PARAMOUNT SCIENCE NOTES

PRIMARY SIX

TERM ONE

TOPIC ONE: CLASSIFICATION OF LIVING THINGS

CLASSIFICATION OF LIVING THINGS

- This is the grouping of living things according to their characteristics and features.

LIVING THINGS

- These are things that have life.

CHARACTERISTICS OF LIVING THINGS

- They feed
- They reproduce
- They excrete
- They respond to their stimuli
- They respire
- They grow
- They move (locomote)
- They breathe

GROWTH

- This is the increase in size of organism

REPRODUCTION

- This is the process by which living things multiply

✓ It prevents extinction of living things

✓ It increases the population of living things

✓ It promotes continuity of life

MOVEMENT

- Living things move to different places for some reasons.
- All locomotions are movements but all movements are not locomotions

Why do animals move (locomote) from one place to another?

- To look for food
- To look for shelter
- To look for mates
- To run away from their enemies (to escape danger)
- To look for their friends
- To look for their young ones

How do animals move from one place to another? (Forms of locomotion)

- By swimming
- By walking
- By flying
- By jumping
- By leaping (hopping)
- By crawling
- By slithering
- By wriggling

EXCRETION

- This is the removal of metabolic waste products from the body.

✓ It prevents body poisoning

RESPIRATION

- This is the oxidation of food (glucose) in the living body cells to produce energy.

✓ Respiration provides energy to the body

Name the two types of respiration

- Aerobic respiration
- Anaerobic respiration

✓ **Aerobic respiration** needs oxygen to occur while **anaerobic respiration** does not need oxygen

SENSITIVITY

- This is the ability of an organism to respond to external stimuli
- A **stimulus** is any change in the environment that causes an organism to react.

✓ Sensitivity enables living things to detect danger

EXAMPLES OF EXTERNAL STIMULI

LIVING THINGS	STIMULI
Plants	▪ Touch ▪ Light ▪ Gravity ▪ Water ▪ Chemicals
Animals	▪ Heat ▪ Pain ▪ Cold ▪ Smell

FEEDING

- This is the act of taking food into the body

Why do living things feed?

- To replace the worn out cells
- To be healthy
- To get energy
- To grow
- To stay alive

NUTRITION

- This is the study of food and how it is used in the body

TYPES OF NUTRITION IN LIVING THINGS

- Autotrophic nutrition: In plants
- Heterotrophic nutrition: In animals and fungi

MODES OF HETEROTROPHIC NUTRITION / FEEDING

- Parasitic e.g in leeches, ticks, lice, mites, tapeworms and hookworms
- Saprophytic e.g in mushrooms, toadstools, yeast, moulds and puffballs
- Holozoic e.g in human beings, dogs and cats

REASONS FOR CLASSIFICATION OF LIVING THINGS (Why do we classify living things?)

- For easy identification
- For easy naming
- For easy study
- For conservation

FEATURES AND CHARACTERISTICS USED TO CLASSIFY LIVING THINGS

- Body symmetry
- Body colour
- Body size
- Body shape
- Body divisions
- Number of legs
- ✓ Form of reproduction
- ✓ Type of respiration
- ✓ Mode of movement
- ✓ Mode of feeding
- ✓ Adaptation to the environment

EXAMPLES OF LIVING THINGS

- Bean plant
- Maize plant
- Orange plant
- Pomegranate plant
- Cow
- Pig
- Goat
- Sheep
- Lion
- Zebra
- Horse
- Donkey
- Hen
- Duck
- Turkey
- Kite
- Hawk
- Owl
- Egret
- Bee

- Butterfly
- Tick
- Mite

KINGDOMS OF LIVING THINGS

- Animal kingdom (Kingdom Animalia)
- Plant kingdom (Kingdom Plantae)
- Kingdom Monera
- Kingdom Protista
- Kingdom Fungi

GROUPS OF LIVING THINGS

- Animals
- Plants
- Monerans / prokaryotes
- Fungi
- Protists

DIFFERENCES BETWEEN PLANTS AND ANIMALS

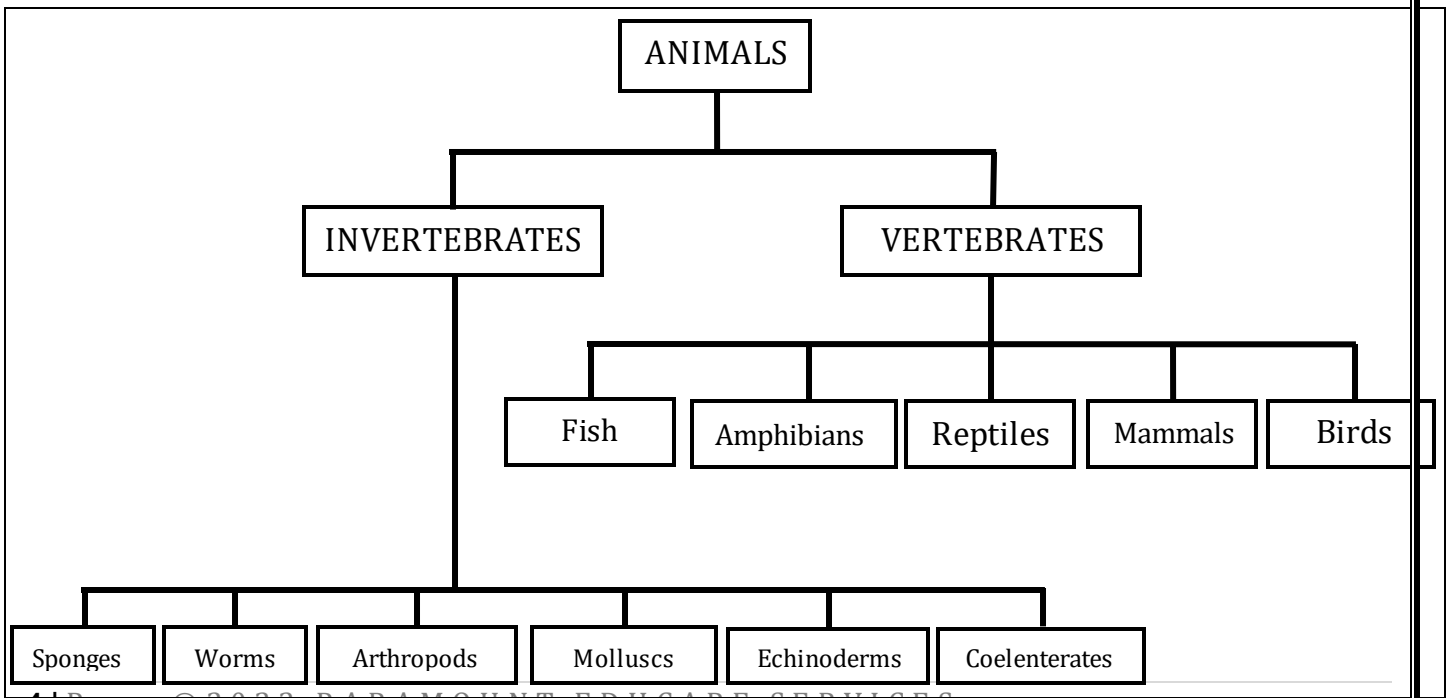
- Plants are autotrophs (make their own food) while animals are heterotrophs (feed on already made food)
- Plants have chlorophyll while animals lack chlorophyll
- Plants lack sense organs while animals have sense organs
- Plant cells have cell walls while animal cells have cell membrane
- Plants respond slowly to stimuli while animals respond quickly to stimuli
- Most plants are fixed in one place while most animals can move from one place to another freely
- Growth in plants occurs throughout life while growth in animals stops before their death.

ANIMALS

- These are multicellular organisms that are mobile, have no chlorophyll and have cells with cell membranes.

✓ A multicellular organism is an organism with many cells

A FLOW CHART SHOWING CLASSIFICATION OF ANIMALS



GROUPS OF ANIMALS

- Vertebrates
- Invertebrates

VERTEBRATES

- These are animals with a backbone (spine or vertebral column)

Importance of a backbone

- It protects the spinal cord

FUNCTIONS OF A SPINAL CORD

- It controls reflex actions
- It connects all nerves to the brain

CHARACTERISTICS OF VERTEBRATES

- They have a backbone
- They have endoskeleton
- They have waterproof skin
- They have alimentary canal
- They have large brain protected by the skull
- Their backbone is made up of many small bones called **vertebrae**
- They have bilateral symmetry
- They have closed circulatory system

GROUPS OF VERTEBRATES

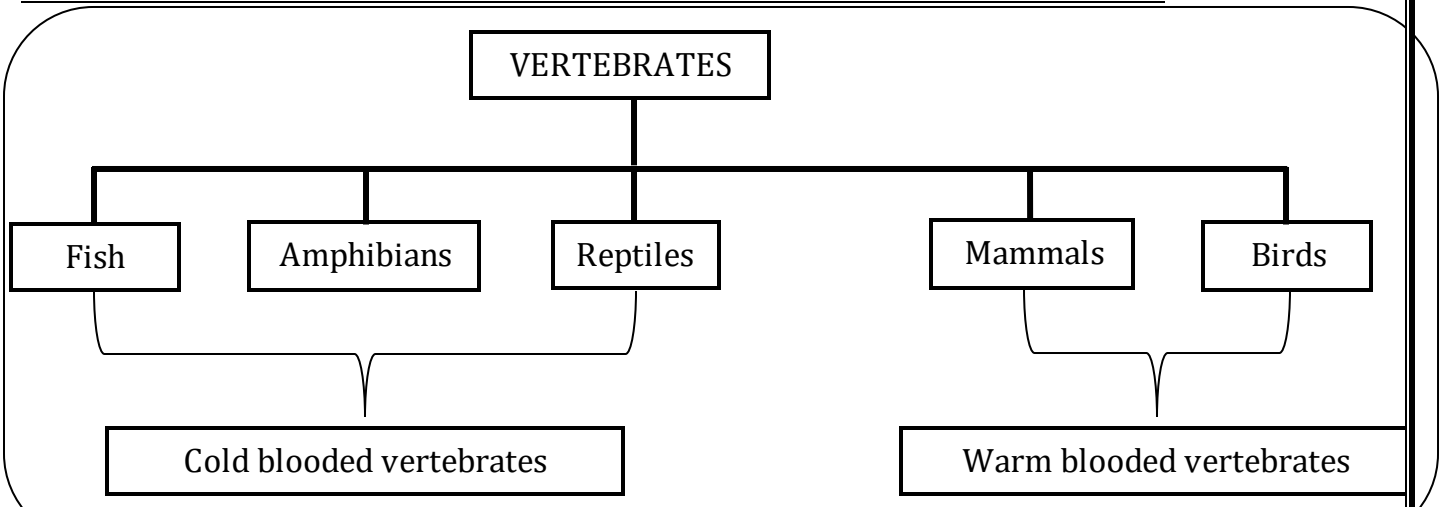
- Fish
- Amphibians
- Reptiles
- Mammals
- Birds



Mention the two main classes of vertebrates

- Warm blooded (homoeothermic or endothermic animals)
- Cold blooded (poikilothermic or ectothermic animals)

A FLOW CHART SHOWING CLASSIFICATION OF VERTEBRATES



WARM-BLOODED VERTEBRATES (HOMEOTERMIC ANIMALS)

- These are animals that maintain a constant body temperature

GROUPS OF WARM-BLOODED VERTEBRATES

- Mammals
- Birds

EXAMPLES OF WARM-BLOODED VERTEBRATES

- Parrot
- Duck
- Emu
- Turkey
- Pigeon
- Goat
- Dog
- Cow
- Cat

COLD-BLOODED VERTEBRATES (POIKILOTHERMIC ANIMALS)

- These are animals whose body temperature changes with the surroundings

GROUPS OF COLD-BLOODED ANIMALS

- Fish
- Reptiles
- Amphibians

EXAMPLES OF COLD-BLOODED VERTEBRATES

- Tilapia
- Mudfish
- Nile perch
- Chameleon
- Gecko
- Common lizard
- Crocodile
- Turtle
- Green snake
- Frog
- Toad
- Newt

BIRDS

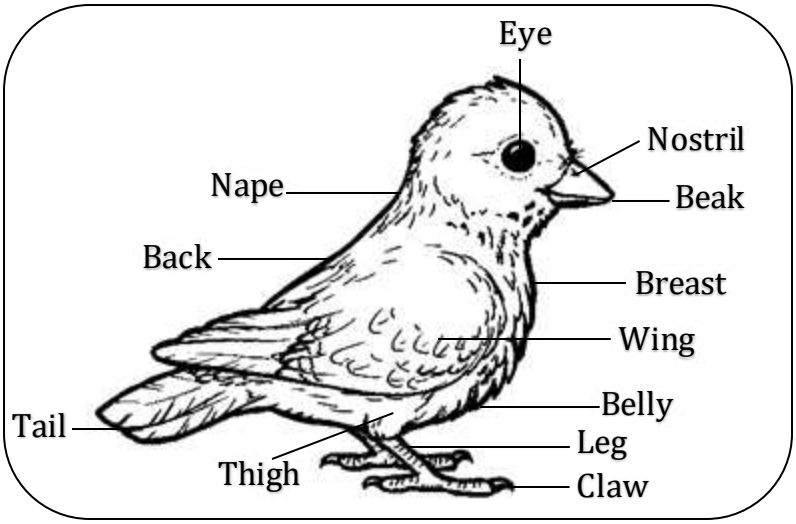
- These are vertebrates with feathers on their bodies

CHARACTERISTICS OF BIRDS

- They have feathers
- They have beaks
- They have wings
- They have streamlined bodies
- They reproduce by laying eggs
- They undergo internal fertilization
- They have scales on their legs
- They are warm blooded animals
- They have a backbone
- They breathe by means of lungs
- They have three eyelids (the lower, upper and nictitating membrane)

- They care for their young

EXTERNAL FEATURES OF A BIRD



PART OF A BIRD	FUNCTION
Eyes	▪ For sight
Beak	▪ For feeding ▪ For protection ▪ For egg turning during incubation
Legs	▪ For walking
Wattle and comb	▪ For temperature regulation
Nostril	▪ For smelling
Wings	▪ For flight
Claws	▪ For protection

ADAPTATIONS OF BIRDS TO FLIGHT

- They have a streamlined body
- ✓ To reduce air resistance/viscosity/friction in air
- They have hollow bones
- ✓ To reduce body weight
- They have many quill (flight)feathers
- ✓ For flight
- They have strong wings
- ✓ To support the bird in air
- ✓ To propel the bird forwards
- They have large pectoral muscles
- ✓ To move the wings
- They have a keel on their breast bone
- ✓ For attachment of pectoral muscles
- They have no pinna that would obstruct wind

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- They have air sacs attached to the lungs
- ✓ To improve gaseous exchange
- They have nictitating membrane on their eyes
- ✓ To protect the eyes from wind
- They have a high metabolic rate
- ✓ To provide the high amount of energy needed
- They have a keen eye sight
- ✓ To judge distances correctly
- They have a quick digestive system

REASONS WHY SOME BIRDS ARE UNABLE TO FLY

- They have heavy bones with bone marrow
- They have weak and small wings
- They have few flight feathers.
- They have no keel on their breast bone

MOULTING IN BIRDS

- This is shedding of old feathers in birds
- Birds moult once each year

Why do birds moult their feathers?

- To grow new feathers

FEATHERS

- These are the outermost covers of the bird's body

USES OF FEATHERS TO A BIRD

- They help a bird to fly (for flight)
- They streamline the bird's body (they give the bird shape)
- They keep the bird's body warm (for warmth)
- They protect the bird's body from injury (for protection against injury)
- They help a male bird to attract mates (for courtship)
- They give the bird colour for identification

USES OF FEATHERS TO PEOPLE

- They are used as costumes
- They are used for decoration
- They are used to make pillows
- They are used to make mattresses

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- They are used as writing materials

TYPES OF FEATHERS

- Quill (flight) feathers
- Covert (body) feathers
- Down feathers
- Filoplume feathers

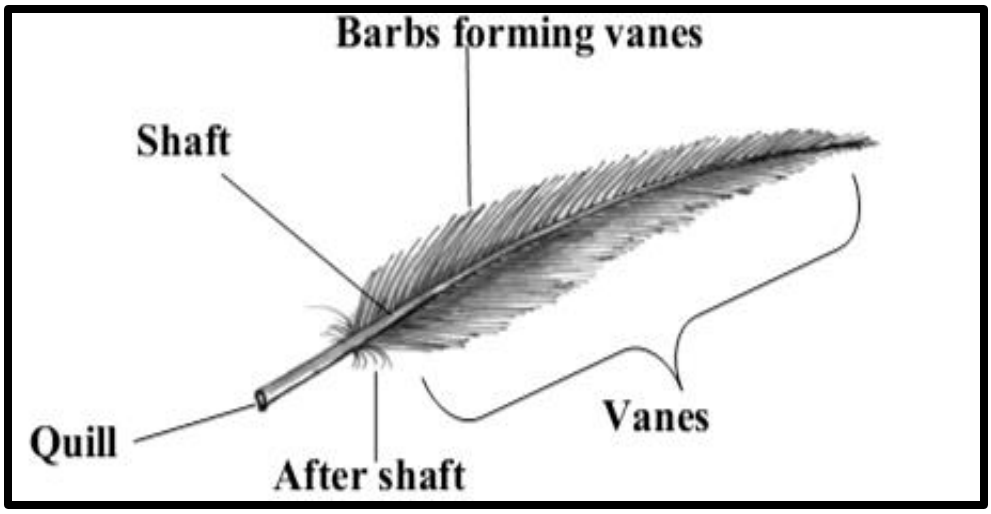
QUILL FEATHERS (FLIGHT FEATHERS)

- They are found on the **wings** and **tail**
- They are divided into **primary** and **secondary feathers**
- Primary feathers are bigger than secondary feathers

Importance of quill feathers

- For flight (they help in flying)

STRUCTURE OF A QUILL FEATHER



Shaft (rachis)

- It holds the vane (it is where the vane is attached)

Vane

- It is the flat expanded part of the feather

Barbs

- They form the vane

Quill (calamus)

- It is the extreme end of the shaft

COVERT FEATHERS (BODY FEATHERS)

- They are found on **the neck** and **bases of wings and tail**
- They cover most of the body
- They are smaller than the quill feathers

Importance of covert feathers

- They insulate the bird's body

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- They streamline the bird's shape (they give the bird shape)

STRUCTURE OF A BODY FEATHER



Why are bird streamlined?

- To overcome viscosity (to reduce air resistance)

What is viscosity (fluid friction)?

- This is the friction in liquids and gases

DOWN FEATHERS

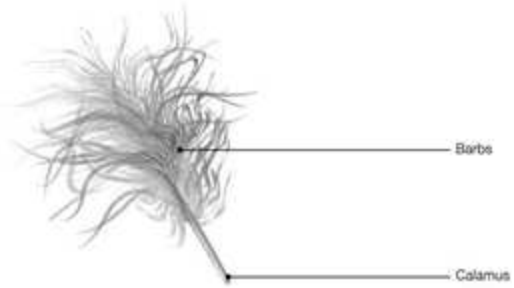
- They are found on the **abdominal region**
- They are the first feathers to appear on a bird
- They have no vane
- They have loose barbs

Importance of down feathers

- They insulate the bird's body

STRUCTURE OF A DOWN FEATHER





FILOPLUME FEATHERS

- These are the feathers that remain when a bird has been plucked
- They are found nearest to the skin between the covert feathers
- They are the tiniest (smallest) feathers
- They have no quill

A DRAWING OF A FILOPLUME FEATHER

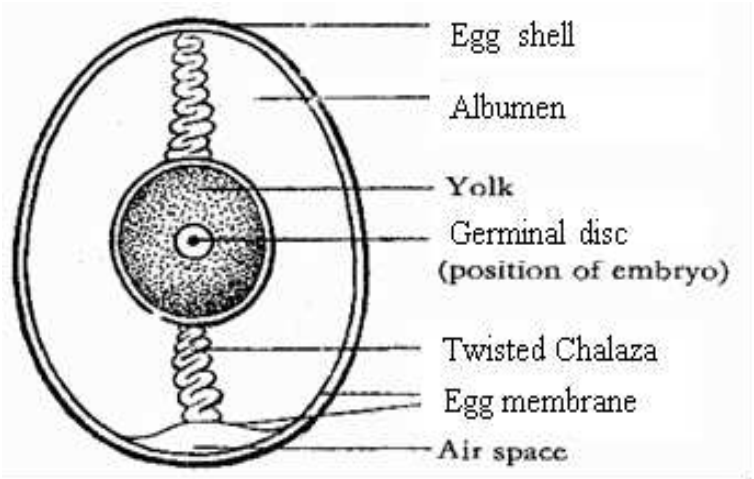




REPRODUCTION IN BIRDS

- They reproduce by laying eggs (they are oviparous)
- Their eggs are fertilized internally
- Birds undergo **internal fertilization**
- Fertilization in birds occurs in the **oviducts**

STRUCTURE OF A FERTILIZED EGG OF A BIRD



FUNCTIONS OF EACH PART OF A FERTILIZED BIRD'S EGG

EGG SHELL

- It protects the inner parts of an egg
- It allows exchange of gases

Why is the egg shell porous?

- To allow gaseous exchange

How is the egg shell adapted to gaseous exchange?

- It is porous

How is the egg shell adapted to protection of the inner parts of an egg?

- It is hard

Why should layers be given mash (feeds) rich in calcium?

- To lay hard shelled eggs

Why should layers be given mash (feeds) rich in calcium?

- To lay hard shelled eggs

SHELL MEMBRANE

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- It prevents an egg from drying up

AIR SPACE

- It keeps oxygen for the embryo
- It supplies oxygen to the embryo

EGG YOLK

- It provides fats and proteins to the embryo

ALBUMEN (EGG WHITE)

- It provides water and proteins to the embryo

CHALAZA

- It holds the yolk and embryo in position
- It is the passage of oxygen to the embryo
- It is the passage of wastes from the embryo

GERMINAL DISC

- ✓ It is found in unfertilized egg
- It develops into an embryo after fertilization

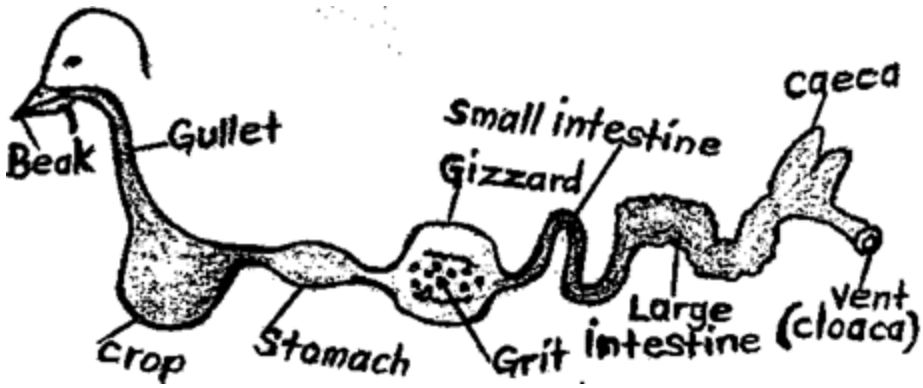
EMBRYO

- ✓ It is found in a fertilized egg
- It develops into a young bird

FEEDING IN BIRDS

- Birds have no teeth
- They have horny beaks (bills)
- The shapes of beaks indicates the bird's general diet

DIGESTIVE SYSTEM OF A BIRD (HEN)



FUNCTIONS OF EACH PART OF THE DIGESTIVE SYSTEM OF A BIRD

BEAK (BILL)

- It picks food

GULLET (OESOPHAGUS)

- It passes food to the crop

CROP

- It stores food for a short time (for temporary storage of food)
- It moistens and softens food
- It produces crop milk to feed the chicks e.g. in pigeons

Things that happen to food while in the crop of the bird

- Food is moistened
- Food is softened

Examples of birds that do not have a crop

- Owl
- Goose
- Button quail

Why does a goose have no crop on its alimentary canal?

- It eats little food at a time

TRUE STOMACH (PROVENTRICULUS)

- It is where food is mixed with digestive juices
- It secretes digestive enzymes that begin the digestion of proteins

GIZZARD

- It crushes (grinds) food

How is the gizzard adapted to its function?

- It has grit (small stones) that grind food

How is the gizzard able to withstand the grit?

- It has thick (muscular) walls

Which part of the human digestive system perform the same function as the gizzard of a bird?

- Teeth

Grit

- ✓ These are small stones found in the gizzard
- They crush food into small particles

SMALL INTESTINES (ILEUM)

- It is where food digestion ends
- It is where food absorption occurs (it absorbs digested food)

Main processes that take place in small intestines

- Food absorption
- Food digestion

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LARGE INTESTINES

- It is where water absorption occurs (it absorbs water)

CAECUM

- It stores undigested food for a short time

VENT (CLOACA)

- It passes out droppings

FACTORS CONSIDERED WHEN GROUPING BIRDS

- Way of feeding
- Type of beak
- Type of foot
- Type of food they eat
- Way of movement

GROUPS OF BIRDS

- Birds of prey (preying birds/raptors)
- Perching birds
- Scratching birds
- Swimming birds
- Wading birds
- Flightless (walking) birds
- Climbing birds
- Scavenger birds

BIRDS OF PREY (RAPTORS)

- These are birds that hunt and kill their prey

✓ **A prey** is an organism which is eaten by another organism

CHARACTERISTICS OF PREYING BIRDS

- They have strong sharp hooked beaks

✓ For tearing their prey (flesh)

- They have strong sharp curved claws or talons

✓ For gripping and killing their prey

- They have strong eye sight

✓ To spot their prey from long distances

EXAMPLES OF PREYING BIRDS

- Hawks
- Eagles
- Secretary birds
- Owls
- Kites
- Falcons
- Osprey
- Buzzard
- Harrier

✓ **An eagle** is termed as the king of all birds.

AN OWL

- It is a nocturnal bird of prey
- It has no crop

Why is an owl able to see at night?

- It has more rod cells than cone cells in its eyes

FOOD FOR PREYING BIRDS (RAPTORS)

- Rats
- Mice
- Chicks
- Fish
- Geckos
- Smaller birds

DIAGRAM SHOWING BEAK AND FOOT OF A PREYING BIRD



How are birds of prey (raptors) dangerous to poultry farmers?

- They eat chicks (they kill poultry)

SCAVENGER BIRDS

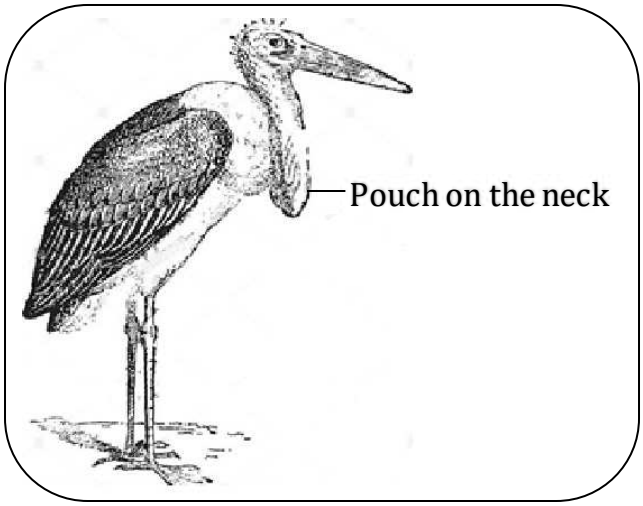
- These are birds that feed on carrion (leftover meat/carcasses/abandoned meat)

EXAMPLES OF SCAVENGERS

- Vulture (condor)
- Crows
- Marabou stork

✓ A marabou stork has long pointed heavy beak and long legs

A DRAWING SHOWING A MARABOU STORK



Of what importance is the pouch on the neck of a marabou stork?

- It is used during courtship

How are scavenger birds important in the environment?

- They clean the environment by eating carrion (rotten meat)

How do scavengers clean the environment?

- By feeding on carrion (dead animals)

PLACES WHERE SCAVENGER BIRDS ARE COMMONLY FOUND

- Dustbins
- Abattoirs
- Rubbish heaps

Explain the meaning of the term carrion

- This is the dead decaying meat

Name one scavenging bird of prey

- Vulture

CLIMBING BIRDS

- These are birds that climb trees.

EXAMPLES OF CLIMBING BIRDS

- Parrot
- Woodpecker

Why does a woodpecker peck trees?

- To make nesting sites
- To look for food (insects)

Why does a woodpecker drum on trees?

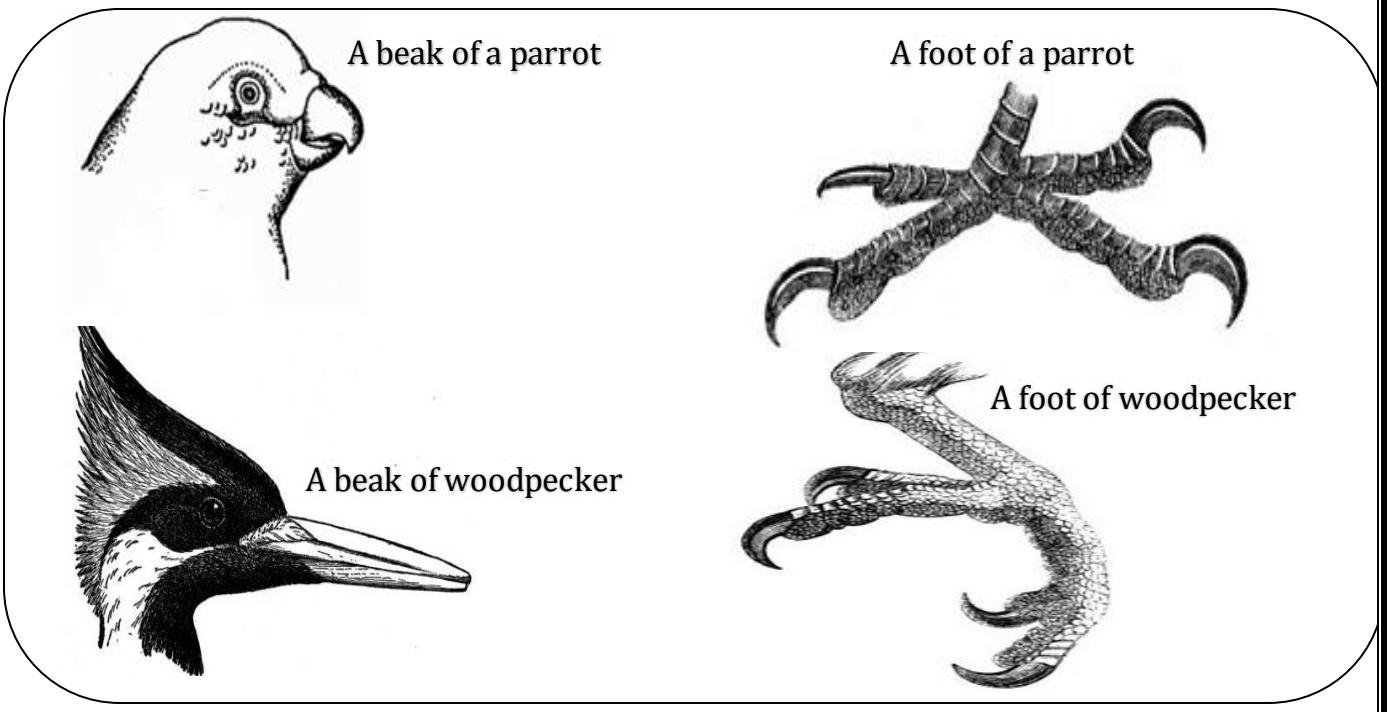
- To attract mates
- To chase away predators
- To communicate to other woodpeckers

CHARACTERISTICS OF CLIMBING BIRDS

- They have two toes facing forward and two backward
- ✓ For climbing trees
- They have long stiff tails
- ✓ For support when climbing upwards
- They have long toes with claws
- ✓ For holding trees
- A parrot has strong short hooked beak
- ✓ For cracking hard seeds (nuts)
- ✓ For climbing trees

- A parrot has a small space between the upper and lower beak
- ✓ To hold seeds
- A woodpecker has chisel-shaped beak
- ✓ For making holes in trees (for pecking wood)
- They live in trees

DIAGRAMS SHOWING BEAKS AND FEET OF CLIMBING BIRDS



FOOD FOR CLIMBING BIRDS

- Insects
- Seeds

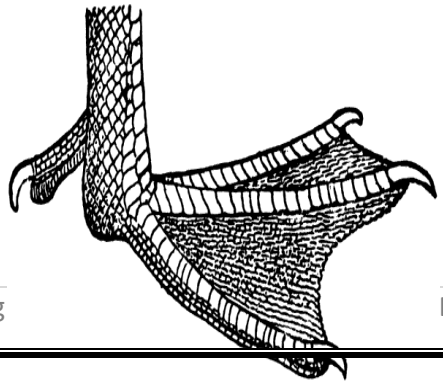
SWIMMING BIRDS

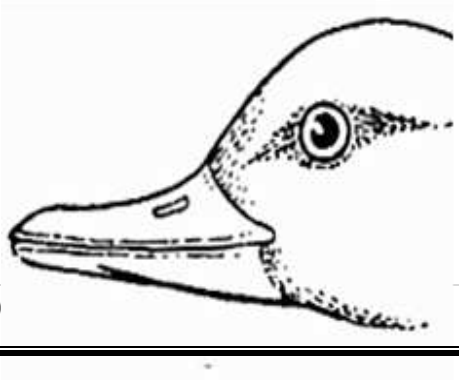
- These are birds that have fully webbed feet for swimming in water.

EXAMPLES OF SWIMMING BIRDS

- Ducks
- Swans
- Geese
- Penguins
- Seagulls
- Pelicans
- Cormorant

STRUCTURE OF A FOOT AND BEAK OF A SWIMMING BIRD





CHARACTERISTICS OF SWIMMING BIRDS

- They have fully webbed feet
- ✓ For swimming (paddling in water)
- They have broad breastbone.
- They have many oil glands in their skins
- ✓ To produce oil that protects the bird from cold water.
- ✓ To produce oil that makes the feathers waterproof
- They have a spoon shaped beak (have a beak with small cross plates on the margins)
- ✓ To strain (sieve) food from water

FOOD FOR SWIMMING BIRDS

- Tadpoles
- Worms
- Pond weeds
- Insects
- Small fish

WADING BIRDS.

- These are birds that can walk through water
- ✓ These birds live near water bodies to get food easily

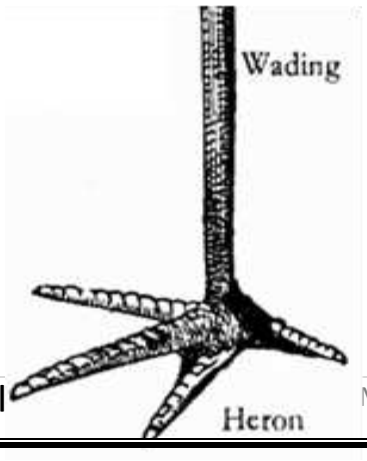
EXAMPLES OF WADING BIRDS

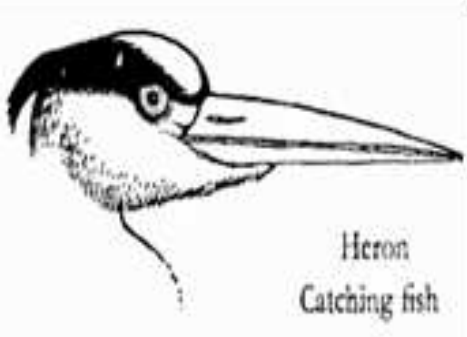
- Heron
- Flamingo
- Crested crane (crane)
- Marabou stork (stork)
- Sandpiper
- Ibis
- Egret
- Kingfisher
- Plover
- Jacana
- Spoonbill

How are white egrets important to cattle farmers?

- They eat up ticks on their cattle

STRUCTURE OF A BEAK AND FOOT OF HERON





CHARACTERISTICS OF WADING BIRDS

- They have long flexible necks
- ✓ To reach food below water surface
- They have thin long legs with half webbed feet
- ✓ To prevent the bird from sinking in water
- They have thin long beaks
- ✓ To catch food in water

How are the thin long legs with half webbed widely spread toes useful to a wading bird?

- They prevent the bird from sinking in water

FOOD FOR WADING BIRDS

- Fish
- Frogs
- Worms

FLIGHTLESS BIRDS (WALKING BIRDS)

- These are birds that cannot fly

EXAMPLES OF FLIGHTLESS BIRDS

- Kiwi
- Ostrich
- Emu
- Rhea

Ratites

- Cassowary
- ✓ Penguin

CHARACTERISTICS OF FLIGHTLESS BIRDS

- They have small weak wings.
- They have heavy bones with bone marrows
- They run very fast

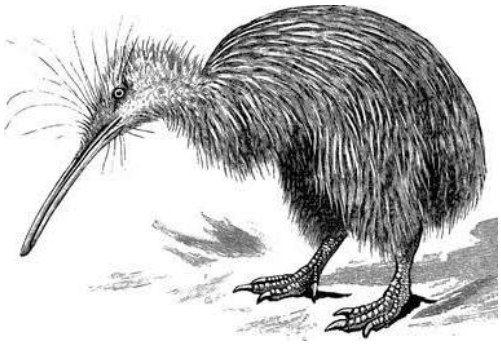
FOOD FOR FLIGHTLESS BIRDS

- Worms
- Insects
- Small animals

KIWI

- It is the only bird with a nostril at the end of its beak

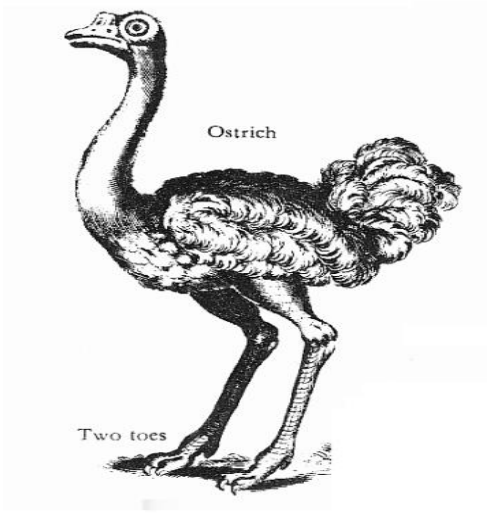
AN ILLUSTRATION SHOWING A KIWI



OSTRICH

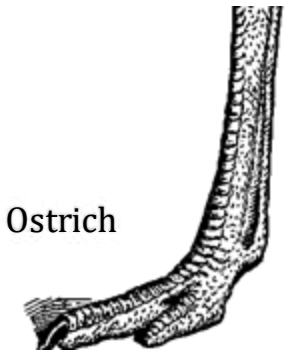
- It is the largest and fastest flightless bird.
- It can run faster than most **horses**.
- It can run at an average speed of 45 miles per hour
- It is the only bird with two toes on each foot

A DIAGRAM SHOWING AN OSTRICH



DRAWINGS SHOWING FEET OF FLIGHTLESS BIRDS





How do some flightless birds (ostrich, emu and cassowary) protect themselves?

- By kicking with their strong huge legs

Give a reason why some domestic fowls are unable to fly high

- They have heavy bones with bone marrow

Why is penguin not regarded as a ratite yet it is a flightless bird?

- It lacks a flat breast bone
- It lacks a bony palate
- It has well developed chest muscles and sternum

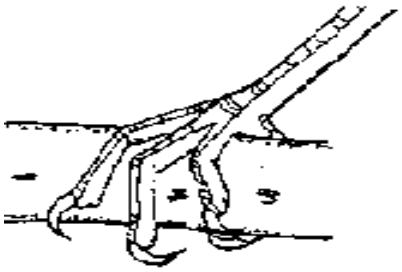
PERCHING BIRDS (SONG BIRDS/PASSERINES)

- These are birds that can roost (rest) on branches of trees.
- ✓ **A perch** is a piece of wood on which a bird sleeps (rests)

CHARACTERISTICS OF PERCHING BIRDS

- They have split feet and walking legs.
- They have three toes pointing forwards and one pointing backward
- ✓ For gripping the perches
- They have strong toes to grip on the trees.

A DRAWING SHOWING FOOT OF PERCHING BIRDS



GROUPS OF PERCHING BIRDS

- ✓ Perching birds are grouped according to their feeding habits
- Seed eaters
- Nectar suckers
- Insect eaters
- Fruit eaters

1. INSECT EATERS

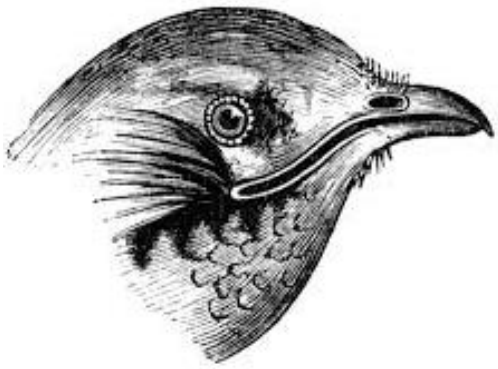
- These are perching birds that feed on insects.
- They have short narrow beaks;
- ✓ For picking up insects from tree barks

Examples of insect eaters

- Swifts
- Shrikes

- Swallows
- Nightjars
- Sparrows
- Robins
- Woodcreepers
- Bee-eaters

A DRAWING SHOWING A BEAK OF INSECT EATERS (E.G SWIFT)



Why do swifts and swallows have short and wide open beaks?

- To catch insects while flying

Why shrikes are sometimes called butcher birds?

- They spear insects on thorns to eat it later

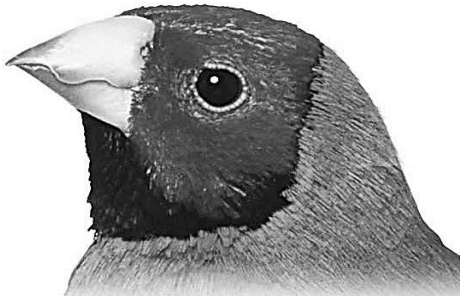
2. SEED EATERS

- These are perching birds that feed on seeds.
- They have strong short conical beaks;
  - ✓ For breaking up seeds

EXAMPLES OF SEED EATERS

- Pigeon
- Dove
- Weaverbird
- Finch

A DRAWING SHOWING A BEAK OF A SEED EATER (E.G DOVE)



3. NECTAR SUCKERS (HONEY EATERS)

- These are perching birds that feed on nectar from flowers.
- They have long slender curved beaks;
- ✓ For sucking nectar from flowers

EXAMPLES OF NECTAR SUCKERS

- Sunbird
- Hummingbird

DIAGRAMS SHOWING A BEAK AND FOOT OF A SUNBIRD



4. FRUIT EATERS (FRUGIVORES)

- These are perching birds that feed on fruits from trees.
- They have long down curved beaks;
- ✓ For collecting fruits from trees

EXAMPLES OF FRUIT EATER

- Hornbill
- Toucan

A DRAWING SHOWING A BEAK OF HORNBILL



Importance of fruit eating birds

- They help in fruit and seed dispersal

Disadvantage of fruit eating birds

- They are crop pests

SCRATCHING BIRDS

- These are birds which scratch the ground for food.

CHARACTERISTICS OF SCRATCHING BIRDS

- They have strong feet with blunt claws.
- ✓ For scratching
- They have strong short pointed beaks
- ✓ For picking up food from soil

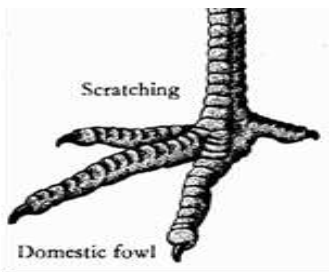
EXAMPLES OF SCRATCHING BIRDS

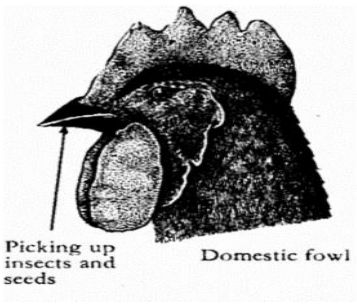
- Chickens
- Turkeys
- Guinea fowls
- Pheasants
- Crested francolin

FOOD FOR SCRATCHING BIRDS

- Seeds
- Insects

Structure of the beak and foot scratching bird





IMPORTANCE OF BIRDS IN THE ENVIRONMENT

- Some birds are a source of meat
- Some birds are a source of eggs
- Some birds are a source of income when sold
- Some birds attract tourists e.g flamingo birds and ostriches
- Some birds pollinate flowers e.g sunbirds and hummingbirds
- Some birds help in seed dispersal
- Some birds are used as dowry
- Some birds are used as sacrifices
- Some birds help to clean the environment by feeding on rotten meat (carrion)
- Their droppings are used as manure
- Their bones are used for making glue
- Their feathers are used for decoration
- Their feathers are used to make costumes

DISADVANTAGES (DANGERS) OF BIRDS

- Some birds are crop pests e.g weaverbirds
- Some birds cause airplane accidents. (They lead to bad strikes)
- Some birds make a lot of noise e.g weaverbirds.
- Some birds hide parasite e.g fleas and mites
- Birds of prey kill poultry

MAMMALS

- These are animals with mammary glands

MAIN /UNIQUE CHARACTERISTICS OF MAMMALS

- They have mammary glands
- They have hair (fur) on their bodies
- They have ossicles (they have three middle ear bones)
- They have sweat glands

OTHER CHARACTERISTICS OF MAMMALS

- They are warm blooded
- They breathe by means of lungs
- They have backbone
- They undergo internal fertilization
- They care for their young
- They have four chambered heart
- Most mammals give birth to live young ones (most of them are viviparous)

- Most mammals have well developed pinnae (ear lobe)

State the importance of mammary glands to female mammals

- To produce milk for feeding their young

IMPORTANCE OF BODY HAIR/FUR ON MAMMALS

- It keeps the body warm (for temperature regulation)
- It protects the body from injury
- For sensing

MAIN GROUPS / CLASSES OF MAMMALS

- Pouched mammals (marsupials)
- Egg laying mammals (monotremes)
- Placental mammals

1. **POUCHED MAMMALS**
   - These are mammals that give birth to immature young and care for them inside their pouch

2. **MONOTREMES**
   - These are mammals that reproduce by laying eggs

3. **PLACENTAL MAMMALS**
   - These are mammals that give birth to fully grown young

GROUPS OF PLACENTAL MAMMALS

- Primates (fingered mammals)
- Ungulates (hoofed mammals)
- Carnivorous mammals (flesh eating mammals)
- Gnawing mammals (rodents and lagomorphs)
- Insectivorous(insect eating mammals)
- Flying mammals (chiroptera)
- Sea mammals (cetaceans and sirenians)

PRIMATES (FINGERED MAMMALS)

- These are mammals with well-developed brain

Why are primates regarded as the most advanced group of mammals?

- They have well developed brain

CHARACTERISTICS OF PRIMATES

- They have a well-developed brain
- They have 5 fingers on each hand and 5 toes on each foot.
- They are omnivores
- They have forward facing eyes
- They have four types of teeth (incisors, canines, premolars and molars)
- They have four limbs
- ✓ Fore limbs for holding and hind limbs for walking.

Why are mammals called omnivores?

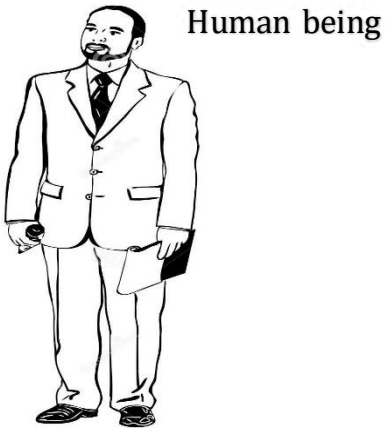
- They feed on both meat and vegetation

EXAMPLES OF PRIMATES

- Human being
- Chimpanzee (bonobo)
- Gorilla
- Orangutan

Apes

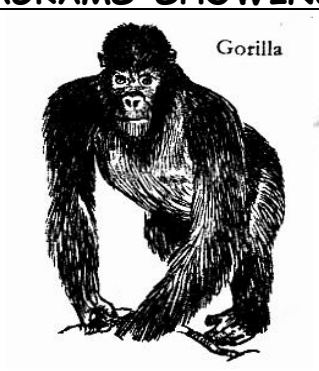
- Gibbons
- ✓ Monkey
- ✓ Baboon
- ✓ Bushbaby



What are apes?

- These are primates with no tails

DIAGRAMS SHOWING SOME PRIMATES









Gorilla Orangutan Monkey Bushbaby

EGG LAYING MAMMALS (MONOTREMES)

- These are mammals that lay eggs

- ✓ They lay 1 to 3 eggs
- ✓ Monotremes have characteristics of birds, mammals and reptiles

REASONS WHY MONOTREMES ARE THE MOST PRIMITIVE IN THE CLASS OF MAMMALS

- They lay eggs
- They have only one opening (cloaca) for reproduction and excretion
- They feed using a beak (bill)

Why are monotremes regarded as mammals?

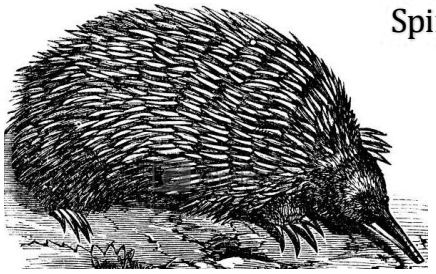
- They have hair on their bodies
- They have mammary glands (they produce milk for their young ones)
- They care for their young after hatching

EXAMPLES OF EGG LAYING MAMMALS (MONOTREMES)

- Duck billed platypus
- Spiny anteater (echidna)

DIAGRAMS SHOWING MONOTREMES

Spiny anteater



Duck billed platypus



How do monotremes locate their food?

- By electroreception

UNGULATES (HOOFED MAMMALS)

- These are mammals with hooves
- ✓ All ungulates are herbivores (feed on vegetation)

GROUPS OF UNGULATES

- Odd toed ungulates
- Even toed ungulates

1. ODD TOED UNGULATES

- These are ungulates with one or three toes on each foot

EXAMPLES OF ODD TOED UNGULATES

- Horse
- Donkey
- Zebra

} One toe on each foot

- ✓ Elephant: has 5 toes on each foot
- ✓ Rhino: has 3 toes on each foot

DRAWINGS SHOWING TOES OF ODD TOED UNGULATES

Horse

Rhino





2. EVEN TOED UNGULATES

- These are ungulates with two toes on each foot

EXAMPLES OF EVEN TOED UNGULATES

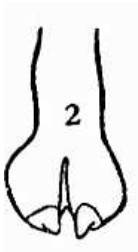
- Cattle
- Goat
- Sheep
- Antelope
- Giraffe
- Camel
- Okapis
- Deer
- Elk
- ✓ Pig
- ✓ Warthog
- ✓ Hippo

DRAWINGS SHOWING TOES OF EVEN TOED UNGULATES

Camel



Cow



SUBGROUPS OF EVEN TOED UNGULATES

- Ruminants
- Nonruminants

i) RUMINANT ANIMALS

- These are animals that chew cud
- ✓ They have four stomach chambers

EXAMPLES OF RUMINANT ANIMALS

- Cattle
- Goat
- Sheep
- Giraffe
- Camel
- Deer
- Antelope
- Elk

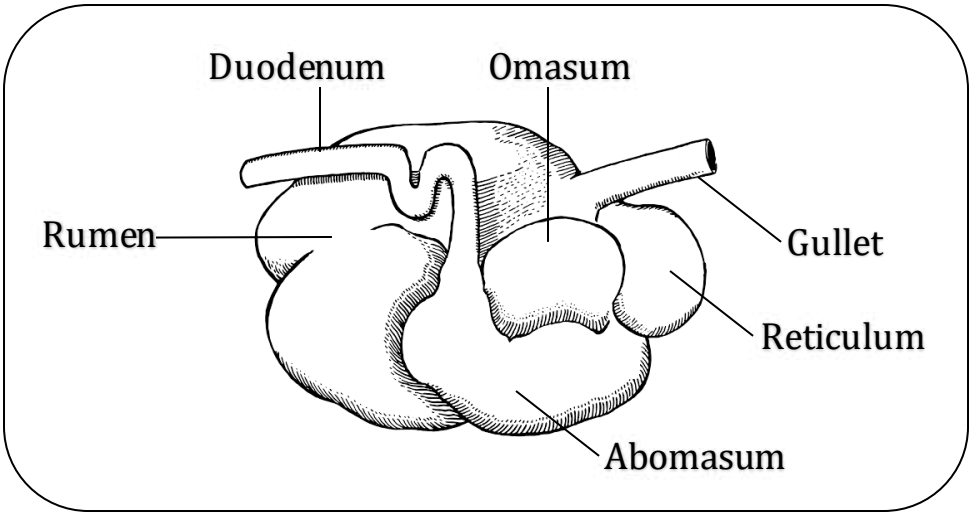
How do most ruminants protect themselves?

- By using their horns

Name the four stomach chambers of ruminant animals

1. Rumen
2. Reticulum
3. Omasum
4. Abomasum

A DIAGRAM SHOWING THE FOUR STOMACH CHAMBERS OF RUMINANTS



GULLET (OESOPHAGUS)

- It passes food to the rumen

RUMEN

- ✓ It is the first and largest stomach chamber
- It stores food for a short time before rumination
- It ferments and softens food

RETICULUM

- ✓ It is the second stomach chamber
- It retains foreign bodies

OMASUM

- ✓ It is the third stomach chamber
- It absorbs water

ABOMASUM (TRUE STOMACH)

- ✓ It is the fourth stomach chamber
- It mixes food with digestive enzymes

ii) NONRUMINANT ANIMALS

- These are animals that do not chew cud

✓ Nonruminants have **well developed canines for protection**

EXAMPLES OF NONRUMINANT ANIMALS

- Pig
- Hippo (hippopotamus)
- Warthog

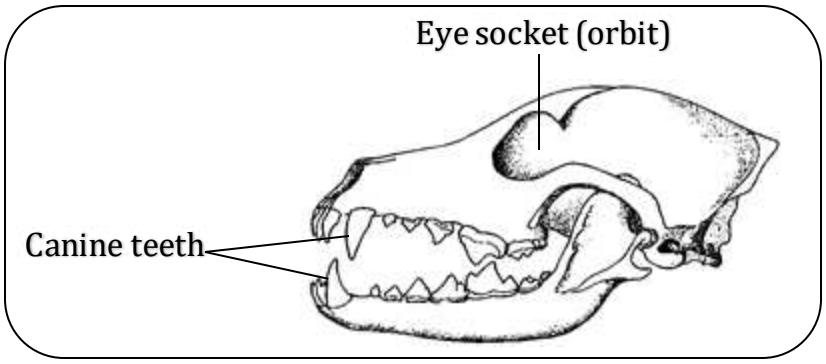
CARNIVOROUS MAMMALS (FLESH EATING MAMMALS)

- These are mammals that feed on flesh/meat

CHARACTERISTICS OF CARNIVOROUS ANIMALS / ADAPTATIONS OF CARNIVOROUS MAMMALS TO HUNTING

- They have well developed canines
- ✓ For tearing flesh (prey)
- They have strong sharp claws
- ✓ For gripping and killing their prey
- They have very good speed
- They have good sense of smell, vision and hearing
- They have soft pads in their feet
- ✓ To run after their prey silently
- They are strong animals

A DIAGRAM SHOWING THE SKULL OF A DOG



FAMILIES (SUBGROUPS) OF CARNIVOROUS MAMMALS

- Dog family
- Cat family

a) DOG FAMILY

- These are dog-like carnivorous mammals

EXAMPLES OF CARNIVOROUS MAMMALS UNDER THE DOG FAMILY

- Domestic dog
- Fox

- Jackal
- Wolf

b) CAT FAMILY

- These are cat-like carnivorous mammals
- ✓ They have retractile claws

Examples of carnivorous mammals under cat family

- Domestic cat
- Cheetah
- Lion
- Leopard
- Tiger
- Jaguar
- Mongoose
- ✓ Hyena
- Civet
- Puma/cougar/panther
- Lynx

Cheetahs can run as fast as 70 miles per hour (120kph)

DRAWINGS OF DOMESTIC DOG AND CAT





NOTE

- Most carnivorous mammals are **predators**
- **Predators** are animals that hunt and kill their prey
- Some carnivorous mammals are **scavengers**
- **Scavengers** are animals that feed on **carrion** (abandoned meat)

EXAMPLES OF SCAVENGER MAMMALS

- Jackal

- Hyena
- Fox

IMPORTANCE OF CARNIVOROUS MAMMALS TO MAN

- Domestic dogs are used for hunting
- Domestic dogs are used for protection at home
- Domestic cats are used to kill rats at home
- Civets produce musk used in perfumes

GNAWING MAMMALS

- These are mammals with well-developed incisors for chewing rapidly

CHARACTERISTICS OF GNAWING MAMMALS

- They have well developed incisors.
- They lack canines.

GROUPS OF GNAWING MAMMALS

- Rodents
- Lagomorphs

Of what importance is gnawing (chewing rapidly) to rodents and lagomorphs

- It helps to keep their incisors short

RODENTS

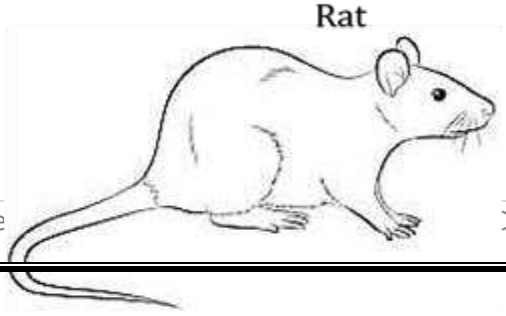
- These are gnawing mammals with one pair of upper incisors

EXAMPLES OF RODENTS

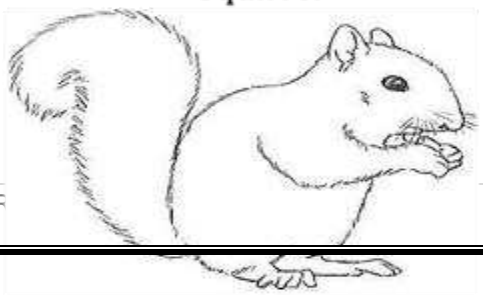
- Rat
- Squirrel
- Mouse
- Mole
- Porcupine
- Guinea pig
- Beavers
- Marmot
- Chipmunks
- Prairie dog
- Voles
- Lemming
- Muskrat
- Hamster

DRAWINGS SHOWING RODENTS (RAT AND SQUIRREL)

Rat



Squirrel



CHARACTERISTICS OF RODENTS

- They have one pair of upper incisors
- They are omnivores
- They have long tails

LAGOMORPHS

- These are gnawing mammals with two pairs of upper incisors

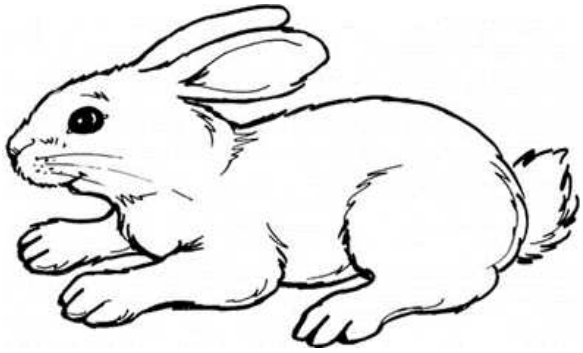
CHARACTERISTICS OF LAGOMORPHS

- They have two pairs of upper incisors
- They are herbivores
- They have short tails (rudimentary)

EXAMPLES OF LAGOMORPHS

- Rabbits
- Hares
- Pikas

A drawing showing a lagomorph (rabbit)



SIMILARITIES BETWEEN LAGOMORPHS AND RODENTS.

- Both have well developed incisors
- Both have no canines
- Both chew rapidly

DIFFERENCES BETWEEN LAGOMORPHS AND RODENTS.

- Lagomorphs have two pairs of upper incisors while rodents have one pair of upper incisors
- Lagomorphs are herbivores while rodents are omnivores
- Lagomorphs have short tails while rodents have long tails

INSECT EATING MAMMALS (INSECTIVORES)

- These are mammals which feed on insects.

CHARACTERISTICS OF INSECT EATING MAMMALS

- They have good sense of smell
- They are nocturnal (they are active at night)
- They live in burrows or trees
- They have sharp claws for digging out insects from soil
- They have long sensitive snouts
- They have abnormal appetite for food

EXAMPLES OF INSECT EATING MAMMALS

- Hedgehog
- Elephant shrew
- Aardvark
- Aardwolf
- Golden mole
- Solenodon

A DRAWING OF A HEDGEHOG



How does a hedgehog protect itself?

- It rolls up itself into a spiny ball

FLYING MAMMALS (CHIROPTERA)

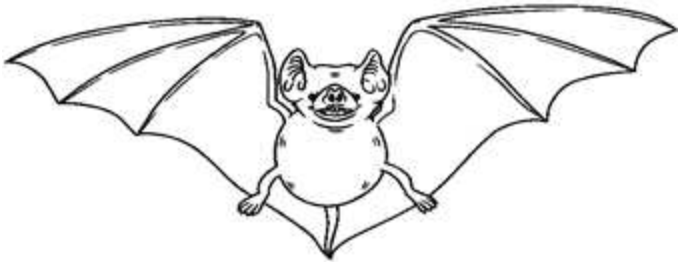
- These are mammals that can fly

AN EXAMPLE OF A FLYING MAMMAL.

- **Bats**

✓ **A bat** is the only true flying mammal

A DRAWING SHOWING A BAT



How is a bat adapted to flight?

- Its forelimbs are modified into wings for flight (it has webbed wings for flight)

Why are bats called nocturnal animals?

- They are active at night (they hunt at night)

Bats are blind, how are they able to locate food at night?

- They use echoes

How are echoes useful to bats?

- They help bats to find food at night
- They help bats to find their way at night (to dodge obstacles at night)

GROUPS (TYPES) OF BATS

- Insectivorous bats (insect eating bats): They feed on insects.
- Frugivorous bats (fruit bats): They feed on fruits.
- Blood-sucking bats (vampire bats): They feed on blood.

IMPORTANCE OF BATS IN THE ENVIRONMENT

- They feed on insect vectors e.g mosquitoes
- They feed on insect pests
- They help in pollination
- They help in seed dispersal
- Their guano is used as fertilizers

DANGERS OF BATS

- They hide parasites e.g fleas
- Infected bats are disease vectors (they spread histoplasmosis)
- They make a lot of noise
- Their dung causes bad smell in houses
- Vampire bats bite farm animals
- Some bats destroy fruits on crops
- Vampire bats suck blood from farm animals e.g cattle

WAYS OF PROTECTING BANANA CROPS AGAINST FRUIT EATING BATS.

- By early harvesting
- By using net traps
- By using plastic banana bunch bags

POUCHED MAMMALS (MARSUPIALS)

- These are mammals with a pouch (marsupium) to carry their young.
- A young marsupial is **called** joey.

EXAMPLES OF POUCHED MAMMALS (MARSUPIALS)

- Kangaroo
- Koala
- Wallaby
- Opossum
- Wombat
- Numbat
- Quokka
- Phalanger
- Dasyure
- Tasmanian devil
- Bandicoot

✓ They are most common in **Australia** and some few in **America**

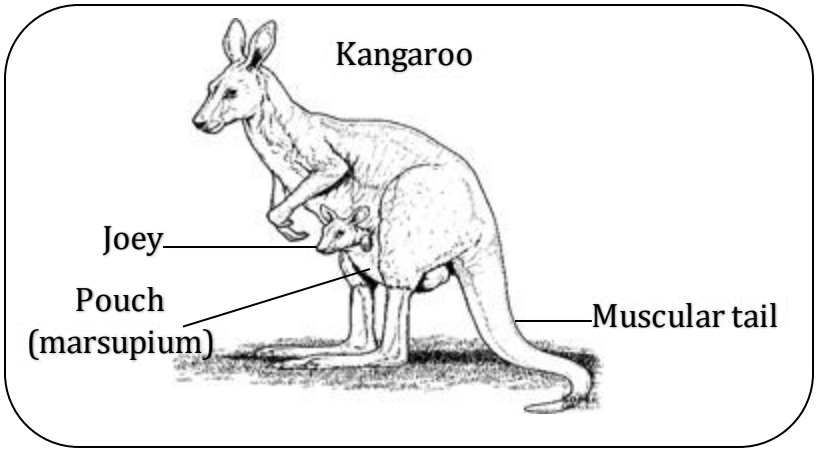
Why does a kangaroo carry its joey in a pouch?

- To feed its immature young (joey)

How are marsupials different from other mammals?

- They feed their immature young inside a pouch unlike other mammals

A DIAGRAM SHOWING A KANGAROO



IMPORTANCE OF EACH BODY PART OF A KANGAROO

Long muscular tail

- To maintain body balance when standing

Pouch (marsupium)

- To carry its young (joey)

MARINE MAMMALS

- These are mammals that live in seas

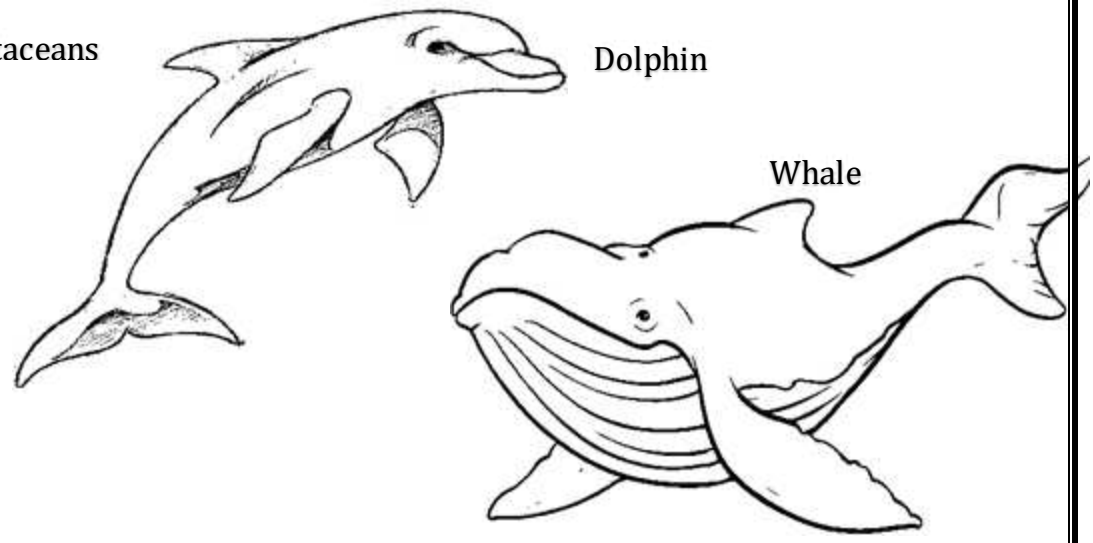
✓ They are also called **sea mammals** or **aquatic mammals**

CHARACTERISTICS OF MARINE MAMMALS

- They have blubber
- They have streamlined bodies
- They have flippers for swimming
- They have well developed brain next to primates

EXAMPLES OF SEA MAMMALS (MARINE MAMMALS)

- Whale } Cetaceans
- Porpoise }
- Dolphin
- ❖ Dugong
- ❖ Manatee
- Seal
- Sea lion
- Walrus
- Sea otter



✓ **A blue whale** is the largest known living mammal.

How do sea mammals breathe?

- By means of lungs

BLUBBER

- This is a fatty layer under the skin of sea mammals
- ✓ It keeps sea mammals warm in water

How is blubber useful to sea mammals?

- It keeps the sea mammal warm in cold water

How does blubber keep the sea mammals warm in water?

- It prevents heat loss

How is a sea mammal able to survive in cold seawater?

- It has blubber

IMPORTANCE OF MAMMALS

- Some mammals are a source of food
- Some mammals are used for transport e.g horses
- Some mammals provide animal labour
- Some mammals attract tourists
- Some mammals guard our homes e.g dogs
- Some mammals are sold for money
- Some mammals provide skins to leather industries
- Some mammals eat disease vectors e.g bats
- Their wastes are used to make biogas and farmyard manure

DISADVANTAGES OF MAMMALS

- Some mammals are crop pests.
- Some mammals kill people.
- Some mammals are disease vectors e.g rabid dogs.

AMPHIBIANS

- These are cold blooded vertebrates that start their lives in water and later live on land.

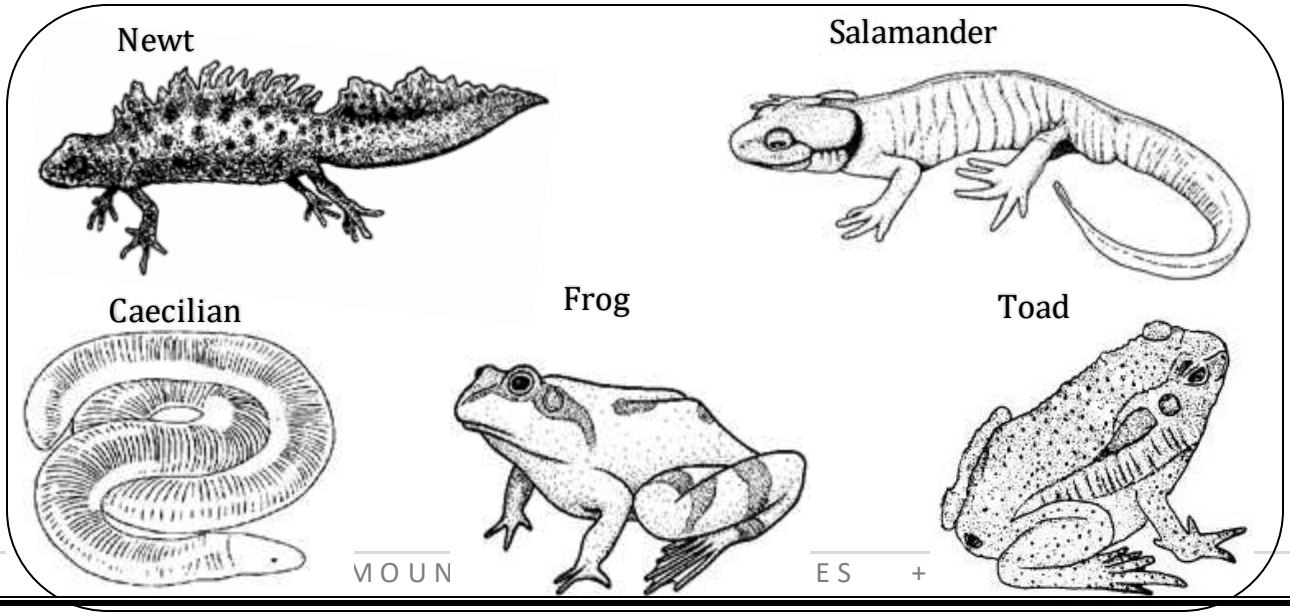
EXAMPLES OF AMPHIBIANS

- Frogs
- Toads
- Newts
- Salamanders (axolotl)
- Caecilians

CHARACTERISTICS OF AMPHIBIANS

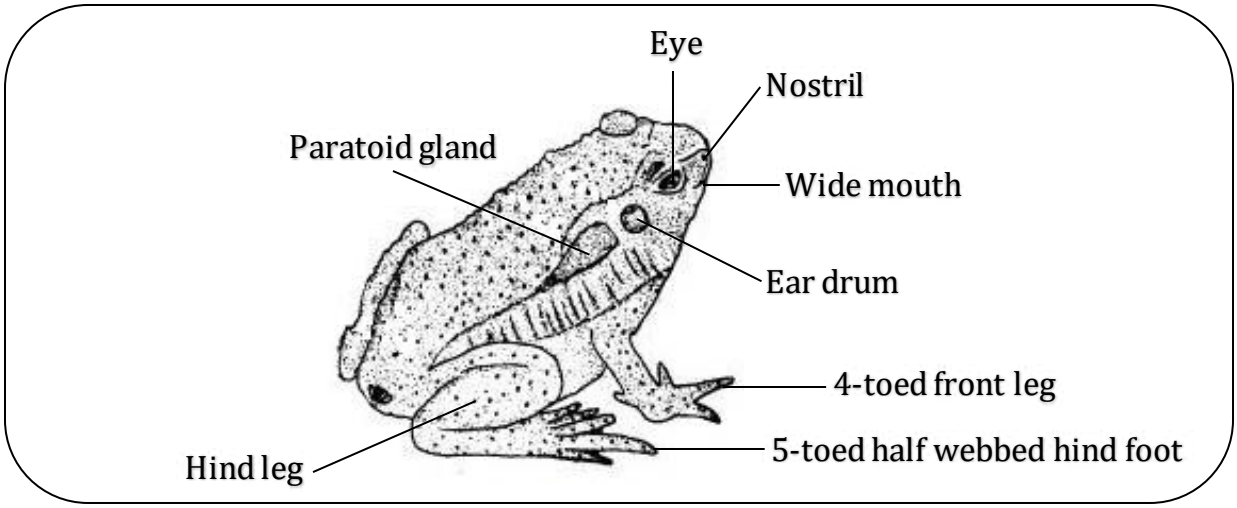
- They can live in water and on land
- They are cold blooded/poikilothermic animals
- They reproduce by laying eggs
- They undergo external fertilization
- They have a backbone
- They have no external ears
- They breathe by means of lungs on land
- They have three chambered hearts
- They have scaleless skin/have no scales on their skins
- They lay their eggs in water
- They do not produce amniotic eggs
- They go through metamorphosis
- They spend their first life in water and later go on land

DRAWINGS SHOWING AMPHIBIANS



- ✓ **Frogs and toads** have no tails
- ✓ **Newts and salamanders** have tails
- ✓ **Caecilians** have no limbs (they are limbless amphibians)

A DIAGRAM SHOWING THE EXTERNAL FEATURES OF A TOAD



FUNCTION OF EACH BODY PART OF A TOAD

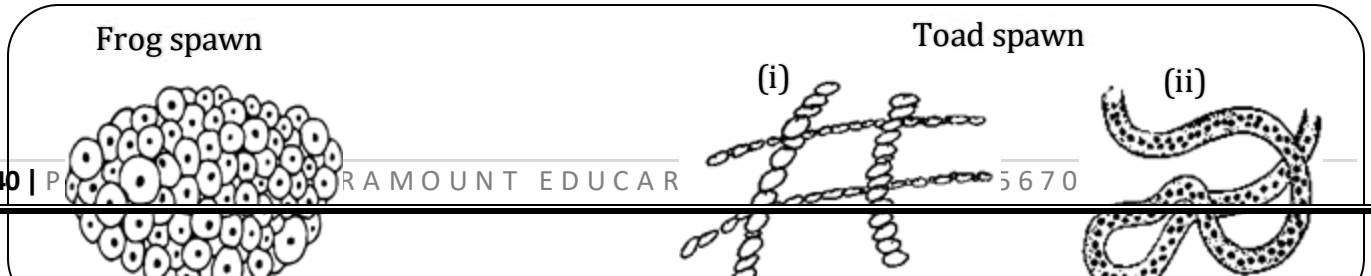
Part	Function
1. Mouth	✓ For feeding
2. Nostrils	✓ For smelling food
3. Eyes	✓ For sight
4. External eardrum	✓ For hearing
5. Paratoid gland	✓ To produce poison which keeps away predators
6. Strong hind legs	✓ For hopping / leaping
7. Webbed hind feet	✓ For swimming in water

DIFFERENCES BETWEEN A FROG AND A TOAD

- A frog lives in water while a toad lives on land.
- A frog has a moist smooth skin while a toad has a dry rough skin
- A frog lays eggs in clusters/bunch/big spawn while a toad lays eggs in strings/ribbon-like spawn
- A toad has poison/paratoid gland while a frog has no poison gland
- A frog has fully webbed hind feet while a toad has half webbed hind feet
- A frog has teeth in upper jaw while a toad has no teeth
- A frog has brown tadpoles while a toad has black tadpoles

EGGS OF FROGS AND TOADS

- Their eggs are called **spawn**



IMPORTANCE OF JELLY ON EGGS OF FROGS AND TOADS

- It prevents eggs from drying up/it keeps the eggs moist
- It protects the eggs from predators
- It prevents bacterial infections
- It activates the sperms to fertilize the eggs

How does the jelly protect eggs of amphibians from predators?

- It has unpleasant taste
- It sticks (binds) the eggs together

MOVEMENT IN AMPHIBIANS

- Amphibians move in water **by swimming**
- Toads and frogs move on land by **leaping/hopping/jumping**
- Strong hind legs **help the frog or toad to leap/jump**
- Fore legs **absorb shock on landing**
- Webbed hind feet **help a frog or toad to swim in water**
- Newts and salamanders move **by walking**

FEEDING IN FROGS AND TOADS

- They are carnivorous animals
- They feed on worms and insects (e.g houseflies, mosquito larvae, cockroaches and beetles)
- They have wide mouth and long sticky tongues

✓ To trap their prey (insects)

- A frog has teeth in the upper jaw

✓ To prevent the prey in mouth from escaping

- Tadpoles feed on water weeds and small water animals

How do frogs in ponds help in control of malaria?

- They eat mosquito larvae / wrigglers of female anopheles mosquitoes

BREATHING IN TOADS AND FROGS

AMPHIBIAN	BREATHING ORGANS

Frog	▪ Lungs ▪ Moist skin ✓ In water, a frog breathes **through its moist skin** ▪ Buccal cavity (lining of the mouth)
Toad	▪ Lungs ▪ Buccal cavity (lining of the mouth)
Salamander	▪ Lungs ▪ Gills ▪ Moist skin
Newts	▪ Lungs ▪ Moist skin
Caecilian	▪ Lungs ▪ Moist skin

How is a frog able to live in water and on land?

- It can breathe through its moist skin in water and through the lungs on land

Why can a frog breathe through is skin?

- Its skin is smooth and moist

Why can't a toad breathe through its skin?

- Its skin is rough and dry

ADAPTATIONS OF A FROG TO ITS LIFE IN WATER

- It has streamlined body to overcome friction in water
- It has webbed hind feet for swimming in water
- It has moist skin for breathing in water
- It has slippery body to escape enemies in water

How do amphibians protect themselves?

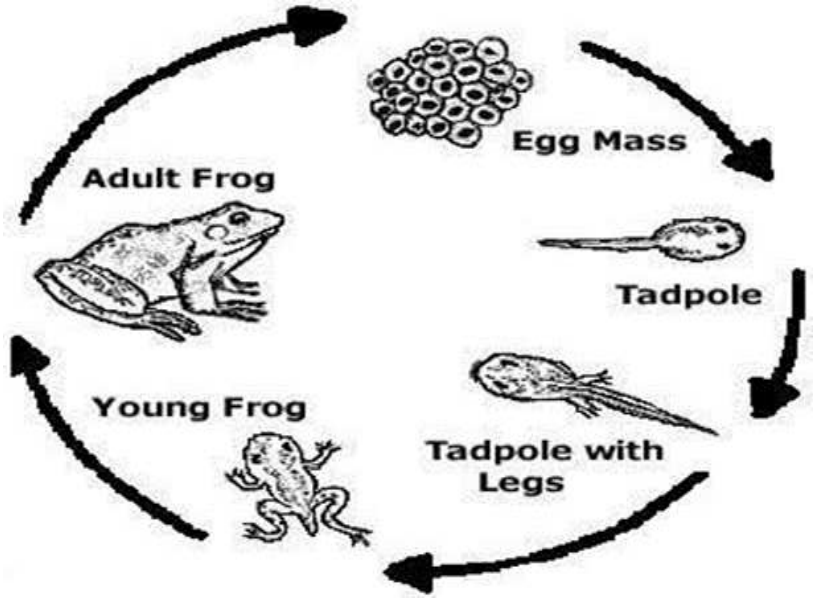
AMPHIBIAN	MODE OF PROTECTION
Toad	▪ By producing poison to kill small enemies ▪ By swelling to scare away enemies
Frog	▪ By using their slippery skin to escape from enemies ▪ By hiding in water

	▪ By swelling to scare away enemies ▪ By camouflaging
Caecilian, salamander and newt	▪ By producing poison in the skin to kill predators

REPRODUCTION IN FROGS AND TOADS

- Breeding/mating/reproduction in frogs and toads occurs in **wet/rainy season**
- They reproduce by laying eggs
- The spawn (eggs of amphibians) are **fertilized externally**
- The eggs of amphibians are called **spawn**
- The lay their eggs in water (ponds and stagnant water)
- ✓ To prevent the eggs from drying up (desiccation)
- The frogspawn and toadspawn are covered with **smelly jelly**
- The eggs hatch into larvae called **tadpoles**
- A tadpole has **gills** for breathing and a **tail** for swimming
- As a tadpole grows, it loses the gills and develops lungs
- Tadpoles later grow into adult frogs and toads.

A DIAGRAM SHOWING THE LIFE CYCLE OF A FROG



TADPOLE

- ✓ This is the larva stage of frogs and toads
- A tadpole lives in water

- A tadpole has **gills** for breathing and a **tail** for swimming / movement

DIFFERENCES BETWEEN A TADPOLE AND A FROG

- A tadpole breathes through gills while a frog breathes through its moist skin and lungs
- A tadpole has a tail while a frog is tailless

Why do amphibians lay very many eggs?

- To prevent extinction of their species

Why do male frogs and toads croak/make noise?

- To attract females for mating

How is sun's heat important to spawn?

- It enables the spawn to hatch

Briefly explain how the eggs of amphibians are fertilized externally?

- The male sheds sperms over the eggs after being laid

Why are eggs of amphibians fertilized as they come out of the female?

- To prevent the eggs from swelling before fertilization

Toads live on land. Why do they sometimes go into water?

- To lay eggs

AESTIVATION IN AMPHIBIANS

- This the inactive state in amphibians during summer/hot weather/drought

DURING AESTIVATION (INACTIVE/DORMANT PERIODS):

- Frogs hide in burrows and breathe through their moist skin
- They feed on fats and glycogen stored in their body

REASONS FOR AESTIVATION IN AMPHIBIANS / WHY DO AMPHIBIANS AESTIVATE?

- To prevent their bodies from drying up
- To maintain body temperature
- To survive during harsh weather (e.g drought and winter)

IMPORTANCE OF AMPHIBIANS TO PEOPLE

- They eat insect vectors
- They eat insect pests
- They are used in science experiments

- Some amphibians act as food

REPTILES

- These are vertebrates that move by crawling and slithering

CHARACTERISTICS OF REPTILES

- They have scales on their bodies
- They use lungs for breathing
- They are cold blooded animals
- They undergo internal fertilization
- They lay hard shelled eggs
- They have a backbone
- They have three chambered hearts
- They have waterproof skin
- Most reptiles have four limbs except snakes (they are tetrapods)
- They move by crawling and slithering
- Most reptiles reproduce by laying eggs
- Most reptiles are terrestrial animals (live on land) though some swim in water

EXAMPLES OF REPTILES

- Kingsnake
- Gaboon viper
- Mamba
- Chameleon
- Skink
- Crocodile
- Tortoise
- Turtle
- Alligator
- Gecko
- Common lizard

GROUPS (CLASSES) OF REPTILES

- Snakes
- Lizards
- Testudines (turtles and tortoises)
- Crocodilians (crocodiles and alligators)

TESTUDINES

- These are reptiles with hard bony shells

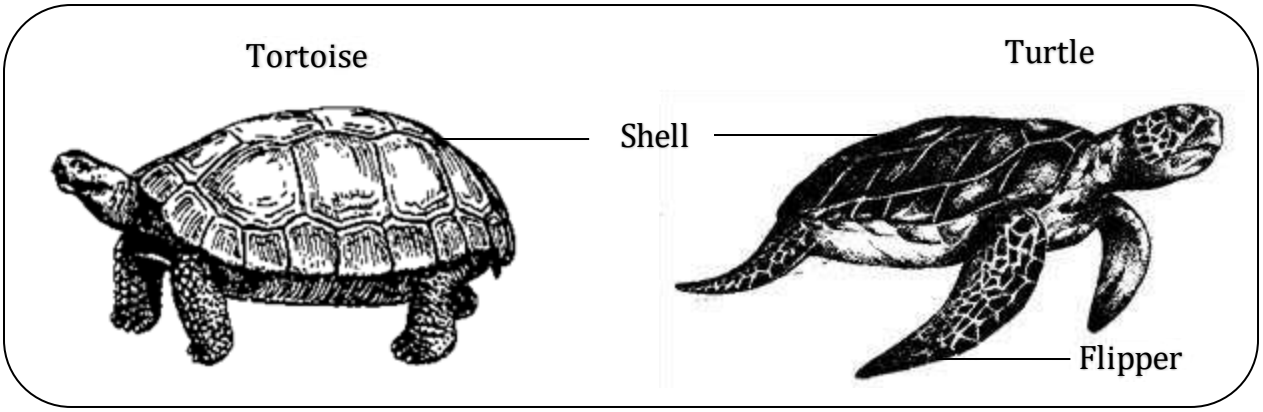
CHARACTERISTICS OF TESTUDINES

- They have hard shells
- ✓ To protect the animal from predators
- ✓ To prevent the animal from drying up
- They have no teeth but have sharp jaws to tear food
- They breathe by means of lungs
- They lay their eggs in loose sand
- They have four limbs
- They have very long lifespan
- ✓ Tortoises may live for 150 to 300 years
- ✓ Turtles live for about 20 to 40 years

EXAMPLES OF TESTUDINES

- Tortoise
- Turtle
- Terrapin
- ✓ Terrapins are turtles that live in fresh and salty water

DRAWINGS SHOWING TORTOISE AND TERRAPIN



What do we call the upper and lower shells of turtles and tortoises?

- Upper shell is called **carapace**
- Lower shell is called **plastron**

How do turtles and tortoises protect themselves?

- By hiding in their hard shells

DIFFERENCES BETWEEN TURTLES AND TORTOISES

- Tortoise has raised (dome shaped) shell while a turtle has flat shell
- Tortoise lives on land while turtle lives in water
- Tortoises have strong stumpy feet for walking while turtles have webbed feet (flippers) for swimming in water
- Tortoises are herbivores while turtles are omnivores

FOOD FOR TESTUDINES (TURTLES AND TORTOISES)

- Insects
- Small animals
- Vegetation

SNAKES

- These are limbless reptiles

CHARACTERISTICS OF SNAKES

- They are limbless (lack limbs)
- They undergo moulting
- ✓ To grow/to increase in size
- They move by slithering
- They are carnivores (feed on flesh)
- They have a forked tongue
- ✓ For smelling
- ✓ For tasting
- They have Jacobson's organ
- ✓ For tracking their prey
- Their teeth point backward
- ✓ To prevent the prey in mouth from escaping
- They lack external ears but have inner ears

What is moulting?

- This is the shedding of outer skin in reptiles

Why do reptiles moult?

- To grow (to increase in size)

What is the sense organ for hearing in snakes?

- Inner ears

How do snakes hear / detect movement/vibrations?

- They hear vibrations with the help of inner ear inside their jawbones.

Why do snakes move while bringing out their forked tongue?

- For smelling

FOOD FOR SNAKES

- Small insects
- Eggs

GROUPS (CLASSES) OF SNAKES

- Venomous snakes
- Non-venomous snakes
- Constrictors

VENOMOUS SNAKES

- These are snakes that have venom

CHARACTERISTICS OF VENOMOUS SNAKES

- They have fangs
- They have triangular heads
- They have a slit-like (elliptical) eye pupil
- They have venom

EXAMPLES OF VENOMOUS SNAKES

- Cobra
- Mamba (green mamba/black mamba)
- Death adder
- Viper (Gaboon viper/pit viper)
- Boomslang
- Coral snakes
- Rattlesnakes
- Water moccasins
- Taipan (**it is the most venomous snake in the world**)
- Sea snakes

Reasons why people greatly fear the following venomous snakes.

GABOON VIPER

- Its venom kills within 30 minutes
- ✓ Gaboon viper is a highly venomous snake
- ✓ It is ovoviviparous (the eggs hatch inside its body and gives birth to live young)

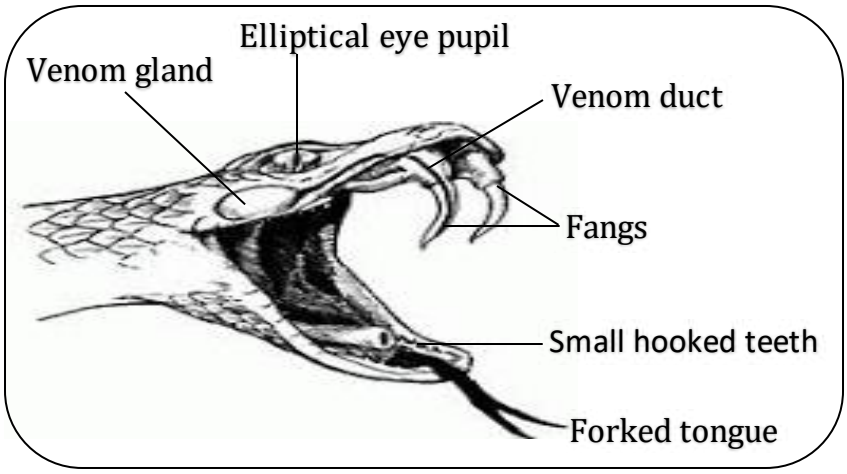
BLACK MAMBA

- It is always quick and ready to bite

COBRA

- It spits venom that can cause blindness
- ✓ A cobra rarely bites

A DIAGRAM SHOWING THE HEAD OF A VENOMOUS SNAKE



FORKED TONGUE

- For smelling

BACKWARD HOOKED TEETH

- For preventing the prey from escaping out of the mouth

VENOM GLAND

- To produce/secrete venom

VENOM DUCT

- It passes venom to fangs

FANGS

- ✓ These are the two long pointed hollow teeth of venomous snakes
- For injecting venom
- For protection

How are fangs adapted to injecting venom into the prey?

- They are hollow and sharp pointed

IMPORTANCE OF VENOM TO VENOMOUS SNAKES

- For killing their prey and enemies

MEDICAL IMPORTANCE OF SNAKE VENOM

- It is used to make antivenin/anti-venom serum
- ✓ Each venomous snake has its own antivenin

DANGERS OF SNAKE VENOM TO HUMAN LIFE

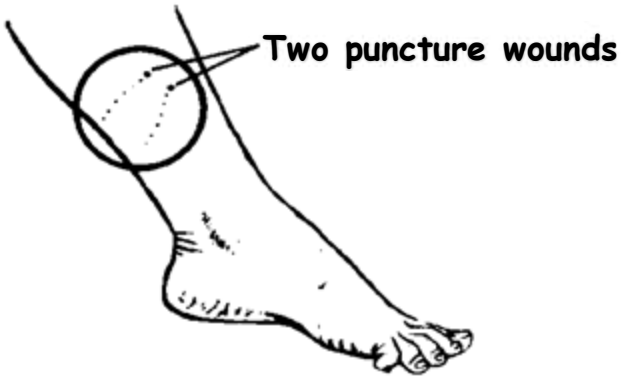
- It poisons blood leading to death
- It clots blood
- It destroys nerve cells

- It leads internal bleeding
  - ✓ By destroying the outer membrane of blood capillaries
  - ✓ By breaking the cells and tissues
- It paralyzes the heart

Why is it advisable to identify the colour, markings and shape of a snake in case of a snakebite?

- To be given the right antivenin

A DIAGRAM SHOWING A BITE OF A VENOMOUS SNAKE



SIGNS OF VENOMOUS SNAKEBITE

- Two puncture wounds (fang marks) on the injured part
- Bleeding from the injured part
- Swelling of the injured part
- Excessive sweating

FIRST AID FOR SNAKEBITE

- Keep the victim calm and at rest
  - ✓ To prevent venom from spreading in the body
- Tie a bandage slightly above the bitten part
  - ✓ To prevent the flow of venom to the heart
- Apply a blackstone
  - ✓ To absorb venom from the injured part
- Rush the victim to the hospital

NON VENOMOUS SNAKES

- These are snakes that do not have venom

CHARACTERISTICS OF NON-VENOMOUS SNAKES

- They have no fangs
- They have round eye pupil
- They have round heads

- They have no venom
- They swallow their prey alive

EXAMPLES OF NON-VENOMOUS SNAKES

- Grass snake
- Rat snake
- Garter snake
- Milk snake
- Hognose snake

NOTE

- Although non-venomous sometimes bite, they do not have venom

A DIAGRAM SHOWING A BITE OF A NON-VENOMOUS SNAKE



CONSTRICTORS

- These are very big snakes that kill their prey by squeezing them

CHARACTERISTICS OF CONSTRICTORS

- They have no venom
- They kill their prey by squeezing them
- They have well developed teeth
- ✓ To prevent the prey in mouth from escaping

Why do constrictors lick their prey before swallowing?

- To make them slippery (smooth)

How does squeezing kill the prey?

- It blocks the flow of blood

EXAMPLES OF CONSTRICTORS

- Python
- Boa constrictor
- Kingsnake
- Anaconda
- Bull snake

REASONS WHY SNAKES BITE

- For protection
- To trap their prey

DON'TS WITH A SNAKEBITE

- Don't apply ice on the snake bite

- ✓ It causes frostbite (it blocks blood circulation)
- Don't suck the wound with mouth
- ✓ To prevent swallowing the venom
- Don't cut across the wound.
- ✓ To prevent causing more pain
- Don't apply a tourniquet
- ✓ It makes the cells to be rapidly destroyed by concentrated venom
- ✓ It blocks blood flow completely which can lead to amputation
- Don't try to capture the snake
- ✓ To prevent the snake from biting you again

What is amputation?

- This is the surgical removal of a limb.

WAYS OF PREVENTING SNAKE BITES

- Stay away from bushes
- Never play with any snake
- Use torchlight at night
- Wear boots and gloves when working in a bush
- If you meet a snake, give it room to move away

Name any two snakes that give birth to live young ones

- Boa constrictor
- Garter snake
- Gaboon viper
- Green anaconda
- Rattlesnake
- Pit viper
- Sea snake

LIZARDS

- These are reptiles with four limbs and a tail which can grow when it breaks off

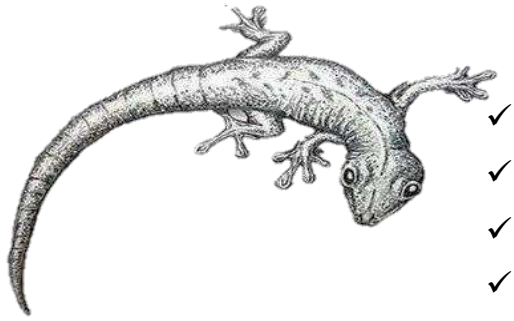
CHARACTERISTICS OF LIZARDS

- They have fleshy tongue
- They have movable eyelids
- They undergo moulting
- They have four limbs
- They move by crawling
- They breathe by means of lungs
- They reproduce by laying eggs
- They undergo internal fertilization
- Most lizards are carnivorous animas
- They can regenerate their tails if the old one breaks
- They have adhesive pads to grip smooth surfaces

EXAMPLES OF LIZARDS

- Sinks
- Geckos
- Chameleons
- Anoles
- Agama lizards
- Monitor lizards
- Iguana lizards
- Komodo dragon

GECKO



- ✓ This is a small carnivorous nocturnal lizard
- ✓ It is yellowish brown in colour
- ✓ It is commonly found in houses
- ✓ It protects itself by **losing (casting off) its tail**

How are wall geckos able to walk on vertical and upside-down surfaces?

- They have adhesive pads on their toes

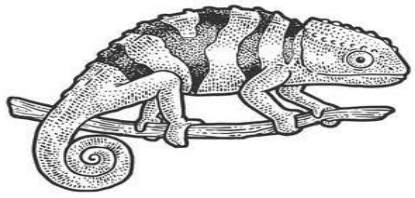
How are geckos useful in our houses?

- They eat insect vectors like mosquitoes and cockroaches

SKINKS

- They protect themselves **by breaking off their tails**
- The tail moves and attracts the attention of the enemy

CHAMELEON



- This is a slow moving lizard with a large head and bulging eyes
- It protects itself **by camouflaging/changing its skin colour**
- It can move its bulging eyes in all direction
- ✓ To look front and back at the same time
- It uses its feet and tail **to hold small branches of trees**
- It has a long sticky tongue for **catching insects (trapping its prey)**
- Most chameleons **reproduce by laying eggs**

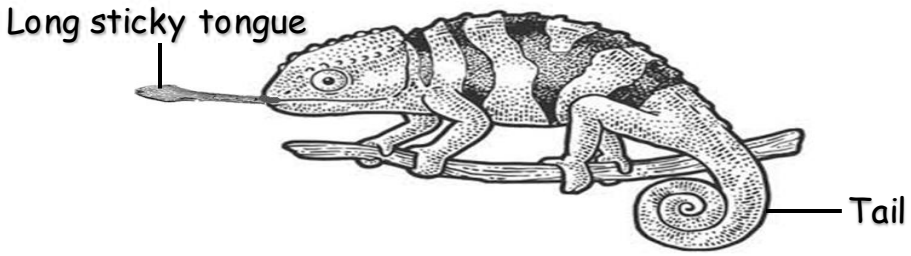
Why does a chameleon camouflage/change its skin colour?

- For protection
- To trap its prey
- To attract mates

How is a chameleon able to change colours?

- It has chromatophores in its skin

A DIAGRAM SHOWING A CHAMELEON TRAPPING A HOUSEFLY



Importance of chameleons in the environment

- They eat insect vectors (e.g houseflies and mosquitoes)
- They eat insect pests

CROCODILIANS

- These are the largest of reptiles
- They are mainly crocodiles and alligators
- Crocodiles are commonly found in Africa
- Alligators are commonly found in America

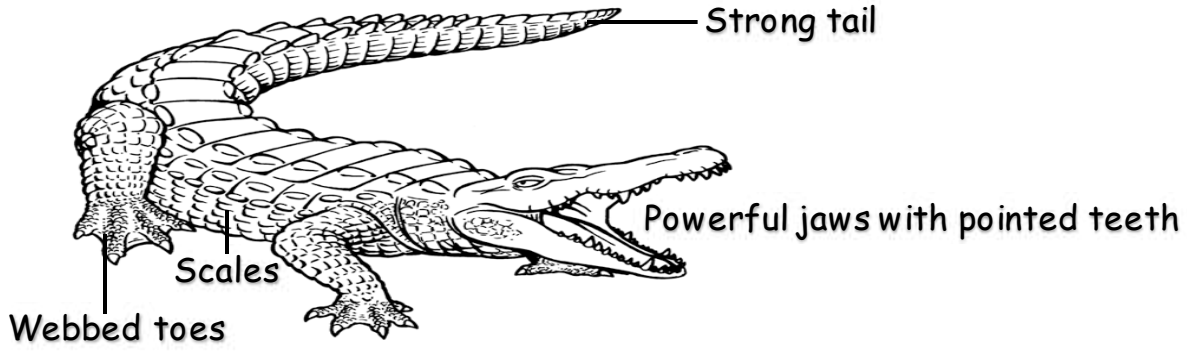
EXAMPLES OF CROCODILIANS

- Crocodile
- Alligator
- Gavial
- Caiman

CHARACTERISTICS OF CROCODILIANS (CROCODILES AND ALLIGATORS)

- They have a strong tail
  - ✓ For swimming
  - ✓ For attacking their enemies
- They lay hard shelled eggs in sand
- They have strong pointed teeth
  - ✓ For biting their enemies
  - ✓ For tearing their prey
- They have strong jaws
- They have scales on their bodies
  - ✓ For protecting their bodies from injuries
- They have streamlined bodies
  - ✓ To reduce friction in water
- They reproduce by laying eggs
- They feed on prey after it had begun to rot
- They are lethargic/lazy animals

A DIAGRAM SHOWING A CROCODILE



Why do crocodiles sometimes gape/open their mouth widely?

- To cool down body temperature/to cool themselves

How do crocodiles protect themselves against enemies?

- By biting using strong pointed teeth
- By attacking with its strong tail

How is sun's heat useful to female crocodiles?

- Their eggs are hatched by sun's heat

How are crocodiles adapted to their life in water and on land?

- The have a strong tail for swimming in water
- They have a streamlined body to overcome viscosity in water
- Their body allows the eyes and nostrils to be above water

IMPORTANCE OF REPTILES TO MAN

- Some reptiles attract tourists e.g crocodiles
- Some reptiles eat insect pests e.g chameleon
- Some reptiles eat insect vectors e.g gecko
- Some reptiles are sources of food to man
- Their skins are sold for income
- They provide skins to leather industries
- They are used in biological research

NOTE:

- **Oviparous animals** are animals which lay eggs
- **Viviparous animals** are animals which produce living young ones
- **Ovoviviparous animals** are animals that give birth to live young ones from the eggs that hatch inside its body
- **Terrestrial animals** are animals which mainly live on land
- **Aquatic animals** are animals that live in water
- **Amphibious animals** are animals that start their lives in water and then live on land
- **Nocturnal animals** are animals that are active at night

- **Diurnal animals** are animals that are active during day time
- **Tetrapods** are animals with four limbs or descended from four limbed animals

FISH

- These are cold blooded vertebrates with fins

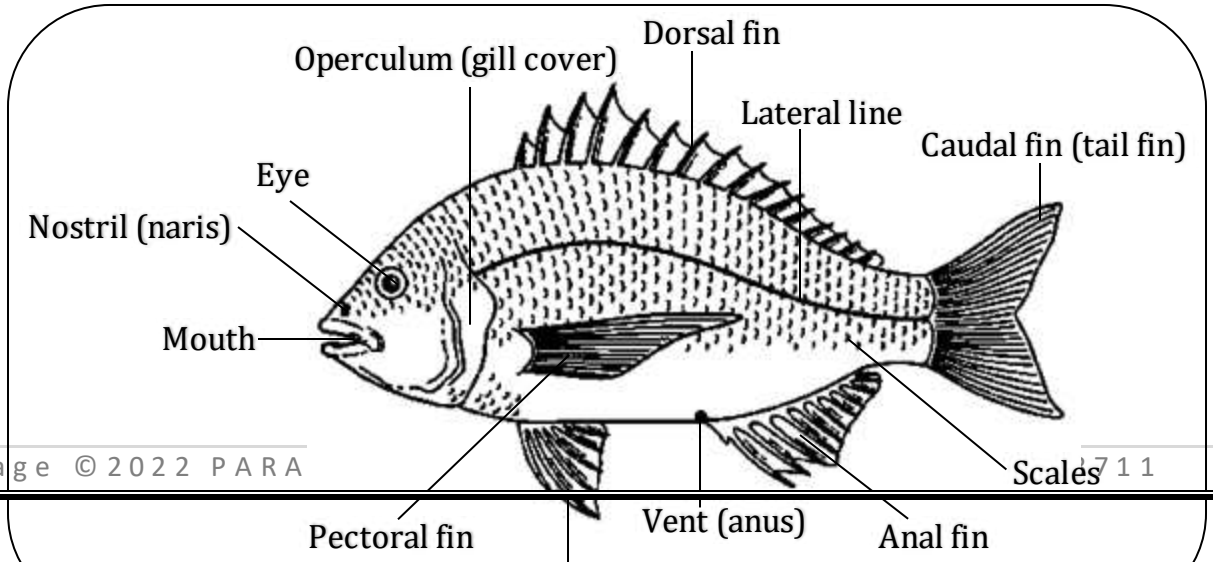
CHARACTERISTICS OF FISH

- They have fins
- They have streamlined bodies
- ✓ To reduce water resistance during movement
- ✓ To reduce viscosity friction in water
- They are cold blooded/poikilothermic animals
- They live in water/they are aquatic animals
- They breathe by means of gills
- They undergo external fertilization
- They have no eyelids
- Most fish have scales **except** catfish
- They reproduce by laying eggs
- They have two chambered hearts
- They have no external ears
- They have a backbone
- Their body is divided into head, trunk and tail

EXAMPLES OF FISH

- Tilapia
- Nile perch
- Dogfish
- Trout
- Salmon
- Skates
- Catfish
- Sawfish
- Herring
- Cichlid
- Shark
- Stingray
- Tuna
- Codfish
- Cyprinid fish/minnow fish

EXTERNAL FEATURES OF A FISH



FUNCTIONS OF EACH PARTS OF A FISH

SCALES

- To protect the skin from injuries

NOSTRIL (NARIS)

- For smelling food
- For tasting food

EYES

- For sight

OPERCULUM (GILL COVER)

- It protects the gills

GILLS

- For breathing

MOUTH

- For feeding
- For taking in water with dissolved oxygen for breathing

LATERAL LINE

- For detecting sound vibrations in water/for hearing
- For detecting pressure changes in water
- For feeling

How is the lateral line adapted to its functions?

- It has sensory hair cells

ANUS

- To pass out wastes

FINS

- For swimming
- For protection

KINDS OF FINS ON A FISH

- Median fins
- Paired fins

i) Median fins

- These are single fins that fun down the midline of the fish's body
- They help in balancing

Examples of median fins

- Dorsal fin
- Anal fin
- Tail fin

ii) Paired fins

- These are fins which exist in pairs and act as limbs in vertebrates

Examples of paired fins

- Pectoral fins
- Pelvic fins
- ✓ The **pectoral fins** act as forelimbs while the **pelvic fins** act as hind limbs

DORSAL FIN

- For protection
- For balancing

How is the dorsal fin adapted to its main function of protecting the fish?

- ✓ It is spiny

CAUDAL FIN (TAILFIN)

- For increasing speed
- For forward movement
- For turning in water/for changing direction when swimming/it acts as steering

PECTORAL FINS

- For balancing in water
- For slowing down speed/they act as brakes

PELVIC/VENTRAL FINS

- For swimming upwards and downwards

ANAL FIN

- It stabilizes the fish during swimming

WAYS THROUGH WHICH FISH PROTECT THEMSELVES

- Some fish use slippery scales to escape from enemies
- Some fish use spiny dorsal fin
- Some fish use electric organs e.g electric eel
- Some fish change colours/camouflage
- Some fish use their teeth to bite enemies
- Some fish inject venom e.g stingray

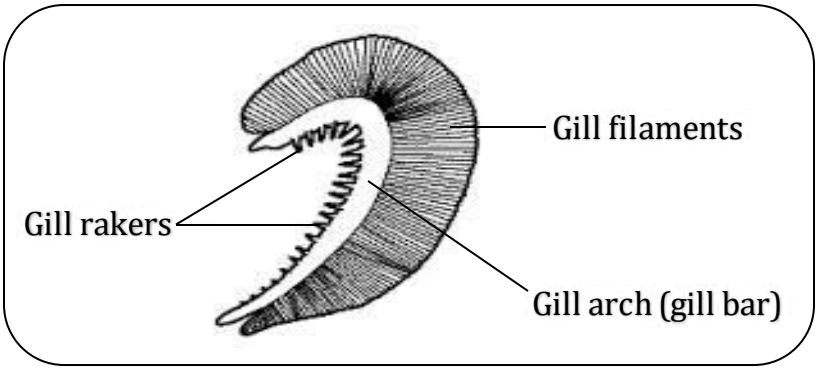
SIMILARITIES BETWEEN A TILAPIA AND A TADPOLE.

- Both use gills for breathing
- Both live in water

BREATHING IN FISH

- Fish breathe by means of gills
- They take in water with dissolved oxygen through the mouth
- Gill filaments absorb dissolved oxygen in water
- Water is passed out through the gill cover

THE STRUCTURE OF FISH GILLS



GILL ARCH / GILL BAR

- It supports the gill filaments and gill filaments

GILL RAKERS

- To trap solid materials from damaging the gills
- To filter food from water as it moves from mouth to the gills

GILL FILAMENTS

- For gaseous exchange

ADAPTATIONS OF GILL FILAMENTS TO GASEOUS EXCHANGE

- They are numerous
- They have a dense network of blood capillaries
- They are moist
- They have thin walls

Why are gill filaments numerous/very many in number?

- To increase the surface area for gaseous exchange

Why does a fish die when removed from water?

- It lacks dissolved oxygen

TYPES (GROUPS) OF FISH

- Bony fish
- Cartilaginous fish
- Lungfish

BONY FISH

- They have no eye lids
- Their skeleton is made up of bones
- They have swim bladder **to keep the fish buoyant**
- They have gill cover/operculum to protect the gills
- They have overlapping scales (so that the free ends of the scales point backwards)

EXAMPLES OF BONY FISH

- Nile perch
- Tilapia
- Salmon
- Trout
- Catfish
- Herrings
- Tuna
- Codfish
- Sardine

CARTILAGINOUS FISH

- They have tough and shiny skin
- They have gill slits instead of gill cover
- Their skeleton is made up of cartilage instead of bones
- They have no swim bladder

How are fish with no swim bladders (cartilaginous fish) able to float on water?

- They use their fins to keep swimming

EXAMPLES OF CARTILAGINOUS FISH

- Shark
- Ray/stingray
- Dogfish
- Skates



LUNGFISH

- They breathe by means of gills and swim bladder modified as lungs
- They live in dirty pools, swamps or rivers
- They have long thin pelvic and pectoral fins
- They are inactive in dry seasons

Why is lungfish called so?

- It has gills and lungs

EXAMPLES OF LUNGFISH

- African lungfish/ mudfish
- South American lungfish
- Australian lungfish

Why does a lungfish take long to die when removed from water?

- It can breathe using its swim bladder/its swim bladder is modified into lungs for breathing

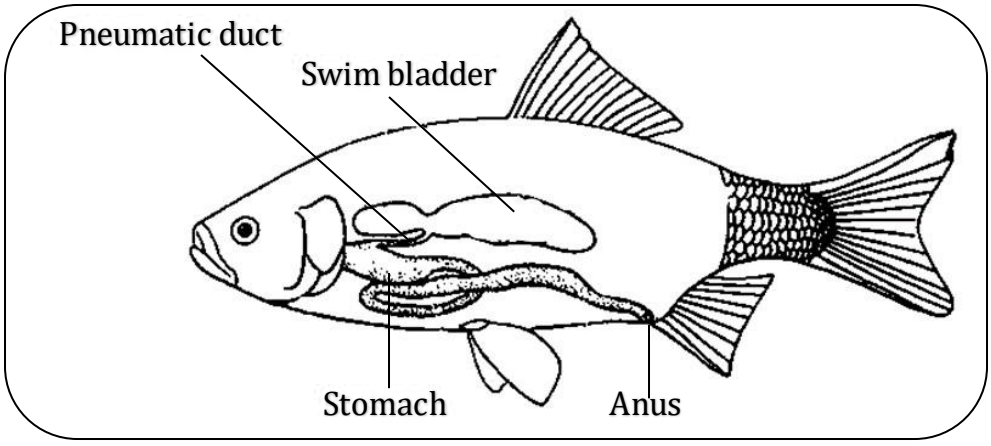
Why does lungfish aestivate/produce mucus that dries into cocoon around its body?

- To survive drought

THE SWIM BLADDER (AIR BLADDER)

- It is a gas filled sac near the backbone of most fish
- The swim bladder is connected to the digestive tract by the **pneumatic duct**
- **The pneumatic duct** allows the fish to adjust the air content in the swim bladder

DIAGRAM SHOWING A SWIM BLADDER



USES OF THE SWIM BLADDER TO A FISH

- It keeps the fish buoyant / it helps the fish to float within water / it controls the depth of fish in water
- It helps in gaseous exchange / breathing e.g lungfish
- It is used by some fish to produce sound e.g toadfish and grunts

How does a swim bladder keep a fish buoyant?

- It reduces the density of a fish's body

REPRODUCTION IN FISH

- A fish reproduces **by laying eggs**
- Eggs of a fish are called **roe**
- Eggs of a fish (roe) are **fertilized externally**
- A fish undergoes **external fertilization**
- A young fish is called **fry**
- Most fish do not care for their young ones **except** tilapia

FEEDING IN FISH

- Fish naturally feed on planktons (e.g wriggler, small insects and seaweeds)
- **Planktons** are small organisms that float in water
- Some fish feed on other types of fish

CLASSES OF FISH BASED ON THEIR FEEDING HABITS

- ✓ **Carnivores:** They feed on small animals in water
- ✓ **Herbivores:** They feed on plants in water
- ✓ **Omnivores:** They feed on plants and small animals in water
- ✓ **Detritus feeders:** They feed on dead organic matter at the bottom of the pond

KEEPING FISH

- **Aquaculture** is the rearing of aquatic animals
- **Aquarium** is a transparent glass tank for keeping aquatic organisms
- Fish can be kept in ponds or aquarium
- Fish are kept in fresh water because **it is not salty**
- Aquaculturists in Uganda mainly keep **tilapia**

State one biological method of controlling the spread of malaria

- Keeping fish in ponds to feed on mosquito larvae and eggs

ADAPTATIONS OF A FISH TO ITS LIFE IN WATER

- They have fins for swimming
- They have gills for breathing in water
- They have streamlined bodies to overcome viscosity
- They have a swim bladder to keep them buoyant
- They have a lateral line to detect danger in water
- They have slippery scales for protection and to reduce viscosity

METHODS OF CATCHING (HARVESTING) FISH

- Use of basket
- Use of hooks
- Use of spears
- Draining water from ponds
- Use of fishing nets (e.g trawling and purse seining)

METHODS OF PRESERVING FISH

- Smoking
- Sundrying
- Salting

} Local methods

- ✓ Refrigeration
- ✓ Canning (tinning)

} Modern methods

How does smoking, sundrying or salting preserve fish?

- By absorbing moisture from fish

How does refrigeration preserve fish?

- It prevents multiplication of germs
- It keeps germs dormant and unable to multiply

USES (IMPORTANCE) OF FISH TO PEOPLE

- They are source of food (they are source of proteins and calcium)
- Their bones are used to make glue
- They are source of income when sold
- Fish in aquarium is used to decorate houses
- Fishing is an employment
- Fish reduce spread of malaria by feeding on mosquito larvae
- Fishing industry gives revenue to the government
- Fish oil is used to make paint
- Cod liver oil from codfish is rich in vitamin A and B

ANIMALS' FREEDOM

- Freedom from fear
- Freedom from pain
- Freedom from hunger
- Freedom from discomfort
- Freedom of reproduction

INVERTEBRATES

- These are animals without a backbone/spine/vertebral column

CHARACTERISTICS OF INVERTEBRATES

- They do not have a backbone
- They are multicellular animals
- They have soft bodies

CLASSES (GROUPS) OF INVERTEBRATES

- Coelenterates
- Sponges
- Molluscs
- Echinoderms
- Worms
- Arthropods

COELENTERATES (CNIDARIANS)

- These are soft bodied invertebrates with only one body opening.

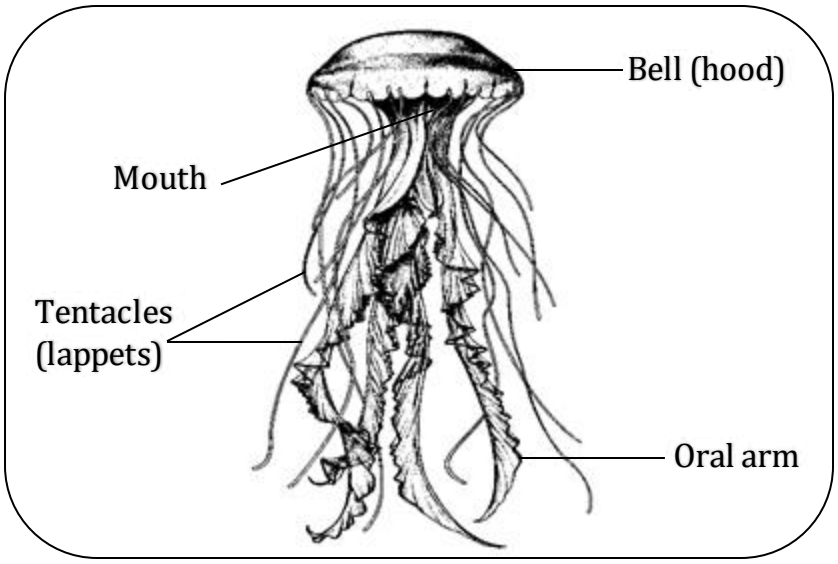
CHARACTERISTICS OF COELENTERATES

- They live in seawater
- They have stinging cells/cnidocytes
  - ✓ For protection
  - ✓ For paralyzing their prey
- They have only one body opening
  - ✓ It acts as mouth and anus
- They have tentacles
  - ✓ For holding food
  - ✓ For holding stinging cells
- They reproduce by budding
- They hydrostatic skeleton
- They have cylindrical bodies with two layers (e.g endoderm and ectoderm)

EXAMPLES OF COELENTERATES

- Jellyfish
- Hydra: it moves by floating, gliding or somersaulting
- Corals
- Sea anemone
- Sea pen
- Sea fan
- Sea whip

A DIAGRAM SHOWING A JELLYFISH



ECHINODERMS

- These are spiny skinned invertebrates with tube feet
- They are exclusively marine animals

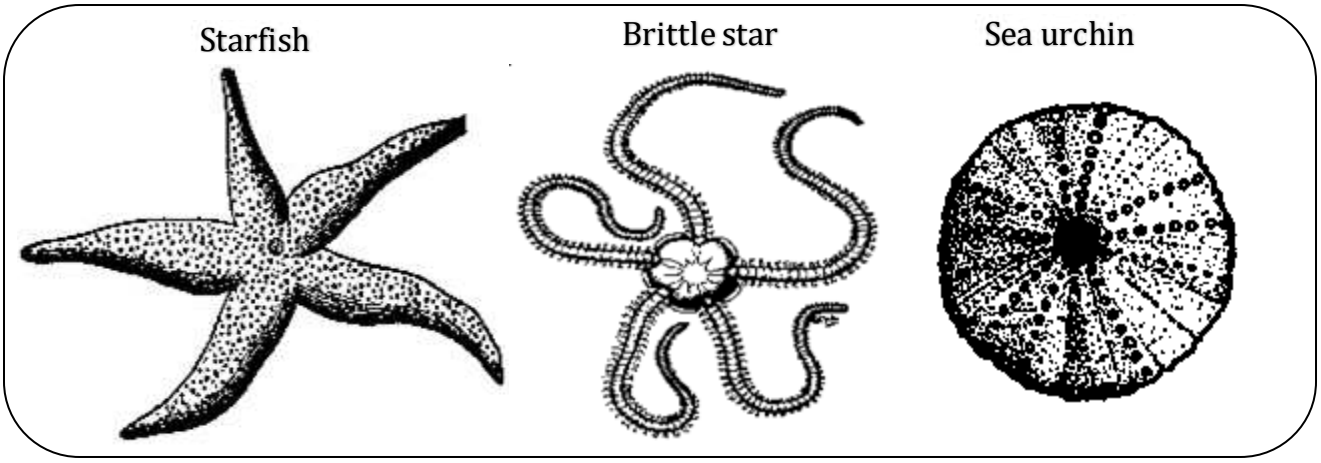
CHARACTERISTICS OF ECHINODERMS

- They have no heads
- They have spiny skins
- They have water vascular system
- They have a true coelom
- Most echinoderms have five arms
- ✓ For holding food
- They have tube feet
- ✓ For movement/locomotion

EXAMPLES OF ECHINODERMS

- Starfish/sea star
- Sea urchin
- Sand dollar
- Sea lily
- Sea cucumber
- Brittle star

DIAGRAMS SHOWING ECHINODERMS



WORMS

- These are long thin soft bodied invertebrates

CHARACTERISTICS OF WORMS

- They breathe through their moist skins
- They reproduce by laying eggs
- They have hydrostatic skeleton
- They have a distinct head and tail head
- They can regenerate their lost/damaged body parts
- They have two identical body sides (they have bilateral symmetry)

NOTE

- ✓ Some worms live in soil or water while others live inside other animals as parasites
- **A parasite** is an organism which depends on another organism for food and shelter
- **A host** is an organism from which a parasite gets food and shelter

REGENERATION IN WORMS

- This is the ability of worms to rebuild/replace their removed body parts

GROUPS (CLASSES) OF WORMS

- Segmented worms (annelids)
- Round worms (nematodes)
- Flatworms (platyhelminthes)

1. SEGMENTED WORMS (ANNELIDS)

- These are worms with segmented bodies
- They are also called **ringed worms**
- They mostly live in soil and water

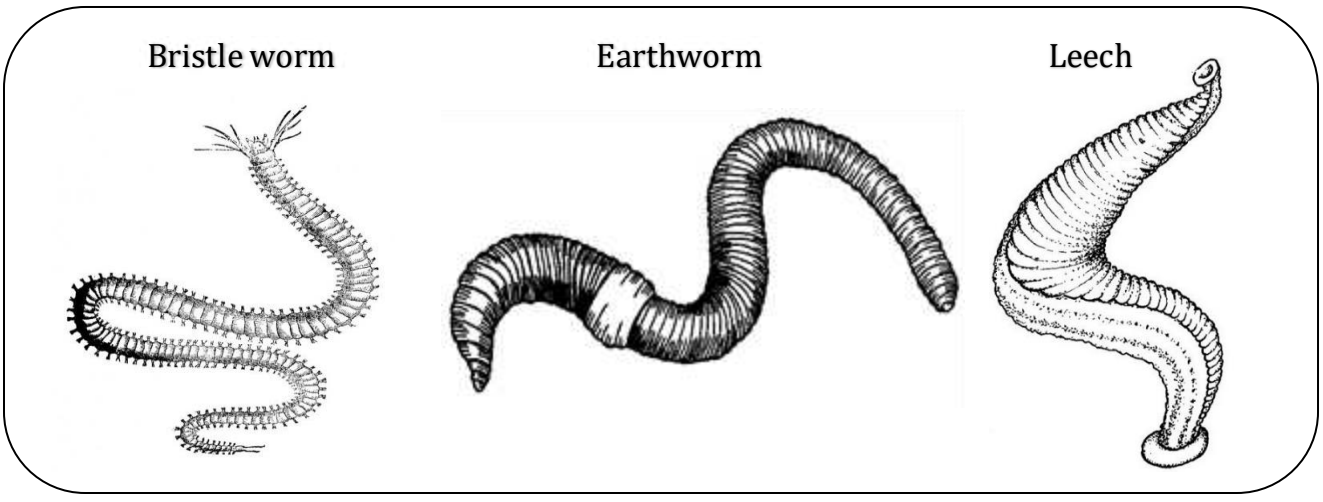
CHARACTERISTICS OF SEGMENTED WORMS (ANNELIDS)

- They have segments
- They are hermaphrodites

EXAMPLES OF SEGMENTED WORMS

- Leech
- Earth worm
- Lugworm (it is used as bait in fishing)
- Bristle worm
- Sandworm: it lives in sand or mud

DIAGRAMS OF SEGMENTED WORMS



EARTHWORM

- It lives in soil
- It reproduces by laying eggs
- The **clitellum** produces mucus to form cocoon for the eggs
- It undergoes sexual reproduction
- It breathes through **its moist skin**
- It feeds on soil or decayed vegetation
- It is hermaphrodite
- Earthworms undergo regeneration
- The skin is kept moist by the **secretions from tiny glands**

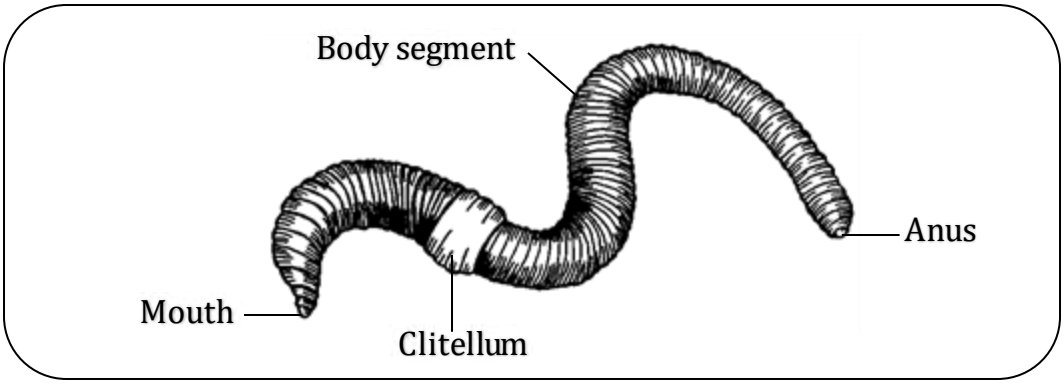
IMPORTANCE OF EARTHWORMS IN THE ENVIRONMENT

- They aerate the soil
- They improve soil drainage
- They break down organic matter
- They are used as fishing baits

How do earthworms improve soil aeration and drainage?

- By making holes in the soil (digging tunnels)

A DIAGRAM SHOWING AN EARTHWORM



Why are earthworms called hermaphrodites?

- They have both male and female sex organs

How are chaetae important to an earthworm?

- For gripping the ground during movement

Of what importance is clitellum to an earthworm?

- It produces the fluid in which eggs are deposited.

Why do earthworms come out of the ground when it rains?

- To get oxygen

Why do earthworms die when oil is poured onto it?

- Oil cuts off oxygen supply to their moist skin
- Oil closes their breathing holes

2. FLATWORMS (PLATY HELMINTHES)

- These are worms with thin flattened bodies

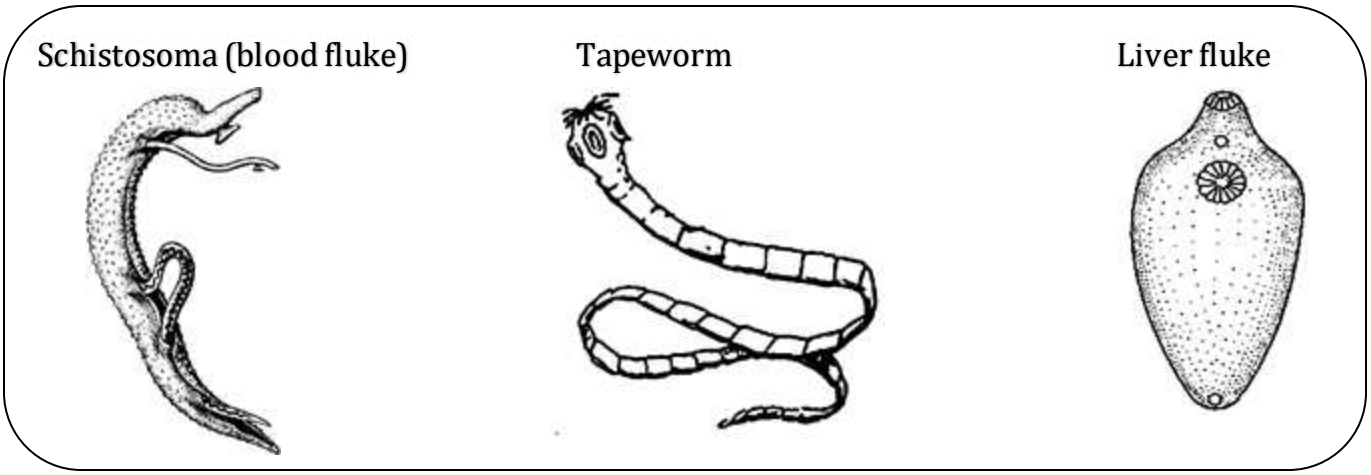
CHARACTERISTICS OF FLAT WORMS

- They have a flat body
- They are hermaphrodites
- Many of them are parasites

EXAMPLES OF FLAT WORMS

- Tapeworm
- Liver fluke
- Schistosoma (blood fluke): **causes bilharziasis or schistosomiasis**
- Pond flatworm

DIAGRAMS SHOWING FLAT WORMS



TAPEWORM

- A tapeworm is a hermaphrodite (has both male and female reproductive organs)
- It reproduces by laying eggs into the host
- It is an endoparasite in animals
- It is an intestinal worm which stays in the small intestines
- It feeds on digested food in the small intestines

How do tape worms enter (penetrate) into the body?

- Through eating infested half cooked meat or fish

How do tapeworms feed?

- They feed parasitically

Why does a tapeworm lack the digestive system?

- It feeds on already digested food

Tapeworms do not have a digestive tract. How do they absorb digested food from the host?

- Through their tegument (porous outer surface of their body)

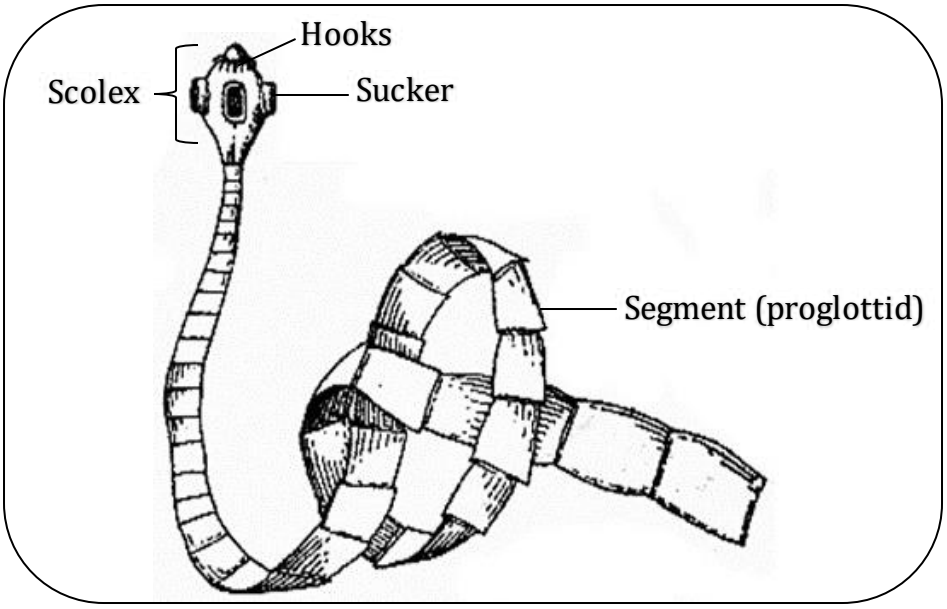
Why can't tapeworms be digested by the host's digestive juices?

- They produce a substance that neutralizes the digestive juice

Why can't tapeworms be moved during peristalsis?

- They have hooks and suckers for firm attachment.

DIAGRAM SHOWING TAPEWORM



FUCTION OF EACH PART OF A TAPEWORM

Hooks and suckers

- For attachment to the host

Segments (proglottids)

- To store eggs

Scolex

- ✓ This is the head of tapeworm
- It holds the hooks and suckers

SIGNS OF TAPEWORM INFESTATION

- Diarrhoea
- Indigestion
- Loss of body weight

EFFECTS OF TAPEWORM INFESTATION

- It leads to malnutrition
- It leads to hydatid disease (echinococcosis)

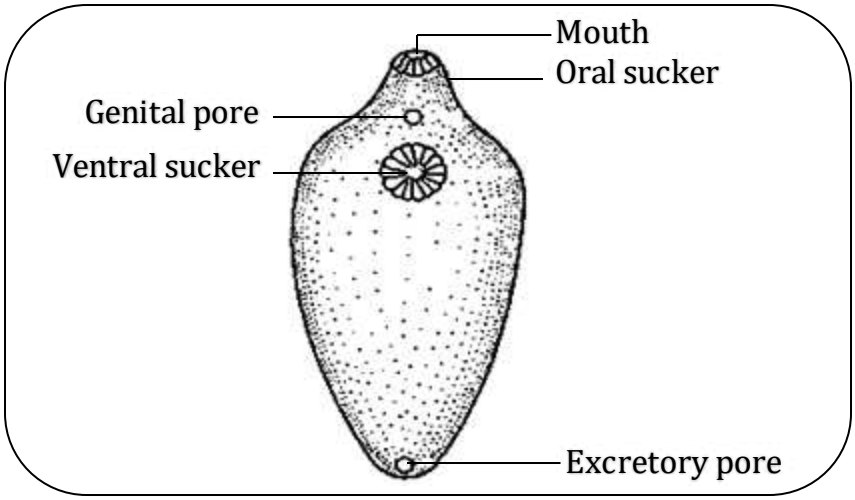
CONTROL OF TAPEWORM INFESTATION

- Feeding on well cooked meat
- Deworming

LIVER FLUKE

- It is found in the liver of infested animals
- It causes **liver rot** in sheep

A DIAGRAM SHOWING LIVER FLUKE



3. ROUNDWORMS (NEMATODES)

- These are unsegmented worms with a streamlined rounded body

CHARACTERISTICS OF ROUNDWORMS

- Their body is pointed at both ends
- They have no segments
- They have a cylindrical body (rounded body)

SIGNS OF ROUNDWORM INFESTATION

- Loss of appetite
- Dullness

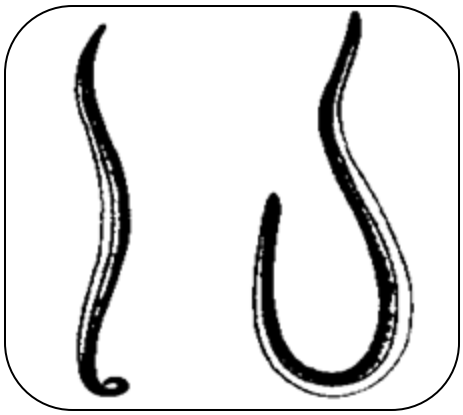
SYMPTOMS OF ROUNDWORM INFESTATIONS

- General body weakness

EXAMPLES OF ROUNDWORMS

- Hookworm
- Eelworm (it affects plants)
- Threadworms (pinworm)
- Ascaris
- Filaria worm: **causes elephantiasis or filariasis**
- Onchocerca volvulus: **causes onchocerciasis or river blindness**

HOOKWORM



- It lives small intestines
- It feeds on blood

How do hookworms enter our bodies?

- By penetrating through the bare skin

EFFECT OF HOOKWORM INFESTATION

- They lead to hookworm anaemia

PREVENTION OF HOOKWORM INFESTATION

- Always wear shoes when walking in dirty places
- Deworming

ASCARIS

- It is pink or white in colour
- It spreads through eating dirty fruits and vegetables which are eaten raw
- It spreads through drinking contaminated water
- It affects people and apes

CONTROL OF ASCARIS

- Always drink clean boiled water
- Wash fruits and vegetables before they are eaten

MOLLUSCS / MOLLUSKS

- These are soft bodied invertebrates with a mantle
- They live in water and on land

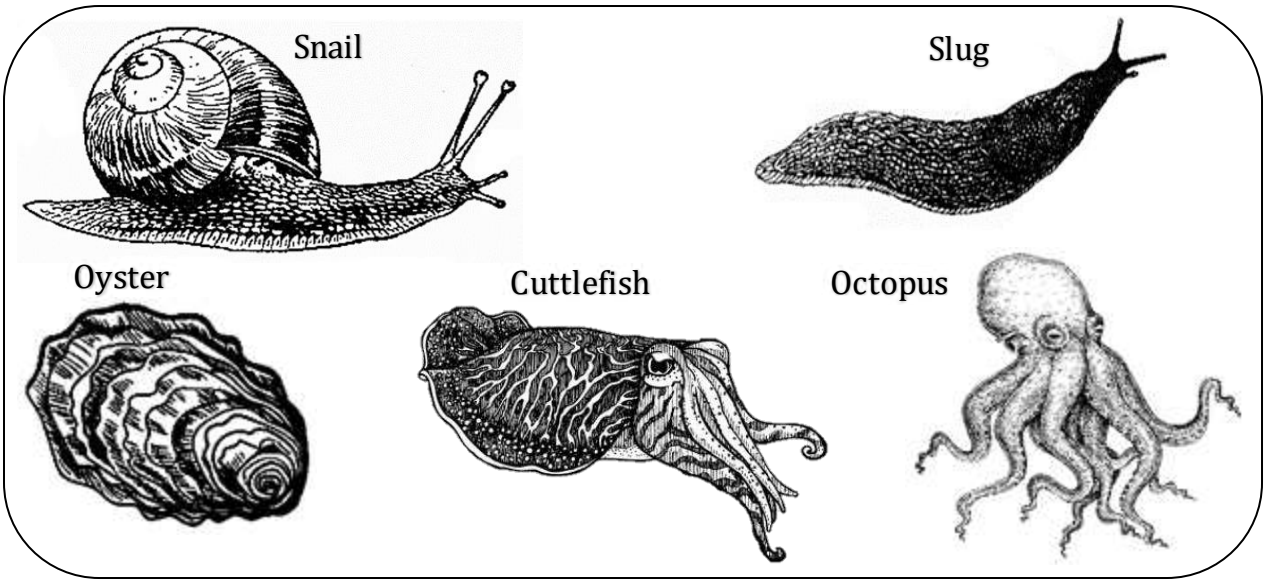
CHARACTERISTICS OF MOLLUSCS

- They have soft bodies
- They have no segments
- They have a mantle
  - ✓ To produce the shell
- Most of them have a shell
  - ✓ For protection
- Mollusks reproduce by laying eggs.
- They have tentacles
  - ✓ For sensing e.g smelling and hearing

EXAMPLES OF MOLLUSCS

- Snail
- Slug
- Squid
- Octopus
- Clam
- Oyster
- Mussel
- Scallop
- Mussel
- Cuttlefish
- Chiton
- Nautilus
- Conch
- Cowrie
- Shipworm
- Cockle

DIAGRAMS SHOWING MOLLUSCS



Why are octopi, squids and cuttlefish regarded as the most intelligent mollusks?

- They have well developed heads and tentacles

How do octopus and squids move?

- By jet propulsion

How does a cuttlefish protect itself from predators?

- By using its beak
- By camouflaging

UNIVALVE MOLLUSCS

- These are molluscs with a shell having one piece

Examples of univalves

- Snail
- Slug
- Conch

BIVALVE MOLLUSCS

- These are molluscs with a shell having two hinged pieces

Examples of bivalves

- Scallop
- Clam
- Mussel
- Oyster

SNAIL

- It has a soft body with a shell
- It feeds on vegetation
- It has hydrostatic skeleton
- It protects itself **by hiding in its shell**
- Its body is made up of spiral coils
- Older snails have more spiral coils than the young ones
- It breathes through **the breathing pore near the entrance of the shell**
- It reproduces by laying eggs
- It is hermaphrodite (it has both male and female reproductive organs)
- Snails live on land and in water

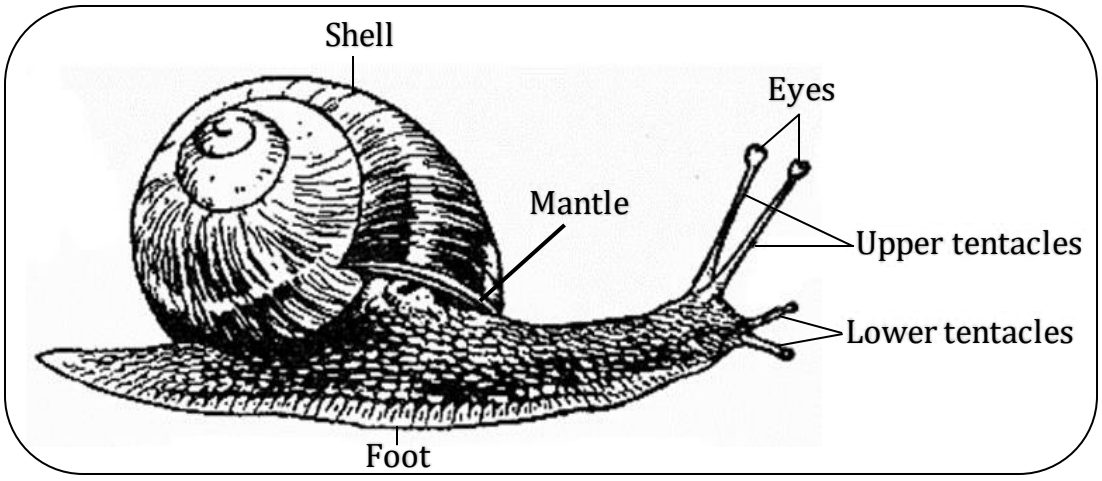
GROUPS OF SNAILS

- Water snails
- Garden snails

✓ Water snails breathe through the **gills**

✓ Garden snails breathe through the **lungs**

A DIAGRAM SHOWING A SNAIL



IMPORTANCE OF EACH PART OF A SNAIL

Mantle

- It produces (secretes) the shell
- It repairs the shell

Shell

- For protection
- It prevents the snail from drying up

Eyes

- For sight

Tentacles

- A snail has two pairs of tentacles

Upper tentacles (eye stalks)

- For holding the eyes

Lower tentacles

- They act as smelling organs
- They are sense organs for touch
- For detecting sound (hearing)
- For detecting change in temperature

Muscular foot (foot)

- For movement

Why does the snail produce slime (mucus)?

- To reduce friction during movement
- To keep its body moist
- It helps a snail to stick (adhere) to smooth surfaces

NOTE:

- Snails have external shells **while** slugs have lack external shells

IMPORTANCE OF MOLLUSCS

- Some molluscs are eaten as food (some snails and octopus are rich in proteins)
- Their shells are used to make poultry feeds
- Garden snails break down organic wastes to form soil

DANGERS OF MOLLUSCS

- Garden snails are crop pests
- Fresh water snails spread bilharziasis

How are molluscs different from other invertebrates?

- They have soft bodies with a shell or mantle unlike other invertebrates

SPONGES

- These are marine invertebrates which live permanently attached to rocks at the sea floor
- They are sometimes called **poriferans**
- Porifera means pore bearing
- They have porous internal skeleton of silica
- They cannot move about
- They feed on tiny pieces of food in sea water
- They breathe and feed **through their porous bodies (ostia / body pores)**
- Sponges can reproduce sexually or asexually by **fragmentation or by producing gemmules**
- Sponges can regenerate parts of its body or even the entire body from fragments

Why are sponges regarded as primitive (simplest) animals?

- They do not move (are sedentary or sessile)
- They lack nerves, muscles and internal organs
- They lack head, mouth, digestive, circulatory or nervous system.

EXAMPLES OF SPONGES

- Bath sponge
- Glass sponge
- Silk cup sponge
- Calcareous sponge

IMPORTANCE OF SPONGES TO PEOPLE

- They are used as bath aids
- For wall painting
- For dish and car washing
- For art and craft
- They are used as cleaning tools
- They are used as drinking vessels

Why are sponges different from other invertebrates?

- They do not move while other invertebrates move

ARTHROPODS

- These are invertebrates with jointed legs, segmented bodies and exoskeleton

CHARACTERISTICS OF ARTHROPODS

- They have jointed legs
- They have segmented bodies
- They have exoskeleton

IMPORTANCE OF EXOSKELETON TO ARTHROPODS

- It protects the body
- It gives the body shape
- It protects the body from drying out

DISADVANTAGES OF AN EXOSKELETON

- It prevents growth
- It increases body weight

MOULTING (ECDYSIS) IN ARTHROPODS

- This is the shedding of exoskeleton in arthropods

Why do arthropods moult (undergo moulting or ecdysis)?

- To increase in size (to grow)

DISADVANTAGE OF MOULTING IN SOME ANIMALS

- The animal may dry out
- The animal may be eaten by predators

NOTE

- Arthropods are the most abundant invertebrates because they can live and survive in a greater range of habitats than any other group of invertebrates

EXAMPLES OF ARTHROPODS

- Millipede
- Centipede
- Crab
- Lobster
- Mite
- Tick
- Spider
- Harvestman
- Housefly
- Moth
- Butterfly
- Mosquito

GROUPS (CLASSES) OF ARTHROPODS

1. Insects
2. Arachnids
3. Crustaceans
4. Myriapods

MYRIAPODS

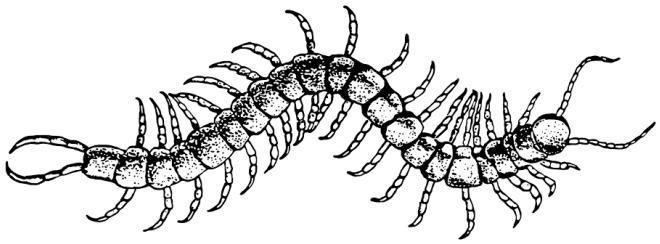
- These are arthropods with many legs and many segments
- They have 20 or more legs
- They can regrow new legs if they lose some legs

GROUPS OF MYRIAPODS

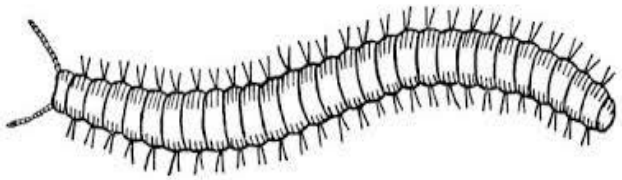
- Centipedes (chilopoda)
- Millipedes (diplopoda)

DIAGRAMS SHOWING MYRIAPODS

CENTIPEDE



MILLIPEDE



DIFFERENCES BETWEEN MILLIPEDES AND CENTIPEDES

- Millipedes have two pairs of legs in each segment while centipedes have one pair of legs on each segment
- Millipedes are herbivores while centipedes are carnivores
- Millipedes have many segments than centipedes
- Millipede protect themselves by curling while centipedes protect themselves by biting using poison claws

MILLIPEDES (DIPLOPODA)

- They have two pairs of legs on each segment
- They are herbivores
- They feed on decaying leaves
- They breathe through spiracles
- They are mostly active at night
- They are move slowly

How do millipedes protect themselves?

- By curling (coiling)
- By producing bad smell

CENTIPEDES (CHILOPODA)

- They have one pair of legs on each segment
- Their first pair of legs is modified into poison fangs
- They are nocturnal animals (mostly active at night)
- They can move quickly
- They breathe **through spiracles**
- They are carnivores
- They feed on insects, worms and spiders

How do centipedes protect themselves?

- By biting using poison claws

How are poison claws useful to a centipede?

- For biting enemies
- For killing the prey

ADVANTAGES OF MYRIAPODS

- Millipedes help in soil aeration
- Millipedes recycle nutrients in the soil
- Centipedes eat insect vectors like flies and cockroaches

DANGERS OF MYRIAPODS

- Millipedes are crop pests (destroy root tubers)
- Centipedes bite people
- Millipedes produce bad smell that causes allergic reactions to some people

CRUSTACEANS

- These are arthropods with a hard crusty skin

CHARACTERISTICS OF CRUSTACEANS

- They have two main parts

i) Abdomen

ii) Cephalothorax (fused head and thorax)

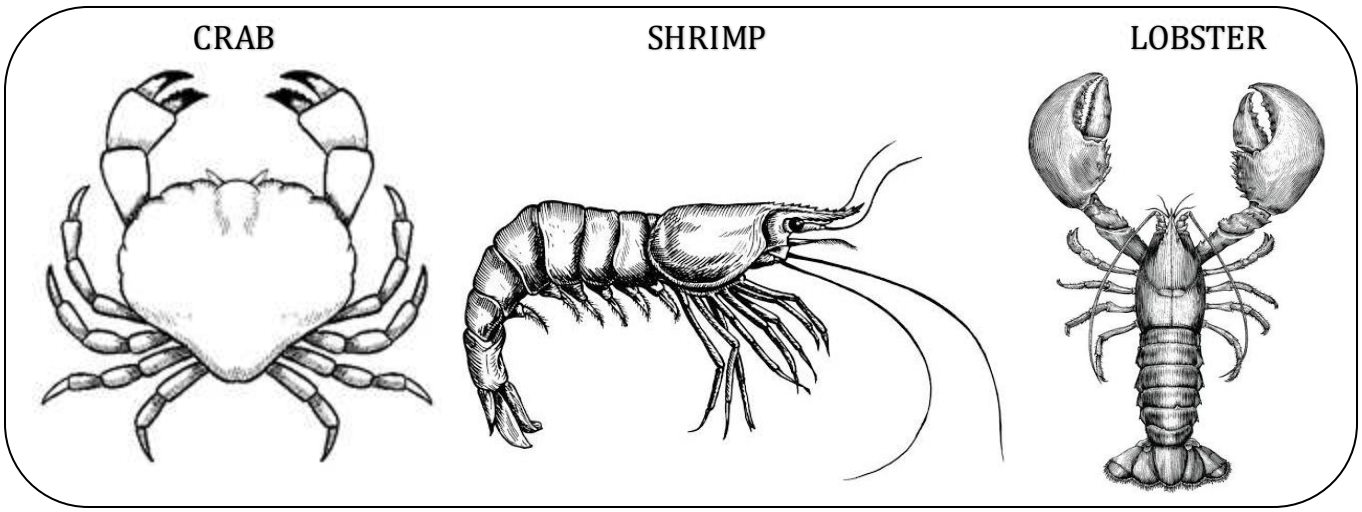
- They breathe through gills
- They live in water or wet places
- They have 10 to 14 legs
- They have 2 pairs of antennae

EXAMPLES CRUSTACEANS

- Crab
- Prawn
- Lobster
- Shrimp
- Woodlice
- Barnacle
- Crayfish
- Water flea
- Sand flea (sandhopper)
- Krill

✓ Some crustaceans feed on worms and insects while others feed on vegetation

DIAGRAMS SHOWING CRUSTACEANS



IMPORTANCE OF CRUSTACEANS

- They are eaten as food by people
- Some of them are used as baits in fishing
- They are source of income when sold in hotels

USES OF APPENDAGES TO CRUSTACEANS

- For feeding
- For walking
- They act as sense organs

USES OF SWIMMERETS TO CRUSTACEANS

- For swimming
- They move over the gills for respiration
- For holding the larvae

ARACHNIDS

- These are arthropods with 2 main body parts and 8 legs

CHARACTERISTICS OF ARACHNIDS

- They have eight legs (four pairs of legs)
- They breathe through book lungs (lung books)
- They have 2 main body parts;
  i) Cephalothorax (prosoma)
  ii) Abdomen (opithosoma)
- They have no antennae

EXAMPLES OF ARACHNIDS

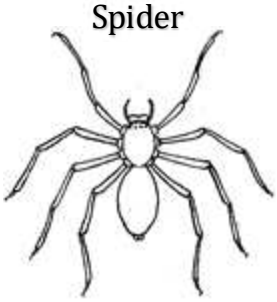
- Spider
- Tick
- Scorpion
- Mite
- Harvestman (daddy longlegs)

SPIDER

- They breathe through book lungs (lung books)
- They have two poison fangs near the mouth **to kill (paralyze) the prey**
- They reproduce by laying eggs
- They have **spinnerets** on the abdomen

DIAGRAMS SHOWING A SPIDER AND A SPIDER WEB

Spider



Spiderweb



Why do spiders make spiderwebs? (Importance of spiderwebs to spider)

- To trap their prey (insects)
- For movement
- For protection
- To encase egg sacs

How do spiders protect themselves?

- By injecting venom into their enemies

IMPORTANCE OF SPINNERET TO SPIDER

- To produce silk
- To spin spiderweb

REASONS WHY SPIDERS PRODUCE SILK

- To make spiderwebs
- To trap prey

IMPORTANCE OF SPIDERS TO PEOPLE

- They eat insect vectors e.g mosquitoes and houseflies

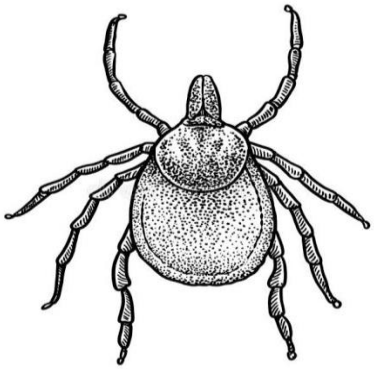
TICK AND MITE

- They live as ectoparasites on animals
- They are parasites and vectors
- They obtain food **by sucking blood from the host**

How are ticks and mites harmful to cattle keepers?

- Ticks and mites are ectoparasites on cattle

A DRAWING SHOWING A TICK



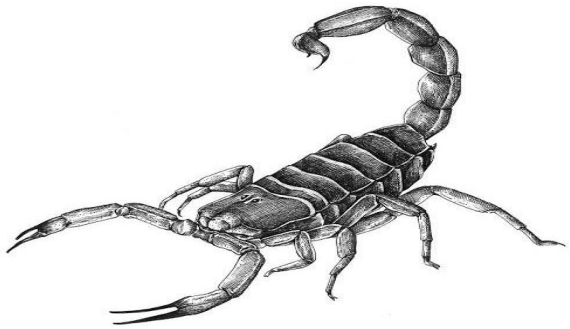
EXAMPLES OF TICKBORNE DISEASES

IN PEOPLE	IN LIVESTOCK (FARM ANIMALS)
▪ Lyme disease ▪ Relapsing fever ▪ Typhus fever	▪ Heart water ▪ East coast fever ▪ Anaplasmosis ▪ Red water

SCORPIONS

- They have a large tail with a poison sting
- Their front legs are modified into pincers
- They produce (give birth) to live young

A DIAGRAM SHOWING A SCORPION



How do scorpions protect themselves?

- By using its poison stinger on the tail
- By biting using its pincers

INSECTS

- These are arthropods with 3 main body parts and 6 legs.

CHARACTERISTICS OF INSECTS

- They have 3 main body parts (head, thorax and abdomen).
- They have 6 jointed legs.
- They breathe through spiracles.

EXAMPLES OF INSECTS

- Tsetse fly
- Housefly
- Mosquito
- Grasshopper
- Butterfly
- Cockroach
- Ants (safari ants, white ants, black ants and red ants)
- Sandfly
- Beetle
- Locust
- Midge
- Blowfly
- Cricket

EXAMPLES OF WINGLESS INSECTS (INSECTS WITHOUT WINGS)

- Red ants
- Safari ants
- Termites
- Silverfish
- Lice
- Fleas
- Firebrats

EXAMPLES OF INSECTS WITH A STINGER

- Bees (worker bee, carpenter bee, bumble bee)
- Wasps
- Fire ants
- Hornets
- Yellow jackets

EXAMPLES OF EDIBLE INSECTS (INSECTS WHICH ARE EATEN BY PEOPLE)

- Grasshoppers
- White ants
- Crickets
- Termites

EXAMPLES OF DANGEROUS INSECTS TO PEOPLE

- Mosquito
- Flea
- Housefly
- Blackfly
- Bedbug
- Tsetse fly
- Locust
- Bumblebee
- Cockroach

GROUPS OF INSECTS

- Social insects
- Solitary insects

SOCIAL INSECTS

- These are insects which live and work together
- They live in a colony

EXAMPLES OF SOCIAL INSECTS

- Termites
- Ants
- Wasps
- Some bees (Honeybees and bumblebees)

SOLITARY INSECTS

- These are insects which live and work alone

EXAMPLES OF SOLITARY INSECTS

- Mosquitoes
- Houseflies
- Butterflies
- Carpenter bees
- Mining bees
- Dragon flies
- Leafcutter bees

THE THREE MAIN BODY PARTS OF AN INSECT

- Head
- Thorax
- Abdomen

THE HEAD

- It has the eyes, antennae and mouth parts.

Compound eyes

- For sight

Antennae (feelers)

- ✓ These are sense organs for;
- Feeling
- Smelling
- Hearing
- Tasting
- Detecting change in temperature and humidity
- Finding direction

MOUTH PARTS

Proboscis

- For sucking food (plant fluids and blood)
- ✓ Insects with proboscis include; bees, moths, mosquitoes, butterflies and tsetse flies

Mandibles

- For cutting and grinding food
- ✓ Insects with mandibles include; grasshoppers, locusts and cockroaches

THE THORAX

- It has the legs and wings
- It has three segments (pro, meso and metathorax)
- Each segment has two legs

Wings

- For flight

Legs (appendages)

- For locomotion (movement)
- For capturing the prey
- For grasping the females during mating
- ✓ Their feet have **sticky pads** to walk on smooth surfaces
- ✓ Their feet have **tarsal claws** to grip and walk on rough surfaces

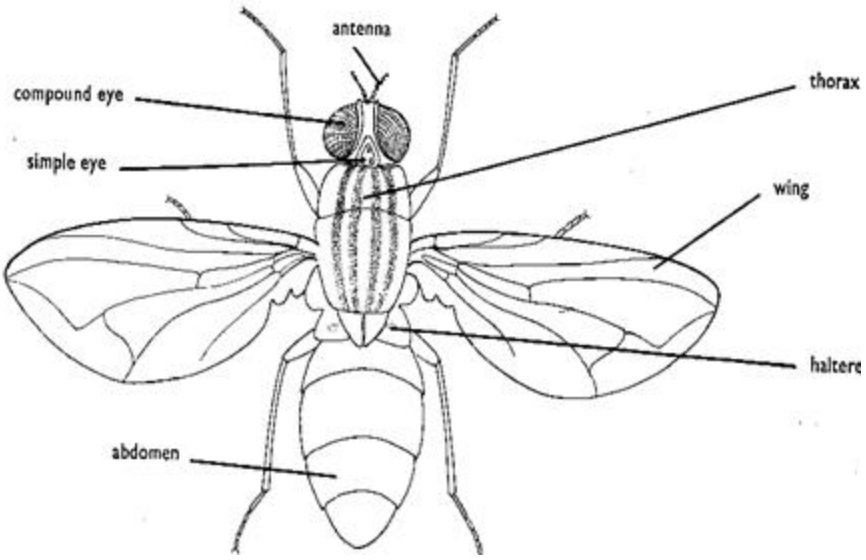
DIPTERANS (DIPTEROUS INSECTS)

- ❖ These are insects with two wings
- ▪ They have **halteres**
- ✓ For balancing during flight
- ▪ They have **proboscis**
- ✓ For sucking food
- ▪ Their larvae are called **maggots**

EXAMPLES OF TWO WINGED INSECTS (DIPTERANS)

- ▪ Housefly
- ▪ Black fly
- ▪ Cranefly
- ▪ Mosquito
- ▪ Sandfly
- ▪ Tsetse fly

A DIAGRAM SHOWING PARTS OF A HOUSEFLY (DIPTERAN INSECT)



ABDOMEN

- ❖ This is the largest main body part of an insect
- ▪ It has spiracles
- ✓ For breathing
- ▪ Female insects have a reproductive organ called **ovipositor**
- ✓ For laying eggs
- ▪ Some insects have **a stinger**
- ✓ For protection (for stinging their enemies)

LIFE CYCLE (METAMORPHOSIS)

- ▪ This is transformation of an organism during the stages of development

TYPES OF LIFE CYCLE (METAMORPHOSIS)

- ▪ Complete metamorphosis (complete life cycle)
- ▪ Incomplete metamorphosis (incomplete lifecycle)

COMPLETE LIFE CYCLE

- This is a life cycle which has four stages of development

Eggs – Larva – Pupa – Adult

EXAMPLES OF INSECTS WHICH UNDERGO COMPLETE METAMORPHOSIS

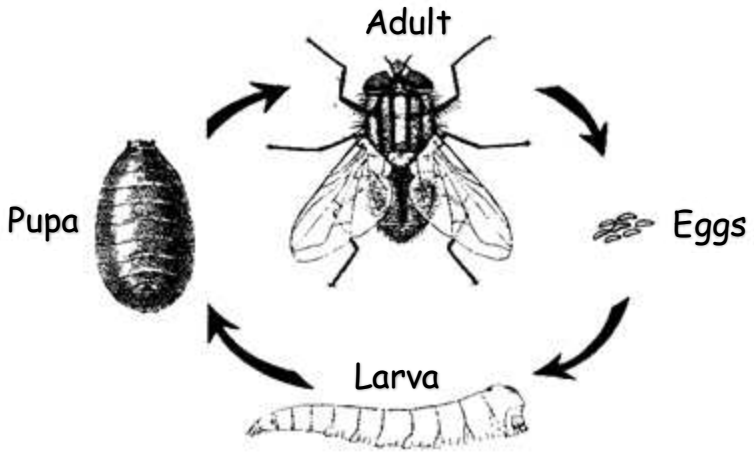
- Houseflies
- Mosquitoes
- Butterflies
- Bees
- Moth
- Wasps
- Tsetse flies
- Fleas

HOUSEFLY

✓ Female houseflies lay their eggs on decaying matter like;

- Manure heaps
- Faeces
- Rubbish pits

A DIAGRAM SHOWING THE LIFE CYCLE OF A HOUSEFLY



- Houseflies undergo complete life cycle
- They lay eggs which hatch into larvae
- The larvae are called **maggots**
- Maggots feed on **decaying matter**
- The larvae (maggots) turn into **pupae**
- The pupa is a **dormant stage**

✓ It neither feeds nor moves

- The pupa grows inside a protective case called **cocoon**

✓ The cocoon protects the pupa

- The pupae develop into adults
- An adult housefly is called **imago**
- Adult houseflies have two wings (they are dipterans)

Why do houseflies lay their eggs in decaying matter?

- For the larvae (maggots) to get food

How are maggots useful in pit latrines and sewage tanks?

- They reduce the volume of faeces

How do maggots reduce the volume of faeces?

- By feeding on faeces

DANGERS (ECONOMIC IMPORTANCE) OF HOUSEFLIES

- They are insect vectors (they carry germs which cause diseases)
- They help in disposal of rotting matter by feeding on it.

How is a housefly able to carry germs?

- It has a hairy body

How do houseflies spread germs?

- By vomiting juices on food
- By defecating on food
- By contaminating food
- Through the 4Fs germ path

State the importance of glandular pads in the feet of a housefly.

- They help a housefly to walk on smooth surfaces and upside down.

DISEASES TRANSMITTED BY A HOUSEFLY

- Diarrhoea
- Typhoid
- Dysentery
- Cholera
- Trachoma

CONTROL OF HOUSEFLIES

- Spraying with insecticides
- Disposing faeces in latrines
- Disposing rubbish in rubbish pits
- Smoking ordinary pit latrines
- Covering dustbins
- Burying kitchen refuse

MOSQUITOES

- All adult mosquitoes feed on nectar and fruit juices.
- They use the proboscis to suck nectar
- Male mosquitoes don't suck blood (don't bite) and so they do not transmit diseases
- Female mosquitoes suck blood **to get proteins for development of their eggs**
- Female anopheles mosquitoes spread malaria
- Malaria is caused by a protozoan germ called **plasmodium**
- Culex mosquitoes spread **elephantiasis (filariasis)**

- Elephantiasis is caused by a **filaria worm**
- Aedes (tiger) mosquito spreads **yellow fever, dengue fever, zika fever and chikungunya fever**
- Yellow fever, dengue fever and chikungunya fever are caused by **a virus** and can be prevented by **immunization**

TYPES OF MOSQUITOES

- Anopheles mosquito
- Culex mosquito
- Aedes (tiger) mosquito

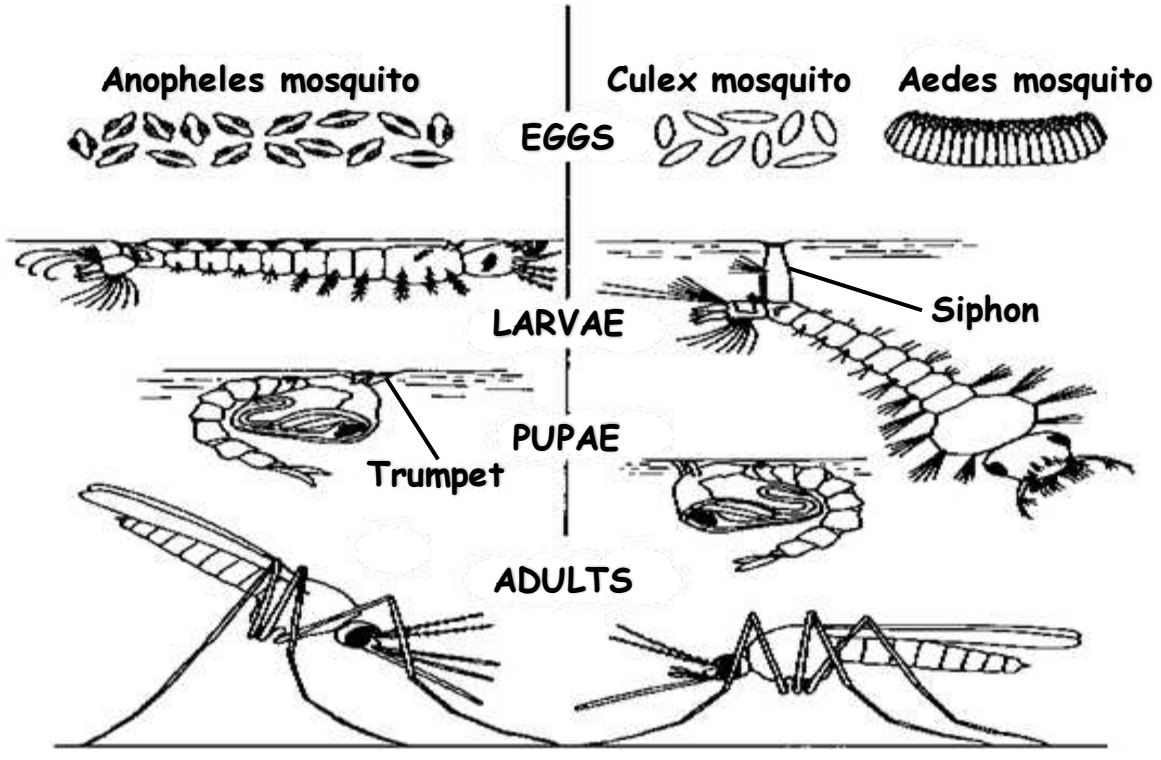
LIFE CYCLE OF A MOSQUITO

- It lays eggs in stagnant water (breeds from stagnant water)
- Its larva stage is called **wriggler**
- The larva (wriggler) breathes through **siphon**
- Its pupa stage is called **tumbler**
- The pupa breathes through **trumpet**
- An adult stage is called **imago**

How does the wriggler (larva stage of a mosquito) move?

- By wriggling

DIAGRAMS SHOWING LIFE CYCLES OF ANOPHELES AND CULEX MOSQUITOES



DIFFERENCES BETWEEN ANOPHELES AND CULEX MOSQUITOES

Anopheles mosquito	Culex mosquito / Aedes mosquitoes
Lays eggs with an air floats; to enable them float on water	Lays eggs in rafts / Lays eggs singly
Larva lies parallel to the water surface	Larva lies at an angle to the water surface
Adult stands at an angle when at rest	Adult stands flat horizontally when at rest.

Why is Aedes mosquito sometimes called tiger mosquito>?

- It has white and black colour pattern.

MOSQUITO BORNE DISEASES.

- These are diseases that spread through bites of infected mosquitoes.

EXAMPLES OF MOSQUITO BORNE DISEASES.

Type of mosquito	Mosquito borne disease	Germ
Anopheles mosquito	Malaria	Plasmodium
Culex mosquito	Elephantiasis / filariasis	Filarial worm
Aedes (tiger) mosquito	Yellow fever	Yellow fever virus
	Dengue fever	Dengue virus
	Zika fever	Zika virus
	Chikungunya fever	Chikungunya virus

How do mosquitoes spread diseases?

- Through bites

How are mosquitoes able to detect people at night?

- They have a good sense of smell

Why can't female anopheles mosquito spread HIV/AIDS yet it feeds on blood?

- HIV is destroyed by the enzymes in the digestive tract of a mosquito
- HIV is destroyed in the body of a mosquito

WAYS OF CONTROLLING MOSQUITOES AND MOSQUITO BORNE DISEASES;

Biological control methods

- Keep fish in ponds to eat on mosquito larvae
- Put mosquito repellant plants in the compound

Chemical control methods

- Pour oil on stagnant water to kill mosquito larvae
- ✓ Oil cuts off oxygen supply to mosquito larvae
- Spray with insecticides to kill adult mosquitoes

- Sleep under treated mosquito nets
- ✓ To prevent mosquito bites
- ✓ To kill mosquitoes
- Apply mosquito repellant vaseline on your body
- Use of mosquito coils

Mechanical control methods

- Drain stagnant water around homes
- ✓ To destroy breeding places for mosquitoes
- Clear all bushes around homes
- ✓ To destroy hiding places for mosquitoes
- Use of electric mosquito traps
- ✓ To electrocute mosquitoes / to shock mosquitoes to death
- Close doors and windows early in the evening
- Burn broken plastic tins and bottles where mosquitoes can breed

WAYS OF CONTROLLING MOSQUITOES AND MOSQUITO BORNE DISEASES WITHOUT USING DRUGS.

- Drain stagnant water around homes
- ✓ To destroy breeding places for mosquitoes
- Clear all bushes around homes
- ✓ To destroy hiding places for mosquitoes
- Keep fish in ponds to eat mosquito larvae (wrigglers)
- Use of electric mosquito traps
- Close doors and windows early in the evening
- Use mosquito repellant plants in the compound like basil and lemon balm
- Burn broken plastic tins and bottles where mosquitoes can breed

DRUGS USED TO TREAT MOSQUITO BORNE DISEASES

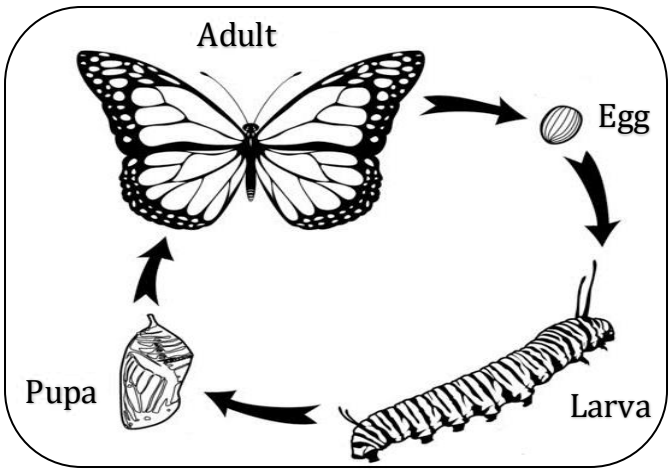
- Chloroquine
- Quinine
- Coartem
- Aloe vera
- Bitter leaf juice
- Neem leaf juice

BUTTERFLIES AND MOTH

- They undergo complete metamorphosis
- ✓ Eggs – Larva (caterpillar) – Pupa (chrysalis) – Adult (imago)
- Female butterflies and moths lays eggs on the surface of leaves
- The eggs hatch into larvae called **caterpillars**
- Caterpillars feed on leaves
- The larvae develop into pupae called **chrysalis**

- Pupae (chrysalis) are protected by **cocoon**
- The pupa neither feeds nor moves (it is dormant)
- The pupae develop into adults called **imago**
- The adult breaks the cocoon and comes out when it is fully grown
- Moths are **nocturnal insects** (then are mostly active at night) while butterflies are **diurnal insects** (active during day time)

A DIAGRAM SHOWING LIFE CYCLE OF A BUTTERFLY



Why butterflies and moths lay their eggs on leaves

- To enable their larvae get food

How are moths able to pollinate scented flowers at night?

- They have a good sense of smell

Besides moths, name other nocturnal insect pollinators

- Beetles (ladybirds)

How do moths and butterflies protect themselves against predators / enemies?

- By camouflaging to confuse predators

How do caterpillars protect themselves?

- They use their prickly hair

ADVANTAGES OF BUTTERFLIES AND MOTHS

- They pollinate flowers of crops
- They eat weedy plants
- Some caterpillars are eaten as food
- They are used in advertisements to show health environment

DISADVANTAGES OF BUTTERFLIES AND MOTHS

- Their larvae destroy crops (caterpillar is a crop pest)
- Caterpillars have prickly (bristle) hairs which cause itching on the skin

DIFFERENCES BETWEEN BUTTERFLY AND MOTH

BUTTERFLY	MOTH
Active during day time (it is diurnal)	Active at night (it is nocturnal)
Has smooth body	Has hairy body
Has bright colours	Has dull colours
Has clubbed (long thin) antennae	Has short feathery antennae
Has slender body	Has stout body
Has rectangular wings	Has triangular wings
Rests with their wings closed	Rests with their wings open

TSETSE FLIES

- They suck blood from animals and people for food
- They have a complete life cycle
- Their eggs hatch inside their body

Where do female tsetse flies lay their eggs?

- Female tsetse flies do not lay eggs but produce larvae

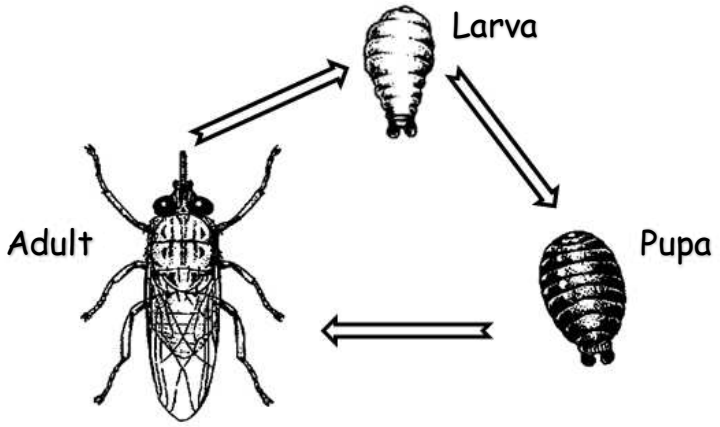
Why are tsetse flies are called ovoviviparous insects?

- Their eggs hatch inside their body and produce larvae

Why do tsetse flies produce larvae instead of laying eggs?

- Its environment does not favour laying eggs

A DIAGRAM SHOWING THE LIFECYCLE OF A TSETSE FLY



Where are tsetse flies commonly found?

- In swamps
- In forests (bushes)

DISEASES THAT SPREAD THROUGH TSETSE FLY BITES

- **Nagana** : in farm animals
- **Sleeping sickness**: in people

INCOMPLETE METAMORPHOSIS

- This is a life cycle with three stages of development

Eggs – Nymph – Adult (imago)

Nymph is the second stage of the incomplete life cycle

Imago is an adult stage in the life cycle of an insect

After moulting, the nymph develops wings and becomes a fully adult.

DIFFERENCES BETWEEN NYMPH AND ADULT

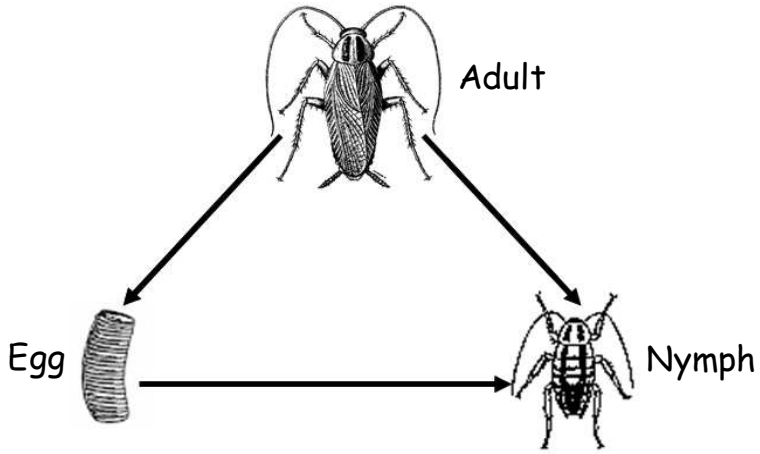
- Nymph has no wings (it is wingless) but adult has wings
- Nymph is always smaller than adult

EXAMPLES OF INSECTS WHICH UNDERGO INCOMPLETE METAMORPHOSIS

- Cockroach
- Grasshopper
- Dragonfly
- Bedbug
- White ant
- Cricket
- Locust
- Termite
- Aphid
- Praying mantis
- Walking sticks
- Katydid

✓ Cockroaches are **nocturnal insects** (active at night)

A DIAGRAM SHOWING LIFE CYCLE OF A COCKROACH



DISEASES TRANSMITTED BY COCKROACHES:

- Leprosy
- Poliomyelitis (polio)
- Cholera
- Typhoid
- Diarrhoea

IMPORTANCE OF INSECTS

- Some insects pollinate flowers of crops e.g moths, beetles, bees and butterflies.
- Some insects are eaten as food (are edible) e.g white ants, grasshoppers and crickets.
- Bees provide honey and beeswax
- Grasshoppers are sold for income
- Silk moths provide silk to textile industries

DANGERS OF INSECTS

- Some insects are vectors (spread germs)
- Some insects are crop pests (destroy crops)

- Some insects sting people
- Termites destroy wood and local houses

PROTISTA KINGDOM (single called organisms)

- This is a kingdom of simple organisms with one cell / unicellular organisms
- They have a nucleus enclosed in a membrane
- They are neither plants, fungi, bacteria nor animals.
- They live in liquids or in other organisms **to prevent themselves from drying out**

EXAMPLES OF PROTISTA

- Algae
- Protozoa
- Euglena

ALGAE

- They have no roots, stems and leaves.
- They have chlorophyll and can make their own food.
- Larger algae reproduce by **means of spores.**
- Smaller algae reproduce by **fragmentation.**
- They are found in water and moist places.

What is algal bloom?

- This is the dense spread of algae on water surface.

EXAMPLES OF ALGAE

- Giant kelp / Seaweeds
- Spirogyra
- Stonewort
- Volvox
- Brown algae (Fucus / Rockweed)
- Diatom

TYPES OF ALGAE

- Red algae
- Green algae

IMPORTANCE OF ALGAE

- They act as food for aquatic animals
- They are a source of iodine when eaten
- They are used as fertilizers
- They provide oxygen to aquatic animals
- They are used to make biofuels (algal biofuel)

PROTOZOA

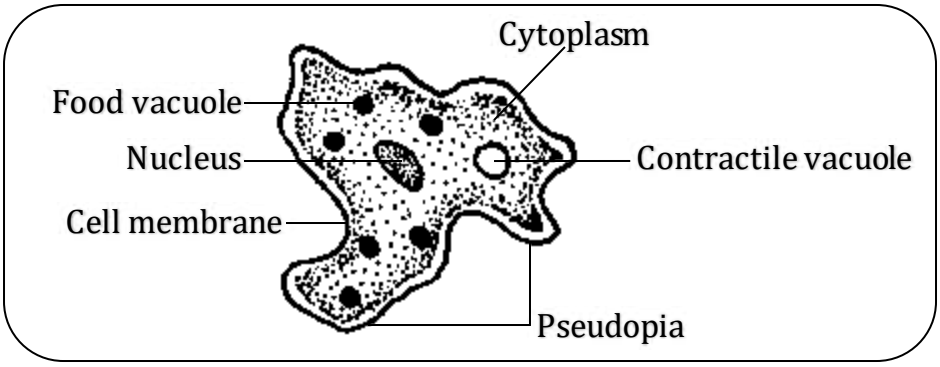
- These are unicellular organisms with nucleus and cytoplasm.
- Protozoa are microscopic **because** they can only be seen using a microscope
- Protozoa are unicellular **because** they have one cell

- They do not have chlorophyll
- Amoeba uses **pseudopodia (false feet)** for locomotion/movement and feeding
- Paramecium uses **cilia** for locomotion and feeding
- They are found in fresh water, damp places and in bodies of animals as parasites.
- They reproduce by **binary fission**

EXAMPLES OF PROTOZOA

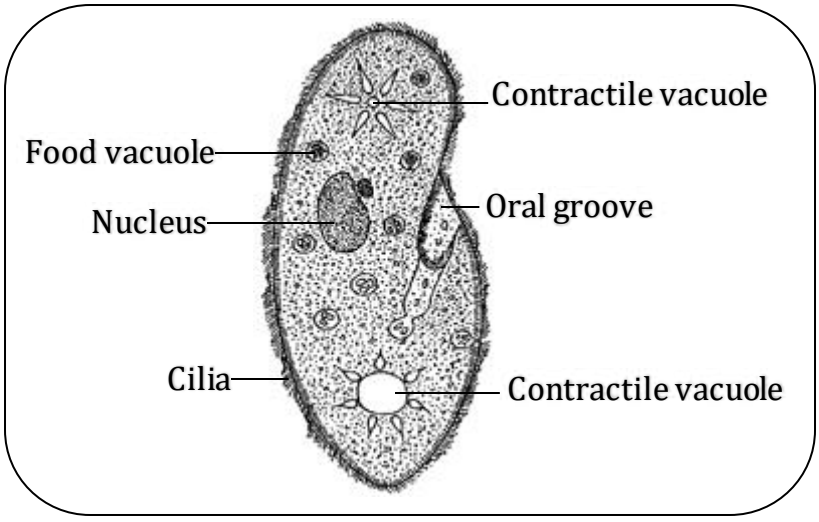
- Amoeba
- Plasmodium
- Paramecium
- Trypanosome

A DIAGRAM SHOWING AN AMOEBA



- An amoeba reproduces by **binary fission**
- Binary fission is an example of **asexual reproduction**
- **Binary fission** is the process by which the cell divides into two identical daughter cells

DIAGRAM SHOWING PARAMECIUM

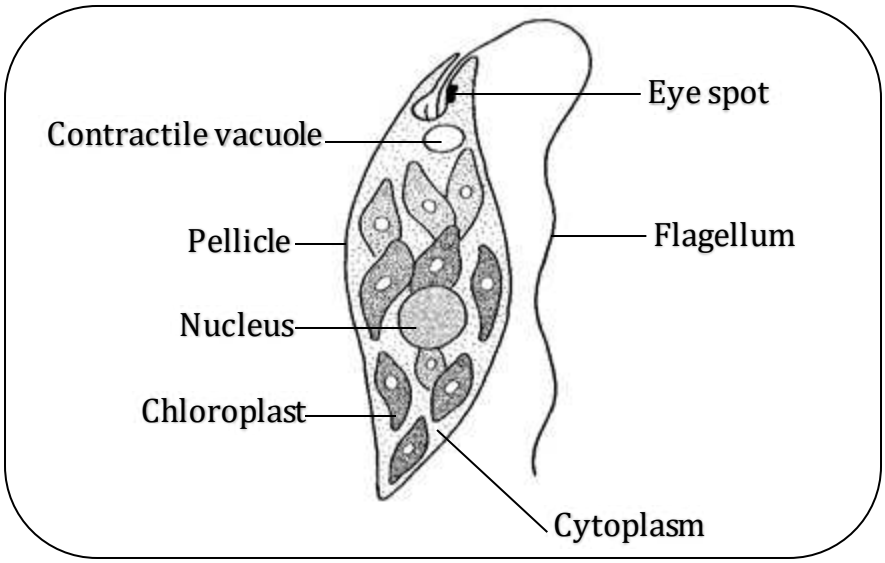


EUGLENA

- This is a unicellular organism which has both plants and animal features.
- It has chlorophyll so makes its own food.
- It can move from one place to another very quickly for protection

- Euglena have chlorophyll as plants and have flagella but do not have cell wall as animals
- It uses **flagella** for locomotion (movement) and feeding
- It is microscopic and lives in ditches and ponds.

A DIAGRAM SHOWING EUGLENA



PROTOZOAN DISEASES IN HUMANS

PROTOZOA	PROTOZOAN DISEASE
Plasmodium	Malaria
Trypanosome	Sleeping sickness
Amoeba	Amoebic dysentery

FUNGI KINGDOM

- This a kingdom of organisms that lack chlorophyll and cannot make their own food
- Fungi belong to **Kingdom fungi**
- They can either be unicellular or multicellular organisms
- Fungi grow in **moist places**

✓ Due to presence of rotting / decaying matter

- They do not have leaves, stem and roots
- Fungi lack roots but they have threadlike structures called **hyphae**
- To absorb food from decaying matter
- A group of hyphae is called **mycelium**
- Fungi cannot make their own food
- Most fungi are saprophytes while others are **parasites**
- **Saprophytes** are organisms that feed on dead matter
- **Parasites** are organisms that depend on other host for survival
- **A host** is an organism on which a parasite depends

Why are fungi unable to make their own food?

- They lack chlorophyll

Why are fungi called saprophytes?

- They feed on dead organic matter

Why are fungi very common in wet season/moist places?

- There is enough water to support growth of fungi
- There is a lot of rotting matter on which fungi feed

REPRODUCTION IN FUNGI

- Most fungi reproduce by means of spores
- Yeast reproduces by budding

FEEDING IN FUNGI

- Most fungi feed saprophytically (feed on dead matter)
- Some fungi feed parasitically (get food from their host)

CHARACTERISTIC OF FUNGI

- They lack chlorophyll
- They have a nucleus
- Fungi have a cell wall
- Most fungi are filamentous
- Most fungi reproduce by means of spores and budding in yeast
- Most fungi feed saprophytically

CONDITIONS NECESSARY FOR GROWTH OF FUNGI

- Moisture
- Warmth

EXAMPLES OF FUNGI

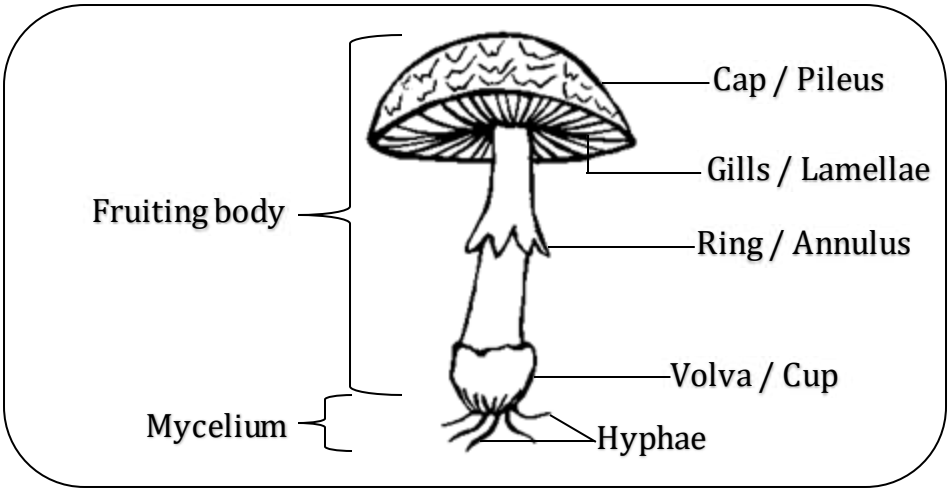
- Mushrooms
- Toadstools
- Yeast
- Moulds
- Mildews
- Puffballs
- Clubroot fungus
- Bracket fungus

✓ Bracket fungi always grow on tree trunks

MUSHROOM

- It reproduces by means of spores
- It is propagated by means of spores
- It feeds saprophytically (feeds on dead organic matter)
- Some mushrooms are edible while others are poisonous

A DIAGRAM SHOWING A MUSHROOM



- The part of a mushroom visible above the ground is called **fruiting body (sporophore)**
- The part of a mushroom below the ground is called **mycelium**

FUNCTIONS OF EACH PART OF A MUSHROOM

CAP PILEUS)

- It protects the gills

GILLS

- They produce and store spores

STALK / STIPE

- It holds the cap and gills

RING

- It protects the mushroom when it is still young

HYPHAE

- They absorb food (nutrients) from dead matter

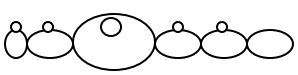
Why is a mushroom not called a plant?

- A mushroom has no chlorophyll while plants have chlorophyll
- A mushroom feeds on rotting matter while a plant makes its own food

YEAST

- Yeast contains an enzyme called **zymase**
- Yeast speeds up fermentation of alcohol
- Yeast reproduces by **budding**

A DIAGRAM TO SHOW BUDDING IN YEAST



TOADSTOOLS

- They grow on decaying organic matter
- Toadstools resemble mushrooms
- They are poisonous

MOULDS

- These are furry tiny fungi that grow on rotten organic matter (rotten cassava, breads and sweet potato)

EXAMPLES OF MOULDS

- Penicillium
- Rhizopus
- Mucor
- ✓ Rhizopus causes rotting of fruits and vegetables
- ✓ Mucor spoils breads and cakes
- ✓ Penicillium is used to make penicillin and cheese

IMPORTANCE OF FUNGI (USEFUL FUNGI)

- Some fungi are eaten as food e.g some mushrooms, morels and truffles (Some fungi are sources of proteins/fungal proteins)
- Mushrooms are sold for income
- Yeast helps in brewing/making alcohol/fermentation of alcohol
- ✓ It speeds up fermentation
- Yeast helps in baking
- ✓ It leavens breads/rise the dough
- Yeast extracts are a source of Vitamin B
- Penicillium are used to make penicillin (antibiotic drug)
- Penicillium is used in making cheese
- Fungi help in decomposition (break down organic matter)

DANGERS OF FUNGI (HOW FUNGI ARE HARMFUL / NUISANCE)

- Some fungi make food go bad e.g moulds
- Some fungi destroy wood
- Toadstools are poisonous when eaten
- Some fungi cause fungal diseases

FUNGAL DISEASES IN PEOPLE

- Ringworm
- Candidiasis
- Athlete's foot
- Barber's itch
- Jock itch

FUNGAL DISEASES IN PLANTS

- Black spot
- Potato blight
- Powdery mildew
- Tomato blight
- Maize rust
- Corn smut

PREVENTION AND CONTROL OF FUNGAL DISEASES

- Regular bathing
- Avoid sharing dirty clothing with infected person
- Spray using fungicides
- Do not eat any mushroom that you don't understand
- Preserving food
- Using essential drugs
- Do not eat uncovered smelly food
- Store food in cool dry places

NEW TOPIC: SOUND ENERGY

ENERGY

- This is the ability of the body to do work.

TYPES OF ENERGY

- **Kinetic energy**

This is the type of energy possessed by a body in motion (moving body)

- **Potential energy**

This is the type of energy possessed by a body at rest (stationary body)

FORMS OF ENERGY

- Sound energy
- Heat energy
- Light energy
- Mechanical energy
- Chemical energy
- Magnetic energy
- Electrical energy

SOUND ENERGY (SOUND)

- This is the form of energy that enables us to hear
- This is the form of energy produced by vibration of matter

How is sound produced?

- By vibration of matter (when an object vibrates)

Why is sound called a form of energy?

- It does work (it can do work)

UNITS FOR MEASURING SOUND

- Decibels (dB)

TERMS USED IN SOUND

VIBRATION

- This is the rapid movement of an object to and fro or up and down
- This is the back and forth movement of an object

A DIAGRAM SHOWING VIBRATION OF AN OBJECT

Why do some objects vibrate?

- Some objects are springy or elastic

MUSIC

- This is organized sound with regular vibration

NOISE

- This is disorganized sound with irregular vibration

PITCH

- This is the highness or lowness of sound
- This is how high or low sound is

VOLUME

- This is the loudness or softness of sound

FREQUENCY

- This is the number of vibrations produced per second
- ✓ It is measured in **Hertz (Hz)**

AMPLITUDE

- This is the width / height of vibrations
- This is the height of the wave from the point of rest

TYPES OF SOUND

- Loud sound
- Soft sound
- High sound
- Low sound

IMPORTANCE OF SOUND

- For communication
- For entertainment
- For protection
- For evidence in courts of law
- Sound is used to show feeling

SOURCES OF SOUND

- These are things that produce sound.

TYPES OF SOURCES OF SOUND

- Natural sources of sound
- Artificial sources of sound

NATURAL SOURCES OF SOUND

- ✓ These are sources of sound that were created by God
- Thunder
- Earth quake
- Waterfall
- Rainfall
- Volcanic eruption
- Wind
- Animals

ARTIFICIAL SOURCES OF SOUND

- ✓ These are sources of sound that are made by people
- Aeroplanes
- Cars
- Trains
- Factories
- Radios
- Loudspeakers
- Guns
- Bombs

Explain how the following organisms produce sound.

MAMMALS (HUMAN BEINGS)

- By vibration of vocal cords

BIRDS

- By vibration of the walls of syrinx and pessulus

BEES, MOSQUITOES AND HOUSEFLIES

- By beating (flapping) their wings rapidly

GRASSHOPPERS

- By rubbing their hind leg on the forewings

CRICKETS

- By rubbing their wings together

MUSICAL INSTRUMENTS

- These are instruments that produce organized sound

GROUPS OF MUSICAL INSTRUMENTS

- String instruments (chordophones)
- Wind instruments (aerophones)
- Percussion instruments (idiophones)

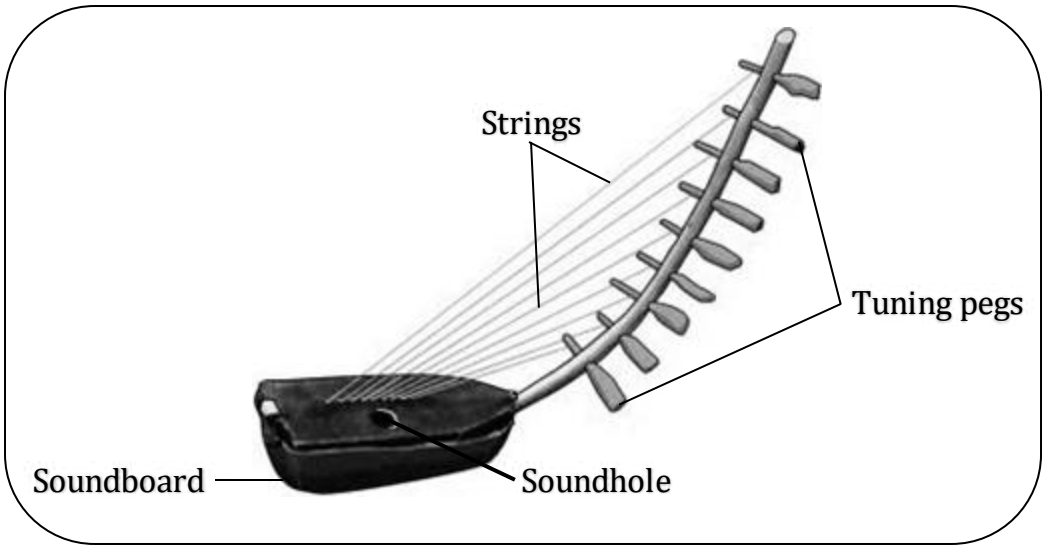
STRING INSTRUMENTS (CHORDOPHONES)

- These are instruments that produce sound by vibration of their strings when plucked or bowed

EXAMPLES OF STRING MUSICAL INSTRUMENTS

- Cello
- Viola
- Violin
- Bow harp
- Guitar
- Lyre
- Tube fiddle
- Harp
- Mandolin
- Banjo
- Double bass
- Ukulele

A DIAGRAM SHOWING BOW HARP



SOUNDBOARD

- It amplifies sound

SOUNDHOLE

- It amplifies sound
- It resonates with the tones
- It enhances the tone quality

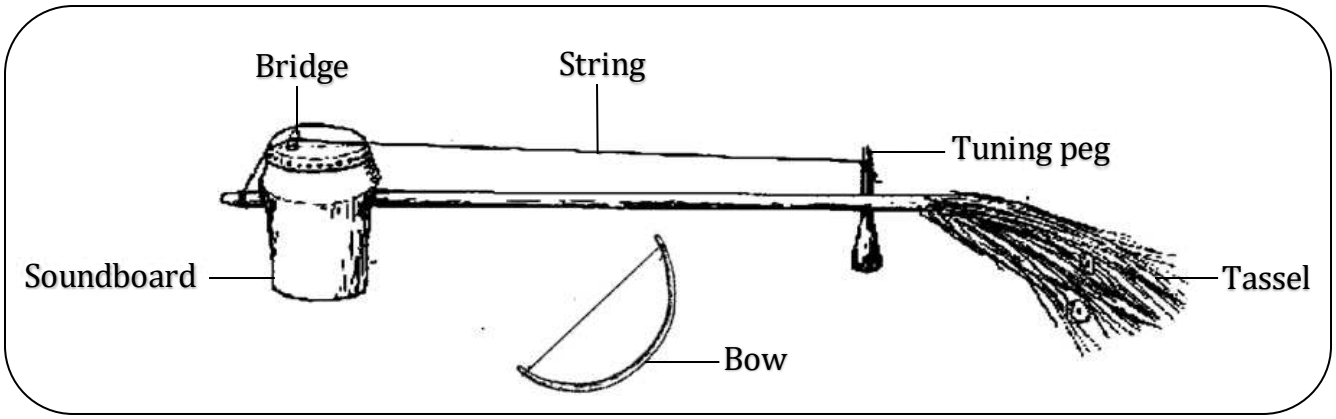
TUNING PEGS

- For changing the tension of the string
- For tightening or loosening the string

STRINGS

- They vibrate to produce sound when plucked

A DIAGRAM SHOWING A TUBE FIDDLE



STRING

- It vibrates to produce sound when stroked

TUNING PEGS

- For changing the tension of the string
- For tightening or loosening the string

BRIDGE

- It supports the string
- It transmits sound vibration from the string to the soundboard

SOUNDBOARD

- It amplifies sound

BOW

- For stroking the string of a tube fiddle to produce sound

CHANGING PITCH OF STRING MUSICAL INSTRUMENTS

- By tightening or loosening the strings
- By shortening or lengthening the strings

INCREASING THE PITCH OF STRING MUSICAL INSTRUMENTS

- By tightening the strings
- By shortening the strings

REDUCING THE PITCH OF STRING MUSICAL INSTRUMENTS

- By loosening the strings
- By lengthening the strings

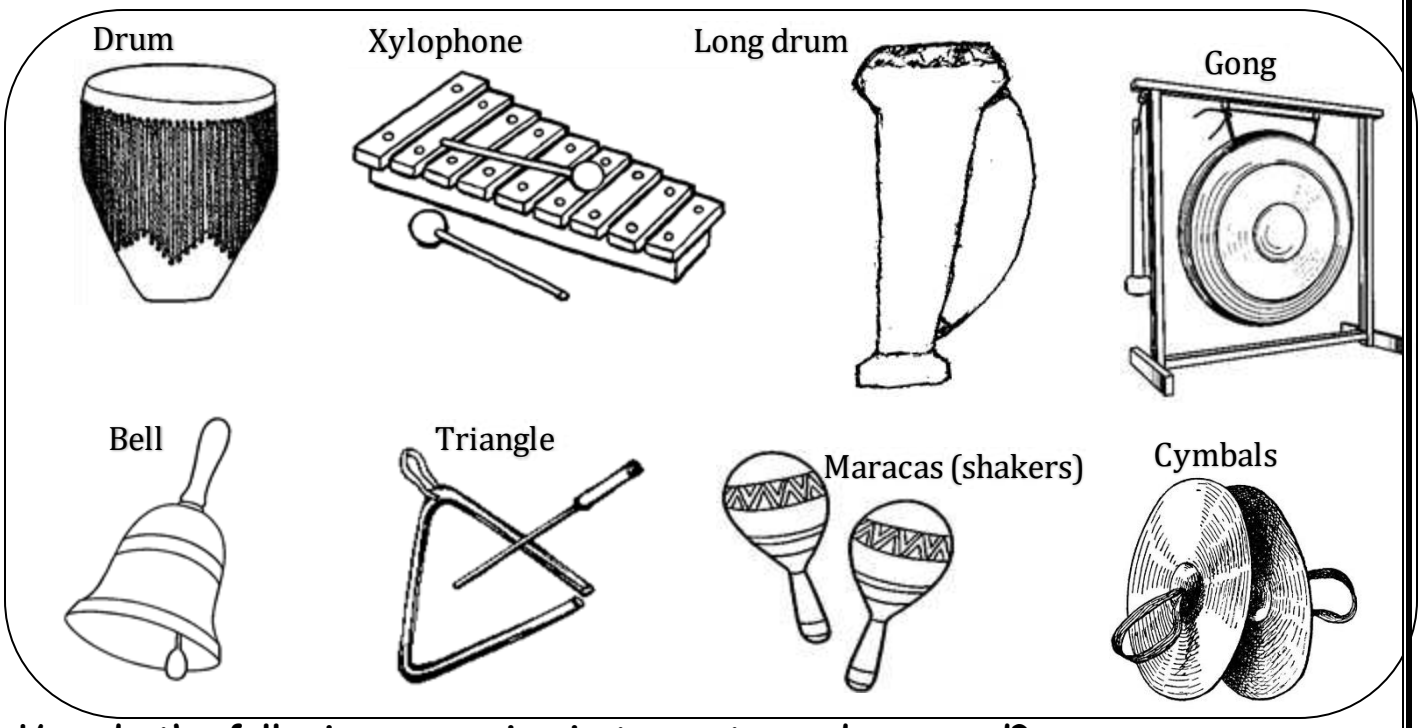
PERCUSSION INSTRUMENTS

- These are instruments that produce sound by vibration of their surface when hit or struck or shaken or beaten.

EXAMPLES OF PERCUSSION INSTRUMENTS

- ✓ Marimba
- ✓ Xylophone (balafon)
- ✓ Vibraphone
- Drum
- Long drum
- Thumb piano
- Piano
- Shakers / maracas
- Cymbals
- Shakers
- Rattles
- Timpani
- Castanet
- Triangle
- Bell
- Tambourine
- Gong
- Celesta

DIAGRAMS SHOWING PERCUSSION INSTRUMENTS



How do the following percussion instruments produce sound?

PIANO

- By vibration when its own hammer hits the strings

SHAKER

- By vibration of its skin and the objects inside it when shaken

DRUM, LONG DRUM AND GONG

- By vibration of its skin when hit

XYLOPHONE

- By vibration of its wooden bars/wooden keys when hit with mallets

BELL

- By vibration of the gong and the hammer when shaken

CHANGING THE PITCH OF SOUND PRODUCED BY PERCUSSION INSTRUMENTS

- By reducing or increasing the size of vibrating surface
- By tightening or loosening the vibrating surface

INCREASING THE PITCH OF SOUND PRODUCED BY PERCUSSION INSTRUMENTS

- By reducing the size of the vibrating surface
- By tightening the vibrating surface

Of what importance are the strings on the sides of the drum?

- To keep the skin tight

WIND INSTRUMENTS (AEROPHONES)

- These are instruments which produce sound by vibration of air blown inside them

EXAMPLES OF WIND MUSICAL INSTRUMENTS

- Whistle
- Oboe
- Flute
- Bugle
- Clarinet
- Trumpet
- Panpipes
- Horn
- Vuvuzela
- Tuba
- Trombone
- Saxophone: By vibration of the reed on the mouth piece when blown

DIAGRAMS SHOWING PANPIPES, HORN, WHISTLE AND FLUTE

How can the pitch of wind musical instruments be increased?

- By reducing the vibrating space (making the vibrating space smaller)

How can the pitch of wind musical instruments be decreased?

- By increasing the vibrating space (making the vibrating space bigger)

TRANSMISSION OF SOUND

- This is the movement of sound waves from one place to another

How does sound travel?

- Through sound waves

PROPERTIES OF SOUND

- It can be reflected
- It can be refracted
- It cannot travel through vacuum
- It travels in all directions from the source

MEDIUM OF SOUND

- This is a material through which sound is transmitted

MEDIA THROUGH WHICH SOUND TRAVELS

- Solid
- Liquid
- Gas

What enables sound to travel through different media (states of matter)?

- Molecules

VACUUM

- This is the space without matter

Why is sound unable to travel through vacuum?

- There is no matter (molecules) to transmit sound waves

SPEED OF SOUND IN DIFFERENT MEDIA

MEDIUM (STATE OF MATTER)	SPEED OF SOUND
Gas (air)	330m/s
Liquid (water)	1500m/s
Solid (iron)	5000m/s

NOTE

- **Sound travels slowest in gases**

✓ Molecules are farthest apart (very loosely packed)

- **Sound travels faster in liquids**

✓ Molecules in liquids are close together

- **Sound travels fastest in solids**

✓ Molecules are tightly packed

Why does sound travel fastest through solids?

- Molecules in solids are tightly packed (closest together)

Why does sound travel faster in water (liquids) than in air (gases)?

- Molecules in water are closer together than those in air

FACTORS AFFECTING THE SPEED OF SOUND

- Temperature
- Altitude
- Heat
- Wind
- Humidity

TEMPERATURE

- When temperature is low, sound waves are nearer the ground and when temperature is high, sound waves raise above the ground.

Why is sound heard clearly at night than during day time?

- At night, temperature is low and sound waves travel nearer the ground than during day time

WIND

- Sound waves travel faster when they are in the same direction with wind and sound waves travel slowly when they are in opposite direction with wind

ALTITUDE

- Low altitude increases the speed of sound and high altitude reduces the speed of sound

HEAT

- Heat of the day raises sound waves higher

PITCH, FREQUENCY AND VOLUME OF SOUND

PITCH

- This is the highness or lowness of sound

FACTORS THAT DETERMINE THE PITCH OF SOUND

i) Size of the vibrating surface

✓ Small surfaces produce high pitch while big surfaces produce low pitch

ii) Tension of the vibrating surface

✓ Tight surfaces produce high pitch while loose surfaces produce low pitch

iii) Frequency

✓ High frequency produces high pitch while low frequency produces low pitch

iv) Nature of the vibrating surface

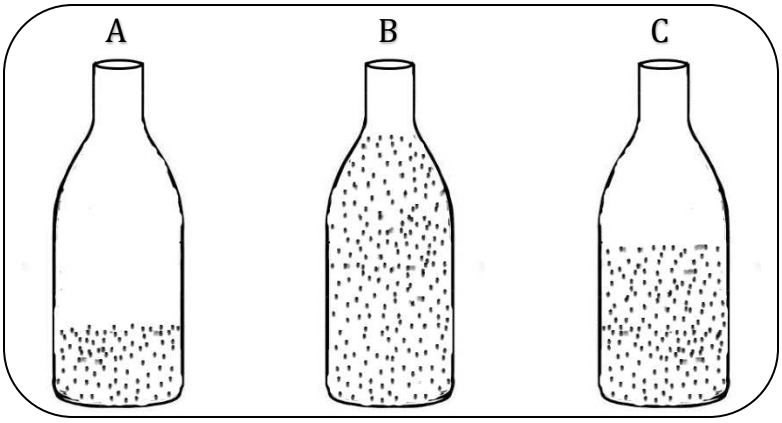
✓ Thin surfaces produce high pitch while thick surfaces produce low pitch

v) Length of the vibrating surface

✓ Short vibrating surfaces have high pitch while long vibrating surfaces have low pitch

EXPERIMENTS ON PITCH OF DIFFERENT OBJECTS

BOTTLES

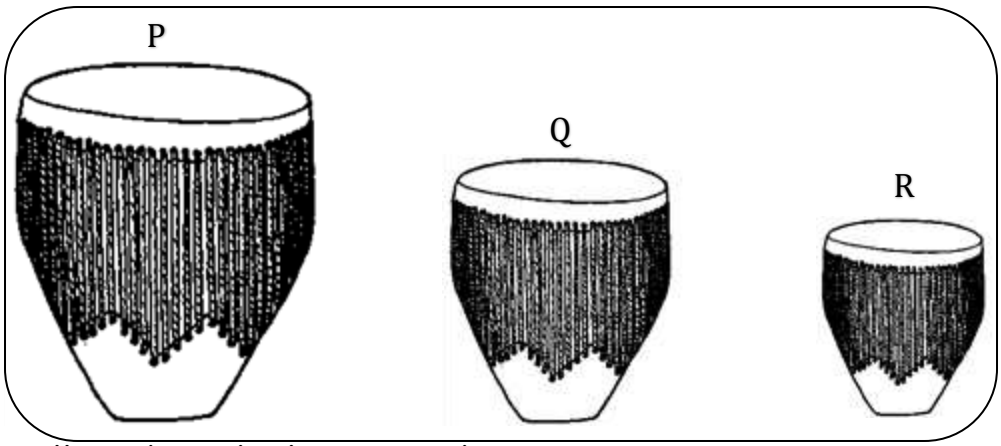


- Bottle B will produce sound of the highest pitch
- ✓ It has the smallest vibrating space
- Bottle C will produce sound of the higher pitch
- ✓ It has the bigger vibrating space
- Bottle A will produce sound of the lowest pitch
- ✓ It has the biggest vibrating space

Why does an empty bottle produce lower pitch than a bottle half filled with water?

- It has a bigger vibrating space than a bottle half filled with water

DRUMS

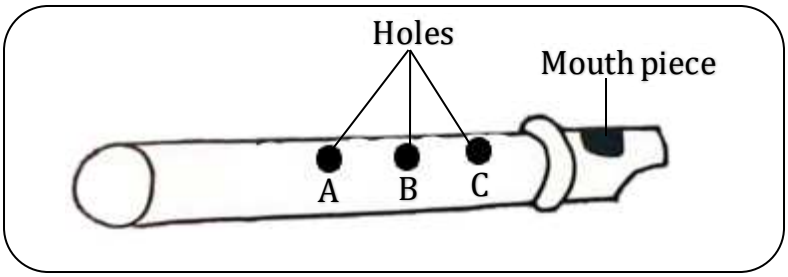


- Drum P will produce the lowest pitch
- ✓ It has the biggest vibrating surface
- Drum Q will produce the lower pitch
- ✓ It has the smaller vibrating surface
- Drum R will produce the highest pitch
- ✓ It has the smallest vibrating surface

BOW HARP

- String X will produce the lowest pitch
- ✓ It has the longest vibrating surface
- String C will produce the highest pitch
- ✓ It has the shortest vibrating surface

FLUTE



- When holes A and B are closed, a flute produces the highest pitch
- ✓ The vibrating space will be very big
- When holes B and C are closed, a flute produces the lowest pitch
- ✓ The vibrating space will be very small

How is a flute played?

- By blowing

How can a pitch of a flute be changed?

- By opening or closing some holes with the fingers while blowing

FREQUENCY

- This is the number of vibrations produced per second
- This is the number of oscillations per second

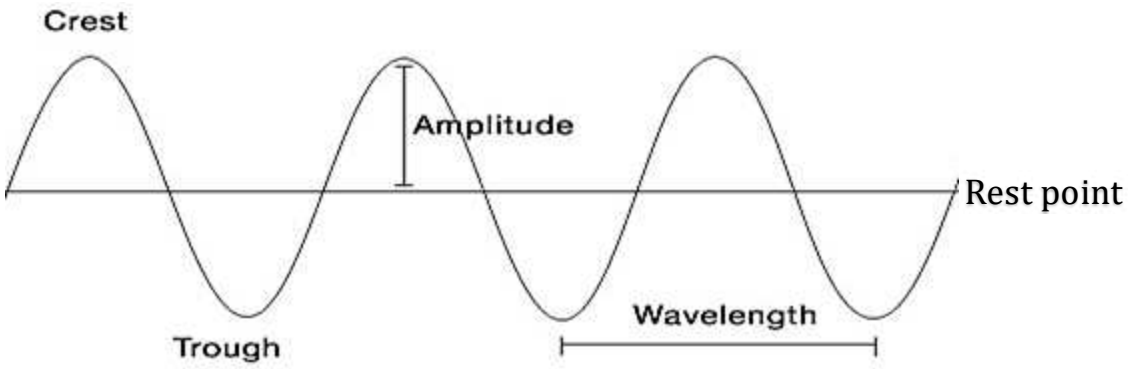
UNITS FOR MEASURING FREQUENCY

- Hertz (Hz)

FACTORS THAT DETERMINE FREQUENCY (F) OF SOUND

- Mass of the object
- Force that shakes the object

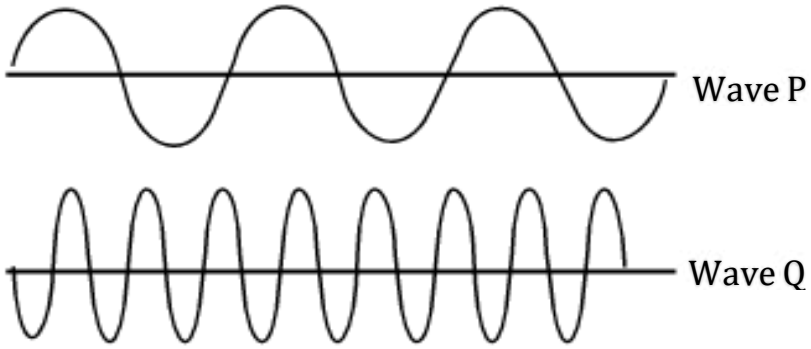
A DIAGRAM SHOWING A SOUND WAVE



WAVE LENGTH

- This is the distance between two consecutive crests or troughs

DRAWINGS SHOWING SOUND WAVES OF DIFFERENT FREQUENCY AND PITCH



- Sound wave P will produce sound with low frequency and low pitch
- It is slow
- Sound wave Q will produce sound with high frequency and high pitch
- It is quick

VOLUME

- This is the loudness or softness of sound
- This is the magnitude or intensity of a certain sound

FACTOR AFFECTING VOLUME OF SOUND

- Amplitude

Amplitude

- This is the height of the wave from the point of rest
- This is the height of sound vibrations

✓ Great amplitude forms loud sound while small amplitude forms soft sound

ECHO

- An echo is a reflected sound

How is an echo formed?

- By obstruction of sound waves (when sound waves hit a hard surface)

ECHOLOCATION

- This is the ability of an organism to locate objects using echoes.

Mention three animals that use echolocation

- Bats
- Dolphins
- Whales
- Porpoises

IMPORTANCE OF ECHOES

- They help bats and whales to dodge obstacles
- They help bats and whales to locate their food
- They help sailors to detect the depth of the water body
- They help fishermen to locate shoals of fish
- They help pilots to dodge tall buildings and mountains.
- They help blind people to dodge obstacles using sonar sticks
- They help doctors to detect heart beat

DISADVANTAGES OF ECHOES

- They turn music into noise in empty room
- They prevent people from communicating clearly

How can echoes be reduced in cinema halls, recording studios, conference halls and theatre halls?

- Covering the walls with soft boards
- Covering the walls with sponge and thick blankets
- Covering the windows with thick curtains
- Covering the floor with woollen carpets

SOUND REFLECTORS

- These are materials that bounce / send back sound waves

CHARACTERISTIC OF SOUND ABSORBERS

- They are hard
- They are impermeable

EXAMPLES OF SOUND REFLECTORS (MATERIALS THAT REDUCE ECHOES)

- Mountains
- Hills
- Cliffs
- Rocks

SOUND ABSORBERS

- These are materials that absorb sound waves

CHARACTERISTICS OF SOUND ABSORBERS

- They are soft
- They are porous

EXAMPLES OF SOUND ABSORBERS (MATERIALS THAT REDUCE ECHOES)

- Thick blankets
- Thick curtains
- Woollen carpets
- Soft boards
- Sponge

How do soft porous materials (e.g soft boards) prevent echoes?

- They absorb sound waves

Mention any two devices that use echoes to work

- **Fathometer**

It is used to measure the depth of seas and oceans

- **Stethoscope**

It is used to detect heart beat

Mention four groups of people who use echoes

- Pilots
- Sailors
- Doctors
- Fishermen

Why do we see lightning before thunder is heard during thunderstorm?

- Light travels faster than sound in air

CALCULATIONS ON SOUND

- Speed of sound in air is 330 m/s

EXAMPLES

1. If a man heard a gunshot after four seconds, how far was he from the firing point?
   (Take; speed of sound in air = 330 m/s)
   D = S x T
   D = 330 m/s x 4 s
   D = (330 x 4) m
   D = 1320 m
2. Mutaawe shouted while facing a cliff and it took him 10 seconds to hear the echo of the sound he produced. How far was he from the cliff if the speed of sound is 330m/s?

Sound moved two journeys (Going to the cliff and coming back from the cliff to Mutaawe)

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

$$D = \frac{330 \times 10}{2}$$

$$D = \frac{3300}{2}$$

D = 1650 metres

3. It took 3 seconds to hear echo of a man chopping wood. How far was the man from a chopping place?

There are two sets of sound waves (original waves and the reflected waves)

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

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

$$D = \frac{990}{2}$$

D = 495m

4. A cliff is 660m away from where Kato is standing. If Kato blows a whistle, how long will it take him to hear the echo if the speed of sound is 330 m/s?

Sound moves two journeys

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

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

T = 2 x 2

T = 4 seconds

TRY THIS

Okello was standing 165 metres away from his father who called him by clapping. How long did it take Okello to hear the clapping?

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

T = 165
330
T = 0.5 seconds

STORAGE OF SOUND

- This is the keeping sound for future use

REASONS FOR STORING SOUND (Why do people store sound?)

- For entertainment
- For communication
- For remembrance
- For evidence in courts of law

METHODS OF STORING SOUND

- Recording method
- Notation method

NOTATION METHOD

- This is the act of storing sound by writing musical symbols or notes

TYPES OF NOTATION

- Sol-fa notation
- Staff notation

SOL-FA NOTATION

- This is the use of octaves (musical notes) to store sound

STAFF NOTATION

- This is the use of musical symbols marked on parallel lines to store sound

WAYS OF REPRODUCING SOUND STORED BY NOTATION

- Using a piano to play sound notes
- Using human voice to sing sound notes
- Using a xylophone to play sound notes

RECORDING OF SOUND

- This is the act of making an audio record

DEVICES USED TO STORE RECORDED SOUND

- Memory cards
- Video Compact Discs (VCDs)
- Digital Video Discs (DVDs)
- Magnetic tapes (cassette tapes)

- Computer diskettes
- Projectors
- Mobile phones
- Flash drive
- Compact discs (CDs)
- Audio tapes / DAT (Digital audio tape)
- IPods
- Computer hard disks

DEVICES USED TO REPRODUCE RECORDED SOUND

- Record players (phonograph)
- Cassette players
- Film projectors
- DVD players
- VCD players
- Computers
- Mobile phones
- Gramophone
- Mp3 player

WAYS OF REPRODUCING RECORDED SOUND

- By playing CDs in CD players
- By playing VCDs in VCD players
- By playing flash discs in computers
- By playing memory cards in mobile phones
- By playing records in record players
- By playing cassette tapes in cassette players
- By playing DVDs in DVD players
- By playing mp3 in mp3 players

THE MAMMALIAN EAR

- It is a sense organ for hearing
- It is a receptor organ for sound
- The ear belongs to the **nervous system**

MAIN FUNCTIONS OF THE MAMMALIAN EAR

- For hearing
- For body balance

How are ears important to a deaf person?

- For body balance

Besides hearing and body balance, how else are ears useful to an elephant?

- For temperature regulation on hot days

REGIONS (MAIN PARTS) OF THE MAMMALIAN EAR

- Outer ear
- Middle ear
- Inner ear

THE OUTER EAR

- It is a hollow region

PARTS THAT MAKE UP THE OUTER EAR

- Pinna
- Auditory canal (ear canal)

THE MIDDLE EAR

- It is an air-filled region

PARTS THAT MAKE UP THE MIDDLE EAR

- Ear drum (tympanic membrane)
- Ossicles
- Eustachian tube
- Oval window

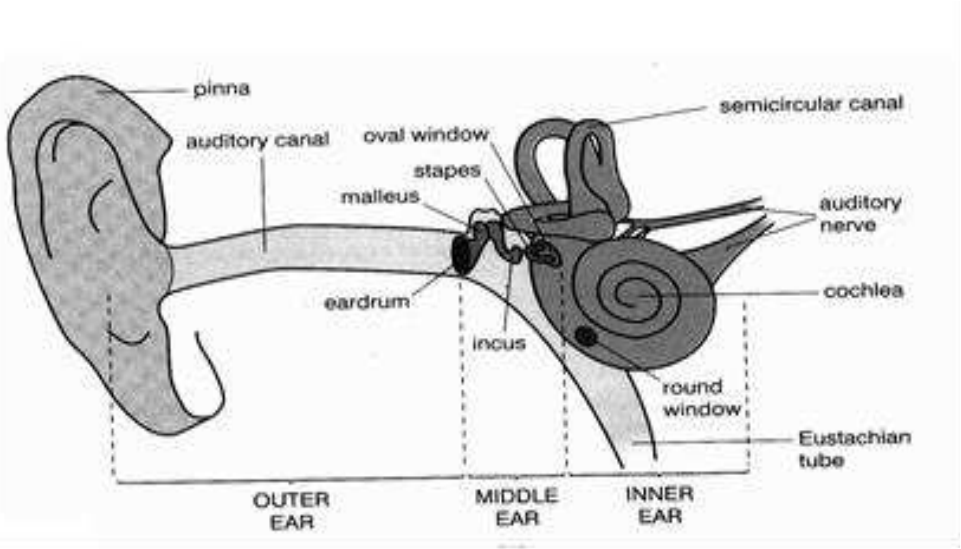
THE INNER EAR (LABYRINTH)

- It is a fluid-filled region

PARTS THAT MAKE UP THE INNER EAR

- Semicircular canals
- Cochlea
- Auditory nerves

THE STRUCTURE OF THE HUMAN EAR



FUNCTIONS OF EACH PART OF THE HUMAN EAR

PINNA

- It traps (collects) sound waves
- it receives and concentrates sound waves

How is the pinna adapted to its function?

- It is large and broad

How is the pinna able to keep open all the time?

- It is made up of cartilage

AUDITORY CANAL (EAR CANAL)

- It directs sound waves to the ear drum

COMPONENTS OF THE AUDITORY CANAL

Earwax (cerumen)

- To trap dust and small insects
- To kill germs in the ear canal

Cilia (tiny hair)

- To trap dust

EAR DRUM (TYMPANIC MEMBRANE)

- It changes sound waves to sound vibrations
- It separates outer ear and the middle ear
- ✓ An **otoscope** is an instrument used to examine the ear drum

How is the ear drum adapted to its function?

- It has a thin membrane which is sensitive to sound waves

OSSICLES

- ✓ These are the three small bones in the middle ear.
- They amplify sound (sound vibrations)
- They transmit sound vibrations to the oval window

Name the three small bones that make up the ear ossicles

- Malleus (Hammer)
- Incus (Anvil)
- Stapes (Stirrup)
- ✓ The **stapes** is the smallest bone in the human skeleton

OVAL WINDOW

- It transmits sound vibrations to the cochlea

ROUND WINDOW

- It balances air pressure in the cochlea

EUSTACHIAN TUBE

- ✓ This is a tube that connects the middle ear to the back of the throat
- It balances air pressure on both sides of the ear drum
- It drains a fluid from the middle ear to the back of the nose (throat)

SEMICIRCULAR CANALS

- It maintains body balance/posture

COCHLEA

- ✓ This is a snail/spiral- shaped part of the inner ear
- It changes sound vibrations to nerve signals/impulses

How is the cochlea adapted to its function?

- It has hair cells (sensory cells)

Which part of the human ear is greatly affected by alcohol?

- Semi-circular canals

Name the two fluids in the inner ear (cochlear fluids)

- Perilymph
- Endolymph

AUDITORY NERVE (COCHLEAR NERVE)

- It transmits sound information to the brain
- It transmits nerve signals to the brain

VESTIBULAR NERVE

- It transmits balance information to the brain

State the importance of the vestibule cochlear nerve in the human ear

- It transmits sound and balance information to the brain

Why do nerve (neural) signals go to the brain?

- For interpretation

EXPLAIN THE MEANING OF THE FOLLOWING TERMS:

POSTURE

- This is the position of the body in everything we do

BODY BALANCE

- This is the ability of the body to keep upright

Name two parts of the human ear that maintains body balance

- Semicircular canals
- Vestibule

Mention three body organs that maintain body balance

- Ears
- Eyes
- Brain

COMMON DISEASES OF THE EAR

- Otitis
- Otomycosis
- ✓ It is a fungal disease
- Ear boils (furuncle)
- ✓ It is a bacterial disease
- Barotrauma
- ✓ It is due to change in altitude (air or water pressure)
- Cancer of the outer ear
- ✓ It is due to excessive exposure of ears to direct sunshine

OTITIS

- ✓ It is grouped into;

i) Otitis externa (swimmer's ear); due frequent moisture in ear canal
ii) Otitis media
iii) Otitis interna

SYMPTOMS OF INFECTED EARS

- Ringing in the ear (tinnitus)
- Dizziness
- Ear pain (earache)
- Mild hearing loss

SIGN OF INFECTED EARS

- Pus discharge from the ears

EAR DEFECTS (DISORDERS OF THE HUMAN EAR)

- Deafness
- Anotia
- Presbycusis

DEAFNESS (HEARING LOSS)

- This is the partial or total inability to hear

TYPES OF DEAFNESS

- Permanent deafness
- Temporary (partial) deafness
- Sensory deafness

PERMANENT DEAFNESS

- This is the inability to hear any sound

CAUSES OF PERMANENT DEAFNESS

- It can be inherited from parents
- Broken (ruptured) eardrum
- Infections like German measles (Rubella)

TEMPORARY (PARTIAL) DEAFNESS

- This is the inability to hear properly

CAUSES OF TEMPORARY DEAFNESS

- Excess earwax (earwax impaction)
- Exposing ears to very loud sounds
- A lot of dust in the ear canal

How does excess ear wax cause temporary deafness?

- It blocks the ear canal

SENSORY DEAFNESS

- This is inability to distinguish some sounds
- In babies, it even affects the ability to talk normally

CAUSES OF SENSORY DEAFNESS

- Damage on the auditory nerve
- Damage on the hair cells in the cochlea
- Head injury (a blow to the head)
- Ototoxic drugs

PRESBYCUSIS

- This is the gradual loss of hearing in both ears due to old age
- ✓ It affects people above the age of 65
- ✓ It is caused by changes in the inner ear to **aging**

ANOTIA

- This is the congenital deformity where a person has no pinna.

METHODS USED DURING COMMUNICATION WITH DEAF PEOPLE

- Sign language
- Lip-reading
- Cued speech
- Typed conversations

CARE FOR THE EARS

- Wash the ears with clean warm water and soap
- Do not push sharp objects into the ear.
- Avoid very loud sound
- Use a clean soft cloth to clean the ears
- Treat any ear infection as soon as possible
- By immunization

Why is it not advisable to push sharp objects in our ears?

- They may damage (rupture) the eardrum.

What first aid can be given to a person with a small insect in the ear?

- Pour clean cold water in the ear to make the insect come out

HEARING IN DIFFERENT ORGANISMS

MAMMALS (PEOPLE)

- By means of ears

BIRDS

- By means of ears covered with soft feathers

FISH

- A fish uses lateral line to detect sound vibrations in water

INSECTS

- By means of antennae/feelers

SNAKES

- They use their skull vibration when hit by sound waves in the air
- They use their jawbone connected to the cochlea to detect ground vibrations

EARTHWORMS

- By means of their entire body

Snails

- By means of tentacles

TOPIC: THE CIRCULATORY SYSTEM

THE CIRCULATORY SYSTEM

- This is the body system that deals with transportation of materials in the body
- This is the body system that deals with the movement of blood round the body

CELL

- This is the smallest unit of life

TISSUE

- This is ta group cells that work together to perform a specific function

ORGAN

- This is a group of tissues that work together to perform a specific function

SYSTEM

- This is a group of organs that work together to perform a specific function

EXAMPLES OF MATERIALS TRANSPORTED IN THE BODY

- Water
- Hormones
- Oxygen
- Food nutrients

Useful materials

- Antibodies

- ✓ Urea
- ✓ Carbon dioxide
- ✓ Poison

Harmful materials

BLOOD CIRCULATION

- This is the movement of blood round the body
- ✓ Blood circulation was discovered by an English scientist known as **Sir. William Harvey**

IMPORTANCE OF BLOOD CIRCULATION IN THE BODY

- It transports food and oxygen in the body
- It transports hormones in the body
- It transports wastes products to excretory organs

TYPES OF BLOOD CIRCULATION

- Pulmonary circulation
- Systemic circulation

1. PULMONARY CIRCULATION

- This is movement of blood from the heart to the lungs and back to the heart

Why is pulmonary circulation sometimes called double circulation?

- Blood flows twice to the heart in a complete cycle.

2. SYSTEMIC CIRCULATION

- This is the movement of blood from the heart to the other body parts

COMPONENTS OF CIRCULATORY SYSTEM

- Heart
- Blood vessels
- Blood

THE HEART

- ✓ Heart is a muscular organ that pumps blood in the body of a vertebrate
- It is located in the **chest cavity** between the lungs
- It is protected by the **rib cage**
- It is made up of special muscles called **cardiac muscles**
- It is enclosed in a serous membrane called **pericardium**
- **Pericardium** produces a fluid that lubricates the heart (produces pericardial fluid)
- **Pericardial fluid** lubricates the heart (reduces friction during heartbeat)
- **Coronary artery** supplies food nutrients and oxygen to the heart muscles.

MAIN FUNCTION OF THE HEART

- To pump blood in the body
- ✓ The heart pumps about **5 litres of blood per minute**

HEARTBEAT

- This is the contraction and relaxation of the heart

PULSE

- ✓ This is the number of times the heart beats per minute
- The normal heartbeat of an adult person at rest is **72 beats per minute**

FACTORS THAT CAN INCREASE HEARTBEAT OR PULSE

- Excitement
- Fright
- Physical exercises
- High temperature
- Sickness
- Increased level of adrenaline hormone
- ✓ **Adrenaline hormone** prepares the body for a flight or fight

Why does the heart beat faster when doing a heavy body exercise?

- To pump more oxygenated blood to the body tissues

NOTE

- **Stethoscope** is used to detect heartbeat/pulse
- **Sphygmomanometer** is used to measure blood pressure

A DIAGRAM SHOWING A STETHOSCOPE

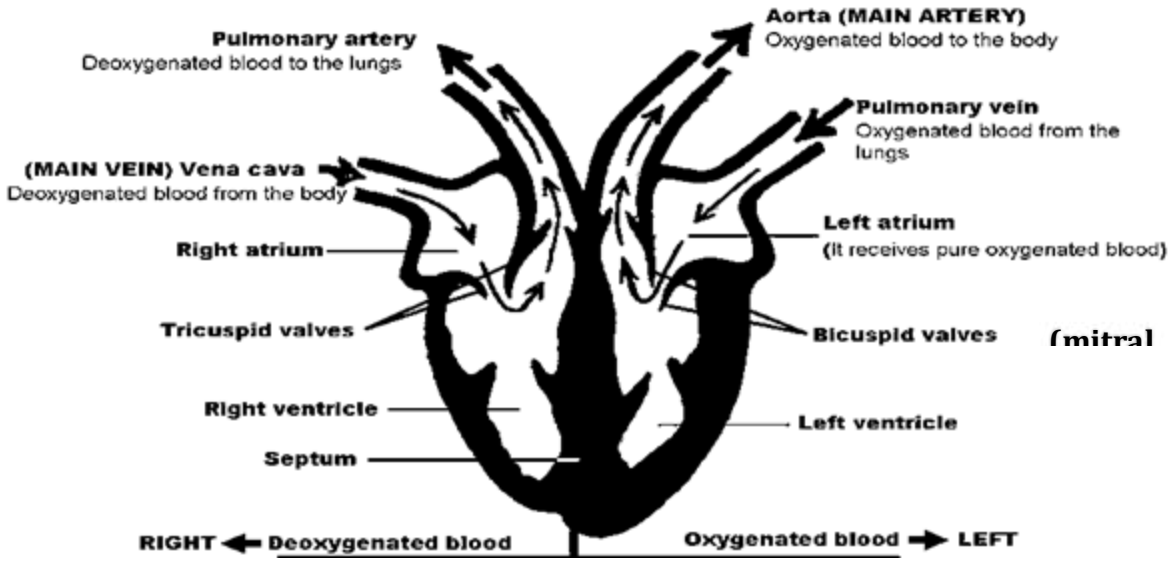
It has a diaphragm, long rubber tube and two earpieces

PHASES OF HEART BEAT (CARDIAC CYCLE)

- Systole phase
- Diastole phase

1. **SYSTOLE PHASE**
   - This is contraction of the ventricles to push blood into the arteries.
   - During this phase, the auricles are filled with blood
2. **DIASTOLE PHASE**
   - This is contraction of auricles to push blood into the ventricles
   - During this phase, the ventricles are filled with blood

THE STRUCTURE OF THE HUMAN HEART



The mammalian heart has 4 chambers

- Right auricle
- Left auricle
- Right ventricle
- Left ventricle

- The upper chambers are called **atria (auricles)**
- **Auricles** receive blood
- The lower chambers are called **ventricles**
- **Ventricles** pump blood out of the heart
- The left and right sides of the heart are separated by a thick wall called **septum**

FUNCTIONS OF EACH PART OF THE HEART

- **Vena cava**

It carries deoxygenated blood from all body parts to the heart

The **vena cava** is the largest vein in the body

- **Right auricle**

It receives deoxygenated blood from the body parts

- **Right ventricle**

It pumps deoxygenated blood to the lungs

- **Pulmonary artery**

It carries deoxygenated blood from heart to lungs

Why does blood go to the lungs?

- ✓ To pick oxygen (to be oxygenated)
- ✓ To drop carbon dioxide (to get rid of carbon dioxide)

- **Pulmonary vein**

It carries oxygenated blood from lungs to heart

- **Left auricle**

It receives oxygenated blood from the lungs

- **Left ventricle**

It pumps oxygenated blood to all body parts

- **Aorta**

It carries oxygenated blood from the heart to all body parts

The **aorta** is the largest artery in the body

- **Septum**

It prevents mixing of oxygenated blood and deoxygenated blood

- **Valves**

They prevent the back flow of blood

- **Mitral (bicuspid) valves and tricuspid valves**

They prevent the back flow of blood into the atria

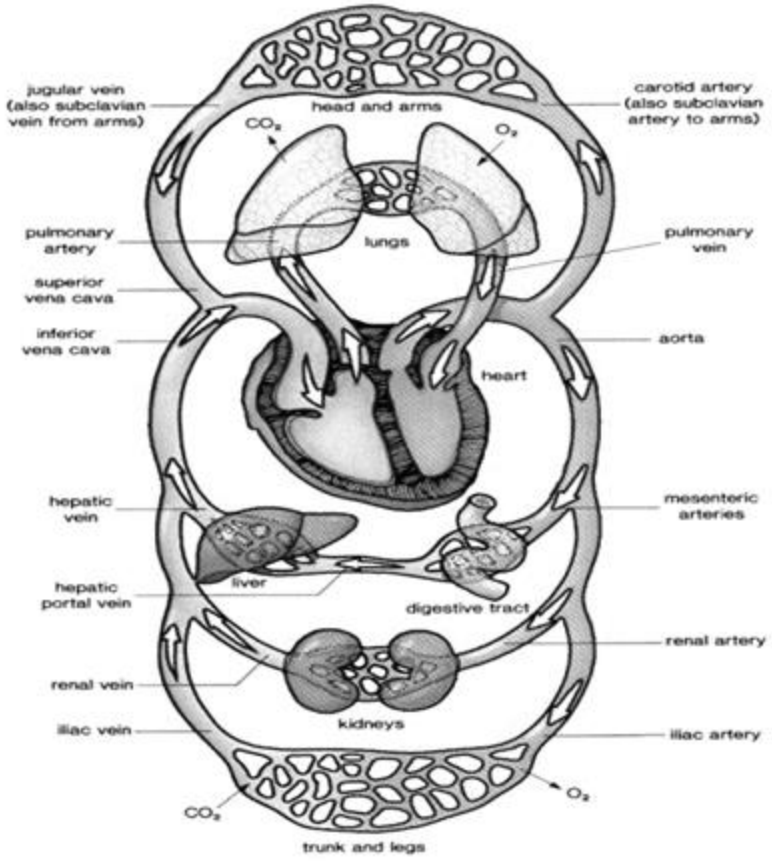
- **Semilunar valves**

They prevent the back flow of blood from the arteries into the ventricles

Why is the left ventricle thicker walled than the right ventricle?

- It pumps blood at a higher pressure than the right ventricle

THE DIAGRAM TO SHOW CIRCULATION OF BLOOD



BODY ORGANS RELATED TO BLOOD CIRCULATION

KIDNEYS

- They filter blood (they purify blood)
- They balance salt and water level in blood

LIVER

- It regulates blood sugar level
- It detoxicates blood

LUNGS

- They oxygenate blood
- They remove carbon dioxide from blood

State the importance of the hepatic portal vein

- It carries blood with digested food from the ileum to the liver

BLOOD VESSELS

- These are tubes that transport blood in the body

TYPES OF BLOOD VESSELS

- Arteries
- Veins
- Capillaries

ARTERIES

- ✓ These are blood vessels that carry blood away from the heart
- The main (largest) artery is the **aorta**
- Most arteries carry oxygenated blood **except** pulmonary artery
- Blood in arteries flows at a high pressure

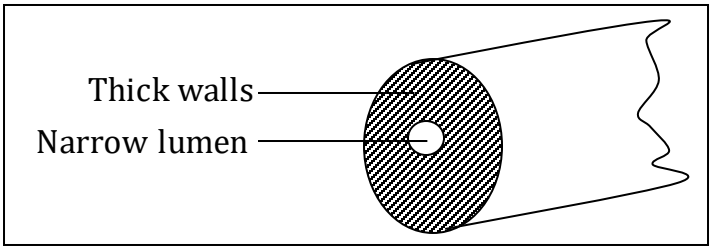
CHARACTERISTICS OF ARTERIES

- They have thick walls
- They have a narrow lumen
- They have no valves

FUNCTION OF ARTERIES

- They carry blood away from the heart.

THE STRUCTURE OF AN ARTERY



ADAPTATIONS OF ARTERIES TO THEIR FUNCTION

- They are thick walled
- ✓ To withstand the high pressure of blood that flows through them.
- They are elastic
- ✓ To stretch so as to accommodate the large volume of blood that flows through them

Why do arteries have thick walls?

- To withstand the high pressure of blood that flows through them.

Why do arteries lack valves?

- They carry blood at a very high pressure

VEINS

- ✓ These are blood vessels that carry blood back to the heart
- The main (largest) vein is the **vena cava**
- Most veins carry deoxygenated blood **except** pulmonary vein
- Veins are seen near the skin surface
- **Hepatic portal vein** carries blood with digested food from the ileum to the liver

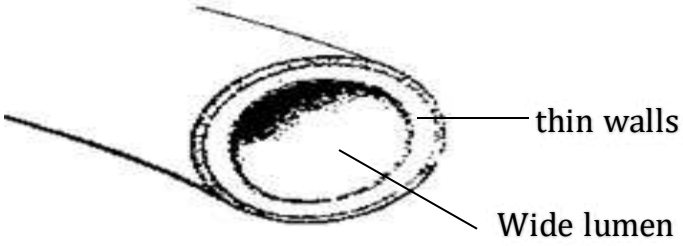
CHARACTERISTICS OF VEINS

- They have thin walls
- They have a wider lumen
- They have valves

FUNCTION OF VEINS

- They transport blood to the heart.

THE STRUCTURE OF A VEIN



A diagram showing the direction of flow of blood in a vein

ADAPTATIONS OF THE VEINS TO THEIR FUNCTION

- They are thin walled
- ✓ To withstand the low blood pressure in them
- They have a wide lumen
- ✓ To encourage the flow of blood
- They have valves
- ✓ To prevent the back flow of blood.

How are valves important in veins?

- Valves prevent the back flow of blood

Why are arteries thick walled than veins?

- Blood in arteries flows at a higher pressure than veins

CAPILLARIES

- ✓ These are tiny blood vessels that join arteries to veins
- Capillaries are the **smallest** blood vessels
- They connect arteries and veins
- Exchange of materials occurs in capillaries

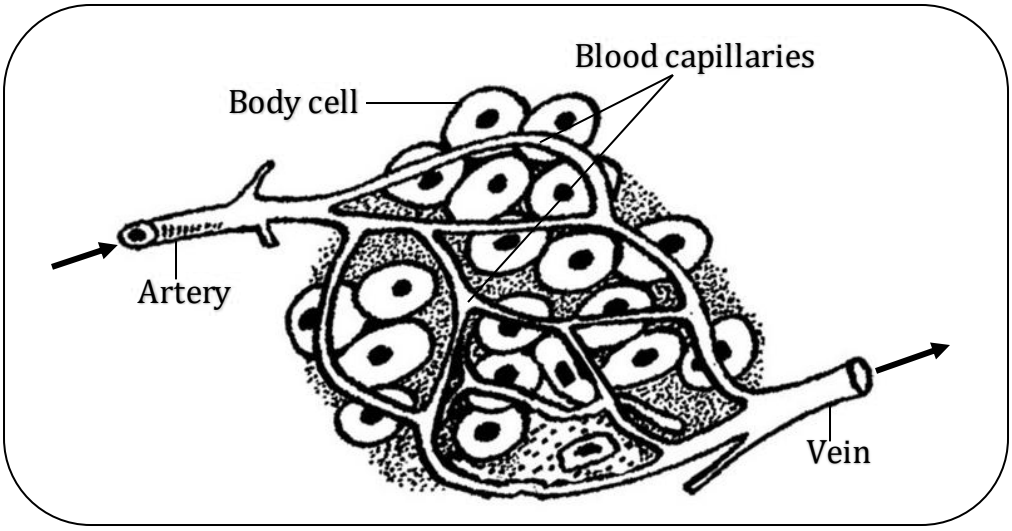
CHARACTERISTICS OF CAPILLARIES

- They have thin walls (have porous walls)
- They have no valves

FUNCTIONS OF CAPILLARIES

- They allow exchange of materials between blood and body cells
- They connect arteries and veins
- They take waste products away from the body cells / tissues

STRUCTURE OF CAPILLARIES



ADAPTATIONS OF CAPILLARIES TO EXCHANGE OF BODY MATERIALS

- They are numerous (very many in number)
- ✓ To increase the surface area for exchange of materials
- They have thin walls (porous walls)
- ✓ For easy diffusion of materials

DIFFERENCES BETWEEN ARTERIES AND VEINS

ARTERIES	VEINS
FUNCTIONAL DIFFERENCE	
They carry blood away from the heart	They carry blood towards the heart
STRUCTURAL DIFFERENCE	
Have no valves	Have values
Have thick walls	Have thin walls
Have a narrow lumen	Have a wide lumen

BLOOD

- This is a liquid tissue that transports materials in the body
- Blood in vertebrates is **red in colour**

TYPES OF BLOOD

- Oxygenated blood
- Deoxygenated blood

Oxygenated blood

- ✓ It is rich in oxygen and digested food
- ✓ It is bright red

Deoxygenated blood

- ✓ It is rich in carbon dioxide and waste products
- ✓ It is dark red

COMPONENTS OF BLOOD (BLOOD CONSTITUENTS)

- Red blood cells (erythrocytes)
- White blood cells (leukocytes)
- Platelets (thrombocytes)
- Plasma

By what process are blood cells formed in the red bone marrow?

- Haemopoiesis

RED BLOOD CELLS

- They are the most numerous blood cells in the body
- They are made in the **red bone marrow**

Function of red blood cells

- They transport oxygen in the body

Characteristics of red blood cells (erythrocytes)

- They have no nuclei
- They have a bi-concave shape (disc shape)
- They contain haemoglobin

What is haemoglobin?

- This is the red pigment found in blood
- It is an iron compound in red blood cells that transport oxygen

Importance of haemoglobin

- It carries oxygen
- It determines the red colour of blood

NOTE

- Haemoglobin combines with oxygen to form **oxyhaemoglobin**
- RBCs become **bright red** with oxygen and **dark red** when they lose oxygen

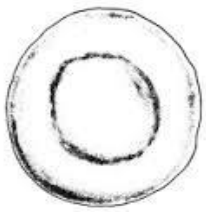
In which form is oxygen transported in blood?

- Oxyhaemoglobin

Why are red blood cells red in colour?

- Due to presence of haemoglobin

The structure of a red blood cell





ADAPTATIONS OF RED BLOOD CELLS TO THEIR FUNCTION

- They have haemoglobin
- ✓ To absorb (carry) oxygen
- They are numerous
- They have no nucleus
- ✓ To provide enough room for oxygen
- They have a biconcave shape
- ✓ To increase the surface area for diffusion of oxygen
- They have a thin membrane
- ✓ To allow easy diffusion of gases

Why do people living at higher altitudes have more RBCs?

- There is little oxygen at higher altitudes

Why do infants have more red blood cells than adults?

- Infants have a higher metabolic rate than adults

NOTE

- **Plasmodia germs (malaria parasites)** destroy the red blood cells
- **Sickle cell anaemia (sickle cell disease)** deforms red blood cells

WHITE BLOOD CELLS

- WBCs are fewer than RBCs in number

Characteristics of white blood cells

- They have a nucleus
- They do not have a defined shape (they have an irregular shape)
- They have no haemoglobin

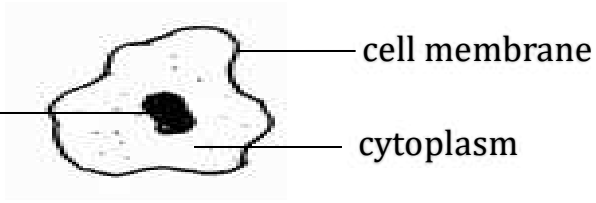
In which body parts are white blood cells made?

- Bone marrow of long bones
- Lymph nodes
- Spleen

Function of white blood cells

- They fight against pathogens (disease causing germs)
- They defend the body against diseases (infections)

The structure of a white blood cell



How do white blood cells defend the body against diseases?

- They engulf and digest germs
- They produce antibodies

Adaptation of a white blood cell to its functions

- It has a nucleus to control cell activities
- It has cytoplasm to engulf germs
- It has an irregular shape to engulf germs of different shapes

Why do children have more WBCs than adults?

- They are more prone to disease attack than adults

Diagrams showing how white blood cells engulf germs

NOTE:

- **HIV (human immunodeficiency virus)** destroys the white blood cells
- Too much white blood cells in blood cause **leukemia (blood cancer)**

How is pus formed?

- When some white blood cells and germs die during the fight (decaying in the tissue)

PLATELETS

- These are small colourless disc shaped particles in blood
- They are made in the **red bone marrow**

Characteristics of platelets

- They have no nucleus
- They have a disc shape

Function of platelets

- They help in blood clotting in case of a cut

How do platelets stop bleeding?

- By forming blood clots on cuts and wounds

STRUCTURE OF PLATELETS

NOTE

- A hereditary disease in which a person has uncontrolled bleeding is called **haemophilia**
- Haemophilia is caused by **lack of clotting factor in blood**
- Vitamin K **helps in formation of platelets**
- Lack of vitamin K in the diet **leads to poor blood clotting**

What health problem is a personal likely to get due to inadequate platelets in blood?

- Excessive bleeding in case a cut / poor blood clotting

BLOOD PLASMA

- ✓ This is the pale liquid component of blood
- It makes up about 55% of blood
- It is where red blood cells, white blood cells and platelets are suspended
- It consists of 90 percent water
- Plasma holds all the other blood cells

CONSTITUENTS (COMPONENTS) OF BLOOD PLASMA

- Water
- Hormones
- Antibodies
- Digested food (e.g glucose, amino acids, mineral salts and lipids)
- Urea
- Carbon dioxide } Excretory wastes

FUNCTIONS OF BLOOD PLASMA

- It transports hormones in the body
- It distributes heat in the body
- It transports blood cells
- It transports digested food in the body (e.g glucose, lipids and amino acids)
- It transports water and mineral salts in the body
- It transports metabolic wastes to the excretory organs
- It transports antibodies in the body

GENERAL FUNCTIONS OF BLOOD

1. **TRANSPORT FUNCTIONS:**
   - It transports digested food in the body
   - It transports oxygen in the body
   - It transports hormones in the body
   - It transports metabolic wastes to excretory organs

2. **PROTECTIVE FUNCTIONS:**
   - It protects the body against diseases
   - It prevents bleeding by clotting on cuts and wounds

3. **REGULATIVE FUNCTION:**
   - It distributes heat in the body

How does blood help in body temperature regulation?

- It distributes heat in the body

BLOOD GROUPS (BLOOD TYPES)

- Group A
- Group B
- Group AB
- Group O

NOTE

- ✓ Blood groups were discovered by a Scientist called **Sir Karl Landsteiner**
- ✓ **Universal recipient** is a person who receives blood from all blood groups
- ✓ **Group AB** is a universal recipient
- ✓ **Universal donor** is a person who gives blood to all blood groups
- ✓ **Group O** is a universal donor

How are blood groups formed?

- According to the antigens in red blood cells

BLOOD DONOR

- This is a person who gives blood

BLOOD RECIPIENT

- This is a person who receives blood

BLOOD RECIPIENT	BLOOD DONOR
A	A and O
B	B and O
AB	A, B, AB and O
O	O

WAYS OF INCREASING THE VOLUME OF BLOOD IN THE BODY

- Feeding on food rich in iron
- Taking iron tablets
- Through blood transfusion
- Drinking plenty of fruit juices

BLOOD TRANSFUSION

- This is the transfer of screened blood from one person to another as long as blood groups agree.

Give one reason why blood should be screened before transfusion

- To prevent the spread of diseases in infected blood

BLOOD SCREENING

- This is the examining of blood under a microscope

IMPORTANCE OF SCREENING BLOOD

- It helps to discover the germs in blood
- It helps to discover blood groups
- It promotes safe blood transfusion

DISEASES OF CIRCULATORY SYSTEM

1. BLOOD DISEASES

- ✓ These are diseases that affect blood components
- Malaria
- AIDS
- Sickle cell anaemia
- Anaemia
- Leukemia (blood cancer)

2. HEART DISEASES

- ✓ These are diseases that attack the heart
- Heart attack (cardiac arrest)
- Coronary heart disease (CHD)
- Coronary thrombosis
- Hypertension (high blood pressure)
- Hypotension (low blood pressure)

3. HEREDITARY DISEASES

- Haemophilia
- Sickle cell anaemia

DISORDERS OF THE CIRCULATORY SYSTEM

- Heart failure
- Artherosclerosis (hardening of the arteries)
- Defective cells
- Blood clot
- Cuts and wounds

PREVENTION AND CONTROL OF THE CIRCULATORY DISEASES

- Feeding on a balanced diet.
- Eat very low animal fats
- Perform regular body exercises
- Avoid much alcohol.

- Avoid smoking
- Have regular health checkups

TOPIC: ALCOHOL, SMOKING AND DRUGS IN THE SOCIETY

ALCOHOL

- This is a liquid substance that makes people drunk when taken in the body in excess

TYPES OF ALCOHOL

- Methanol (Methyl alcohol)
- Ethanol (Ethyl alcohol)

METHANOL

Methanol is made by **distillation**

- It is found mostly in home distilled alcohol.
- It is very dangerous and poisonous **because** it can cause blindness or death.
- It is always used in hospitals and industries
- It is used as fuel in cars and boats
- It is used to kill germs on (sterilize) medical instruments.
- It is used to clean wounds
- It is used to mix some drugs
- It is used to make paint remover

ETHANOL

- It is the main alcohol present in alcoholic beverages
- It is an addictive content in alcoholic drinks/beverages

METHODS OF MAKING/PRODUCING ALCOHOL

- Fermentation
- Distillation

FERMENTATION

- This is the use of yeast to turn sugary juice into alcohol
- ✓ Fermented juice of fruits is used to make wine
- ✓ Fermented cereal grains are used to make beer

Products during fermentation of alcohol

- Ethanol
- Carbon dioxide

Name the catalyst used during fermentation of alcohol

- Yeast

State the importance of yeast during fermentation

- Yeast contains an enzyme that speeds up fermentation of alcohol.

Name the enzyme in yeast that speeds up (catalyzes) fermentation

- Zymase enzyme

Besides yeast, name other organisms that help in fermentation

- Bacteria (e.g in fermentation of milk)

RAW MATERIALS USED TO MAKE FERMENTED ALCOHOLIC DRINKS

FERMENTED ALCOHOLIC DRINKS	RAW MATERIALS
Beer	Barley, water
Wine	Grapes, gooseberry
Tonto	Ripe bananas
Hard cider	Apple juice
Kwete	Sorghum, millet, maize, malt and boiled water
Malwa	Maize flour, millet, sorghum, water
Omuramba	Sorghum, water

- **Wineries** ferment grapes to make wine
- **Breweries** ferment barley, wheat and other grains to make beer

Why do most fermented drinks contain low level of alcohol?

- They have a lot of water

DISTILLATION

- This is the process of evaporating crude alcohol and condensing its vapour to obtain pure alcohol

Physical processes involved in distillation

- Evaporation
- Condensation

Besides evaporation and condensation, name other process involved in distillation

- Heating

Name the type of alcohol made by distillation

- Methanol (methyl alcohol)

A DIAGRAM SHOWING DISTILLATION METHOD OF MAKING ALCOHOL (METHANOL)

Name the physical processes M and P

- M is evaporation
- P is condensation

State the importance of the cold water and heat in the process above

Cold water

- To condense alcohol vapour

Heat (fire)

- To cause evaporation

Name the natural process that is similar to distillation

- Water cycle

In which way is distillation similar to water cycle?

- Both involve heating, evaporation and condensation

Name two materials always used to make the delivery tube

- Copper
- Aluminium
- Stainless steel

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Why is the delivery tube always made out of copper and aluminium?

- They do not rust

What substance is contained in the delivery tube before it reaches cold water?

- Alcohol vapour

Why is the delivery tube passed through cold water?

- To condense alcohol vapour

Why is the delivery tube coiled as it is passed in cold water?

- To increase the surface area for condensation of alcohol vapour

What scientific name is given to the liquid substance collected by distillation?

- Distillate

Why does the first drop of drink collected contain more alcohol than water?

- Alcohol has lower boiling point than water

Give two medical uses of the distillate

- It is used to clean wounds
- It is used to kill germs on (sterilize) medical instruments
- It is used to clean the skin before an injection

NOTE

- The boiling point of alcohol is 78^0C
- The boiling point of alcohol is 100^0C

EXAMPLES OF DISTILLED ALCOHOLIC DRINKS

- Gin
- Whisky
- Waragi
- Vodka
- Brandy
- Rum
- Tequila

Advantage of distillation

- Concentrated alcohol is collected

Disadvantages of distillation

- It can lead to burns and scalds.
- It needs much attention
- It is expensive to manage
- It can lead to fire outbreaks

Why is alcohol collected by distillation very concentrated?

- It does not contain water

USES OF ALCOHOL

- It is used as fuel in cars and boats
- It is used to kill germs on wounds
- It is sold for money

- It is used to mix some paints
- It is used as a drink on parties
- It is used in six's thermometers.
- It is used to pay dowry.
- It is used to make paint remover
- It is used to light pressure lamps
- It is used to clean (sterilize) clinical thermometers
- It is used to mix some drugs in hospitals
- It is used in hand sanitizers to kill germs on hands

State the importance of alcohol in six's thermometer

- It is used to measure the lowest temperature of the day

Why is alcohol used in six's thermometer?

- It has a very low freezing point

REASONS WHY PEOPLE DRINK ALCOHOL

- To pass time
- To quench thirst
- To fit in peer groups of alcoholics
- To celebrate their success
- To break boredom
- To show that they are rich.
- To be brave
- Young people drink to show that they are mature

Misconceptions (myths) about alcohol

- Alcohol improves mental performance
- Alcohol solves social problems

ALCOHOLISM

- Alcoholism is a condition where a person totally depends on alcohol.
- Alcoholism is a condition that results from prolonged use of alcohol.

Who is an alcoholic?

- This is a person addicted to alcohol.

Addiction

- This is a condition in which a person has a very strong desire to take alcohol every day.

A drawing showing alcoholics



FACTORS THAT LEAD TO ALCOHOLISM

- Peer pressure
- Frustration
- Family back ground
- Seductive advertisements
- Social environment
- Idleness
- Stress

EFFECTS OF ALCOHOLISM TO AN INDIVIDUAL

- It leads to brain damage.
- Loss of appetite for food
- Loss of jobs
- Self-neglect
- It leads liver cirrhosis (damages the liver)
- It worsens stomach ulcers

Body organs affected by alcohol

- Brain
- Liver
- Stomach
- Pancreas
- Kidney
- Heart

How does alcohol damage the liver?

- It causes liver cirrhosis

How does alcohol worsen stomach ulcers?

- It leads to loss of appetite for food

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EFFECTS OF ALCOHOLISM TO A FAMILY

- It leads to family neglect
- It leads to poverty in a family
- It leads to sex deviation like incest
- It leads to broken marriages.
- It leads to antisocial behaviour among children
- It leads to domestic violence (child and spouse abuse)

EFFECTS OF ALCOHOLISM ON THE COMMUNITY

- It leads to truancy
- It increases road accidents.
- Ii increases the spread of HIV/AIDS
- It leads to loss of important people
- Alcoholics become public nuisance
- It leads to high crime rates (e.g rape, defilement and robbery)
- It leads to verbal and physical abuse (e.g quarrels and disagreements)

WAYS THROUGH WHICH THE BODY CAN REMOVE (GET RID) OF ALCOHOL

- Through urinating
- Through sweating
- It can be burnt up by the liver

Effects of alcohol to pregnant women

- Low birth weight
- Premature birth
- Miscarriage
- Still birth

Immediate effects of alcohol on people

- Slows down the action of the brain.
- Mumbling
- Double vision
- Forgetfulness
- Loss of respect for laws.
- Loss of body balance

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Long term effects of alcohol

- Loss of appetite
- Stomach ulcers
- Liver cirrhosis
- Self-neglect
- Loss of jobs
- Swollen pancreas.
- Hand tremors (Shaking hands)

WAYS OF AVOIDING ALCOHOLISM/HEALTHY LIFESTYLES TO AVOID ALCOHOLISM

- Avoid peer groups alcoholics
- Decide never to drink alcohol.
- Never believe in adverts that praise alcohol
- Join good social clubs (e.g sports clubs and church choir)
- Never drink alcohol to solve a problem.
- Learn more facts about dangers of alcohol.
- Take warnings about the dangers of alcohol seriously.

LIFE SKILLS TO SAFE GUARD AGAINST ALCOHOL

- Self-awareness
- Self esteem
- Assertiveness
- Peer resistance
- Proper decision making
- Critical thinking

LAWS GOVERNING ALCOHOL IN UGANDA

- All people below 18 years of age are not allowed to drink or sell alcohol in public places
- Drivers are not allowed to drink and drive: This is the **traffic law** on alcohol

✓ To prevent road accidents

- All bars must be licensed
- Home distillation of alcohol is not allowed

✓ It produces methanol which is poisonous (toxic)

- No one is allowed to transport or sell home distilled alcohol.

SMOKING

- This is the inhaling of tobacco smoke

TYPES OF SMOKING

- Active smoking
- Passive smoking

ACTIVE SMOKING

- This is where a person inhales smoke directly from burning cigarette or smoking pipe.

PASSIVE SMOKING

- This is where a person inhales tobacco smoke from an active smoker.

SMOKER

- This is a person who inhales tobacco smoke frequently.

KINDS / GROUPS OF SMOKERS

- **Active smoker**

✓ This is a person who inhales smoke directly from burning cigarette or smoking pipe.

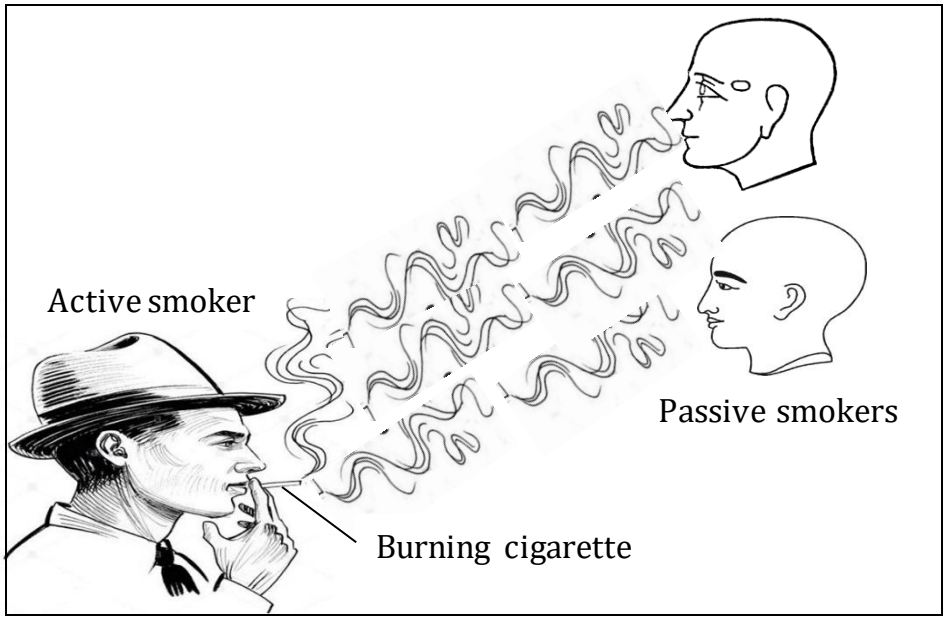
- **Passive Smoker**

✓ This is a person who inhales tobacco smoke from an active smoker.

Who is an exsmoker?

✓ This is a person who has smoked more than 100 cigarettes in his or her life but has not smoked in the last 28 days.

A DIAGRAM SHOWING ACTIVE AND PASSIVE SMOKERS



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Dangerous drugs contained in tobacco

- Nicotine
- Tar

POISONOUS CHEMICALS CONTAINED IN TOBACCO

- Tar

ADDICTIVE DRUG (SUBSTANCE) FOUND IN TOBACCO SMOKE

- Nicotine

POISONOUS GASES IN TOBACCO SMOKE

- Carbon monoxide
- Hydrogen cyanide

BODY ORGANS DAMAGED BY SMOKING

- Lungs
- Brain
- Mouth
- Throat

How does nicotine affect human health?

- It rises blood pressure
- It constricts blood vessels

How does tar affect human health?

- It causes lung cancer
- It makes stains teeth
- It causes cancer of mouth lips and throat

REASONS WHY PEOPLE SMOKE

- To pass time/ to relax
- To concentrate on work
- To feel warm
- To fit in groups of smokers (peer influence)
- To feel confident
- To look mature
- To look attractive
- Due to seductive advertisements on radios and televisions.

FACTORS / CONDITIONS WHICH LEAD TO SMOKING AND ALCOHOLISM

- Ignorance
- Seductive advertisements
- Family background
- Peer pressure
- Boredom
- Stress (frustration)
- Idleness

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Effects of smoking to an individual (to the human body)

- It causes some respiratory diseases
- It worsens some respiratory diseases
- It spoils the colour of teeth
- It worsens stomach ulcers
- It shortens one's lifespan
- It causes cancer of the mouth (lips) and throat
- It increases the risk of getting some circulatory diseases (heart attack and hypertension)

Respiratory diseases caused by smoking

- Lung cancer
- Emphysema
- Chronic bronchitis

Respiratory diseases not caused by smoking

- Asthma
- Pneumonia
- Tuberculosis

Effects of smoking to pregnant women

- Leads to premature births
- Leads to low birth weights
- Leads to miscarriages
- Leads to stillbirths

Effects of smoking to the family

- Leads to family neglect
- Family members may become passive smokers
- Leads to poverty at home
- Children may copy the habit
- Careless smokers can burn house property

Effects of smoking to the community

- Tobacco smoke causes discomfort to other people
- It leads to truancy among school children
- It leads to death of skilled people
- It leads to respiratory diseases among people

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How to avoid smoking

- Do not believe in advertisements which praise cigarette smoking.
- Know that there is no good reason for smoking
- Keep away from smokers.
- Decide never to be an active smoker.
- Join good social groups like sports clubs.
- Keep yourself busy for example by reading novels.
- Destroy all things connected to smoking like cigarettes, lighter and ash trays.

How the ministry of health helps to reduce the increased number of smokers

- Putting a high tax on the sale of cigarettes
- Enforcing strict laws against smoking in public places
- Putting health warnings on cigarette packets.

LIFESTYLES TO SAFEGUARD AGAINST SMOKING

- Keep away from people who smoke
- Never allow any body to convince you to smoke.
- Gather more information on dangers of smoking from health workers.
- Report your friends who smoke to the teachers or their parents for advice.
- Like games and sports during your free time.
- Never use your money to buy cigarettes.

Withdrawal effects of nicotine (smoking)

Qn. Mention two symptoms of an ex-smoker.

- Depression
- Severe sweating
- Convulsions
- Anxiety
- Restless
- Poor concentration on work
- Irritability

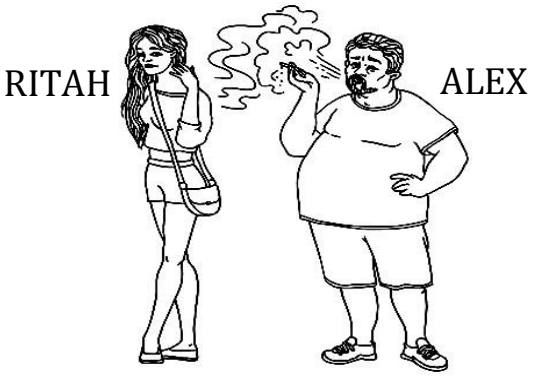
Note. The irritant substance in cigarettes is called Carcinogen.

WAYS THROUGH WHICH PEOPLE USE TOBACCO.

- By active smoking
- By passive smoking
- By sniffing tobacco powder in the nose
- By chewing tobacco leaves

ACTIVITY

1. (a) Explain the meaning of the term smoking.
   (b) Write down two types of smoking.
   (c) Which human body system is mainly affected by smoking?
2. (a) Identify the part of tobacco plant which is used in making of cigarettes.
   (b) Besides smoking, give other two ways people use tobacco.
   (c) Differentiate between active smoking and passive smoking.
3. ***Study the diagram below and use it to answer questions.***



   (a) Which antisocial habit is shown in the diagram above?
   (b) Name the human body organ which is greatly affected by the habit above.
   (c) Which type of smoker is;
   (i) RITAH (ii) ALEX
4. (a) Why are tuberculosis patients discouraged from smoking?
   (b) Give two diseases caused by smoking.
   (c) Why does an active smoker find it difficult to stop his/her habit?
5. (a) Besides tuberculosis, name other disease worsened by smoking.
   (b) Name the two harmful substances found in tobacco.
   (c) Give any one factor that can lead to smoking.
6. (a) Write down two effects of smoking to a pregnant woman.
   (b) Why is it not advisable to sit near an active smoker?
   (c) How has the Ministry of Health helped to reduce the increased number of active smokers in Uganda?
7. (a) Identify the poisonous gas found in tobacco smoke.
   (b) Which components of tobacco cause the following effects?
   (i) Narrowing of blood vessels
   (ii) Staining of the teeth
   (c) Write down one lifeskill that can safeguard youth against tobacco smoking.
8. (a) Give two reasons why people smoke.
   (b) Besides tobacco, give one other drug commonly abused by youth.

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(c) Give any one way youth can protect themselves against smoking.

DRUGS

- A drug is a chemical substance which can affect physical and mental state of the body when taken
- It can either help or harm the body system.

TYPES OF DRUGS

- Essential drugs
- Drugs of dependence

ESSENTIAL DRUGS

- These are drug which satisfy people's health needs when used properly.

Examples of people's health needs

- Relieving pain
- Preventing diseases
- Stopping conception
- Adding substances in the body
- Curing diseases

QUALITIES/CHARACTERISTICS OF ESSENTIAL DRUGS

- Should be cheap
- Should be safe to use
- Should be effective
- Should be affordable
- Should be accessible
- Should be easy to administer
- Should have important curative value

EXAMPLES OF ESSENTIAL DRUGS

- Aspirin
- Panadol
- Iodine; for wounds
- Paracetamol; for pain and headache
- Hedex
- Coartum
- Mexaquin
- Chloroquine; for malaria fever

- Mabendazole; for deworming
- Fancida
- BCG; for tuberculosis
- ORS; for dehydration
- Cough mixtures; for cough
- Tetracycline; for bacterial infections in eyes
- Penicillin; for fungal infections
- Iodine; for wounds
- Measles vaccine
- Paracetamol
- Mululuuza
- Lweza
- Nnalongo
- Enkejje

GROUPS OR TYPES OF ESSENTIAL DRUGS

- Laboratory manufactured drugs
- Traditional (herbal) drugs

LABORATORY MANUFACTURED DRUGS

- These are drugs which are manufactured and tested in laboratories.

CHARACTERISTICS OF LABORATORY MANUFACTURED DRUGS

- They are well tested.
- Their strength, stability and purity are known.
- They are the same for each quantity.
- Their effect on human health is known,
- They are well packaged.
- They are well sealed in water or air proof containers
- They are well labeled
- They have expiry and manufactured dates.

EXAMPLES OF LABORATORY MANUFACTURED DRUGS

- Aspirin
- Chloroquine
- Quinine
- Fancida
- Hedex
- Panadol
- Coartem
- Mebendazole

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GROUPS OF LABORATORY MANUFACTURED DRUGS

1. Preventive drugs
2. Curative drugs
3. Pain killer drugs
4. Contraceptive drugs

PREVENTIVE DRUGS

- These are drugs which prevent diseases.
- Preventive drugs are mainly vaccines and dewormers.

Examples of preventive drugs

Vaccines	Dewormers for children
BCG vaccine Measles vaccine Polio vaccine Yellow fever vaccine DPT vaccine	Mebendazole Albendazole

CURATIVE DRUGS

- These are drugs which cure diseases

Examples of curative drugs

- Chloroquine
- Quinine
- Mabendazole

PAIN KILLERS

- These are drugs which reduce or remove pain from the body.

Examples of pain killers

- Panadol
- Hedex
- Action
- Curamol
- Paracetamol

CONTRACEPTIVE DRUGS

- These are drugs which are used in family planning to avoid getting pregnancy.

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Examples of contraceptive drugs

- Depo-Provera

TRADITIONAL DRUGS

- These are drugs which are locally made from raw plant and animal materials

Characteristics /qualities of traditional drugs

- They are made of raw plants and animals.
- Their strength, purity and stability changes
- They are of different quantities.
- Their effects on human health are not known.
- They are not well labeled.
- They are not well packaged.

EXAMPLES OF TRADITIONAL DRUGS

- Mululuuza
- Aleo vera
- Bombo
- Kakubasujja
- Kiffumufumu
- Enkejje

STORAGE OF DRUGS

- Drugs should be stored properly **to keep them safe.**

CONDITIONS UNDER WHICH DRUGS SHOULD BE STORED

1. **In a cool dry place**

✓ A cool place prevents the drug from being spoilt

✓ A dry place protects the drug from dampness

2. **In a dust free place**

✓ To prevent contamination

3. **Away from reach of children**

✓ To prevent poisoning among children

4. **Should not be exposed to direct sunlight**

✓ To prevent contamination of drugs

5. **Should be kept in well-sealed containers**

- ✓ To prevent contamination of drugs

DANGERS OF BUYING DRUGS FROM LOCAL SHOPS

- Drugs may be expired
- Drugs may be fake
- Drugs may not be prescribed
- Drugs may be contaminated

DRUG PRESCRIPTION

- This is the information written by a medical worker on how to use a drug.

FACTORS CONSIDERED WHEN PRESCRIBING DRUGS.

- Age of the patient
- Weight of the patient
- Type of the sickness
- Kind of previous drug
- Duration of sickness

CONTENT OF DRUG PRESCRIPTION

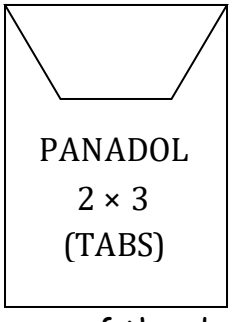
- **Name of the drug**
- **Dosage**

This is the amount of drug to take.

- **Duration of treatment**

This is the period we should take the drug

A DIAGRAM SHOWING DRUG PRESCRIPTION



- **Panadol** shows the name of the drug
- **2** shows the dosage
- **3** shows the duration of treatment

2 x 3 means "**take 2 tablets every after 8 hours**

ADVANTAGES OF DRUG PRESCRIPTIONS

- It prevents wrong dose (under dose and over dose)

- It prevents drug misuse
- It prevents poisoning
- It helps the patient to know the correct drug to use

OVERDOSE

- This is when a person takes more amount of drug than is required.

Causes of overdose

- Much fear for the disease
- Sweetness of some drugs
- Self-medication
- Drug misuse
- Keeping drugs in children's reach

Disadvantages of overdose

- It leads to poisoning
- It can lead to death
- It damages body organs

UNDERDOSE

- This is when a person takes fewer amounts of drugs than what is required.

Reasons why people take underdose (causes of underdose)

- Much fear of the drugs
- Unpleasant smell of drugs
- Bitterness of some drugs
- Lack of money to buy a full dose
- Self-medication

Disadvantages of underdose

- The germs become more resistant to drugs.
- The disease is not likely to be cured.

INFORMATION MANUFACTURERS PUT ON A DRUG DURING PACKAGING AND BEFORE SELLING IT.

- Name of a drug
- Disease cured by a drug
- Dosage
- Duration of treatment
- Expiry date

- Manufacture date
- Composition of the drug
- Method of taking a drug e.g injection, swallowing or ointment

MANUFACTURE DATE OF A DRUG

- This is the date at which a drug was made.

EXPIRY DATE OF A DRUG

- This is the final date at which a drug is safe to use.

Dangers of taking expired drugs

- It leads to body poisoning
- It leads to death
- It damages body organs

Medical consultation

- This is when a patient goes to the medical worker to seek for help and advice.

Importance of medical consultation

- A patient gets prescribed drugs
- A patient knows the disease he/she is suffering from
- A patient gets counseling
- A patient gets advice on which drug to use.
- It prevents self-medication

SELF-MEDICATION

- This is the self-use of a drug without prescription

DANGERS OF SELF-MEDICATION

- It leads to drug misuse
- It leads to wrong dose
- It leads to poisoning

DRUG MISUSE

- This is the use of a drug without health worker's advice.

FACTORS THAT LEAD TO DRUG MISUSE

- Lack of money to buy a full dose of a drug
- Buying drugs from local shops

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- Keeping drugs in children's reach
- Failure to follow drug prescription
- Self-medication
- Ignorance

How do people misuse drugs?

- Taking a drug when not sick
- Taking wrong dose (over dose or under dose)
- Sharing drugs for one patient

FORMS OF WRONG DOSE

- Over dose
- Under dose

DRUGS OF DEPENDENCE

- These are drugs which cause addiction after prolonged use.

An addiction to a drug

- This is a strong desire that makes a person feels uncomfortable when he or she does not use the drug.

DRUG DEPENDENCE

- This is the condition when the human body cannot function well without a particular drug.

✓ Drug dependence results from drug abuse

COMMON DRUGS OF DEPENDENCE

- Cocaine
- Caffeine
- Glue
- Aviation fuel
- Heroin
- Opium
- Shisha
- Alcohol
- Tobacco

- Marijuana (cannabis or bhang)
- Khat (miraa or mirungi)

GROUPS OR CLASSES OF DRUGS OF DEPENDENCE

- Narcotic drugs (Narcotics)
- Stimulants
- Sedative drugs (depressants)
- Hallucinogens

1. **Sedative drugs (depressants)** are drugs which slow down the activity of the brain.

They make a person feel drowsy and sleepy

- Alcohol
- Piriton
- Tranquilizers (calming drugs)

3. Narcotic drugs are drugs that dull the senses and relieve pain.

- Opium
- Morphine
- Heroin
- Codeine

4. Hallucinogens are drugs which make a person see, hear, feel or smell something which does not exist

- Cocaine
- Heroin
- Marijuana
- Peyote
- Mescaline

4. **Stimulants** are drugs which makes the brain more active.

They make a person feel lively.

- Caffeine
- Amphetamines
- Cocaine
- Tobacco

How do people abuse drugs? (How the drugs of dependence are taken in the body)?

- By sniffing e.g cocaine, heroin, glue and petrol
- By drinking e.g caffeine, alcohol
- By smoking e.g tobacco, opium, marijuana
- By chewing the leaves e.g heroine, miraa, tobacco
- By injecting into the body e.g heroin
- By swallowing e.g heroin

DRUG ABUSE

- This is the use of a drug in a way that is harmful to the body

Factors (conditions) that lead drug abuse

- Peer pressure
- Family back ground
- Ignorance
- Stress
- Frustration (many problems)
- To keep awake
- Much fear of the illness

Reasons why people abuse drugs/ take drugs of dependence

- To overcome fear
- To fit in peer groups of drug abusers
- To keep awake
- To reduce stress
- To forget problems
- Due to good advertisement
- To pass time
- To get sleep
- To get energy
- To concentrate on work

EFFECTS OF DRUGS OF DEPENDENCE/DRUG ABUSE TO;

1. An individual

- Brain damage
- Loss of appetite
- Insomnia (inability to sleep)
- Job neglect
- Self-neglect
- Low body immunity
- Imprisonment

2. The family

- Family neglect
- Child abuse
- Spouse abuse
- Broken homes
- Poverty in the family
- Children may become delinquents

3. The community

- It leads to increased accidents
- Criminal acts like rape
- Poor job performance
- Truancy: is the act of being absent from school without permission.
- Violence
- Impaired school performance

How can a school child avoid drugs of dependence/drug abuse?

- Avoid bad peer groups
- Learn more about dangers of drug abuse
- Join good social clubs like church choir
- Engage in games and sports during free time

LIFE SKILLS TO SAFE GUARD AGAINST ALCOHOL, SMOKING AND DRUG DEPENDENCE:

What are life skills?

- These are abilities and behaviour that help a person to effectively deal with the challenges of everyday life.

Examples of life skills

- Self-awareness
- Self esteem

- Assertiveness
- Peer resistance
- Responsible decision making
- Critical thinking

TERM TWO

CLASSIFICATION OF PLANTS

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

Characteristics of plants

They have chlorophyll
They make their own food (they are autotrophs)
They are multicellular organisms
They breathe through stomata
Plant cells have cell walls
They have leaves, roots and stems

How do plants benefit from animals?

Plants get carbon dioxide from animals.
Plants get manure from animals.
Some animals help in pollination.
Some animals help in seed dispersal.
Some plants get care from some animals.

How do animals benefit from plants?

Some animals get food from plants.
Animals get oxygen from plants.
Some animals get herbal medicine from plants.
Some animals get shelter from plants.

State the importance of plants in the environment.

Plants provide food.
Plants provide herbal medicine.
Plants provide wood fuel.

Plants provide timber.

Plants provide poles for building houses.

Plants purify air.

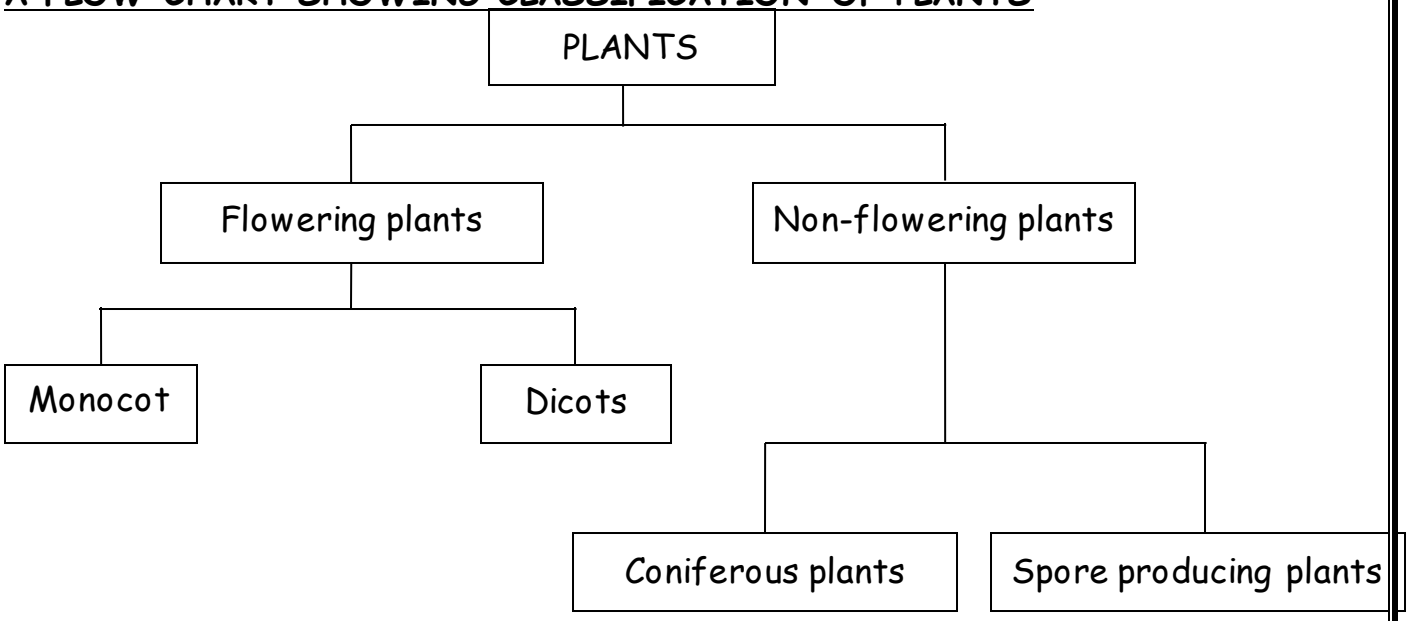
Plants help in water cycle.

GROUPS OF PLANTS:

Non flowering plants

Flowering plants

A FLOW CHART SHOWING CLASSIFICATION OF PLANTS



NON-FLOWERING PLANTS

These are plants which do not bear flowers.

Groups (classes) of non-flowering plants

Spore producing plants

Coniferous plants/conifers

SPORE BEARING PLANTS

These are plants that reproduce by means of spores.

Examples of spore producing plants:

Ferns

Mosses

Liverworts

Horsetails

Hornworts

What is a spore?

This is a reproductive cell that can develop into a new organism without fusion with another reproductive cell.

Spores in plants are produced and stored by the **sporangium (spore case).**

Mature spores are always dispersed by **wind** or **insects**

FERNS

They have chlorophyll and can make their own food

They have proper leaves, roots and stems.

They reproduce by means of spores.

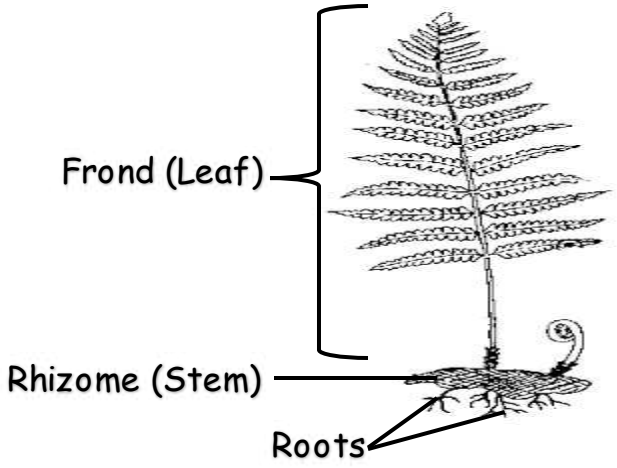
Their spores are produced on the lower side of the leaves in brown spore cases.

They grow in shady moist places (damp places).

They dry when exposed to direct sunshine

Diagrams showing ferns





A leaf of a fern is called a **frond** while the stem is called **rhizome.**

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

It has proper leaves, roots and stems.

MOSSES

These are small green plants.

They have stalk, leaves and rhizoid

They grow in areas of high humidity and in cold regions

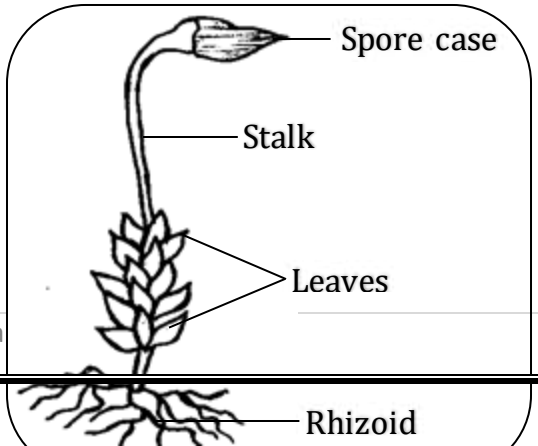
They grow on house roofs, veranda, and tree trunks, on rotting logs, damp rocks, and soil in damp places.

Spores are produced and stored by the spore case (sporangium)

Reproduce by means of spores.

Contain chlorophyll and makes its own food.

A diagram showing a moss plant

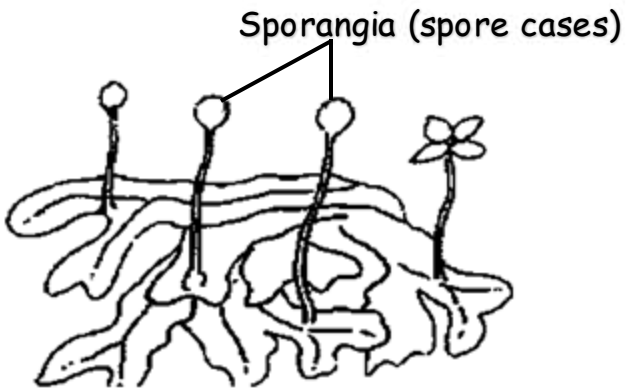


Importance of mosses

Their rhizoids hold soil to prevent soil erosion.

Peat moss is used to make organic fuel e.g peat moss.

3. Liverworts



They have flat liver like shape of their main body

They have plate-like or leaf like structures with chlorophyll to make food

They grow in warm moist places

They reproduce by means of spores.

Its spores are produced in a bulb like spore case (sporangium)

4. Hornworts

These are the smallest group of bryophytes

They grow in damp areas such as ditches, along edges of streams and near the shores of lakes

They look like liverworts

Reasons why mosses, liverworts and ferns are called plants

They have chlorophyll

They can make their own food

They have leaves, stems and roots

CONIFERS

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

They store their seeds in cones

Most conifers have small needle-like leaves.

They are evergreen trees

EXAMPLES OF CONIFERS

Pine	Juniper	Hemlock
Spruce	Larch	Podocarpus (podo)
Fir	Cypress	
Cedar	Redwood	

Why is pine called a conifer?

It doesn't bear flowers but reproduces by means of seeds.

How do conifers reduce the rate of transpiration?

Most conifers have small needle-like leaves; to reduce the surface area for transpiration.

They cover their leaves with a waxy layer.

They have a thick cuticle on the upper surface of their leaves.

Economic importance of conifers

Some conifers are sold for income.

Some conifers act as tourist attractions.

They provide soft wood timber.

Other importance of conifers.

Some conifers act as live fences.

Some conifers act as wind breaks on compounds.

They help in rain formation.

They act as natural habitat for wild animals.

They help to control soil erosion.

They purify air in the environment.

Some conifers provide food e.g pine nuts.

Uses of soft wood timber.

For making papers.

For making match sticks.

For making plywoods.

ORGANISMS RELATED TO PLANTS:

Algae

Euglena

Lichens

ALGAE

They belong to kingdom protista.

They have no roots, stems and leaves

They have chlorophyll and can make their own food

Larger algae reproduce by **means of spores**.

Smaller algae reproduce by **fragmentation**.

They are found in water and moist places.

They can also live in moist soil, on tree barks, moist rocks and inside hydra cells.

What is algal bloom?

This is the rapid increase in population of algae on a water body.

EXAMPLES OF ALGAE

Giant kelp / Seaweeds

Spirogyra

Stonewort

Volvox

Brown algae (Fucus / Rockweed)

Diatom

TYPES OF ALGAE

Red algae

Green algae

IMPORTANCE OF ALGAE

They act as food for aquatic animals

They are a source of iodine when eaten

They are used as fertilizers

They provide oxygen to aquatic animals

They are used to make biofuels (algal biofuel)

EUGLENA

This is a unicellular organism with features of both plants and animal.

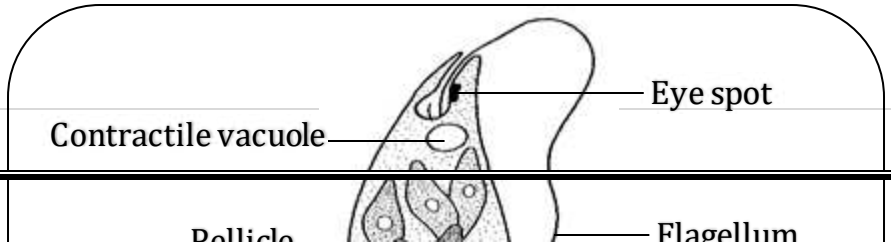
It has chlorophyll so makes its own food.

It can move from one place to another very quickly for protection

It uses **flagella** for locomotion (movement) and feeding

It is microscopic and lives in ditches and ponds.

A DIAGRAM SHOWING EUGLENA



LICHENS

These are organisms which are partly algae and partly fungi.

Lichen is **a symbiosis** feeding relationship between fungus and alga.

It reproduces by means of spores.

Have chlorophyll and can make its own food.

The alga makes food while the fungus absorbs **water from the atmosphere** this enables lichen to grow on dry rocks.

FLOWERING PLANTS

These are plants that bear flowers.

They reproduce by means of seeds.

GROUPS OF FLOWERING PLANTS

Monocotyledonous plants (monocots)

Dicotyledonous plants (dicots)

MONOCOTYLEDONOUS PLANTS

These are plants whose seeds have one cotyledon

Characteristics of monocots

They have seeds with one cotyledon

They undergo hypogeal germination

They have fibrous root system

They have parallel leaf venation

Examples of monocots

Millet

Maize

Sorghum

Rice

Rye

Barley

Wheat

Oats

Sugar cane

Onion

Grass

CEREALS

These are plants which produce grains (corns).

Examples of cereals

Maize	Sorghum
Wheat	Barley
Millet	Rye
Rice	Oat

Points to note about cereals

They produce grains

They are annual crops

These are crops which mature within one year.

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

To provide extra support to the plant.

They are wind pollinated (since they have flowers without petals).

They have green leaf-like scales instead of petals

To protect the inner parts of the flower.

Uses of cereals

They are used as food by man (they are sources of carbohydrates)

They are used to make alcoholic drinks

They are used as animal feeds

They are used to make corn oil (e.g maize)

DICOTYLEDONOUS PLANTS

These are plants whose seeds have two cotyledons.

Examples of dicots

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

Characteristics of dicots

They have seeds with two cotyledons

They undergo epigeal germination

They have tap root system

They have network leaf venation

LEGUMES

These are plants with root nodules

They store their seeds in pods

Examples of legumes

Beans

Peas

Soybeans (soya beans)

Groundnuts

Uses of legumes

They are used as food (they are source of plant proteins)

They improve soil fertility

By fixing nitrogen in the soil

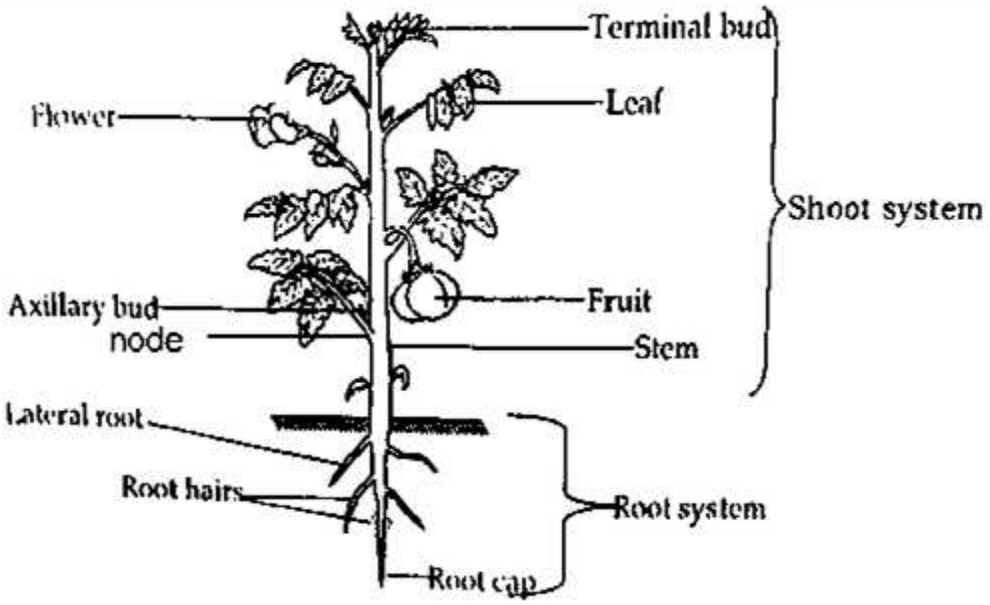
They are source of income when sold

Some legumes can be used to make oil e.g groundnuts

DIFFERENCES BETWEEN DICOTS AND MONOCOTS.

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

PARTS OF A FLOWERING PLANT



SYSTEMS OF A FLOWERING PLANT

Shoot system

Root system

SHOOT SYSTEM

This is the system of a plant that grows above the ground.

It consists of; the stem, leaves, lateral/axillary bud, terminal bud, flowers, fruits nodes and internodes

ROOT SYSTEM

This is the part of a plant that grows below the soil.

It consists of; main (tap root), root hairs, lateral root and root cap

TYPES OF ROOT SYSTEMS

Fibrous root system

Tap root system

TAP ROOT SYSTEM

This is where the radicle forms a main (tap) root with lateral roots

It is found in dicotyledonous plants

Examples of plants with tap root system

Bean plant

Soybeans (soya beans)

Peas

Groundnuts

Mango

Orange

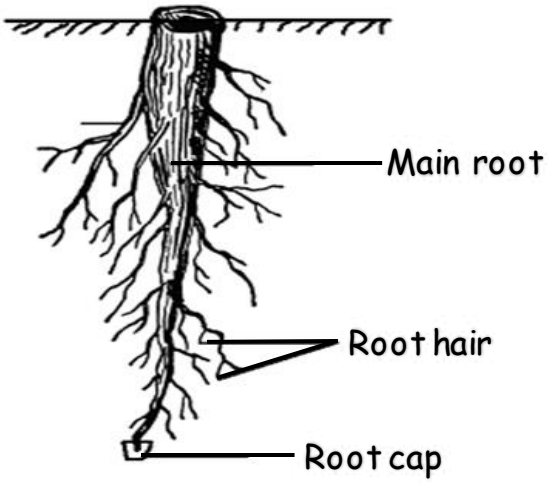
Cassava

Pawpaw plant

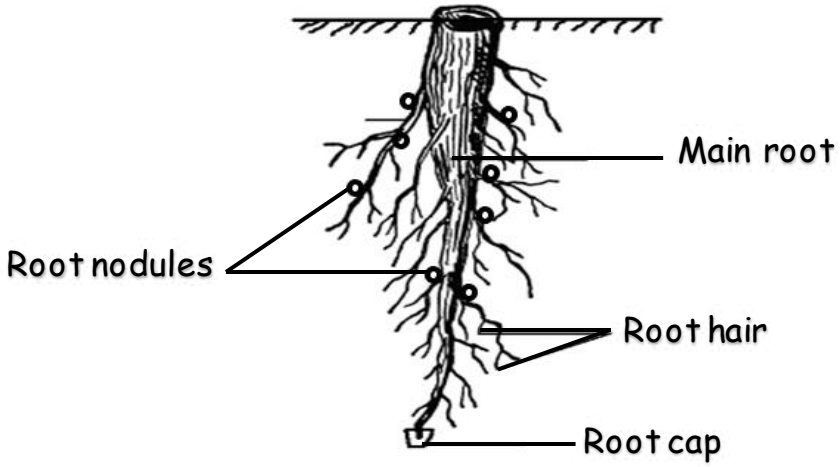
Avocado plant

Jack fruit plant

Structure of a tap root system



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



FUNCTIONS OF THE PARTS

Main root

To hold the plant firmly in the soil.

Lateral roots

They increase water uptake.

They provide support to the plant in the soil.

Root hairs

They absorb water and mineral salts from the soil

Root hairs absorb water and minerals salts from the soil by a process called **Osmosis.**

Root cap

It protects the tip of the growing root from damage

Root nodules

They store nitrogen fixing bacteria (rhizobia)

State the importance of nitrogen fixing bacteria stored in root nodules

They fix nitrogen in the soil

They help in formation of root nodules

State the importance of planting legumes in the garden.

They improve soil fertility (they fix nitrogen in the soil)

FIBROUS ROOT SYSTEM

This is where many roots of the same size and length grow from the radicle.

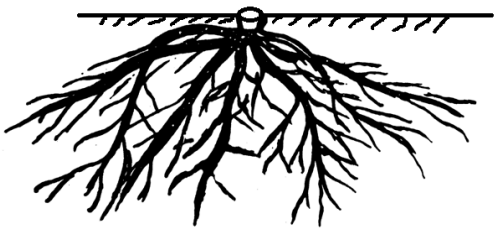
It is common in monocotyledonous seeds

Examples of plants with fibrous root system

Millet	Sorghum
Maize	Rice

Rye
Barley
Wheat
Oats
Sugar cane
Onion
Grass

Diagram showing fibrous root system



TYPES OF ROOTS

Primary roots

Adventitious roots (secondary roots)

PRIMARY ROOTS

These are roots which develop from the radicle.

Examples of primary roots

Tap root e.g in bean plant and groundnuts

Fibrous roots: e.g maize, wheat, rice and in grasses

ADVENTITIOUS ROOTS (SECONDARY ROOTS)

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

Examples of adventitious roots

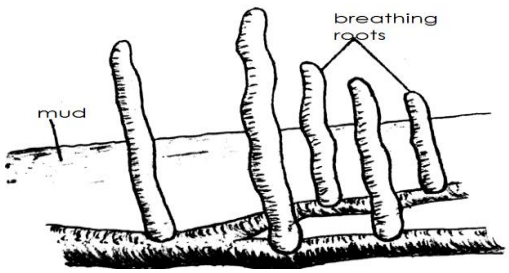
BREATHING ROOTS.

They grow upwards above the ground.

They are common in plants in waterlogged areas e.g mangrove

They help the plant to breathe

Diagram showing breathing roots



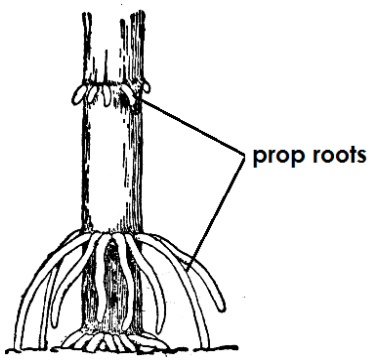
PROP ROOTS.

They grow from the nodes of the stem.

They are mainly found in monocot plants e.g maize, sorghum, millet and sugarcane.

They grow in tall cereals during the flowering stage to provide extra support e.g maize, sorghum and millet.

Diagram showing the prop roots.



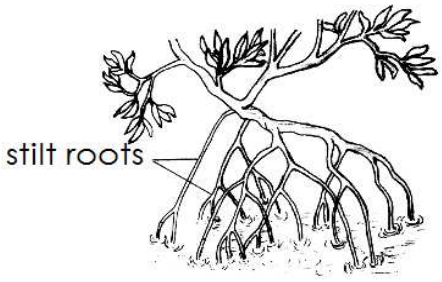
Buttress roots: e.g silk cotton trees and mahogany

STILT ROOTS.

They are found on plants which grow in swamps.

They give extra support to a plant.

Diagram showing stilt roots



Clasping roots

Roots of rhizomes

Roots of bulbs

Roots of corms

Roots of yam

Storage roots: store food for the plant

They are swollen because they store starch.

Examples of storage roots (root tubers)

Carrots	Parsnip
Cassava	Beetroot
Sweet potatoes	Swede
Turnip	Dahlia

Diagrams showing a carrot and sweet potato root tubers

Carrots are rich in vitamins e.g vitamin A

Diagram

Qn. What are aerial roots?

These are adventitious roots which grow above the ground

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

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

Functions of roots to the plant

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

Uses of roots to man

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

Dangers of roots to man

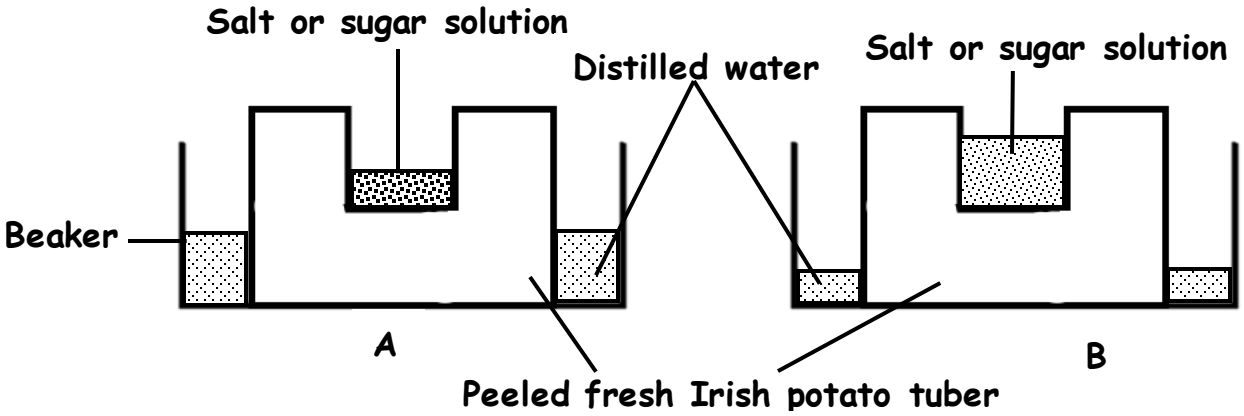
- Some roots are poisonous when eaten
- Some roots damage people's houses

OSMOSIS

- This is the movement of water molecules from a region of low salt concentration to a region of high salt concentration through a semi-permeable membrane.
- Absorption of water and mineral salts (mineral salt solution) by roots is by **osmosis**
- Absorption of water by plant roots is by **osmosis.**
- Absorption of mineral salts by roots is by **active transport.**

Water moves from the roots to other plant parts (stems and leaves) by **capillary action**

An experiment showing osmosis



What is the experiment above about?

Osmosis

State the role played by peeled fresh Irish potato in the experiment above.

It acts as a semi-permeable membrane

It allows movement of water molecules from distilled water in the beaker into the sugar or salt solution.

Why is salt or sugar solution placed in the cavity drilled into the Irish potato?

To act as an area of high salt concentration.

Why did the water level in the beaker decrease as shown in diagram B?

Some water molecules moved from the beaker towards salt or sugar solution.

Water molecules moved from a region of low salt concentration to the region of high salt concentration.

What can't osmosis occur in a boiled Irish potato?

A boiled Irish potato has dead cells yet osmosis can only occur in living cells.

Importance of osmosis to plants

It enables absorption of water and mineral salts by the plant roots.

It enables transportation of water from roots to other plant parts.

It enables movement of water from one plant cell to another.

How do animals benefit from osmosis?

It enables re-absorption of water in the medulla of the kidney.

A DIAGRAM SHOWING A STEM

Functions of each part of the stem

Node: it is where a leaf or flower is fixed (grows from)

Internode: it is the region between two nodes

Terminal bud: it is the growing tip of the plant

Axillary/lateral bud: it grows into branch or leaf or flower

An axillary bud is found in the axil

Axil: the angle between each leaf and the stem

FUNCTIONS OF THE STEMS TO PLANTS

They transport water and mineral salts from the roots to the leaves

They transport glucose/starch from the leaves to other parts of a plant (they help in translocation)

They hold up the leaves to get sunlight

They hold the flower for pollination

They hold fruits for proper dispersal

Green stems make food for the plant

Some stems store food for the plant.

Translocation

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

FUNCTIONS OF STEMS TO MAN

Some stems provide food to man

Some stems provide herbal medicine

Some stems are sold for income

Some stems provide timber

Some stems provide wood fuel

Some are used in vegetative propagation

TYPES OF STEMS

Upright stems

Weak stems

Underground stems

With diagrams

Weak stems

These are stems which cannot support themselves upright.

Groups of weak stems

Creeping stem

Climbing stems

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

To get enough sunlight

To get extra support

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

Use of tendrils e.g passion fruits, cucumber, watermelon, gourd, pumpkin and cowpeas

Use of hooks e.g strawberry

Hooks are pointing downwards to prevent the climbing plant from slipping off the plant.

By twining or clasping e.g morning glory, tomato, vanilla and some beans

UNDERGROUND STEMS

They have buds, scale leaves and adventitious roots

They are **swollen** because they store food (starch)

Why are underground stems sometimes called storage stems?

They store food (starch)

Groups of underground/storage stems

Stem tubers	Rhizomes
Bulbs	Corms

STEM TUBERS

These are swollen underground stems that store food

We eat the stem tuber

Examples of stem tubers

White yam

Irish potatoes

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

Scale leaf: it protects the axillary bud

Axillary bud: it develops into a shoot

Stem tuber: it stores starch

How are white yams and Irish potatoes propagated?

By means of stem tubers

Why is a sugarcane plant not called a stem tuber?

Its storage stem is above the ground while that of a stem tuber is found underground

Its storage stem is not found underground

BULBS

These are swollen underground stems with swollen fleshy leaves

They have adventitious roots

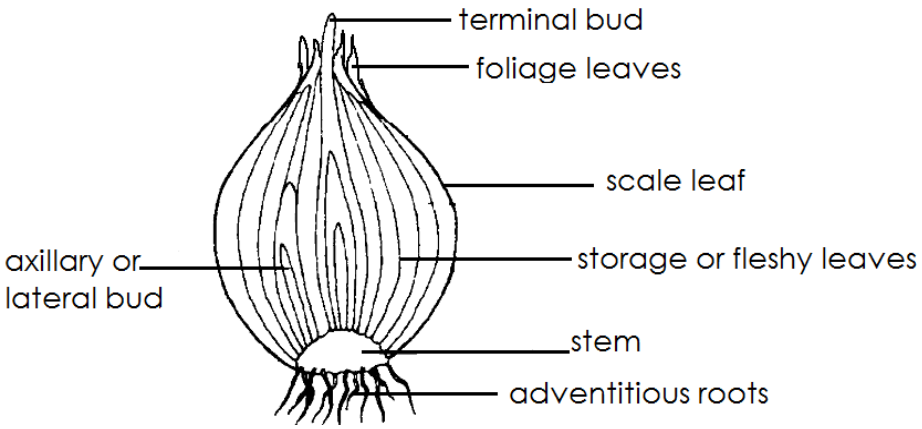
Examples of bulbs

Onion	Shallot
Garlic	Spider lily

Tulip Amaryllis

Daffodil (Narcissus)

A diagram showing a bulb (e.g onion)



Foliage leaves: to make food

Fleshy leaves: to store food

Scale leaves: to protect the fleshy leaves

Stem: to hold the fleshy leaves / to conduct water and mineral salts from the roots to the leaves

Adventitious roots: to provide extra support / to absorb water and mineral salts from the soil

Terminal bud: to enable the plant grow taller

Axillary bud: to develop into a new shoot

How are onions propagated?

By means of bulbs

By means of seeds

RHIZOMES

These are horizontal underground stems that store food

They have adventitious roots which grow from nodes of the stem

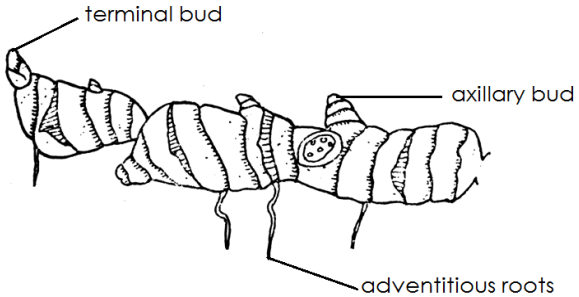
Examples of rhizomes

Ginger Canna lily

Turmeric Couch grass

Zoyzia Spear grass

A diagram showing a rhizome (e.g ginger)



How is ginger propagated?

By means of rhizomes

CORMS

These are short vertical underground stems that store food

Examples of corms

Coco yam

Crocus

Gladiolus

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



How is coco yam propagated?

By planting of corms

THE STRUCTURE OF A LEAF

FUNCTIONS OF EACH PART OF A LEAF

Leaf blade/lamina

For photosynthesis/ It helps in making of starch

For respiration

It is where transpiration mainly takes place

It is where the breathing organs (stomata) are found

Apex

It is the sharpest tip of the leaf

It provides protection to the leaf

Stomata

For breathing

Allow out water during transpiration

Let in carbon dioxide by diffusion during day time and oxygen during night time.

Veins

They transport water and mineral salts in the leaf

They transport food from the leaf blade to the main vein (midrib)

Leaf stalk (petiole)

It holds a leaf

It transports water from the stem to the leaf

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It transports food from the leaf to the stem

Leaf base

It attaches the leaf to the stem

Leaf blade (lamina)

It is where photosynthesis occurs

FUNCTIONS OF LEAVES TO PLANTS

They make food for the plant (carry out photosynthesis)

They plants in breathing

They carry out transpiration

Some leave store food for the plant e.g cabbage and onion

FUNCTIONS OF LEAVES TO PEOPLE

Some leaves are eaten as food

They are sold for income

They are used as herbal medicine

They are used as animal feeds

Dry leaves can be used as mulches

Some leaves can be used for plant propagation e.g bryophyllum

They are used for thatching houses

For decoration

Tea leaves can be used on beverages

TYPES OF LEAVES

Simple leaves

Compound leaves

SIMPLE LEAVES

These are leaves with one leaf blade and leaf stalk

They have one leaflet on the stalk

They have one leaf stalk

They have one margin

Their leaf blade (lamina) is undivided or not completely divided

Examples of simple leaves

Simple entire e.g mango, avocado and jack fruit

Simple serrated e.g black jack

Simple divided entire

Simple lobed

Simple palmate e.g pawpaw and castor oil

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Monocotyledons leaf (simple lanceolate leaf) e.g maize, sorghum, millet, elephant grass, rice and reeds

Diagrams of simple leaves

COMPOUND LEAVES

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

They have many leaflets

They have many leaf stalks

EXAMPLES OF COMPOUND LEAVES

Compound pinnate e.g acacia and eucalyptus

Compound bipinnate e.g jacaranda

Compound digitate e.g cassava and silk cotton leaves

Compound trifoliate e.g beans and soya beans

Compound bifoliate e. g bryophyllum

Diagrams of compound leaves

LEAF VENATION

This is the arrangement of veins in the leaf

Types of leaf venation

Network leaf venation (reticulate leaf venation)

Parallel leaf venation

NETWORK LEAF VENATION

This is when veins form something like a net in a leaf

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It is found in dicotyledonous plants

A diagram showing network leaf venation

Examples of plants with network leaf venation

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

PARALLEL LEAF VENATION

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

A diagram showing parallel leaf venation

Examples of plants with parallel leaf venation

Millet
Maize
Sorghum
Rice
Rye
Barley
Wheat
Oats

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Sugar cane Grass

Onion

PROCESSES THAT OCCUR IN LEAVES

Photosynthesis

Transpiration

Breathing (gaseous exchange)

Guttation: loss of water in form of water droplets from the plant leaves

PHOTOSYNTHESIS

This is the process by which plants make their own food (glucose/starch)

It is a biochemical process in plants

It mainly takes place in the leaves

It can also occur in green stems and in cotyledons of seedlings

Photo – means light

Synthesis – means to build up (to make)

On which part of a plant does photosynthesis mainly occur?

Leaves

Where in the plant leaves does photosynthesis occur?

In the chloroplasts

EQUATION SHOWING PHOTOSYNTHESIS

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

RAW MATERIALS FOR PHOTOSYNTHESIS.

Water

Carbon dioxide

CONDITIONS FOR PHOTOSYNTHESIS

Chlorophyll

Sunlight

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PRODUCTS OF PHOTOSYNTHESIS

Glucose/starch (it is the main/useful product)

Oxygen (it is the byproduct/waste product)

REQUIREMENTS FOR PHOTOSYNTHESIS

Water

Carbon dioxide

Chlorophyll

Sunlight

IMPORTANCE OF THE REQUIREMENTS FOR PHOTOSYNTHESIS

Water

Water is got from the soil

It provides the hydrogen needed to form glucose

Carbon dioxide

Carbon dioxide is got from air in the atmosphere

It provides carbon needed to form glucose

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

By diffusion

Chlorophyll

This is the green pigment in plants

It traps sunlight

Sunlight

It helps to splits water into hydrogen and oxygen

Why can't photosynthesis occur at night?

There is no sunlight

Importance of glucose produced by plants during photosynthesis

It is used for respiration to produce energy.

It is used to make insoluble starch for storage.

It is used to make cellulose which builds cell walls.

ADAPTATIONS OF LEAVES FOR PHOTOSYNTHESIS

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They are broad and flat

To trap sunlight easily

They have thin walls

To allow easy diffusion of carbon dioxide

They have chlorophyll

To trap sunlight

They have stomata

To allow in carbon dioxide

They have veins

To transport water to all leaf cells

They are well arranged on the stem

To get sunlight easily

FACTORS THAT AFFECT PHOTOSYNTHESIS

Light intensity

Carbon dioxide concentration

Optimum temperature

How do plants benefit from photosynthesis?

Plants get food

How do animals benefit from photosynthesis?

Animals get oxygen for respiration

Some animals get food e.g herbivores and omnivores

How does photosynthesis purify air (control global warming)?

It uses carbon dioxide and gives out carbon dioxide

STEPS OF TESTING A GREEN LEAF FOR STARCH

Boil the leaf in water for some minutes

To kill the cells

To break the cell wall of a leaf

Boil the leaf in alcohol (ethanol/methylated spirit)

To remove chlorophyll

Wash the leaf with hot water

To remove alcohol and soften the leaf

Put drops of iodine solution on a leaf

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

If starch is absent, iodine will remain brown

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POINTS TO NOTE

Killing the cells helps to stop all the chemical reactions in a leaf

Breaking the cell wall enables easy removal of chlorophyll

Removing chlorophyll enables clear observation of colour changes of iodine solution

Making the leaf soft enables easy diffusion of iodine

TRANSPIRATION

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

Types of transpiration

Lenticular transpiration: in the **lenticels**

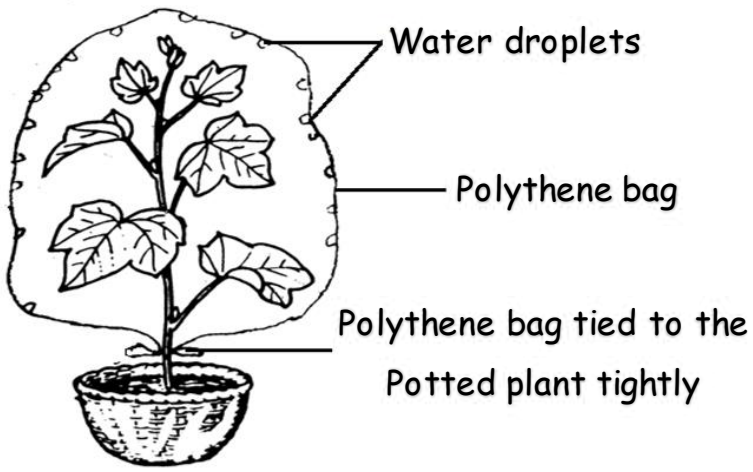
Stomatal transpiration: in the **Stomata**

Cuticle transpiration: **in the cuticle of the stem**

Transpiration occurs in the leaves and some stem.

Most transpiration occurs in the **leaves**

An experiment showing transpiration



Potted plant

To carry out transpiration.

Polythene bag

To trap and condense water vapour.

Why is the polythene bag tied to the stem of the potted plant tightly?

To prevent water vapour from escaping.

Why are water droplets formed inside the polythene paper?

Due to condensation.

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Importance of transpiration to plants

It cools the plant

It pulls up water and mineral salts to the leaves

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

It can lead to wilting

It lowers crop yields due to less water left in the plant

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

All are cooling processes (they cool living things)

Importance of transpiration in the environment

It helps in the water cycle

FACTORS THAT AFFECT THE RATE OF TRANSPIRATION

These are conditions that either increase or decrease the rate of transpiration;

Temperature

Light intensity

Wind

Humidity

Surface area (size) of the leaf

Number of stomata on the leaf

Temperature

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

Light intensity

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

Wind

Strong wind increases the rate of transpiration.

It blows off water molecules on the plant giving space for more vapour to come out.

Surface area (size) of the leaf

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

Humidity

Humidity is the amount of water vapour in the atmosphere

High humidity lowers the rate of transpiration and vice versa

Number of stomata on the leaf

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

Factors that increase the rate of transpiration

High temperature
High light intensity
Low humidity
High number of stomata
Large size of the leaf
Strong wind

Factors that lower the rate of transpiration

Low temperature
Low light intensity
High humidity
Few number of stomata
Small size of the leaf
Gentle wind

Ways through which plants reduce the rate of transpiration.

Some plants shed their leaves during dry season e.g deciduous trees (mvule, fig tree, elk, basswood, beech, maple and oak)
Some plants cover their leaves with a layer of wax e.g banana.
Some plant leaves are modified into thorns e.g cactus and aloe-vera.
Some stems have tough lenticels and cuticle to prevent water loss.
Some plants grow very small leaves (leaves with small surface area).
Some plants develop needle shaped leaves.
Some plants have few stomata on their leaves.
Some plants fold their leaves during the dry seasons.

How do farmers reduce transpiration among their crops?

By cutting off leaves from suckers while planting
By transplanting seedlings in the evening
By putting a shade on a nursery bed

XEROPHYTES

- These are plants that can grow in places with very little water
- They can live in deserts and snow-covered areas.

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EXAMPLES OF XEROPHYTES

- Euphorbia
- Cactus
- Pineapple
- Prickly pear
- Aloe vera
- Sisal

Cactus

- It is flowering plant
- It is a perennial xerophyte
- It is commonly found in deserts

ADAPTATIONS OF CACTUS TO ITS SURVIVAL IN DESERTS (DRY PLACES)

- It has a fleshy stem; to store water and make food.
- It has wide and deep roots; to absorb rainwater on the surface and underground deep water.
- Its leaves are modified as spines; to reduce the rate transpiration.
- It has a thick waxy layer on the stem; to reduce the rate of transpiration.
- It has sunken (deep-layer) stomata; to reduce the rate of transpiration.
- It has a short growing season

How does a cactus benefit from the following parts?

Stem

- It stores water
- It makes food

Spines

- They reduce the rate of transpiration
- They protect the cactus from being eaten by animals (for self-defense)

How does a thorn differ from a spine?

- A thorn is a modified sharp-pointed stem while a spine is a modified sharp-pointed leaf.

POINTS TO NOTE

Lime water is used to test for the presence of carbon dioxide.

It turns milky (cloudy white) if carbon dioxide is present.

Cobalt chloride paper is used to test for the presence of water.

It turns from blue to pink if water is present.

Iodine solution is used to test for the presence of starch.

It turns from brown to blue-black if starch is present.

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TYPES OF REPRODUCTION IN FLOWERING PLANTS

Asexual reproduction

Sexual reproduction

Asexual reproduction; does not involve union of gametes.

Examples

Vegetative propagation

Spore formation

Sexual reproduction; involves union of gametes.

Example

Seed propagation

THE FLOWER

It is the reproductive part of the flowering plant

Uses of flowers to people

For decoration

Making of insecticide

Are used as wreath (sign of respect to death)

Used to make perfumes

Used as sign of welcome (bouquet)

Are sold for income

Are used to get dyes

Act as sign of love.

Some flowers can be eaten as food e.g cauliflower

PROCESSES WHICH OCCUR IN THE FLOWER

Pollination

Fertilization

USE OF A FLOWER TO THE PLANT

For reproduction

Help a plant to form seeds and fruits

NOTE

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A flower has gametes and gonads.

The male gonads in flowers are **pollen**.

The male gametes in flowers are **anthers**.

The female gonads in flowers are the **ovaries**.

The structure of a flower.

FUNCTIONS OF EACH PART

Petals

A group of petals on a flower is called **corolla**.

Petals are brightly coloured to attract living pollinators like insects, birds and fruit bats.

Insects and birds feed on nectar.

Petals have nectaries or nectar glands at their base.

Nectary glands produce a sweet juice called **nectar**.

Pistil or Carpel

The pistil is the female part of a flower

It is made up of three main parts; namely

Ovary; It contains undeveloped seeds called ovules.

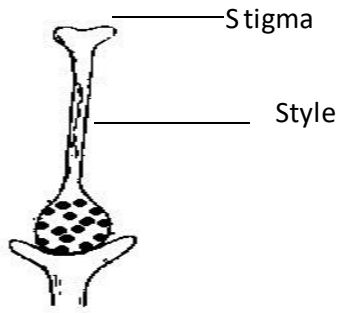
An ovule is a female gamete

Stigma: It receives pollen grains from the anthers.

Style: It holds the stigma in position.

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Illustration



C. The Stamen

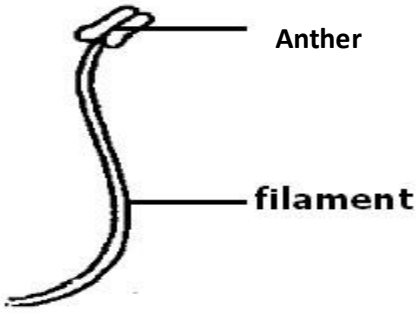
The stamen is the male part of a flower.

It is made up of the anther head and filament.

The anther head produces and stores pollen grains.

The filament supports the anther head

Illustration



D. Sepals

A group of sepals is called **calyx**.

Sepals protect the flower during the bud stage.

E. Flower stalk

It holds the flower in a position for easy pollination

POLLINATION

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

Types of pollination

Cross pollination

Self-pollination

1. SELF POLLINATION

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

Characteristics of self-pollinated flowers

Filaments are longer than the style

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Do not have scent

Have heavy pollen grains

Their anthers are above the stigma

Have dull coloured petals

Produce small quantity of nectar

How some flowers are adapted to self-pollination?

They are hermaphrodites/bisexual

The flower remains closed until self-pollination has taken place

Some flowers are buried in the ground

The stamen and pistil mature at the same time e.g tomato

The filaments are longer than the style

The anthers are above the stigma

Examples of plants with self-pollination

Tomato

Vanilla

Wandering jew: its flower does not open

Ground nut: its flower grow at the ground

Disadvantages of self-pollination

The new plants and seeds produced are generally weak

The plants produced are vulnerable to diseases

The chances of introducing new characteristics in new plants is minimized.

Diagram showing self-pollination.

2. CROSS POLLINATION

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

Characteristics of cross pollinated flowers

How are some flowers adapted to cross pollination?

The male and female flowers grow on the same plant but mature at different time e.g the maize and the coconut

In some plants, the male and female flowers grow on different plants e.g the pawpaw

In some plants, pollen grains cannot germinate on the stigma of the same flower e.g the passion fruit

Examples of plants with cross pollination

Passion fruit

Maize plant

Coconut plant

Pawpaw plant

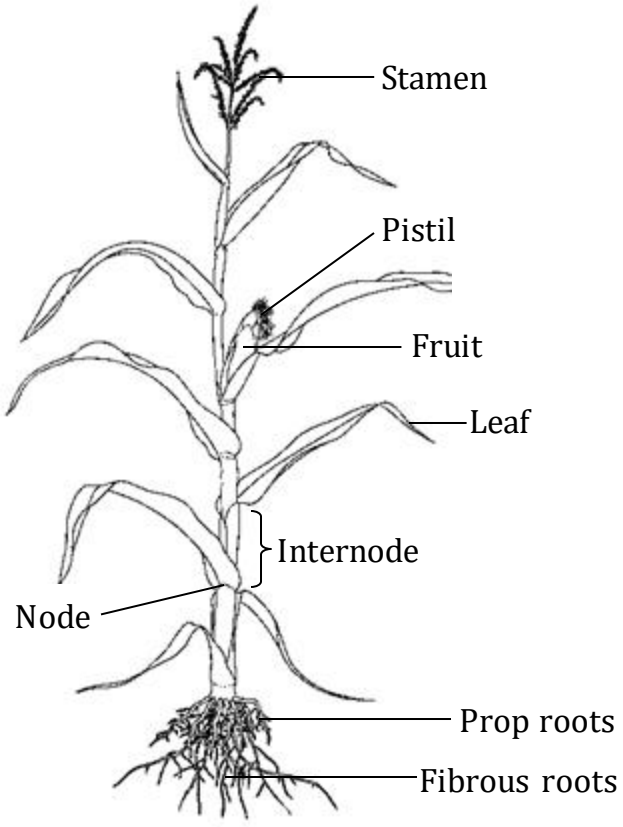
Advantages of cross pollination

Healthier plants are produced

The seeds and fruits produced are larger in size

Disease resistant varieties are produced

A diagram showing a maize plant



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AGENTS OF POLLINATION

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

Characteristics wind pollinated flowers

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

Examples of plant flowers pollinated by wind

Maize
Wheat
Grass flowers

Characteristics of insect pollinated flowers

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

Importance of pollination

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

FERTILISATION IN PLANTS

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

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It is a biological process that occurs in the ovary of a flower

After pollination, the pollen grains form a pollen tube.

The pollen tube grows downwards through the style to take pollen to the ovary to meet the ovules.

Fertilisation in plants occurs in the flowers

In flowers, fertilisatiobn occurs in the ovary

After fertilisation,

Ovules become seeds

Ovary develops into a fruit.

The calyx, corolla, stamen and style wither away.

Ovary wall becomes the pericarp

Note:

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

Diagram

SEEDS

A seed is a mature fertilized ovule.

It has one scar

Classes/ groups of seeds

Monocotyledonous seeds

Dicotyledonous seeds

MONOCOTYLEDONOUS SEEDS

These are seeds with one cotyledon.

Examples of monocotyledonous seeds / grains

Maize	Sorghum	Most grass
Rice	Barley	
Millet	Oats	

A diagram showing a monocotyledonous seed e.g maize grain.



Functions of the parts of a maize grain.

Testa

It protects the inner parts of a maize grain.

Plumule

It develops into shoot system

Radicle

It develops into root system.

Endosperm

It stores food for the embryo.

Cotyledon

It supplies food to the embryo.

Stalk scar

It holds (attaches) the maize grain to the cob.

Style scar

It is where the style of a flower was attached.

Embryo

It grows into a seedling.

Why is a maize grain called a fruit?

It has two scars.

Why is a maize grain not called a seed?

A maize grain has two scars while a seed has one scar.

Name the two parts that form the embryo of a seed

Radicle

Plumule

Name the two scars of a maize grain (fruit).

Style scar

Stalk scar

DICOTYLEDONOUS SEEDS

These are seeds with two cotyledons.

Examples of dicotyledonous seeds

Beans	Ground nuts	Tomatoes
Peas	Oranges	Coffee

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Avocado Soya bean

Structure of a bean seed

Give two differences between a maize grain and a bean seed.

Maize grain has two scars while a bean seed has a one scar.

A maize grain stores food in the endosperm while a bean seed stores food in the cotyledon.

GERMINATION

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

Types of germination

Epigeal germination

Hypogeal germination

Viviparous germination: it is found in mangrove

EPIGEAL GERMINATION

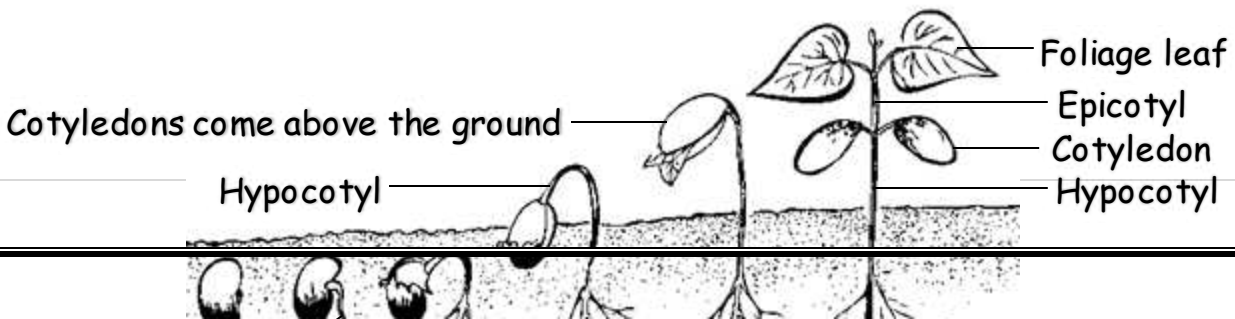
This is the type of germination where the cotyledons come above the ground level.

It occurs in all dicotyledonous plants e.g beans, peas and ground nuts.

NOTE:

Simsim is the only monocot that undergoes epigeal germination.

A DIAGRAM SHOWING EPIGEAL GERMINATION.



Hypocotyl

The region of a seedling stem below the cotyledons.

Epicotyl

The region of a seedling stem above the cotyledons.

HYPOGEAL GERMINATION

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

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

A diagram showing hypogeal germination.

Conditions necessary for germination

Oxygen:

It aids in respiration

Water:

It softens the testa

It dissolves stored food in the seed

It activates the protoplasm of seed cells

Warmth:

It activates enzymes that initiate seed germination

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Experiment to show the conditions necessary for germination

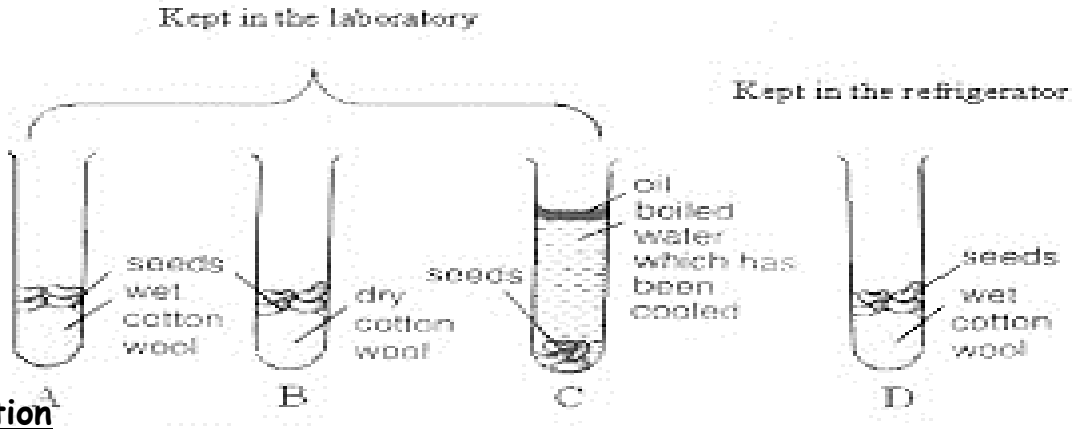
Seeds are placed in four test tubes labeled A, B, C and D as shown below.

Seeds in test tube A are placed in wet cotton wool and kept in a room

Seeds in test tube B are placed on dry cotton wool and kept in a room

Seeds in test tube C are placed in cool boiled water mixed with oil and kept in a room

Seeds in test tube D are placed in wet cotton wool and kept inside a refrigerator



Observation

Seeds in test tube A will germinate

They have water, oxygen and warmth

Seeds in test tube B will not germinate

They lack water

Seeds in test tube C will not germinate

They lack oxygen

Seeds in test tube D will not germinate

They lack warmth

Why is oil poured on water in test tube C?

To cut off oxygen supply to the seeds

Why is test tube D place in a refrigerator?

To prevent seeds from getting warmth

SEED VIABILITY

This is the ability of seeds to germinate under favourable conditions.

Qualities of viable seeds

They should be mature.

They should be dry.

They should be healthy (free from diseases).

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They should not be broken.

They should be free from pest damages.

They should not have overstayed.

They should be of a suitable size.

They should have a high germinating rate.

SEED DORMANCY

This is the inability of a seed to germinate under favourable conditions.

Factors that can lead to seed dormancy

Planting diseased seeds.

Planting premature seeds.

Planting broken seeds.

Too much heat in the soil.

Dampness of seeds during storage.

Ways of protecting seeds from dormancy

Proper drying of seeds before storage.

Keeping seeds in a dry place.

Putting rat guards on granaries.

Dusting seeds.

Seed dressing.

What is meant by seed dressing?

This is the applying of chemicals on seeds to prevent infections and pests

TROPISM

Tropism is a growth response of a plant towards stimuli

Stimuli

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

EXAMPLES OF STIMULI FOR PLANTS

Water

Light

Gravity

Chemical

Touch

KINDS (TYPES) OF TROPISM

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Phototropism
Hydrotropism
Chemotropism
Thigmotropism
Geotropism

PHOTOTROPISM (HELIOTROPISM)

This is a growth response of a plant towards light

The plant shoot is positively phototrophic while the roots are negatively phototrophic

Diagrams showing phototropism.

Diagram I

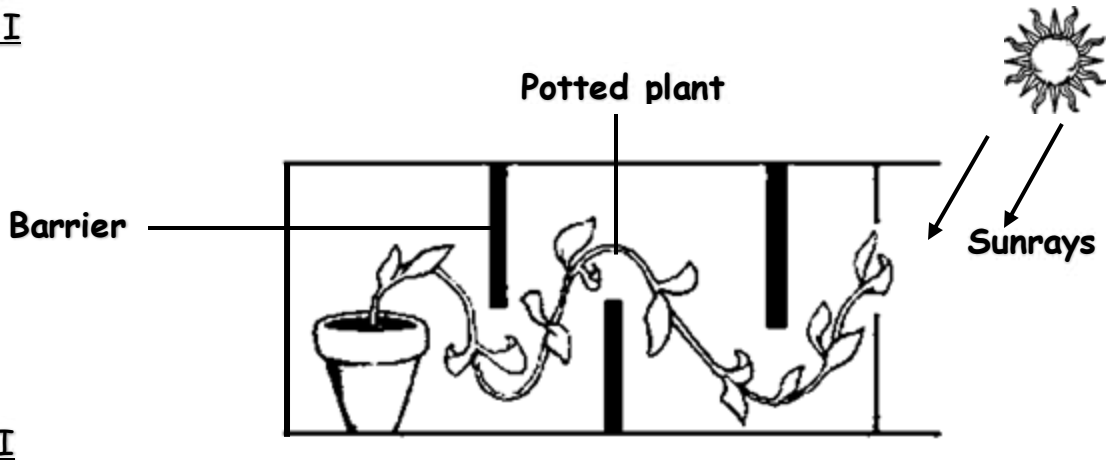
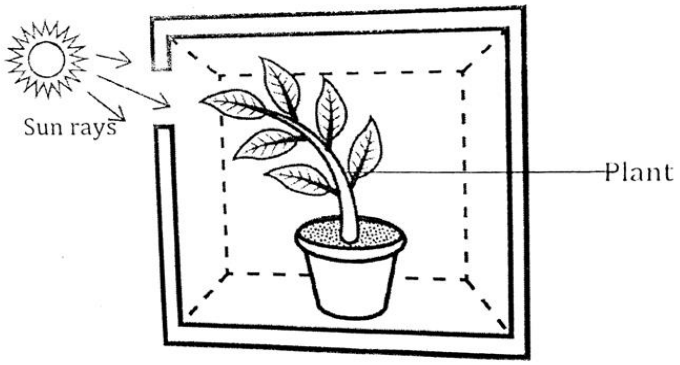


Diagram II

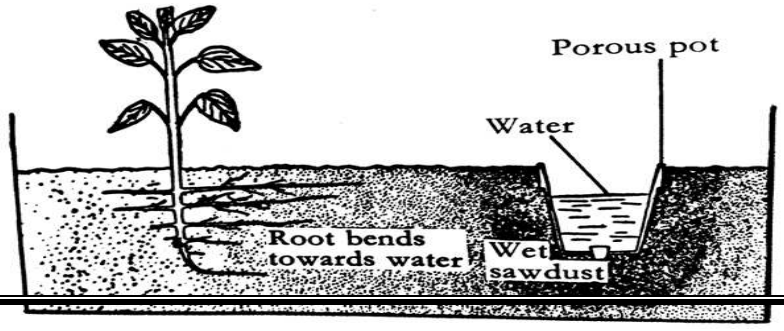


HYDROTROPISM.

This is the growth response of a plant towards the water source

Plant roots are positively hydrotropic **because** they grow towards the source of water

A diagram showing hydrotropism



GEOTROPISM

This is the growth response of a plant towards gravity

Plant roots grow downwards due geotropism

Plant roots are positively geotropic **because** they grow towards gravity

Plant shoot is negatively geotropic **because** it grows while opposing gravity

A diagram showing geotropism.

Chemotropism

This is a growth response of a plant towards chemicals

Give an example of chemotropism in plants.

Growth of pollen tubes towards the ovules

Conversion of a flower into a fruit

A diagram showing chemotropism.

THIGMOTROPISM (HAPTOTROPISM)

This is the growth response of a plant towards touch

How is thigmotropism important to climbing plants such as some beans, tomatoes and morning glory?

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It helps climbing plants to twine (clasp) other plants

A diagram showing thigmotropism.

SUMMARY OF TROPISM.

Tropism	**Stimulus**
Phototropism	sunlight
Geotropism	Force of gravity
Hydrotropism	Water and moisture
Thigmotropism/ Haptotropism	Touch
Chemotropism	Chemicals

FRUITS

A fruit is a developed ovary.

Fruits have two scars i.e. style stalk and stalk scar.

Importance of fruits to plant

Fruits protect seeds.

Fruits assist in seed dispersal.

Importance of fruits to people

Some fruits are eaten as food.

Some fruits are sold for income.

Some fruits act as herbal medicine.

DIFFERENCES BETWEEN SEEDS AND FRUITS

A seed is a fertilized ovule while a fruit is a developed ovary.

A seed has one scar while a fruit has two scars.

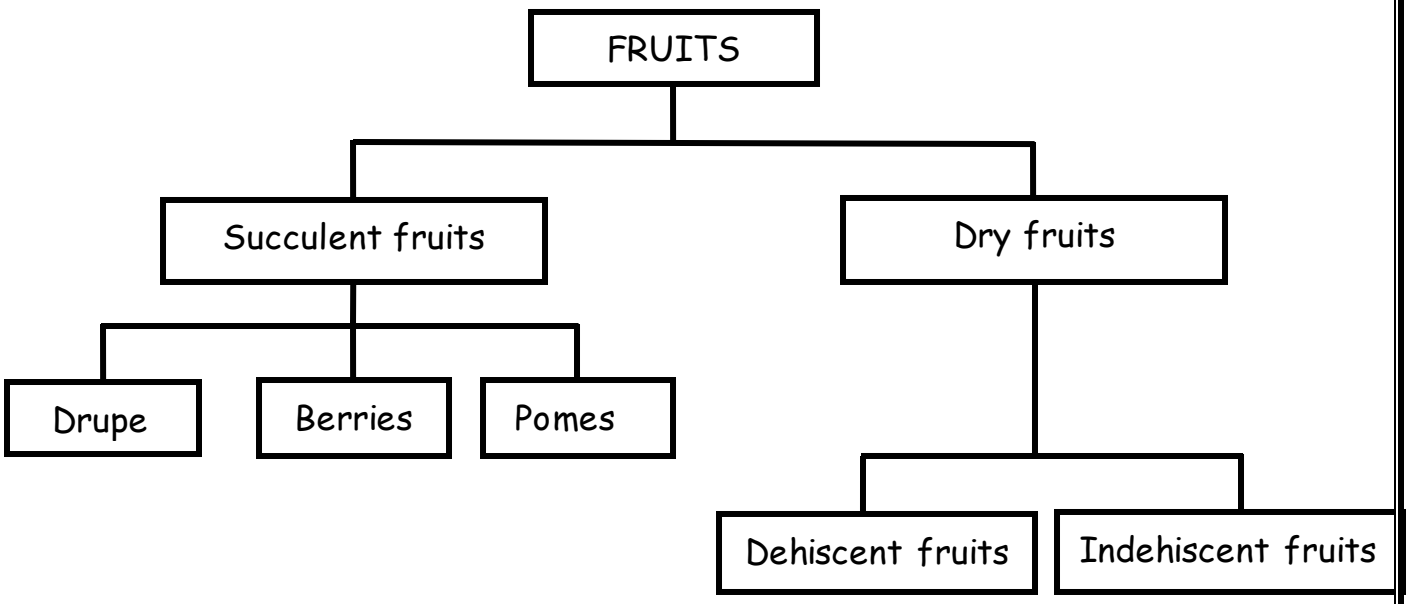
TYPES OF FRUITS

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Succulent fruits (fleshy fruits or juicy fruits)

Dry fruits

A FLOW CHART SHOWING CLASSIFICATION OF FRUITS



SUCCULENT FRUITS / JUICY FRUITS/ FLESHY FRUITS

These are fruits with juicy pericarp.

Pericarp:

These are layers of a fruit

Parts which make up the pericarp

Exocarp (Epicarp): outermost layer

It protects the inner layers

It attracts living agents of dispersal

Mesocarp: middle juicy layer

It is responsible for the colour of both ripe and unripe fruits

Endocarp: innermost layer

It protects the seeds

Groups of succulent fruits

Berries

Drupes

Pomes

BERRIES

These are fleshy fruits with many seeds.

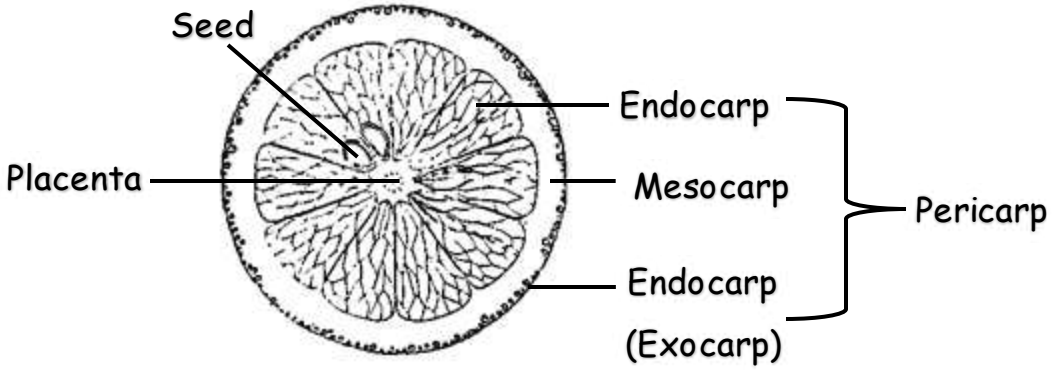
Berries have a fleshy endocarp

Examples of berries

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Oranges	Grapes	Watermelon
Tomatoes	Guavas	Pumpkin
Pawpaw	Thorn apple	Lemon
Passion fruit	Sodom apple	Banana

A diagram of an orange fruit.



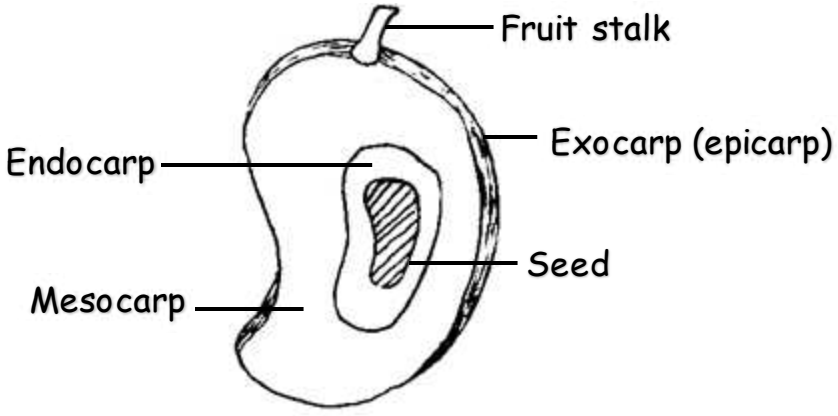
DRUPES.

These are fleshy fruits with one seed inside a hard endocarp.

Examples of drupes.

Mango	Coconut	Pecan
Peach	Oil palm	Plum
Cherry	Cashew nut	Sabal
Olive	Walnut	
Dates		

A diagram showing a drupe.



Why is avocado not regarded as a drupe yet it has one seed?

Avocado has a fleshy endocarp yet drupes have a hard endo carp

Why is avocado called a single-seeded berry?

Avocado has a fleshy endocarp

POMES

These are fruits formed from the swollen receptacle

Its inner core is the pericarp.

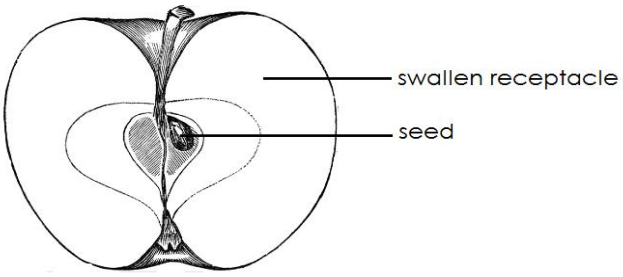
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Examples of pomes

Apples

Pears

A diagram of an apple.



Why is an apple called an accessory fruit (false fruit)?

It develops from the receptacle other than the ovary

DRY FRUITS

These are fruits with a dry pericarp

Groups of dry fruits

Dehiscent fruits /splitting fruits

Indehiscent fruits /non splitting fruits

Dry dehiscent fruits

These are dry fruits which split to disperse the seeds

Examples of dry dehiscent fruits

Beans	Cassia	Desmodium (tick clover)
Peas	Tobacco	
Castor oil	Sodom apple	Poppy

A structure of a dehiscent fruit

The fruit splits along the lines of weakness

Dry indehiscent fruits

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

Examples of dry indehiscent fruits

Sunflower

Tridax

Black jack (bidens pilosa)

Maize

Cashew nuts

OTHER FRUITS

Multiple fruits

Aggregate fruits

AGGREGATE FRUITS.

These are fruits that develop from multiple ovaries of a single flower.

Examples of aggregate fruits

Blackberry Dewberry

Raspberry Strawberry

MULTIPLE FRUITS.

These are fruits that develop from ovaries of multiple flowers fused together into a larger fruit.

Examples of multiple fruits

Jack fruit Pineapple

SEED DISPERSAL

This is the scattering of seeds from a parent plant to a new area.

Importance of seed dispersal to plants

It enables plants to colonise new areas.

It prevents overcrowding of plants

It reduces competition for plant nutrients, water and sunlight.

It prevents extinction of plant species (it increases chances of survival of plant species)

Importance of seed dispersal to animals.

It increases food for herbivorous animals

It creates natural homes for wild animals

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Disadvantage of seed dispersal

It leads to growth of weeds.

It exposes seeds to pests.

It exposes fungal infections.

What is an agent of seed dispersal?

This is anything that scatters seeds from a parent plant to a new area.

AGENTS OF FRUIT AND SEED DISPERSAL

Wind

Animals (e.g birds, bats, monkeys and people)

Water

TYPES / METHODS / MECHANISMS OF FRUIT AND SEED DISPERSAL

Water dispersal

Animal dispersal

Wind dispersal

Explosive mechanism (self-dispersal or mechanical dispersal)

CHARACTERISTICS / ADAPTATIONS OF SEEDS AND FRUITS DISPERSED BY:

WIND.

Some seeds are small and light to float in air e.g orchid.

Some seeds have hairy structures (tuft of hair) e.g cotton seed, Calotropis and silk cotton

Some seeds have parachute like structure e.g dandelion and tridax

Some seeds have wing like structures to float in air e.g jacaranda, moringa, pinus, shorea, Tacoma and terminalia

Some seeds have balloon like structure e.g physalis and cardiospermum

Some seeds are dispersed when wind blows and shakes the porous capsule e.g aristolochia and poppy

Examples of seeds dispersed by wind.

Orchid	Jacaranda	Calotropis
Tridax	Dandelion	
Poppy	Cotton seed	

Diagrams showing seeds dispersed by wind.

Jacaranda



Cotton



Dandelion



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WATER.

They are light to float on water

Some seeds have air spaces e.g water lily

Some fruits are water proof (have a hard testa)

Some fruits have air-tight epicarp

Some fruits have a fibrous mesocarp; to enable them float on water e.g coconut fruit

Some fruits are spongy e.g lotus fruit

Examples of seeds dispersed by water.

Coconut

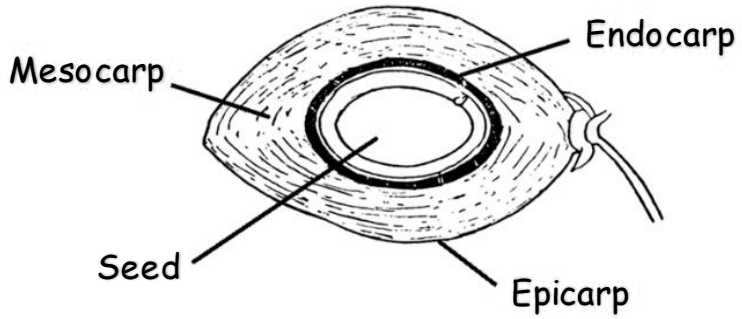
Water lotus

Mangrove

Oil palms

Water lily

Diagrams showing seeds and fruits dispersed by water e.g coconut fruit



Of what importance is a fibrous mesocarp to a coconut fruit?

It enables the fruit to float on water for dispersal

ANIMALS.

Some have hooks to attach on animal's fur or clothing e.g black jack

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Some seeds are sticky e.g aegle and boerhaavia

Some seeds have a hard testa to protect them from digestive juices e.g passion fruits, tomato and guava

Some seeds are found in fruits with bright colours when ripe e.g mangoes

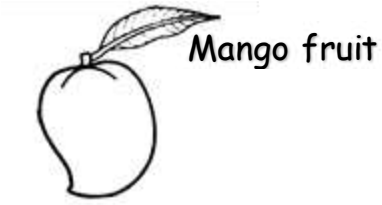
Some seeds are found in fruits with good scent when ripe e.g jackfruit

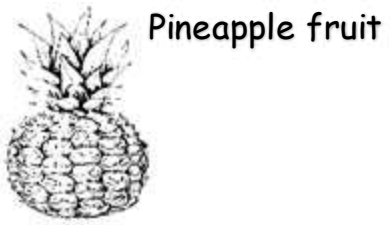
Some seeds are found in edible fleshy fruits e.g apple, mango, pomegranate and papaya (pawpaw)

Examples of seeds dispersed by animals.

Passion fruit	Tomato	Watermelon
Guava	Pawpaw	Pineapple
Jack fruit	Orange	Apple
Mango	Blackjack	Lemon
Avocado	Pumpkin	

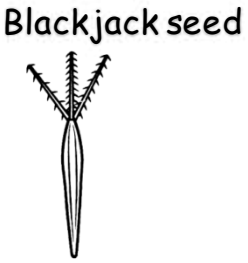
Diagrams showing seeds and fruits dispersed by animals.











How is a black jack adapted to its mode of dispersal?

It has hooks that attach on the animal's body

State the importance of hooks to a black jack seed.

To attach the blackjack seed on the animal's body

EXPLOSIVE MECHANISM (SELF DISPERSAL).

The fruit/pod/capsule bursts and throws away the seeds as it dries

It is common in dry dehiscent fruits

<u>Characteristics of seeds dispersed by explosive mechanism</u>

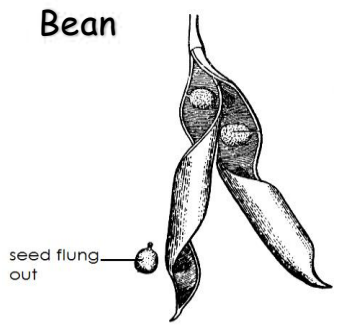
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They are found in dry dehiscent fruits.
They are found in pods or capsules.
Their pods have lines along which they split (burst) when dry.
Their pods burst to throw away the seeds when dry

Examples of seeds with explosive mechanism

Beans	Soybean (soya beans)	Phlox
Castor oil		Geranium
Lupin	French beans	
Peas	Mahogany	

Diagrams showing self-dispersal (explosive mechanism)





PLANT PROPAGATION

Plant propagation refers to the methods used in growing certain plants
This is the method of making plants multiply in the environment
This is the way how plants can be grown

Basic methods (types) of plant propagation

Seed propagation
Vegetative propagation

SEED PROPAGATION

This is the growing of a new plant by means of seeds
It is common in most flowering plants and coniferous plants.

Examples of plants which are grown by means of seeds

Beans
Mango
Avocado
Pine
Cedar

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Cypress

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

Advantages of seed propagation (sexual reproduction in plants)

New varieties are produced

Seeds are always able to survive bad weather

Good offsprings are produced

Plants have high chances of colonising new areas

There is little or no competition for nutrients among parent plants and the new plants

Disadvantages of seed propagation

It is a slower means of reproduction

It requires the agents of pollination

It requires the agents of seed and fruit dispersal

Parental food supply to the new plant is limited

VEGETATIVE PROPAGATION.

This is the growing of a new plant using other parts of a parent plant rather than seeds

This is the form of asexual reproduction in which a new plant is grown from other plant parts but not from the seeds.

Vegetative propagation is an example of asexual reproduction in plants

What is a sexual reproduction?

This is the type of reproduction that does not involve the use of gametes (reproductive cells).

Besides vegetative propagation, give three forms of asexual reproduction.

Spore formation. Binary fission. Parthenogenesis

Budding. Fragmentation.

Types of vegetative propagation

Natural vegetative propagation

Artificial vegetative propagation

NATURAL VEGETATIVE PROPAGATION

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Examples of natural vegetative propagation	Plant
Use of corms	Coco yam, crocus, gladiolus
Use of bulbs	Onion, garlic, spider lily, shallot
Use of rhizomes	Ginger, turmeric, zoyzia, canna lily
Use of leaves	Bryophyllum, begnonia
Use of suckers	Banana , pineapple, sisal
Use of stem tubers	White yam, Irish potato
Use of crowns	Pineapples
Use of slips	Pineapples
Use of roots	Dahlia, asparagus
Use of runners (stolons)	Strawberry

Parts of plants used in natural vegetative propagation.

Corms	Suckers	Roots
Bulbs	Stem tubers	Runners
Rhizomes	Crowns	
Leaves	Slips	

ARTIFICIAL VEGETATIVE PROPAGATION

This involves use of special skill and techniques to produce high quality and high yielding crops which are resistant to diseases

Example of artificial vegetative propagation

a) Stem cutting

Sweet potatoes

Cassava

Sugarcane

Hibiscus

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

Description & Diagram

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b) Layering

Description & Diagram

c) Grafting

Description & Diagram

d) Budding

Description & Diagram

e) Marcotting

Description & Diagram

Advantages of vegetative propagation (asexual reproduction in plants)

The new plants mature quickly

Only one parent plant is needed to produce a new plant

The new plant is exactly similar to the parent plant

The new plant gets food from the parent plant until it is well settled

No agents of pollination or seed dispersal are needed to produce a new plant

It becomes easy to get hybrids without using seeds

Disadvantages of vegetative propagation (asexual reproduction in plants)

No new varieties are produced

Why? There is no mixing of characteristics

There is easy spread of crop diseases

The new plant may not be resistant to diseases

The new plant competes with the parent plant for sunlight, water and nutrients

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ECONOMIC VALUES OF PLANTS TO MAN

Plants provide food to man.

Plants help in controlling soil erosion

Plants are need in construction and building industry.

They provide raw materials for agro based industries

Agricultural industry is a source of revenue for government

ANIMAL HUSBANDRY

Animal husbandry is the care and management of livestock (farm animals)

Animal husbandry is the keeping of farm animals (livestock)

Livestock are all kinds of farm animals

Examples of farm animals (livestock)

Goats	Pigs	Cattle
Rabbits	Sheep	Poultry

CATTLE KEEPING

Cattle keeping is the rearing of cows and bulls.

TERMS USED IN CATTLE KEEPING.

Cattle

This refers to cows and bulls

Bull

This is a male animal of cattle family

Cow

This is an adult female animal of cattle family

Calf

This is a young one of a cow

Heifer

This is a young female cattle that has not yet had a calf

Oxen

These are castrated bulls kept for doing work

Bullock

This is a young castrated bull

Steer

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This is a castrated bull kept for meat production

Note

A bull protects itself by **goring**

Reasons why farmers rear cattle

For meat production

For milk production

For income after sale

For provision of labour

Importance of cattle keeping.

Cattle provide us with meat

Cattle provide us with milk

Cattle are source of income when sold

Bulls and oxen are used for ploughing and transport

Cow dung and urine are used to make manure

Cattle provide hides used for making leather

Their bones, horns and hooves are used to make glue and animal feeds.

Cattle are used to pay dowry or bride price.

Their horns are used to make buttons

CATTLE PRODUCTS

Meat

Fats

Blood

Hides

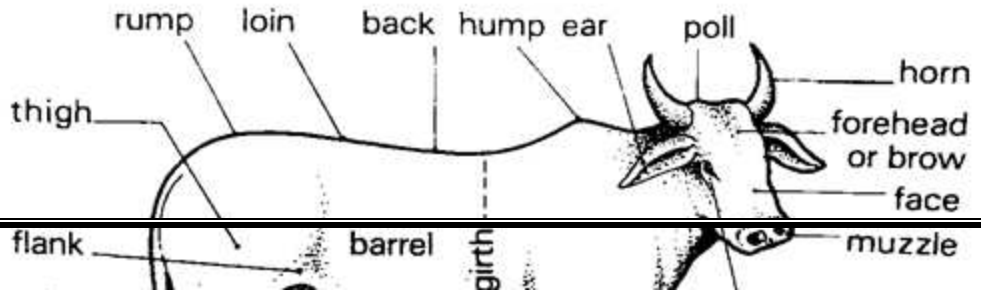
Bones

Milk

Horns and hooves

Cattle dung and urine

A diagram showing the external parts of a cow.



Functions of some parts of a cow

Eyes

For sight

Ears

For hearing

For body balance

For beating insects around the head.

Muzzle

The muzzle is the protruding part of the nose.

The muzzle is cold and moist when the cow is healthy and warm when the cow is sick.

Hooves

To protect the toes from external damage.

Udder

To stores milk produced by mammary glands.

Teats

To let out milk from the udder.

Switch

To chase away insect from animals.

Horns

For protection

TYPES OF CATTLE

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

Beef cattle

Dairy cattle

Dual purpose cattle

Draught cattle

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BEEF CATTLE

These are cattle mainly kept for meat production.

Characteristics of beef cattle

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

Examples of exotic breeds of beef cattle

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

Diagram of beef cattle as seen from above and from sides

Seen from sides **Seen from above**

DAIRY CATTLE

These are cattle kept mainly for milk production

Characteristics of dairy cattle

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

Examples of exotic breeds of dairy cattle

- Friesian
- Brown Swiss
- Jersey
- Guernsey
- Ayrshire
- Jamaica hope

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Danish Red cattle

Diagram of a dairy cow as seen from above and aside

Seen from above **Seen from sides**

DUAL PURPOSE CATTLE

These are cattle kept for both meat and milk production.

Examples of dual purpose cattle

Red Poll

Short horn

Sahiwal

DRAUGHT CATTLE

These are cattle mainly kept for providing labour on a farm (ploughing and transport).

They are used to plough soil, pull carts and transporting harvested crops from gardens.

Examples of draught cattle

Oxen

BREEDS OF CATTLE

Cattle breed

This is a group of cattle that have similar characteristics.

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

Colour of cattle

Size of cattle

Milk yield of cattle

Body shape of cattle

TYPES OF BREEDS OF CATTLE

Local breeds

Exotic breeds

Cross breeds

LOCAL BREEDS

These are breeds that have existed in Uganda for a very long time.

They are also called **native breeds or indigenous breeds.**

External features of local breeds of cattle

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They have different colours.

They have big humps.

They have dewlaps.

They always have long horns.

Examples of indigenous breeds

Ankole cattle

Boran cattle: for meat production

Zebu cattle: for milk production

Karimojong cattle

Nganda cattle

Nsagala (sanga) cattle: for milk production

Intermediate cattle: for milk production

Advantages of local breeds of cattle

They are resistant to diseases.

They can survive on poor pasture and little water.

They are resistant to bad weather

They need less care.

They produce high quality meat and milk

Disadvantages of local breeds of cattle

They mature slowly

They produce little milk

They produce less meat

EXOTIC BREEDS

These are breeds which were imported from outside countries.

Examples of exotic breeds of cattle

Friesian

Hereford

Jersey

Guernsey

Ayrshire

Aberdeen Angus

Note

Exotic breeds of cattle are mainly beef and dairy cattle.

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External features of exotic breeds.

They have specific colours

They have very small humps.

They have thin dewlaps.

They have short or no horns

Advantages of exotic breeds of cattle

They mature fast

They produce much meat

They produce a lot of milk

Disadvantages of exotic breeds of cattle

They are vulnerable (not resistant) to diseases

They need good pasture and water.

They are not resistant to harsh weather

They need a lot of care.

They are expensive to manage.

Differences between local and exotic breeds of cattle

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

CROSS BREEDS

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

Advantages of cross breeds over local and exotic breeds.

They grow faster than the local breeds.

They produce more meat than the local breeds.

They produce more milk than local breeds.

They are more resistant to diseases than the exotic diseases.

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BREEDING OF CATTLE

Breeding

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

Examples of inherited characteristics in cattle;

Colour
Growth
Resistance to diseases
Milk production
Ability to live long

Types of breeding

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

In Breeding

This is the mating of very closely related animals

Example of in-breeding

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

OR. The mating of near relatives in animals

Advantages of in breeding

It strengthens good quality of animals

Disadvantages

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

Line-breeding

This is the mating of closely related animals

It is common in chicken and rabbits because they grow faster

Examples of line-breeding

Mating of cousins
Mating granddaughter and grandson

Advantage of line-breeding

It maintains animals related to their ancestors

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Disadvantage of line breeding

Leads to inheritance of bad traits

Leads to poor production of animals

Out breeding

This is the mating of distantly related animals.

Example of out-breeding

Mating of animals of the same breed but from different herds

Advantage of out-breeding

It restores good qualities that may be disappearing in a breed

Cross breeding

This is the mating of unrelated animals of different breeds.

Example of cross breeding

Mating of exotic breeds with local breeds

The off springs after cross breeding are called **cross breeds**.

Advantages of cross breeding

It improves the quality of local breeds

It creates a hybrid

Cross breeds have better performance than their parents or relatives.

Upgrading

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

Advantages of upgrading

Offsprings are of good quality

It increases the quantity of farm products

Young ones produce good yields

Selective Breeding

This is the mating of selected good breeds in a herd.

OR. This is the allowing of certain animals to be parents of future generation

Poor breeds in a herd are sold off.

MATING

This is the sexual union of the male and female animals.

Mating of a bull and a cow occurs only when a cow is on heat.

During mating, **insemination** takes place.

A heifer is ready for mating at the age of **18 months.**

A cow or heifer ready for mating shows signs of heat.

HEAT PERIOD /ESTRUS PERIOD

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

OR

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

Oestrus cycle

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

Signs of a cow on heat

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

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

INSEMINATION/SERVICE

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

Types of service/insemination

- Natural Insemination
- Artificial Insemination

<u>Natural Insemination</u>

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

Systems of natural insemination

- Hand mating
- Pasture mating

Hand mating

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

Pasture Mating

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

Advantages of natural insemination

It saves time.

It does not require a skilled cattle keeper to carry it out.

It is easy for a bull to inseminate the cow

It is cheap for a farmer since semen is not bought.

It is easy for a bull to notice the signs of heat in cows.

Both animals enjoy their natural sexual rights.

Disadvantages of natural insemination

Controlling venereal diseases is difficult.

Small cows can be injured by heavy bulls.

It leads to venereal diseases in animals

It is expensive to buy and maintain a bull

It encourages inbreeding.

It is difficult to control hereditary diseases

Once a bull dies, the sperms are lost

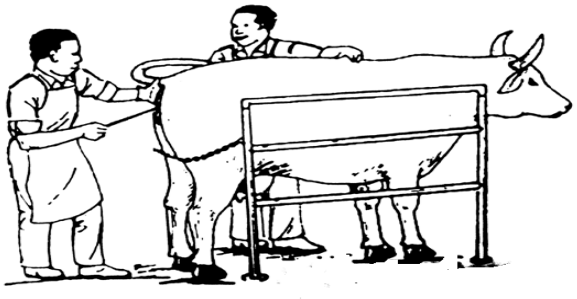
ARTIFICIAL INSEMINATION.

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

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

Artificial insemination gun is a farm tool used to deposit sperms into the cow's vagina

A diagram showing artificial insemination.



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Advantages of artificial insemination

It controls inbreeding.

It controls easy spread of venereal diseases in animals.

It prevents injuries caused on small cows by heavy bulls.

Semen is not wasted.

Semen can easily be transported.

Semen can be stored and used even after death of a bull.

It enables the farmer to only use semen from good breeds of cattle.

It is cheaper to than keeping a bull.

Disadvantages of artificial insemination

It needs an expert to carry it out.

It is difficult to store sperms.

It may be difficult for a farmer to identify the cow on heat.

It denies the animals their natural sexual rights

It may not give good results.

REPRODUCTION IN CATTLE

Reproduction is the process by which living things multiply in number.

Reproduction is the ability to produce off springs and increase in number.

Forms of reproduction

Sexual reproduction: involve gametes

Asexual reproduction: does not involve gametes

Examples of the asexual reproduction

Budding e.g in yeast and coelenterates

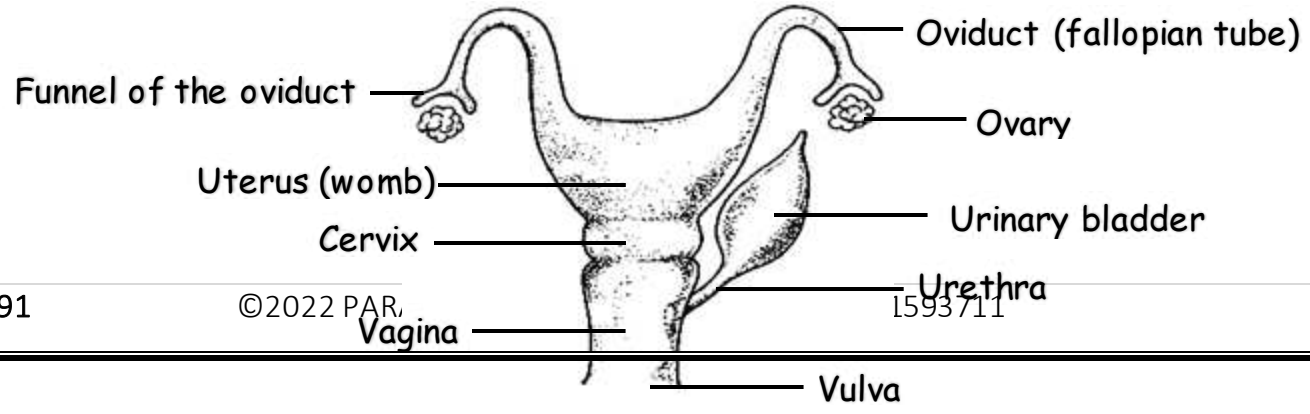
Cell division (binary fission) e.g in bacteria and amoeba

Spore formation e.g in most fungi, algae, ferns, liver warts and algae

Fragmentation e.g flatworms and algae

Vegetative propagation e.g grafting, marcotting and layering

THE REPRODUCTIVE SYSTEM OF A COW.



USES OF EACH PART OF THE REPRODUCTIVE SYSTEM OF A COW.

OVARIES.

These are the female gonads

A cow has two ovaries

They produce and store ova /eggs / female gametes

They produces female sex hormones (oestrogen and progesterone)

Ova (eggs).

These are the female gametes (female reproductive cells)

FUNNEL OF THE OVIDUCT.

It directs the ovum (egg) into the oviduct

OVIDUCT (FALLOPIAN TUBE/UTERINE TUBES).

It is where fertilization and conception take place.

It passes an egg from the ovary to the uterus.

UTERUS.

It is where implantation takes place.

It is where the fetus develops from.

CERVIX.

It closes the lower end of the uterus during pregnancy.

It prevents the fetus from coming out before it is time.

VAGINA.

It is where sperms are deposited.

It is a birth canal.

How is the vagina adapted to its function as a birth canal?

It has elastic muscular walls.

How is mucus important in the vagina?

It lubricates the vagina.

It keeps the vagina moist (prevents the vagina from drying up).

VULVA.

It protects the vagina.

It directs the penis to the vagina.

URINARY BLADDER.

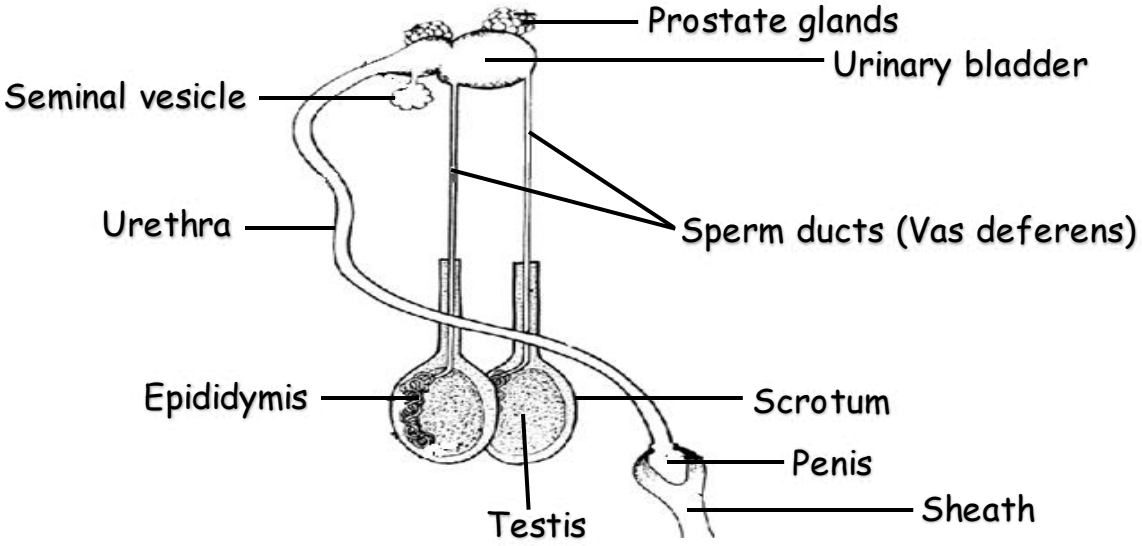
It stores urine for a short time before urination.

URETHRA.

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It passes out urine from the urinary bladder.

THE REPRODUCTIVE SYSTEM OF A BULL.



USES OF EACH PART OF THE REPRODUCTIVE SYSTEM OF A BULL.

PENIS

It deposits sperms into the vagina

The most sensitive part at the tip of penis is called **glans penis**

How is the penis adapted to its function?

It has an erectile tissue for erection.

It has a sheath which protects its head (glans)

It has urethra to pass out sperms

SHEATH

It protects the glans (head of the penis)

TESTES (TESTICLES)

These are the male gonads.

Bulls have two testes.

They produce the sperms (male gametes).

They produce testosterone hormone.

Testosterone increases sexual desire

EPIDIDYMIS

This is a long coiled tube on the backside of the testes

It stores sperms.

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It allows sperms time to mature.

Why is the epididymis coiled?

To provide enough time for sperms to mature.

To delay release of sperms.

How is epididymis adapted to its function?

It is long and coiled.

URETHRA

It passes out sperms from the penis.

SCROTUM

This is the outer covering of the testicles.

It protects the testicles (testes) from harm.

It regulates temperature of the testes (testicles).

Why is the scrotum always hanging between the legs?

To keep the testes at a slightly lower temperature than the rest of the body

How does the scrotum regulate temperature around the testes on the following days?

Cold days.

It contracts for the testes to move up and get warmth from the body.

On hot days.

It relaxes for the testes to move away from the body to cool the temperature.

SPERM DUCT (VAS DEFERENS)

It carries sperms to the urethra

SEMINAL VESICLE

It produces semen that transports semen

PROSTATE GLAND

It produces a fluid that nourishes sperms

It produces a fluid that protects sperms

COWPER'S GLAND

It produces a fluid that neutralizes acids in the urethra.

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It produces a fluid that lubricates the urethra

FERTILIZATION IN A COW.

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

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

GAMETES.

These are reproductive cells.

The female gamete is called **ovum.**

The male gamete is called a **sperm.**

Diagram of a sperm and an Ovum

Sperm **Ovum**

After fertilization, the zygote (embryo) is formed

Embryo develops into a fetus

Fetus finally into a calf

Embryo (zygote)

This is the developing baby between conception and eight weeks

Fetus

This is the developing baby from 9 weeks after conception to birth

CELL DIVISION

After fertilization in the oviducts, the embryo begins cell division as it passes to the uterus.

When it reaches the uterus, conception (implantation) takes place

IMPLANTATION

This is the attachment of the fertilized ovum onto the uterus walls

Implantation occurs in the **uterus (womb)**

The embryo is attached to the uterus wall by the **placenta.**

GESTATION PERIOD

This is the time taken from conception to birth.

The gestation period of an in-calf is 270 days or nine months.

In-calf is a pregnant cow.

Signs of pregnancy in cows

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The uterus enlarges

The cervix closes up

The udder increases in size

The cow does not go to heat 21 days after service

The movement of fetus can be seen or felt after 7 months.

There is mucus around the cervix

DRY PERIOD OF A COW.

This is the period before calving that cows are not milked.

A cow is dried 6 to 8 weeks before calving.

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

Drying off the cow.

This is the practice of not milking a pregnant cow before calving

Importance of drying off in cows

It lengthens the next lactation period

It helps the cow to prepare and produce enough colostrum

It leads to increased milk during next lactation

STEAMING UP

This is the feeding of a pregnant animal on foods rich in protein.

It is done in the last two months before giving birth.

<u>Reasons (importance or advantages) of steaming up</u>

It leads to increased milk rich in colostrum

It enables the fetus to grow healthy.

It builds a cow's body in preparation for calving (parturition)

It prevents low birth weight.

It prolongs milk let down.

It lengthens the lactation period

Lactation period

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

Milk-let-down

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

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CALVING (PARTURITION).

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

Signs of calving.

The vulva swells and becomes red.

The cow becomes restless.

The teats open.

The cow stops grazing.

The udder and teats become swollen.

The cow isolates itself.

Colostrum

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

Importance of colostrum

It has a lot of nutrients.

It opens up the digestive system of a calf.

It boosts the calf's immunity (it contains a lot of antibodies).

It is easy to digest.

WEANING

This is the gradual introduction of semi-solid food other than breast milk alone

Weaning in calves starts during the **third week**

Types of weaning calves

Early weaning: calves stop suckling at 5 weeks

Late weaning: calves stop suckling at 16 weeks

METHODS OF FEEDING CALVES

Mother cow feeding:

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

Nurse-cow feeding:

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

Open bucket feeding:

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

Teat feeding:

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

Importance of feeding calves on roughages

Helps in formation of vitamin B

Stimulates rumination process (ability to chew cud)

It quickly develops the digestive system of a calf

MILKING

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

Milk let down

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

Types of milking

There are two types of milking namely;

Hand milking

Machine Milking

Hand milking

Hand milking is the removal of milk from the udder of a cow by squeezing teats using hands.

Hand milking is also called **full hand milking.**

Machine milking

This is the removal of milk from the udder of a cow using a machine.

The parts of a milking machine must be washed to avoid milk contamination.

PREPARATION FOR MILKING

Assemble the clean milking equipment.

Put the cow in a milking place and tie the hind legs with a rope. **This prevents the cow from kicking the person who is milking** and **to prevent the cow from kicking the milk container.**

Give the cow some feeds **to keep it busy and relaxed during milking.**

Wash the udder and teats with warm clean water **to encourage milk let down.**

Wash your hands clean **to prevent milk contamination/to remove germs and dirt.**

Draw one or two streams of milk from each teat into a strip cup (fore cup) **to detect the presence of mastitis in milk.**

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If the cow has mastitis, bloody milk clots will remain on the wire mesh of a strip cup.

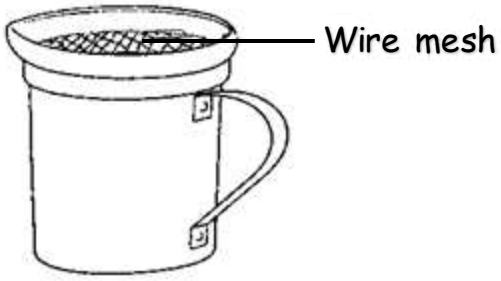
A cow with mastitis should be milked last.

After milking, wash the milking place and equipment using disinfectants. **To kill germs which may make milk to go bad**

STRIP (FORE) CUP

This is an instrument used to detect the presence of mastitis in milk.

Diagram of a strip cup



LACTOMETER

This is an instrument used to;

Detects whether water has been added to milk

Detects whether fats have been removed from milk.

Detects the purity of milk

Measures specific gravity/density of milk

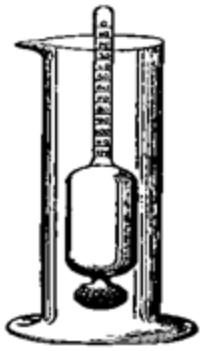
A lactometer is a closed weighed tube graduated to make the level of normal milk.

How a lactometer works

A lactometer is dipped in a container having milk.

If water has been added to milk, it will sink deeper due to lack of support.

Diagram of a lactometer



MILK PRESERVATION

This is the way of keeping milk free from bacteria

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Methods of preserving milk

Pasteurization	Refrigeration
Sterilization	Boiling

PASTEURIZATION

This is the heating of milk at controlled temperature and cooling it rapidly.

Heating kills germs.

Rapid cooling prevents the bacteria from entering and multiplying in milk.

Pasteurization of milk was discovered by **Louis Pasteur,** a French Scientist who discovered that milk goes bad due to bacteria.

Advantages of pasteurization

It kills bacteria without destroying nutrients prevent

It increases the quality of milk

It does not cause change in taste of milk

STERILIZATION

This is the method of killing bacteria in milk by maximum boiling followed by cooling and covering.

Disadvantage of using sterilization in milk preservation

It destroys nutrients (fats and proteins) in milk

REFRIGERATION.

This is the act of putting milk in a refrigerator to lower its temperature to about 4^0C.

Low temperature prevents multiplication of bacteria (makes bacteria dormant and unable to multiply).

BOILING METHOD.

It kills germs which enter milk when it is cold

Disadvantage of boiling.

A lot of milk is lost by evaporation.

HOMOGENIZING

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

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PRODUCTS GOT FROM MILK

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

CASEIN

It can be used as food

It is a raw material for making shinny paper.

Whey

It used as sauce to accompany food.

Examples of processed milk

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

CALF MANAGEMENT PRACTICES ON A FARM

These are ways of caring for calves on the farm

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

NUMBERING

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

Importance of livestock identification/numbering

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

Ways of numbering/methods of livestock identification

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

Branding

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

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

Ear notching

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

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Diagram

Ear Tagging

This means fixing tags with numbers on the ear of animal.

It is done using an applicator

A drawing showing ear tagging



Using a number Lace

This is the putting of a wooden or iron piece of plate around the neck of animals.

A drawing showing use of a number lace as a method of cattle identification



Ear tattooing

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

Diagram

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Tail bobbing

This is the trimming long hair on the animals' tail/switch.

NB: Cows are not usually docked i.e. tails are not shortened.

Diagram

HOOF TRIMMING

This is cutting off overgrown hooves of animals.

It is done using a hoof trimming knife or a pair of shears

Advantages

It reduces the risk of injuries among cattle.

It reduces the risk of transmission of diseases.

Note

After hoof trimming, the animal is made to walk in a foot bath **to prevent foot rot disease**

Foot rot is caused by bacteria

CASTRATION

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

Methods of castration

Open castration

Closed castration

Loop castration (band castration)

OPEN CASTRATION

This is when the scrotum is cut to remove the testicles

The sperm ducts are then sealed by burning using a hot metal.

Instruments used in open castration

Sharp knife

Razorblade

Scalpel

CLOSED CASTRATION

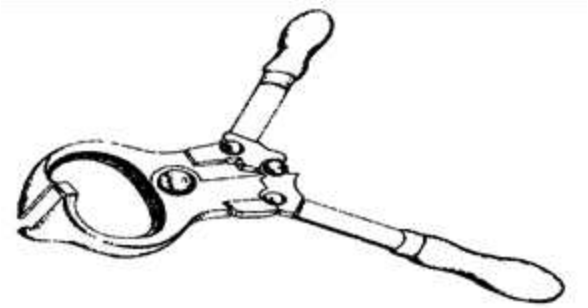
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This is the use of burdizzo to crush the sperm ducts and blood vessels

Instrument used in closed castration

Burdizzo

Diagram of a burdizzo



How is a burdizzo useful on cattle farm?

It is used in closed castration of livestock

How is a burdizzo adapted to its function?

It has blunt pincers

Elastration

This is the use of a rubber band to squeeze and break the sperm ducts and blood vessel from the scrotum and testicles.

The scrotum and testicles fall off the body after some time.

Instruments used in elastration

Rubber band Elastrator

An elastrator is used to apply rubber band to the neck of the scrotum during elastration.

Advantages of castration

It prevents inbreeding

It prevents random mating

It prevents unwanted pregnancies

It makes the male animal humble (docile)

It makes the male animal grow big and fat

It reduces bad smell in male animals

Disadvantages of castration

It is painful

It increases the risk of infections

It can lead to excessive bleeding hence death

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It can lead to swelling

It denies the male animal its right of reproduction

It needs a skilled person

DEHORNING (DISBUDDING)

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

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

Methods/ways of dehorning

Use of spoon dehorners: at 2 months of age

Use of chemicals such as common salt and potassium hydroxide: 3 to 14 days

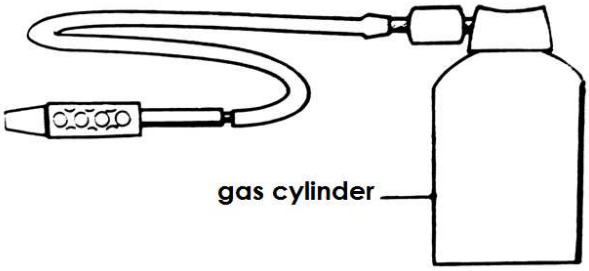
Use of dehorning iron (hot iron rod): 6 to 30 days after calving.

Instruments used in dehorning

Spoon dehorner

Dehorning iron

A diagram showing dehorning iron.



Advantages of dehorning

It increases space in the Kraal (byre).

It makes animals easy to handle.

It prevents animals from destroying farm structures.

It prevents animals from injuring people and other animals.

Disadvantages of dehorning

It is painful to the animal

The animal may lose a lot of blood and die

The wound may become septic

The animal loses its defence organs

It needs skilled person.

It may lead to mental disturbance of the animal

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DEWORMING.

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

Why farmers deworm their animals?

To kill endoparasites (worms) in animals.

EXAMPLES OF WORMS (ENDOPARASITES) IN ANIMALS.

Tape worm
Liver fluke
Hook worm
Thread worms

METHODS OF DEWORMING.

Drenching
Dosing

DRENCHING.

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

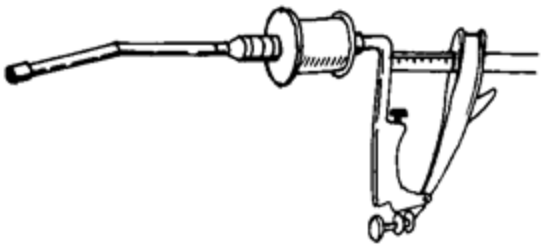
Equipment used for drenching

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

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

For drenching

A diagram of a drenching gun.



Dosing

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

Forms of solid medicine used for dosing.

Deworming capsules
Deworming tablets

Equipment used for dosing

Bolus gun

How does a cattle farmer make use of a bolus gun?

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For dosing

SPRAYING

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

Why do farmers spray acaricides on their animals?

To kill ticks and mites

To prevent tick-borne diseases.

Knapsack sprayer is the farm tool used for spraying acaricides

DIPPING

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

Dip tank

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

Advantages of using a dip tank

Less labour is needed

The animal is well covered by acaricides

The acaricides can be used again

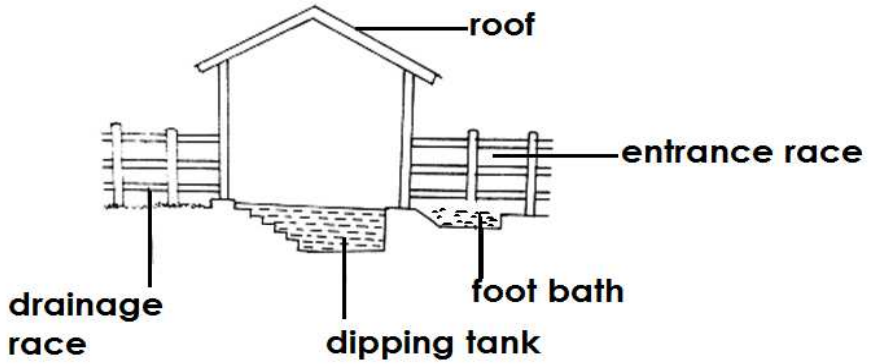
It is very useful for farmers with large herds

Disadvantages of using a dip tank

It requires a lot of capital

Skilled labour is needed to detect the strength of acaricides

A diagram showing a dip tank



Why should the dip tank be cemented?

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To make it last longer

To prevent contamination of acaricides

To prevent drainage of acaricides through the walls

Why should a dip tank be made shallow?

To prevent the animals from drowning.

Why are cattle first given drinking water before dipping?

To prevent farm animals from drinking the acaricides.

Why are farm animals passed through a footbath before dipping?

To prevent contamination of acaricides.

Why is a dip tank and a spray race always made narrow?

To prevent the animal from turning.

Examples of acaricides used in a dip tank

Gumtox	Taktic	Amitraz
Tsetsetick	Triatix	

DUSTING

This is the act of smearing the animal with acaricides to kill ticks and mites.

DETICKING

This is the act of using hands to pick ticks from the animal's skin.

Removal of extra teats

This act of cutting extra teats from the udder of a cow.

There should be only four teats.

HOUSING OF CATTLE

This is the constructing of houses for cattle

Reasons for housing of cattle

To protect animals from bad weather

To protect animals from predators

To protect animals from thieves

Importance of houses on a cattle farm

Houses protect animals from bad weather

Houses protect animals from thieves

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Houses protect animals from predators
Houses are used to keep farm produce
Houses are used to keep farm records.
Houses are used to keep animal feeds
Houses are used to keep farm tools (farm equipment)
Houses are used as milking places.
Houses are used as treating places for animals.

Qualities of a good house for cattle

It should be well ventilated
To allow free circulation of air
To allow in fresh air
It should have a waterproof roof
To prevent leaking of rain
It should concrete or cemented floor
To make cleaning easy
To prevent accumulation of mud
It should have a slanting floor
For easy drainage of urine

Dangers of sharing a house with animals

It leads to bad smell in the house
Animals may spread parasites to people
Animals may destroy household property
It leads to competition for oxygen
Animals may spread diseases to people

Zoonosis (zoonotic disease)

This is a disease that can spread from infected animal to humans

Examples of Zoonoses

Tuberculosis (TB)
Rabies
Anthrax
Brucellosis
Anaplasmosis

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FENCING

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

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

Types of fences

Natural fences (live Fences)

Artificial fences (dead fences)

NATURAL FENCES

These are fences planted by man.

Examples of plants used to make natural fences

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

ARTIFICIAL FENCES

These are fences made out of non living materials

Examples of artificial fences

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

Importance of fencing

- It allows proper use of pasture.
- It protects animals from thieves.
- It controls the spread of cattle diseases
- It prevents animals from destroying crops

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Natural fences act as wind breaks.
It controls boundary disputes
Natural fences promote practice of agroforestry
It facilitates rotational grazing
It makes culling easy.
Some fences add humus to the soil.
It enables a farmer to easily separate animals according to age, sex and health.

Disadvantages of fencing

Thorny plants can cause injury to animals
Fences can hide snakes and ticks
Some fences are expensive to maintain

PASTURE

This is the grass for feeding farm animals.

PASTURE LAND

This is an open grassland on which animals graze.

TYPES OF PASTURE

Natural pasture
Prepared pasture

Natural pasture

This is pasture that grows by itself.

Examples of natural pasture

Kikuyu grass
Guinea grass
Nandi grass
Goat weed
Star grass
Elephant grass
Guatemala grass
Alfalfa

Prepared pasture

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This is pasture made out of fodder crops.

What are fodder crops?

These are crops grown for feeding animals

Examples of fodder crops

- Maize
- Sorghum
- Rice
- Millet
- Sweet potatoes
- Oats
- Cloves
- Elephant grass

Kinds of prepared pasture.

Silage

This is undried green grass cut and stored to be used as food for animals

Hay

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

Importance of pasture

- It is food for farm animals
- It adds humus to the soil after decaying.
- It is used as animal bedding.
- It controls soil erosion.
- It is used for thatching houses
- Leguminous pastures fix nitrogen in the soil.

PASTURE WEEDS

These are unwanted plants in the pasture land.

Examples of pasture weeds.

- Thorn apple
- Sodom apple
- Lemon grass
- Tick berry
- Catstail grass (timothy grass)

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Dangers of pasture weeds.

They are poisonous to farm animals.

They compete with pasture for nutrients.

They add a strange smell in milk.

TANNING

This is the process of making leather from hides

Methods of tanning (methods of preserving hides and skins)

Wet salting

Salt absorbs moisture from hides.

Suspension drying

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

FEEDING HABITS IN CATTLE.

Cattle are herbivores (they feed on vegetation)

Cattle are ruminant (ungulate)s hoofed mammals.

RUMINATION

This is the ability of some mammals to chew cud

RUMINANTS

These are mammals that chew cud.

Characteristics of ruminants

They chew cud

They have four stomach chambers.

How do most ruminants protect themselves?

By using their horns.

Examples of ruminant animals

Cattle

Sheep

Goats

Horse

Giraffe

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Camel

Antelope

Elephant

THE DIGESTIVE SYSTEM OF RUMINANTS

Uses of each part

Mouth

It chews food by the help of teeth

Gullet (oesophagus)

It is the passage of food mouth to rumen

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

Rumen (paunch)

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

It stores food for a short time before chewing cud.

It breaks down cellulose and vitamin B

It is where food is fermented and softened.

Reticulum (honeycomb stomach)

It is the second stomach chamber of a ruminant.

It retains foreign bodies.

It maintains supply of digestive fluids.

It separates well chewed food from unchewed food

Omasum

It is the third stomach chamber of a ruminant.

It grinds food.

It absorbs water.

Abomasum (true stomach)

It is the fourth stomach chamber of a ruminant.

It is where digestion of proteins starts.

It mixes food with enzymes

Small intestines (ileum)

It absorbs digested food.

Caecum and appendix

It is where cellulose is digested by the action of bacteria

Rectum

It stores undigested food as dung

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Anus

It is where dung is passed out of the body

TYPES OF CATTLE FEEDS.

Forages

Concentrates

Production rations

Maintenance rations

Additives

Forages:

These are plants given to cattle as food

Hay (dried grass)

Maize stalks

Vegetables

Legumes

Silages

Green grass

Roughages

Concentrates

These are commercial cattle feeds prepared in factories

Maize bran

Crushed oil seeds

Bone meal

Blood meal

Fish meal

Supplements

These are proteins and vitamins added to cattle feeds.

Production rations

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

Maintenance rations

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

Additives

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

IMPORTANCE OF SALT TO CATTLE

Why are cattle given salt to lick?

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It stimulate milk production

It controls milk fever disease.

It provides mineral salts to the body

It fattens the cows

GRAZING

This is the proper use of grassland by livestock

SYSTEMS (METHODS) OF GRAZING

Herding

Paddock grazing

Strip grazing

Tethering

Zero grazing

Mention three methods of rotational grazing;

Paddock grazing

Strip grazing

Tethering

HERDING

This is when a herdsman looks after animals as they graze.

Herding is sometimes called **free range grazing or open range grazing**

Advantages of herding

Animals eat a variety of feed

Animals make enough body exercise

Less attention is needed

It is cheap

Disadvantages of herding

There is easy spread of cattle diseases and parasites

Animals can destroy crops.

Animals can get lost

It needs a big piece of land.

It can lead to overgrazing.

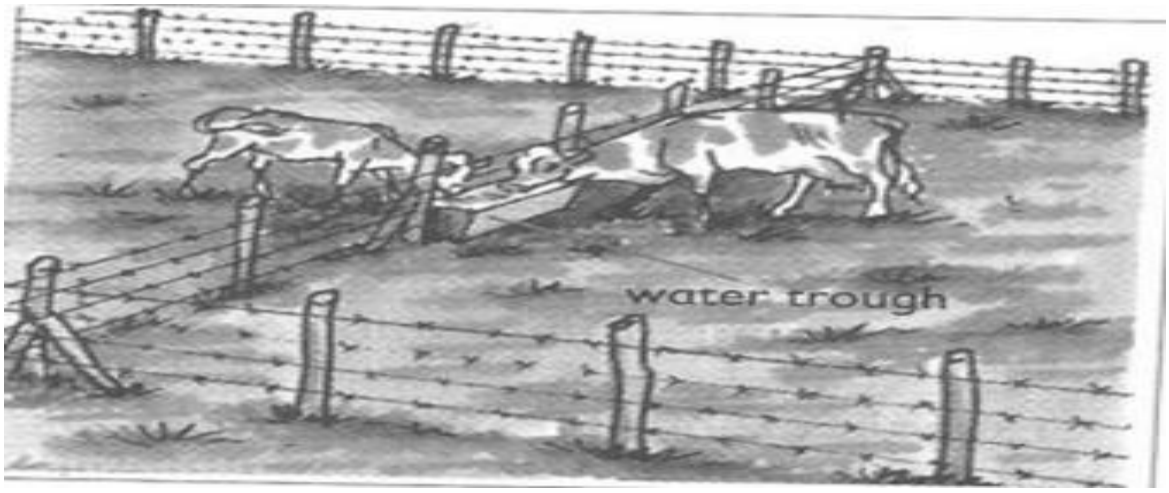
PADDOCK GRAZING

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

Paddocks are small fenced plots on pastureland.

Illustration of paddock grazing



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

Advantages of paddock grazing

It allows proper use of pasture.

It gives pasture time to grow.

It controls over grazing.

Animals do not destroy crops.

Manure is evenly distributed on the farm.

It prevents easy spread of tickborne diseases

It controls ticks

How?

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

Disadvantages of paddock grazing

It is expensive to fence the paddocks

It needs a big piece of land.

Animals do not make enough body exercises

STRIP GRAZING

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

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

They shock animals to keep them in the strip.

Illustration of strip grazing

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

Advantages of strip grazing

There is proper use of pasture.

It controls cattle diseases and parasites

It prevents over grazing

Animals do not destroy crops

Disadvantages

It is expensive to maintain

Few animals are kept

Animals do not make enough body exercises

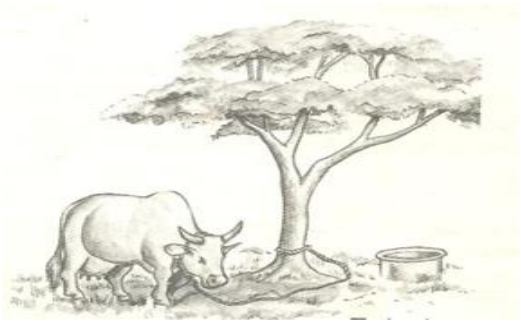
It can only be used in places with electricity

TETHERING

This is the grazing of animals in which a farmer ties the animal on a peg or tree using a rope.

The animals tethered is moved to a new place when necessary.

An illustration showing tethering



Advantages of tethering

No fence is needed.

It is easy to start

It is cheap to manage

It needs a small piece of land

Animals may not destroy crops

The farmer gets time to do other work

Disadvantages of tethering

Animals do not make enough body exercises

Animals do not get balanced diet.

The rope can easily strangle the animal

Few animals are kept.

Animals can easily be stolen

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Animals can easily be killed by predators.

ZERO GRAZING

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

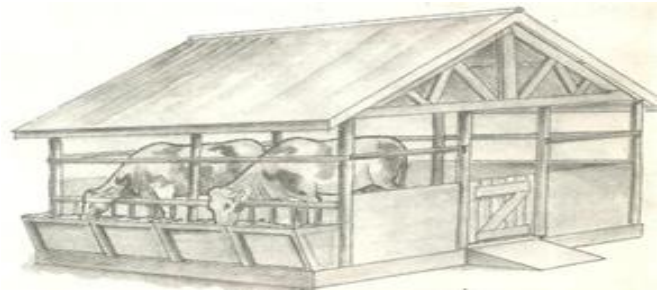
Advantages of zero grazing

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

Disadvantages of zero grazing

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

ILLUSTRATION SHOWING ZERO GRAZING



REQUIREMENTS FOR ZERO GRAZING

Cattleshed (byre)

It is where the animal is kept.

A store

It is used to keep farm tools and animal feeds

Feeding trough

It is where animal feeds are put.

Water trough

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It is where animals drink water from.

Workers

To clean the shed

Garden

It is where fodder crops are grown

Chaff cutter

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

PRACTICES THAT HARM DOMESTIC ANIMALS

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

PRACTICES THAT HARM CATTLE.

Write down the practices that harm cattle in the field.

Over beating cattle.
Making animals to over work.
Improper disposal of polythene bags.
Piercing them to get blood.
Giving animals less food.

Write down the practices that harm animals at home.

Castration
Dehorning (disbudding)
Ear tagging
Branding
Ear notching
Neglecting animals when they are sick
Giving animals less food.

Write down the practices that harm animals in transit.

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Overloading cattle on small trucks.

Making cattle to walk long distances.

Write down the practices that harm cattle in abattoirs.

Brutal killing of animals

Slaughtering them with blunt objects

What is an abattoir?

This is a public house where domestic animals are slaughtered.

Handling structures on the livestock farm

Milking parlour

For handling the animal when milking

Cattle crush

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

Spray race

For handling the animals during spraying

SPRAY RACE.

This is a confined space in which cattle are sprayed.

Advantages of a spray race

It is quick

Many animals can be sprayed in short time

There is no wastage of acaricides

Less labour is needed

Disadvantage of a spray race

It is expensive

CATTLE PARASITES

These are parasites that attack cattle

A parasite is an organism that depends on another organism for survival

A host is an organism on which a parasite depends for food.

How do parasites benefit from their host for survival?

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Parasites get food from their host

Parasites get shelter from their host

GROUPS (TYPES OR CLASSES) OF PARASITES

External parasites (ectoparasites)

Internal parasites (endoparasites)

External parasites (ectoparasites)

These are parasites that live outside the body of host.

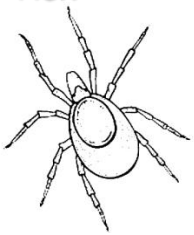
Ticks

Tsetse flies

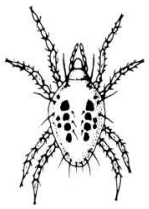
Mites

ILLUSTRATIONS OF EXTERNAL PARASITES IN CATTLE.

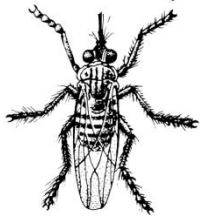
Tick



Mite



Tsetse fly



Ways of controlling ectoparasites (external parasites) in cattle

Spraying animals using acaricides

Dipping animals in acaricides

By paddock grazing

Using a spray race

By dusting animals with acaricides

By deticking (hand picking the ticks)

Clearing bushes around the farm (to control tsetse flies)

Trapping tsetse flies using tsetse fly traps.

Reasons why ticks are very difficult to control.

Due to host movement

Due to high cost of acaricides

INTERNAL PARASITES (ENDOPARASITES)

These are parasites that live inside the body of the host.

They live in the intestines and liver.

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Give examples of internal parasites (endoparasites)

Tape worms	Thread worms
Hook worms	Liver flukes

Ways of controlling endoparasites (external parasites) in cattle.

By deworming (drenching and dosing)

Regular vaccination

Grazing in well drained areas (to control liver flukes) / Avoid grazing in high risk pastures

Giving animals clean feeds

Always clean the feeding equipment

Effects of parasites of cattle

Pests suck blood from animals.

Some pests spread diseases.

Pests damage the skin of animals.

Some pests cause discomfort to the host

CATTLE DISEASES

These are diseases that attack cattle.

Signs of sickness in farm animals (cattle)

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

Symptoms of diseases (sickness) in farm animals

Fever

Body weakness

Constipation

Conditions that can lead to diseases in farm animals

Poor feeding

Poor sanitation in their houses

Dirty food and water

Physical injuries like dirty wounds

Infected bites from vectors

Routes of disease infection in animals

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Direct body contact with sick animals

Through dirty food and water.

Mention three groups of causative organisms for cattle diseases

Bacteria

Viruses

Protozoa

GROUPS OF CATTLE DISEASES.

Bacterial diseases

Viral diseases

Protozoan diseases

EXAMPLES OF CATTLE DISEASES

Bacterial diseases

Anthrax

Brucellosis/bang disease/contagious abortion

Mastitis

Tuberculosis

Foot rot

Black Quarter

Red water

Heart water

Calf scour

Viral diseases:

Rinderpest

Foot and mouth disease

Viral and bacterial disease

Pneumonia

Protozoan diseases

Nagana (trypanosomiasis)

East coast fever (ECF)

Coccidiosis

Mention four tick-borne disease in cattle

Heart water

East coast fever

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Anaplasmosis

Red water

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

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Foot rot	It attacks hooves of all hoofed animals. It is always common during wet weather.	Swollen hooves Rotten hooves Smelly hooves Lameness High fever Reduced milk production	Treat with antibiotics. Trim affected hooves. Always provide foot bath to animals. Regular foot trimming.
Tuberculosis It is caused by a bacterium called **mycobacterium tuberculosis**	Through inhaling contaminated air Through milk of infected cows	Coughing Loss of weight (emaciation) Loss of appetite to	Isolate and treat sick animals Ensure proper sanitation Kill infected animals Early treatment using antibiotics
Brucellosis (contagious abortion or bang's disease) It is caused by a bacterium called **Brucella**	Through mating with infected animals Through body contact with infected animals	Miscarriage (abortion in cows) Brownish discharge from vulva Swollen testicles Still births in cows The placenta remains inside the uterus	Isolate and treat the sick animals Regular vaccination Use gloves to hold aborted fetus. Use artificial insemination to avoid mating infection Always drink well boiled milk.

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Anaplasmosis It destroys the red blood cells	Through bites of infected ticks (blue ticks). Through surgical and dehorning instruments with infected blood	Constipation Blood in urine and dung Loss of weight High fever Rapid reduced milk production Loss of appetite for food Rapid loss of weight Pale skin around the eyes and muzzle Abortion	Dip cattle in acaricides Spray animals with acaricides
Heart water	Through bites of infected ticks (brown ear tick)	Animals walk in circles. Animals become restless Animals place their heads on objects When the animal falls, legs keep paddling in air	Dip animals in acaricides Spray animals with acaricides
Red water It damages the liver	Through bites of infected ticks (red tick)	High fever Red urine Loss of appetite Constipation Infected animal stays away from the herd	Dip animals in acaricides Spray animals with the acaricides.
Viral diseases			
Foot and mouth disease It attacks the muzzle and coronet.	Through sharing feeding containers with infected animals	Swollen teats and lameness Salivation in the mouth	Regular vaccination (every six months)

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	Through sharing grazing land with infected animals Through body contact with infected animals	Lameness (due to wounds on the cornet). Blisters on top of hooves, tongue and muzzle Loss of appetite for pasture High fever Reduced milk production	Applying quarantine. Slaughter the infected animals **It has no treatment**
Rinderpest	Through body contact with infected animals	Soars in the mouth Sunken eyes Nasal discharge Rapid breathing Discharge from eyes High fever Profuse diarrhoea	Regular vaccination Applying quarantine Slaughter t5he infected animals **It has no treatment**
Bacterial and viral disease			
Pneumonia	Spreads through inhaling contaminated air Through living in dirty places	Difficulty in breathing Coughing, Nasal discharge Loss of appetite for pasture High fever	Use well ventilated dry and clean pens. Treat the animal at the early stage of the disease
Protozoan disease			
Nagana (trypanosomiasis) It is caused by protozoan parasite called Trypanosoma.	Through the bites of infected tsetse flies	Loss of weight Anemia Loss of appetite High fever Dullness	Clear all bushes around the farm Spray with insecticides Use tsetse fly traps

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

FACTORS TO CONSIDER BEFORE STARTING A LIVESTOCK FARM

Land Labour Management
Capital Market

LAND

This is the place on which the farm is started.

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Ways of getting land

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

The reward to land is **rent**

CAPITAL

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

Ways of getting capital

Through donation
Through savings
Through loans

The reward to capital is **interest**

LABOUR

These are all people who do activities on the farm.

Groups of labour (classes of workers) on the farm

Skilled labour
Unskilled labour

SKILLED LABOUR

These are people who are trained to do specialized work

Examples of specialized work on the farm

Vaccination
Artificial insemination
Castration
Deworming
Dehorning
Dipping

UNSKILLED LABOUR

These are people who do casual work on the farm

Examples of activities done by unskilled labour.

Feeding the animals
Weeding the farm
Cleaning the farm
Milking

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

MARKET.

This is the demand for cattle and cattle products.

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MANAGEMENT.

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

FARM RECORDS

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

TYPES OF FARM RECORDS

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

Production records

These show yields of various farm produce.

They involve how many animals have been produced and how many have died.

Health records

These show the type of disease and parasites affecting the cattle.

These also show treatment that has been given to cattle.

Field records

These show the number of animals kept on the farm.

They show different farm activities carried out on the farm.

Sales and expenses records (marketing records)

These show the amount of money collected after selling the products and how much is spent.

They show the products sold on the farm.

Labour records

These show number of workers on the farm

They also show their work.

Inventory records

These show the list of farm equipment with their respective value.

REASONS FOR KEEPING FARM RECORDS

To know the profits or losses.

To be taxed fairly.

To enable the farmer to make decision.

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To get loans easily.
To plan for the farm.
To know the farm history.

PROBLEMS FACING CATTLE FARMERS IN UGANDA

Cattle diseases.
Cattle parasites.
Lack of enough land.
Lack of capital.
Prolonged drought.
Shortage of labour.
Shortage of water and pasture.
Lack of ready market.

FREEDOM OF DOMESTIC ANIMALS

Freedom from fear
Freedom from pain
Freedom from hunger
Freedom from discomfort
Freedom of reproduction

RESOURCES IN THE ENVIRONMENT

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

TYPES OF RESOURCES

Renewable resources
Non-renewable resources

RENEWABLE RESOURCES

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

Examples of renewable resources (inexhaustible resources)

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

NON-RENEWABLE RESOURCES

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

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Examples of non-renewable resources (exhaustible resources)

Rocks
Minerals
Fossil fuels

IMPORTANCE OF PLANTS AS RESOURCES

Some plants are used as herbal medicine.
Some plants provide food to animals.
Plants provide shades and shelter to animals
Some plants provide wood for making furniture
Some plants provide wood fuel
Some plants provide electric poles
Some tree barks are used to make bark cloth
Some plants provide plant fibres e.g cotton, sisal, jute, flax, hemp, raffia, ramie and banana fibre
Some plants are used as live fences.

Ways of conserving plants as resources

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

BETTER METHODS OF HARVESTING WOOD

Coppicing
Lopping
Pollarding

POLLARDING

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

AN ILLUSTRATION SHOWING POLLARDING



Importance of harvesting trees by pollarding

It enables fruit trees to produce more and better fruits e.g. mangoes

It keeps fruits trees short for easy harvesting of fruits.

LOPPING

This is the cutting of side branches of a tree.

Mature side branches are harvested as the tree continues to grow

AN ILLUSTRATION SHOWING LOPPING

Importance of lopping

It enables the tree to grow taller

It enables the tree to continue growing after harvesting firewood

COPPICING

This is the cutting of the whole tree leaving a short stump.

AN ILLUSTRATION SHOWING COPPICING (E.G. EUCALYPTUS)

Importance of coppicing

It allows growth of new shoots

It provides good wood for timber

Note:

Sprouting means to develop new shoots

Why is pollarding or coppicing not done on some trees (e.g pine, podo and cypress)?

Some trees cannot not grow new branches

NOTE:

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Selective felling: This is when only mature trees are harvested leaving young trees to grow

Carpet felling: This is when all mature and young trees are harvested at once.

How does covering of wood with banana leaves conserve plants?

It prevents heat loss hence using less wood fuel

IMPORTANCE OF ANIMALS AS RESOURCES

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

EXAMPLES OF ANIMAL FIBRES

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

BEASTS OF BURDEN (DRAUGHT ANIMALS)

These are animals that are used to provide labour.

Forms of animal labour.

Pulling carts
Ploughing
Transport
Turning machines

Examples of beasts of burden.

Donkeys
Horses

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Mule
Camels
Oxen

WAYS OF CONSERVING ANIMALS AS RESOURCES.

Gazetting game parks
Putting strict laws against poaching
Treating sick animals
Vaccinating animals
Use of legal fishing methods

Examples of poor (illegal) fishing methods

Overfishing
Use of under sized nets
Use of poison

By what process are plants and animals replaced naturally?

By reproduction

FUNGI

These are organisms which lack chlorophyll and unable to make their own food

How do fungi feed?

Most fungi feed saprophytically
Some fungi feed parasitically

Examples of fungi

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

IMPORTANCE OF FUNGI AS RESOURCES

Penicillium moulds are used to make penicillin drug (antibiotics)

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

SOIL

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

IMPORTANCE OF SOIL AS A RESOURCE

For growing crops
For building houses
For making glasses
For making ceramics
For making sand papers
For making bricks
For putting out fire.
For washing cooking utensils
For filtering water

How soil can be conserved as a resource.

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

How can soil be replaced naturally?

By decomposition
By weathering

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SUN

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

IMPORTANCE OF SUN AS A RESOURCE

Sunlight helps crops to make starch.

How?

By splitting water into hydrogen and oxygen

Sunlight is used to produce solar electricity.

Sunlight helps our skin to make vitamin D

Sun's heat dries wet clothes

How?

By evaporating water from wet clothes

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

How?

By evaporating moisture from food

Sun helps in the water cycle

How?

It heats plants and water bodies to cause transpiration and evaporation

What do we call energy from the sun?

Solar energy

Why the sun is called an energy resource

It provides people with useful energy

IMPORTANCE OF WATER AS A RESOURCE

For cooking

For bathing

For drinking

For washing

For mopping

For irrigation

Water is used as a raw material in beverages industries

Water is used to cool machines

Water helps in seed germination

Water helps crops to make starch

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Water is a used for keeping aquatic animals like fish

Fast flowing water is used to generate hydro electricity

How is water replaced naturally?

Through rain cycle (water cycle)

Sources of water

Rain (it is the main natural source of water)

Lakes

Rivers

Swamps

Wells

Hot springs

Games played on water bodies

Swimming

Boat racing

Water surfing

Water relay

AIR AND WIND AS RESOURCES

AIR

This is the mixture of gases

Components of air

Nitrogen 78%

Oxygen 21%

Rare gases 0.97%

Carbon dioxide 0.03%

IMPORTANCE OF AIR A RESOURCE

Oxygen

Oxygen is used for respiration

Oxygen supports burning (combustion)

Oxygen helps in seed germination

Carbon dioxide

Carbon dioxide is used to put out fire.

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Why?

It does not support burning

Carbon dioxide is used by plants to make starch

Carbon dioxide helps to preserve bottled soft drinks

Why?

It does not allow germs to multiply

Nitrogen

Nitrogen is used to preserve vaccines and semen

Nitrogen is very cool

Nitrogen is used in aeroplane tyres

Rare gases

Rare gases are used in electric bulbs

Rare gases such as helium are used in gas balloons

Mention two gases used in gas balloons

Helium

Hydrogen

Why does a gas balloon fly up in air when released?

Air inside the balloon is lighter than air outside

Why is a balloon tied with a thread?

To prevent it from flying up in air

Why a balloon is always tied with long threads

To prevent the gas inside the balloon from escaping

WIND

This is air in motion (moving air)

What causes wind?

Difference in atmospheric pressure between places

IMPORTANCE OF WIND AS A RESOURCE

It is used for winnowing

It turns windmills to produce electricity

It is used to fly kites

It sails boats and dhows

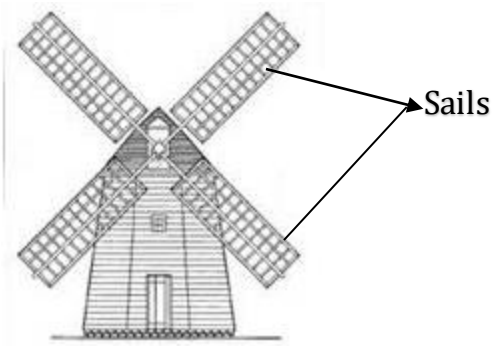
It helps in seed dispersal

It helps in pollination

It increases the rate of evaporation to enable the clothes to dry faster

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STRUCTURE OF A WINDMILL



Uses of a windmill

It is used to draw water from underground tanks

It is used to grind grains and seeds

It is used to generate wind electricity

Why are windmills not commonly used in Uganda to produce electricity?

Uganda does not have regular windy seasons

Dangers of wind to people

It is an agent of soil erosion

It spreads airborne diseases

It destroys houses

It capsizes (overturns) boats on water bodies

It breaks trees and crops

MINERALS AS RESOURCES

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

OR

A mineral is a useful solid or liquid material obtained from underground.

Minerals are non-renewable resources.

Examples of minerals and their uses

Chalk

Clay

Copper; making telephone wires, bullets, coins and refrigerators.

Gold: coating trophies and making coins

Tin; making food cans and tins for carrying water

Silver; coating metals and trophies

Gold; coating metals, rings and trophies

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Cobalt

Wolfram: provides tungsten for making filaments of electric bulb

Asbestos; making roofing sheets and fire suits for fire service men

Uranium; producing nuclear electricity

Diamond; cutting of glass and drilling of rocks.(It is the hardest metal)

Lead; making accumulators, batteries and water pipes

Phosphates: used to make phosphate fertilizers

Limestone; for making cement

Bronze; coating rings, trophies and medals

Aluminium; making aircrafts and cooking utensils

Mercury; used as a thermometric liquid, to make insecticides and to fill dental caries

General uses of minerals

They are source of income when sold

They are used as raw materials in industries

They earn foreign exchange for the government

Ways of conserving minerals

Making alloys

Painting metals to avoid rusting

Recycling scrap metals

ALLOYS

An alloy is the mixture of two or more metals.

Reasons for making alloys (importance of making alloys)

To make the metals harder

To lower the melting point of metals

To reduce wear and tear of metals

To increase electrical resistance of metals

EXAMPLES OF ALLOYS AND THEIR USES

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

For making magnets

CUPRONICKEL: This is a mixture of copper and nickel.

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For making coins

SOLDER: it is a mixture of lead and tin

For joining metals

DENTIST AMALGAM: it is a mixture of copper and mercury

For filling dental cavity in tooth.

BRONZE: it is a mixture of copper and tin

For decorating metals

For making coins and medals

BRASS: it is a mixture of copper and zinc

For decorating ornaments

For making wires

For making brass musical instruments

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

For making permanent magnets

STEEL: is a mixture of iron and carbon

For making cars

Examples of steel

Cobalt steel

For making permanent magnets

Stainless steel (chromium steel)

For making cooking utensils that do not rust.

Manganese steel

For reducing wear and tear on railway lines

Nickel steel

ROCKS AS RESOURCES

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

A boulder is a large detached rock

Why are rocks regarded as non – renewable resources?

Rocks cannot be replaced naturally.

Importance of rocks as resources

They form soil by weathering.

They provide precious metals (minerals).

They provide building materials.

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They act as habitat for some wild animals

They describe earth's history.

TYPES OF ROCKS

Igneous rocks

Metamorphic rocks

Sedimentary rocks

Igneous rocks

These are rocks formed when magma cools and hardens.

They are hard and impervious (waterproof).

Basalt

Quartz

Pumice: for scrubbing human feet during bathing

Obsidian: it was used by early man to make tools

Feldspar

Granite

Sedimentary Rocks

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

They are soft and porous.

Limestone

Sandstone

Ironstone

Shale (clay-rock)

Flint

Metamorphic rocks

These are rocks which change from one form to another.

They are also called **changed rocks**

Marble

Slate

Graphite

Schist

Quartzite

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Ores

An ore is a rock that contains metals

Examples of metal ores

Bauxite: an ore of aluminium

Galena: an ore of lead

Calamite: an ore of zinc

Malachite: an ore of copper

Haematite and magnetite: are ores of iron

Magnetite is a natural magnet

WEATHERING.

This is the breakdown of rocks into small particles to form soil.

How is weathering important in the environment?

It helps in soil formation.

TYPES OF WEATHERING.

Chemical weathering

Physical weathering

Biological weathering

What is chemical weathering?

This is the breakdown of rocks as a result of chemical reactions.

What is physical weathering?

This is the breakdown of rocks by use of force.

What is biological weathering?

This is the breakdown of rocks by plants and animals.

AGENTS OF WEATHERING.

Type of weathering	**Agents of weathering**
Biological weathering	Action of plant roots Animal burrowing
Physical weathering	Temperature changes Frost action Ice wedging Human activities e.g road construction, mining and quarrying Flowing water Animal movements

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Chemical weathering	Acid rain

FOSSILS

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

Examples of fossils

Plant fossils
Animal fossils

Uses of fossils

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

FOSSIL FUELS AS RESOURCES

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

What made fossils to turn into fossil fuels?

Heat and pressure from underground

Examples of fossil fuels (fossil minerals)

Crude oil (petroleum)
Coal
Natural gas

Coal and petroleum are not got from ores.

How are fossil fuels are obtained from underground?

By mining

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PETROLEUM (CRUDE OIL)

This is a liquid fossil fuel got from remains of animals

Fuels got from crude oil (petroleum)

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

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

Other petroleum products

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

Importance of petroleum products

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

COAL

This is a solid fossil fuel got from remains of plants

Coal is a hard black material found below the ground.

Products from coal

Coal tar

Coal gas

Importance of coal

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

NATURAL GAS

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

Gases which make up natural gas

Methane
Ethane
Propane
Butane

Uses of natural gas

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

Write LNG and LPG in full

Liquefied Natural Gas
Liquefied Petroleum Gas

Disadvantages of using fossil fuels

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

How to conserve fossil fuels and minerals

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

FUELS

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This is anything that burns to produce energy.

Forms of energy produced by fuels

Heat energy

Light energy

Electric energy

TYPES OF FUELS

Liquid fuels

Kerosene

Petrol

Diesel

Jet fuel

Solid fuels

Firewood

Charcoal

Sawdust

Coal

Wood shavings

Gas fuels

Biogas

Natural gas

FIBRES.

These are thin long threadlike structures used to make certain materials (fabrics).

Write down the types of fibres.

Natural fibres.

Synthetic fibres.

NATURAL FIBRES

These are threadlike materials got from plants and animals.

Examples of plant fibres (natural fibres got from plants) and their importance.

Plant fibres	**Importance**
Sisal	For making ropes, sacks and doormats (carpets)
Cotton	For making cotton cloths and cotton wool

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Flax	For making linen cloths, papers and ropes
Hemp	For making ropes, cloths (jeans), bags, papers and shoes
Jute	For making ropes, jute bags (gunny bags), curtains and doormats (carpets)
Raffia	For weaving baskets, making bags, hats and mats
Ramie	For making threads, fishing nets and filter cloths
Banana fibre	For making bags, dolls, balls, ropes and mats,

Examples of animal fibres (natural fibres got from animals) and their importance.

Animal fibres	**Animal from which it is obtained**	**Importance**
Wool	Sheep and Llama	For making woollen jackets, blankets, carpets and wax
Silk	Silkworm	For making silk suits, jackets and sleeping bags
Mohair	Angora goat	For making mohair blankets, carpets, socks, duvets, wigs and scarves.
Rabbit fur (Angora fibre)	Angora rabbit	For making sweaters, scarves and blankets
Chiengora	Dog	For making cloths and pillows

ARTIFICIAL FIBRES (SYNTHETIC FIBRES)

These are man-made thread like chemical substances joined together.

Examples of artificial fibres (synthetic fibres) and their importance

Synthetic fibres	**Importance**
Nylon	For making ropes, tarpaulin, sleeping bags, car seat belts and dental floss

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Rayon	For making blankets, carpets and curtains
Polyester	For making clothing, tarpaulin, filters and bottles
Acrylic	For making sweaters, blankets, hats, socks, shawls and carpets
Polythene (polyethylene)	For making waterproof papers, ropes and shopping bags

Advantages of synthetic fibres over natural fibres.

Synthetic fibres are stronger than natural fibres

Synthetic fibres are more durable than natural fibres

Synthetic fibres are cheaper than natural fibres

Disadvantages of synthetic fibres over natural fibres.

They can be affected if washed with hot water unlike natural fibres

They can catch fire easily as compared to natural fibres

Synthetic fibres are cheaper than natural fibres

HARVESTING RESOURCES

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

a) Harvesting non – living resources

Obtaining sand from dry river beds: scooping it with spades and machinery

Mining sand from the ground

Harvesting minerals

By mining

Fossil fuels like oil

By drilling

Harvesting energy from the sun (solar energy)

It can be harvested in the following ways

Uses of solar panels

Use of solar cookers

Use of solar driers

Use of solar heater

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Harvesting water

Using water tanks

Using big drums

Using basins

Using jerrycans

Using buckets

Using windlass to draw water from deep wells

Using electric water pumps.

Harvesting energy from air

Wind can be trapped and used to drive wind will

It can be tapped using sail to drive sail boat + dhows

Harvesting living resources

Plants resource

Hand picking ripe coffee berries , cotton balls

Plucking tea leaves from tea plants

Ready maize cobs are harvested by hands

By cutting sisal leaves

Harvesting animal resources

a) Meat

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

b) Skins and hides

Animals are slaughtered and skins carefully removed from the carcass.

c) Horns

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

d) Milk

It is obtained by milking using either hands or machines

d) Honey:

It is extracted from honey combs.

THE ENVIRONMENT

Environment refers to an organism and its surrounding.

COMPONENTS OF ENVIRONMENT

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The environment is composed of the following

- Water
- Soil
- Air (wind)
- Plants
- Animals
- Sun
- Fungi
- Bacteria
- Protista

TYPES OF ENVIRONMENT

Environment is divided into two types:-

Biological environment (Biotic / non physical environment)

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

Physical environment (a biotic environment)

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

FOOD CHAIN

A food chain is the way how organisms in an environment get their food. In the environment, plants make their own food and are called producers.

The organisms which depend on food made by plants (producers) are called consumers are consumers

Consumers are divided into the following groups

Primary consumers

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

Secondary consumers

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

Tertiary consumers

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Tertiary consumers which feed on secondary consumers eg. Leopards, man, birds of prey etc.

NB: In a food chain , organism like fungi and bacteria help in reducing food to its component parts (decay / rot) are called decomposers

The sun is the main source of energy in a food chain from which energy flows other organism in the environment

Illustration of a food chain

Producer – primary consumer – secondary consumers – Tertiary consumers.

plants -grasshoppers – lizard – Hawks.

A FOOD WEB

A food web is a more complicated interrelationship of how organism in an environment obtain their food.

A food web involves many organism in an ecosystem how they get food from many other living things

Illustration of a food web

Ecosystem

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

A habitat

This is a home of an organism in the environment

Degradation

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

Environment degradation

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

Types of environment degradation

Soil / land degradation

Deforestation / devegetation

Wetland drainage

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Pollution

Wild life destruction (degradation)

- silting

Causes of environmental degradation

There are two main causes of environmental degradation

a) Human activities

b) Natural causes

HUMAN ACTIVITIES THAT CAUSES ENVIRONMENTAL DEGRADATION

a) Mining / quarrying

b) Construction and road work

c) Poor waste disposal

d) Bad agricultural practices e.g bush burning, over grazing etc.

NATURAL CAUSES OF ENVIRONMENTAL DEGRADATION

Soil erosion / leaching

Silting

Hurricanes

Tornados

Whirl wind / whil pools

Earth quakes

Hailstones

Land slides

Flood

Tsunamis

Volcanic eruptions

Global warning

a) Soil / land degradation

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

Leaching

Is a process through which mineral salts or nutrients sink deeper into the soil layers where they cannot be reached by plant roots

It is caused by too much rain.

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

SILTING

This is the deposition of eroded materials into water bodies

Causes of silting

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

Dangers of silting

It leads to water pollution

It reduces the depth of water bodies

It leads to flooding of water bodies

It destroys homes of some marine (aquatic) animals

It leads to death of some marine animals

Effect of silting

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

Deforestation

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

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Causes of deforestation

- Population growth leading to need for land for settlement , farming and recreation
- Industrialization (development of industries in an area)
- Wild fires / bush burning
- Clearing forests for fire wood , charcoal , building poles timber etc

Effects of deforestation

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

Wet land degradation

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

Examples of wet lands

- Swamps
- Marshes
- Bogs
- Lakes and rivers

Importance of wet lands

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

POLLUTION

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

CAUSES OF POLLUTION

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

TYPES OF POLLUTION

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

EFFECTS POLLUTION

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

CONTROL AND PREVENTION OF POLLUTION IN THE ENVIRONMENT

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Uses of alternative energy source eg. bio gas , natural gas , solar energy , wind m power , hydro electricity

Ensure proper disposal of domestics and industrial wastes

Educating people about the danger of pollution

Using good method of farming

Advantages (importance) of conserving wildlife

Some mammals, plants and birds are a source of food for man.

Some animals and birds are valued as cultural heritage by some countries and clans.

Plants are homes of many animals, birds and insects.

Trees or forests help in the formation of rainfall.

Mammals, birds and trees species earn foreign exchange for the government through tourists.

Plants improve the atmosphere by balancing the amount of carbon dioxide and nitrogen.

Plants provide shade to man and other animals.

How to conserve and protect wild life.

Animals are protected by law in their habitant through the Uganda Wildlife Authority (UWA).

A habitant is a natural environment or home of a plant or animal.

Uganda wildlife Authority is a department which is responsible for wildlife in Uganda.

The animals are being taken care of in national game parks and game reserves.

Banning the selling and buying of wildlife trophies helps to reduce their being killed.

Fishes can be conserved by controlled fishing.

Some rare animals should be caught and let to breed in wildlife educational centre.

Conserving non renewable resources

Soil erosion should be controlled.

Soil should be kept fertile by using manure and fertilizers.

Plastic wastes like broken Jerrycans, polythene papers should be recycled.

Vehicles in dangerous mechanical conditions should be repaired to conserve fuel.

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Petroleum products should be used wisely to prevent further exploitation of oil.

Conserving the natural vegetation

Over grazing should be discouraged because it causes soil erosion.

Bush burning should be restricted to certain areas.

Over stocking is dangerous because it leads to over grazing.

The government should limit population growth because more people means more land to be destroyed for housing and agriculture.

Cattle farmers should practice rotational grazing.

Afforestation should be practiced.

Swamps and wetlands should be declared restricted areas.

RESPIRATION

Respiration is the oxidation of food in the living cells to produce energy

It occurs in the **living cells**.

Respiration is a **chemical change**

Oxidation is the process by which oxygen combines with a substance

Importance of respiration to the human body.

It provides energy to the body

EQUATION FOR RESPIRATION

Food + Oxygen $\longrightarrow$ Heat energy + Carbon dioxide + Water vapour

Raw materials for respiration

Food (glucose or carbohydrates)

Oxygen

Main (useful) product of respiration

Energy

By-products (waste products) of respiration

Carbon dioxide

Water vapour

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TYPES OF RESPIRATION

Aerobic respiration

This is the type of respiration that uses oxygen

Anaerobic respiration

This is the type of respiration that does not use oxygen

Note

In animals, it produces **lactic acid** in muscles during vigorous exercises

In plants and yeast, it produces **alcohol** and **carbon dioxide**

Why does a person breathe heavily after a vigorous exercise?

To pay the oxygen debt.

THE RESPIRATORY SYSTEM (BREATHING SYSTEM)

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

Importance of the respiratory system

It supplies the body with oxygen.

It gets carbon dioxide out of the body.

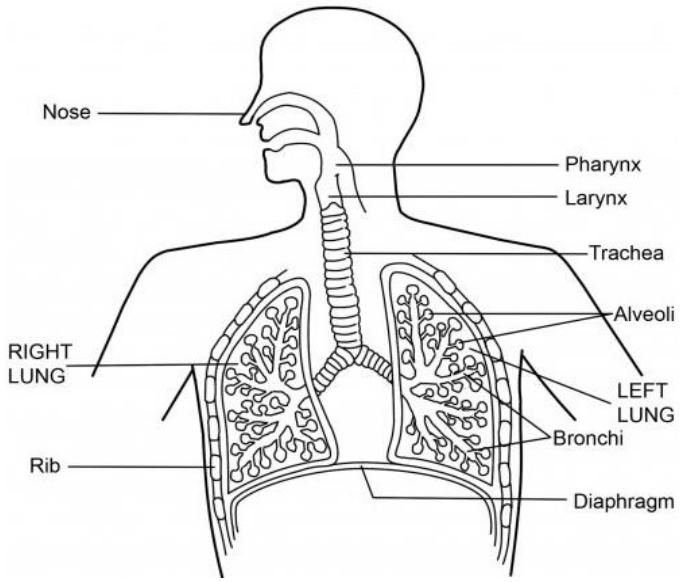
ORGANS OF RESPIRATORY SYSTEM

Nose

Trachea (wind pipe)

Lungs (the main respiratory organs)

THE STRUCTURE OF THE RESPIRATORY SYSTEM



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NOSE

It is an olfactory organ (sense organ for smell)

It contains cilia and mucus that trap dust and germs

Importance of the nose

For smelling

It is the passage of inhaled air to the trachea

It cleans, warms and moistens inhaled air

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

To warm the inhaled air before it reaches the lungs

Contents of the nose and their importance

Nasal mucus (snot)

It traps germs and dust

It moistens inhaled air

It prevents the nose from drying up

Cilia

Cilia filter inhaled air (trap dust and germs)

What happens to inhaled air in the nose?

Air is cleaned (filtered)

Air is warmed

Air is moistened.

Why do people sometimes breathe through the mouth?

Due to nasal congestion

Due to deviated nasal septum

Why is it not advisable to breathe through the mouth?

The mouth has no cilia to clean the inhaled air

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It can chill the lungs since air is not warmed

Disorders of the nose

Nose bleeding

Nasal congestion

What warms the inhaled air in the nose?

Blood in the vascular membrane

Why should we cover the nose while sneezing?

To prevent spread of droplet infections (airborne diseases)

Care for the nose

Wash the nose with clean water and soap.

Do not share handkerchiefs

Use a clean piece of cloth to clean the nose

Avoid rough games that can harm the nose

Do not allow mucus to flow and reach the lips

THROAT (PHARYNX)

This is a common passage for food and air

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

EPIGLOTTIS

It prevents food from entering the trachea.

It prevents choking.

LARYNX (VOICE BOX)

It contains vocal cords

Vocal cords vibrate to produce sound when air flows over them

THE TRACHEA (WIND PIPE)

It is the passage of air to the lungs.

Trachea is made up of rings of cartilage

Why?

To keep it open all the time.

The trachea contains cilia **that trap dust and germs**.

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The trachea divides into **bronchi** (left bronchus and right bronchus)
The bronchi subdivide into **bronchioles**
The bronchioles end into tiny air sacs called **alveoli**
Gaseous exchange takes place in the **alveoli**

DIAPHRAGM

This is a dome-shaped muscle that separates the chest cavity and abdominal cavity
It helps in breathing

INTERCOSTAL MUSCLES

They hold the ribs in position.

THE LUNGS

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

Why are lungs regarded as respiratory organs?

They supply oxygen for respiration

Why are lungs regarded as excretory organs?

They remove metabolic wastes from the body

Importance of the lungs in the human body

They supply oxygen to blood (they oxygenate blood)
They remove carbon dioxide and water vapour from the body

Why are lungs elastic?

To easily expand and contract during breathing

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How are lungs adapted to their functions?

They are spongy and elastic

They have very many alveoli

They have a dense network of blood capillaries.

They have a moist surface

They are covered in thin membranes

GASEOUS EXCHANGE IN HUMAN BEINGS

This is the transfer of respiratory gases between the cells and the environment

In which human body organ does gaseous exchange take place?

In the lungs

Where in the lungs does gaseous exchange take place?

In the alveoli (air sacs)

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

By diffusion

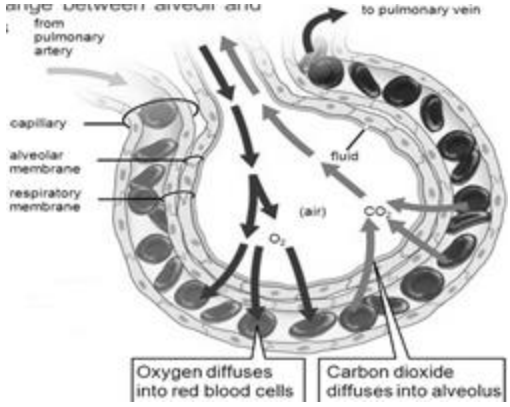
What is diffusion?

Diffusion is the movement of molecules from an area of high concentration to an area of low concentration

ALVEOLI (AIR SACS)

This is where the exchange of gases takes place by diffusion.

The structure of the alveolus



Adaptations of alveoli (air sacs) to their function

They have thin walls.

They have a moist surface.

They are covered by a dense network of blood capillaries.

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They are numerous (very many in number).

COMPOSITION OF AIR BREATHED IN AND OUT

Type of air	Inspired air	Expired air
Oxygen O_2	21%	16%
Carbon dioxide CO_2	0.03%	4%
Nitrogen N_2	78%	78%
Water vapour	Low (less)	High (more)
Rare gases	0.97%	0.97%

Explanation:

Inhaled air has more oxygen than exhaled air

Oxygen is used during respiration

Exhaled air has more carbon dioxide than inhaled

More carbon dioxide is produced during respiration.

Exhaled air has more water vapour than inhaled air

More water vapour is produced during respiration

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

They are not used in the human body

BREATHING (VENTILATION OF THE LUNGS)

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

IMPORTANCE OF BREATHING

It provides oxygen to the lungs

It removes carbon dioxide from the lungs

What is tidal air?

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

TYPES (PHASES) OF BREATHING

Breathing in (inhalation or inspiration)

Breathing out (exhalation or expiration)

Breathing in (inhalation or inspiration)

This is the intake of air into the lungs.

Things that occur during inhalation (inspiration)

Intercostal muscles contract

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Ribs move upwards and outwards.

Diaphragm contracts and flattens

Volume of the chest cavity increases

The lungs expand.

In four steps, explain the mechanism of inhalation

Diaphragm and intercostal muscles contract

Volume of the chest cavity increases

Air pressure inside decreases

Air rushes into the lungs

Why is inhalation said to be an active process?

It involves muscle contraction that requires energy

Breathing out (exhalation or expiration)

This is the expelling of air from the lungs.

Things that occur during exhalation (expiration)

Intercostal muscles relax.

Ribs go downwards and inwards.

Diaphragm relaxes and becomes dome-shaped (move upwards)

Volume of the chest decreases

The lungs contract

The lungs and the stomach go to their original size.

In four steps, explain the mechanism of exhalation

Diaphragm and intercostal muscles relax

Volume of the chest cavity decreases

Air pressure inside increases

Air moves out of the lungs

Why is exhalation regarded as a passive process?

It does not involve muscle contraction

MODEL TO SHOW THE MECHANISM OF BREATHING

Cut off the bottom of a plastic bottle.

Cover and tie the open end with a rubber sheet.

Tie two empty balloons to a Y – shaped (straw) glass tube.

Insert the straw into the bottle through its cork.



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

DISORDERS OF THE RESPIRATORY SYSTEM

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

DISEASES OF THE RESPIRATORY SYSTEM (RESPIRATORY DISEASES)

Communicable (infectious) respiratory diseases

- Tuberculosis (TB)
- Diphtheria
- Whooping cough (Pertussis)
- Common colds
- Pneumonia
- Influenza (Flu)

Non communicable (non-infectious) respiratory diseases

- Lung cancer
- Emphysema

] They are caused by tobacco smoking

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

RESPIRATORY DISEASES WORSENED BY TOBACCO SMOKING

- Asthma
- Tuberculosis

ASTHMA

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It is a hereditary disease of the respiratory system

It blocks the bronchioles hence making breathing difficult.

Sign of asthma

Difficulty in breathing (especially during cold days)

Wheezing

Why is asthma called a hereditary disease?

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

TUBERCULOSIS

It is a bacterial airborne disease (droplet infection)

It attacks the respiratory and skeletal system

It mainly affects the lungs and the backbone (spine)

Name the germ (bacterium) which causes tuberculosis

Mycobacterium tuberculosis

How does tuberculosis spread?

Through inhaling contaminated air

Through drinking unboiled milk from tubercular cows

Signs and symptoms of tuberculosis

Chronic cough

A lot of sweating at night

Loss of body weight

Ways of preventing and controlling tuberculosis

Immunize babies using BCG vaccine

Isolate and treat the infected person

Drink boiled or pasteurized milk

CARE FOR THE RESPIRATORY SYSTEM

Perform regular body exercise

Avoid tobacco smoking

Take infants for immunisation

Do not play in dusty places

Always keep the nose away from dust

Always breathe through the nose but not the mouth

Sleeping in a well-ventilated house

Feed on a balanced diet

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TERM THREE

TOPIC: SCIENCE AT HOME AND COMMUNITY

WATER

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

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

Water supports life.

SOURCES OF WATER

Natural sources of water

Rain	Lakes	Seas
Springs	Rivers	Ponds
Streams	Swamps	
Oases	Oceans	

Rain is the main natural source of water

Artificial sources of water

Wells	Dams
Boreholes	Water tank

PROPERTIES OF PURE WATER

It has no colour (colourless)	It has no taste (tasteless)
It has no smell (odourless)	It boils at 100°C and freezes at 0°C

Importance of water in the human body

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

USES OF WATER IN THE ENVIRONMENT

For cooking	For building houses
For washing	For mixing drugs and agrochemicals
For bathing	For making beverages
For drinking	For irrigation
For mopping	For cooling machines in factories

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For generating electricity

It is used by plants to make starch

GROUPS (TYPES) OF WATER

Hard water

Soft water

SOFT WATER

This is the water that lathers quickly

Examples of soft water

Distilled water (pure water)

Spring water

Rainwater

Sources of soft water

Rain

Springs

Advantages of soft water

Distilled water is used for mixing drugs in hospitals

Distilled water is used in car radiators

HARD WATER

This is the water that does not lather quickly

What causes hardness in water?

Presence of much mineral salts in water

High concentration of dissolved mineral salts in water

Mineral salts found in hard water

Calcium

Magnesium

Sources of hard water

Lakes

Rivers

Seas

Oceans

Oases

Advantages of hard water

It strengthens teeth and bones

It is used for making beer

It helps in formation of shells in molluscs

It is used in science experiments to conduct electricity

Disadvantages of hard water

It wastes soap

It damages hot water pipes

It stains on clothes

It causes furring of kettles

Types of hardness in water

Permanent hardness

Temporary hardness

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

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

WATER CONTAMINATION

This is the way of making water dirty

WATER POLLUTION

This is the releasing of harmful materials in water

Water impurities (water pollutants)

These are things that make water dirty and unsafe to use

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

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

Ways of contaminating (polluting) water sources

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

Control of water contamination/water pollution

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

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SILTING

This is the deposition of eroded materials into a water sources

Agents of silting

Flowing water Strong wind Moving animals

SILT

These are eroded materials deposited into a water source

Examples of silt

Soil/mud Grass

Cow dung Rubbish

Causes of silting

Soil erosion

Cultivating along riverbanks and lake shores

Allowing animals to drink from water sources

Clearing vegetation around riverbanks and lake shores

Effects (dangers) of silting

It leads to water pollution

It reduces the depth of a water body (it makes a water body shallow)

It leads to death of some marine animals

It destroys the habitats for marine animals

How does silting lead to floods?

By reducing the capacity/depth of water sources

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

Silt suffocates marine animals

Control of silting

Avoid cultivating along river banks and lake shores

Planting short grass around water sources

Putting silt traps around water bodies

Using a dredging machine to remove silt from water bodies

DREDGING

This is the removal of silt from a water body.

Importance of dredging

It maintains the depth of water bodies

It prevents flooding of water bodies

Of what importance is a dredging machine?

For removing silt from water bodies

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DISEASES ASSOCIATED WITH WATER

These are diseases that are spread by unprotected water

Groups (classes) of diseases associated with water.

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

WATER BORNE DISEASES

These are diseases spread through drinking contaminated water

Examples of waterborne diseases

Cholera	Dysentery	Hepatitis B
Typhoid	Poliomyelitis	Guinea worm disease
Bilharziasis	Diarrhoea	

Cholera

It attacks the digestive system

It is caused by bacteria called vibrio cholerae

Typhoid

It attacks the digestive system

It is caused by bacteria germs called salmonella typhi

Bilharziasis (schistosomiasis)

It attacks the kidneys

It is caused by blood flukes or schistosomes

It is spread by fresh water snails

Poliomyelitis

It attacks the skeletal system (bones)

It also attacks the nerves (nervous system)

It is caused by poliovirus

It is spread by cockroaches

Dysentery

It attacks the digestive system

Bacillary dysentery is caused by bacilli bacteria called shigella

Amoebic dysentery is also caused by an **amoeba** called entamoeba histolytica

Hepatitis A

It attacks the liver

It is caused by hepatitis A virus

Diarrhoea

It attacks the digestive system

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It is caused by rotavirus

Guinea worm disease (GWD)

It is caused by guinea worms

CONTROL OF WATERBORNE DISEASES

Always drink clean boiled water (always drink safe water)

Proper disposal of human wastes

What does "WASH" stand for?

Water, Sanitation and Hygiene

Of what importance is WASH programme to the community?

It reduces the spread of waterborne diseases

It promotes clean water supply

WATER CONTACT DISEASES

These are diseases spread through bathing or swimming in contaminated water

Examples of water contact diseases

Bilharziasis

Swimmer's itch

Swimmer's ears (otitis externa)

CONTROL OF WATER CONTACT DISEASES

Avoid swimming in contaminated water

Avoid bathing with dirty water

Treating water in swimming pools

WATER CLEANED DISEASES

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

Examples of water cleaned diseases

Trachoma

Scabies

Impetigo

Athlete's foot

Ringworm

Conjunctivitis

Scabies

It is caused by itch mites

It attacks the skin

Impetigo

It is caused by bacteria

It attacks the skin

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Trachoma

It is caused by bacteria germs called chlamydia trachomatis

It is spread by houseflies

It attacks the eyes

Ringworm

It is caused by fungi

It attacks the skin

Athlete's foot

It is caused by fungi

It attacks the skin, mainly the feet

Conjunctivitis

It is caused by virus or bacteria

It attacks the eyes

CONTROL OF WATER CLEANED DISEASES

Bathing with enough clean water and soap

Washing clothes with enough clean water and soap

WATER HABITAT VECTOR DISEASES

These are diseases spread by vectors that develop, live or get food from water.

Examples of water habitat vector diseases

Bilharziasis
River blindness
Malaria
Elephantiasis
Yellow fever
Dengue fever
Zika fever
Chikungunya fever

Bilharziasis (schistosomiasis)

It is caused by blood flukes or schistosomes

It is spread by a fresh water snail

River blindness (onchocerciasis)

It is caused by onchocerca volvulus worms

It is spread by a black fly

It attacks the eyes

Malaria

It is caused by protozoa called plasmodia

It is spread by female anopheles mosquitoes

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It attacks the red blood cells (circulatory system)

Elephantiasis (filariasis)

It is caused by filarial worms

It is spread by culex mosquitoes

Dengue fever

It is caused by dengue virus

It is spread by aedes (tiger) mosquito

Yellow fever

It is caused by flavivirus

It is spread by Aedes (tiger) mosquito

Zika fever

It is caused by zika virus

It is spread by Aedes (tiger) mosquito

Chikungunya fever

It is caused by Chikungunya virus (CHIKV)

It is spread by Aedes (tiger) mosquito

EXAMPLES OF VECTORS THAT SPREAD WATER HABITAT VECTOR DISEASES

Fresh water snail

Black fly (Jinja fly or Simulium fly)

Female anopheles mosquito

Culex mosquito

Aedes (tiger) mosquito

CONTROL OF WATER HABITAT VECTOR DISEASES

Draining still water

Oiling still water

Spraying with insecticides to kill adult mosquitoes

Keeping fish in ponds to eat mosquito larvae

Treating water to kill water snails

Avoid sleeping near river banks

SAFE WATER

This is the water that does not contain germs

WAYS OF MAKING WATER SAFE FOR DRINKING

By boiling

Use of ultra Violet light

By treating water with chemicals (chlorination or fluoridation)

BOILING

This is the heating of water to its boiling point (100^0C)

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It is the cheapest and safest method to prepare safe water for drinking

How does boiling make water safe for drinking?

It kills germs in water

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

To prevent water contamination

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

To prevent water contamination

Common containers used to store boiled water

Pots	Water bottles	Vacuum flasks
Jerrycans	Saucepans	Buckets

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

To keep water cold and free from germs

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

It has cold conditions that prevent multiplication of germs

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

Lack of electricity in most rural areas

Pots are cheaper than refrigerators to buy

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

To kill germs in the pot

To give water a good taste

Why is boiled water sometimes filtered before storage?

To remove solid impurities

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

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

USE OF ULTRA VIOLET LIGHT (USE OF UV LIGHT)

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

CHEMICAL TREATMENT OF WATER

This is the killing of germs in water using chemicals.

Methods of treating water with chemicals

By chlorination By fluoridation

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By adding iodine crystals

Chlorination

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

Fluoridation

This is the adding of fluoride in water to kill germs

Examples of chemicals used to treat water

Chlorine Fluoride Iodine

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

They kill germs in water

Disadvantages of using chemicals

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

STEPS (STAGES) OF WATER TREATMENT FOR PUBLIC WATER SUPPLY

Screening
Coagulation
Sedimentation
Filtration
Chlorination

Screening

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

Coagulation

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

Sedimentation

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

Filtration

This is separating of solid impurities from water using a filter

Chlorination

This is the adding of chlorine to water to kill germs

After chlorination, treated water is distributed to different areas through water pipes.

Write Nwsc in full

National water and sewerage corporation

Duties of Nwsc

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To supply of treated piped water in urban areas

To supply sewerage services in urban areas

How is boiling different from evaporation?

Boiling occurs at a specific temperature while evaporation occurs at any temperature

Boiling occurs in the entire liquid while evaporation occurs on the surface of the liquid

Boiling occurs rapidly while evaporation occurs slowly

Bubbles ate formed during boiling while bubbles are not formed curing evaporation

CLEAN WATER

This is water that does not contain impurities

METHODS OF MAKING DIRTY WATER CLEAN

Decantation Filtration Distillation

DECANTATION (THREE POT METHOD)

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

Application (importance) decantation at home

For collecting clean water from dirty water

For removing unwanted liquid from a mixture of immiscible liquids

Uses of water collected by decantation

For washing

For cooking

For irrigation

For mixing herbicides and acaricides

Why is water collected by decantation not safe for drinking?

Decantation does not kill germs

Experiment of the three pot system (decantation)

Get three containers (pots)

Put dirty water in the first pot

Allow dirt to settle at bottom and gently pour the clear water on top into another pot.

After some time, gently pour the clean water on top into the last pot

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FILTRATION

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

Materials used as a filter (equipment used for filtration)

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

Which human body organ acts as a biological filter?

Kidney

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

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

Diagram showing filtration

Filtrate is the clear liquid that passes through the filter

Residue (filtride) is the solid substance that remains on the filter

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

Filtration does not kill germs

Uses of filtered water at home

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

Application (uses) of filtration in our homes

For removing tea leaves from tea

For removing husks from local beer

For removing seeds from fruit juice

For collecting clean water from dirty water

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Local materials used in water filtration at home

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

HOW TO MAKE A HOMEMADE WATER FILTER

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

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

IMPORTANCE OF EACH COMPONENT OF HOMEMADE WATER FILTER

Pebbles

- To remove bigger solid impurities

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Clean sand (coarse sand and fine sand)

To remove smaller solid impurities

Charcoal

To remove smell and taste from water

To remove toxin (poison) from water

To adsorb pollutants

Cotton wool

To allow out clean water (filtrate)

Beaker

To collect the filtrate

Plastic bottle

To hold the filtering materials

Why is the bottom of the plastic bottle cut off?

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

What force enables water to move down through the components?

Gravity

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

To make water cleaner

DISTILLATION

This is a method of collecting a pure liquid from impure liquid by evaporation and condensation

Distillate is the pure liquid collected after distillation

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

It lacks mineral salts

Why does the distillate lack mineral salts?

They are lost during evaporation

Use of distilled water

For mixing drugs in drips and injections

For drip hydration

For cleaning the human body before taking an injection

Diagram showing distillation

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Application (importance) of distillation

It helps in making of alcohol

It helps in water purification

It helps in separation of petroleum into different products

Disadvantages of distillation

It can lead to burns and scalds

It can lead to fire outbreaks

It needs much attention

CLEANING CLOTHES AT HOME

How do clothes keep our bodies warm?

By preventing heat loss

LAUNDRY

These are dirty clothes that need to be washed

This is a business that washes clothes for customers

STEP USED IN CLEANING CLOTHES AT HOME

Sorting

Soaking

Washing

Rinsing

Wringing

Drying

Ironing

SORTING

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

It prevents mixing of colours

It prevents very dirty clothes from making white clothes dirty

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

Factors considered when sorting clothes

Colour of clothes

Dirtiness (intensity of dirt)

Thickness of clothes

SOAKING

This is the putting clothes in soapy water (water with detergents) for some time.

It dissolves dirt and stains

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It softens thick clothes.

It reduces wear and tear of clothes during washing.

It makes washing easy

WASHING

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

Reasons for washing clothes

To remove dirt and stains

To remove bad smell from clothes

To prevent skin infections

To remove parasites like lice

Why do we wash clothes with soap?

To kill germs and parasites in clothes

To remove bad smell easily

To prevent skin infections

To remove dirt and stains easily

Common detergents used during washing

Omo Washing Powder

Nomi Washing Powder

Magic Washing Powder

Jik Bleach

Lotus Liquid Soap

Chamuka Liquid Soap

Reasons for using detergents when washing clothes

To remove tough stains

To kill germs and parasites

To make hard water soft

To whiten clothes

To remove bad smell easily

RINSING

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

It removes soapy water from the clothes

WRINGING

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

It makes drying faster (speeds up drying)

Reasons why woollen clothes should be dried without wringing

It prevents the clothes from losing their shape

DRYING

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

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

By radiation

How does sun's heat dry wet clothes?

By evaporating water from clothes

How do wet clothes dry when hung in shady places?

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By the help of wind

How does wind speed up drying of clothes?

By blowing away water from clothes

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

Air exerts pressure

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

It leads to growth of mosses which cause stains

IRONING

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

To kill germs and parasites

To remove creases

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

For easy removal of creases when ironing

To save charcoal/electricity when ironing

ACCIDENTS AND FIRST AID

AN ACCIDENT

This is a sudden happening that causes harm to the body

COMMON ACCIDENTS (INJURIES) AT HOME AND SCHOOL

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

EFFECTS OF ACCIDENTS TO AN INDIVIDUAL

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

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

- Avoid playing with hot objects
- Avoid careless running
- Avoid fighting
- Avoid playing in bushes
- Avoid playing with cutting objects
- Avoid unnecessary climbing of trees
- Avoid playing rough games
- Avoid speeding the vehicles

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Avoid playing on the roads
Always cross busy roads at zebra crossings
Avoid putting metallic objects in electric sockets
Avoid touching electric wires that have fallen off the poles

FIRST AID

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

Casualty

This is a person who has been injured in an accident

Reasons (importance or advantages) of giving first aid

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

FIRST AIDER

This is a person who gives first aid

Qualities of a good first aider

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

RESPONSIBILITIES OF A FIRST AIDER

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

STEPS FOR GIVING FIRST AID

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Check whether the victim is breathing

Check the blood circulation by feeling the heart beat

The above steps can be summarized as below;

ABC – Airway, Breathing, Circulation

OR:

3Bs - Breathing, Bleeding, Broken bone

FIRST AID BOX

This is a small container used to keep first aid kit

Places where a first-aid box is found

Schools
Football stadium
Airports
Petrol stations
Homes

Groups of people found in the school sick bay

Health workers (nurses)

Sick people (sick children)

FIRST AID KIT

This is the set of tools used to give first aid

THE FIRST AID KIT (COMPONENTS OF A FIRST AID BOX)

Bandage
Plaster (adhesive bandage)
Methylated spirit
Cotton wool
Razorblade
Scissors
Safety pin
Surgical gloves
Tweezers
Pain killer
Liniment
A pair of tongs
Small first aid book
Tourniquet
Arm sling

FIRST AID KIT	IMPORTANCE
Bandage	To dress big cuts
Plaster (adhesive bandage)	To dress small cuts
Methylated spirit	To kill germs on cuts and wounds
Cotton wool	To clean cuts and wounds
Razorblade	To cut bandage To shave hair on the injured part

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Scissors	To cut the bandage
Safety pin	To fasten bandage To remove thorns from the skin
Surgical gloves	To prevent direct contact with blood
Tweezers	To remove insect stingers from the skin
Pain killer	To reduce (relieve) pain
Liniment	To reduce pain on sprains and strains To reduce swelling on sprains and strains
A pair of tongs	To hold cotton wool when cleaning cuts and wounds
Tourniquet	It is used to stop bleeding on cuts
Small first aid book	To guide a first aider on how give first aid
Armsling	To hold the broken arm in one position

How does a tourniquet stop bleeding?

By stopping the flow of blood in the blood vessels

OTHER THINGS USED TO HELP CASUALTIES

Splints

To keep the broken bone of the limb in one position

Ambulance

To transport the casualty to the hospital

Plaster of Paris

To hold the broken limb in one position as it heals

Crutch

To support the casualty to walk

How do crutches support the casualty to walk?

By reducing the body weight put on the leg

Stretcher

It is used to carry a casualty who cannot walk

Why is a stretcher not kept in a first aid box?

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It is too big to fit in a first aid box

Mention four accidents (injuries) that require the use of a stretcher

Fractures
Dislocation
Fainting
Sprains
Strains

How is a wheel chair important to a crippled person?

It helps a crippled person to move

COMMON ACCIDENTS AND THEIR FIRST AID

SCALDS

A scald is a skin injury caused by wet heat

Causes of scalds

Skin contact with steam
Skin contact with hot water
Skin contact with hot porridge
Skin contact with hot tea
Skin contact with hot milk
Skin contact with hot soup

Objects (things) that may cause scalds

Hot milk
Hot tea
Hot porridge
Hot sauce
Hot cooking oil
Steam

First aid for scalds

Put the injured part in clean cold water

BURNS

A burn is a skin injury caused by dry heat

How is a burn similar to a scald?

Both are caused by heat

How does a burn differ from a scald?

A burn is caused by dry heat while a scald is caused by wet heat

CAUSES OF BURNS

Skin contact with hot charcoal
Skin contact with hot flat iron
Skin contact with hot plates and cookers
Skin contact with acids
Skin contact with fire
Skin contact with burning cigarette
Skin contact with high voltage electricity wires

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Too much exposure of the skin to sun rays

Skin contact with friction from revolving wheels

Objects (things) that may cause burns

Hot charcoal	Hot saucepan	Cookers
Hot flat iron	Fire	Hot nails
Hot plates	Hot charcoal stove	Acids

EXAMPLES OF BURNS

Dry burns: are caused by fire flames and cigarettes

Chemical burns: are caused by acids

Radiation burns: are caused by too much exposure to sun rays or x-rays

Electrical burns: are caused by high voltage electricity or lightning

Dry friction burns: caused by the skin rubbing against objects such as ropes

DEGREE OR TYPES OF BURNS (CLASSIFICATION OF BURNS)

First degree burns	Second degree burns	Third degree burns

FIRST DEGREE BURNS

These are minor burns which do not form blisters

Why are first degree burns also called superficial burns?

They affect the outermost layer of the skin

Signs of first degree burns

No blister is formed	Skin becomes red
Dry peeling skin as the burn heals	Minor swelling

Symptom of first degree burns

Tender skin (painful skin when touched)

First aid for first degree burns

Put the burnt part in clean cold water

Why?

To reduce pain

To cool down the temperature

Note

First degree burns need no dressing

SECOND DEGREE BURNS

These are burns which form blisters

Blister

This is a raised skin with a liquid inside it.

Signs of second degree burns

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Blisters are formed

Swelling of the skin

Symptom of second degree burns

Much pain on the injured part

First aid for second degree burns

Put the injured part in clean cold water; if the blister is not broken

Cover the injured part with a bandage or clean cloth; if the blister is broken

Why it is not advisable to break (burst) blisters?

It exposes the wound to germs

It causes more pain

Why should a second degree burn be dressed in a clean bandage?

To prevent infections

THIRD DEGREE BURNS

These are very serious burns that damage all the layers of the skin

They are the most severe burns

Signs of third degree burns

Skin may turn white

Skin may turn black/may be charred

Skin is burnt deeply

Raised and leathery skin

Signs of third degree burns

Shock

Numbness

First aid for third degree burns

Put the burnt part in clean cold water

Cover the wound with a clean cloth

To protect it from houseflies and dust

Give the casualty a lot of fruit juice

To prevent dehydration

To replace the lost water and mineral salts

Why is a third degree burn not painful at all though it is very serious?

It damages the nerves

How is skin grafting important in treatment of burns?

It helps to fill the burnt part with skin cut from another body part

When is a burn said to be a fourth degree burns?

When a burn affects muscles and bones

EFFECTS (DANGERS) OF BURNS AND SCALDS

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They lead to loss of some body parts
They damage the skin
They lead to loss of feeling
They lead to death
They can lead to dehydration
They lead to lameness

PREVENTION OF BURNS AND SCALDS

Use heat insulators to lift hot objects
Cooking from raised places
Keep hot objects and acids out of children's reach
Do not keep petrol in a living house.
Avoid cooking in open places
Do not allow young children to cook
Refill lanterns or lamps after putting them off
Teach children the dangers of fire
Do not play near hot things and acids
Put smoke detectors in buildings
Measure bath water temperature before use
Lock up kitchens when not in use
Handle home distillation tools with care when in use
Do not put a burning candle near beddings and curtains at night

THINGS WE SHOULD NEVER DO TO BURNS AND SCALDS (DON'TS WITH BURNS AND SCALDS)

Never apply cooking oil, rabbit fur and cow dung
They contaminate the wound and cause infections
Never apply salt
It absorbs water and causes dehydration
Never apply sugar
It attracts bacteria that cause infections
Never burst the blisters
It exposes the wound to germs (it may lead to infections)
Never apply cotton balls on a burn
They can stick in the injury and lead to infections

FEVER AND CONVULSIONS

FEVER

This is the condition when the body temperature rises beyond the normal one
This is the abnormal rise in body temperature

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Note

The normal body temperature is **37°C** or **98.6°F.**

Fever is not an illness but a symptom of many illnesses.

Signs of fever

Excessive sweating

Frequent urination

Causes of fever

Reactions to vaccines

Body injuries

Some sicknesses (diseases)

High temperatures in the environment

Diseases that has a symptom of fever

Malaria

Typhoid

Measles

Meningitis

FIRST AID FOR FEVER

Apply tepid sponging

To reduce body temperature

Give the victim plenty of fruit juice

Remove most of the victim's clothes

Tepid sponging

This is the act of putting a cloth soaked in lukewarm water on the forehead or chest of a victim

Why is it not advisable to leave a cold wet cloth on the patient's body for a long time?

It can lead to convulsions(to prevent convulsions)

EFFECT OF FEVER

High fever leads to convulsions

CONVULSIONS

These are sudden uncontrolled body movements

OR

This is the condition when the body shakes (jerks) involuntarily

CAUSES OF CONVULSIONS

Epilepsy (fits)

Brain tumour

Alcohol withdrawal

High fever

Cerebral malaria

SIGNS OF CONVULSIONS

Violet shaking of the body

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Foaming mouth (saliva bubbles in the Mouth)

FIRST AID FOR CONVULSIONS

Apply tepid sponging

To cool down body temperature

Remove all tight clothes on the victim

To cool down body temperature

Put a clean object in the victim's mouth

To prevent the victim from biting the tongue.

Control the bystanders

To enable the victim get enough fresh air

Do not give any food or drink to the victim

To prevent choking

Do not force the jaws to open in case they have closed

To prevent breaking the victim's jaws

Why are patients taken to hospitals after convulsions have stopped?

For medical checkup and treatment

Causes of fits/epilepsy

Brain damage during birth

Epilepsy can be inherited

Give any one cause of baby's brain damage during birth

Difficulty in delivery

FAINTING

This is the loss of consciousness for a short time.

Fainting is sometimes called **nervous shock**

Main cause of fainting

Lack of oxygenated blood supply to the brain

Conditions that can lead to fainting

Doing very heavy exercises

Excessive bleeding

Extreme anger

Excessive coldness

Extreme excitement

Being frightened

Dehydration

Excessive hunger(starvation)

Severe pain

Sudden shocking news

Standing under sunshine for a long time (excessive heat)

Overcrowding in poorly ventilated houses

Why does a person faint after receiving shocking news?

Due to shortage of oxygen supply to the brain

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Signs and symptoms of fainting

Loss of body balance (dizziness)

Loss of senses for a short time

Symptom of fainting

General body weakness (fatigue)

FIRST AID FOR FAINTING

Raise the legs of the victim slightly above the head

To allow blood flow faster to the brain

Loosen up all tight clothing and fan the victim

Put the victim in a shade and fan him or her

Avoid bystanders around the victim

To enable the victim have enough fresh air

State what should be done to a fainted victim after regaining consciousness

Give the victim glucose (sweet warm water) to get energy

Get the victim some soft food to eat

Let the victim rest for some time

DROWNING

This is the condition when a person dies in water

Why is there no first aid for drowning?

The victim is already dead

NEAR DROWNING

This is the condition when a person stops breathing due to having the lungs filled with water but not yet dead

A person who has near drowned has **4 minutes** only to stay alive.

Common places for drowning and near drowning

Swimming pool

Ponds

Lakes

Wells

Bathtubs

Rivers

Basins full of water

Streams

Irrigation trenches

Pits dug by builders to trap rain water

Main cause of near drowning

Having lungs filled with water

Factors that can lead to near drowning

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Lack of swimming skills

Leaving babies in basins full of water

Heart attack and seizures while in water

Panic in water

Alcoholism while in water

First aid for near drowning

Apply the kiss of life (mouth to mouth resuscitation)

Shout out for help

Remove the casualty from water as quickly as possible

How to apply the kiss of life (mouth to mouth resuscitation/artificial respiration)

Lie the casualty on his or her back

Remove any foreign objects stuck in the mouth

Press the casualty's nostrils with your fingers

Blow into the casualty's mouth several times to restore breathing

How is the kiss of life an important first aid for near drowned person?

It restores breathing

How can a first aider force water out of the lungs of a near drowned person?

By making upward push on the belly using the hands

How to prevent drowning and near drowning

Learn swimming skills

Always empty bathtubs

Cover all septic tanks

Fence swimming pools

Do not use leaking boats while fishing

Do not store big open water containers in children's reach

Wear life jackets when using water transport

Pits to trap water for building should be fenced

Do not allow children to go near open water sources without adults

Do not allow babies to play in basins full of water

NOSE BLEEDING

This is the sudden flow of blood from the nose

Main cause of nose bleeding

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Breaking of the blood vessels in the nose

Conditions that lead to nose bleeding

Headache

Over blowing of the nose

Over inhaling of dry air

Being hit on the nose or head

FIRST AID FOR NOSE BLEEDING

Make casualty sit and bend forward

To prevent dizziness and swallowing blood which can cause vomiting

Pinch the nose just below the bridge

To make the bleeding blood vessel stop bleeding

Encourage the casualty to breathe through the mouth

To prevent over straining the blood vessels in the nose

Put the ice pack on the nose

To moisten the lining of blood vessels in the nose

NOTE

Do not make the casualty to bend backwards

To swallowing blood which can cause vomiting

Do not blow the nose very soon after nose bleeding

To prevent rebleeding

Why are casualties with excessive nose bleeding sometimes advised to bend backwards though it is not recommendable?

To prevent excessive loss of blood

To reduce the amount of blood that comes out

PREVENTION OF NOSE BLEEDING

Avoid inhaling dry air

Keep the nostrils moist

Eat citrus fruits to make blood vessels strong

Avoid rough games that can harm the nose

ELECTRIC SHOCK

This is a sudden painful contraction of muscles when electricity flows through them

Causes of electric shocks

Short circuits

Touching electric wires that have fallen off the poles

Pushing metallic objects in electric sockets

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Touching electric appliances with wet hands

Repairing electric appliances when you are not an expert

First aid for electric shock

Switch off current the source of electricity

Use an insulator to put away the victim

Prevention of electric shocks

Cover electric wires using insulators

Do not put metallic objects in electric sockets

Do not touch plugged electric appliances with your wet hands

Electricians should wear rubber gloves during electric repairs

Electric repairs should be done by experts

SNAKE BITES

This is an injury when a venomous snake injects venom into the victim

Signs of snake bites

Two puncture wounds (fang marks) on the injured part

Bleeding from the injured part

Swelling of injured part

Difficulty in breathing

Excessive sweating

Symptoms of a snake bite

Pain

Fever

Necrosis on the injured part

Blurred vision

FIRST AID FOR SNAKE BITES

Tie the bandage slightly above the bitten part

To prevent venom from flowing to the heart

Apply a black stone

To suck venom from the injured part

Keep the casualty calm and at rest

To prevent venom from spreading

Why is it not advisable to wash a bitten part in case of a snake bite?

Any venom left on the skin can help to identify the type of snake

Why is it advisable to identify the colour, markings and shape of a snake in case of a snake bite?

To be given the right antivenin

HOW TO PREVENT SNAKE BITES

Stay away from bushes

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Wear boots and gloves when working in a bush

Do not try to capture a snake

Give a snake room to move away if it appears

DON'TS WITH SNAKE BITES

Don't apply ice on the snake bite

It blocks blood circulation (it causes frostbite)

Don't suck blood with your mouth

To prevent swallowing the venom

Don't cut across the wound

Venom may not be where you expect it to be since snake fangs are curved

Don't apply a tourniquet

Concentrated venom destroys the cells rapidly since blood does not flow

Don't try to capture the snake

It may bite you again

SPRAINS

This is an injury on a ligament

OR

This is a stretched/torn/twisted ligament

What is a ligament?

This is a tissue that joins a bone to a bone

CAUSES OF SPRAINS

Twisting of the ligament

Tearing of the ligament

Stretching of the ligament

SIGNS OF SPRAINS

Swelling

Bruising

Difficulty in moving the injured part

Symptom of sprains

Pain at the injured part

Mention three body parts where sprains occur

Ankles

Knees

Thumbs

Wrists

STRAIN

This is an injury on a muscle or tendon

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OR

This is a stretched/torn or twisted/muscle or tendon

What is a tendon?

This is a tissue that connects a muscle to a bone.

Causes of strains.

Twisting of the muscle/tendon

Tearing of the muscle/tendon

Stretching of the muscle/tendon

SIGNS OF STRAINS

Swelling

Bruising

Difficulty in moving the injured part

Symptoms of strains

Pain at the injured part

Muscle weakness

Muscle spasms

Mention three body parts where strains occur

Back

Thigh

Calf

First aid for sprains and strains

Rest the injured part

To prevent further injuries

Apply ice pack on the injured part

To reduce pain

Wrap a clean bandage around the injured part

To prevent swelling

Elevate the injured part

To reduce pain

Write RICE in full as used in first aid

Rest, Ice pack, Compress, Elevate

HOW TO PREVENT STRAINS AND SPRAINS

Perform regular body exercises

Wear proper fitting sports shoes

Feed on a balanced diet

Warm up before any sports activity

Wear protective equipment for every sport

DISLOCATION

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This is the condition when a bone is displaced from a joint

Signs of dislocation

Swelling of the injured part

Difficulty in moving the injured part

Symptom of dislocation

Pain at the injured part

First aid for dislocation

Rest the injured part

Apply ice pack on the injured part

Provide a crutch to let the casualty walk

Use a stretcher to carry the casualty who cannot walk

FRACTURE

This is a broken or cracked bone in the body

Causes of fractures

Falls

Unnecessary jumping

Fighting

Heavy blows

Car knocks

What disorder of the skeletal system occurs due to excessive stress on bones?

Fracture

General signs of fractures

A snap of the bone is felt

Difficulty in moving the fractured limb

Swelling of the fractured part

Symptom of fractures

Pain on the fractured part

TYPES OF FRACTURES

Compound fracture (open fracture)

Simple fracture (closed fracture)

Comminuted fracture

Greenstick fracture

Depressed fracture

Complicated fracture

COMPOUND FRACTURE

This is the type of fracture where a broken bone breaks and comes out of the skin (flesh)

Signs of compound fracture

The broken bone is seen outside the skin

Bleeding on fractured part

SIMPLE FRACTURE

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This is the type of fracture where a bone breaks and remains inside the skin (flesh)

Signs of simple fracture

The broken bone may be seen near the skin

Swelling of the fractured part

Bruise at the injured part

Symptom of simple fracture

Pain on the fractured part

GREENSTICK FRACTURE

This is the type of fracture where a bone is bent but broken on one side

It is common in babies

Why is green stick fracture common in babies (young children)?

They have weak bones

COMMINUTED FRACTURE

This is when a bone breaks into many pieces

A broken bone is crushed

DEPRESSED FRACTURE

This is when a bone of the skull is pushed inside

COMPLICATED FRACTURE

This is the type of fracture where a bone breaks and damages an internal body organ e.g lungs, heart or intestines

It can occur when a rib is broken

FIRST AID FOR FRACTURES

Tie splints around the fractured part

To keep the broken bone in one position

Use arm sling to hold the broken arm in one position

Use a stretcher to carry a casualty who cannot walk

Provide a crutch (walking stick) to help the casualty in walking (for stability when walking)

Why are antibiotics applied on a compound fracture?

To prevent bacterial infections

Why is it dangerous for the first aider to attempt putting broken/displaced bone in its position?

It can lead to further injuries

EQUIPMENT USED TO GIVE FIRST AID TO FRACTURES

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Arm sling
Crutches/walking stick
Stretcher
Wheelchair

Splints

To keep the broken bone in one position

Stretcher

It is used to carry a casualty who cannot walk

Why is a stretcher not kept in a first aid box?

It is too big to fit in a first aid box

Crutch/walking stick

It helps a casualty with a broken leg to walk

How do crutches help a casualty with a broken leg in walking?

By reducing the body weight put on the broken leg

Arm sling

To keep the broken arm in one position

BRUISE

This is a swelling on the skin with blood inside it

Causes of Bruises

Falls
Boxing
Sports injuries
Being hit by a hard object
Car accidents

Signs of bruises

Swelling
Skin becomes tender
Skin discoloration

Symptom of bruise

Pain

FIRST AID FOR BRUISE

Wrap a clean wet bandage around the injured part
Raise the injured part above the chest

To reduce pain

Rest the injured part

To prevent further injuries

POISONING

This is the condition when a harmful substance is taken into the body

Poison

This is a substance that can cause harm or death when taken into the body

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Examples of corrosive poisons

- Paraffin (kerosene)
- herbicides
- Rat poison
- Jik Bleach (liquid cleaners)
- Petrol
- Insecticides
- Acaricides
- Expired drugs
- Carbon monoxide gas

Why is kerosene called a corrosive poison?

It is a highly reactive chemical and can cause death when taken into the body

Ways through which poison can be introduced into the body

- Through inhaling contaminated air
- Through taking overdose of drugs
- Through taking expired drugs
- Through drinking harmful chemicals
- Through infected animal bites and stings
- Through skin contact with harmful chemicals
- Through eating poisoned food

SIGNS OF POISONING

- Rapid breathing
- Sweating
- Mental confusion
- Coma
- Vomiting
- Loss of body balance
- The victim may smell poison

SYMPTOMS OF POISONING

- Feeling thirsty
- Blurred vision
- Low blood pressure (hypotension)
- Dizziness

CAUSES OF POISONING

- Keeping poisonous drugs in unlabelled containers
- Taking overdose of drugs
- Taking expired drugs
- Keeping harmful liquids in bottles of soft drinks
- Keeping poisonous substances children's reach
- Taking essential drugs got from local shops
- Breathing in poisonous gases

FIRST AID FOR POISONING

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Poisoning with liquid poison/corrosive poison (kerosene, petrol and liquid cleaners)

Give the casualty a lot of drinks (milk, juice or safe water)

To dilute the poison

Why is it not advisable to induce vomiting in case a person takes a corrosive poison?

It causes double damage to the gullet

Poisoning with rat poison and expired solid drugs

Give the victim soapy water to induce (cause) vomiting

Push your finger into the victim's mouth (throat) to cause vomiting

PREVENTION OF POISONING

Keep drugs out of children's reach

Label the containers of poisonous drugs

Follow the drug prescription

Teach children the dangers of poisonous drugs.

Do not keep poisonous liquids in bottles of soft drinks

Do not buy drugs from local shops

Dispose expired drugs

Avoid drug misuse

What is food poisoning?

This is a group of diseases caused by eating contaminated food

OR

This is any food borne disease

Examples of food borne diseases

Diarrhoea

Cholera

Typhoid

Dysentery

Poliomyelitis

CUTS AND WOUNDS

TYPES OF CUTS

Minor cuts

Deep cuts

Minor cuts

These are cuts near the skin surface

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Deep cuts

These are cuts which go deep in the skin

Signs of cuts

Bleeding from injured part

EFFECTS OF CUTS

They cause wounds

They cause bleeding

WOUNDS

A wound is a tear on the skin that allows blood to escape

Types of wounds

Lacerated wounds

Puncture wounds

Contused wounds

Incised wounds

Abrasion wound

Lacerated wounds

These are deep wounds caused by sharp objects like knives and razorblades.

Puncture wounds

These are deep wounds with a small hole caused by long pointed objects like needle, nail or spear

Contused wounds

These are wounds caused by direct blows by some objects

Incised wounds

These are wounds caused by sharp objects that can lead to open bleeding e.g razorblade and knife

Abrasion wounds

These are wounds caused by friction when a body scrapes across a rough surface

FIRST AID FOR CUTS AND WOUNDS

Apply a bandage

Apply a tourniquet to stop blood flow

First aid for cuts and wounds

Apply direct pressure with a clean cloth

To stop bleeding

Raise the injured leg or arm above the heart

To reduce (slow) bleeding

Cover the cut with a clean cloth or bandage

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To prevent infections

To prevent exposing the wound or cut to germs

Apply a plaster on the minor cut

Apply a clean bandage/tourniquet on the deep cut

To stop bleeding

How does a tourniquet stop bleeding in case of a deep cut?

By stopping the flow of blood

INSECT STING

This is when insects put their stingers into the human skin

Examples of insects which sting

Wasps Bees Fire ants

First aid for insect stings

Apply ice pack on the injured part

To reduce pain

To reduce swelling

Use tweezers to remove the sting if present

Apply baking soda paste to reduce pain

FOREIGN BODIES

These are objects that enter the human body through a natural opening

Examples of natural openings on the human body

Nose Ears

Mouth Vagina

Anus Throat

Eyes Rectum

How do foreign bodies enter our bodies?

Some foreign objects enter by their own

Some foreign objects are pushed by people into the body

Effects of foreign bodies

They cause pain They cause discomfort

FOREIGN BODIES IN THE MOUTH

Food remains Chewing gum

Bone fragments

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First aid for a foreign body in the mouth

By rinsing the mouth with clean water

By dental flossing

By brushing the teeth

Why is it not advisable to remove food particles stuck between teeth using a tooth pick?

A tooth pick can damage the gum

FOREIGN BODY IN THE EYE

Dust

Small insects

Small stones

Iron bits

Splinters

First aid for a foreign body in the eyes

Wash the eye with plenty of clean water

Use a clean soft cloth to remove the foreign body

How do ophthalmologists/oculists remove iron bits in the victim's eyes?

By using a magnet

Why is it not advisable to use a rough (sharp) object to remove a foreign object from the eye?

The object can harm the eye

FOREIGN BODIES IN THE EAR

Small insects

Small seeds

Small stones

Dust

FIRST AID FOR A FOREIGN BODY IN THE EAR

Pour clean cool water in the ear to make the insect come out

Why is it not advisable to try removing a foreign object besides an insect from the ear?

It can damage the ear drum

How can you help a person who has got a small stone inside the ear?

By taking the casualty to the hospital

FOREIGN BODIES IN THE NOSE

Small insects

Small seeds

Small stones

Dust

Beads

First aid for a foreign object in the nose

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Blow the nose

To force out the insect

Breathe through the nose

To prevent sucking the object into the wind pipe

Why is it not always advisable to try removing a foreign object besides an insect from the nose?

It can go deeper and block the nose

FOREIGN BODIES IN THE ANUS

These are common in children who don't put on underwear or knickers

Sand	Leaves	Small seeds
Small stones	Grass	Dust

First aid for a foreign object in the anus

Wash the anus with plenty of clean water

FOREIGN BODIES IN THE VAGINA

These are common in young girls who climb trees and adolescent girls

Tampons (e.g cotton wool)	Grass
Sand	Small seeds
Small sticks	Small stones

Tampons

These are materials put in vagina to absorb menstrual blood e.g cotton wool

Why are adolescent girls at a risk of getting foreign bodies in their vaginas?

Some tampons (cotton wool) can stick in their vaginas during menstruation

First aid for a foreign object in the vagina

Wash the vagina with plenty of clean water

Use clean fingers to remove the object from the vagina

Why should a foreign body in the vagina be removed as quickly as possible?

To prevent infection of the vagina

Why do casualties sometimes fear to get first aid for foreign bodies in the anus or vagina?

Due to shyness (fear for ridicule)

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FOREIGN BODY IN THE THROAT

Food Beads

Coins

Food is the commonest foreign body in the throat

Effect of foreign bodies in the throat

They cause choking

CHOKING

This is the condition when a foreign body in throat blocks the airway to lungs

Conditions that can lead to choking

Eating hurriedly

Improper chewing of food

Swallowing big food particles

Eating while talking (talking with food in the mouth)

Signs of choking

Hand signals pointing to the throat

Clutching the throat (victim grabs the throat with hands)

Sudden inability to talk

Coughing

Difficulty in breathing

Wheezing

FIRST AID FOR CHOKING (FOREIGN BODY IN THE THROAT)

Give the victim sharp blows on the back

To force out the choking object

Apply abdominal thrusts

To force out the choking object

If the victim is a baby (smaller than you),

Hold the baby upside down and give sharp blows at the back

State any two effects of choking

Death

Asphyxia

This is the loss of consciousness due to interrupted breathing

Why is it not advisable to give the person anything to drink during choking?

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To prevent fluids from covering the remaining space for passage of air

HOW TO PREVENT ACCIDENTS CAUSED BY FOREIGN BODIES

Avoid eating hurriedly

Do not talk with food in the mouth

Swallow small pieces of food

Do not put coins and beads in the mouth

Wear eye glasses and helmets when moving on motorcycles and bicycles

Teach children the dangers of putting foreign objects in their natural openings

SANITATION

SANITATION

This is the general cleanliness of a place where we stay

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

Water and sanitation

Tools used to promote sanitation

Hoe

Slasher

Brooms

Rake

Dust bin (trash bin/litter bin)

Panga

Wheel barrow

Mop or rag

Mop bucket

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

Rubbish pit or dustbin

Latrine

Kitchen

Rack (plate stand)

Bathroom

Urinal place

Of what importance is a plate rack at home?

It is where washed utensils are put to dry without contamination

How is a tippy tap important at home?

For washing dirty hands

IMPORTANCE OF GOOD SANITATION

It prevents bad smell in a place

It prevents diarrhoeal diseases

It prevents mosquito borne diseases

It destroys breeding places for insect vectors

It destroys hiding places for insect vectors

POOR SANITATION

This is the general dirtiness of a place where we stay

Signs (indicators) of poor sanitation

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

Diseases associated with poor sanitation

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

Causes of poor sanitation

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

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

It leads to outbreak of faecal/diarrhoeal diseases

Dangers (effects) of poor sanitation

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

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

Mention four activities done to promote good sanitation.

Constructing rubbish pits:

For proper disposal of rubbish

Constructing pit latrines:

For proper disposal of faeces and urine.

Picking rubbish around homes:

To keep away vectors like houseflies

Burning rubbish at home:

To destroy breeding places for houseflies

Providing dust bins:

For proper disposal of rubbish

Sweeping away rubbish in the compound:

To keep away dust and insect vectors

Draining still water:

To destroy breeding places of mosquitoes

Smoking ordinary pit latrines:

To kill houseflies

To prevent bad smell

Slashing tall grass in the compound:

To destroy hiding places for mosquitoes

Cutting bushes around our homes

To destroy hiding places for mosquitoes and tsetse flies

Treating sewage before it is disposed off

Fencing and sweeping around water sources

To prevent water contamination

Spraying insect vectors using insecticides

Avoid sharing a house with domestic animals

Scrubbing the floor of latrines

Mopping the floor of the house

Incinerator

It is where rubbish is burnt under high temperature

HOUSING

This is the providing of a proper house/shelter to an animal

Importance of proper housing to people

It protects people from wild animals

It protects people from bad weather

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It protects people from thieves

Factors to consider before selecting a site for a house

Well drained soil
Size of a house
Nearness to the water source
Nearness to the health centre
Nearness to the market/shop
Distance from the main road
Security of the place

SITE OF A HOUSE

This is a place where a house is located

Qualities of a good site for a dwellinghouse (residential house)

It should have well drained soil

It should be near a water source

To easily get water for domestic use

It should be near a health centre

To easily get proper medical care in time

It should be near shops and markets

To easily buy the domestic needs

It should be at a reasonable distance from main road

To prevent motor accidents

It should not be near a wetland or forest

They are hiding places for vectors and wild animals

QUALITIES OF A GOOD HOUSE

It should be well ventilated

It should have a veranda

It should be well roofed

It should be big enough to accommodate all family members

COMPONENTS OF A WELL-VENTILATED HOUSE

Windows
Doors
Ventilators
Louvres (louvers)

VENTILATORS

To let out warm stale air

Why are ventilators always put (above windows and doors) near the roof/ceiling of a house?

To easily allow out warm stale air which is lighter than fresh air

WINDOWS AND DOORS

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To allow in fresh air

To allow in light

Why are doors and windows are put at a lower level than ventilators?

To easily allow in fresh air which is denser than stale air

How does light help in control of insect vectors in a dwellinghouse?

It chases away vectors like cockroaches

How is an egress window or door useful on a residential house?

It acts as emergency exit

Besides allowing in light and fresh air, state other importance of a door on the house.

It acts as entrance and exit

LOUVRES (LOUVERS)

To allow in fresh air and light while keeping out rain

IMPORTANCE OF PROPER VENTILATION ON A HOUSE (REASONS WHY A GOOD HOUSE SHOULD BE WELL VENTILATED)

To allow free air circulation (To allow in fresh air)

To prevent easy spread of airborne diseases

To reduce temperature inside the house

How does air move through the ventilation components of a house?

By means convection currents/by convection

WAYS OF IMPROVING AIR CIRCULATION IN A WELL-VENTILATED HOUSE

By opening windows

By using air purifiers

By using electric fans

DANGERS OF LIVING IN A POORLY VENTILATED HOUSE

It leads to easy spread of air borne diseases

It leads to suffocation

WAYS OF KEEPING THE DWELLING HOUSE CLEAN

By sweeping the floor

By mopping the floor

By scrubbing the floor

By removing cobwebs from the walls

Avoid sharing same house with domestic animals

Dangers of sharing a house with domestic animals

It leads to bad smell in the house

It leads to competition for oxygen

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It leads to parasites in the house e.g ticks
Sick animals may spread diseases to people
Animal wastes make the house dirty
Animals may destroy household property

Zoonoses (zoonotic diseases)

These are diseases that can spread from sick animals to people

Examples of Zoonoses

Tuberculosis | Brucellosis | Bubonic plague
Rabies | Anthrax

TYPES OF HOUSES

Temporary houses | Permanent houses

TEMPORARY HOUSES

These are houses that last for a short time

Examples of temporary houses

Huts | Caravans
Tents | Houseboats

Materials used to build temporary houses

Mud | Small sticks
Dry grass | Papyri
Reeds | Bamboo
Cow dung | Dry leaves
Banana fibres | Tarpaulin
Sisal

Advantages of temporary houses

They are cheap to make | They need a small space
They need less labour to make

Disadvantages of temporary houses

They last for a short time (they are not durable) | They are vulnerable to bad weather
They are small in size

PERMANENT HOUSES

These are houses that last for a long time

Examples of permanent houses

Flats | Bungalow | Mansion

Materials used to build houses

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Iron bars	Glass	Iron sheets
Concrete	Bricks	Steel nails
Cement	Wood	Metallic poles
Mortar	Stones	Polythene sheets

Advantages of permanent houses

They are durable (last longer)

They are resistant to bad weather

It is easy to build a big house

Disadvantages of modern houses

They are expensive to make

They require skilled labour to make

IMPORTANCE OF A VERANDA ON A HOUSE

It prevents dampness

It prevents flowing water from entering the house

DAMP-PROOF COURSE (D.P.C)

This a layer of polythene paper in the walls of a house

Importance of damp-proof course (D.P.C)

It prevents water from rising through the walls

It prevents dampness of the walls and floor

By what process does water rise through the walls of a house?

By capillarity/capillary action

MORTAR

This is the mixture of water, cement and sand

Of what importance is mortar during building construction?

It is used to bind/join bricks together

It is used to plastering walls

CONCRETE

This is the mixture of water, sand, cement and small stones

Importance (uses) of concrete

It is used to make buildings

It is used to make roads and bridges

It is used to make concrete dams

It is used to make pavements

It is used to make culverts

Advantages of using concrete

It is strong

It is durable

It is fire resistant (it does not burn)

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It does not rust
It can be cast in different shapes
It is a sound insulating material

Disadvantages of using concrete

It is heavy
It is expensive to make formwork to hold concrete
It is less ductile

WAYS OF INCREASING THE STRENGTH OF CONCRETE

Adding iron bars and wire mesh
Concrete curing
Reducing water to cement ratio

CONCRETE CURING

This is the maintaining of enough moisture and temperature for hydration of concrete

Ways of curing concrete?

By pouring water on concrete surface
By putting polythene sheet on concrete surface
By putting sand on concrete surface

Why do builders always pour water on concrete after construction? (Importance of concrete curing)

To harden (strengthen) concrete
To make concrete durable
To prevent cracks

What do we call the process by which water hardens concrete after placement?

Hydration

LATRINES

These are places where human wastes are disposed

Importance of latrines

For proper disposal of human wastes

Why should human wastes be disposed in a latrine? (importance of proper disposal of faeces)

To prevent easy spread of faecal/diarrhoeal diseases
To prevent water contamination
To prevent bad smell in a place
To prevent multiplication of vectors
To limit exposure of human wastes to vectors

TYPES OF LATRINES

Pit latrine

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Toilets (flush toilets)

Potties

How is a lavatory useful in an aircraft?

It helps in proper disposal of human wastes

PIT LATRINES

These are latrines made by digging a hole in the ground

Factors to consider when siting a pit latrine (qualities of a good site for a pit latrine)

It should be 10 metres from a dwellinghouse, school, hotel or kitchen

To prevent food contamination

To prevent bad smell

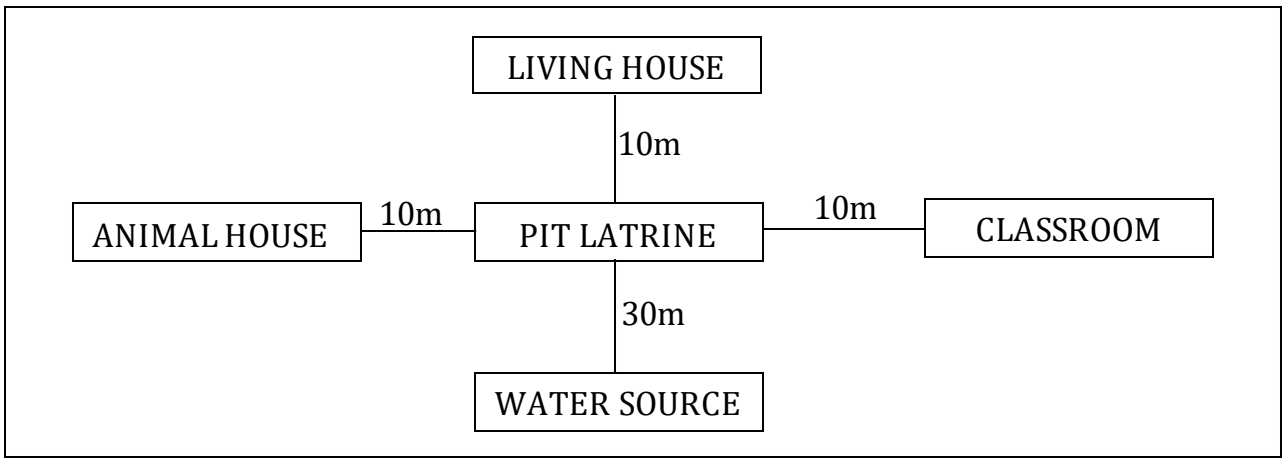
It should be 30 metres from water source

To prevent water contamination

It should be constructed downhill from a water source

To prevent water contamination

A diagram showing a good site for a pit latrine.



Qualities of a good pit latrine

It should have a deep pit

To keep faeces for long time

It should have a strong floor

To allow the user stand on

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It should have a smooth floor

For easy cleaning

It should be well roofed

To prevent leaking of rain (to protect the floor and user from rain)

It should have a hole that is big enough for the human wastes to pass but small enough to prevent children from falling inside

It should have stances and walls

For privacy

The pit should be 2 metres above the water table

To prevent contamination of ground water

DISADVANTAGES OF PIT LATRINES

They can pollute ground water if not placed clearly

They are not friendly to babies

WAYS OF MAKING PIT LATRINES DIRTY

Defecating on the floor

Urinating on the floor

Dumping dirty toilet tissue on the floor

Spitting on the floor

Rubbing faeces on the floor

MATERIALS USED TO MAKE THE FLOOR OF PIT LATRINES

Strong wood

Iron bars

Wire mesh

Concrete

Sand

Mud

THINGS USED TO CLEAN THE FLOOR OF PIT LATRINES

Soapy water

Scrubbing brush

Broom

Disinfectants

Why should disinfectants be used when cleaning the floor of an ordinary pit latrine?

To kill germs

To reduce the bad smell

TYPES OF PIT LATRINE

Ordinary/conventional pit latrine

VIP latrines

Ecosan latrine

Pour-flush latrine

ORDINARY (CONVENTIONAL) PIT LATRINES

This is a local pit latrine without a vent pipe and screen (flyscreen)

It is made from local materials

Ordinary pit latrines are common in rural areas

Characteristics of an ordinary pit latrine

It does not have a vent pipe

It does not have a screen (flyscreen)

It has a lid on the squat hole

A diagram showing an ordinary pit latrine

Importance of a lid on the squat hole of an ordinary pit latrine

To prevent bad smell from escaping

To keep out houseflies

Local materials used to make ordinary pit latrines

Reeds	Small sticks	Sisal
Banana fibres	Cow dung	Strong wood
Papyri	Mud	
Dry grass	Clay	

Ways of keeping an ordinary latrine clean (how to maintain an ordinary pit latrine)

Sweeping the floor

Scrubbing the floor

Smoking an ordinary pit latrine

Removing cobwebs from the walls

Repairing any damage on the latrine

Cutting tall grass around the latrine

Disposing human wastes directly into the squat hole

Importance of smoking an ordinary pit latrine

To kill houseflies

To reduce bad smell

CORRECT USE OF AN ORDINARY PIT LATRINE

Remove the lid from the squat hole

Squat and pass the wastes into the squat hole

Clean yourself, dress up and cover the squat hole

Wash your hands with clean water and soap

VIP LATRINE

This is a modern pit latrine with a vent pipe and a screen (flyscreen)

VIP **stands for** Ventilated improved pit latrine

Why is VIP latrine said to be ventilated?

It has a vent pipe that takes out bad smell

Why is VIP latrine said to be improved?

It does not smell badly and it kills flies

CHARACTERISTICS (FEATURES) OF A VIP LATRINE

It has a vent pipe

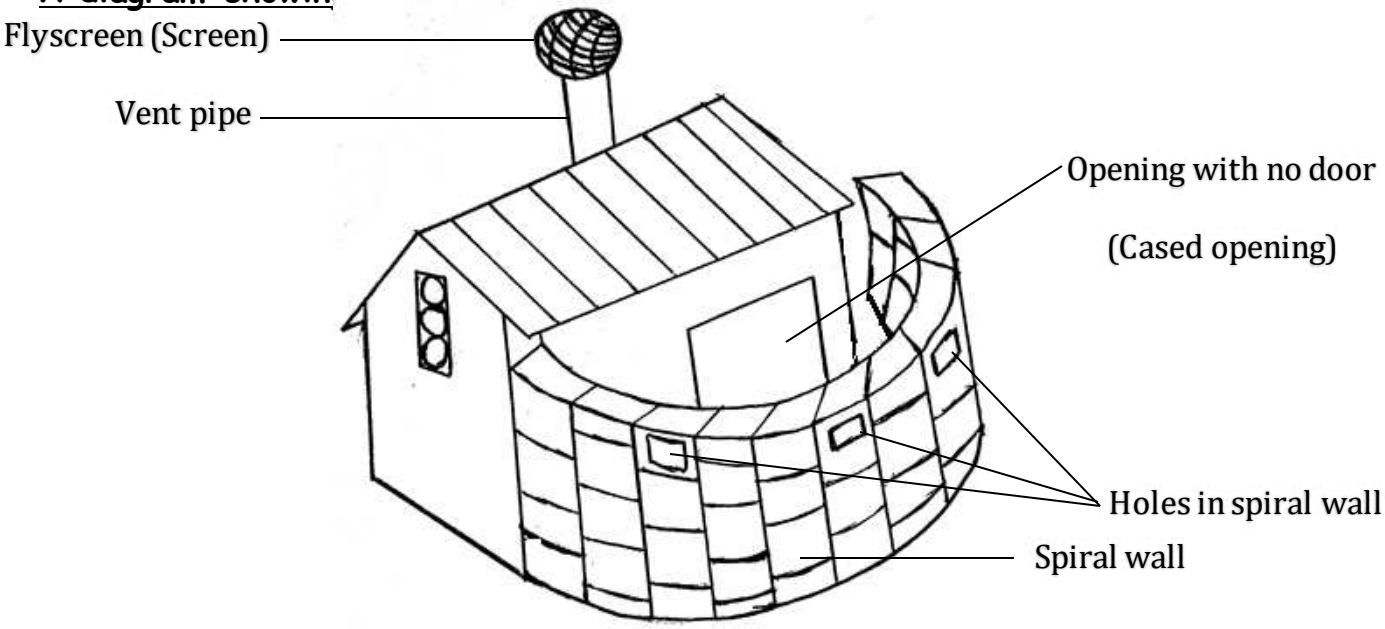
It has a screen (fly screen)

It has no lid for the squat hole

It has spiral walls

It has no door on its opening

A diagram showing a VIP latrine



IMPORTANCE OF EACH PART OF A VIP LATRINE

Vent pipe

To let out bad smell

Screen (flyscreen)

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To trap and kill flies

How does the screen kill houseflies?

It suffocates them without escaping

What attracts flies to pass through the vent pipe towards the screen?

Light entering through the screen

Spiral walls

For privacy

To direct fresh air into the door of the VIP latrine

Why are the some holes put in the spiral walls of a VIP latrine?

To allow free circulation of air

Why is a VIP latrine made with no door on its opening?

To allow free circulation of air (to allow in fresh air)

Why does a VIP latrine has no lid for the squat hole?

To allow in fresh air (to allow free circulation of air)

By what process does air move (circulate) in a VIP latrine?

Convection

Ways of keeping A VIP latrine clean (How to maintain a VIP latrine)

Sweeping the floor

Scrubbing the floor

Repairing any damage on the latrine

Removing cobwebs from the walls

Cutting tall grass around the latrine

Disposing human wastes directly into the squat hole

Why is it not necessary to smoke a VIP latrine?

It has a vent pipe that lets out bad smell

It has a screen that kills flies

Why is a lid of no importance on the squat hole of a VIP latrine?

It blocks air circulation

ECOSAN LATRINE

This is a modern pit latrine in which urine does not mix with faeces

Ecosan stands for **Ecological sanitation**

Characteristic (feature) of an Ecosan latrine

It has a shallow pit

To allow ash reach faeces before spreading

Why is ash poured into the pit of Ecosan pit latrine after use?

To dry up faeces

A diagram showing Ecosan latrine

ADVANTAGES OF ECOSAN LATRINE

It does not produce any smell

Human wastes collected are used as manure

Give a reason why an Ecosan pit latrine does not produce any smell

There is no mixing of faeces and urine

The ash dries up faeces

Ways of keeping an Ecosan latrine clean (How to maintain Ecosan latrine)

Sweeping the floor

Avoid dirtying the floor with ash

Cover faeces with ash after use

Why are Ecosan pit latrines not cleaned with water?

To prevent mixing of faeces with water

TOILETS (FLUSH TOILETS/ WATERBORNE TOILETS /WATER CLOSETS)

These are latrines with a water flushed bowl connected to a sewer

WC stands for **Water closet**

Why are toilets sometimes called flush toilets?

They use water to carry away human wastes

PLACES WHERE TOILETS ARE FOUND

Hospitals	Modern houses	Urban schools
Banks	Hotels	

Why are flush toilets found in towns and cities?

There is supply of piped water

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Why are flush toilets not common in rural areas?

There is no supply of piped water

Why are toilets not smoked?

Heat can cause damage to the toilet equipment

A diagram showing a flush toilet

IMPORTANCE OF EACH OMPONENT OF A FLUSH TOILET

Seat

It is where the user sits when using the toilet

Toilet bowl

It is where human wastes are deposited

What is the importance of water that remain inside the toilet bowl after flushing?

To prevent bad smell

Handle

It is pulled or pushed or pressed to flush the toilet

Toilet water tank (cistern)

To keep water for flushing the toilet

Why is the cistern (water tank) always raised up the bowl?

To increase water pressure when flushing the toilet

Refill pipe

To supply water to the water tank (cistern)

Upper pipe (water pipe)

To carry water from the tank to the bowl

Lid (seat cover)

To cover the seat and bowl when not in use

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Toilet bowl brush

For cleaning the toilet bowl

Sewage pipe (sewer)

To carry human wastes from to the septic tank

Septic tank (cesspit)

To store sewage (to store human wastes after flushing)

Why should a septic tank be cemented (made with concrete walls)?

To prevent contamination of ground water

To prevent drainage of sewage into the soil

Why should the septic tank not be put near a kitchen?

To prevent food contamination

Why should the septic tank be covered?

To prevent bad smell

To prevent exposure of human wastes to vectors

Roles of S-trap in the sewage pipe

To prevent bad smell

To prevent back flow of human wastes into the bowl

To trap objects that may block the flow of wastes through the pipes

CORRECT USE OF A FLUSH TOILET

Open the lid and sit on the seat

Pass wastes into the bowl

Clean yourself with toilet paper and dress up

Flush and cover the toilet bowl

Sewage

These are human wastes carried from toilets through sewers

CESSPOOL EMPTIER

This is a vehicle used to empty septic tanks and pit latrines

A diagram showing a cesspool emptier

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Importance of a cesspool emptier

To empty septic tanks and pit latrine

ADVANTAGES OF A WATERBORNE TOILET

It can be put inside the house

It can be used by young children

It is easy to clean

Why are waterborne toilets said to be user friendly?

They can be used by young children

DISADVANTAGES OF WATERBORNE TOILET

It is very expensive to construct

It needs piped water to use

It be blocked if hard objects are put in it

National water and sewerage corporation (NWSC)

It collects and treats sewage (it supplies sewerage services in towns)

It supplies treated piped water in urban areas

Ways of keeping a flush toilet clean (how to maintain flush toilets/urban toilet system)

Flush the toilet after use

To carry human wastes to the septic tank

Do not squat on the seat

To prevent making the seat dirty

To prevent injuries in case the seat breaks

Sweep the floor

Remove cobwebs from the walls

Dispose human wastes directly into the bowl

Mop the floor with long stick mop

Use a bowl brush to clean inside the toilet bowl

Use soapy water or detergents to clean the toilet

To kill germs

To prevent the bad smell

Do not use the toilet when it is blocked

To prevent spilling of human wastes

Repair any damage on the toilet equipment

Put disinfectants in the bowl

To kill germs

Put toilet papers in the toilet

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To prevent blocking the sewage pipe

Put a dustbin in the toilet

For proper disposal of hard materials like sanitary pads and hard papers

Do not use hard papers in a toilet

To prevent blocking the sewage pipe (sewer)

Why should we wear gloves when cleaning the latrine?

To protect our hands from germs

Problems faced by urban toilet system/flush toilets

Lack of water for flushing makes the toilet fail to work

Use of hard materials blocks the sewage pipes

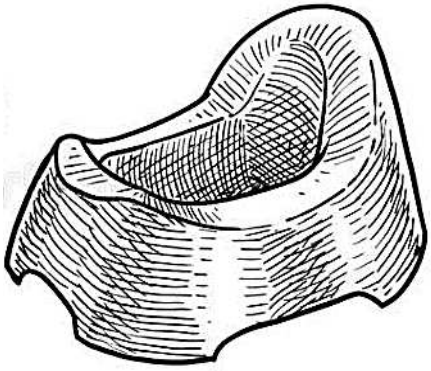
Blocking of sewage pipe spills human wastes that attracts vectors in the toilet

POTTY

This is a small portable latrine for small children

It is usually used by toddlers as they train them to use other latrines

A drawing showing a potty



Groups of people who use potties

Toddlers/Babies

Very sick people/invalids

Elderly

Why are potties not used by big children?

To prevent them from breaking the potties

State the importance of a potty at home

For proper disposal of human wastes by small children

It is where small children dispose their human wastes

Mention one disease that can make a toddler to be with a potty all the time

Diarrhoea

Why do crawling babies have a high risk of diarrhoea/food poisoning?

They eat contaminated food

GROWTH AND DEVELOPMENT

Growth

This is the increases in body size

It is a biological change

Growth is most rapid during infancy

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Development

This is the increase in maturity

Note:

Growth and development occur at the same time

Factors that affect growth and development

Hormones Genes Environment

PUBERTY

This is the period when a person becomes sexually mature

ADOLESCENCE

This is the transitional stage between childhood and adulthood

Adolescent

This is a person developing from childhood to adulthood

At what age does adolescence usually begin and end in boys and girls?

10 to 19 years (10 to 24 years)

Note:

Girls experience early menstruation than boys because they have more fat tissues than boys

STAGES OF ADOLESCENCE (CHANGES THAT OCCUR DURING ADOLESCENCE)

Primary sex characteristics (basic sex characteristics **or** puberty changes)

Secondary sex characteristics (physical sex characteristics)

Emotional (psychological sex characteristics)

Out of step adolescent changes

PRIMARY (BASIC) SEX CHARACTERISTICS/PUBERTY CHANGES

These are changes which prepare sex organs for reproduction

Primary sex organs in females are the **ovaries** while in males are the **testes**

Examples of primary (basic) sex characteristics

In boys

Penis enlarges (enlargement of the penis)

Wet dreams begin

Production of sperms

In girls

Menstruation begins

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Uterus develop (development of the uterus)

Ovulation begins

In both girls and boys

Production of gametes

Development of gonads

SECONDARY (PHYSICAL) SEX CHARACTERISTICS

These are changes on the body which distinguish a mature person from a young person

They give a person either male or female appearance

Oestrogen controls secondary sex characteristics in girls

Testosterone controls secondary sex characteristics in boys

Examples of secondary (physical) sex characteristics

In boys

Sweat glands become more active

Growth of pubic hair and armpit hair

Voice deepens

Growth of pimples

Body grows more muscular

In girls

Sweat glands become more active

Growth of pubic hair and armpit hair

Voice becomes soft and attractive

Breasts enlarge (breasts grow bigger)

Hips enlarge (widening of hips)

In both boys and girls

Sweat glands become more active

Growth of pubic hair and armpit hair

Change in voices

Growth of pimples

EMOTIONAL (PSYCHOLOGICAL) CHANGES OF ADOLESCENCE

These are changes which occur in minds of adolescents

Examples of emotional (psychological) changes in adolescents

They get sexual feelings (They become interested in members of opposite sex)

They want freedom

They reject rules of elders (they become disobedient)

They quickly react towards situation

They want to have their own identity

They want to be recognized as mature (they become ambitious)

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They quickly become angry (mood swings)

They spend much time in peer groups

What causes mood swings in adolescent boys and girls?

Changes in levels of sex hormone

OUT OF STEP ADOLESCENT CHANGES

These are changes which occur to different individuals of the same age group

Examples of out of step adolescent changes

Some boys and girls suddenly becomes taller than the agemates

Some boys and girls suddenly become fatter than the agemates

Some boys and girls grow pubic hair faster than the agemates

Some girls develop breasts faster than the agemates

Some girls undergo menstruation before their agemates

COMMON PROBLEMS OF ADOLESCENCE

It leads to antisocial behaviour

It leads to sexual conflicts

It results into body odours

It leads to conflicts with culture and religion

It increases the risks of unwanted pregnancies

It increases the risks of drug abuse

It leads to conflicts with elders

HOW TO HELP ADOLESCENTS (HOW TO OVERCOME THE CHALLENGES OF ADOLESCENCE)

Advise them to share their problems with elders

Advise them to join good social clubs

Advise them to have good role models

Teach them how to manage the body changes

Teach them the dangers of early sex

Regular counselling and guidance

REPRODUCTION IN ANIMALS

Reproduction is the process by which living things multiply in the environment

Reproduction is the process by which new organisms are produced from the parent organisms

It is a biological change

Importance of reproduction

It prevents extinction of living things

It promotes continuity of living things

It increases the population of living things

TYPES OF REPRODUCTION

Asexual reproduction

Sexual reproduction

ASEXUAL REPRODUCTION

This is the type of reproduction which does not involve the union of gametes

Examples/forms of asexual reproduction in animals

Binary fission

Budding

Fragmentation

Parthenogenesis

A table showing examples of animals that undergo asexual reproduction

FORMS OF ASEXUAL REPRODUCTION	ANIMALS
Budding	Coelenterates (Hydra, Corals, Jellyfish, Sea anemone)
Fragmentation	Starfish, Brittle star, Tapeworms, Blackworms, Hydra
Parthenogenesis	Some bees, Some ants, Some aphids, Some sharks

SEXUAL REPRODUCTION

This is the type of reproduction which involves the union of gametes

Gamete

This is a reproductive cell

Gonad

This is a sex organ that produces a gamete

A TABLE SHOWING GAMETES AND GONADS IN ANIMALS

Male gonad	Male gamete	Female gonad	Female gamete
Testes	Sperms	Ovary	Ova

Examples/forms of sexual reproduction

Giving birth to live young (calving, kidding, lambing, childbirth, kindling)

Laying eggs

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HERMAPHRODITE

This is an organism with both male and female sex organs

Examples of hermaphrodites

Snails	Slugs	Earthworms

FERTILISATION

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

The immediate result of fertilization is **a zygote**

TYPES OF FERTILIZATION

External fertilization Internal fertilization

EXTERNAL FERTILIZATION

This is the type of fertilization which occurs outside the body of the female

It takes place in water/moist areas/aquatic environment

Examples of animals which undergo external fertilisation

Tilapia	Shark	Salamander
Nile perch	Frog	Newt
Mudfish	Toad	

Groups of vertebrates that undergo external fertilization

Fish Amphibians

How are eggs of amphibians and fish fertilised?

They ate fertilized externally

Why does external fertilization usually occur in water?

Water facilitates the movement of sperms to the eggs

INTERNAL FERTILIZATION

This is the type of fertilization which occurs inside the body of the female

It takes place in the **oviducts (fallopian tubes)**

Examples of animals that undergo internal fertilization

Human being	Duck	Crocodile
Monkey	Eagle	Tortoise
Gorilla	Cobra	
Chicken	Chameleon	

Groups of vertebrates that undergo internal fertilization

Mammals	Birds	Reptiles

How are birds, mammals and reptiles fertilized?

They are fertilized internally

REPRODUCTION IN HUMANS

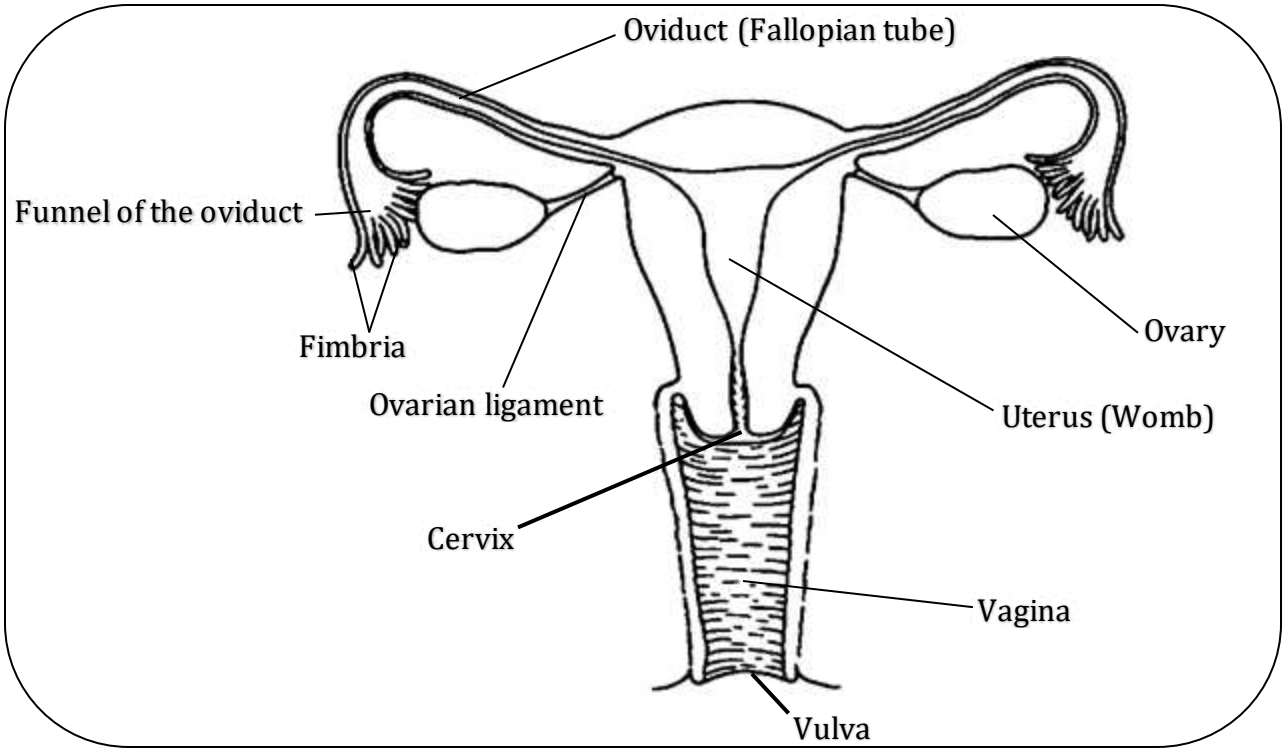
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Humans undergo sexual reproduction

They undergo internal fertilization

Fertilization in humans occurs in the **oviducts (fallopian tubes)**

A DIAGRAN SHOWING THE FEMALE REPRODUCTIVE SYSTEM



FUNCTIONS OF THE FEMALE REPRODUCTIVE ORGANS

OVARIES

These are the female gonads

A woman has two ovaries

Ovulation occurs in the ovaries

They produce ova/eggs (they produce female gametes)

They produces female sex hormones (oestrogen and progesterone)

Besides producing eggs and female hormones, give other two functions of ovaries

They release eggs for fertilization

They protect the eggs

Ova (eggs)

These are the female gametes (female reproductive cells)

An ovum (egg) unites with a sperm to form a zygote

Functions of oestrogen

It regulates secondary sex characteristics in girls

It regulates menstrual cycle

It regulates vaginal lubrication (regulates sexual desires)

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Functions of progesterone

It thickens the uterine walls for implantation

It maintains pregnancy

OVIDUCT (FALLOPIAN TUBE/UTERINE TUBES)

It is where fertilization takes place

It is the passage of the egg from the ovary to the uterus

It is where conception occurs

UTERUS (WOMB)

It is where the fetus grows from It is where implantation takes place

CERVIX

It closes the lower end of the uterus during pregnancy

It prevents the fetus from coming out before it is time.

URETHRA

It passes out urine from the Urinary bladder

VULVA

It is the outer part of the female reproductive system

VAGINA

It is where sperms are deposited

It is a birth canal

How is the vagina adapted to its function as a birth canal?

It has elastic muscular walls

How is mucus important in the vagina?

It lubricates the vagina

It keeps the vagina moist (prevents the vagina from drying up)

It provides acidic medium to prevent growth of bacteria and fungi

FIMBRIAE AND FUNNEL OF THE OVIDUCT

It directs the ovum (egg) into the oviduct

HYMEN

It is the skin around the vaginal opening

CLITORIS

It is the most sensitive part of the female reproductive organs

OUTER LIPS (LABIA MAJORA)

It is the skin that protects the delicate organs inside

URINARY BLADDER

It stores urine for a short time before urination

DISORDERS OF THE FEMALE REPRODUCTIVE SYSTEM

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Ectopic pregnancy
Female sterility (barrenness)
Fibroids
Ovarian tumour
Inflammation of oviducts
Vaginal fistula
Vaginitis (inflammation of vagina)

ECTOPIC PREGNANCY

This is the condition when a fertilized egg develops outside the womb (implants itself in the oviduct)

Causes of ectopic pregnancy

Inflammation of the oviduct
Cigarette smoking
Unsuccessful tubal ligation
Pelvic inflammatory disease

FEMALE STERILITY (BARRENNESS)

This is the condition when a woman fails to conceive

Causes of barrenness

Failure to ovulate
Blocked oviducts
Damaged uterus
Old age

FIBROIDS

These are swellings that develop on the uterine walls

OVARIAN TUMOUR

These are abnormal cells that grow on the ovaries

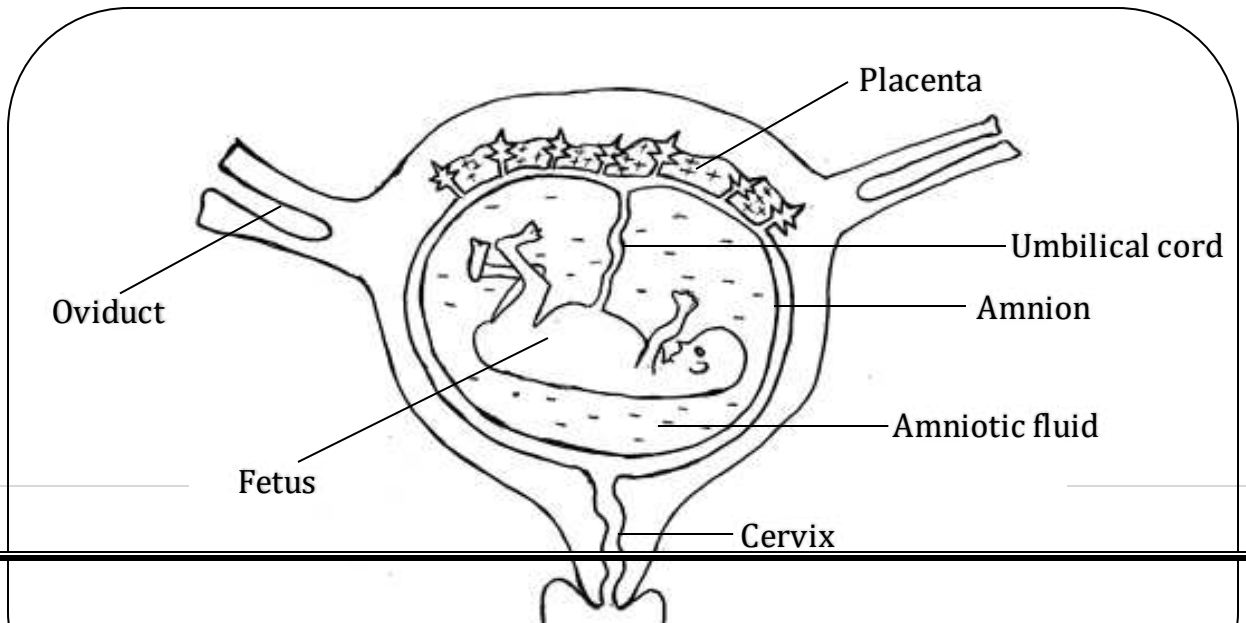
VAGINAL FISTULA

This is abnormal opening that connects the vagina with another organ (e.g urinary bladder, colon or rectum)

Causes of vaginal fistula

Injury during childbirth
Surgery of the vagina

THE HUMAN FETUS IN THE WOMB



PLACENTA

This is an organ that develops in the uterus/womb during pregnancy

It provides food and oxygen to the fetus

It removes waste products from the fetus (e.g carbon dioxide)

It prevents harmful substances from reaching the fetus

It prevents mixing of mother's blood and that of the fetus

Name any two harmful substances that can cross the placenta and harm the growing baby

Alcohol Nicotine

What process allows exchanges between the mother and fetus in the placenta?

Diffusion

UMBILICAL CORD

This is the tube that connects the fetus to the placenta

It carries food and oxygen from the placenta to the fetus

It carries waste products from the fetus to the placenta

How is the umbilical cord adapted to its functions?

It has the umbilical vein and arteries

How is the function of umbilical artery different from that of umbilical vein?

Umbilical vein carries oxygenated blood from the placenta to the fetus while umbilical artery carries deoxygenated blood from the fetus to the placenta

How is the umbilical artery similar pulmonary artery in terms of function?

Both carry deoxygenated blood

How is the umbilical vein similar pulmonary vein in terms of function?

Both carry oxygenated blood

AMNIOTIC SAC (AMNION)

It protects the fetus from injury

It keeps the amniotic fluid

AMNIOTIC FLUID

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It protects the fetus from injury

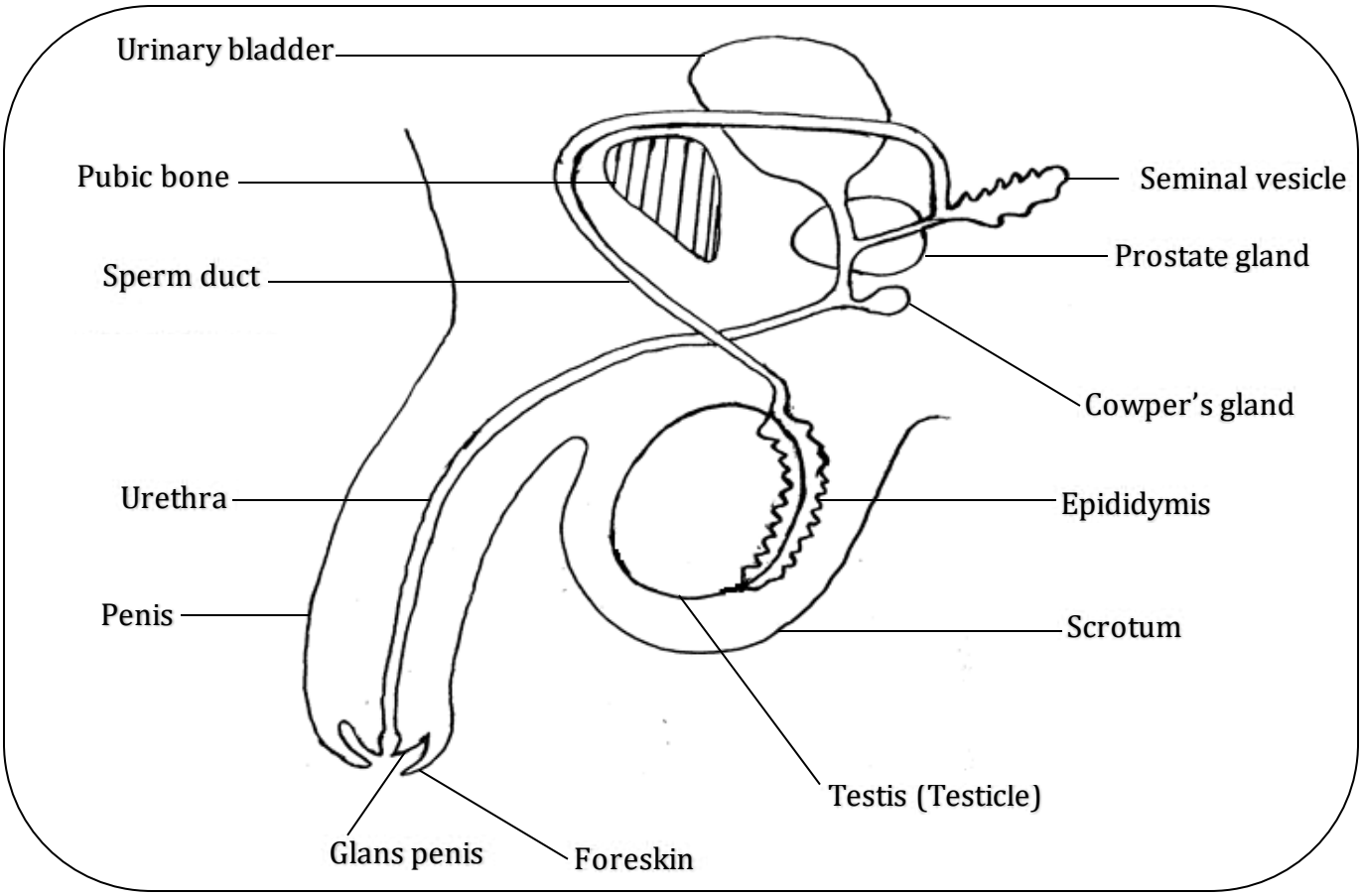
It prevents the fetus from drying up

It lubricates the fetus and prevents body parts from growing together

How does the amniotic fluid protect the fetus from physical damage?

By absorbing shock

THE STRUCTURE OF THE MALE REPRODUCTIVE ORGAN



FRONT VIEW OF THE MALE REPRODUCTIVE SYSTEM

Ureter

Prostate gland

Sperm duct (Vas deferns)

Urethra

Testis (Testicle)

Scrotum

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Examples of male reproductive organs found outside the body

Penis
Scrotum
Testes

Examples of male reproductive organs found inside the body

Epididymis
Seminal vesicles
Vas deferens (sperm duct)
Prostate gland
Urethra
Cowper's gland

FUNCTIONS OF THE MALE REPRODUCTIVE ORGANS

PENIS

It deposits sperms into the vagina

Ejaculation is the depositing of sperms into the vagina by an erect penis

The penis has an **erectile tissue** to erect the penis during sex

The most sensitive part at the tip of penis is called **glans penis**

Foreskin (prepuce)

It covers the glans (head of the penis)

TESTES (TESTICLES)

These are the male gonads

Most men have two testes

They produce the sperms (male gametes)

They produce testosterone (the main sex hormone in men)

Uses of testosterone

It controls secondary sex characteristics in boys

It controls sexual desires

SCROTUM

It protects the testes from harm.

It regulates temperature around the testes

How does the scrotum regulate temperature around the testes on the following days?

Cold days;

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It contracts for the testes to move up and get warmth from the body

On hot days;

It relaxes for the testes to move away from the body to cool the temperature

Why is the scrotum hanging between the legs?

To keep the testes at cooler temperature than the body temperature

EPIDIDYMIS

This is a long coiled tube on the backside of the testes

It stores sperms

It helps sperms to survive and mature

Why is the epididymis coiled?

To allow sperms time to mature

To delay release of sperms

SPERM DUCT (VAS DEFERENS)

It carries mature sperms to the urethra

URETHRA

It carries sperms to the vagina

SEMINAL VESICLE

It helps in producing semen which helps sperms to swim

It produces an alkaline fluid that neutralizes acids in urethra

It produces a fluid that provides energy to sperms

PROSTATE GLAND

It produces prostate fluid

Give two functions of prostate fluid

To nourish sperms

To neutralize acids in the vagina

COWPER'S GLAND

It produces Cowper's fluid

Cowper's fluid is produced before ejaculation

Give two functions of Cowper's fluid

To neutralize acids in the urethra

To lubricate the urethra

DISORDERS OF THE MALE REPRODUCTIVE SYSTEM

Impotence

Low sperm count

Enlargement/swelling of the prostate gland

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Epididymitis — Swelling of the scrotum/hydrocele

Orchitis

Impotence

This is the inability of the penis to erect

It is caused by obesity, diabetes or high blood pressure

Low sperm count

This is the inability of the testes to produce enough sperms

It is caused by drinking too much alcohol and tobacco smoking

Swelling of the prostate glands

It occurs in men older than 50 years

Epididymitis

This is the inflammation of the epididymis

It is caused by bacterial STIs (gonorrhoea or chlamydia)

Orchitis

This is the inflammation of the testes

It is caused by mumps or bacterial STIs (gonorrhoea or chlamydia)

Hydrocele

This is the accumulation of fluids in the scrotum

It can be caused by an injury on the testes

REPRODUCTIVE HEALTH

This is the state of physical, mental and social well-being of the reproductive system

Importance of reproductive health

It prevents the spread of STIs (sexually transmitted infections)

It helps a mother to deliver a healthy baby

It creates awareness about safe sexual practices

CARE FOR REPRODUCTIVE SYSTEM (HOW TO PROMOTE REPRODUCTIVE HEALTH)

Washing genital parts with clean water

Shaving the long pubic hair

Always put on clean dry underwear

Abstain from premarital sex

Avoid tight underwear

Never spray perfumes on genital parts

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Observe good hygiene during menstrual periods

Avoid sharing underwear and body towels

Avoid cleaning the vagina with long fingernails and soap

Always keep the flush toilets clean

FERTILIZATION IN HUMANS

Fertilization

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

It can follow sexual intercourse or artificial insemination

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

Its immediate result is the **zygote**

Conception

This is the formation of a zygote

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

Implantation

This is the attachment of a fertilized ovum onto the uterine wall

It occurs in the **uterus (womb)**

STAGES OF BABY DEVELOPMENT

Zygote Embryo Fetus

Zygote

This is a single cell formed after fertilization

It is the initial stage baby development

Embryo

This is the developing baby from two weeks after conception to eight weeks

Fetus

This is the developing baby from eight weeks after conception to birth

It is the final stage in baby development

GAMETES

These are reproductive cells

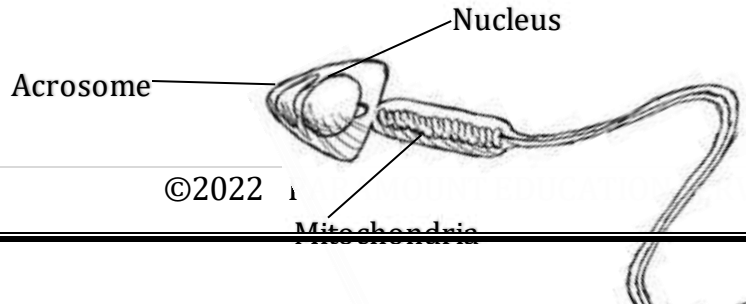
Examples of gametes in humans

Sperm cells Ova (eggs)

SPERM

This is a male gamete

The structure of a sperm cell



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FUNCTIONS OF EACH PART OF A SPERM CELL

Acrosome

It has digestive enzymes

Nucleus

It contains chromosomes

Mitochondria

To supply energy to the cell

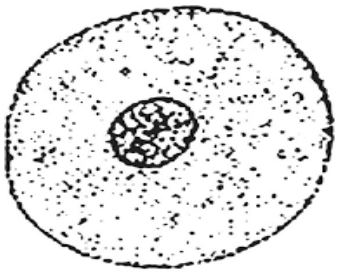
Flagellum (Tail)

For movement (for swimming)

OVUM

This is a female gamete

The structure of an ovum (human egg)



NOTE

An ovum spends 3 days moving from the oviduct to the uterus

A released mature ovum can survive for **24 hours**

Sperms can stay in the female's body for about **3 days**

OVULATION

This is the releasing of a mature ovum from the ovary

It occurs at about 14 days from the first day of the last menstrual cycle

An ovum is released every 4 weeks

MENSTRUATION

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This is the monthly flow of blood from the uterus through the vagina

It recurs at about a month (4 weeks)

The average length of menstrual cycle is 28 to 32 days

Normal menstruation takes **3 to 4 days.**

The first menstruation occurs at the onset of puberty

Importance of menstruation

It prepares the uterus for implantation

It prepares the body for pregnancy

Problems that may occur during menstruation

Painful menstrual periods

Heavy menstrual bleeding

No menstrual bleeding

Conditions that cause missing menstrual periods (conditions that interrupt menstruation)

Pregnancy or Conception or Fertilisation

Breastfeeding

Use of contraceptive (birth control) pills and injections

Stress

Menopause

Strong fever

Tobacco smoking

Menopause

This is the time when menstruation stops permanently

It generally occurs between the ages of 45 and 55

It is confirmed when a woman misses her periods for 12 months

Care during menstruation

Regular bathing

Use tampons (sanitary pads to absorb blood)

Visit health workers incase abnormalities are noted

PROCESSES INVOLVED IN DEVELOPMENT OF A BABY INSIDE THE WOMB

Fertilization	Zygote formation	Implantation	Childbirth

SEX DETERMINATION

The baby's sex is determined by **sex chromosomes in sperms**

Types of sex chromosomes

X chromosome

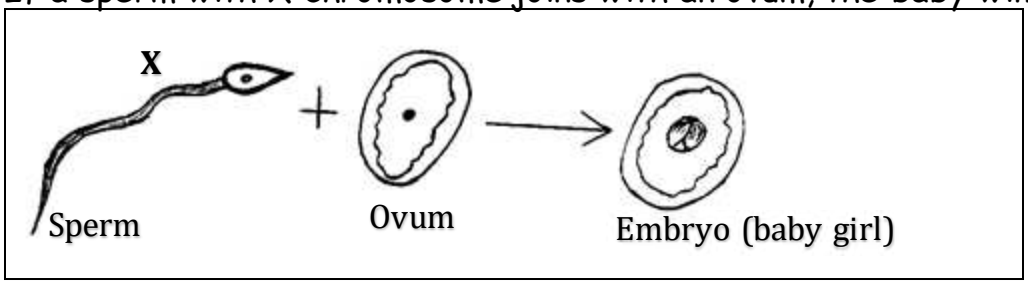
Y chromosome

All females have XX chromosomes

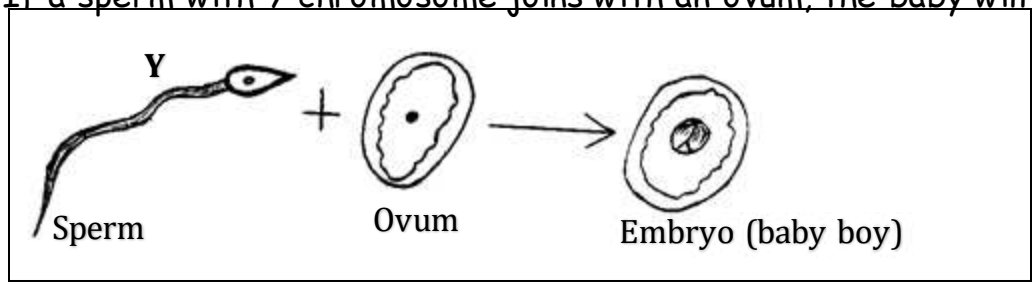
All males have XY chromosome.

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If a sperm with X chromosome joins with an ovum, the baby will be a girl



If a sperm with Y chromosome joins with an ovum, the baby will be a boy



PREGNANCY (GESTATION PERIOD IN HUMANS)

This is the time taken (period) from conception to birth

Pregnancy in humans lasts for **9 months**

Signs of pregnancy

Menstruation stops (missing the menstrual periods)

Breasts enlarge (grow bigger)

Frequent urination

Morning sickness

Belly enlarges

Danger signs of pregnancy

Swollen feet

Vaginal bleeding

Severe vomiting

Problems that may occur during pregnancy

Swollen feet

Vaginal bleeding

Severe vomiting

Severe tiredness

Severe headache

Severe abdominal pain

Severe anaemia

Constipation

Heartburn

Backache

Itchy breasts

Difficult in seeing

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Of what importance is the pregnancy test kit?

For detecting pregnancy

Why do women prefer blood pregnancy tests to urine pregnancy tests?

Blood tests detect pregnancy earlier than urine tests.

Why do pregnant women sometimes lick anthill soil?

Due to lack of iron (due to iron deficiency)

REQUIREMENTS OF PREGNANT WOMAN (EXPECTANT MOTHER)

Balanced diet (proper feeding)
Antenatal care (prenatal care)
Enough rest and sleep
Appropriate clothing
Regular body exercises
Good personal hygiene

WAYS OF CARING FOR A PREGNANT WOMAN

Feeding her on a balanced diet
Taking her for antenatal care
Encouraging her to do body exercises
Helping her to do heavy work

FOOD FOR PREGNANT WOMEN

FOOD	FUNCTION
Proteins	To build up body tissues of the fetus To repair worn out body tissues of the mother
Carbohydrates	To provide energy to the mother's body
Vitamins	To keep their body healthy To boost the mother's immunity
Roughage	To prevent constipation
Iron	To form blood To prevent anaemia
Calcium	To strengthen bones

ANTENATAL CARE (PRE-NATAL CARE)

This is the treatment and education given to a pregnant woman at health centre

Ante means **before**

Natal means **birth**

Antenatal visit (prenatal visit)

This is a visit made by a pregnant woman to the health centre

Services provided during antenatal visits (examples of antenatal care)

Immunizing pregnant women with TT vaccine

Monitoring the foetal growth and position in the womb

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Teaching pregnant women how to prepare for delivery (childbirth)
Teaching pregnant women how to keep themselves clean
Teaching pregnant women how to care for a newborn baby
Treating some STIs when detected

Why are pregnant women immunized with TT vaccine (Tetanus Toxoid vaccine)?

To protect the mother and her baby against tetanus during birth

POSTNATAL CARE (PNC)

This is care given to the mother and her newborn baby up to six weeks after birth

Postnatal visit

This is any visit made by a mother with her newborn baby to a clinic up to six weeks after birth

Services provided during postnatal visits (examples of post natal care)

Immunizing the baby
Checking the mother's recovery after birth
Reminding the mother to keep the baby warm

RESPONSIBILITIES OF FAMILY MEMBERS TO A PREGNANT MOTHER

Giving her medical care
Feeding her on a balanced diet
Advising her to do body exercises
Advising her to wear maternity clothes
Helping her to do heavy work
Giving her encouragement

WAYS OF PREPARING FOR CHILD BIRTH

Buying new clothing
Buying new beddings
Buying mama kit
Saving money for emergency/transport

NEEDS FOR THE PREGNANT WOMAN DURING DELIVERY

Mama kit
Cotton cloth
Money for transport (emergency)
Soap
Basin
Food and water
Baby clothing
Clean towel

MAMA KIT

This is a set of things needed by a pregnant woman for clean and safe delivery

Examples of mama kit (Things needed by a mother for clean and safe delivery)

Cotton wool
Soap
Surgical gloves
Razor blade

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- Disinfectant
- Plastic sheet (mackintosh)
- Cord ligature
- Sanitary pads

TEENAGE PREGNANCY

This is the pregnancy got by a girl aged between 13 and 19 years

This is the pregnancy in girls under the age of 20

It is also called **adolescent pregnancy**

Who is a teenager?

This is a person aged between 13 and 19 years

Causes of teenage pregnancy (adolescent pregnancy)

- Peer pressure
- Rape
- Premarital sex
- Drug abuse
- Lack of parental care
- Forced marriage
- Desire for luxury goods (greed for money)
- Poverty at home
- Unfulfilled promises by parents
- Lack of sex education

Effects (outcomes or consequences) of teenage pregnancy

- Dropping out from school (loss of school education)
- Rejection by parents
- Lack of financial support
- Obstructed labour

Due to contracted/small pelvis

- Difficulty in delivery

Due to contracted/small pelvis

- Attempt to have abortion
- Isolation by friends

Prevention of teenage pregnancy

- Avoid premarital sex
- Avoid bad peer groups
- Seek advice from elders
- Avoid gifts for sex
- Avoid bad touches
- Attend sex education

YOUNG PARENTS

These are young girls and boys who give birth before the age of consent.

Young mother

This is the girl who gives birth before the age of consent

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Young father

This is a boy who gives birth before the age of consent

Problems faced by young parents

Lack of skills to manage the family
Lack of financial support
Isolation by friends
Dropping out from schools
Ignorance about caring for the baby
Risks of abortion
Risks of getting STDs
Obstructed labour

CHILDBIRTH AND LABOUR

CHILDBIRTH

This is the act of producing a baby in human beings

Methods of childbirth (delivery)

Vaginal delivery
Cesarean delivery

LABOUR

This is the process by which the fetus and placenta leave the uterus

What is the normal birth weight?

Between 2.5 kg and 4 kg

What is the average birth weight?

3.5 kg

Name the hormone which facilitates labour and childbirth

Oxytocin

Why does a baby cry directly after birth?

Due to cold air and the new environment

Why is it importance for a baby to cry after birth?

It cleans and opens the breathing system

Why are babies sometimes held upside down by the legs after birth?

To induce cry which cleans and opens the breathing system

MULTIPLE BIRTHS

This is when a mother delivers two or more babies in a single birth

Forms (examples) of human multiple births

Twins
Triplets
Quadruplets
Quintuplets
Sextuplets

TWINS

These are two babies born by the a mother in a single birth

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It is the most common form of human multiple births

TYPES OF TWINS

Identical twins/monozygotic twins

Fraternal twins/dizygotic twins

Siamese twins/conjoined twins

IDENTICAL TWINS

These occur when a fertilized egg splits and develops into two babies

Features (characteristics) of identical twins

The babies share the same placenta

The babies look very alike

The babies are the same sex

The babies share the same DNA

FRATERNAL TWINS (DIZYGOTIC TWINS)

These occur when two eggs are fertilized by two separate sperms.

Features of fraternal twins

Each baby has its own placenta

The babies can be the same sex or different sexes

SIAMESE TWINS

These occur when a fertilised egg partially divides into two babies

Most siamese twins are still births or die shortly after birth

Features of siamese twins

The babies are born physically connected to each other

The babies may share some organs

Factors that increase the chances of having twins

Use of fertility drugs

Heredity

High number of previous pregnancies

Old age of the mother

Problems faced by families with many children

Poor feeding (lack of balanced diet)

Lack of parental care towards children

Poor education for children

Lack of proper medical care

Lack of clothes for children

Reasons why some families have many children (causes of frequent births)

Desire for a certain sex of a child

To provide labour in the family

Ignorance about family planning methods

For prestige

For security

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High death rate of infants (high infant mortality rate)

Problems faced by the mother due to frequent births

Maternal anaemia
Miscarriage
Premature births
Underweight babies
Rapture of the uterus during birth

INFANT MORTALITY

This is the death of a child under one year of age

Causes of high infant mortality rate

Childhood immunisable diseases
Malnutrition
Malaria
Birth defects
Premature births

Ways of reducing infant mortality rate

Immunize infants
Get antenatal and postnatal care
Practise family planning
Provide ORS to prevent dehydration in infants
Practise exclusive breastfeeding
Participate in health education

CHILD SPACING

This is the giving of enough time between the births of children in a family.

Advantages of child spacing

It helps a child to get enough parental care and love
It enables the child to get enough basic needs
It allows the mother's uterus to rest and recover after birth
It helps the mother to keep healthy

FAMILY PLANNING

This is the use of birth control methods to decide when to have or not to have a child in a family

It depends on birth control (contraceptive) methods

Birth control (contraception)

This is the way of preventing pregnancy or conception

ADVANTAGES OF FAMILY PLANNING (REASONS WHY PEOPLE PRACTISE FAMILY PLANNING)

To the family

It enables a family to have a limited number of children
It promotes saving in the family

It promotes child spacing

To the mother

It prevents frequent births It reduces risks of maternal death

It allows the mother's uterus to rest and recover after birth

It reduces the risks of miscarriages and abortion

To the baby/child

It enables the child to get enough parental care and love

It enables the child to get enough basic needs

To the country

It controls rapid population growth

CHALLENGES FACED BY FAMILY PLANNING IN UGANDA

Poverty

Myths and misconceptions about family planning

Ignorance about family planning methods

Religious teachings against family planning

Write "FPAU" in full

Family Planning Association of Uganda

Functions of FPAU

It educates people about family planning

It distributes contraceptives/birth control devices

It performs legal abortions at free of charge (incase a woman has Rubella)

FAMILY PLANNING METHODS (METHODS OF BIRTH CONTROL)

Natural Methods

Artificial methods

NATURAL BIRTH CONTROL METHODS (NATURAL METHODS OF FAMILY PLANNING)

Withdrawal method (coitus interrupts)

Exclusive (prolonged) breast feeding/Lactational Amenorrhoea Method(LAM)

Rhythm method (calendar method) } Periodic abstinence methods

Cervical mucus method

Basal body temperature method

Advantages of natural family planning methods

They are cheap to use They have no side effects

Disadvantages of natural family planning methods

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They are unreliable (they are less effective)

They need complete cooperation of the husband and wife

They are difficult for women with irregular menstrual cycle

Only skilled women can use some of the natural methods

How does breastfeeding prevent pregnancy?

By delaying ovulation

Rhythm method (calendar method)

This is the use of ovulation calendar to predict the fertile days of a woman

Ovulation occurs at about 14 days from the first day of the last menstrual cycle

A diagram showing ovulation calendar



Of what importance is an ovulation calendar to a married woman?

It helps a woman to predict her fertile days

ARTIFICIAL BIRTH CONTROL METHODS (ARTIFICIAL METHODS OF FAMILY PLANNING)

ARTIFICIAL BIRTH CONTROL METHODS	HOW IT PREVENTS PREGNANCY
Use of condom (male and female condoms)	It traps sperms from reaching the vagina
Use of birth control/contraceptive pills	They prevent ovulation
Use of birth control/contraceptive injections	
Use of IUD or **IUCD** or **loop** or **coil** IUDs are often T-shaped	It prevents implantation It prevents fertilization
Use of diaphragm	It prevents sperms from entering the uterus

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Use of cervical cap	It prevents sperms from entering the uterus
Use of implant	It produces a hormone which prevents sperms from reaching the egg
Use of spermicides (foams, gels and creams)	They kill sperms
Use of vaginal ring	It produces hormones which prevents ovulation It thickens cervical mucus to prevent sperms from reaching an egg
Permanent birth control methods	
Vasectomy This is when the sperm ducts are cut and tied	It blocks the passage of sperms through the sperm ducts
Tubal ligation This is when the oviducts are cut and tied	It blocks the passage of sperms and eggs through the oviducts

Which artificial family planning method prevents both pregnancy and STDs when used correctly?

Use of condoms

Why should the male and female condoms not be used at the same time?

They can break due to friction

ADVANTAGES OF ARTIFICIAL FAMILY PLANNING METHODS

They are very effective
They are easy to use
They are commonly available

DISADVANTAGES OF ARTIFICIAL PLANNING METHODS

They have side effects e.g amenorrhoea (absence of periods)
They are expensive to use
Some of them need supervision of health worker
Permanent birth control methods are irreversible (cannot be reversed)
Permanent birth control methods are painful

DIAGRAMS SHOWING TUBAL LIGATION AND VESECTOMY

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How do the above methods prevent pregnancy?

Vasectomy

It blocks the sperm ducts and keeps sperms out of semen

Tubal ligation

It prevents the egg from traveling through the oviducts to reach the sperm

It prevents sperms from traveling up the oviducts to reach the egg

EXAMPLES OF CONTRACEPTIVE/BIRTH CONTROL DEVICES

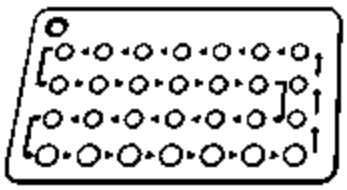
Condom Implant

Contraceptive injection (birth control injection)

Intrauterine device (IUD)/Intra uterine contraceptive device (IUCD)

Contraceptive pill (birth control pill)

Diagrams showing contraceptive devices

Male condom	**Female condom**	**Birth control pills**
		
Vaginal ring	**Diaphragm**	**Cervical cap**
	 Diaphragm	 Cervical cap
Birth control injections	**Intrauterine device (IUD)**	**Spermicides**



State the importance of Emergency contraception pill

It is used to prevent pregnancy after sex

Factors that can lead to use of Emergency contraception pill

Playing sex without any contraception

Breaking of the condom when playing sex

MYTHS AND MISCONCEPTION ON CONTRACEPTIVES AND FAMILY PLANNING

Misconception is a wrong idea

Myth is a commonly held false belief

MYTH: Birth control is 100% effective

Fact: IUDs are the most effective with 99.8%

MYTH: A woman cannot get pregnant when breastfeeding

Fact: Breastfeeding is between 75% - 88% effective and so you can get pregnant

MYTH: Birth control pills increase the risk of cancer

Fact: They reduce the risk of ovarian cancer

MYTH: Birth control pills cause infertility

Fact: They don't cause infertility but preserve fertility by preventing PID

MYTH: Emergency contraception pill is the same as abortion pill

Fact: It only stops pregnancy before it starts but cannot end pregnancy which has already started

MYTH: A male condom can get lost in the vagina or uterus and move through a woman's body

Fact: If a condom slips, it will go no further than the vagina and is easily removed without surgery

MYTH: Condoms are not effective in preventing pregnancy and STIs

Fact: They prevent pregnancy and STIs when used correctly

MYTH: Vasectomy makes a person impotent
Fact: It does not affect your ability to erect

MYTH: IUDs prevent pregnancy by causing abortions.
Fact: They work by preventing fertilization

MYTH: A woman cannot get pregnant if she doesn't have orgasm
Fact: Ovulation occurs whether a woman has orgasm or not and so she can get pregnant

MYTH: A woman cannot get pregnant if she plays sex during her periods
Fact: Ovulation can occur earlier than expected and fertilization takes place

MYTH: A woman cannot become pregnant on her first time to have sex
Fact: A woman can get pregnant any time ovulation occurs

MYTH: A woman cannot get pregnant if she douches/bathes/urinates after sex
Fact: Urinating/bathing/douching does not stop sperms that have already entered the uterus

MYTH: A woman cannot get pregnant if she plays sex while standing up or when she is on top
Fact: Positions during sex don't affect fertilization and so she can get pregnant

MYTH: Birth control pills make women to grow beards
Fact: Women grow beards due to high levels of androgen

MYTH: All contraceptive methods are appropriate for all women
Fact: Some factors must be considered to choose an appropriate contraceptive method

SEXUALLY TRANSMITTED DISEASES (STDs)/SEXUALLY TRANSMITTED INFECTIONS (STIs)/VENEREAL DISEASES (VDs)

These are diseases/infections that spread through playing unprotected sex with an infected person

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Examples of STDs/STIs/VDs (DISEASES THAT AFFECT THE REPRODUCTIVE ORGANS)

Bacterial STDs	**Viral STDs**
Gonorrhoea	AIDS
Syphilis	Cervical cancer
Chancroid	Genital warts
Chlamydia	Genital herpes
Lymphogranuloma venereum (LGV)	Hepatitis B
Fungal STD	**Protozoan STD**
Candidiasis	Trichomoniasis

INCUBATION PERIOD OF A DISEASE

This is the time taken from exposure to germs until the first signs and symptoms appear

GONORRHOEA

It is caused by the bacterium called **Neisseria gonorrhoeae**

It mainly affects the **urethra**

Its incubation period is **1 to 14 days**

Most men become symptomatic within **2 to 5 days** after exposure

Most women are asymptomatic (have no symptoms)

How does gonorrhoea spread?

Through playing unprotected sex intercourse with an infected person

From the infected mother to the baby during childbirth

SIGNS AND SYMPTOMS OF GONORRHOEA

Signs in men

Pus-like discharge from the penis

Swollen foreskin

Swollen testicles

Symptoms in men

Painful urination

Pain in the testicle

Signs in women

Pus-like discharge from the vagina

Vaginal bleeding between periods

Symptoms in women

Painful urination

Abdominal pain

Effects/dangers of untreated gonorrhoea

It leads to infertility

It causes PID (pelvic inflammatory disease)

It causes blindness in newborn babies

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How does untreated gonorrhoea cause sterility in males and females?

Males: It blocks the epididymis

Females: It blocks the oviducts

Prevention and control of gonorrhea

Abstain from sex

Be faithful to your sexual partner

Condoms use when playing sex

Early treatment of infected ones

Why should a husband and his wife go together for treatment when gonorrhoea is detected?

To prevent re-infection

SYPHILIS

It is caused by the bacterium called **Treponema pallidum**

Its incubation period is **14 to 21 days** after exposure

How does syphilis spread?

Through playing unprotected sex with an infected person

Through infected blood transfusion

From the infected mother to her unborn baby

SIGNS AND SYMPTOMS OF SYPHILIS AT VARIOUS STAGES

Primary stage

Chancre on the penis, vagina, or mouth

Chancre is a painless sore formed during the primary stage of syphilis

Secondary stage

Sore throat

Swollen lymph nodes

Skin rash on palm of hands and soles of feet

Patchy hair loss

Latent stage

Syphilis remains active but with no signs and symptoms

It can only be detected with a blood test

If syphilis is untreated at this stage, a person continues to have it for years

Tertiary stage

It occurs when a person spends 10 to 30 years with untreated syphilis

It starts to affect the internal organs

Brain damage

Deafness

Numbness

Heart diseases

Stroke

Effects of untreated syphilis

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It leads to madness/insanity
It leads to heart diseases
It leads to deafness
It leads to stillbirths
It causes paralysis
It leads to loss of body feeling

Prevention and control of syphilis

Abstain from sex
Condoms use when playing sex
Be faithful to your sexual partner
Early treatment of infected ones

CHLAMYDIA

It is caused by a bacterium called **Chlamydia trachomatis**
Its incubation period is **7 to 21 days** after exposure

How does chlamydia spread?

Through playing unprotected sex intercourse with an infected person
From the infected mother to the baby during childbirth

Signs of chlamydia

Discharge from vagina or penis
Vaginal bleeding between periods
Swollen testicles

Symptom of chlamydia

Painful urination
Painful sex
Pain in the testicles

Effects/dangers of untreated chlamydia

It leads to infertility
It increases the risks of ectopic pregnancy
It causes blindness in newborn babies

Prevention and control of chlamydia

Abstain from sex
Condoms use when playing sex
Be faithful to your sexual partner
Early treatment of infected ones

CHANCROID

It is caused by bacteria
Its incubation period is **3 to 7 days** after exposure

How does chancroid spread?

Through playing unprotected sex intercourse with an infected person
Through contact with pus from the genital ulcer of an infected person

Signs of chancroid

Genital ulcer (bubo)
Swollen lymph nodes

Symptoms of chancroid

Painful genital ulcer
Painful sex
Painful lymph nodes

Effects of untreated chancroid

It leads to nonhealing genital ulcer
It causes permanent scars on the genitals

Prevention and control of chancroid

Abstain from sex
Condoms use when playing sex
Be faithful to your sexual partner
Early treatment of infected ones

TRICHOMONIASIS (TRICH)

It is caused by protozoan parasite called **Trichomonas vaginalis**
Its incubation period is **5 to 28 days** after exposure

How does trichomoniasis spread?

Through playing unprotected sex intercourse with an infected person

Signs of trichomoniasis

Vaginal discharge with fishy smell
Redness of the genitals
Discharge from penis

Symptoms of trichomoniasis

Itching in the vagina or penis
Painful urination
Abdominal pain
Painful sex

Effect of untreated trichomoniasis

It increases the risks of getting HIV

Prevention and control of trichomoniasis

Abstain from sex
Condoms use when playing sex
Be faithful to your sexual partner
Early treatment of infected ones

HEPATITIS B

It is caused by a virus called **hepatitis B virus (HBV)**
Its incubation period is **75 days** on average
It affects the liver

How does hepatitis B spread?

Through playing unprotected sex with infected person
Through sharing contaminated needles with an infected person
Through body contact with infected body fluids
From the mother to her baby during birth

Signs of hepatitis B

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Dark urine
Vomiting
Jaundice (the skin and white of the eye turn yellow)

Prevention and control of hepatitis B

Immunize with Hep B vaccine
Use condoms during sex
Never share needles with an infected person
Use latex gloves during fisting or fingering

CERVICAL CANCER

It is caused by a virus called **human papillomavirus (HPV)**
It attacks the cervix
Its incubation period is **15 to 20 years** after exposure

How does cervical cancer?

Through playing unprotected sex intercourse with an infected person

Signs of cervical cancer

Smelly vaginal discharge
Frequent urination
Bleeding between periods

Symptom of cervical cancer

Painful urination
Pain in the pelvis

Effects of untreated genital warts

It increases the risk of getting HIV
It causes abnormal urine flow in men

Why do health workers carry out "Pap smear" test?

To diagnose cervical cancer

Prevention and control of cervical cancer

Immunize girls with HPV vaccine
Condoms use when playing sex
Abstain from sex
Through surgery
Be faithful to your sexual partner
Through radiation therapy

GENITAL WARTS

It is caused by a virus called **human papillomavirus (HPV)**
Its incubation period is **2 to 3 months** after exposure

How does genital warts spread?

Through playing unprotected sex intercourse with an infected person
Through direct skin to skin contact (handshakes or hugs) with an infected person

Signs of genital warts

Bumps around the penis or vagina
Bleeding from the penis or vagina

Symptom of genital warts

Itching of the vagina or penis
Itchy anus

Effects of untreated genital warts

It increases the risk of getting HIV
It causes abnormal urine flow in men

Prevention and control of genital warts

Abstain from sex
Early treatment of infected ones
Be faithful to your sexual partner
Immunisation with HPV vaccine
Condoms use when playing sex

GENITAL HERPES

It is caused by a virus called **herpes simplex virus (HSV)**
Its incubation period is **2 to 12 days** after exposure
Genital herpes **has no cure**

How does genital warts spread?

Through playing unprotected sex intercourse with an infected person
Through direct skin to skin contact with an infected person

Signs of genital herpes

Sores on the penis or vagina

Symptom of genital herpes

Itching of the penis or vagina
Painful urination

Prevention and control of genital herpes

Abstain from sex
Be faithful to your sexual partner
Do not play sex during herpes outbreak, even with a condom. Some sores may not be covered by the condom

CANDIDIASIS

It is caused by a yeast/fungus called **Candida**
Its incubation period is **2 to 5 days** after exposure

How does candidiasis spread?

Through playing unprotected sex with an infected person
When we fail to clean our genitals after playing sex

Signs of candidiasis

Swelling of the penis or vagina
Sores on the penis or vagina
A thick white vaginal discharge

Symptoms of candidiasis

- Itching of penis or vagina
- Painful sex
- Painful urination

Prevention and control of candidiasis

- Abstain from sex
- Observe proper personal hygiene
- Be faithful to your sexual partner
- Don't douche
- Avoid extra marital sex
- Avoid tight underwear
- Keep the vagina clean and dry
- Wash the vagina with lemon leaves put in warm water
- Wipe from front to back after using a toilet
- Avoid sharing underwear with an infected person

Mention the two STIs prevented by HPV vaccine

- Cervical cancer
- Genital warts

Mention the two STIs that can cause infertility if untreated

- Gonorrhoea
- Chlamydia

Mention the two STIs that can cause blindness in newborn babies

- Gonorrhoea
- Chlamydia

AIDS

- It is caused by a virus called **human immunodeficiency virus (HIV)**
- HIV affects the circulatory system, mainly the white blood cells
- HIV can only survive in the human body
- The incubation period of HIV is **1 to 4 weeks**

Write AIDS in full

- Acquired Immune Deficiency Syndrome

Give the meaning of each word in the full form of AIDS

- **Acquired:** got from (A person gets infected with it)
- **Immune Deficiency**: lack/weakness of immune system
- **Syndrome**: group/collection of signs and symptoms

OR

- **Acquired:** Got from
- **Immune**: Protected against
- **Deficiency**: Lack of
- **Syndrome**: group of signs and symptoms

Why can't HIV (AIDS virus) spread through mosquito bites?

- HIV is destroyed in the digestive system of a mosquito

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HIV is destroyed by the enzymes in the digestive system of a mosquito

Mode of transmission of HIV (how does AIDS spread?)

Through playing unprotected sex with an infected person

Through sharing sharp objects (e.g needles) with an infected person

Through infected blood transfusion

From an infected mother to the baby during birth or breastfeeding

Through artificial insemination with semen from infected person

Through a donated body organ from an infected donor

HIV STATUS

A persons HIV status can either be **negative** or **positive**

Antibody tests detect HIV in 3 months while rapid HIV tests detect HIV in about 20 minutes

HIV negative

This means that a person does not have HIV

HIV positive

This means that a person has HIV

How long does it take for most HIV tests to detect HIV?

3 months (90 days) after exposure

How does AIDS differ from HIV?

AIDS is a disease while HIV is a germ

What is the difference between HIV positive person and HIV negative person?

HIV positive person has HIV while HIV negative person does not have HIV

What is the difference between HIV positive person and AIDS patient?

HIV positive person has not yet developed signs and symptoms while AIDS patient has signs and symptoms

Note

Both AIDS patients and HIV positive persons can spread HIV

Why do people go for HIV test before marriage?

To know their HIV status

To prevent the spread of AIDS

To prevent marriage in case one person is HIV positive

What does a red ribbon symbol mean about HIV/AIDS?

For awareness and support to people living with HIV/AIDS (For the solidarity of people living with HIV/AIDS)

CONCORDANT COUPLE

This is when both partners are HIV infected

DISCORDANT COUPLE

This is when one partner is HIV infected and the other is not

How to prevent HIV transmission within a discordant couple

Use condoms during sex

HIV negative partner should use PrEP

HIV positive partner must take ARVs daily

BODY FLUIDS IN WHICH HIV CAN SPREAD

Blood
Semen
Vaginal fluids
Breast milk

BODY FLUIDS IN WHICH HIV CANNOT SPREAD

Tears
Saliva
Urine
Sweat

SOCIAL PRACTICES THROUGH WHICH AIDS VIRUS (HIV) CANNOT SPREAD

Hugging AIDS patient
Shaking hands with AIDS patient
Sharing latrines with AIDS patient
Sharing utensils with AIDS patient
Sharing bedding with AIDS patient
Touching AIDS patient
Sitting close to AIDS patients
Washing clothes of AIDS patient
Normal kissing AIDS patient

Why can't HIV/AIDS spread through the practices mentioned above?

There is no mixing of blood

Practices that lead to easy spread of AIDS (habits that increase risks of HIV transmission)

Sharing wives

Inheriting widows

Unscreened/Infected blood transfusion

Massive circumcision with one knife

Tribal tattooing

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Blood pacts
Polygamy
Prostitution
Extra marital sex
Premarital sex
Unprotected casual sex
Tribal tooth extraction
Communal jigger extraction
Ear and nose piercing

SIGNS AND SYMPTOMS OF AIDS

Signs of AIDS

Skin rash/herpes zoster
Rapid weight loss
Severe night sweats
Oral thrush (white coating in mouth)
Chronic dry cough
Chronic diarrhoea
Sores on the mouth

Symptoms of AIDS

General body weakness (tiredness)
Chronic fever
Loss of appetite

CONDITIONS MISTAKEN FOR AIDS

Alcoholism
Malnutrition

DISEASES MISTAKEN FOR AIDS

Tuberculosis
Typhoid
Measles
Skin cancer

EFFECTS OF HIV/AIDS TO;

An Individual

It leads to loss of immunity
It leads to loss of jobs (income)
It leads to much worry
It leads to death
It leads to restricted movement to some countries

Family

It leads to poverty in a family
It leads to divorce
It reduces family labour force
It increases orphans
It leads to stigma towards family members

Community

It leads to loss of important people
It leads to labour force

It increases child headed families It reduces the population

PREVENTION AND CONTROL OF HIV/AIDS

Abstain from sex

Avoid sharing sharp objects with an infected person

Be faithful to your sexual partner

Use condoms during sex

Taking PrEP or PEP to prevent getting HIV

AIDS patients should take ARVs

HIV positive women should not breastfeed

Only screened blood should be used for transfusion

HIV positive person should not donate blood

Sterilize sharp medical instruments before use

Consider male circumcision to reduce the risk of getting HIV

Mention two medicines given to HIV negative people to prevent getting HIV

PrEP (pre-exposure prophylaxis)

PEP (post-exposure prophylaxis)

PrEP is recommended for people with a high risk of getting HIV before exposure

PEP is recommended within 72 hours after exposure

Factors that can make a person take PEP pills

Breaking of condom when playing sex with untrusted partner

After unprotected sex among discordant couple

Rape

Why are HIV negative people sometimes given PrEP or PEP?

To prevent getting HIV

Write the following abbreviations in full

EMTCT: Elimination of mother to Child Transmission

PMTCT: Prevention of mother to Child Transmission

ARVs: antiretrovirals

ART: antiretroviral therapy

VHT: Village Health Team

VCT: Voluntary Counselling and Testing

HCT: HIV Counselling and Testing

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Why are AIDS patients advised to take ARVs?

To reduce the risks of HIV transmission(to prevent them from spreading AIDS)

To enable them live longer

How to prevent mother to child transmission of HIV

Infected women should take ARVs during pregnancy

Infected women should give birth from hospitals

Infected women should practise bottle feeding

Importance of EMTCT and PMTCT program

It prevents the infected mother from transmitting HIV to her babies

EMTCT also prevents the transmission of syphilis from infected mother to the baby

GROUPS OF PEOPLE WITH A HIGH RISK OF GETTING HIV/AIDS

GROUP OF PEOPLE	REASON
Commercial sex workers (prostitutes)	They have many sexual partners They use sex to get money They are unable to have regular condom use
Barmaids	They can be forced into sex by drunkards They use sex to get money
Long distance truck drivers	They play casual sex to overcome lust They get female company to reduce stress while travelling
Health workers who care for AIDS patients	They can be stuck with contaminated needles
Alcoholics	They have unplanned and unprotected sex
Injection drug users	They share contaminated needles
Adolescent girls	They are sexually attractive They are vulnerable to rape They have peer groups

Why are the groups of people mentioned above recommended to take PrEP?

To prevent them from getting AIDS

REASON WHY THERE ARE MORE WOMEN WITH HIV THAN MEN

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They are sexually more attractive than men

They are more vulnerable to rape than men

They have more greed for material things (money) than men

Their vagina is large and more vulnerable to sexual secretions than the hard skinned penis

WAYS OF CARING FOR AIDS PATIENTS

Advising them to take ARVs

Feeding them on a balanced diet

Advising them to promote personal hygiene

Counselling them

Giving them company

HIV COUNSELLING

This is the advice given to a person before or after HIV test by a trained person

Groups of trained people who provide HIV counselling

Teachers

Health workers

Community leaders

Religious leaders

Types of HIV counselling

Pre-test HIV counselling

Post-test HIV counselling

Importance of HIV counselling (importance of counselling AIDS patients)

It prevents suicide

It enables a person to overcome fear

It enables a person to live longer and useful with HIV

It enables a person to prevent spreading HIV/AIDS to others

ORGANIZATIONS IN UGANDA THAT HELP AIDS PATIENTS

Organization	**Responsibilities**
TASO (The AIDS Support Organization)	It provides voluntary counselling and testing (VCT) It provides food supplements
AIC (AIDS Information Centre)	It provides counselling
ACP (AIDS Control Program)	It provides counselling It provides HIV testing
Uganda Cares	It provides counselling It provides HIV testing

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National AIDS Control Organization (NACO)	It provides counselling It provides HIV testing

AIDS does not kill. What kills?

Opportunistic infections (secondary infections)

SECONDARY INFECTIONS (OPPORTUNISTIC INOFECTIONS)

These are infections that attack the body due to weak immune system

Examples of opportunistic (secondary) infections associated with HIV/AIDS

Tuberculosis
Candidiasis
Pneumonia
Meningitis

Ways of controlling opportunistic/secondary infections associated with HIV/AIDS

Abstain from sex until marriage
Be faithful to your sexual partner
Use condoms during sex
Avoid sharing sharp objects with infected person
Avoid extra marital sex
Learning more facts about HIV

URINARY TRACT INFECTIONS (UTIs)

These are infections of the urinary system
They are caused by bacteria called **E. coli** normally found in the intestines
They usually occur in the urinary bladder and urethra
They occur when bacteria from anus enter the urethra during sex

Why are UTIs very common in women?

Their urethra is closer to the anus

Examples of Urinary Tract Infections (UTIs)

Urethritis
Cystitis

Signs of UTIs

Smelly urine
Frequent urination
Bloody urine or cloudy urine
Pus discharge from penis and vagina

Symptoms of UTIs

Painful urination
Pain during sex
Pain in lower abdomen
Fever

Effect of untreated UTIs

They cause kidney infections

PELVIC INFLAMMATORY DISEASE (PID)

This is an infection of the female reproductive organs

Causes of PID

Untreated bacterial STDs (untreated gonorrhoea or chlamydia)

Multiple sex partners

Signs of PID

Abnormal bleeding after sex

Abnormal menstrual bleeding

Smelly vaginal discharge

Symptoms of PID

Pain in lower abdomen

Painful urination

Pain during sex

Fever

Dangers of untreated PID (effects of untreated STDs)

Ectopic pregnancy

Painful menstruation

Infertility (sterility/barrenness)

How does untreated PID lead to infertility?

It blocks the oviducts

GENERAL PREVENTION AND CONTROL OF STDs/STIs/VDs

Abstain from sex until marriage

Keep the genital parts clean

Be faithful to your sexual partner

Keep latrines clean

Condom use during sex

Immunisation with HPV vaccine

Avoid sex when under the influence of drugs

Always have HIV test with your partner before marriage

Use of PEP and PrEP

LIFE SKILLS TO SAFEGUARD AGAINST STDS

Peer resistance

Assertiveness

Self-awareness

Critical and creative thinking

Self esteem

Good decision making

PIASCY MESSAGES ABOUT ADOLESCENCE AND REPRODUCTIVE HEALTH

PIASCY

This is a program that provides information on HIV/AIDS to school children and teachers

What does "PIASCY" stand for?

Presidential Initiative on AIDS Strategy for Communication to Youth

Who initiated PIASCY program in Uganda?

H.E Yoweri Kaguta Museveni (in 2002)

Objectives (aims) of PIASCY program

To prevent the spread of HIV/AIDS

To promote AIDS awareness

Importance of PIASCY messages

They promote AIDS awareness

They promote reproductive health

They prevent the spread of HIV/AIDS

They promote care for AIDS patients

They prevent early pregnancy/teenage pregnancy (adolescent pregnancy)

EXAMPLES OF PIASCY MESSAGES FOR ADOLESCENTS

Say no to sex (abstain from sex)

Say no to early marriage

Avoid gifts for sex

Stay Virgin

AIDS kills

AIDS has no cure

Choose to delay sex

Virginity is healthy

Early sex affects reproductive system

HIV damages the immune system

Avoid risks to stay safe

Avoid bad touches

Premarital sex is risky

Follow your religion to stay safe

Using violence to get sex is wrong

Body changes at puberty are not signs to start sex

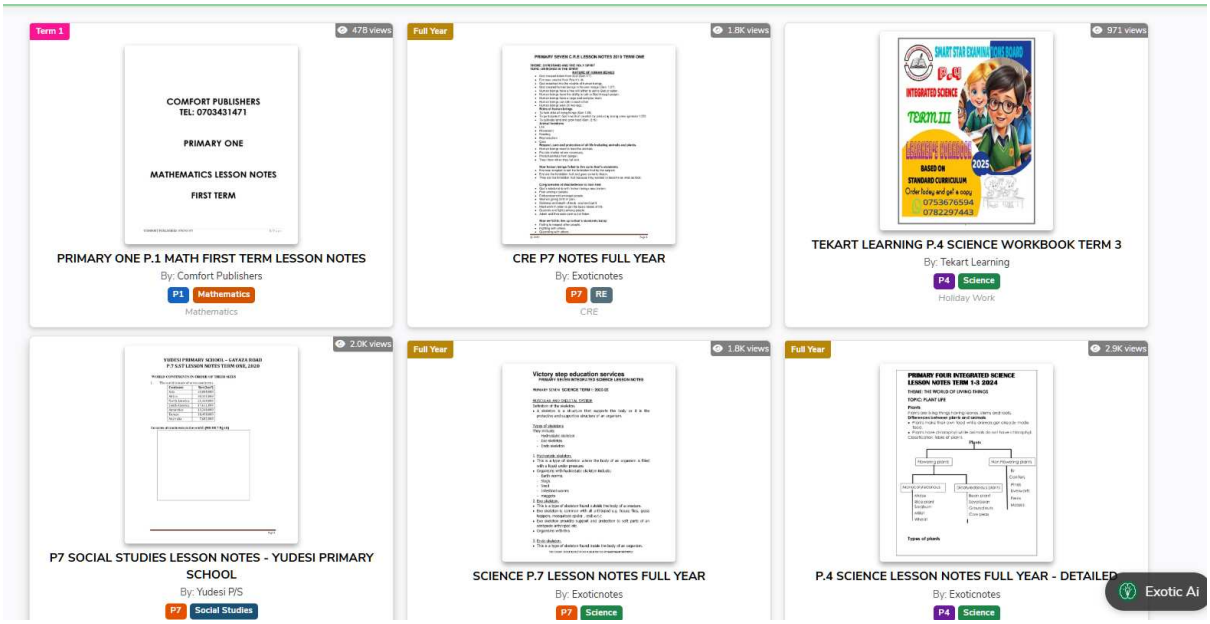
Learn how AIDS is transmitted

Avoid dark corners

AIDS patients need care and support

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