KITENDE MODERN NURSERY AND PRIMARY SCHOOL

P.6 SCIENCE LESSON NOTES 2023

TERM ONE

CLASSIFICATION OF ANIMALS

QN. **What is classification**?

Classification is the grouping of organisms according to their characteristics.

Qn. **What are living things?**

Living things are things that have life.

Characteristics of living things

- Living things reproduce.
- Living things respond to stimuli.
- Living things respire.
- Living things feed.
- Living things grow.
- Living things excrete.
- Living things move / locomote.
- Groups of living things

Living things are grouped into major groups called **Kingdoms**.

Qn. Identify five groups/ Kingdoms of living things.

- Animal kingdom
- Plant kingdom
- Fungi kingdom
- Bacteria kingdom
- Protoctista kingdom
- ANIMALS KINGDOM
- Animals are classified according to their characteristics.

Qn. **What is classification of animals**?

Classification of animals is the grouping of animals according to their characteristics.

Qn. **Give one reason why animals are classified**.

For identification

Qn. **Give different factors considered when classifying animals.**

- The way animals move.
- The way animals reproduce.
- The habitat of animals.

Groups of animals

Qn **Identify the two main groups of animals**.

- Vertebrates
- Invertebrates

A chart showing classification of animals

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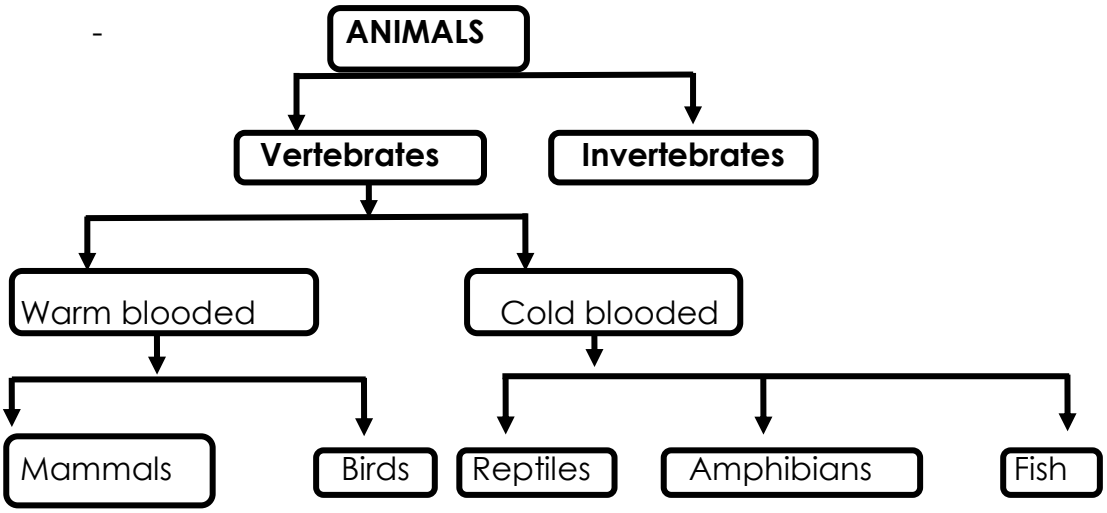


VERTEBRATES

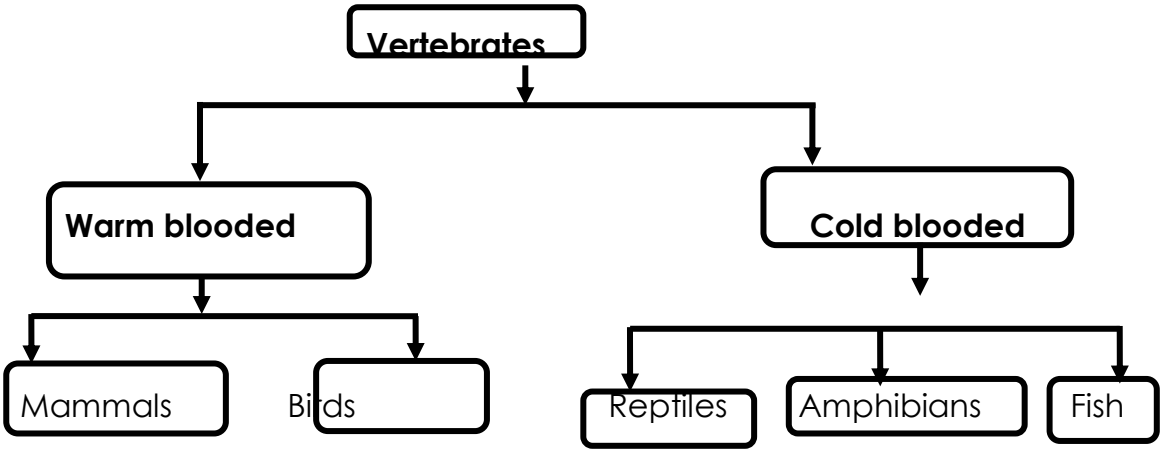
Qn. **What are vertebrates**?

Vertebrates are animals with backbones.

Qn. **Mention any five examples of vertebrates**

- Human beings
- Rats
- Goats
- Sheep
- Cat
- Dog
- elephants
- snake
- hedgehogs
- spiny ant eater
- hen
- hare

- Characteristics of vertebrates
- Vertebrates have back bones.
- Vertebrates have endo skeleton.
- Vertebrates have waterproof skin.
- Vertebrates have a brain that is protected by the skull.
- Groups of vertebrates
- Vertebrates are grouped into main groups namely:-
- Warm blooded vertebrates (Homoiothermic)
- Cold blooded vertebrates (Poikilothermic



(a) Warm blooded vertebrates

Qn. **What are warm blooded vertebrates?**

These are animals which maintain a constant body temperature.

Qn. **State any four examples of warm-blooded animals.**

- Human being
- Goat
- Elephant
- Chimpanzee
- Bush baby
- spiny ant eater
- Pika

Groups of warm-blooded animals

- Mammals
- Birds

(b) **Cold blooded animals**

Qn. **What are cold blooded vertebrates?**

These are vertebrates whose body temperature changes according to the surrounding.

Qn. **Give any four examples of cold-blooded vertebrates.**

- Snake
- Frog
- Toad
- Crocodile
- fish
- Newts
- Chameleon
- Gecko

Groups of cold-blooded vertebrates

- Reptiles
- Amphibians
- Fish

Classes or groups of vertebrates

- Mammals
- Birds
- Reptiles
- Amphibians
- Fish

MAMMALS

Qn. What are mammals?

Mammals are animals with mammary glands.

Qn. **State any six examples of mammals**

- Dog
- Monkey
- -Spiny an eater -
- Elephant
- Whale
- -Duckbilled platypus
- -Cow
- -Amadillo
- -Pika
- -Rabbits

Specific characteristics of mammals

- They have mammary glands.
- They have fur on their bodies.
- They feed their young ones on milk produced by the mother's mammary glands.
- Other characteristics of mammals
- Mammals undergo internal fertilization.
- Mammals have a four chambered heart.
- Mammals have two pairs of limbs.
- Mammals have well developed ear lobes with the pinna for trapping sound waves.
- Mammals are warm blooded.
- Mammals take care of their young ones.
- Groups of mammals
- Primates (Fingered mammals)
- Rodents (Gnawing mammals)
- Pouched mammals (Marsupials)
- Hoofed mammals (Ungulates)
- Flying mammals(chiroptera)
- Egg laying mammals (Monotremes)
- Sea mammals (Ceteceans)
- Insect eating mammals (Insectivores)
- Flesh eating mammals (Carnivores)
- Lagomorphs
- Edentate (toothless mammals)

1. PRIMATES (FINGERED MAMMALS)

Qn. **What are primates**?

Primates are the most advanced groups of mammals.

Qn. **Why are primates said to be the most advancedmammals**?

Primates have awelldeveloped brain

Characteristics of primates

- Primates have well developed brain.
- Primates have five fingers on each hand and five toes on each foot.
- Primates have their font limbs for holding things and hind limbs of walking.
- All primates are omnivorous.
- Primates have a well developed set of teeth .

Qn. **What are omnivorous animals?**

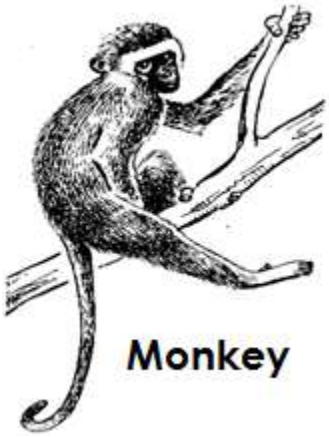
These are animals which feed on both flesh and vegetation.

Examples of primates

- Human beings
- Baboons
- Apes
- Monkey
- Bush baby
- Gorilla
- Orangutans
- Chimpanzee
- Gibbon

Diagrams showing some primates

Baboon



Monkey

Bush baby

Gorilla

2. **<u>EGG LAYING MAMMALS (MONOTREMES)</u>**

Qn. **What are monotremes**?

These are mammals that reproduce by laying eggs.

<u>Note</u>:

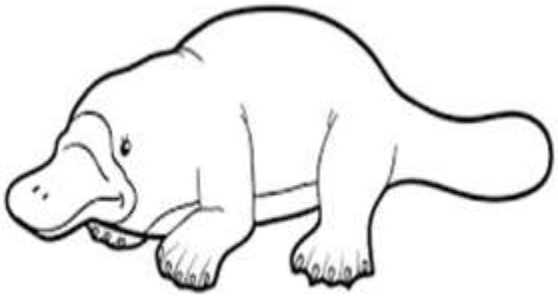
Monotremes are regarded as the most primitive group of mammals.

Qn. **Why are monotremes regarded as the most primitive group of mammals**?

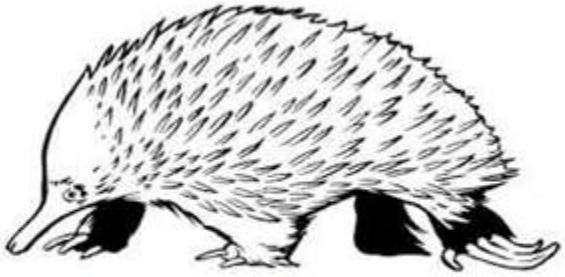
- They have characteristics of mammals, reptiles and birds.

Qn. **Why are monotremes grouped under mammals yet they reproduce by laying eggs?**

- They have mammary glands.
- They feed their young ones on breast milk produced by the mammary glands.
- Characteristics of monotremes
- Monotremes reproduce by laying eggs.
- Examples of monotremes
- Duck billed platypus
- Spiny an eater (Echidna)
- Illustration showing monotremes



Duck billed platypus



Spiny anteater

3. **<u>FLYING MAMMALS (Chiroptera)</u>**

Qn. **What are flying mammals?**

These are mammals that fly.

Examples of flying mammals

Bats

Note

- Bats are the only mammals that can fly.

Characteristics of flying mammals

- They fly
- They have a fold skin attached to the fore limbs.
- Bats are active at night and rest during day time.

Qn. **How are bats able to fly**?

- They have a fold skin attached to their fore limbs that enable them to fly.

Qn. **Why are bats regarded as mammals but not birds yet they can fly**?

- Bats have mammary glands while birds do not have mammary glands.
- Bats feed their young ones one breast milk while birds do not feed their young ones on breast milk.

Qn. **What name is given to animals that become active at night and rest during day time**?

Nocturnal animals.

Groups / types of bats

- Vampire bats (blood sucking bats)
- Insect eating bats
- Fruit eating bats

(a) **Blood sucking bats**

These are bats which suck blood from other animals.

Note:

- Blood sucking bats suck blood from animals like cattle,pigs, buffalo, elephants etc.

(b) **Insect eating bats**

These are bats that fed on insects.

(c) **Fruits eating bats**

These are bats that fed on fruits from trees.

Qn. **How are echoes important to bats**?

- Echoes enable bats to locate their food.
- Echoes enable bats to dodge obstacles while moving.

Importance of bats in the environment

- Fruit eating bats help in seed dispersal.
- Insect eating bats help to feed on harmful insects in the environment.

A diagram showing a bat.

4. **<u>POUCHED MAMMALS/MARSUPIALS.</u>**

Qn. **What are marsupials**?

These are mammals with a pouch / pocket on their abdomen.

Qn. **How is a punch important to pouched mammals?**

- For carrying the young ones.
- For protecting the young ones.

Note:

The word **marsupial** means a pouch or bag.

Characteristics of pouched mammals

- They have a pouch.
- Their hind limbs are longer than the fore limbs.

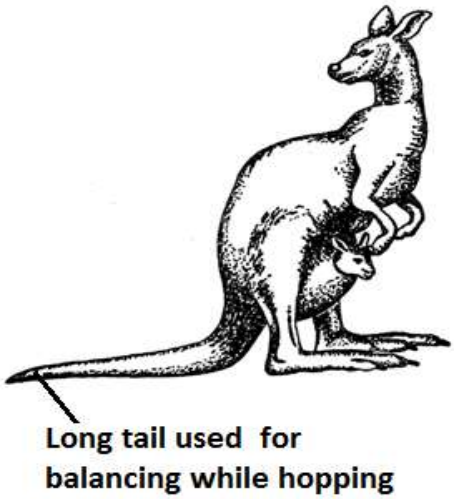
They have a long tail for balancing while hopping.

- They move by hopping

Examples of marsupials

- Kangaroo
- Koala bear
- Opossums
- Wallabies
- Wombats

Diagram showing a Kangaroo.



FLESH EATING MAMMALS (CARNIVORES)

Qn. What are carnivores?

These are mammals that feed on flesh.

Characteristics of carnivores

- They have well developed canines for tearing flesh.
- They have sharp claws for holding, killing and tearing flesh.
- They have soft pads under their feet to enable them run after their prey without making noise.
- They have a good speed.
- They have good sense of smell, sight and hearing

Groups of carnivores

- Cat family
- Dog family

(a) **Cat family**

These are carnivores with features similar to those of a domestic cat.

Examples of carnivores in the cat family.

- cat
- jaguar
- leopard
- cheetah

- lion
- tiger
- puma
- panther

(b) **Dog family**

These are carnivores with features similar to those of a domestic dog.

Note:

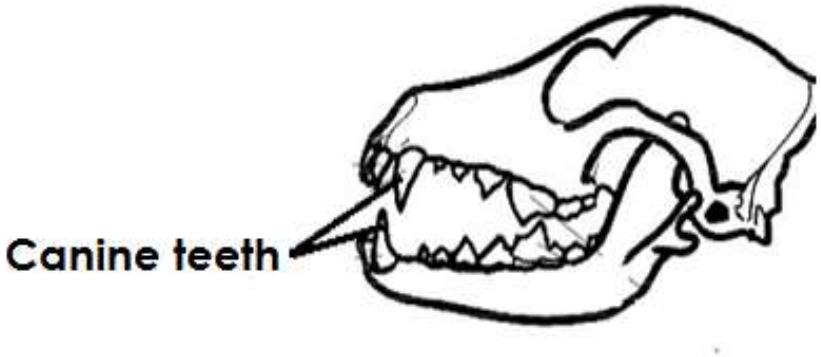
Hyenas and **jackals** are called scavenger mammals

Qn. **What are scavenger mammals?**

These are carnivores which feed on abandoned flesh.

Importance of scavenger mammals

- They help to clean the environment by feeding on abandoned flesh/ carrion.
- Diagram show the skull of a carnivore



6. **CETACEANS (SEA MAMMALS)**

Qn. **What are cetaceans**?

These are mammals that live in seas.

Characteristics of sea mammals

- They live in seas.
- The have blubber (layer of fats) under their skin.
-

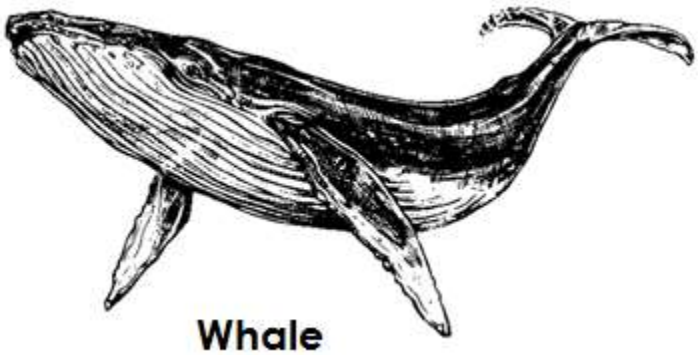
Qn.**How is a blubber important to sea mammals**?

- Blubber keeps the sea mammal warm in water.
- Blubber acts as a food store for sea mammals.

Examples of sea mammals

- Whale
- Dolphins
- Porpoise
- Note
- The whale is the largest mammal.
- Dugongs
- seals

Diagram showing some cetaceans



Whale

Porpoise

7. **UNGULATES (HOOFED MAMMALS)**

Qn.**What are hoofed mammals**?

- These are animals which have hooves on their feet.

Characteristics of ungulates

- They have hooves on their feet.
- They are herbivores (feed on vegetation)
- **Groups of ungulates**
- Even toed ungulates

  Odd toed ungulates

(a)**Even toed ungulates**

These are ungulates with even numbers of hooves on their feet.

Examples of even toed ungulates

- cows - camel
- goat - giraffe
- pig - deer
- sheep- antelope

Qn. **Name the groups of even toed ungulates**.

- Ruminants
- Non – ruminants

(i) Ruminants

Qn. **What are ruminants**?

- These are animals with four chambered stomachs and chew the cud.

Qn. **What is cud**?

- Cud is the half digested food animals bring back from the rumen for further chewing.

Qn. **What do we call the process of chewing cud?**

Rumination

Characteristics of ruminants

- They chew cud
- They have four chambered stomachs.

Qn. **Name the four chambers of stomachs of a ruminant animal.**

- Rumen (1st stomach)
- Reticulum (2nd stomach)
- Omasum (3rd stomach)
- Obamasum (true stomach)

Examples of ruminants

- cattle - antelope
- zebra - sheep
- giraffe - camel

(i) **Non ruminants**

Qn. **What are non ruminant animals?**

These are animals which do not chew cud.

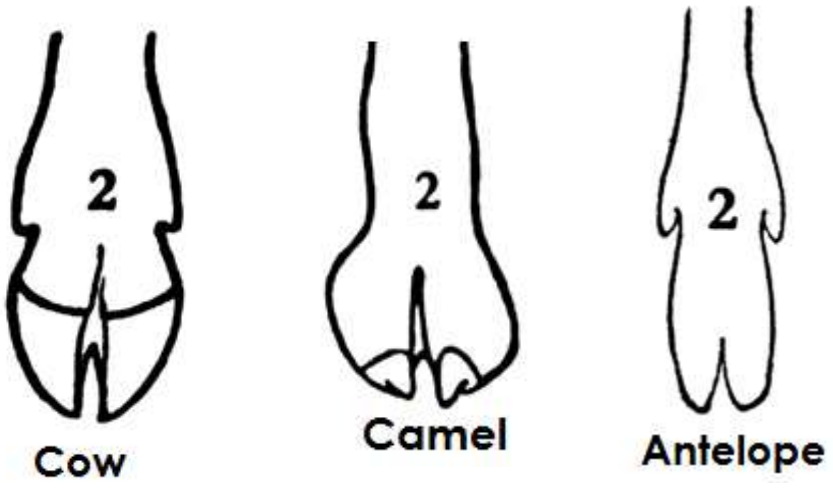
Characteristics of non ruminants

- They do not chew cud.
- They have one stomach.

Examples of non ruminants

- pigs - horse
- warthogs - rhinoceros
- donkey - hippopotamuses

Diagram showing hooves of even toed ungulates.



(b) **Odd toed ungulates**

These are ungulates with odd number of hooves on their toes.

Examples of odd toed ungulates

- Elephant - Rhinoceros

- Horse - Zebra
- Donkey

A diagram showing hooves of odd toed ungulates

Horse

Elephant

8. **INSECTIVORES**

Qn. **What are insectivores**?

These are mammals that feed on insects.

Characteristics of insectivores

- They feed on insects.
- They are mainly nocturnal.
- They have a long sensitive snout.
- They have strong and sharp claws for digging up insects from the ground.
-

Examples of insectivores

- Porcupine
- Hedge hog
- Pangolin
- Elephant shrew
- Aardvark

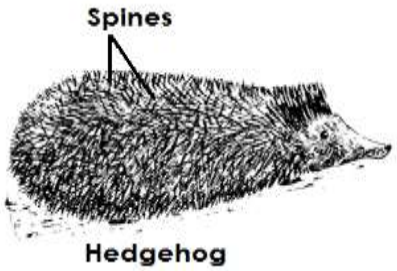
Qn. **How do the following animals protect themselves**?

(i) **<u>Porcupine</u>**

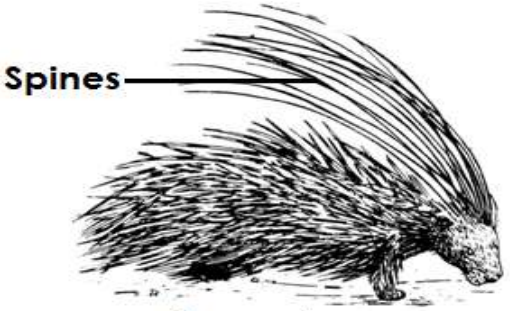
- By piercing the enemy using spines.

(ii) **<u>Hedge hog</u>**

- By curling / rolling itself into a ball like structure
- Diagram show insectivores

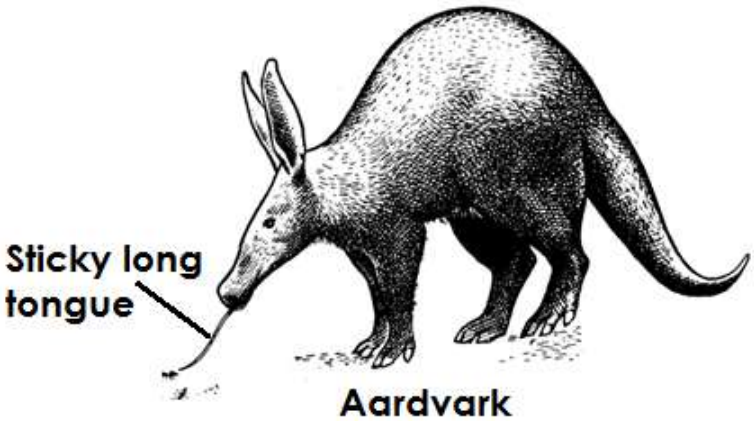


Hedgehog



Porcupine

Pangolin



Aardvark

9. **RODENTS (GNAWING MAMMALS)**

Qn. **What are rodents**?

Are mammals with well developed incisors and chew rapidly.

Characteristics of rodents

- Rodents chew rapidly.
- Have well developed incisors for biting.
- They have sharp strong claws for digging up root crops
- Most rodents make holes in the soil for protection and as habitat.
- They don't have canine teeth.

Qn. State the disadvantages of rodents to crop farmers

- Rodents destroy farmer's crops.
- Examples of rodents
- squirrels - guinea pig
- rats - porcupines
- mice - beavers
- mole rats

Diagram showing some rodents.

Rat

Squirrel

Beaver

10. **LAGOMORPHS**

Qn. **What are lagomorphs**?

These are mammals with four sharp incisor teeth in their upper jaw.

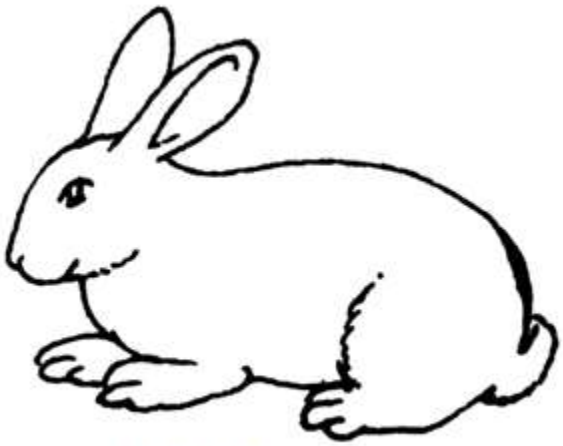
Characteristics of lagomorphs

- They have four sharp incisors in their upper jaw.
- They have strong hind limbs that are longer than their forelimbs.
- They have long ears and short tails.

Examples of lagomorphs

- Rabbits
- Pikas
- Hares

Diagram showing some lagomorphs (Rabbit)



Rabbit

Importance of mammals

- Some mammals provide meat and milk.
- Some mammals are used for transport.
- Some mammals are used for ploughing.
- Some mammals provide security.
- Some mammals (scavenger mammals) clean the environment by feeding on abandoned flesh.
- Some mammal's droppings are used to make manure.
- Some mammals provide hides and skins to people.
- The dung of some mammals can be used to produce biogas.

Disadvantages of mammals

- Some mammals are crop pests.
- Some mammals dirt the environment by disposing off their wastes.
- Carnivores feed on people and other animals.
- Some mammals make a lot of noise in the environment.

Qn. **How do the following animals protect themselves**?

(a) **Dog**

- By biting
- By barking

(b) **Cattle**

- By goring

(c) **Zebra**

- By running very fast

(d) **Cats**

- By scratching using their strong claws

(e) **Goats**

- By goring

BIRDS

Qn. **What are birds**?

Birds are animals with feathers on their bodies.

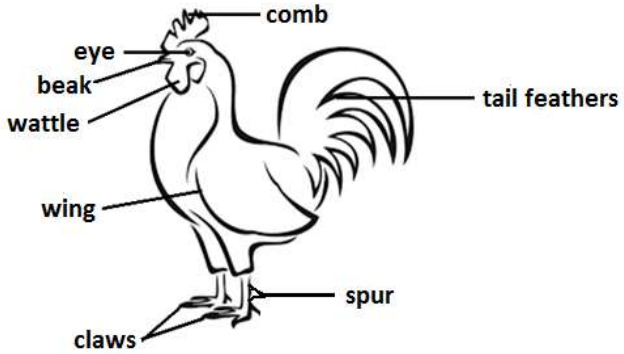
Note:

Birds are vertebrates that are said to have developed from reptiles.

Characteristics of birds

- They have bodies covered with feathers.
- They reproduce by laying eggs.
- Birds undergo internal fertilization.
- Their front limbs are modified into wings for flight.
- Birds have scales on their legs.
- Birds have streamlined bodies to overcome viscosity friction during flight.
- Birds are warm blooded vertebrates.
- Birds breathe through lungs.
- Birds have a nictitating membrane to protect their eyes when flying.

External parts of a bird.



FEATHERS

Qn. **How are feathers useful to birds**?

- Feathers cover and protect the body of a bird.
- Feathers enable birds to fly.
- Feathers keep the bird's body warm.
- Feathers give the birds colour for identification.
- Feathers give the bird's body shape.

Qn. **How do feathers keep the birds body warm**?

- Feathers prevent heat loss from the bird's body.

Qn. **How are feathers useful to people?**

- Feathers are used for decoration.
- Feathers are used for making pillows.
- Feathers are used for making cushions.
- Feathers are used for making dancing props.
- Feathers are used for making clothes.
- Feathers are used for cleaning certain parts of the body e.g ears.

Types of feathers

- Quill feathers / flight feathers
- Body feathers / covert feathers
- Filoplume feathers / hair feathers
- Down feathers

Quill feathers

- Quill feathers have a strong central part called **shaft** and the hallow portion at the end called **quill**.
- Quill feathers have a flat part called the vane and **space** called **barbs**.

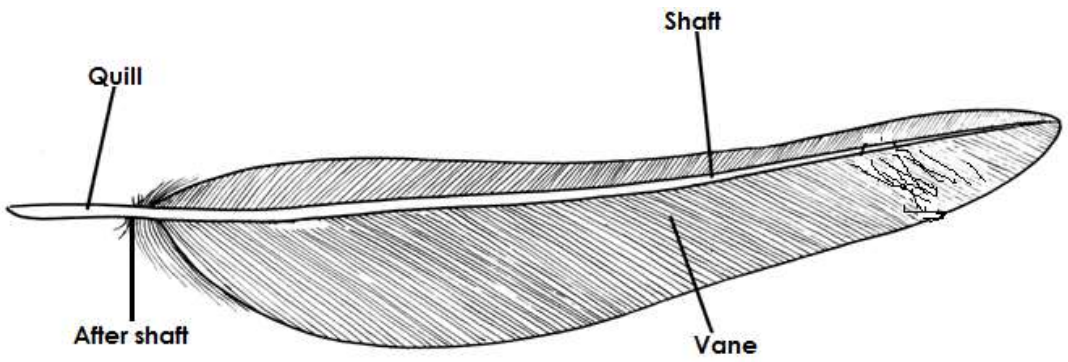
Qn. **Mention two body parts of a bird where quill feathers are found**.

- Wings
- Tail

Qn. **How are quill feathers useful to a bird?**

- Quill feathers are used for flying/flight.

Structure of a quill feather



Body / covert feathers

- They cover the body of a bird.

Qn. **How are covert feathers useful to a bird**?

- Covert feathers prevent heat loss from the body of a bird.
- Covert feathers give the bird's body shape.

Diagram showing the structure of a covert feather

DOWN FEATHERS

- These are feathers a chick is hatched with.

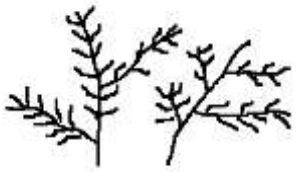
Qn. **How are down feathers useful to a bird?**

- Down feathers keep the bird's body warm.

Structure of a down feather

FILOPLUME FEATHERS / HAIR FEATHERS

- Filoplume feathers are the smallest feathers found nearest the bird's skin.
- Structure of a filoplume feather



Note

- Birds undergo biological process/change called **moulting /ecdysis.**

Qn. **What is moulting as used in birds?**

- Moulting is the process where birds shed their old feathers to replace them with new ones.

Note:

- Birds do not have sweat glands.
- Birds have a dry skin.

Qn. **How do birds regulate their body temperature ?**

- By panting

REPRODUCTION IN BIRDS

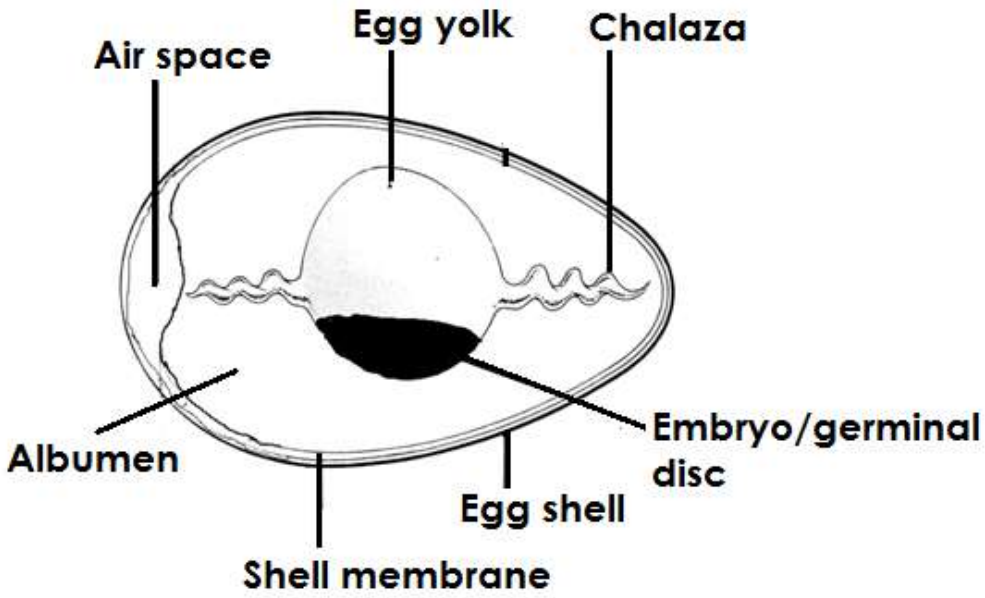
Qn. **How do birds reproduce**?

- By laying eggs

Qn. **What type of fertilization do birds undergo?**

- Internal fertilization

A diagram showing the structure of an egg



Functions of each part of an egg.

(a) Egg shell

- Protects the inner parts of an egg.
- The egg shell is porous to allow free circulation of air/gaseous exchange.

Qn. How is the egg shell adapted to gaseous exchange?

- It is porous to allow gaseous exchange.

Qn. Identify the mineral salts that harden the egg shell.

- Calcium.
- Phosphorus.

(b) **Air space**

- Keeps and provides oxygen to the embryo.

(c) **Chalaza / twisted albumen**

- It holds the embryo and yolk in the central position.
- It is a passage of oxygen from the air space to the embryo

(d) **Egg yolk**

- It provides proteins and fats to the growing embryo.

(e) **Albumen**

- It provides water and proteins to the growing embryo.

(f) **Embryo / germinal disc**

- Develops into a young one.

(g) **Shell membrane**

- Prevents the albumen from pouring.

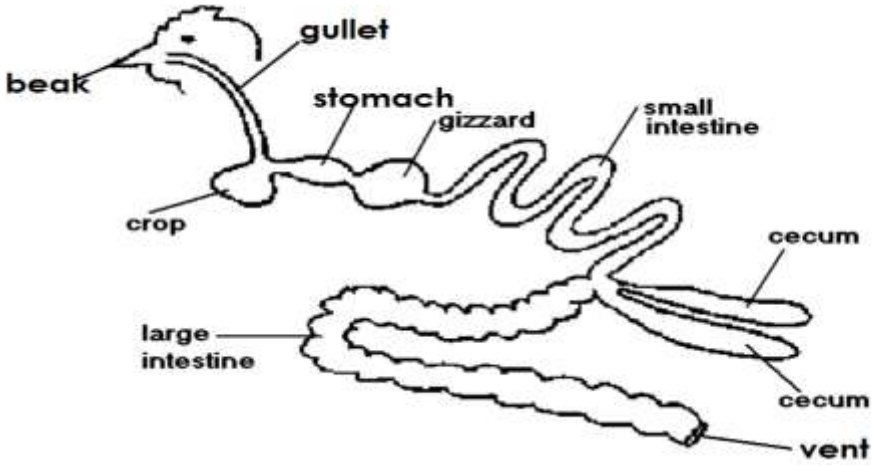
FEEDING IN BIRDS

- Birds use beaks to feed.

Qn. **Why are birds fed?**

- To grow well.
- To keep the bird's body healthy.
- To enable birds lay many eggs.
- To enable birds lay eggs with hard egg shell.
- To enable birds grow fatter/put on weight.

<u>The alimentary canal of a bird</u>



<u>Functions of each part.</u>

(i) **Beak**

- For picking food

(ii) **Gullet**

- Acts as a food passage to the crop.

(iii)**Crop**

- Stores, softens and moistens food.

(iv)**Gizzard**

- The gizzard crushes food into small particles by the help of grit.

(v)**Small intestines**

- The small intestines absorb digested food.

Note:

- Digestion of food ends in the small intestines.

(vi]**Large intestines**

- Large intestines allow absorption of water to take place.

(vii) **Caeca**

- It is where undigested food is stored for sometime before it is passed out as droppings.

(viii) **Vent**

It acts as a passage of droppings out of the bird's body.

Qn**. State the importance of the nostril to a bird .**

- For smelling.

CLASSIFICATION OF BIRDS

- Birds are classified according to their characteristics.

Qn. **How are birds classified?**

- The type of beak they have.
- The type of food they feed on.
- Nature of their feet (claws)

Groups of birds

- Birds of prey
- Swimming birds
- Flightless birds
- Scavenger birds
- Scratching birds
- Climbing birds
- Perching birds
- Wading birds

BIRDS OF PREY

Qn. **What are birds of prey?**

- These are birds which hunt and kill other animals for food.

Characteristics of birds of prey

- They have strong sharp and hooked beaks for tearing their prey.
- They have strong sharp and curved talons or claws for holding, gripping and killing their prey.
- They have a strong eye sight for locating their prey.
- They only feed on flesh.

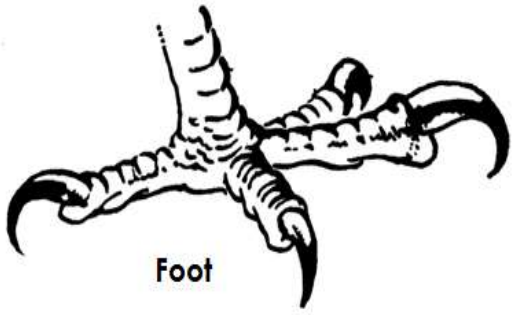
Examples of birds of prey include

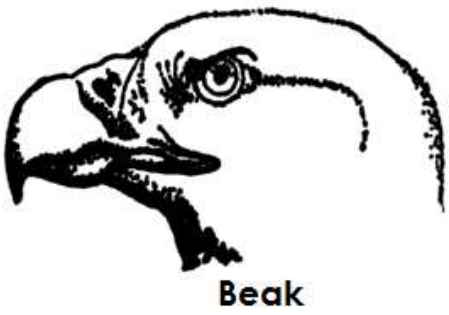
- Hawks
- Eagles
- Secretary birds
- owls
- kites

Qn. **What is a prey**?

- A prey is a small animal hunted, killed and eaten by another animal.

- Example of prey eaten by birds of prey
- Chicks
- Kittens
- Lizards
- Rats
- snakes
- Geckoes
- Frogs
- Ducklings
-
- Diagram showing the beak and foot of a bird of prey





Qn. **State any one danger of birds of prey**

- Birds of prey feed on chicks and kitten of people.
- Note:
- Birds of prey are also carnivorous groups of birds.
-

2. **<u>SCAVENGER BIRDS</u>**

Qn. **What are scavenger birds**?

- Scavenger birds are birds which feed on flesh killed by other animals [abandoned flesh].

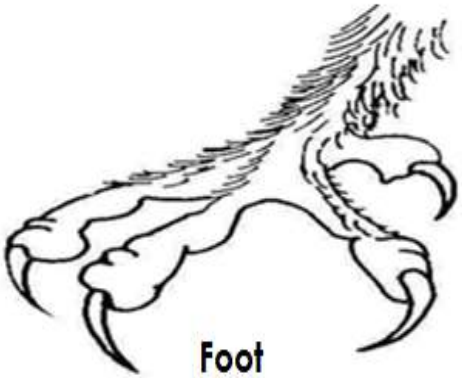
- Examples of scavenger birds
- Crow
- Vulture
- Marabou stork

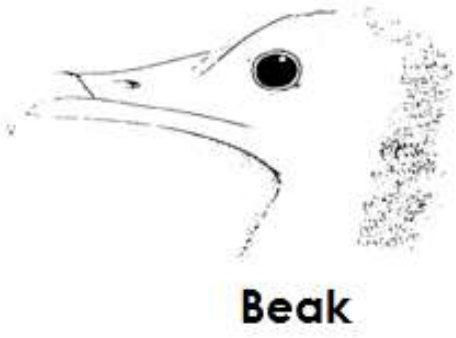
- Note:
- **A vulture** is both a scavenger and a bird of prey.

Characteristics of scavenger birds

- Scavenger birds feed on rotten flesh.
- Scavenger birds have sharp hooked beaks.
- Scavenger birds have curved claws.

- Diagram show the feet and beak of a scavenger bird





Qn. How are scavenger birds useful in the environment?

- They keep the environment clean by feeding on the abandoned flesh.

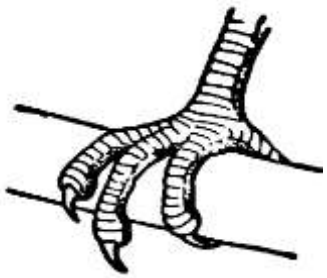
3. **PERCHING BIRDS**

Qn. **What are perching birds?**

These are birds that perch on branches of trees.

Characteristics of perching birds

- Perching birds have three toes pointing forward and one toe pointing backward.
- Foot of a perching bird



Groups of perching birds

- Insect eaters
- Seed eaters
- Nectar suckers
- Seed eaters
- These are perching birds that feed on seeds
- Adaptation of seed eaters to their mode of feeding
- They have short strong conical beaks for breaking up seeds.

Examples of seed eaters

- Pigeons
- Doves
- finches
- weaver birds

- Diagram showing a head of a seed eater
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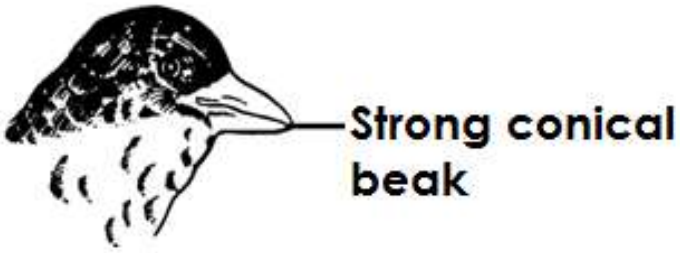

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- INSECT EATERS
- These are perching birds that feed on seeds.

Adaptation of seed eaters to their mode of feeding

- They have short narrow beaks for easy picking up of the insects from barks of trees.
- Examples of insect eaters
- Robin
- Sparrows
- Cuckoo
- swallow
- swift
- swallows
-
- Diagram showing the beak of an insect eater

Nectar suckers

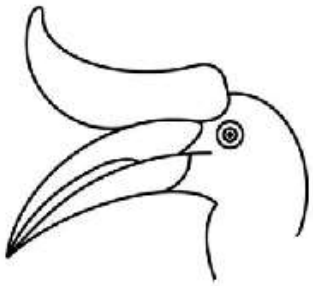
- These are perching birds that fed on nectar.

Adaptation of nectar suckers to their mode of feeding.

- They have long, slender and slightly curved beaks for sucking nectar from flowers.
- Examples of nectar suckers
- Sun bird
- Humming birds
- Diagram showing the beak of a sun bird.

Qn. **How are nectar suckers useful to crop farmers**?

- They help to pollinate flowers while looking for nectar.
- Fruit eaters
- These are perching birds that feed on fruits.
- Adaptation of fruits eater to their mode of feeding.
- They have long stout beaks for collecting fruits.
- Examples of fruit eaters
- Horn bill
- Qn.How are fruit eaters useful to people?
- They help in seed dispersal.
- Diagram showing a beak of a fruit eater



4. <u>SCRATCHING BIRDS</u>

- These are birds which scratch the ground while looking for food.
- Characteristics / adaptation of scratching birds to their mode of feeding.
- They have strong feet with thick toes and blunt claws.
- They have strong, short and pointed beaks for picking up things from the ground.

Qn. **What do scratching birds feed on?**

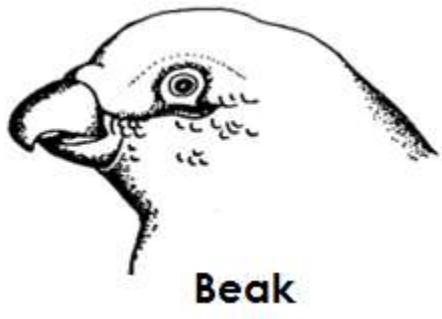
- - seeds
- - insects
- - worms

Examples of scratching birds

- Chicken
- Guinea fowl
- Turkey
- Crested francolin.

Diagram showing the beak and feet of a scratching bird

- 5. CLIMBING BIRDS
- These are birds with two toes pointing backward and two toes pointing forward.
- Adaptation or characteristics of climbing birds.
- They have two toes pointing forward and two toes pointing backward.
- They have strong pointed beaks for trapping food.
- Examples of climbing birds
- **-** Parrot
- - Woodpecker
- Diagram showing the beak and foot of parrot.



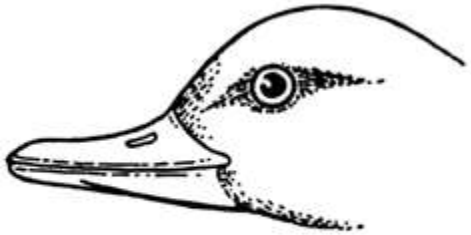
- Diagram showing the beak and foot of a wood pecker

6. **SWIMMING BIRDS.**

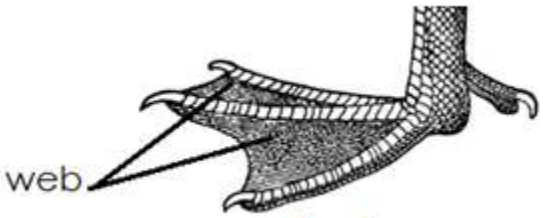
Swimming birds are birds with webs for swimming in water.

Adaptation / characteristics of swimming birds to living in water

- They have webbed feet for swimming.
- They have a spoon shaped beak for sieving food from water or mud.
- They have a layer of fats to keep them warm in water.
- They have a broad breast bone.
-
- Examples of swimming birds
- - Ducks - Penguins
- - Pelicans - Coots
- - Geese
- - Swans
- - Sea gulls
- Diagrams showing beak and foot of a swimming bird.
-



Beak



Foot

Qn .**How are the webs important to a swimming bird**?

- For paddling in water
- For swimming in water

7. **WADING BIRDS**

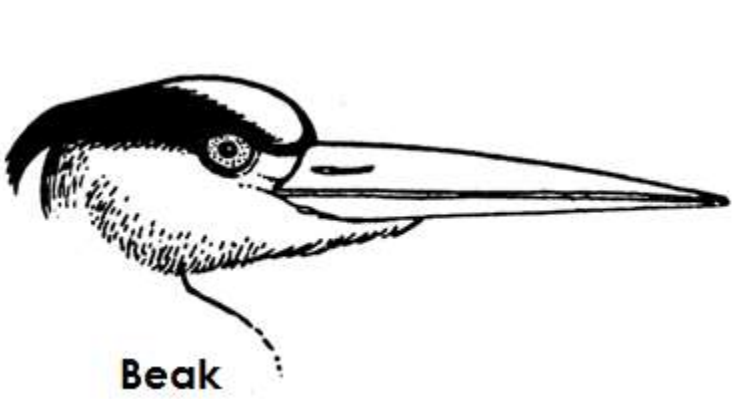
Qn. **What are wading birds**?

These are birds that walk through water or mud to find food.

Adaptation / characteristics of wading birds.

- They have long legs with half webbed toes that prevent them from sinking in water.
- They have long beaks for easy trapping of their food.
- Examples of wading birds
- Heron - Crested crane
- Ibis - Flamingo
- Egret - Storks
- King fisher

- Diagram showing a beak and foot of a wading bird



Qn. **What do wading birds feed on**?

- - Small fish
- - Frogs
- - Worms
- - Toads
-
- 8. FLIGHTLESS BIRDS.

Qn. **What are flightless birds?**

These are birds which cannot fly but run very fast.

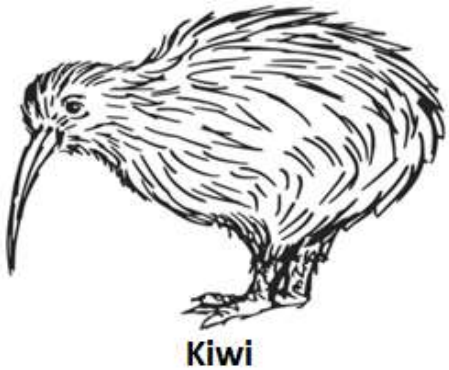
Qn. **Why are flightless birds unable to fly**?

- They have heavier bodies compared to their wings.
- They have a lot of bone marrow that make them heavier to fly.

Qn. **How do flightless birds protect themselves yet they can't fly?**

- By running very fast.
- Examples of flightless birds
  - Ostrich
  - Kiwi
  - Emu
  - Penguin
  - Cassowary
  - Rhea

A diagram showing some flightless birds.



Note:

The ostrich is the biggest flightless bird.

Adaptation of birds to flight

- Birds have streamlined bodies to overcome viscosity friction.
- Birds have hallow bones to reduce on their body weight.
- Bird's front limbs are modified into wings for flight.
- Birds have no pinna to obstruct the flow of air while on flight.
- Birds have a nictitating membrane which protect their eyes against foreign bodies during flight.
- They have strong flight feathers on their wings and tail.

Advantages of birds in the environment.

- Birds provide people with meat and eggs.
- Some birds can be sold to get money.
- Feathers from birds are used for decoration.
- Sun birds and humming birds help to pollinate crops.
- Droppings from birds are used as manure in the garden.
- Some birds provide security e.g parrot.
- Scavenger birds help to keep the environment clean.
- Disadvantages/ dangers of birds in the environment
- Some birds destroy crops.
- Some birds cause sound pollution.
- Some birds cause aeroplane accidents at the run ways.
- Feathers of birds keep vectors which may spread diseases to people.
- Some birds dirt the environment by disposing off their wastes.

REPTILES

- Reptiles are animals which mostly move by crawling.
- Note:
- The word reptile comes from a latin word called reptalia meaning crawlers.
- **Characteristics of reptiles**
- All reptiles are cold blooded.
- Reptiles breathe through the lungs.
- Reptiles reproduce by laying eggs.
- Reptiles undergo internal fertilization.
- Reptiles have three chambered heart.
- Reptiles do not care for their young ones.
- Reptiles have their bodies covered with scales.
- Most reptiles have two limbs apart from snakes.

- **Groups of reptiles**

  Reptiles are sub divided into main groups namely: -
- Snakes
- Lizards
- Tortoises and turtles
- Crocodiles and alligators
-
- SNAKES
- Snakes are reptiles with no limbs.
- Characteristics of snakes
- Snakes are limbless.
- Snakes move by slithering/gliding.
- Snakes have forked tongue which is used as sense organ for feeling and touch.
- Snakes undergo moulting.
- Snakes are carnivores.

Qn. **How is a forked tongue important to a snake**?
- It acts as a sense organ for touch or feeling.

Qn. **What is moulting as used in snakes?**

Is the shedding of the old skin to be replaced by a new one.

Qn. **How is moulting important to a snake?**
- It helps the snake to grow or increase in size.

Qn. **Why do snakes move while bringing the tongue out**?
- To trap their prey
- For protection

Groups of snakes
- Snakes are grouped into three namely: -
- - Poisonous/Venomous snakes.
- - Non poisonous/Non-venomous snakes.
- - Constrictors
- (i) Poisonous snakes
- These are snakes with poison glands and hallow fangs.
- Characteristics of poisonous snakes
- They have a pair of hallow teeth called fangs.
- They have poison glands.
- They produce venom.

Qn. ***How are the fangs important to a poisonous snake?***
- For injecting poison or venom into the enemy.
- For injecting poison into the prey.

Qn. **What scientific name is given to poison produced by poisonous snakes?**
- Venom

Qn. **What is the function of venom from poisonous snakes**?

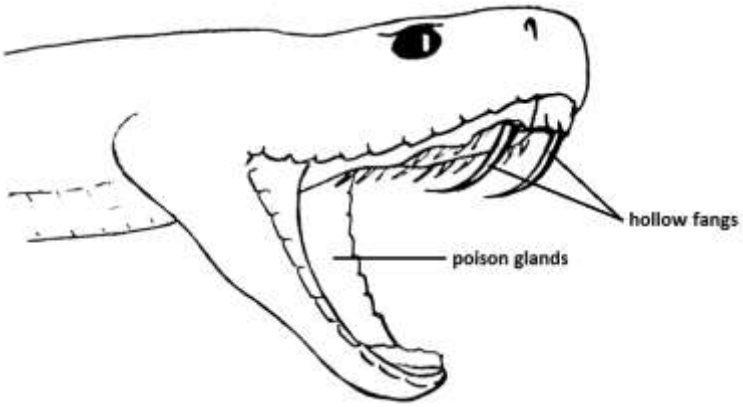
- It is used to make serum used for treating snakes bites.

Qn. **State the effect of snake poison/venom on blood.**

- Venom lowers the temperature of blood thus clotting it.

Examples of poisonous snakes/venomous snakes.

- - A cobra
- - A puff adder
- - Black mamba
- - Gabon viper
- - Boom slang
- Diagram showing the head of a poisonous snake



Qn. **Why are the fangs of a poisonous snake hallow**?

- To allow venom pass through easily.

Qn. **Why are the fangs of a poisonous snake curved inside / in wards?**

- To prevent the prey from escaping

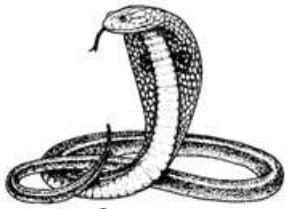
Qn. **State the first aid for snake bites.**

- Tie slightly above the bitten part.
- Use a black stone to suck venom from the body.

Qn. **Why do we tie slightly above the bitten part when giving firstaid for snake bites?**

- To prevent blood containing poison from flowing to the heart.
- Diagram showing some poisonous snakes

Puff adder



Cobra

(ii) **Non- poisonous/ Non-venomous snakes.**

Qn. **What are non- poisonous snakes?**

These are snakes without poison glands.

Characteristics of non- poisonous snakes

- They have solid fangs.
- They do not have poisonous glands.
- They do not produce venom.
- They swallow their prey as a whole.
- They kill their prey by suffocating them to death.

Examples of non- poisonous snakes

Green snakes

Brown house snakes

Qn. **Identify the examples of prey fed on by non-poisonous snakes.**

- Rats - Mice - Frogs
- Newts - Salamander - Chicken

(iii) **Constrictors**

Qn. **What are constrictors**?

- Constrictors are snakes which kill their prey by crushing and suffocating them to death.
- Characteristics of constrictors
- They have developed fangs.
- They kill their prey by crushing and suffocating them.
- They lick their prey making it slippery for easy swallowing.

Examples of constrictors

Python

Anaconda

Boa

- Diagrams showing some constrictors

Boa

Python

LIZARDS

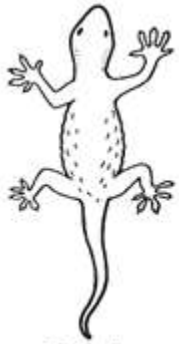
- Lizards have two pairs of limbs i.e. the front limbs and hind limbs.
- Characteristics of lizards
- They have a fleshy sticky tongue for trapping their prey.

- They have movable eyelids.
- They are cold blooded.
- They reproduce by laying eggs.
- They undergo internal fertilization

Examples of lizards

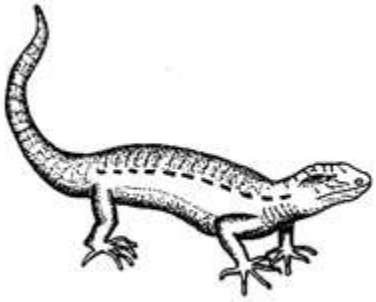
- - Gecko - monitor lizard
- - Chameleon - Agama lizards
- -Common lizards

Diagram showing some lizards



Gecko

Chameleon



Common lizard

Qn. **Why does a chameleon changescolour / camouflage**?

- For protection
- For easy hunting of prey

Qn. **How is a sticky long tongue important to a chameleon?**

- For trapping prey

Qn. **A part from a chameleon, mention four other organisms that protect themselves by camouflaging?**

- Crocodile
- Zebra
- Octopus
- Lizards
- Geckoes

Qn. **How are geckoes able to move upside down on ceilings without falling?**

- They have suction pads under their feet.

Qn. **How are geckoes and chameleons important in the environment?**

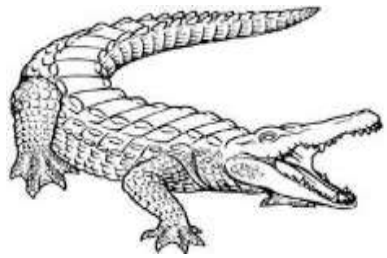
- They help to feed on harmful insects.

CROCODILES AND ALIGATORS

- Crocodiles and alligators are the largest among reptiles.

Characteristics of crocodiles and alligators

- They are lethargic or very lazy.
- They have a long strong powerful tail for swimming and attacking their enemies.
- They have strong jaw bones for feeding on some aquatic animals.
- Diagram showing a crocodile



TORTOISES, TURTLES AND TERRAPINS

- These are reptiles enclosed in a complete hard shell made of bony plates for protection.
- Characteristics of tortoise and reptiles
- They do not have teeth but have sharp cutting edges used during feeding.
- They use lungs for breathing.
- They all reproduce by means of laying eggs.
- They hide under their shells for protection

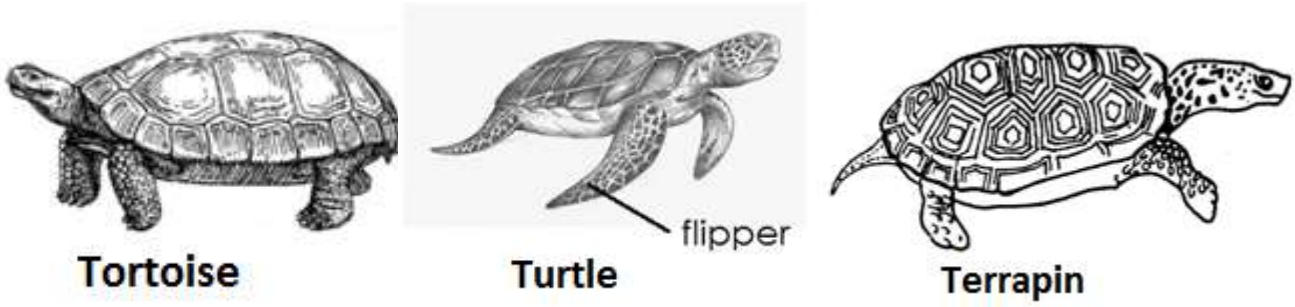
Qn. **Name any one example of a vertebrate with a shell**.

- Tortoises
- Turtles
- Terrapins

Qn. **How do tortoises protect themselves**?

- By hiding in their hard shells

Diagram showing tortoise, turtles and terrapins



Feeding habits of tortoises and turtles

- Tortoises feed on vegetation.
- Turtles feed on small animals in water

Qn. **How are tortoises and turtles adapted to their mode of feeding**?

- They have sharp cutting edges

- Habitat for turtles, tortoise and terrapins
- Tortoises mostly live on land.
- Turtles stay in oceans and seas.
- Terrapins stay in fresh water.
-

Qn. **How are terrapins and turtles adapted to life in water**?

- They have flippers for swimming in water.

- Advantages of reptiles
- Some reptiles act as tourist attractions in the country.
- Some reptiles provide us with skins for making leather products.
- Some reptiles are sources of food to people.
- Some reptiles help to control insect vectors by feeding on them.
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- AMPHIBIANS

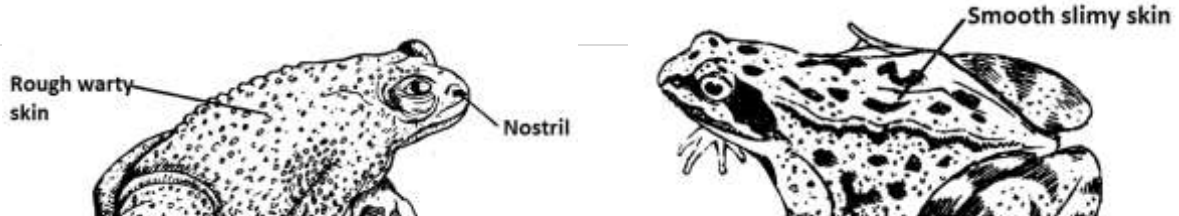
Qn. **What are amphibians**?

- Amphibians are vertebrates that live on both land and in water.

Note:

- Amphibians spend their early stage of life in water and adult stage on land.
-
- Characteristics of amphibians
- They are cold blooded.
- They undergo external fertilization.
- They reproduce by laying eggs.
- They do not take care of their young ones.
- They live both on land and in water.
- Amphibians have webbed feet for easy swimming in water.
- They have backbones.
- Note:
- The young one of an amphibian is called **a tadpole.**
- Examples of amphibians
- - frog - salamander - toad
- - Newts - caecilians

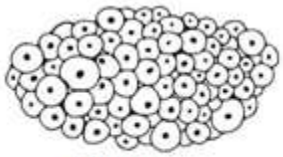
Diagram showing some amphibians



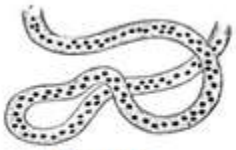
Differences between a frog and a toad

- A frog lays eggs in big masses(cluster) while a toad lays eggs in double ribbon like structure called **spawn.**
- A frog has no poison glands while a toad has poison glands.
- A frog has a fully webbed hind feet while a toad has a half webbed feet.
- A frog breathes through its moist skin in water and lungs on land while a toad breathes through lungs only.
- A frog commonly lives in water in the adult stage while a toad lives on land during the adult stage.
- A frog has a moist and smooth skin while a toad has a dry and rough skin.
- The tadpoles of a frog are brown while the tadpoles of a toad are black.

- Diagram showing eggs of a frog and a toad.
-



Frog



Toad

-

Breathing in amphibians

- A frog breathes through its moist skin and mouth cavity in water and lungs on land.
- A toad uses lungs and mouth cavity for breathing.
- A tadpole breathes through gills.
- Reproduction in amphibians
- Amphibians reproduce by laying eggs.
- The male amphibian mounts the female back.
- The female then lays eggs in water as the male sheds its sperms over them.
- This type of fertilization is called **external fertilization**

Qn. **What is external fertilization**?

Is the type of fertilization which takes place outside the body of a female animal.

Note:

- The eggs of amphibians are covered with a jelly like structure which has a bad smell.

Importance of a jellylike substance to the eggs of an amphibian

- It protects the eggs from being eaten by predators.
- It makes the eggs difficult to pick.

Diagram showing a tadpole

-
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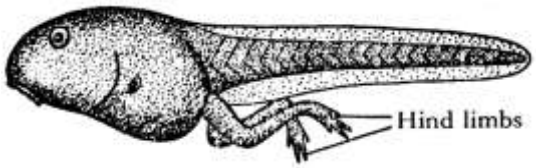


- Feeding habits of amphibians
- Frogs and toads feed on worms and insects.
- Tadpoles feed on plants in water.

Qn. **State the importance of a sticky tongue to an amphibian**

- It helps an amphibian to catch the flying insects easily.

Qn**. How do amphibians protect themselves?**

- A toad has poison glands which produce poison.
- A frog has a smooth and slippery skin which helps it to slide away from its enemies.
- The eyes of amphibians are found on top of the head to enable them see well in water.

Adaptation of frogs to living in water

- Frogs have fully webbed hind feet to enable them swim in water easily.
- Frogs have a streamlined body to overcome viscosity friction in water.

Qn. **How is a frog adapted to living on both land and in water?**

- A frog breathes through its moist skin while in water and lungs on land.

Qn. **Give a reason why amphibians lay very many eggs**.

- To increase the chance of survival since some are preyed upon. [may be eaten by predators].
- Importance of amphibians
- They feed on some insect vectors.
- They are used in practical science lessons in schools.
- They are eaten as food in some parts of the world.

FISH

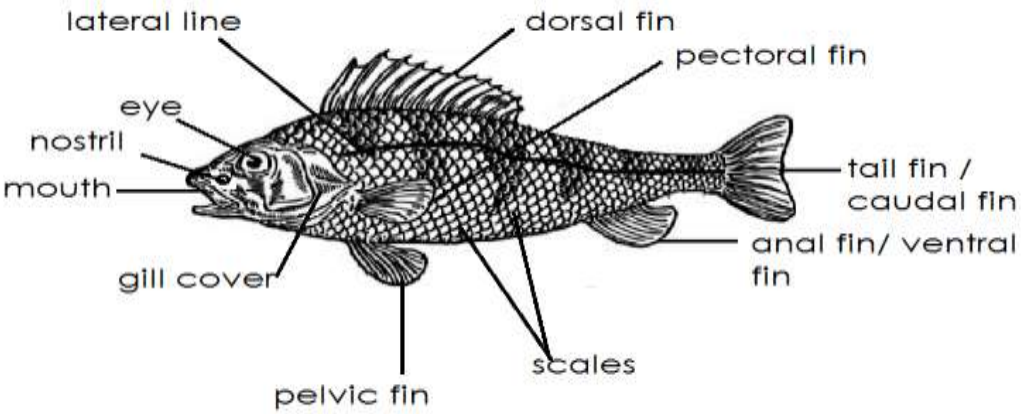
- Fish are aquatic animals.

Characteristics of fish

- They are cold blooded.

- They reproduce by laying eggs.
- They undergo external fertilization.
- They breathe through the gills.
- They have a streamlined body to overcome viscosity friction in water.
- The body of fish is covered with scales.
- Fish are vertebrates [have backbones].
- Note:
- The young one of a fish is called **a fry.**

Diagram showing external parts of a fish



Functions of each part of a fish

(i) **Scales**

Covers and protect the body of a fish.

(ii) **Gill cover/operculum.**

Protect the gills from damage.

(iii) **Nostril**

For smelling

For tasting food

(iv) **Gills**

For breathing

(v) **Mouth**

Acts as a passage of food into the body of a fish.

Acts as a passage of dissolved oxygen to the gills.

(vi) **Lateral line**

Detects sound waves in water.

(vii) **Tail fin**

It enables the fish to move forward (gives the fish forward movement).

It protects the fish against enemies.

(viii) **Dorsal fin**

It protects the fish against enemies.

(xi) **Anal fish / ventral fish**

Controls the rolling and unsteady movement of fish in water.

(x) **Pectoral fin and pelvic fin**

They enable the fish to move downwards and upwards in water.

They help the fish to reduce speed and stop.

Note:

- Pectoral fin and pelvic fin are called **paired fins.**

Types of fish

- There are three types of fish namely: -
- - Bony fish
- - Cartilaginous fish
- - Lung fish

(a) **Bony fish**

These are fish with a bony skeleton and covered with overlapping scales.

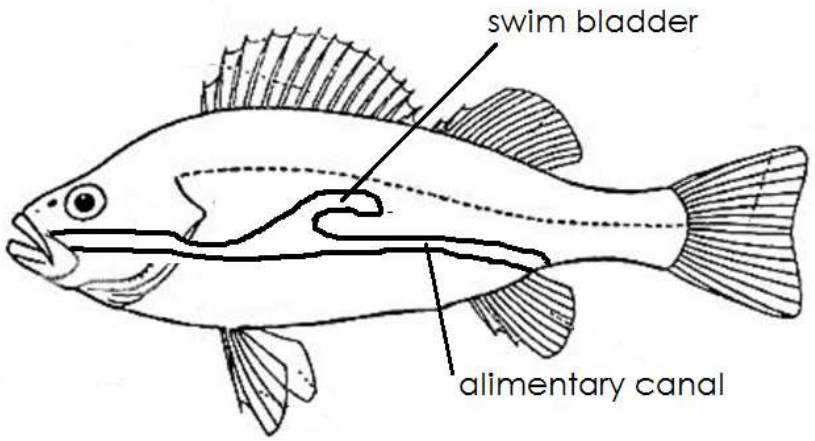
Characteristics of bony fish

- They are covered with overlapping scales.
- They have swim bladder that keep them buoyant in water.

Qn. **How is a swim bladder important to a bonny fish**?

- It keeps the fish buoyant in water (keeps a fish afloat).
- It controls the depth at which the fish swims in water.

Position of a swim bladder in the body of a fish.



- Examples of bony fish
- Nile perch
- Salmon
- herrings
- pike
- Tilapia

(b) **LUNG FISH**

- These are fish commonly found in dirty waters of pools, swamps and rivers.
- Lung fish commonly hibernate during the dry season and continue living in wet season.

Qn. **What is hibernation**?

Hibernation is a state when body activities are slowed down.

Examples of lung fish

- Common lung fish
- Diponi
- Epiceratodus

(c) **CARTILAGINOUS FISH**

Cartilaginous fish are fish with soft tissue called cartilages

Characteristics of cartilaginous fish

- They do not have gill covers instead they have gill slits.
- They do not have a swim bladder.
- They prevent sinking by constant swimming.

Examples of cartilaginous fish

- - shark
- - Dog fish
- - Rays
- - Skates

Ways in which fish protect themselves

- Fish use dorsal fins for protection.
- Some fish have slippery body to protect themselves from enemies.
- Fish have different shades of colour for hiding away from enemies.
- Some fish have electric organs for shocking the enemy.
- Some fish inject poison into their enemy.

Reproduction in fish

Qn. **How do fish reproduce**?

- Fish reproduce by laying eggs.

Qn. **What type of fertilization do fish undergo?**

- External fertilization

Qn. **Where do fish lay their eggs**?

- They lay eggs in swallow water.

Qn. **What name is given to the young one of a fish**?

- Fry or fingerling.

Qn. **What name is given to the eggs of a fish**?

- Roe

Feeding in fish

- Fish feed on aquatic plants.
- Breathing in fish

Qn. **How do fish breathe**?

- Fish breathe in dissolved oxygen using gills.

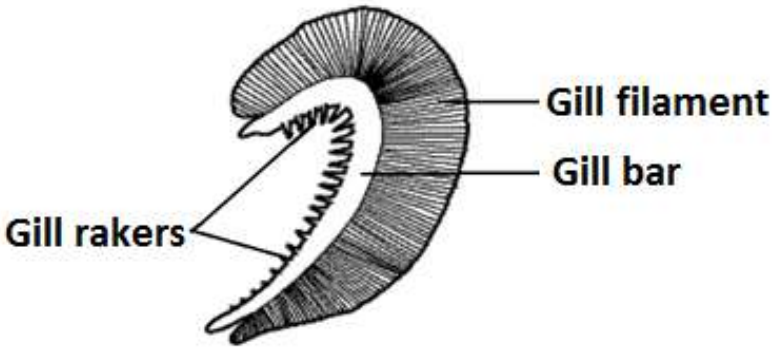
Qn. **Why does fish die shortly after being removed from water**?

- Due to lack of dissolved oxygen.

Qn. **By what process does fish take in dissolved oxygen**?

By diffusion

Diagram showing the structure of gills



Uses of each part of the gills.

(i) **Gill rakers**

Trap dirt and any solid particles that may damage the filament.

Qn. **How are gill rakers adapted to their function?**

- They are comb like.

(ii) **Gill bar**

Holds the filament in position.

It prevents the gill rakers from interlocking with the gill filaments.

(iii) **Filaments**

- It is where gaseous exchange takes place.

Qn. **Identify one adaptation of the gill filaments to their function**.

- They are many in number.
- They have thin walls.

Qn**. Why are gill filaments many in number?**

- To increase the surface area for gaseous exchange to take place**.**

- Adaptations of fish to living in water

Qn. **How are fish adapted to living in water?**

- They have gills for breathing in water.
- They have fins for swimming in water.
- They have streamlined bodies that reduce viscosity friction in water.
- Fish have a swim bladder that keep them buoyant in water.

- They have a lateral line for detecting sound waves in water.
- Some fish are slippery to escape easily from their enemies.

Advantages of fish

- Fish are eaten as food.
- Fish are source of income after sale.
- Fish help to control malaria.
- Fish bones are used in making poultry feeds.
- Their bones are used to make glue.
- Their skins are used to make surgical threads.

Qn. **Which food value do we get from eating fish**?

- Proteins

Qn. **How do fish help to control malaria**?

- Fish feed on the larva of mosquitoes which spread malaria.

Qn. **What name is given to a glass container used to keep fish at home?**

- Aquarium

Qn. **How does fish help to control kwashiorkor in children**?

- Fish provide proteins to children

INVERTABRATES

Qn. **What are invertebrates?**

- Invertebrates are animals with no back bones / spine /spinal column.

Characteristics of invertebrates

- They do not have back bones /spine.
- Most invertebrates have an exo skeleton

Groups of invertebrates

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

COELENTERATES

These are stinging animals with only one opening.

Characteristics of coelenterates

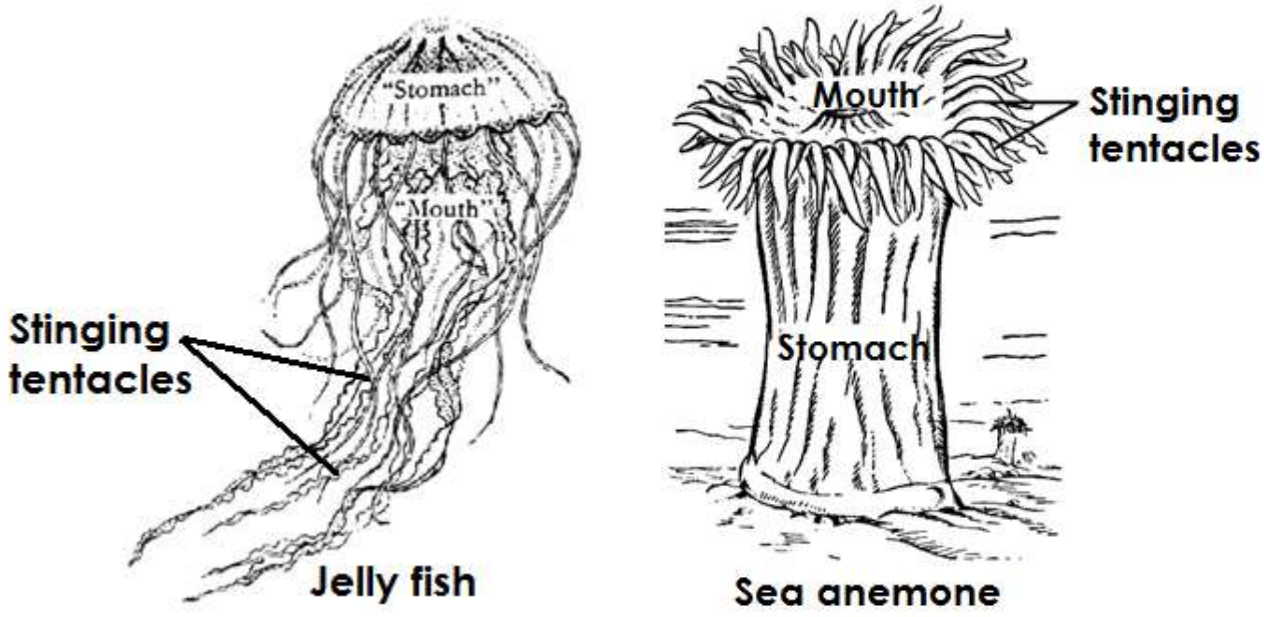
- They have one body opening which acts as both mouth and anus.
- They have tentacles which act as sense organs for touch and smell.
-

Examples of coelenterates

-Jelly fish

- Sea anemones
- Hydra
- Corals

Diagram showing some coelenterates



ECHINODERMS

These are invertebrates which mostly live in seas.

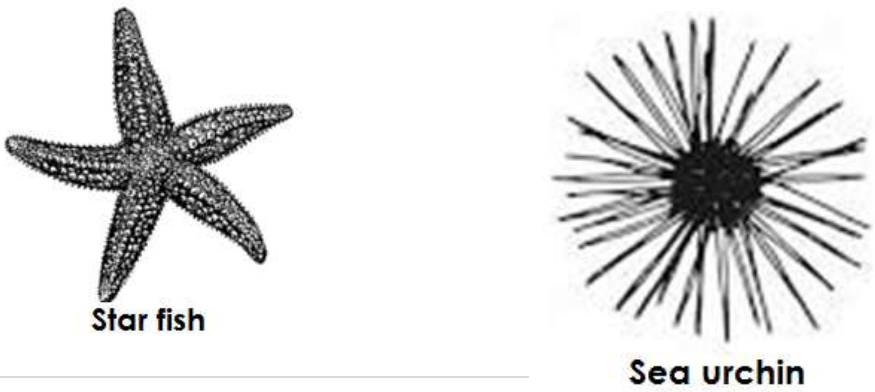
Characteristics of echinoderms

- They have spines.
- They have unsegmented body.

Examples of echinoderms

- Star fish
- Sea urchin
- Sea cucumber

Diagram showing some echinoderms



SPONGES

- Sponges mostly live in fresh water of the sea.

Characteristics of sponges

- Most of sponges have soft bodies.
- Sponges do not move but remain attached to the floor of the sea.
- Sponges breathe through the holes found on their skin.
- Sponges feed through the holes found on their skin.

MOLLUSCS.

- Molluscs are soft bodied and unsegmented invertebrates.
-

Characteristics of molluscs

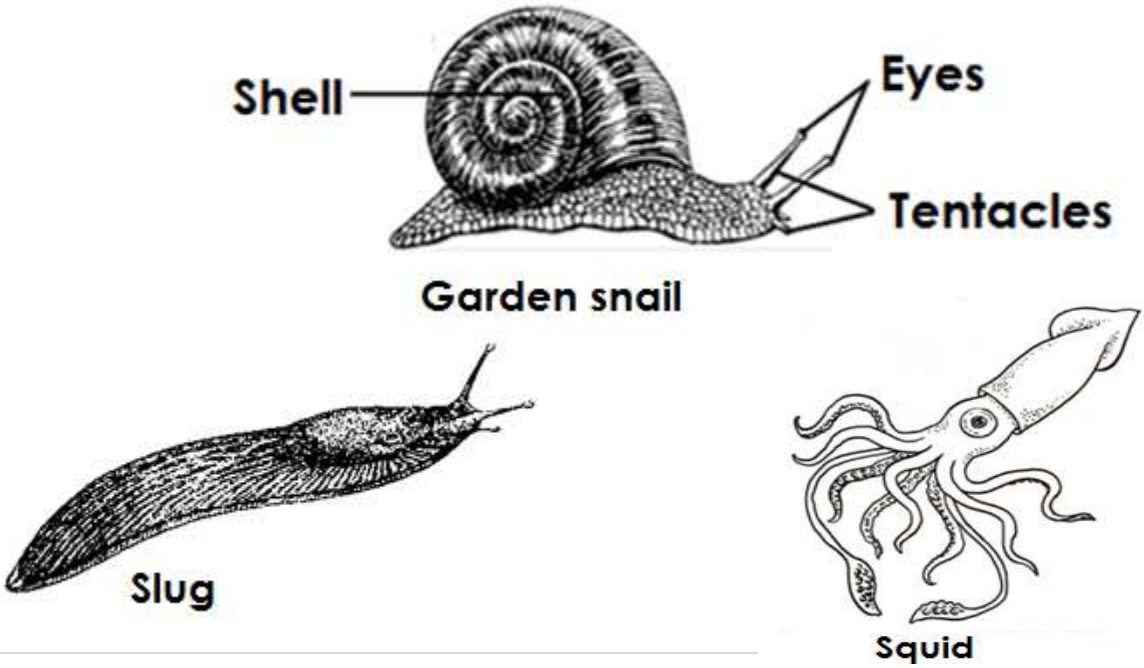
- Most molluscs have shells for protection.
- Molluscs have soft bodies.
- Molluscs have tentacles for detecting sound, smell and temperature.
- Sea molluscs breathe through gills.

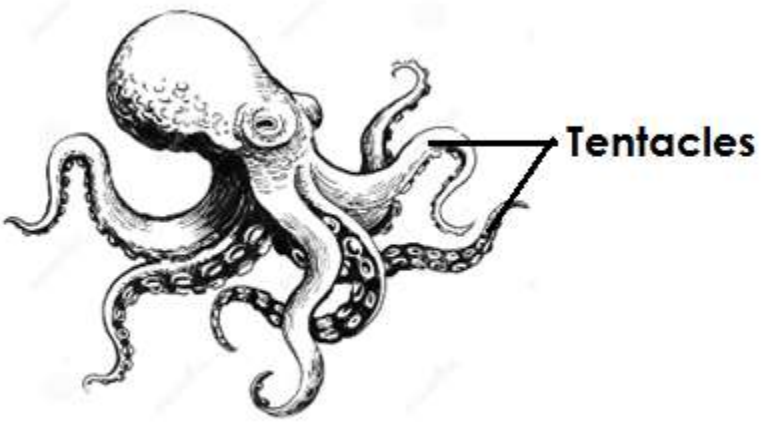
- Land molluscs breathe through simple lungs.

Examples of molluscs

- Fresh water snail - Oyster
- slug - squid
- octopus - garden snail
- curtle fish

Diagram showing different molluscs





Octopus

Oyster

WORMS

- Worms are long thin and soft bodied invertebrates.

Characteristics of worms

- Worms have soft bodies.
- Worms breathe through their moist skin.

Groups of worms

- Segmented worms (annelids)
- Round worms (Nematodes)
- Flat worms (Platy helminthes)

(a)Segmented worms

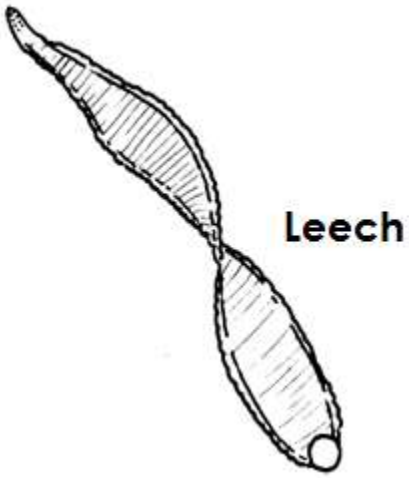
- These are worms whose bodies are divided into segments or rings.
- They mostly live in moist places.

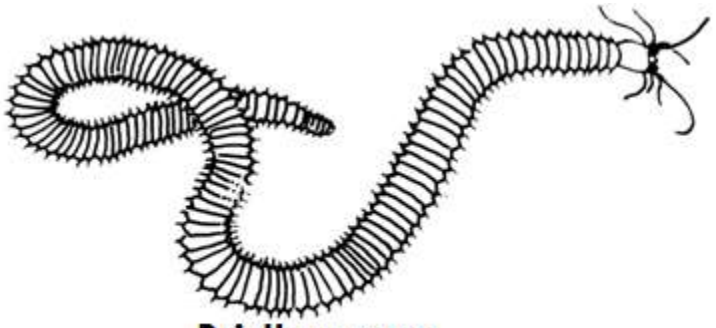
Examples of segmented worms

-Earth worms
-Leeches
-Bristle worms

Diagrams showing segmented worms

An earthworm





Bristle worm

Earth worms

Earth worms mostly live in fresh waters and soil.

Note:

- Earth worms are hermaphrodites i.e. they have both male and female reproductive organs.

Qn. **How do earth worms breathe**?

- Through their moist skin.

Qn. **How do earth worms move**?

- By contraction of their body muscles.

Qn. **How are earth worms important in the environment**?

- They help in aerating the soil.

Qn. **How do earth worms aerate the soil**?

- By digging holes/ tunnels in the soil.

Qn .**How is soil aeration important**?

- It enables air to enter into the soil.
- It enables water to enter into the soil.

Qn. **Why do earthworms come out of the soil after it has rained?**

- To get oxygen for breathing.

Qn. **What happens when oil is poured on the body of an earth worm**?

- It dies.

Qn. **Why does an earthworm die when oil is poured on its body?**

- Oil blocks the breathing organs of an earth worm.

Qn . **What type of skeleton do earth worms posses?**

- Hydrostatic skeleton

FLAT WORMS

- Are worms with flattened and segmented bodies.
- Flats worms are parasites to animals.

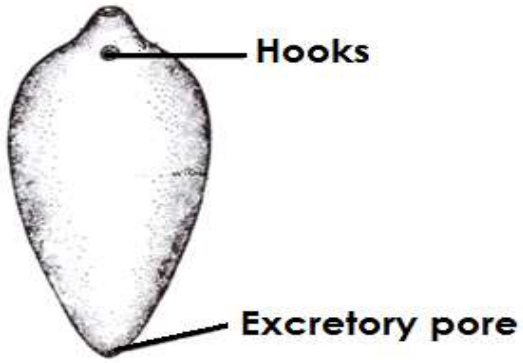
Examples of flat worms

- Liver flukes
- Tape worms

Liver fluke

- A liver fluke is a paper like worm.
- It lives in the liver and damages it.
- It enters the body through eating under/half cooked liver.

A diagram showing a liver fluke



Tape worm

Qn. **How do tape worms enter our bodies**?

- Through eating half cooked meat or pork.

Qn. **Where do tapeworms live in our bodies**?

- Small intestines

Qn. **What do tape worms feed on**?

- Digested food

Qn. **How do tape worms feed**?

- By diffusion

Qn. **How are suckers and hookworms useful to a tape worm**?

- They attach the tape worm onto the walls of the small intestines.

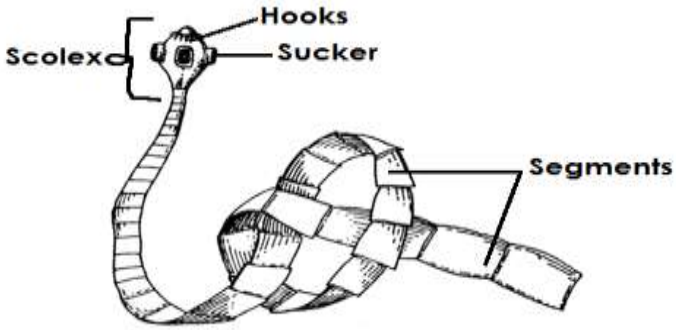
Qn. **How are segments useful to a tape worm**?

- For storing eggs

Qn. **What scientific name is given to the head of a tape worm**?

- Scolex

A diagram showing a tape worm



Qn. **State one way of controlling tapeworm infestation**.

- Eating well cooked meat or pork.
- Regular deworming.
- Proper disposal of faeces.

Qn. **State the effect of tape worms to an individual.**

- Tape worms feed on digested food and cause malnutrition.

ROUND WORMS

- These are worms with cylindrical bodies.
- They are parasites to animals and people.
- Some live in water and others in soil.

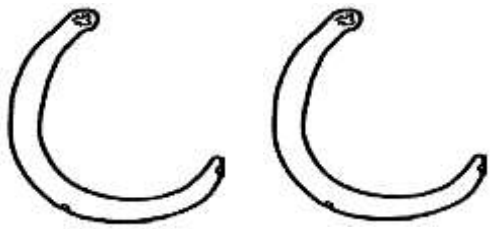
Examples of round worms

- hook worms
- Pin worms
- guinea worms
- askaris
- Eel worms
- Filarial worms
- whip worms
- thread worms

Hook worms

- Hook worms live in small intestines.
- Hook worms feed by sucking blood.

Diagram showing hook worms.



Qn. How do hook worms enter our bodies?

- Through entering the skin of the bare feet.
- Through entering the skin when one walks bare footed in wet/damp places.

Qn. What do hook worms feed on?

- Blood

Qn. How are hook worms dangerous to humans?

- They suck blood from the body and cause hook worm anaemia.

Ways of controlling hook worm infestations.

- By regular deworming
- Proper disposal of faeces.

- Washing hands after visiting the latrines
- Wear shoes / sandals when walking in wet dirty places.

Qn. State any two signs of hookworm infestations.

- Abdominal pain
- Fever
- Faeces containing worms
- Diarrhoea

ARTHROPODS

Qn. **What are arthropods**?

- Arthropods are animals with jointed legs and segmented bodies.

Characteristics of arthropods

- They have segmented bodies.
- They have jointed legs.
- They have an exo skeleton.
- They undergo moulting in order to remove theirexo skeleton.

Qn. **How is moulting important to arthropods?**

- It helps arthropods to grow and increase in size.

Groups of arthropods

- Insects
- Crustaceans
- Myriapods
- Arachnids

Myriapods

- Myriapods are arthropods with many legs and segmented bodies.

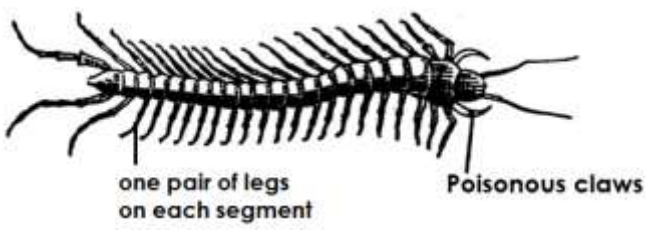
Examples myriapods

- Centipedes
- Millipedes

Centipedes (Chilopoda)

- A centipede has a pair of jointed legs on each segment.
- A centipede has a pair of antennae.
- A centipede has poisonous claws used for protection.
- Centipedes are carnivores.

A diagram showing a centipede.



Qn. **How does a centipede protect itself**?

- By injecting poison into the body of the enemy.
- By stinging using their poisonous claws.

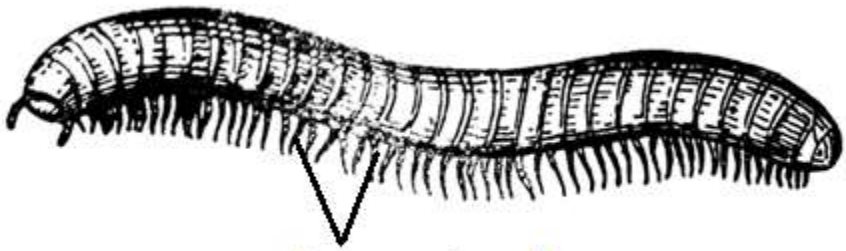
Qn. **Name two examples of prey a centipede feeds on**.

- Worms
- Insects

Millipede (diplopoda)

- A millipede has two pairs of jointed legs on each segment.
- A millipede protects itself by coiling.
- Millipedes are herbivores.

A diagram showing a millipede



Qn. **How does a millipede protect itself?**

- By coiling or curling

Qn. **How are millipedes important in the environment**?

- They aerate the soil by creating tunnels in the soil.
- Their waste products make the soil fertile.
- Their bodies when they die add fertility to the soil.

Qn. **State three differences between millipedes and centipedes**.

- Millipedes are herbivorous while centipedes are carnivorous.
- Millipedes have two pairs of legs on each segment while centipedes have one pair of legs on each segment.
- Millipedes protect themselves by coiling while centipedes protect themselves by stinging.

Qn. **Apart from coiling, how else do some millipede protect themselves**?

- By producing bad smell.

CRUSTACEANS

Qn **What are crustaceans?**

- These are arthropods with a hard crust exo skeleton.

Characteristics of crustaceans

- They mainly live in fresh water.
- They have a hard crusty exo skeleton.

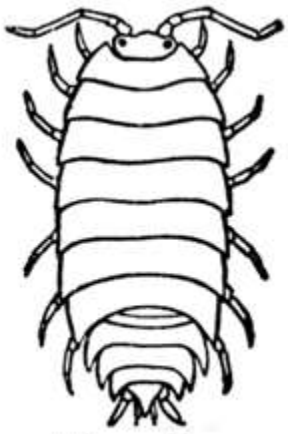
Examples of crustaceans

- crab
- lobster
- cyclop
- cray fish
- shrimp
- prawn
- wood louse

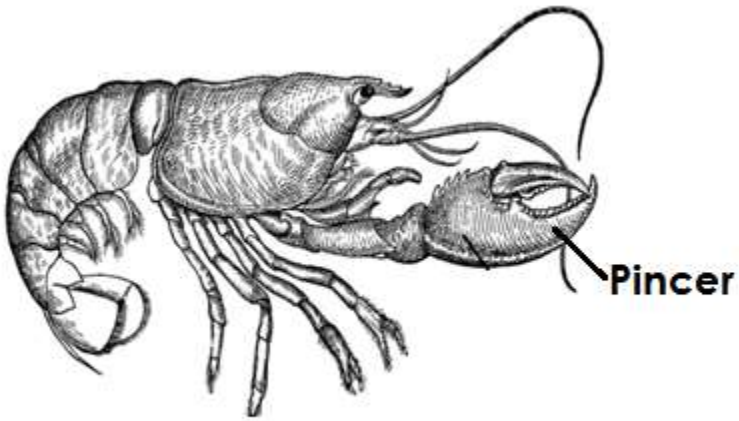
Note:

- Crabs and lobsters have pincers (sharp claws) for protection.

Diagram showing some crustaceans

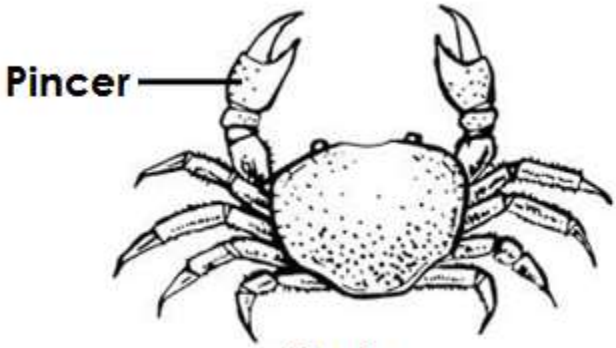


Woodlouse



Lobster

Prawn



Crab

Feeding habits of crustaceans

- Some feed on vegetation.
- Some feed on insects and worms.
- Some have filtering structures in the mouths which filter tiny plants and animals out of water.

Importance of crustaceans

- Crabs and lobster are used as food.
- They are sold for money.

ARACHNIDS

Qn. **What are arachnids**?

- These are arthropods with two main body parts and four pairs of legs.

Characteristics of arachnids

- They have four pairs of legs.
- They have two main body parts i.e**cephalothorax**and**abdomen.**
- They have no wings.
- They have no antennae.
- Arachnids breathe through lung books.

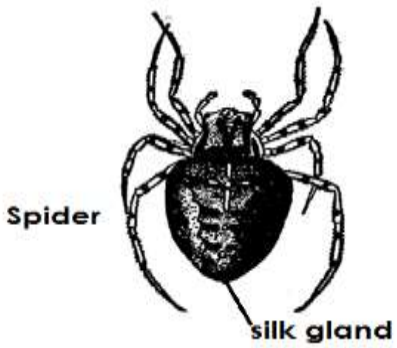
Examples of arachnids

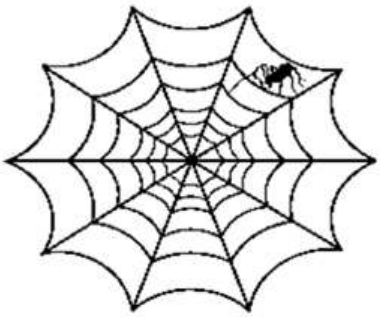
- Ticks - scorpion
- spider - mites

Spiders

- A spider breathes through lung books.
- A spider reproduces by laying eggs.
- A spider has special organs called **spinneretes** at the end of the abdomen for spinning silk or making a web.

A diagram showing spider and its web.





Spider web

Importance of a web to a spider

- It helps a spider to trap its food/prey.
- It acts as a habitat for the spider.
- It is used for protection.
- Male spiders use a web for trapping the female during mating.

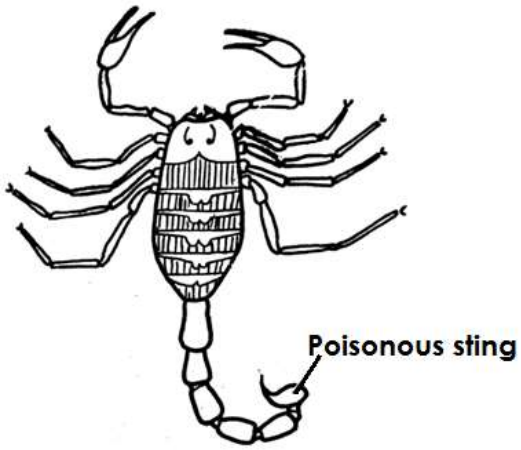
Qn. **Why is a spider not regarded as an insect**?

- A spider has two main body parts while an insect has three main body parts.
- A spider breathes through lung books while an insect breathes through spiracles.
- A spider has four pairs of legs while an insect has three pairs of legs.

Scorpion

- A scorpion breathes through lung books.
- A scorpion has a large tail with poisonous sting.
- A scorpion reproduces by giving birth to live young ones.

A diagram showing a scorpion



Qn. **How is a scorpion different from other arachnids in the way it reproduces?**

- A scorpion reproduces by giving birth to live young ones while the other arachnids reproduce by laying eggs.

Qn. **How does a scorpion protect itself**?

- By injecting poison into the body of an enemy.
- By stinging using its poisonous claws.

TICKS AND MITES

- Ticks and mites are parasites that feed on blood.
- Ticks spread diseases to livestock animals.

Examples of tick borne diseases

- East Coast fever
- Red water

- Heart water
- Anaplasmosis

Note:

- All the above diseases are caused by protozoa.

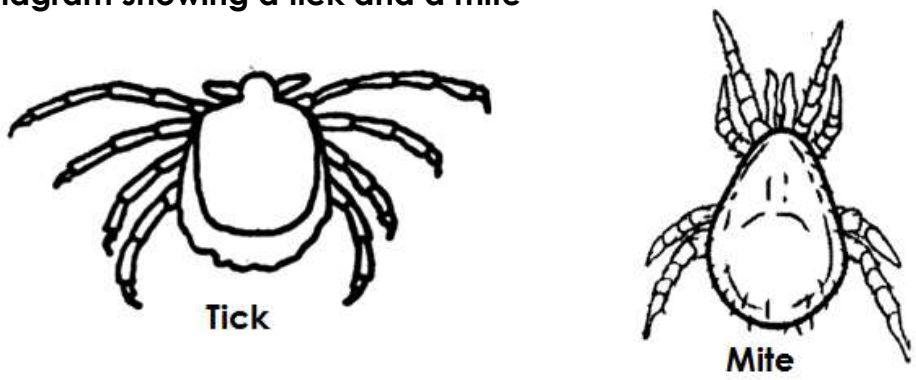
Qn. **What is a parasite**?

- A parasite is an organism which depends on another organism for its survival without killing it.

Qn. **What name is given to the organism on which a parasite depends**?

- Host

Diagram showing a tick and a mite



INSECTS

- These are arthropods with three main body parts and three pairs of legs.

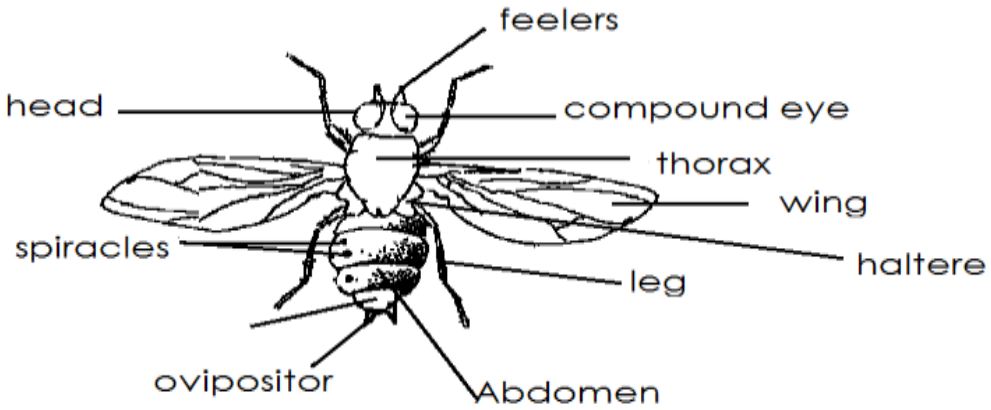
Characteristics of insects

- All insects have three main body parts.
- All insects have three pairs of jointed legs.
- Insects breathe through spiracles.
- They have a pair of feelers called antennae.

Examples of insects

- Housefly - grasshoppers - dragon flies
- Cockroach - mosquitoes - wasps
- Bees - tsetse flies - ants

Diagram showing the parts of an insect.



Qn. **Mention the three main body parts of an insect**.

- head
- thorax
- abdomen

Parts of an insect which are found on the head.

(i) **compound eyes**

- They are used for seeing

(ii) **Antennae**

- For smelling and feeling
- For detecting sound waves and temperature changes.

(iii) **Proboscis**

- For sucking blood and plant juice.

(iv) **Mandibles**

- For biting and chewing
- Parts of an insect found on the thorax

(v) **Wings**

- For flying

(vi) **Halteres**

- For balancing the body of an insect during flight.

(vii) **Legs**

- For movement

Parts of an insect found on the abdomen

(viii) **Spiracles**

- For breathing

(ix) **Ovipositor**

- For laying eggs

(x) **Stinger**

- For protection

Feeding habits of insects.

- The feeding habits of insects depend on the mouth parts they have.
- Some insects have **mandibles** while others have **proboscises.**

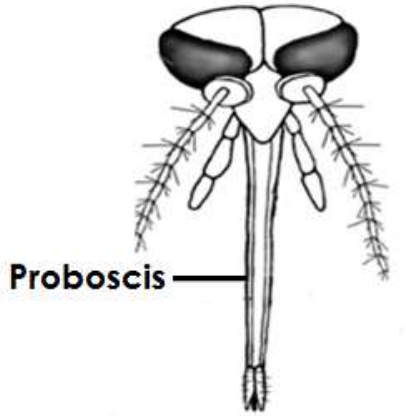
Qn. **Name any four examples of insects with mandibles**.

- Cockroaches - Crickets
- Grasshoppers - Termites
- Locusts - Beetles

Qn. **Mention any four examples of insects with proboscises**

- Houseflies
- Tsetse flies
- Mosquitoes
- Moths
- Bees
- Butterflies

A diagram of a blood sucking mosquito (proboscis)



Reproduction in insects

Qn. **How do insects reproduce**?

- By laying eggs

Qn. **What name is given to the different stage of development the eggs of an insect undergoes?**

- Metamorphosis or life cycle.

Metamorphosis

- Metamorphosis are the different stages of development an insect undergoes.

Types of metamorphosis

- Complete life cycle
- Incomplete life cycle

Complete life cycle/metamorphosis.

Qn. **What is a complete metamorphosis?**

- This is where an insect undergoes all the four stages of development.

Stages of a complete lifecycle/metamorphosis.

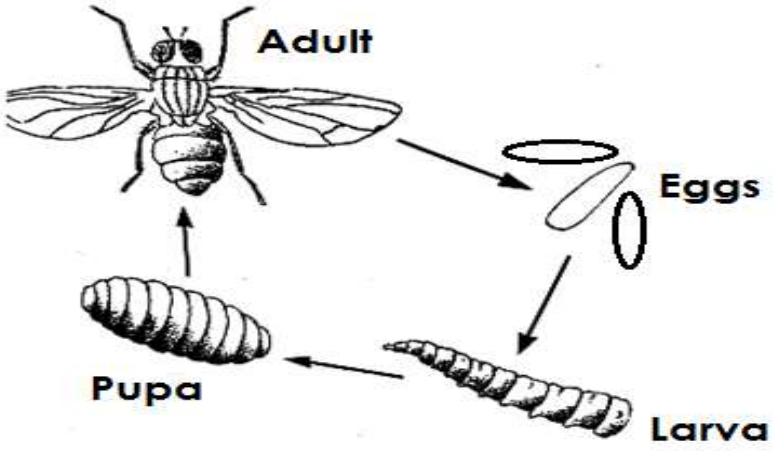
- egg ⟶ larva ⟶ pupa ⟶ adult

Examples of insects that undergo complete lifecycle

- housefly
- mosquito
- butterfly
- bee
- moths
- termites
- black flies
- black fly

(i)A house fly

A diagram showing the life cycle of a housefly



Note:

- The larva of a housefly is called a **maggot.**
- The adult stage of a housefly is called **imago.**

Qn. **How are houseflies help to reduce the volume of faces in pit latrine?**

- The larvae of houseflies help to reduce the volume of faeces in pit latrines.

Qn. **State any two dangers of a housefly**.

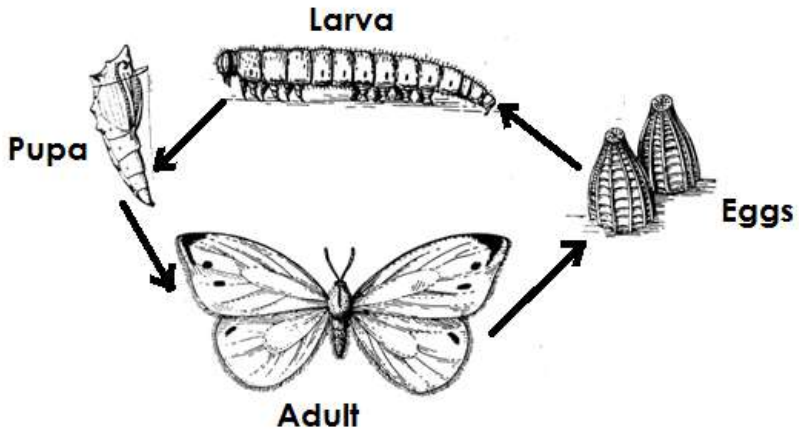
- Houseflies spread diarrhoeal diseases.
- Houseflies contaminate food.

Qn. **How do houseflies able to spread diseases**?

- Through the hair on their bodies.
- By the help of their hairy body.

(ii) **Butterfly**

A diagram showing the life cycle of a butterfly



Note:

- The larva stage of butterfly is called a **caterpillar.**

Qn. **At what stage is a butterfly**:-

(a) **Useful to people**?

- Adult stage

(b) **Dangerous to people**

- Larva stage

Qn. **How is a larva stage of a butterfly dangerous to people**?

- It destroys people's crops

Qn. **How is the adult stage of a butterfly important to crop farmers**?

- It helps in pollination of farmer's crops.

Qn. **At what stage is a butterfly dormant**?

- Pupa

(iii) **Mosquitoes**

- There are three types of mosquitoes namely:-

- Culex mosquito
- Anopheles mosquito
- Aedes / tiger mosquito

Culex mosquitoes

- Culex mosquitoes spread elephantiasis to people.
- Elephantiasis is caused by **filarial worms**.

Characteristics of culex mosquitoes.

- Culex mosquitoes fly during day and night.
- The body of an adult mosquito lies horizontal or flat during rest.
- They lay eggs in a raft.

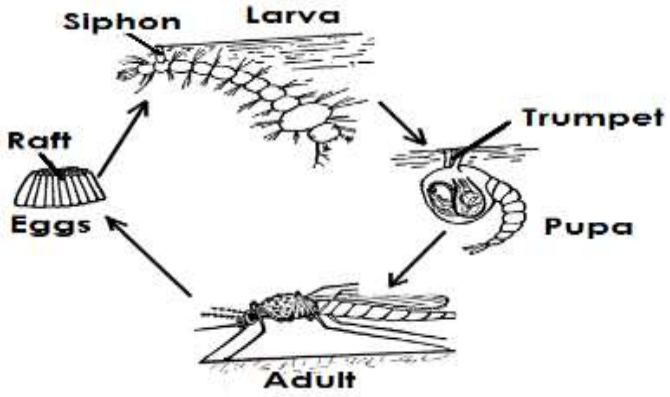
Aedes / Tiger mosquito

- It spreads yellow fever and dengue fever.
- Yellow fever is caused by viruses.

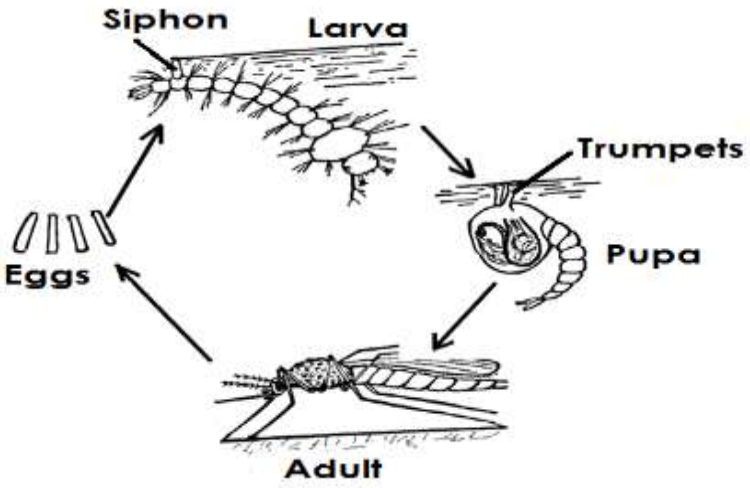
Characteristics of aedes/tiger mosquitoes

- They fly during day.
- They lay single eggs.

A diagram showing the life cycle of tiger and culex mosquito.



Life cycle of an aedes / tiger mosquito



- The larva of a culex and aedes mosquito lie at an angle to the surface of water.

Anopheles mosquito

- The female anopheles mosquito spreads malaria.
- Malaria is caused by **plasmodia germs.**

Qn. **Why can't a male anopheles mosquito spread malaria**?

- It does not suck blood but feeds on plant juices.

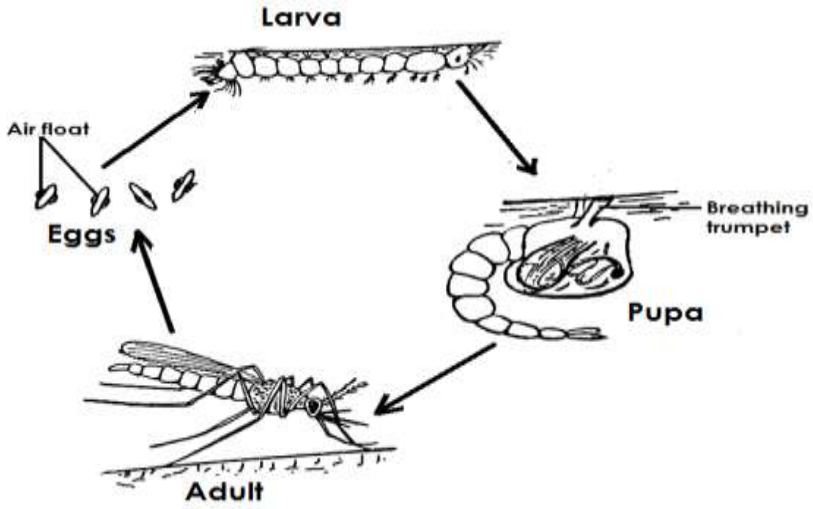
Qn. **Why does a female anopheles mosquito suck blood**?

- To enable their eggs grow.

Characteristics of anopheles mosquitoes.

- Anopheles mosquitoes lay eggs with an air float.
- The larva of anopheles mosquito lies parallel to the surface of the water.
- The adult anopheles mosquito rests at a floppy position.

Diagram showing the lifecycle of anopheles mosquito.



Qn. **Name the structures the larva stage of a mosquito uses for breathing.**

- Siphon

Qn. **State the importance of an air float found on the eggs of a female anopheles mosquito.**

- To enable the eggs float on water.

Qn. **Name the breathing structure of the pupa stage of a mosquito**.

- Trumpet

Breeding of mosquitoes

Qn. **Where do mosquitoes breed from**?

- Stagnant water/Still water.

Qn. **Why do mosquitoes lay their eggs in stagnant water**?

- To prevent eggs from being carried away.

Ways of controlling mosquitoes

- Draining stagnant water.
- Spraying using insecticides.
- Clearing tall grasses around the home.
- Pouring oil on stagnant water.
- Keeping fish in ponds to feed on mosquito larva.

Note:

- Keeping fish in ponds to feed on mosquito larva is a **biological method** of controlling mosquitoes.

Tsetse fly

- A tsetse fly feeds on blood.

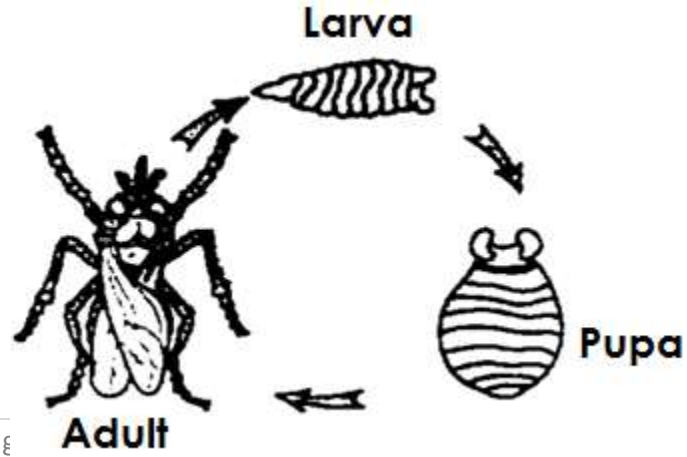
Qn. **How does a tsetse fly feed**?

- By sucking blood using a proboscis

Qn. **Where do tsetse flies live or breed from**?

- Tsetse flies live in bushy areas or forests.

The diagram showing the life cycle of a tsetsefly



Note:

- The eggs of a tsetse fly hatch into larvae inside the abdomen of a female tsetse fly.

Qn. **How does a tsetse fly reproduce**?

- By giving birth to a live larva.

Qn. **State any two dangers of a tsetse fly**.

- A tsetse fly spreads sleeping sickness to people.
- A tsetse fly spreads Nagana to animals.

Qn. **What causes Nagana in animals and sleeping sickness in people**?

- A germ called Trypanosome

Qn. **State any two ways of controlling tsetse flies**.

- By clearing bushes
- By setting up tsetse fly traps.

Incomplete life cycle

Qn. **What is incomplete metamorphosis**?

- This is where an insect undergoes only three stages of development.

Stages of incomplete life cycle

- Egg ⟶ Nymph ⟶ Adult

Examples of insects that undergo incomplete lifecycle

- Cockroaches - Dragon flies
- Grasshopper - Praying mantis
- Cricket
- Locusts

1. **Cockroach**

Qn. **Where do cockroaches breed from**?

- In latrines
- In septic tanks
- Cupboards
- In sofa sets

Qn. **What do cockroaches feed on**?

- Leftover food

Qn. **List any four diseases spread by cockroaches**.

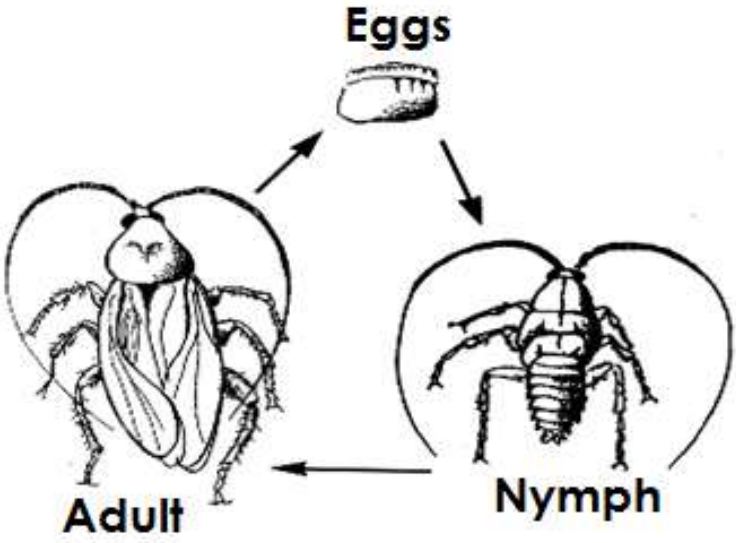
- Diarrhoea
- Typhoid
- Dysentery
- Polio
- Cholera

Qn. **Give any two ways of controlling cockroaches**.

- By spraying using insecticides.
- By keeping cooked food covered

- By spraying breeding places for cockroaches.

The diagram showing the life cycle of a cockroach



Grasshoppers

- Grasshoppers feed on vegetation or leaves.

Qn. **State one importance of grasshoppers to people.**

- Grasshoppers are eaten as food.
- Grasshoppers are sold for money.

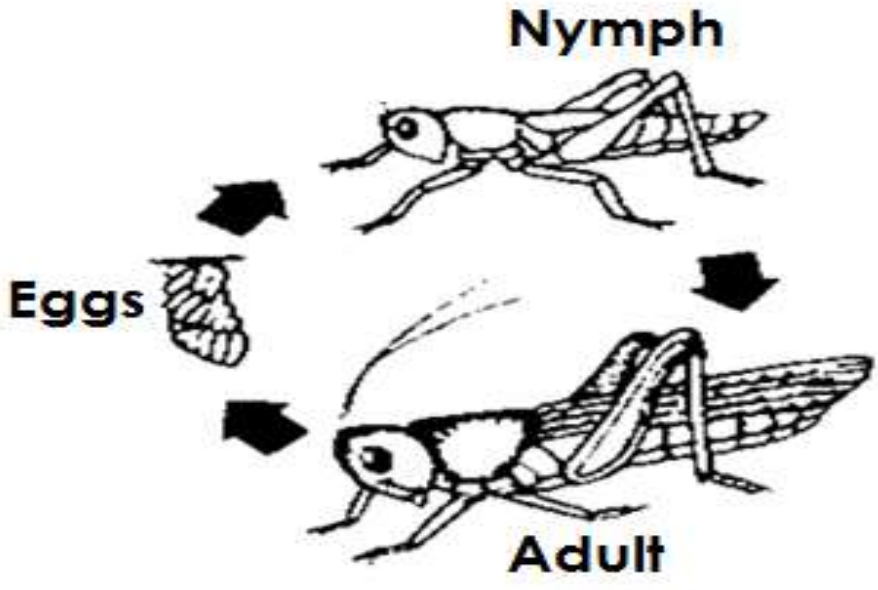
Qn. **Identify any one danger of grasshoppers to crop farmers**.

- Grasshoppers destroy farmer's crops.

Qn. **Where do grasshoppers lay their eggs?**

- Soil

The diagram showing the life cycle of a grasshopper



Advantages of insects

- Insects pollinate crops.
- Some insects are eaten as food.
- Some insects aerate the soil.
- Bees provide honey and wax.
- Maggots of houseflies help to reduce the volume of faeces in pit latrines.
- Some insects are sold for money.

Disadvantages of insects.

- Some insects spread germs that cause diseases.
- Some insects destroy farmer's crops.
- Some insects sting animals and people.
- Some insects are external parasites to farm animals.

SINGLE CELLED ANIMALS

Qn. **What are single celled animals**?

- These are animals with only one cell.

Groups of single celled animals

Protoctista

Monera

Protoctista Kingdom

Protoctista kingdom is divided into two groups viz: -

- Protozoa
- Algae

1. **Protozoa**

- Most of the protozoa are germs that cause different diseases to people and animals.

Examples of protozoa

- Amoeba
- Plasmodia
- Trypanosomes

Paramecium

An amoeba

Qn. **Why is an amoeba called a single celled animal**?

- It has only one cell

Qn. **Where does an amoeba live**?

- In fresh water

Qn. **How does an amoeba reproduce**?

- By the means of cell division or binary fission

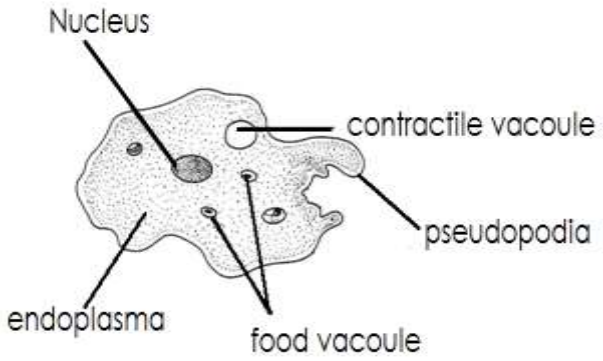
Qn. **How does an amoeba move**?

- By the help of the pseudopodia or false legs.

Qn. **How does an amoeba feed**?

- By engulfing the food particles

The diagram showing an amoeba

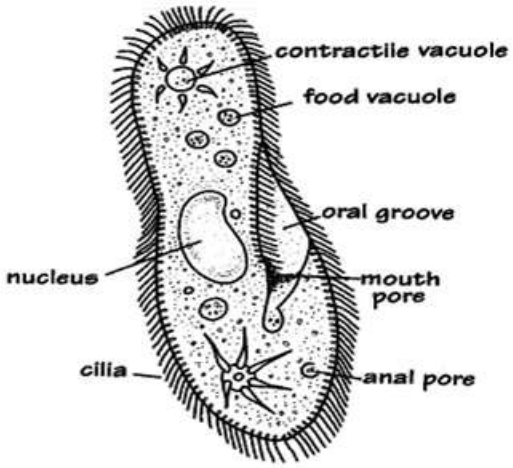


A paramecium

Qn. **How does a paramecium move**?

- By the help of the cilia

The diagram showing a paramecium



An euglena

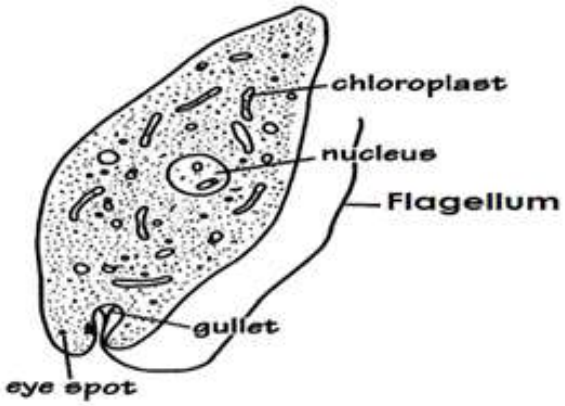
Qn. **How does an euglena move**?

- By the help of the flagellum

Note:

- Most euglena contain chlorophyll therefore they make their own food.

The diagram showing an euglena



2. **Algae**

Qn. **Where do algae grow**?

- Algae grow in water
- Algae grow in damp places.

Qn. **How do algae reproduce**?

- By means of spores

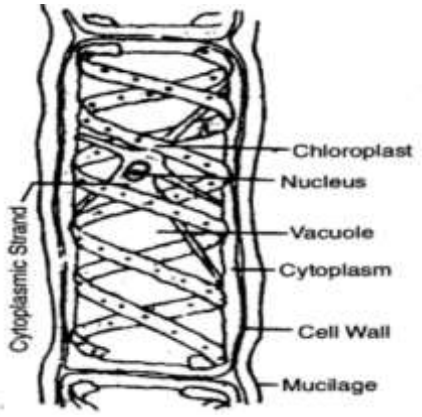
Qn. **State the two examples of algae**

- Spirogyra
- Sea weeds
- Fucus

Note:

- Algae have chlorophyll and can make their own food.

The diagram showing a spirogyra



Qn. **How does a spirogyra move**?

- By the means of fragmentation

Uses of algae

- They are used as food

- They add oxygen to water
- They are used in making fertilizers.

THEME : MATTER AND ENERGY

TOPIC : SOUND ENERGY

Qn. **Give the meaning of the term sound.**

- Sound is the form of energy that enables us to hear.

OR

- Sound is the form of energy produced by vibration of an object.

Qn. **Why is sound called a form of energy**?

- Sound enables us to do work.

Properties of sound

- Sound can be reflected.
- Sound moves in all directions.

Types of sound

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

Production of sound

Qn. **How is sound produced?**

- By means of vibration.

Qn. **What is vibration**?

Vibration is the **to**and**fro** movement of an object

Sources of sound

Qn. **What is a source of sound**?

- A source of sound is anything that vibrates to produce sound.

Note:

- Sources of sound are divided into two types viz.
- Natural sources of sound.
- Artificial sources of sound.

1. **Natural sources of sound**

- These are materials that produce sound on their own.

Examples of natural sources of sound

- Birds - A cat
- Human beings - Storms
- A cow - Insects
- A dog - Water falls
- A snake - Earth quakes

Qn. **How do the following animals produce sound**?

(i) **Human beings**

- By vibration of their vocal cords

(ii) **Birds**

- By vibration of the rings of cartilage in their trachea.

(iii) **Bees and mosquitoes**

- By moving/flapping their wings rapidly in air

(iv) **Crickets and grasshoppers**

- By rubbing their hind legs against their vibrating wings

2. **Artificial sources of sound**

- These are man made materials that produce sound.

Examples of artificial sources of sound

- Drums - Phones
- Xylophones - Guitars
- Aeroplanes - Bottles
- Cars - Horns
- Guns - Bow harp
- Whistles - Piano
- Motorcycles

Musical instruments.

- Musical instruments are tools played to produce musical sounds.

Qn. **What is music**?

- Music is an organized sound produced by regular vibration.

Qn. **What is noise**?

- Noise is disorganized sound produced by irregular vibration.

Qn. **What is a musical instrument**?

- A musical instrument is a tool or device used for producing musical sound.

Group of musical instruments

- Wind musical instruments.
- String musical instruments.
- Percussion musical instruments.

PERCUSSION MUSICAL INSTRUMENTS

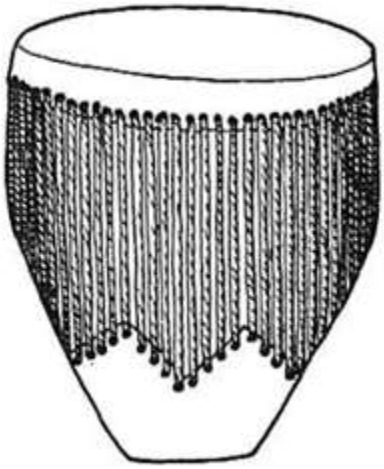
Qn. **What are percussion musical instruments?**

- These are instruments which produce sound by vibration when struck, hit or shook.

Examples of percussion musical instruments

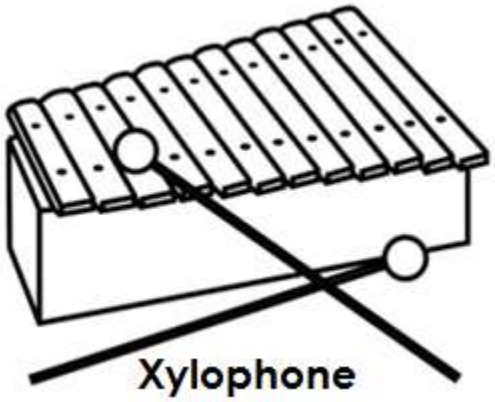
- Drum
- Xylophone
- Long drum
- Bells
- Shakers
- Thumb piano
- Brass band
- Rattles
- Clappers / strikers

Diagram showing some percussion instruments

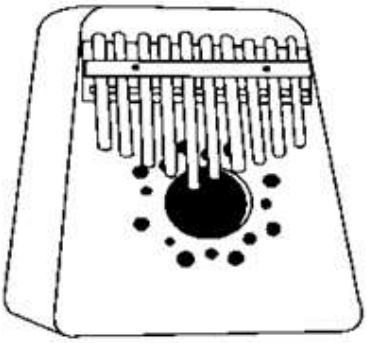


Drum

Long drum



Xylophone



Thumb piano

Bell

Bass drum

Qn. How some percussion musical instruments are played and Produce sound?

1. **Drum**

Qn. How is a drum played?

- By hitting it to vibrate.

Qn**. How does a drum produce sound?**

- By vibration of its skin/membrane when hit.

2. **Shakers**

Qn. **How are shakers played?**

- Shakers are played by striking/shaking.

Qn. **How do shakers produce sound?**

- By vibration when struck

(iii) **Xylophone**

Qn. **How is a xylophone played**?

- A xylophone is played by hitting or beating

Qn. **How does a xylophone produce sound**?

- By vibration when hit.

(iv) **Bell**

Qn. **How is a bell played**?

- A bell is played by hitting.

Qn. **How does a bell produce sound**?

- By vibration when it is hit.

STRING MUSICAL INSTRUMENTS.

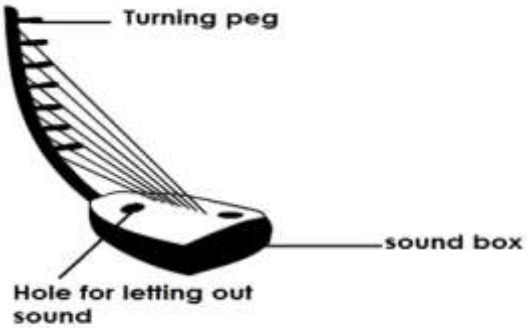
Qn. What are string musical instruments?

- These are musical instruments made of strings and produce sound by vibration when they are plucked or bowed.

Examples of string musical instruments

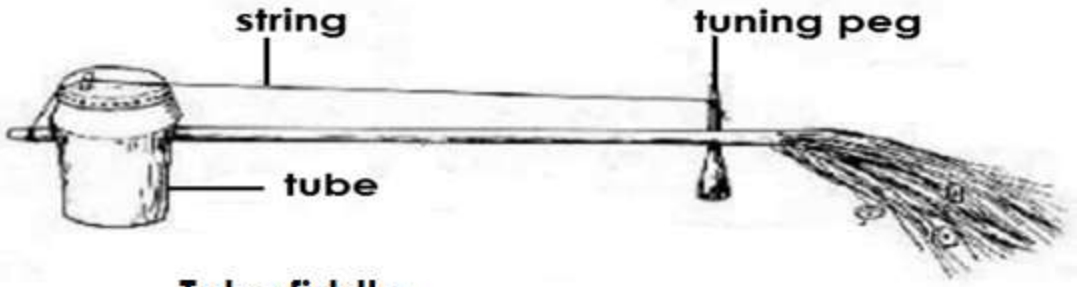
- Bow harp - Guitar
- Tube fiddle - Violin
- Lyre

Diagram showing some string musical instruments

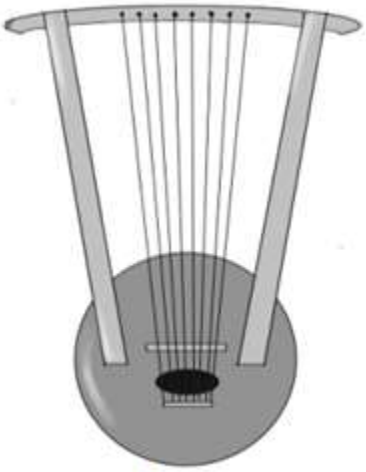


Bow harp

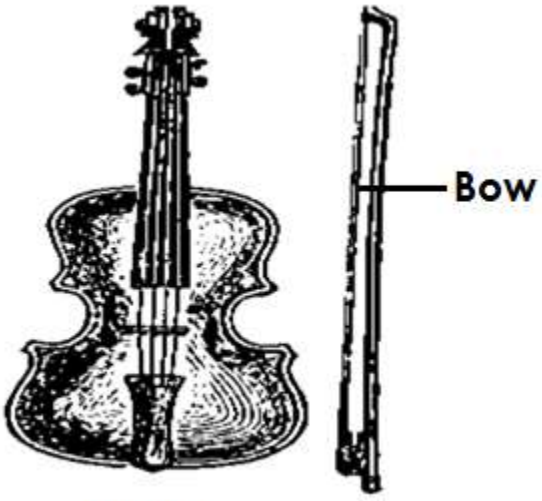
Guitar



Tube fiddle



Lyre



Violin

Note:

- Strings of a bow harp have different length to produce different pitch of sound.

Qn. **How can one change pitch of astring musical instrument?**

- By tightening or loosening the strings.

Qn. **How can one increase the pitch of string instruments**?

- By tightening the strings

Qn. **How can one lower the pitch of string musical instruments?**

- By loosening the strings

WIND MUSICAL INSTRUMENTS.

Qn. **What are wind musical instruments?**

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

Qn. **How are wind musical instruments played?**

- By blowing air inside them.

Qn. **How do wind musical instruments produce sound?**

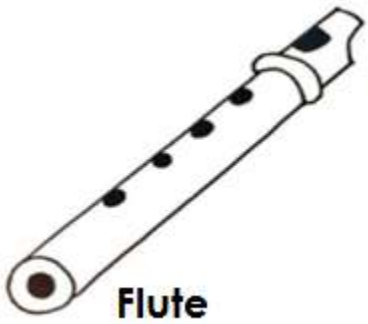
- By vibration of air blown inside them.

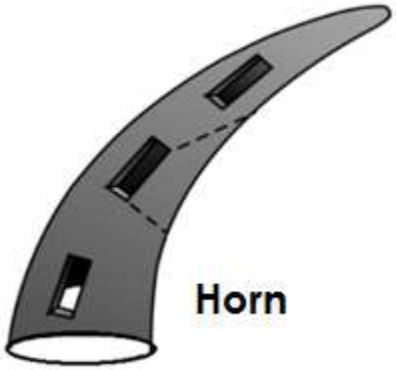
Examples of wind musical instruments

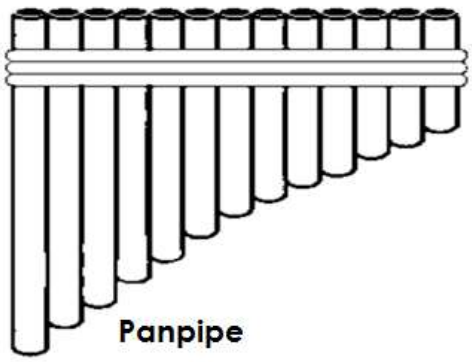
- Flute - Trumpet
  A horn - Trombone
- A whistle

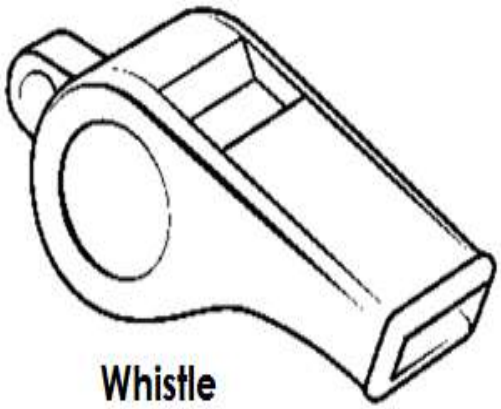
- A recorder
- Empty bottles
- Panpipes
- Saxophone

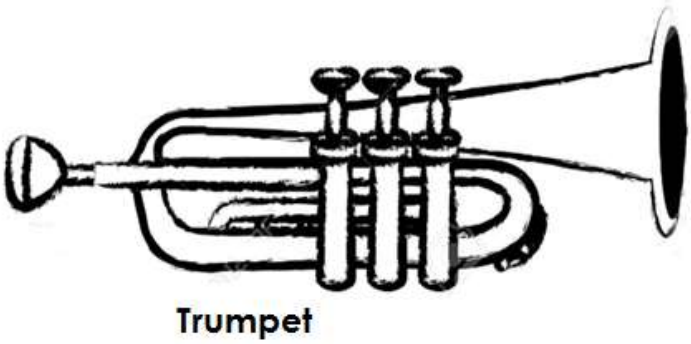
Diagram showing some of the wind musical instrument











Note: Some wind musical instruments have holes numbered to produce different pitch of sound.

TRANSMISSION / MOVEMENT OF SOUND

Qn. **How does sound travel**?

- By means of sound waves.

Note

- Sound travels in all direction from the source.

Diagram showing that sound travels in all directions.

Note:

- For sound to travel,there must be a medium of sound transmission or matter

Qn. **Why can't sound travel through a vacuum?**

A vacuum has no matter that can transmit sound waves.

Speed of sound

- Sound travelsthrough different states of matter at different speed ie
- Through solids at speed of 1500m/sec.
- Through liquids at a speed of 1484m/sec.
- Through gases at a speed of 330m/sec.

Qn**. In which state of matter does sound travel fastest?**

- In solids

Qn. **Why does sound travel faster in solids?**

- Solids have closely packed molecules which allow vibration to take place easily.

Qn**. In which state of matter does sound travel lowest?**

- In gases

Qn. **Why does sound travel slowest in gases?**

- Gases have widely spread molecules.

An experiment to show that sound travels through solids

This experiment is done using two cups and a string as shown below.

Qn. **What does the above experiment prove about sound**?

- It proves that sound travels through solids.

Factors that affect the speed of sound.

- Altitude
- Temperature
- Heat
- Wind

Qn. **How does wind affect the speed of sound**?

- Wind obstructs sound waves by blowing it to different directions.
- Wind carries sound waves further.

Qn. **How does temperature affect the speed of wind**?

- When temperature is low, sound waves travel along the ground and when it is high, sound waves rise.

Qn. **Why are we able to hear clearly at night**?

- There is low temperature at night which makes sound waves to move nearer to the ground.

Qn. **How does altitude affect the speed of sound**?

- Sound waves move easily along a lower altitude than going uphill.

Qn. **Why are we unable to hear clearly on hills or mountains**?

- Hills and mountains are on a higher altitude.

Terms used in sound.

Qn. **Give the meaning of the following terms as used in sound**.

1. **Pitch**
   Pitch is the highness or lowness of sound.
2. **Volume**
   Volume is the loudness or softness of sound.
3. **Frequency**
   Frequency is the number of vibration produced by an object per second
   Note:
   Frequency is measured in units called **Hertz (Hz)**
4. **Echo**
   An echo is a reflected sound.
5. **Amplitude**
   Amplitude is the width of sound vibration.

PITCH

Qn.What is pitch?

- Pitch is the highness or lowness of sound.

Factors that affect pitch of sound

- Size of an object.
- Length of the string.
- Thickness of the string.
- Nature of the vibrating material.
- Tension of the string.
- Frequency.

Qn. **How does the size of an object affect pitch of sound?**

- The bigger the musical instrument, the lower the pitch of sound produced and the smaller the musical instrument, the higher the pitch of sound produced.
- Illustration showing how size of an object affects pitch of sound.

1. **Comparing drums**

A **B** **C**

Qn. **Which drum produces sound of;**

high pitch?

Drum marked C

Qn**. Give a reason to support your answer.**

- Drum C has a small vibrating surface or space.

(b) **Low pitch?**

Drum marked A

Qn. **Give a reason to support your answer above**.

Drum marked A has a big vibrating surface or space.

2. **Comparing with different level of water**.

W **X** **Y**

Qn. **Which of the bottles produce sound of:**

(a) **high pitch**?
- Bottle marked X produces high pitched sound.

(b) **Low pitch?**
- Bottle marked W produces low pitched sound.

Qn. **Give a reason to support your answers above.**

(a) Bottle marked x has a small vibrating space.

(b) Bottle marked W has a large vibrating space.

Qn. **How does the thickness of the strings affect pitch of sound**?
- The thicker the string, the lower the pitch of sound and the thinner the string, the higher the pitch of sound.

An illustration

Qn. **Which string produces sound of** :-

(a) **Lower pitch**?
- String marked A

(b) **Higher pitch**?
- String marked B

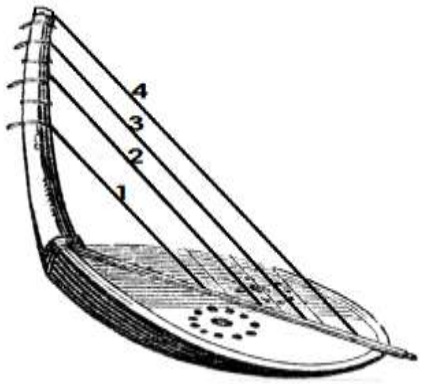
Qn. **Give a reason to support your answers above**.

(a) String marked A has a large vibrating space.

(b) String marked B has a small vibrating space.

Qn. **How does the length of the string affect the pitch of sound produced**?
- The shorter the string, the higher the pitch of sound and the longer the string, the lower the pitch of sound produced

An illustration using a bow harp



Qn. **Which string produces sound of**:-

(a) **Lower pitch**?
- String marked 4

(b) **Higher pitch**
- String marked 1

Qn. **Give a reason to support your answers above.**

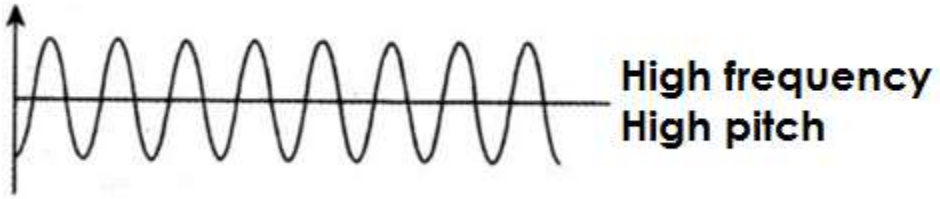
(a) String marked 4 has a large vibrating surface.

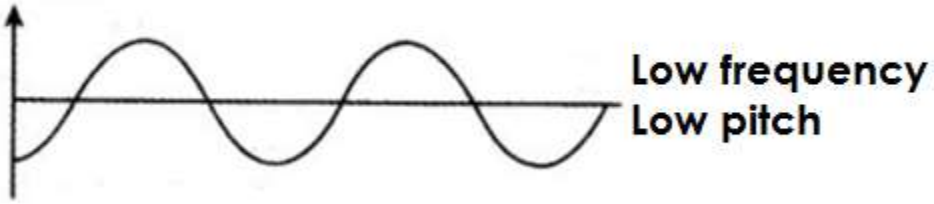
(b) String marked 1 has a small vibrating surface.

Qn. **How does frequency affect the pitch of sound produced?**

- The higher the frequency, the higher the pitch and the lower the frequency, the lower the pitch of sound produced.

An illustration





Volume

- Volume is the loudness or softness of sound.

Qn. **Name the factor that affects the volume of sound**.

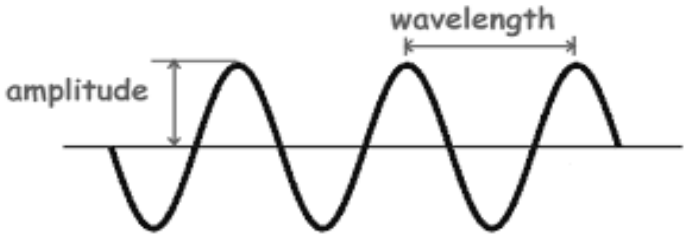
- Amplitude

Qn. **What is amplitude**?

Amplitude is the width of the sound vibration.

Qn. **How does amplitude affect the volume of sound**?

- The greater the amplitude, the louder the sound and the smaller the amplitude the softer the sound.



Qn. **In which units is sound measured**?

- Decibels

ECHO

Qn. **What is an echo?**

- An echo is a reflected sound.

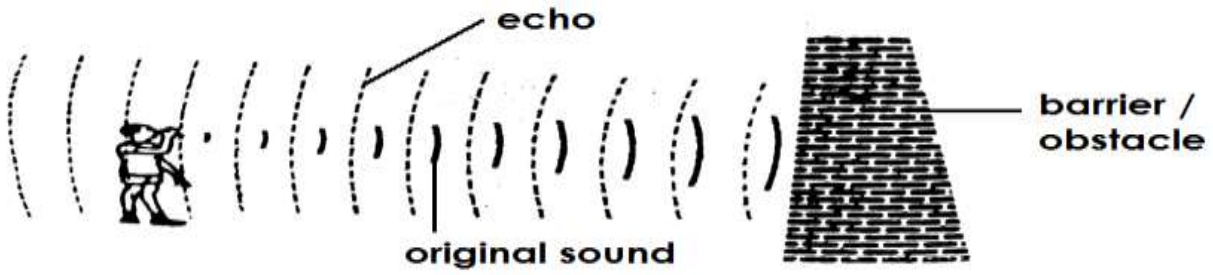
Qn. **How is echo formed**?

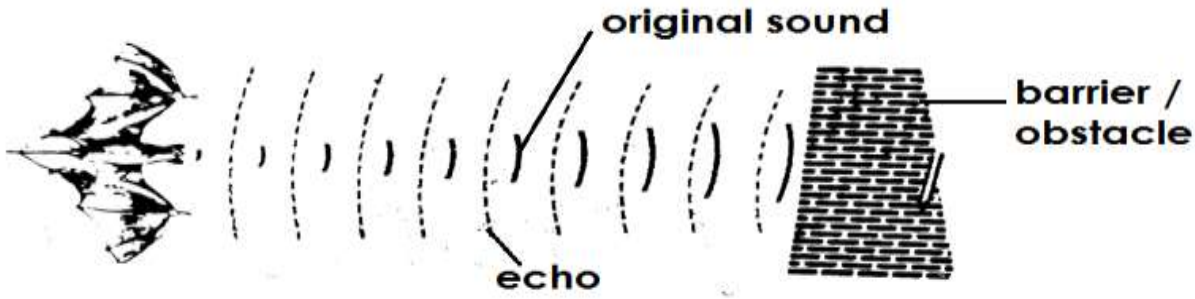
- Echo is formed when sound waves hit an obstacle or barrier.

Examples of obstacles that may form echo.

- Mountain
- Hills
- Walls
- Valleys
- Cliffs
- Caves
- Thick forests
- Empty tall buildings

An illustration showing formation of echo.





Advantages of echoes

- Echoes enable bats to locate food at night.
- Echoes enable bats to dodge obstacles (to find their way)
- Echoes enable sailors and seamen to determine the depth of the sea.
- Echoes help pilots to avoid accidents.
- Echoes help whales to dodge their enemies and obstacles in water.

Qn. **Name the device sailors and seamen use to determine the depth of the sea.**

- Fathometer

Disadvantages of echoes

- Echoes cause sound pollution.
- Echoes cause accidents.

- Echoes make sound hard to interpret.

Qn. **How is echo controlled in disco halls and theatres**?

- By covering the inside walls with soft boards.
- By covering the inside walls with thick curtains.

Qn. **How do soft boards reduce or control echoes in the theatres or cinema halls**?

- Soft boards absorb sound waves.

STORING SOUND

Qn. **Write down the methods of storing sound.**

- Recording method
- Notation method

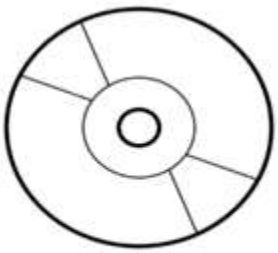
1. **Recording method**

This is the method of storing sound using electric devices.

Examples of devices used to store sound.

- Memory cards
- Compact discs (CDs)
- Flash discs
- Digital video discs (DVDs)
- Video compact discs (VCDs)
- Cassette tapes
- Records
- Floppy discs
- MP3 and MP4
- Computer diskettes
- Cinefilm

Diagrams showing different devices used to record sound.



DVD

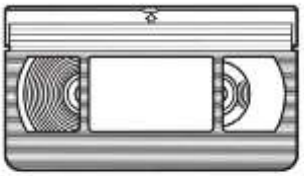
Memory card

Cassett

Flash disc

Floppy disc

Video tape



Notation method

- This is a method of storing sound by writing.

Qn. **Write the types of notation**.

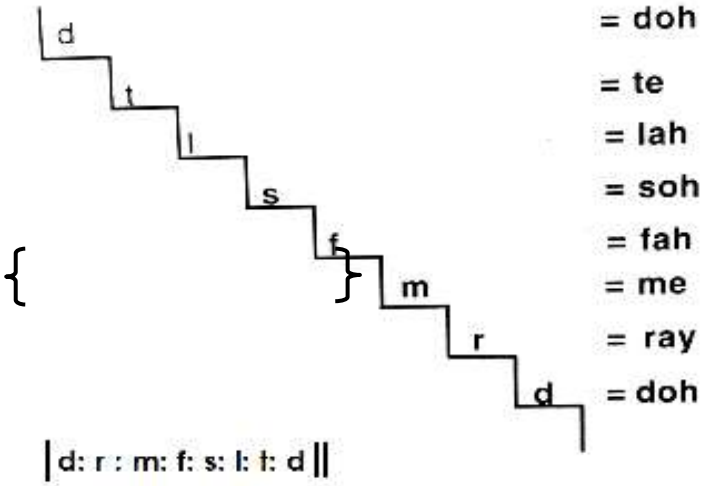
- Solfa notation
- Staff notation

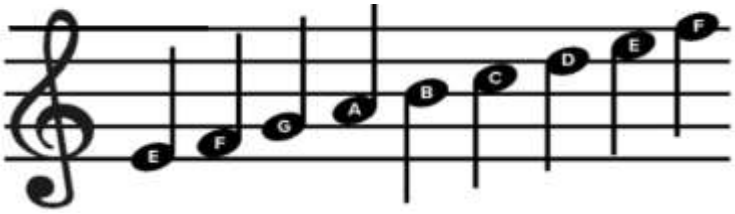
(a) **Solfa notation**

This is a method of storing sound using letters called solfas

Illu

(b)





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- Reasons or importance of storing sound.
- Stored sound is used for entertainment.
- Stored sound is used as evidence in courts of law.
- Stored sound is used as source of income.
- Stored sound is used for remembrance or reference.
- Sound is used for communication.

REPRODUCTION

Qn. State different ways of reproduction sound

- Singing the solfas
- Playing cassette tapes in cassette tape player.
- Playing video tapes in a video deck.
- Playing CDs in a CD player.
- Playing DVDs in a DVD player.
- Playing VCDS is a VCD player.
- Playing memory cards on mobile phones.
- Playing records in record players.
- Playing cinema films using a problem.
- Using a piano and a keyboard to reproduce sound stored by notation.
- Playing flash discs using computer and music systems.

Qn. **Name different devices used to reproduce stored sound.**

- Computer monitors
- Compact disc players
- DVD players
- VCD players
- MP3 players
- Radio cassette players
- MP4 players
- Mobile phones
- Film projectors
- Gramophones
- Video decks

Diagrams showing some devises used to produce sound

DVD player

THE HUMAN EAR

The human ear is sense organ used for hearing.

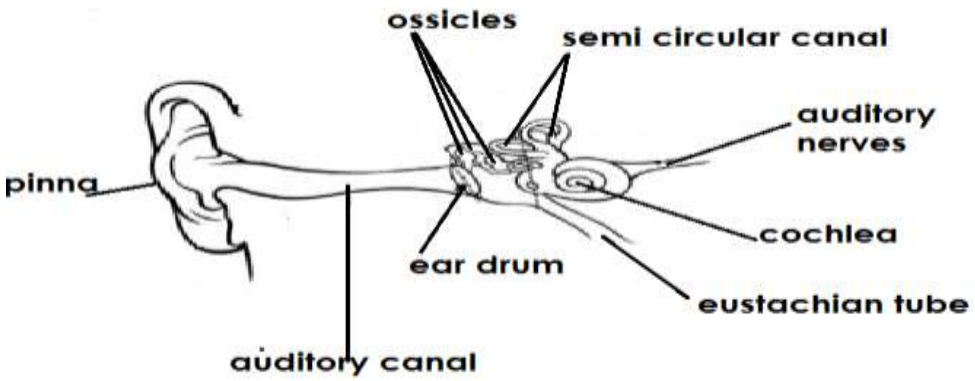
Qn. **A part from hearing , how else is the human ear useful**?

- For body balance

Qn. **Which part of the human skeleton protects the ear**?

- Skull

Structure of the human ear



Region of the human ear

(i) The outer ear

(ii) The middle ear

(iii) The inner ear

Qn. **Name the parts that make up the outer ear.**

- Pinna
- Auditory canal

Qn. **Identify the parts that make up the middle ear**.

- Ear drum
- The ossicles
- Eustachian tube

Qn. **Mention the parts that make up the inner ear**.

- Cochlea
- Semi- circular canal
- Auditory nerves

Qn. **State the function of each of the following parts of the human** ear.

(i) Pinna

- Collects sound waves from the environment.
- Directs sound waves into the auditory canal.

Qn. **How is the pinna adapted to collecting sound waves?**

- The pinna is folded to increase the surface area for collecting sound waves.

(ii) **Auditory canal**

- Directs sound waves to the middle ear.
- Acts as a passage of sound waves to the middle ear.
- Note:
- The auditory canal contains hair and wax which traps dust and other foreign bodies in the ear.

(iii) **Ear drum**

- Changes sound waves into sound vibrations.
- Vibrated according to the pattern of sound waves it receives.

Qn. **How is the ear drum adapted to its functions**?

- It is made up of a thin soft membrane which is very sensitive to sound waves.

(iv) **Ossicles**

- They amplify sound vibrations.
- Transmit sound vibrations from the ear drum to the inner ear.
- Note
- The ossicles are the three small bones found in the middle ear. I.e. Hammer, Anvil , stirrup mallers , …… and stapes (HAS/MIS)
- The stirrup / stapes is the smallest bone in the human body.

(v) **Eustachian tube**

- Balances / equalizes the air pressure between the middle ear and the atmosphere.

(vi) **Sem – circular canal**

- Helps in body balance.

(vii) **Cochlea**

- Changes/ converts sound vibrated into nerve impulses / signals.

Qn. **How is the cochlea adopted to its function**?

- Contains fluids called Endolymph and perilymph which convert sound vibration into nerve impulses.
- Note
- The cochlea is sais to be the centre of hearing.

(viii) **Auditory nerves**

Transmits sound impulses to the brain for interpretation.

Qn. **Name the parts of the human ear which are not connected to the hearing process**.

- Semi – circular canal
- Eustachian tube

Qn. **Disorder of the human ear**

(i) Partial deafness

(ii) Sensory deafness

(iii) Permanent deafness

Qn. **What is deafness?**

Deafness is the inability to hear properly.

Types of deafness

(i) This is the type of deafness where a person is unable to hear properly.

Causes of deafness

- Having too much wax in the ear.
- Correction of partial deafness
- By removing too much wax from the ear.

(ii) **Sensory deafness**

This is a type of deafness / condition where a person cannot differentiate between sound.

Causes of sensory deafness

- Old age
- Damage caused on the ear drum.
- Disease or injury on the auditor nerve.
- Serious fracture of the skull.
- Living / working in noisy places for along time.

Qn. **How to control sensory deafness?**

- Feeding on a balances diet to keep healthy.
- Avoid travelling in vehicles which are in dangerous mechanical condition (DMC'S)
- Avoid staying in noisy places for a long time.
- Treat any infection of the ear as early as possible.

(ii) **Permanent deafness**

This is the irreversible inability to hear.

Causes of permanent deafness

- Through inheritance.
- Diseases like German measles.
- Damage of the ear drum after piercing it with a very sharp objects.
- Note
- Permanent deafness cannot be corrected.

Diseases of the human ear

- Otalgia
- Otitis media
- Ways of caring for the human ear
- Clean the ears with clean water and soap daily.
- Avoid pushing sharp piercing instruments in the ear.
- A void playing games which may damage the ear.
- Use ear buds while cleaning the ear.
- Feed on food that make up a balance diet.
- Carry out regular physical exercises.
- State the importance of wax / cerumen in the ear
- Traps dust in the ear.

Qn. **State the danger of having too much wax/ cervmen in the ear**.

- Leads to partial deafeness

Qn. **State the danger of cleaning the ear using sharp piercing objects**

- Causes damage to the ear drum
- Comparing the human ear with other hearing organs of other animals

(i) Fish use of the lateral line for detecting sound waves.

(ii) Insects use the antennae/ feelers for detecting sound waves.

(iii) Snakes use the basal skin for detecting sound waves.

(iv) Amphibians (frogs , toad etc) use the tympanum/ tympanic membrane/ ear drum for detecting sound waves.

(vi) Birds use fine feather / tiny hair found at the entrance of the ear canal to defect sound waves.

TOPICS 3
THE CIRCULATORY SYSTEM

Qn. **What is the circulatory system**?

The circulatory system is the body's transport system through which , oxygen and other materials are supplied to all body parts.

Or The circulatory system is the system made up of organs and tissue which help in the transportation of substance in the body.

Qn. **Write down the components of the circulatory system**.

- The heart
- Blood
- Blood vessels

1. **THE HEART**

The heart is the main organ of the human body which pumps blood to all body parts.

- The heart is found / located in the **chest cavity**.
- The heart is protected by part of the skeleton called **Rib cage / Ribs**
- The heart is made up of strong muscles called **Cardiac muscles.**
- The heart is made up of four chambers ie the two upper chambers and two lower chambers.
- The upper chambers are called Atria (auricles) and the lower chambers are ventricles.
- Heat beat

Qn. **What is heart beat?**

Heart beat is the alternate contraction and relaxation of the heart muscles.

Qn. **State factors /conditions that may increase heart beat.**

- Shock
- Fear
- Too much excitement
- Fatigue
- After performing a vigorous exercise
- Note
- The number of heart beats per minute is regarded or pulse rate.
- The heartbeat of an adult person under normal condition is about 72 times per minute.

Qn. **Why does the heart beat faster after performing a vigorous exercise/ activity?**

- To supply more food and oxygen to the body muscles.

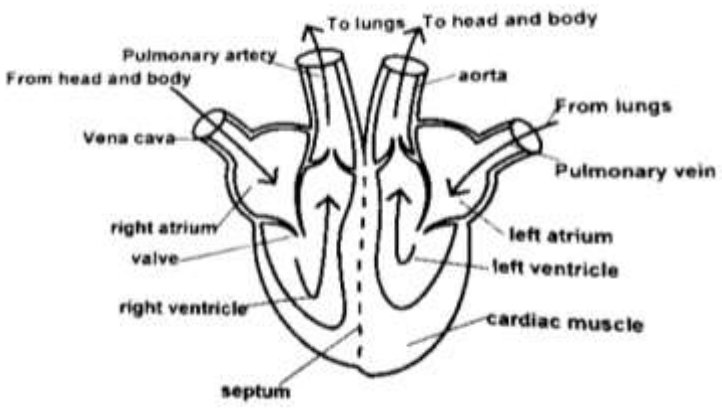
Qn. **Which instrument do doctors use to listen to the heart beat/ blood flow?**

- Stethoscope

Qn. **Name the instrument used to measure blood pressure.**

- Sphygmomanometer

STRUCTURE OF THE HUMAN HEART



Functions of each part of the heart.

(i) **Vena cava**

- Transports deoxygenated blood from all body parts to the heart.

(ii) **Right atrium**

- Receives deoxygenated blood from the vena cava.

(iii) **Right ventricle**

- Pumps deoxygenated blood to the lungs through the pulmonary artery.

(iv) **Pulmonary artery**

- Transports deoxygenated blood from the heart to the lungs.

Qn. **Why is deoxygenated blood sent to the lungs**?

- To drop carbon dioxide and pick oxygen.
- To be oxygenated.

(v) **Pulmonary vein**

Transports oxygenated blood from the lungs to the heart.

(vi) **Left atrium**

- Receives oxygenated blood from the pulmonary vein.

(vii) **Aorta**

- Transports oxygenated blood from heart to all body parts.

(ix) **Septum**

- Prevents deoxygenated blood from mixing with oxygenated blood.

(x) **Valves**

- The valves prevent the backflow of blood in the heart.

Qn. **Why is the left side of the hear thicker that the right side**?

- The left side pumps blood of high pressure to longer distance than the right side. **BLOOD CIRUCULATION**

Qn. **What is blood circulation?**

Blood circulation is the continuous movement of blood around the body.

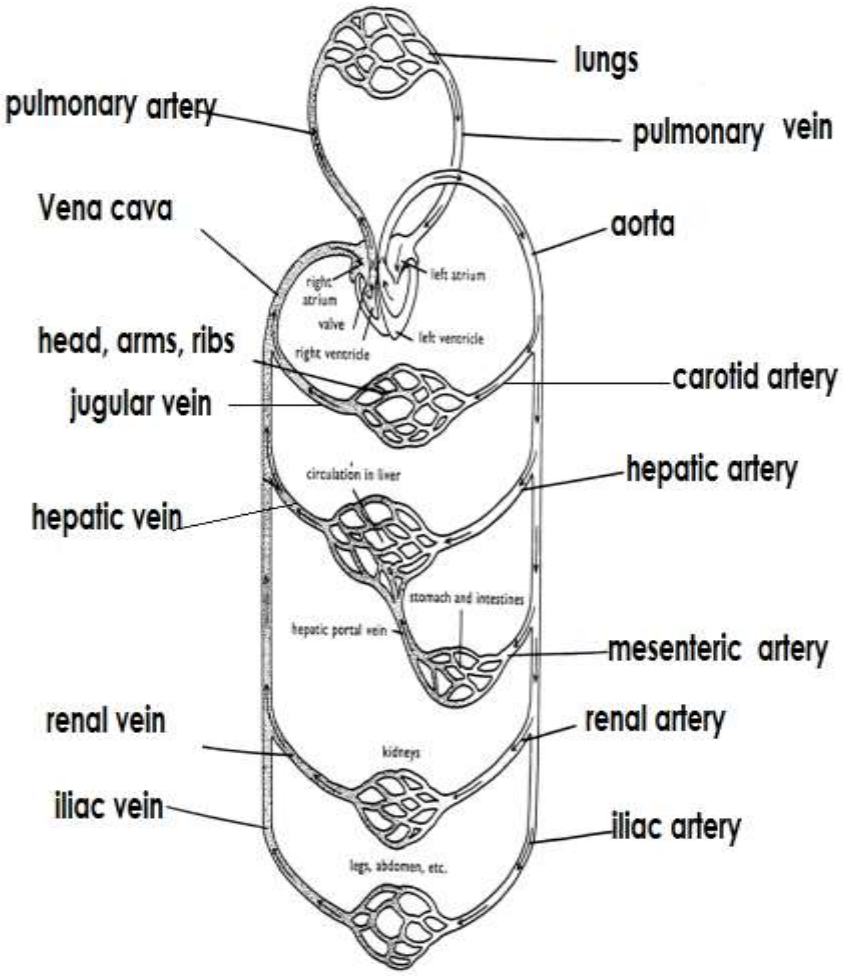
Qn. **Write down the types of blood circulation**.

- Pulmonary circulation
- Systemic circulation
- Qn. **What is pulmonary circulation**?
- Pulmonary circulation is the circulation of blood to and from the lungs.

Qn. **What is systemic circulation**?

Systemic circulation is the circulation of blood from the heart to the all parts of the body.

DIAGRAM SHOWING BLOOD CIRCULATION



2. **BLOOD**

Qn. What is blood?

- Blood is a red liquid that flows around the body.

Qn. **Write down the types of blood.**

(i) Oxygenated blood.

(ii) Deoxygenated blood

(i) **Oxygenated blood**

- This is the type of blood rich in oxygen.

Note

Oxygenated blood id bright red in colour.

(ii) **Deoxygenated blood**

This is the type of blood rich in carbon dioxide (type of blood without oxygen)

Note

Deoxygenated blood is dark red in colour.

Qn. **Write down the components/ parts of blood.**

(i) Red blood cell (Erythrocytes)

(ii) White blood cells (Leucocytes)

(iii) Platelets (Thrombocytes)

(iv) Plasma

(i) **Red blood cells (ERYTHROCTTES)**

- These are disc shaped cells with no nucleus.

Qn. **How are red blood cells useful in the body?**

- Red blood cells transport oxygen around the body.

Qn. **Where in the body are red blood cells made/ manufactured**?

- Red bon marrows of short bones

Qn. **How are red blood cells adapted to their function**?

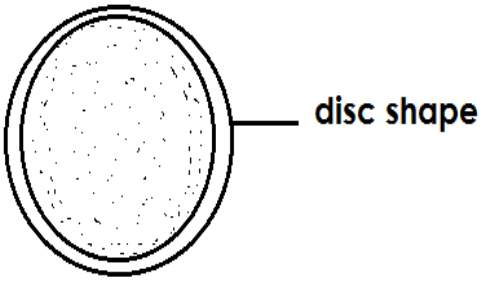
- They contain haemoglobin

Qn. **How is haemoglobin important**?

- Haemoglobin transports oxygen around the body.
- Note:
- Haemoglobin is red pigment found in red blood cells.
- Haemoglobin is made from a minerals salt called iron.

Qn. **What is formed when oxygen combines with haemoglobin**?

- Oxyhaemoglobin
- Diagram showing a red blood cell



Qn. **State the characteristics of red blood cells.**

- They are disc shaped.
- They have no nucleus.
- They carry oxygen around the body.
- They contain haemoglobin.
- Note
- Red blood cells are affected by malaria disease which is caused by plasmodia.

- Red blood cells are destroyed in the liver / spleen.

Qn. **Why are red blood cells destroyed in the liver**?

- To make up like pigments

(ii) **WHITE BLOOD CELLS (LEUCOCYCLES)**

- These are colourless blood cells with a nucleus.

Qn. **State the function of white blood cells in the body**.

- White blood cells fight against disease causing germ.
  Or
- White blood cells defend the body against disease causing germs.

Qn. **How do white blood cells defend the body against disease causing germ?**

- By engulfing disease causing germs.
- By producing antibodies against disease causing germs.

Qn. **How are white blood cells adapted to their function**?

- White blood cells produce antibodies that fight against disease causing germs.
- White blood cells have an irregular shape to enable them engulf disease causing germs.

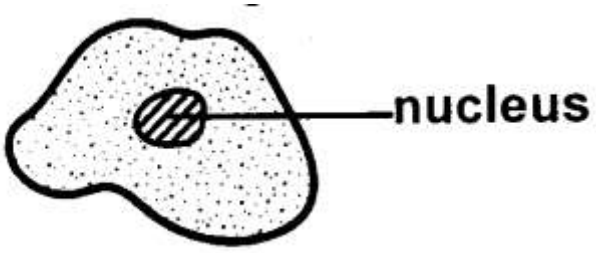
Qn. **What are antibodies**?

- Antibodies are chemicals produced by white blood cells to defend the body against diseases.

Qn. **Where are white blood cells manufactured in the body?**

- In bone marrow of long bones.
- In the spleen.
- In the lymph nodes.

DIAGRAM SHOWING THE STUCTURE OF A WHITE BLOOD CELL



Characteristics of white blood cells.

- White blood cells have a nucleus.
- White blood cells are irregular shaped.
- White blood cells defend the body against diseases.

Note:

- White blood cells are fewer in number that red blood cells.
- Too many white blood cells can lead to leukaemia (blood cancer)
- White blood cells are destroyed or attacked by the HIV germs that causes AIDS.

Differences between white blood cells and red blood cells.

- White blood cells defend the body against disease while red blood cells transport oxygen around the body.
- White blood cells have a nucleus while red blood cells do not have a nucleus.
- White blood cells have an irregular shape while red blood cells are disc shaped.

Qn. **State the functional difference between white blood cells and red blood cells.**

- White blood cells defend the body against diseases while red blood cells transport oxygen around the body.

Qn. State any two structural difference between the white blood cells and red blood cells.

- White blood cells have nucleus while red blood cells don't have nucleus.
- White blood cells have an irregular shape while red blood cells have disc shape.
-

PLATELETS (THROMBOCYTES)

- Platelets are the smallest component of blood in the body.

Qn. **Where are platelets made in the body**?

- In the red bone marrow.

Qn. **State the function of platelets**.

- Platelets help in blood clotting.

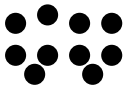
Qn. **What is blood clotting**?

- Blood clotting in the thickening of blood at the site of an injury.
- OR
- Blood clotting is the formation of a solid lump of blood at the site of an injury (wound or cut)

Qn. **How do platelets help to prevent bleeding**?

- By clotting blood in wounds or cuts in case of an injury.
- Note:
- Lack of enough platelets in the body may result in excessive bleeding in case of a cut or wound.

DIAGRMA SHOWING THE STUCTURE OF PLATELETS



PLASMA

- Plasma is the liquid part of blood.
- Plasma is pale in colour and watery.

Functions of plasma

- Plasma transports carbon dioxide from all body part to the lungs.
- Plasma transports digested food to all body parts.
- Plasma transports hormones from the glands where they are made to where they are needed in the body.
- Plasma transports antibodies to the site of infection.
- Plasma distributes heat produced in the liver to all body parts.

Components of blood plasma

- Digested food
- Carbon dioxide
- Hormones
- Blood proteins
- Water
- Mineral salts.

General function of blood in the body.

- Blood defends the body against diseases.
- Blood transports oxygen around the body.
- Blood regulates body temperature.
- Blood transports digested food to all body parts.
- Blood transports antibodies to the site of infection.
- Blood helps in clotting to control excessive bleeding.
- Blood transports carbon dioxide from all body parts to the lungs.
- Blood transports nitrogenous wastes from the liver to the kidney.
- Blood transports hormones around the body.
- Blood distributes heat from the liver to all body parts.

BLOOD GROUPS

- Blood groups is a method of classifying blood according to whether antigen A or B are present in the red blood cells.

Qn. **<u>What is an antigen</u>**?

- An antigen is a substance that stimulates production of antibodies.

Classification of blood groups

- Blood group A (has antigen A only)
- Blood group B (has antigen B only)
- Blood group AB (has both antigens A and B)
- Blood group O (has neither antigens)

Note:

- Blood groups were discovered by an Austrian Scientist called **Karl Landsteiner**.
- When a person gets a serious accident, he or she loses a lot of blood and blood has to be given to him or her to replace the lost blood through blood **transfusion**.
- Blood transfusion

Qn. **What is blood transfusion**?

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

Qn. **Why should blood be screened before transfusion**?

- To know where there are HIV germs that cause AIDS.
- To know if it is free from blood diseases.

Qn. **What is a blood bank?**

- A blood bank is a place where supplies of blood for transfusion are kept or stored.
- Note:
- A person who donates /gives blood is called **a blood donor.**
- A person who receives blood is called a **blood recipient**
- A person who donates blood to any person of any blood group is called a **universal donor.**
- A person who received blood from a person of any blood group is called a **universal recipient**.

SUMMRY OF BLOOD GROUPS

Blood group	Donor group	Recipient
A	A and AB	A and O
B	B and AB	B and O
AB	AB	AB, A, B , O
O	AB, A , B , O	O only

Note:

- A person of blood group A can give blood to a person of blood group A and AB but receives blood from a person of blood group A and O only.
- A person of blood group B can give blood to a person of blood B and AB but receives from a person of blood group B and O only.
- A person of blood group AB can give blood to a person of AB only but receives blood from a person of any blood group. Therefore he or she is called a **Universal recipient.**
- A person of blood group O can give blood to a person of any blood but receive blood from a person of blood group O only. Therefore, she / he is called a **Universal donor.**

Qn. **Give any two conditions in which one may require blood transfusion.**

- When a person in anaemic.
- When a person gets a severe accident and loses a lot of blood.
- Ways of increasing the volume of blood in the body.
- Feeding on a balanced diet.
- Taking plenty of fluids.
- Talking iron tablets.
- Feeding on food rich in iron.
- Through blood transfusion.

Qn. **Why should adolescent girls be given food rich in iron?**

- To replace lost blood during process of menstruation.
-
- BLOOD VESSSELS

Qn. **What are blood vessels?**

Blood vessels are tubes through which blood flows.

Types of blood vessels

- Veins
- Arteries
- Capillaries

(i) **VEINS**

Veins are blood vessels that carry towards the heart.

Qn. **Which types of blood is carried by most veins?**

- Deoxygenated blood

Note:

- Most veins carry deoxygenated blood except the pulmonary vein which carries oxygenated blood from the lungs to the heart.

Characteristics of veins

- Veins have thin walls.
- Veins have a wider lumen.
- Veins have valves.

Qn. **State the function of valves found in veins.**

- Valves prevent the back flow of blood.

Qn. **Why do veins have thin walls**?

- Veins carry blood of low pressure.

Qn. **Name the largest / main vein in the body**.

- Vena cava
- Diagram showing a vein

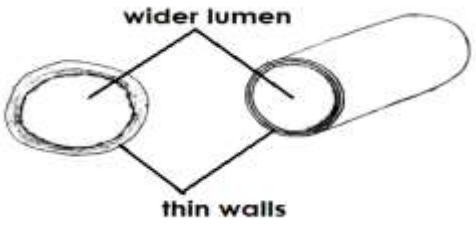
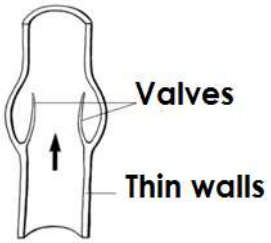


Diagram showing position of valves



(ii) ARTERIES

- Arteries are blood vessels that carry blood away from the heart.

Qn. Which type of blood is carried out by most arteries?

- Oxygenated blood

Note

- Most arteries carry oxygenated blood except the pulmonary artery which carries deoxygenated blood.
-
- Characteristics of arteries
- Arteries have thick walls.
- Arteries have narrow lumen.
- Arteries do not have valves.

Qn. **Why do arteries have thick walls**?

- Arteries carry blood of high pressure.

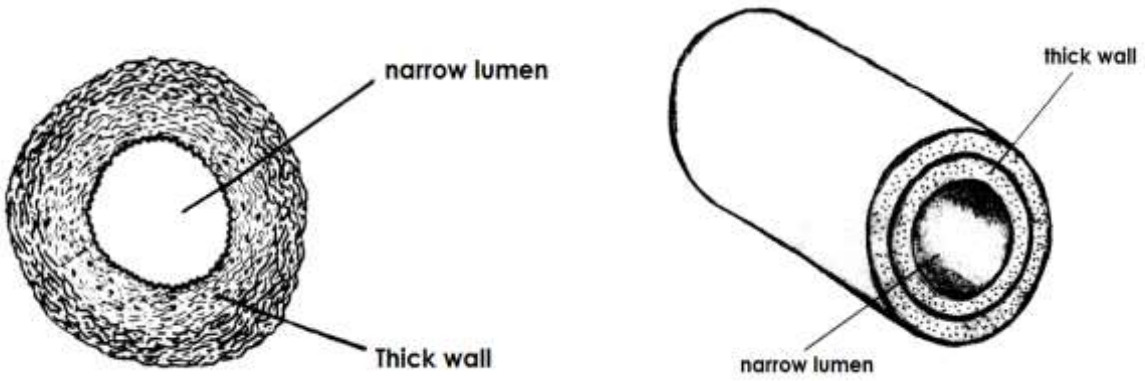
Qn. **How is the backflow of blood prevented in arteries**?

- By the high pressure of blood moving through the narrow lumen.

Qn. **Name the largest/main artery in the body**.

- Aorta

DIAGRAM SHOWING ARTERY



Qn. **State the functional difference between arteries and veins**.

- Arteries carry blood away from the heart while veins carry blood towards the heart.

Qn. **Give the structural differences between arteries and veins**.

- Arteries have narrow lumen while veins have a wider lumen.
- Arteries have thick walls while veins have thin walls.
- Arteries lack valves while veins have valves.

(ii) **CAPILLARIES**

- Capillaries are the smallest vessels in the body.

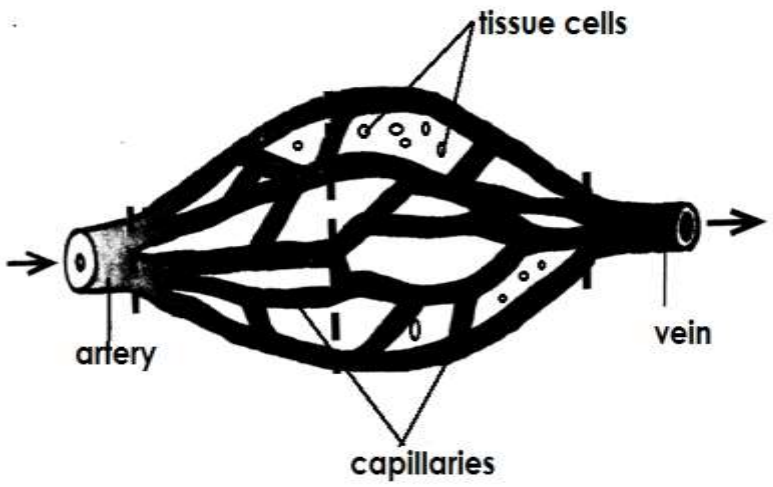
Qn. **State the functions of capillaries in the body.**

- Capillaries allow exchange of materials in the body.
- Characteristics of capillaries
- Connect veins to arteries.

Qn. **Write down different examples of materials exchanged by capillaries.**

- Oxygen
- Digested food.
- Carbon dioxide
- Water
-

Diagram showing blood capillaries



Disorder of the circulatory system

- Poor blood clotting
- Heart attack
- Artheroma (buildup of a fatty substance in artery)
- Angina

Diseases of the circulatory system

(i) **Diseases that affect the heart**

- Heart attack
- Heart failure
- Coronary thrombosis
- Hypertension (High blood pressure)

Heart attack

- It is caused due to smoking

Qn. **How does smoking cause heart attack?**

- The poisonous drugs contained in tobacco smoke damages the cardiac cells.

Coronary Thrombosis

- This is a heart disease caused due to blockage of the coronary arteries which supply the heart with blood rich in oxygen and digested food.

Heart failure

- Heart failure is a condition when the heart fails to pump blood properly.

Hypertension

- It is a heart disease caused due to high accumulation of fats on the walls of arteries making the narrow.

Qn. **How can high blood pressure be controlled?**

- Taking less fatty foods.
- Avoid smoking
- Avoid taking alcohol
- Carry out regular physical exercise.
- Checking blood pressure regularly.

(i) **Diseases that affect the blood.**

- Malaria
- Anaemia
- Sickle cell anaemia
- Blood cancer (Leukaemia)
- AIDS

Malaria

- Malaria is a blood disease caused by plasmodia germs.
- The plasmodia germs are spread through the bites of female anopheles mosquito.

Qn. **How does malaria affect blood**?

- Plasmodia germs destroy red blood cells which carry blood around the body.
- Anaemia
- Anaemia is a blood disease caused due to lack of enough iron in the body.

Qn. **How does anaemia affect blood**?

- Anaemiamakes them unable to carry oxygen.

Qn. **How can anaemia be controlled**?

- Taking iron tablets.
- Eating food rich in iron.
- Through blood transfusion.

Sickle cell anaemia

- Sickle cell anaemia is a blood disease caused when one red blood cells become sickle celled. (having a sickle cell)

Qn. **How doe sickle cell anaemia affect blood?**

- It deforms the red blood cells making them unable to carry oxygen around the body.

Diagram showing effects of sickle cell anaemia on red blood cells

- The child grows slowly.
- A person passes out dark coloured urine.
- A person has yellowish eyes.
- Fingers, arms and fingers swell.

Note:

- Sickle cell anaemia is genetic / hereditary inherited disease of the circulatory system.

Haemophilia

- Is a condition in which ones blood is unable to clot in case of an injury.

Qn. **How is haemphilia caused**?

- Haemophilla is caused when there are few platelets in the body.
- Note:
- Haemophila is a genetic/hereditary disease of the circulator system.

Qn. **How can haemophilia be controlled**?

- By giving the patient vitamin K.

Qn. **How is vitamin K useful to a person suffering from haemophilia**?

- The drag contains a substance which helps in blood clotting.
- Leukaemia (blood cancer)
- Is a condition in which a person has a large number of immature white blood cells.
- These immature white blood cells prevent the production of normal blood cells by the bone marrows.

Note:

- Leukaemia is incurable.

AIDS

- AIDS is a blood disease caused by HIV.

Qn. **How AIDS does affect the circulator system**?

- HIV destroys the white blood cells.

Qn. **Write the following in full**.

(i) **AIDS** - Acquired Immune Deficiency Syndrome.

- **Acquired** - means got from.
- **Immune** - means protected against
- **Deficiency** - means lack of
- **Syndrome** - means signs and symptoms

(ii) **HIV** - Human Immunodeficiency Virus

Note

- AIDS does not kill its victims instead they die due to opportunistic infections.

Examples of opportunistic infection that affects AIDS victims.

- Pneumonia
- Tuberculosis
- Diarrhoea

Ways through which AIDS spreads.

- Through having unprotected sexual intercourse with an infected person.
- Through sharing sharp skin piercing instruments.
- From the infected mother to the unborn baby in the womb during pregnancy.
- From the infected mother to the baby during birth.
- From the infected mother to the baby during breastfeeding.
- Through circumcision using unsterilized instruments.

Ways through which AIDS cannot spread

- Shaking hands.
- Sharing a desk
- Swimming together
- Through insect bites
- Sharing cups, plates and spoons
- Sharing a seat
- Through hugging
- Through sharing food
- Through sharing cups

Body fluids which may contain HIV germ

- Semen
- Virginal fluids
- Breast milk
- Blood

Traditional practices that may lead to the spread of HIV /AIDS

- Tribal circumcision using unsterilized instruments.
- Tribal tattooing
- Female genital mutilation.

Social practice that may lead to the spread of HIV/AIDS

- Ear and nose piercing using unsterilized instruments.
- Extraction of false teeth using unsterilized instruments.
- Jigger extraction using unsterilized instruments.
- People at high risk of getting AIDS
- Prostitutes

- Bar maids / bar attendants
- Rapists
- Long distance travelers e.g. truck drivers
- The youth

Qn. **Why are the youth more vulnerable to contracting HIV/AIDS**?

- The youth are more sexually active.

Qn. **Why are girls most attacked /affected by AIDS than boys of the same age group?**

- Girls are easily convinced to engage in sex unlike boys.
- Girls like luxury than boys.

Signs and symptoms of AIDS

Qn. What is a sign of a disease?

Is an effect or a health problem that can be seen by others.

Qn. **What is a symptom of a disease**?

Is an effect of a disease that can be felt by only the sick person.

Sign of AIDS

- Loss of body weigh
- Chronic cough
- Skin rash all over the body
- Sores in the mouth (oral thrush)
- Chronic diarrhoea

Symptoms of AIDS

- Persistent fever
- General body weakness
- Mental disturbance
- Loss of appetite

Qn. **Write down any four diseases that shouldn't be confused with AIDS**

- Pneumonia
- Tuberculosis
- Measles
- Cancer
- Typhoid

Qn. **How can one confirm his / her HIV status**?

- By having a blood test for HIV

Qn. **Who is an HIV positive**?

- An HIV positive person is one who has HIV germ in the body.

Qn. **Who is an HIV negative**?

- Is a person who does not have HIV germ in the blood.

Qn. **What is the difference between on HIV positive and a person with AIDS.**

- An HIV positive is a person who has got HIV germs in the body but not shown sign while a person with AIDS is the one who has started showing the signs and symptoms.
- EFFECTS OF HIVS /AIDS

(a) **To an individual**

- It destroys the body immunity.
- AIDS leads to death.
- AIDS causes depression, fear, hopelessness.
- AIDS makes a person lose income.
- AIDS causes worries.
- AIDS affects the brain that leads to mental confusion.

(b) **To the family.**

- It leads to poverty.
- AIDS leads to loss of family members.
- Some children in the family may be infected with HIV/AIDS.
- Children become orphans when parents die.

(c **To the community**

- AIDS leads to loss skilled manager.
- AIDS leads to shortage of the productive population.
- AIDS leads to childhood families.
- AIDS leads to increased numbers of orphans in the community.
- AIDS leads to depopulation.

Ways of controlling and preventing the spread of HIV/AIDS

- Abstaining from sex until marriage.
- Be faithful to one sexual partner.
- Use of condoms when having sex.
- A void extra martial sex.
- A void sharing sharp skin piercing instruments.
- A void traditional practice that may lead to spread of HIV /AIDS.
- Pregnant women should go for antennal care visits to test for HIV /AIDS.

Qn. **Write ABC in full as used in the prevention and control of HIV/AIDS.**

- Abstaining from sex.
- Be faithful to your sexual partner.
- Condom use.

Qn. **Give ways in which an HIV/AIDS mother can protect her unborn baby from getting HIV /AIDS**?

- Through taking ARVs.
- Delivering from hospitals.
- Through PMTCT services.
- By proper feeding.
- Going for antenatal care services.

Qn. **Write the following in full.**

(i) PMTCT - Prevention of Mother to Child Transmission.

(ii) ARVs - Anti retroviral.

Qn. **How are ARVs useful to HIV/AIDS patients**?

- ARVs prevent the HIV germs from multiplying.
- Reduce the effect of the disease to the body.

Qn. **Why is it easier to control the spread of HIV/AIDS than controlling the spread of malaria?**

- It is easy to abstain from sex than to prevent mosquito bites.

CARE FOR AIDS PATIENTS

- Feeding the patient on a balanced diet.
- Giving the patient ARVs.
- Taking the AIDS patients to the hospital.
- Offering counselling services to AIDS victims or patients.
- Encouraging the AIDS patients to take ARVs.
- **Reason for counselling HIV/AIDS**
- Counselling helps to create awareness among HIVS/AIDS victims.
- Counselling prevents the HIV/AIDS patients from spreading the disease.
- Counselling enables the HIV /AIDS victims to live positively with the diseases.
- Counselling prevents the HIV/AIDS victim from feeling neglected.
- Counselling helps the HIV/AIDS victims to have hope.

Organisations that offer counselling services to the HIV/AIDS victims.

- TASO (The AIDS Support Organisation**)**
- AIC (AIDS Information Centre)
- ACP (AIDS Control Programme)
- SYFA (Safe Guard Youth from Aids)

ROLES PLAYED BY TASO

- TASO provides ARVs to AIDS victims.
- TASO provides maternal assistance to AIDS victims.
- TASO provides counselling services to AIDS victims.

- TASO provides relief items to AIDS victims.

Qn. **Why is AIDS most common in women than men?**

- Women are more sexually active than men.

PIASCY

- PIASCY stands for Presidential Initiative on AIDS.
  Strategy for Communication to Youth.

Examples of PIASCY messages

- Say No to sex.
- Say No to bad touches.
- Resist peer pressure.
- AIDS kills.
- Virginity is healthy.
- Avoid gifts from strangers.
- Avoid lifts from strangers.
- AIDS has no cure.

Qn. **How do PIASCY messages help to control the spread of HIV/AIDS?**

- PIASCY messages help children to abstain from sex.
- PIASCY message enable children to know how HIV/AIDS is transmitted.

TOPICS FOUR

ALCOHOL, SMOKING AND DRUGS IN SOCIETY

Alcohol

Qn. What is alcohol?

Alcohol is a chemical substance which make people drug when taken.

Qn. **Write down the two types of alcohol**.

- Ethanol or Ethyl
- Methanol or Methyl

Methanol alcohol

- Methanol alcohol is the most poisonous type of alcohol that cause death if it is drunk.

Note:

- Methanol also causes blindness in case it comes into contact with eyes.

Ethanol alcohol

- This is the commonest type of alcohol which is contained in most alcoholic drink.

Qn. **Write down the common examples of alcoholic drinks.**

- Beer - wines
- Malwa - Whiskey
- Tonto - Gins
- Waragi - Kwete

Qn. **Mention the different reasons or excuses people give for drinking alcohol**.

- To pass time
- To forget problems for a while.
- To celebrate victory / success.
- To fit in peer groups of alcoholics.
- To quench thirst.
- To socialize with others.
- To feel confident at doing certain things.
- Some drink to improve on their mental performance.
- The young drink to show that they are mature.

Methods of making alcohol.

Qn. **Write down the two methods used to make alcohol.**

- Fermentation method.
- Distillation method.

(a) **Fermentation method**

Qn. **What is fermentation**?

Fermentation is the process of making alcohol where sugars from plants juices added to water are turned into alcohol by the help of yeast.

Note:

- The sugar found in millet,maize, banana, sorghum, wheat, barley can be used.

Qn. **Name the fungus used in fermentation process of making alcohol.**

- Yeast

Qn. **State the role or importance of yeast in fermentation process of making alcohol.**

- Yeast produces zymase enzyme which speeds up rate of fermentation.

Qn. **Write down examples of alcoholic drinks brewed using fermentation method.**

- Tonto - Pineapple wine - Kwete
- Malwa - Maramba- Kwete

(b) **Distillation**

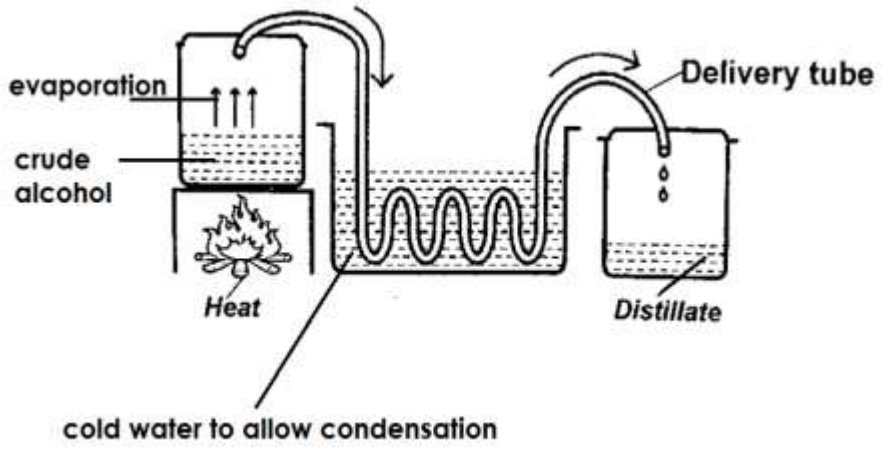
Qn. **What is distillation method?**

Distillation is the process of obtaining alcohol by the process of evaporation and condensation of liquids containing alcohol.

Qn. **Write down the two main physical process involved in distillationmethod of making alcohol.**

- Evaporation
- Condensation

The diagram showing distillation method of making alcohol.



Note:

- Heat helps to evaporate crude alcohol.
- The delivery acts as a passage of the alcohol vapour.
- Cold water helps to condense the alcohol vapour.

Qn. **Why is the delivery tube passed through cold water**?

- To allow condensation of the alcohol vapour.

Qn. **Why is the delivery tube coiled in the container with cold water**?

- To increase the surface area for condensation to take place.

Qn. **Why are the most delivery tubes in the distillation method made of copper?**

- Copper does not rust easily.

Qn. **What scientific name is given to the fine liquid collected after distillation?**

- Distillate

Qn. **Write down the examples of alcohol drinks obtained through distillation.**

- Waragi
- Whiskey
- Gins
- Spirits -Vodka

Qn. **Write down body organs damaged by alcohol.**

- Brain
- Liver

- Pancreas
- Stomach

Qn. **Name the body organ mostly affected by excessive drinkingof alcohol**.

- The liver
- Uses of alcohol in society
- Alcohol is used to sterilize medical instruments.
- Alcohol is source of income to people.
- Alcohol is used in cleaning wounds.
- Alcohol is used to mix paints and dyes.
- Alcohol is used in some types of thermometers.
- Alcohol is mixed in petrol to make gasohol.
- Alcohol is used to clean the area of skin where an injection is to be taken.
- Alcoholism and Alcoholics

Qn. **What is alcoholism**?

- Alcoholism is a condition which results from prolonged use of alcohol.

Qn. **Who is an alcoholic?**

- An alcoholic is a person who depends on an alcohol for his / her normal body functioning.

Qn. **Write down the different factors that can lead to alcoholism.**

- Stress
- Peer pressure
- Seductive adverts
- Family backgrounds
- Sad news
- Happiness
- Success
- Excitement
- Frustration.
- Effects of alcoholism

(a) **To an individual**

- Alcoholism leads to self neglect.
- Alcoholism leads to brain damage.
- Alcoholism leads to damage of the liver.
- Alcoholism leads to stomach ulcers.
- Alcoholism leads to damage of the pancreas.
- Alcoholism leads to loss of appetite.
- Alcoholism leads to loss of jobs.

- Alcoholism leads to poverty.
- Alcoholism may lead to death.

(b) **To the family**

- Alcoholism leads to child abuse.
- Alcoholism leads to poverty in the family.
- Alcoholism leads to spouse abuse.
- Alcoholism leads to family neglect.
- Alcoholism leads to domestic violence.
- Children in the family may learn to drink alcohol when they are still young.
- Children of alcoholics may lack love and parental care.

(c) **To the family**

- Alcoholism leads to road accidents.
- Alcoholism leads to poor job performance.
- Alcoholism leads to increased crime rates.
- Alcoholism leads to poor performance at school.
- Laws related to drinking alcohol in Uganda.

Qn. **State any four laws governing the drinking of alcohol in Uganda**.

- Persons below 18 years are not allowed to drink alcohol.
- Do not drink and drive.
- Home distilled alcohol is not allowed to be transported.
- Home distillation of alcohol is not allowed.
- Alcohol should not be sold in shops.
- Ways of controlling alcoholism
- A void bad peer groups.
- Never believe in advertisements that praise alcohol.
- Join groups whose members are not alcoholics.
- Read more about dangers of alcohol.
- Teach people about the danger of alcohol.
- Get activities to occupy you during free time.
- Join good social groups like football clubs, net ball clubs.
- SMOKING

Qn. **What is smoking?**

- Smoking in the frequent inhaling of tobacco smoke.
- Ways through which people smoke
- Through burning pipes.
- Through burning cigarettes.
- By chewing leaves.

- By sniffing tobacco powder.
- Types of smoking

Qn. **Write down the two types of smoking.**

- Active smoking
- Passive smoking

(a) **Active smoking**

Qn. **What is active smoking?**

- Active smoking is the inhaling of tobacco smoke directly from a burning cigarette.

Qn. **Who is an active smoker**?

- An active smoker is a person who inhales smoke directly from a burning cigarette.

(b) **Passive smoking**

Qn. **What is passive smoking?**

- Passive smoking is the inhaling of air containing tobacco smoke from an active smoker.

Qn. **Write down the poisonous substance contained in tobacco smoke**.

- Nicotine
- Tar

Qn. **Mention the poisonous gas contained in tobacco smoke.**

- Carbon monoxide

Qn. **How do the following poisonous substances affect as smoke**.

(i) **Nicotine**

- Nicotine causes addiction
- Nicotine narrows the blood vessels to the heart.

(i) **Tar**

- Tar causes lung cancer

Qn. **State the effect or danger of carbon monoxide to a smoker**.

- Carbon monoxide reduces the intake of oxygen in blood.
- Factors that lead people to smoking.
- Peer pressure
- Desire to relax
- Desire to warm up
- Pride
- Poor home atmosphere

Qn. **State the different reasons or excuses some people give for smoking**.

- Some people smoke to pass time.

- Some people smoke to feel confident.
- Some people smoke to feel warm.
- Some people smoke to look sophiscated.
- Some people smoke to concentrate on what they are doing.
- Some people smoke to socialize with others.

Harmful effects of smoking

(a) **To an individual**

- Smoking leads to lung cancer.
- Smoking cause bronchitis.
- Smoking cause emphysema.
- Smoking worsen tuberculosis and asthma.
- Smoking increases the risks of heart attack.
- Smoke stains teeth.
- Smoking cause a bad smell in the mouth.
- Smoking worsens ulcers in the stomach.
- Smoking reduces appetite.

(b) **Effects of smoking to a pregnant mother**

- Smoking leads to miscarriage.
- Smoking leads to still birth.
- Smoking leads to premature birth.
- Smoking leads to birth of underweight babies.

(c) **Effects of smoking to the family.**

- Family members become passive smokers.
- Smoking leads to poverty.
- Smoking may lead to fire outbreak.
- Young children may learn to smoke when they are still young.
- Smoking may lead to family neglect.

(d) **Effects of smoking to the community**

- Smoking caused air pollution.
- Smoking leads to passive smoking.
- Smoking leads to fire outbreak.
- Smoking may lead to poor job performance.

Qn. **Write down any three diseases caused by smoking**.

- Lung cancer
- Emphysema

Qn. **Mention any four diseases worsened by smoking**.

- Tuberculosis

- Asthma
- Pneumonia
- Heart attack
- Whooping cough
- Diphtheria

Qn. **Mention the body organs damaged due to smoking**.

- Lungs
- Heart

Note:

- The lungs are the organs which are greatly damaged by smoking.
- Ways of safeguarding against smoking
- A void bad peer groups of smokers.
- Keep busy during free time.
- Never allow any body to convince to start smoking.
- Read more about the dangers of smoking.
- Teach friends about the dangers of smoking.
- Never believe in advertisement that praise smoking.
- Join good social groups e.g. football clubs, church choir.
- Report all friends who smoke to elders.
- Take advice from elders about smoking serious.

DRUGS

Qn. **What is a drug**?

A drug is a chemical substance which when introduced into body, affects the body's functioning.

Groups of drugs

- Essential drugs
- Drugs of dependency or Narcotics

(a) **Essential drugs**

Qn. **What are essential drugs?**

Essential drugs are drugs which meet people's health needs.

Groups 0r classes of essential drugs

- Pain killers
- Curative drugs
- Preventive drugs
- Contraceptives

(i) **Pain killers**

- Pain killers are drug used to reduce body pain.

Examples of pain killers

- Paracetamol
- Ibrufen
- Diclofenac

(ii) **Curative drugs**

- Curative drugs are drugs which cure diseases.

Examples of curative drugs

- Coatem
- Fansidar
- Quinine
- Chloroquine
- penicillin

(iii) **Preventive drugs**

- Preventive drugs are drugs used to prevent diseases.
- Examples of preventive drugs
- Vaccines

(iv). **Contraceptives**

Contraceptives are drugs used in family planning to space children or avoid unwanted pregnancies.

Examples of contraceptives

- Birth control pills
- Spermicides

Characteristics of essential drugs

- They meet people's health needs.
- Essential drugs are safe and effective if used correctly.
- Essential drugs are affordable.
- Essential drugs are readily available.
- Essential drugs should be accessible.
- Essential drugs should have valve for money.

Qn. **Give any two uses of essential drugs.**

- Essential drugs reduce pain.
- Essential drugs prevent diseases.
- Essential drugs control unwanted pregnancies.
- Essential drugs cure diseases.

Qn. **State any two ways in which drugs are introduced in the body.**

- By swallowing e.g. Tablets.
- By injections e.g. injectables.
- By drinking e.g. syrups

- By smearing e.g. Ointments

Types of essential drugs

- Traditional drugs
- Laboratory manufactured drugs or modern drugs

(a) **Traditional drugs**

Qn. **What are traditional drugs?**

These are drugs obtained from plants and animals and are mainly used in their raw form.

Examples of traditional essential drugs

- Black jack
- Mululuza
- Aloevera
- Bombo

Qn. **State the characteristics of traditional drugs**

- They are mostly used in their raw form.
- Their effect on human health is not well known.
- Their qualify and purity changes.
- They are not well packaged.

(b) **Laboratory manufactures drugs.**

Qn. **What are laboratory made drugs**?

These are drugs manufactured in factories under well controlled conditions.

Qn. **Write down the different examples of laboratory manufactureddrugs.**

- Coatem
- Panadol
- Septrin
- Ibrufen
- Chloroquine
- Quinine
- Fansider

Qn. **State the characteristics of laboratory made drugs**.

- They are well packaged.
- Their effect on human health is well known.
- Their quality is the same for every amount.
- They are labelled to show name and date of manufacture etc.
- Their strength, purity and stability is known.

- They are carefully made and tested.
- Drug prescription

Qn. **What is drug prescription?**

Drug prescription is the written information given by a health worker on how to use the drug.

Information found on drug prescription

- Name of the drug
- Dosage
- Time of taking the drug
- The disease it cures

Qn. **Write down the factors a health worker should consider before prescribing a drug for a patient**.

- Age of the patient.
- Weight of the patient.
- Medical history of the patient.
- Sex of the patient.
- Severity of the disease affecting the patient.

Qn. **State the importance of drug prescription.**

- Drug prescription prevents people from taking overdose.
- Drug prescription prevents patient from taking under dose.
- Drug prescription prevent drug misuse.

Qn. **What is under dose**?

An under dose is the taking of less drugs than the recommended amount by the health worker.

Qn. **State the effects of under dose.**

- Under dose makes the germs stronger and resistant to a certain drug.

Qn. **What is an over dose**?

An over dose is the taking of more drugs than the recommended amount by the health worker.

Qn. **State the dangers or effects of an over dose**.

- Over dose cause body poisoning.
- Over dose can lead to death.
- Use the information about drug prescription below to answer the questions below.

(a) How many tablets is the patient supposed to take in a day?

- 6 tablets

(b) How many times in a day will the patient take the drug?

- 3 times

(c) **After how long is the patient supposed to take the drug?**

$\frac{24}{3}$ = 8 hours

(d) **What is the name of the drug given to the patient**?

- Panadol

(e) **Why is the patient not advised to take the drug in March 2022**?

- They drug will have expired.

Qn. **Give the danger of taking expired drugs**.

- Expired drugs cause body poisoning.
- Expired drugs do not cure the disease.
- Expired drugs may lead to death.

Proper storage of drugs

Qn. **State the conditions under which drugs should be stored**.

- Drugs should be stored in well stored sealed containers.
- Drugs should be stored out of reach of children.
- Drugs should be stored in dry cool place.
- Drugs should be kept away from sunlight, dirt and moisture.

Qn. **Why should drugs be kept in well sealed containers**?

- To prevent drug contamination.

Qn. **Why should drugs be kept away from children's reach?**

- To prevent drug poisoning.
- To prevent drug misuse.
- To prevent children from taking over dose.

Qn. **Give a reason why drugs should be kept in a cool dry place**.

- Prevent drugs from losing their curative value.
- To prevent drugs from getting spoilt.

Qn. **State the dangers of poor storage of drugs**.

- Drugs can be contaminated.
- Drugs can lose their curative value.
- Drugs can become poisonous and lead to death.
- Drugs can be misused.

- Drugs can get spoilt easily.

Qn. **Mention the different places recommended for people to buy drugs.**

- Hospitals
- Clinics
- Dispensaries
- Pharmacies
- Drug shops

Note:

- Never buy drugs from shops, markets, hawkers.

Qn. **State the danger of buying drugs from local shops, markets and hawkers.**

- Drugs from shop may be poorly prescribed.
- Drugs from shops may be contaminated due to poor storage.
- Drugs from shops may be fake.
- Drugs from shops may be expired.
- The patient may buy wrong drugs for the diseases.
- DRUG MISUSE

Drug abuse

Qn. **What is drug abuse?**

Drug abuse is the use of a drug in a way that is harmful to the body.

Qn. **Mention the different examples of commonly abused drugs.**

- Marijuana / cannabis
- Heroin
- Cocaine
- Alcohol
- Tobacco
- Shisha
- Aviation fuel
- Petrol
- Opium
- Miraa
- Caffeine

Qn. **Give different reasons why people abuse drugs**.

- To fits in peer groups of drugs abusers.
- To keep awake at night.
- To boost their mental performance.
- To concentrate on what they are doing.
- To get sleep.
- To celebrate victory.

- To pass time.
- To be confident at doing certain things.
- To forget their problem for a while.
- To acts as mature if they are young.

Qn. **Give the factors that can lead to drug abuse.**

- Bad peer influence.
- Poor family background.
- Emotional stress.
- Seductive advertisements on televisions and radios.
- Boredom
- Frustration
- Desire to stay awake
- Desire to be strong and bold
- Effects of drug abuse

(a) **To an individual**

- Drug abuse can lead to brain damage.
- Drug abuse can lead to damage of the liver.
- Drugs abuse can lead to damage of the pancreas.
- Drug abuse can lead to self neglect.
- Drug abuse can lead to death of an individual.
- Drug abuse can lead to job neglect and dismissal.
- Drug abuse can lead to loss of school education.
- Drugs abuse can lead insomnia.
- Drug abuse can lead to intensive sleepiness.

(b) **To the family**

- Drug abuse leads to poverty in the family.
- Drug abuse leads to child abuse.
- Drug abuse leads to spouse abuse.
- Drug abuse leads to family separation.
- Drug abuse leads to delinquent children.

Qn. **Who is a delinquent child?**

A delinquent child is a child who commits crimes that are punishable by law.

(c) **To the community**

- Drug abuse leads to high crime rates.
- Drug abuse leads to accidents.
- Drug abuse leads to poor job performance.
- Drug abuse can lead to death of important people in the community.

- Drug abuse can lead to the spread HIV/AIDS.

DRUG MISUSE

Qn. **What is drug misuse**?

Drug misuse is the use of a drug against the doctor's prescription.

Ways how people misuse drugs

- Through sharing drugs with another patient.
- Through taking over dose.
- Through taking under dose of the drug.
- Through taking drugs that do not cure the disease.

Qn. **Why do some people misuse drugs**?

- Poverty
- Ignorance
- Inaccessibility of drugs
- Narcotics or drugs of dependency

Qn. **What are narcotics?**

Narcotics drugs are drugs that cause addition due to prolonged use.

Qn. **What is drug dependency**?

Drugs dependency is a condition in which one's body becomes addicted to a certain drug.

Note:

- A person who depends on drugs for his / her normal body functioning is called a **drug addict or drug dependant.**
- Examples of drugs of dependency
- Alcohol
- Tobacco
- Marijuana
- Opium
- Cocaine
- Heroin
- Shisha
- Aviation fuel
- Petrol
- Caffeine