THEME: WORLD OF LIVING THINGS

TOPIC 1: CLASSIFICATION OF ANIMALS

Living things

Living things are components of the environment which have life in them.

Groups of living things

1. Plants
2. Animals

Characteristics of living things.

1. Living things breathe.
2. Living things Move.
3. Living things grow.
4. Living things feed.
5. Living things reproduce.
6. Living things excrete.
7. Living things respond to stimuli.

Examples of living things according to their groups

Plants		Animals	
a	Mango plant	a	**Insects** like cockroaches, house flies
b	Banana plant	b	Cows, dogs, pigs, goats
c	Rose plant	c	Man
d	Pawpaw plant	d	**Birds** like hens, doves, pigeons

Differences between plants and animals

Plants	Animals
They have chlorophyll	They do not have chlorophyll
They make their own food	They do not make their own food
They do not move from one place to another	They move freely from one place to another
They respond to stimulus slowly	They respond to stimulus quickly

Non-living things

Living things are components of the environment which have life in them.

Characteristics of non-living things

1. Non-living things do not breathe.
2. Non-living things do not Move.
3. Non-living things do not grow.
4. Non-living things do not feed.
5. Non-living things do not reproduce.
6. Non-living things do not excrete.
7. Non-living things do not respond to stimuli.

Examples of non-living things

Stones, books, pens, boxes, houses, drums

Activity

1. What are living things?
   _____
   _____
2. State any **two** groups of living things found in the environment.
   (i) _____
   (ii)_____
3. Mention any **two** characteristics of living things.
   (i) _____
   (ii)_____
4. State any **two** common characteristics between plants and animals.
   (i) _____
   (ii)_____
5. Outline any **two** differences between plants and animals
   (i) _____
   (ii)_____
6. Why is a mango tree called a living thing?
   _____
   _____

7. What are nonliving things?
   _____
   _____
8. State any **two** characteristics of non-living things
   (i) _____
   (ii)_____
9. Mention any **two** examples of non-living things.
   (i) _____
   (ii)_____

LESSON

Kingdoms of living things

Living things are divided into five kingdoms namely:

1. Animal Kingdom
2. Plant Kingdom
3. Fungi Kingdom
4. Bacteria (Monera) Kingdom
5. Protoctista Kingdom (protozoa)

TOPIC: CLASSIFICATION OF ANIMALS

Classification is an act of grouping things basing on their common characteristics

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

Why is it important for organisms to be classified?

- For easy identification

Characteristics used to classify animals

1. Type of skeleton in an animal
2. Way of movement.
3. Way of reproduction.
4. Animal body structure and features
5. Animal habitats
6. Way of breathing.
7. Mode of feeding
8. Body temperature

ACTIVITY

1. Give **two** reasons why animals move from one place to another.
   (i) _____
   (ii)_____
2. Why is reproduction important to living things?
3.
4. Which type of feeding is characterized by animals?
5.
6. How are animals different from plants in terms of feeding?
7.
8. How is the reproduction of bacteria different from that of mushrooms?
9.
10. What are single celled organisms?
11.
12. Give **two** examples of unicellular organisms.
    (i) _____
    (ii)_____
13. How useful is the nuclear to the cell?
14.
15. Where does respiration take place in the organism?
16.
17. State the importance of chlorophyll to the plants.
18.
19. Why can't mushrooms make their own food?
20.
21. Which type of nutrition do most fungi undergo?
22.

LESSON

Groups of animals

Animals are classified into **two** main groups namely:

1. Vertebrates (animals with a back bone/vertebral column/spine)
2. Invertebrates (animals without a back bone/vertebral column/spine).

Vertebrates

Vertebrates are animals with a back bone
The backbones form the vertebral column.
Invertebrates are animals without a back bone.

Characteristics of vertebrates

1. They have a back bone (vertebral column)
2. They have the water proof skins
3. They have blood coloured red and pumped by the heart to all body parts
4. They mostly have an endo skeleton
5. They have an alimentary canal
6. They have two pairs of limbs or fins foe locomotion apart from the snakes.
7. They have a large brain protected by the skull

Classification of vertebrates

Vertebrates are grouped into two main categories
i) Homoeothermic animals (warm blooded animals)
ii) Poikilothermic animals (cold blooded animals)

Warm blooded vertebrates

1. Warm blooded animals are vertebrates with constant body temperature.
2. They are also called homoeothermic animals.

Cold blooded vertebrates:

These are animals whose body temperature changes or varies according to the temperature in their environment.
Such animals their body temperatures are not constant.

Examples of cold blooded vertebrates

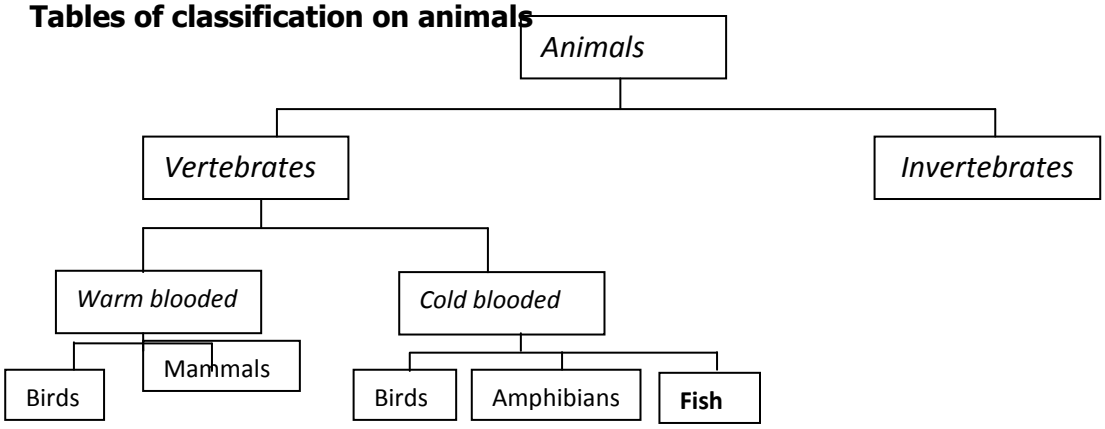
i) Reptiles ii) Amphibians iii) Fish

Activity

1. What are living things?
   _____
   _____
2. Mention **two** characteristics of animals as living things.
   (i) _____
   (ii)_____
3. Mention **two** kingdoms of living things.
   (i) _____
   (ii)_____
4. State the meaning of classification of animals.
   _____
   _____
5. Give any **two** criteria used to group animals.
   (i) _____
   (ii)_____
6. State any **two** main groups of animals.
   (i) _____
   (ii)_____
7. Why is a rat grouped under vertebrates?
   _____
   _____

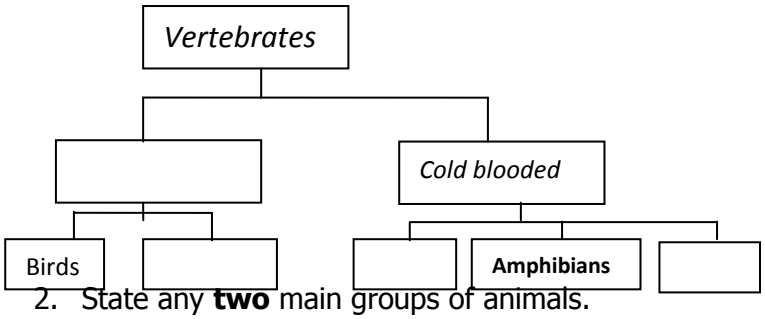
LESSON

Tables of classification on animals



Classification is an act of grouping things basing on their common characteristics

1. Complete the table below



2. State any **two** main groups of animals.
3.
4. What do you understand by the term:
   (a) Poikilothermic
   (b) Homeothermic
5. Apart from birds, mention any **one** group of warm blooded animals.
6.
7. State any **two** reasons why animals move from one place to another.
   (i) _____
   (ii)_____
8. Mention any **two** ways in which different animals move.
   (i) _____
   (ii)_____
9. Mention any **two** common characteristics of living things.
   (i) _____
   (ii)_____
10. Mention any **two** groups of cold blooded animals.
    (i) _____
    (ii)_____

LESSON

BIRDS

1. They are warm blooded animals (Homoeothermic)
2. They reproduce by laying eggs (oviparous) but these eggs are hard shelled
3. They undergo internal fertilization

Characteristics of birds

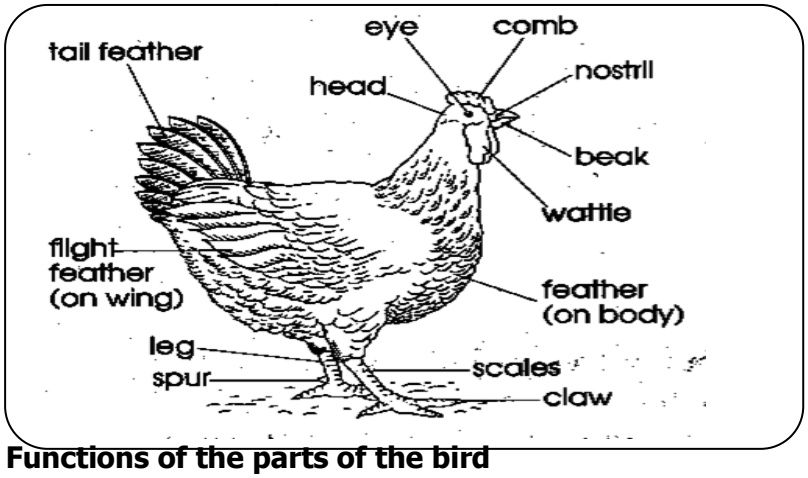
1. They are warm blooded.
2. Their legs are covered with scales.
3. They reproduce by laying eggs.
4. They undergo internal fertilization.
5. They respire by means of lungs.

6. They have streamlined bodies
7. Their bodies are covered with feathers.
8. They take care of their young ones
9. Birds have got 4 limbs but their fore limbs are modified into wings for flying.
10. Birds don't have teeth but have got horny beaks with nostrils
11. Birds have ear lobes covered with short feathers
12. Birds have got 3 eyelids i.e the lower and upper eye lid and the nictitating membrane to protect the birds eyes against strong blow of wind during flight

ACTIVITY

1. Give **two** characteristics of birds.
   (i) _____
   (ii)_____
2. Write down **two** ways birds are adapted to flight.
   (i) _____
   (ii)_____
3. In which **two** ways are birds useful to plants?
   (i) _____
   (ii)_____
4. State **two** ways in which plants are useful to birds.
   (i) _____
   (ii)_____
5. Give any **two** ways how birds are harmful in the environment.
   (i) _____
   (ii)_____
6. State any **two** examples of birds that destroy our crops.
   (i) _____
   (ii)_____
7. How do birds reproduce?
   _____
   _____
8. State **two** characteristics which are common to both birds and reptiles.
   (i) _____
   (ii)_____
9. In which way is the function of nostril to the birds differ from that of the fish?
   _____
   _____

An illustration showing the external parts of a bird



Functions of the parts of the bird

1. **The claws** enable the birds to scratch the ground to look for food.
2. **Wings** are used by birds for flying.
3. **Spur** is used for protection by a bird.
4. **Nostril**: It is used for breathing.
5. **Beak**: is used by the bird to pick food and also protection
   - It also enable broody hen to change eggs during incubation of eggs

- They are used by the birds to grip or hold food or their prey
- They are also used for protection

ACTIVITY

1. State the function of the following parts of a bird
   Beak
   Claws
   Spurs
   Nostrils
2. Why do birds have streamlined bodies?
3.
4. Apart from birds, mention any **two** examples of living things which have streamlined bodies.
   (i) _____
   (ii)_____
5. State the reason why birds see referred to as warm blooded animals.
6.
7. What name is given to the young one of a bird?
8.
9. Mention any t**wo** examples of domestic birds.
   (i) _____
   (ii)_____
10. How are birds different from amphibians?
    _____
    _____
11. State the importance of the spur to an eagle.
    (i) _____
    (ii)_____
12. Why are birds said to be oviparous?
    _____
    _____
13. Which type of fertilization occurs in birds?
    _____
    _____
14. How do birds respire?
15.

LESSON

BIRDS' FEATHERS

Birds' bodies are covered with feathers of different types.

Parts of a feather

Types of bird feathers

There are basically four types namely;

1. Quill or flight feathers
2. Body or covert feathers
3. Down feathers
4. Filoplume feathers.

Quill feathers (flight feathers)

✓ They are the biggest feathers on the bird's body

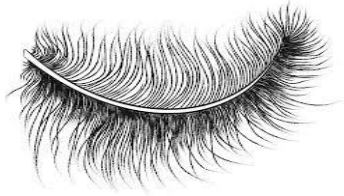
- ✓ Quill feathers are divided into primary and secondary feathers.
- ✓ Quill feathers have a strong central part called the shaft, the hollow portion. They are found on the tails and the wings.
- ✓ They enable birds to fly and that is why they are called flight feather

Covert feathers or body feathers

Covert feather is also called contour feather.

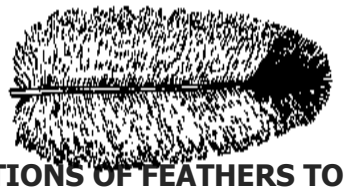
- ✓ Covert feathers help to cover the whole body of the bird.
- ✓ It gives the bird a shape.
- ✓ Covert feathers are slightly smaller compared to quill feathers.
- ✓ They give warmth to birds and provide streamlining shape for easy flying

- **<u>DOWN FEATHERS</u>**
- These are feathers the chicks are hatched with.
- They provide warmth to the birds and control heat loss.
- They are used for insulation



<u>HAIR FEATHERS (FILOPLUME)</u>

- ✓ Filoplume feathers are the smallest hairy feather found nearest the skin of the bird.
- ✓ Down feathers help to trap a layer of air close to the body therefore keeping the bird's body warm.



FUNCTIONS OF FEATHERS TO BIRDS

1. They enable birds to fly
2. They give birds shape and colour for easy identification
3. They provide warmth to the birds' body on cold days
4. For sensitivity
5. For courtship purpose
6. For identification
7. They cover and protect the birds' body against injuries
8. They are used by a broody hen to provide warmth to the chicks and protection.

ACTIVITY

1. Why are birds said to be homoeothermic?

   _____

   _____
2. Why are quill feathers called fight feathers?

   _____

   _____
3. State the importance of the birds' body being streamlined during flying.

   _____

   _____

4. List **one** example of a flightless bird.

   _____

   _____

5. How are eggs laid by birds different from those of amphibians?

   _____

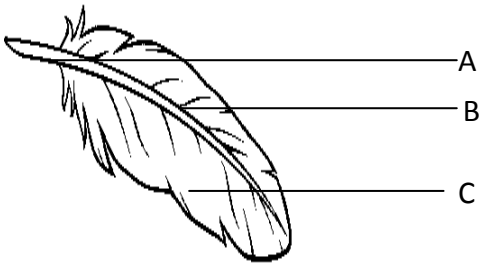
   _____

6. Point out **two** reasons why birds are able to fly.

   (i) _____

   (ii)_____

Below is a feather of a bird. Use it to answer questions that follow.



Name the part of the feather marked with letters:

A

B

C

State any **two** importance of feather to bird.

(i) _____

(ii)_____

State the use of the following types of feathers:

(a) Flight feathers

(b) Down feathers

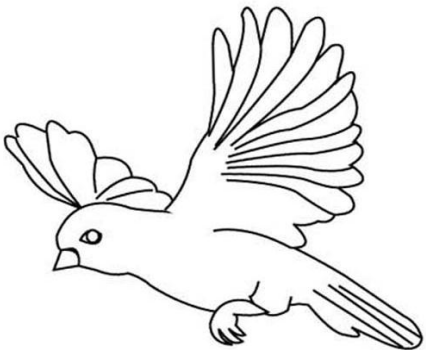
State any **two** importance of covert feathers to the birds.

(i) _____

(ii)_____

LESSON

ADAPTATION OF BIRDS TO FLY



1. Birds have got hollow bones which help to reduce their weight during flight.
2. Birds have got streamlined bodies which help to reduce viscosity friction during flight.
3. The birds fore limbs are modified into wings for flying.
4. Birds have got wings for flapping air during flight.
5. The birds' eyes are protected against strong blowing wind by a tough membrane called **nictitating membrane**.
6. Birds have got strong breast muscles which enable them easily flap their wings.
7. Birds have no pinna to obstruct the flow of wind during flight.
8. Birds have got small heads and long necks which make them easily turn quickly.
9. Birds' bodies are covered with flight feathers which are bad conductors of heat and keeps them warm on cold days when flying.
10. Birds have got hollow air sac starting from the lungs which makes respiration effective during flight.

ACTIVITY

1. Name the tough membrane which protect the birds eyes against strong blowing wind.
2.
3. Write another name for:
   a) Covert feather
   _____
   _____
   b) Quill feather:
   _____
   _____
4. Name the type of feathers which covers the greatest part of the birds body.
5.
6. State the reason why birds fore limbs are modified into the wings.
7.
8. Write **one** way birds are adapted to flight.
   _____
   _____
9. Give any **two** disadvantages of birds in the environment.
   (i) _____
   (ii)_____

LESSON

GROUPS OF BIRDS

Birds are classified basing on two features; beaks and feet

Birds are grouped into 8 categories depending on their feeding habits and characteristics.

1. Perching birds
2. Swimming birds
3. Wading birds
4. Climbing birds
5. Birds of prey (carnivorous birds)
6. Scratching birds
7. Scavenger birds
8. Flightless birds

BIRDS OF PREY

- ✓ **Birds of prey** are birds that hunt and kill other animals for food.
- ✓ **Birds of prey** are birds that eat other birds called prey.
  - ✓ **Prey** are living organisms hunted and killed by a predator for food
  - ✓ **Predators** are animals that hunt and kill others.
  - ✓ **Scavenger** birds are birds that feed on carrion.

Examples of prey

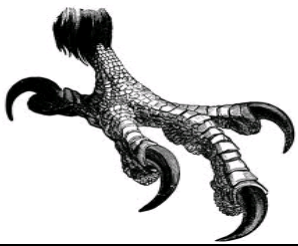
Smaller birds; chicks, frogs, toads, tortoises/ turtles, small snakes

Examples of birds of prey

a) Eagles
b) Kites
c) Hawks
d) Owls
e) falcons
f) Secretary birds

Characteristics of birds of prey

- They have strong, sharp hooked beaks for tearing flesh of their prey.
- They have strong curved talons for easy gripping of their prey.
- They have a strong eye sight to locate their prey.

	
Strong, sharp and hooked beak	curved talons for easy gripping of prey

Dangers of birds of prey to people

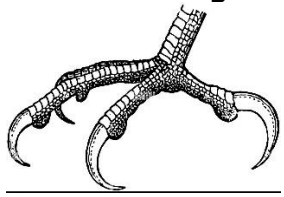
They eat people's chicks, rabbits.

Birds of prey are harmful to the poultry farmers because they are predators to farmers poultry.

ACTIVITY

Below is a diagram of a bird. Use it to answer questions that follow.

1. Why is the bird above called a bird of prey?
2.
3. Why does the above bird have strong, sharp hooked beak?
4.
5. State any **two** ways in which the bird above is a problem to poultry farmers.
   (i) _____
   (ii)_____
6. Apart from the bird above, mention any **two** other examples of birds of prey.
7.
8. What are prey?
9.
10. Mention any **two** examples of prey.
    (i) _____
    (ii)_____
11. State any **two** examples of predators.
    (i) _____
    (ii)_____
12. Which bird is both a scavenger and a bird of prey?
13. **Below is a diagram of a foot of a bird. Use it to answer questions that follow.**



_____

14. What does the above bird feed on?

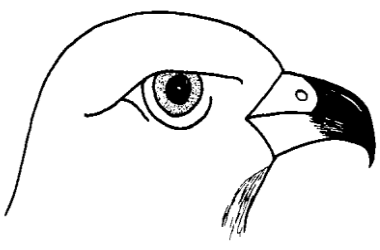
LESSON

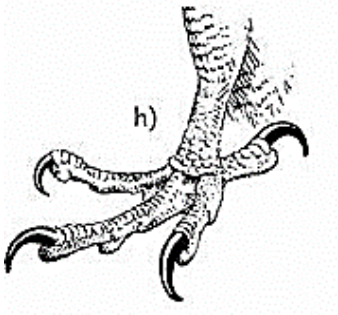
SCAVENGER BIRDS.

- These are birds that feed on carrion [flesh left by other animals**]**
- They feed on leftover meat of dead animals.
- They keep the environment clean by eating flesh of dead animals which may rot or smell.

They have strong sharp curved beaks for tearing flesh of their prey.

Examples: crows, vultures, marabou storks





Strong, sharp and hooked beak	Long, sharp, curved talons which grip carrion.

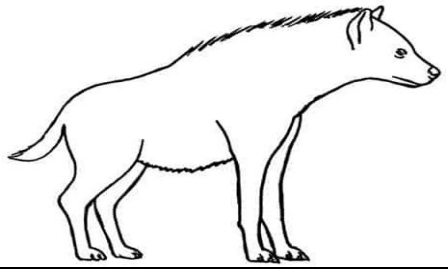
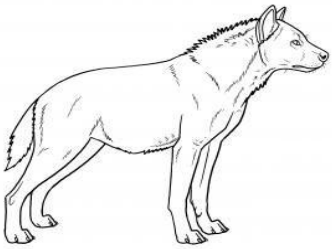
Scavenger animals

These are animals that feed on carrion.

Carrion refers to the flesh eaten and being left by other animals.

Examples of scavenger animals

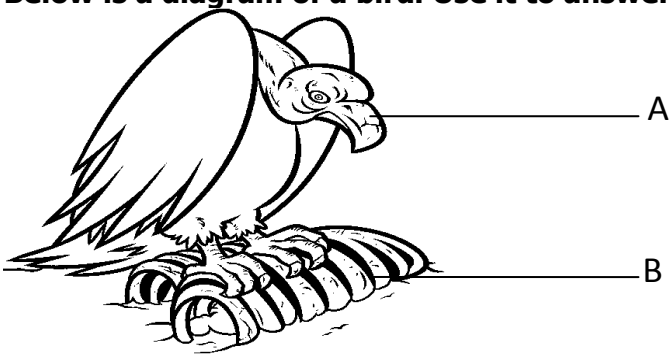
Fox, hyenas, jackals

		
Hyena	Fox	Jackal

Note: Scavenger birds have beaks and feet similar to those of birds of prey.

Activity

1. What do you understand by the word carrions?
2. **Below is a diagram of a bird. Use it to answer the questions that follow.**



3. Describe the nature of the beak of a bird marked A.

   _____

   _____
4. In which way is the feet of bird **A** adapted to its mode of feeding?

   _____

   _____
5. Name the type of bird shown above.

   _____
6. How is the mode of feeding in a fox similar to that of the bird?

   _____

   _____
7. State any **two** examples of birds feeding mode.

   (i) _____

   (ii)_____
8. State the way in which the bird differs from an eagle in the way they feed.

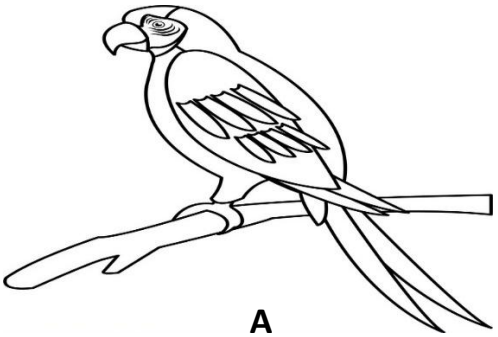
   _____

   _____
9. State the main similarity between scavenger birds and scavenger animals.

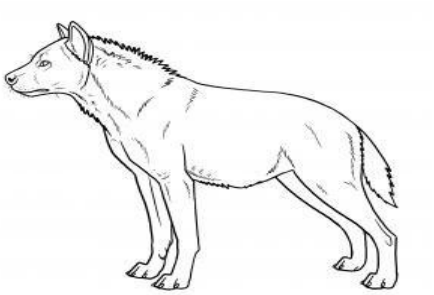
   _____

   _____

Below is a diagram of some organisms. Use them to answer the questions that follow.



A



B

10. Name the type of bird marked with the letter A.
11.
12. State any **two** similarities between the **two** organisms **A** and **B** above.
    (i) _____
    (ii)_____
13. How useful are the organisms above in promoting sanitation?
    _____
    _____
14. Apart from animal **B**, mention any **two** examples of animals of the animals belonging to the same class.
    (i) _____
    (ii)_____
15. How are crows, marabou storks, ventures friendly to the environment?
16.
17. In which way can strong, sharp and hooked beak be an advantage to a scavenger bird?
    _____
    _____

LESSON

PERCHING BIRDS

These are birds that perch/rest on branches of trees or electric wires.
They have one toe pointing backwards and three toes pointing forward.
A perch is a place where birds rest or stay.

Groups of perching birds

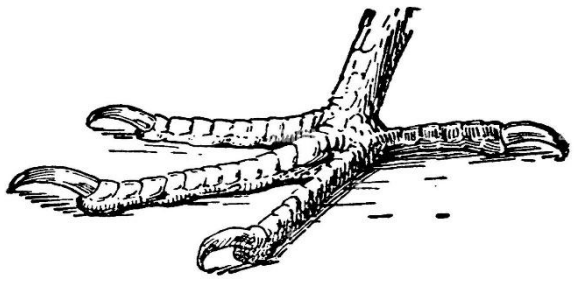
Perching birds are classified according to the way they feed.

These include:

1. Seed eating birds
2. Insect eating birds
3. Nectar eating birds
4. Fruit eating birds

Seed eaters

These have short conical beaks for easy splitting of seeds.
Examples: pigeons, dove, weaver birds and finches.

Foot of insect eaters	Beak of a Seed eaters:
	

Seed eating birds help in seed dispersal

Insect eaters

They have short narrow beaks for easy picking up of the insects from barks of trees or from the ground.

Examples of insect eaters

Robins, sparrows, swift, swallows.

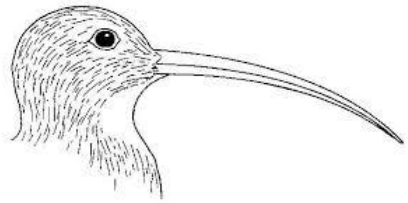
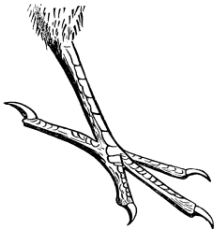
NB: They also have the ability to catch their prey/insects on flight.

Nectar sucking birds

They have long slender beaks for easy sucking of nectar from flowers.

Examples: sun bird **and** humming bird.

Nectar eating birds help in the pollination of flowers.

An illustration showing a beak and a foot of a sun bird.	
	

Fruits eaters:

- These are perching birds which feed on fruits
- They have long stout beaks for collecting fruits from trees.
- They help in seed dispersal.
- Fruit eating birds are harmful because they are pests
- A horn bill is the best example of a fruit eater.

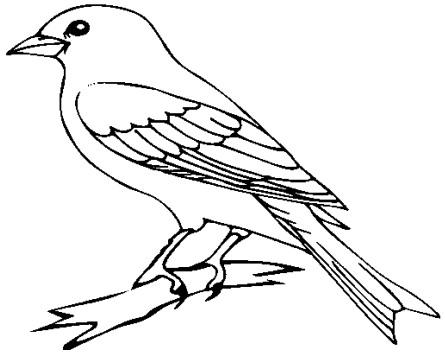
Drawing of a hornbill

ACTIVITY

Below is a diagram of a part of a bird. Use it to answer the questions that follow.

1. Name the group of bird with such beak
2. .
3. State any **one** example birds with such beak.
4.
5. How important is the horn bill ito the plant?
6.
7. State any **one** way in which hornbill is a pest to farmers.
8.

9. Mention any **two** examples of:
   (a) Nector sucking birds
   (b)
   (c) Perching birds
10.
11. State any **one** way in which perching birds are useful to the environment.



12. Describe the foot of the above bird.
13.
14. How useful is the arrangement of the toes on the foot to the bird shown above.
15.
16. State any two kinds of birds with such kind of foot.
17.
18. Why are pigeons grouped under perching birds?
19.
20. How to crop farmers benefit from the sunbirds that visit flowers.
21.
22. What do sunbirds collect from the flowers?

LESSON

SCRATCHING AND CLIMBING BIRDS

SCRATCHING BIRDS.

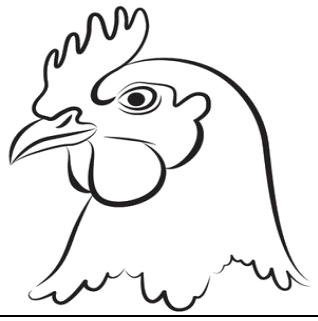
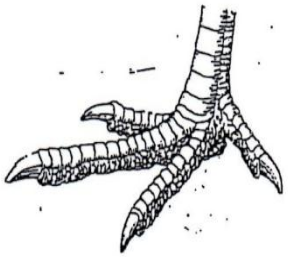
- These are birds with strong blunt stout claws for scratching the surface of the earth to find their food.
- They get worms, small insects and seeds from soil.

Characteristics of scratching birds

- They have strong feet with blunt talons.
- They have short and strong pointed beaks for picking up food from the ground.
- They feed on grains and insects.

Examples of scratching birds

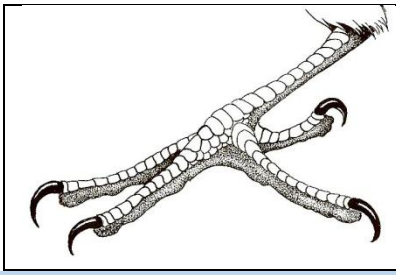
Chicken, turkeys, guinea fowls

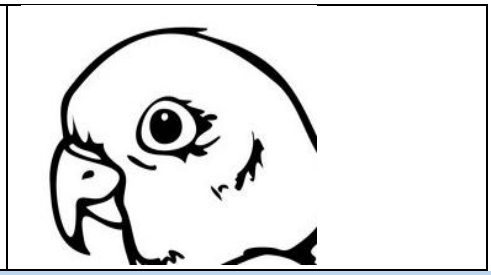
	
Strong, short and pointed beak	Strong feet with blunt claws for scratching.

CLIMBING BIRDS

- They have two toes pointing forward and two pointing backwards.
- They have strong and pointed beaks for making holes in tree trunks.
- **Examples:** parrots, toucan, turaco and wood pecker.

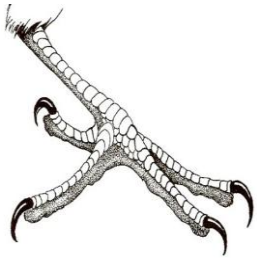
A foot of a climbing bird.	**Beak of a parrot**





Activity

1. Give at least **two** examples of each of the following:
   a) Seed eaters.
   (i) _____
   (ii)_____
   b) Insect eaters
   (i) _____
   (ii)_____
   c) Fruit eaters
   (i) _____
   (ii)_____
   d) Nectar suckers.
   (i) _____
   (ii)_____
2. Give **one** characteristic of climbing birds
   _____
   _____
3. How are the feet of the climbing birds different from that of the scratching birds?
4.
5. **Below is a foot of a bird. Use it to answer questions that follow.**



5. Name any **two** examples of birds with the above shown type of foot.
   (i) _____
   (ii)_____
6. How are scratching birds adapted to their mode of feeding?
7.
8. How are soils important to the scratching birds?
9.
10. Mention any **two** examples of scratching birds.
    (i) _____
    (ii)_____
11. State **one** way in which scratching birds are harmful to crop farmers.

LESSON

SWIMMING BIRDS.

Swimming birds are birds with fully webbed feet for paddling in water as they swim.
Web: A large skin grown between toes of some birds

The webbed feet help these types of birds for padding in water as they swim
Examples:

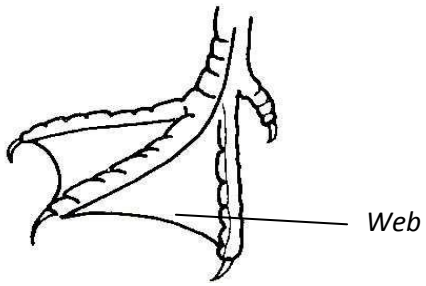
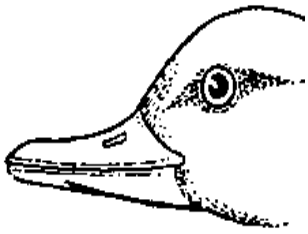
1. Swans
2. Ducks
3. Geese
4. Penguins
5. sea gulls
6. pelicans

7. Cormorants 8. King fishers

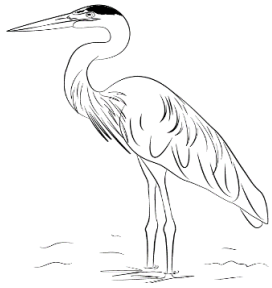
Characteristics of swimming birds

1. They have a broad flat spoon shaped beak.
2. They have webbed feet for paddling in water.
3. They have a layer of fats to keep them warm in water.
4. They are commonly seen in water looking for their food.
5. They feed on worms, snails, fish and other insects found in mud.

All illustration showing the foot and a beak of a swimming bird

	
A webbed foot for paddling in water	Spoon shaped beak for sieving food from water

WADING BIRDS



These are birds that walk through water to find their food.

Characteristics of wading birds

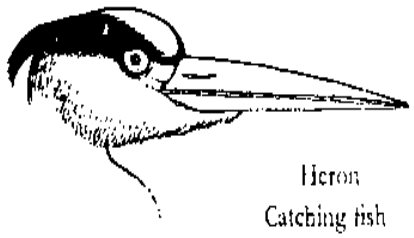
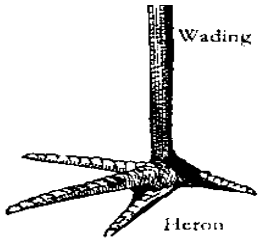
(a) They have long beaks for easy piercing of small fish and frogs.

(b) They have long, thin legs

(c) They have half webbed feet.

Examples of wading birds

Ibis, heron, egret, crested crane, flamingos, jacana, storks, kingfishers, marabou storks

	
A long and strong beak.	Half–webbed toes to prevent sinking in water.

ACTIVITY

1. Why do wading birds have long beaks?
2.
3. List any **two** examples of swimming birds
   (i) _____
   (ii)_____
4. State **two** ways in which swimming birds are adapted to their mode of life
   (i) _____
   (ii)_____
5. Draw a foot of a swimming bird.

6. How is the foot drawn above useful to the geese?
7.
8. Why do wading birds have long, thin legs?

   _____

   _____

9. Apart from a duck, mention any **one** other example of a swimming bird.
   (i) _____
   (ii)_____
10. How is a streamlined body adapted for bird flight?

    _____

    _____

11. How important is a nictating membranes to the eyes of the birds?

    _____

    _____

12. The diagram below is a beak of a bird. Use it to answer question 7 and 8.

Name any **one** bird with the above kind of beak apart from a duck.

_____

_____

13. State the habitat for these kinds of birds

_____

_____

16. Why are these kind of birds very common in muddy water?
17.
18. Mention any **two** food fed on by the bird above from muddy water.
    (i) _____
    (ii)_____
19. State one reason why ducks are able to fly.

LESSON

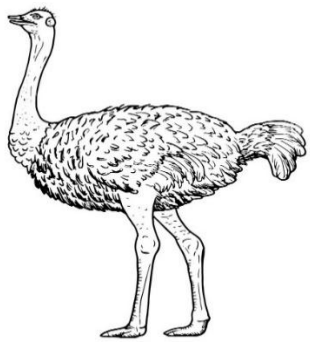
FLIGHTLESS BIRDS.

- These are birds which cannot fly.
- They have small and weak wings compared to their bodies.
- They have bone marrows which make their bodies very heavy.
- They are heavier.

Examples of flightless birds;

Ostrich, kiwi, emu, penguin, cassowary, Rhea

An ostrich is the biggest and fastest bird on earth



Advantages of birds to people

1. Birds provide people with meat and eggs as food.
2. Some birds such as sun bird help in plant pollination.
3. Some birds (scavengers) help to keep the environment clean.
4. They attract tourists
5. Their feathers are used for decoration and cultural ceremonies
6. Domestic birds are a source of income once sold.

Disadvantages of birds in the environment

1. Many birds spoil farmer's crops. They get raw materials to make nests and feed on crops.
2. Birds cause noise pollution especially weaver birds in the environment.
3. Bird feathers keep vectors to human health like fleas and mites.
4. Some birds can cause accidents in the air.

ACTIVITY

1. Give any **two** examples of a flightless bird.
   (i) _____
   (ii)_____
2. Name the biggest and fastest bird in the world.
3.
4. State any **two** examples of birds that can fly.
   (i) _____
   (ii)_____
5. Mention any importance of birds to people.
6.
7. State **two** reasons why birds destroy our crops.
   (i) _____
   (ii)_____
8. Apart from destroying crops, mention **one** way in which weaver birds are disadvantageous to us.
9.
10. Mention any **two** common vectors kept by domestic birds.
    (i) _____
    (ii)_____

Below is a diagram of a part of a bird. Use it to answer the questions that follow.

11. Name the bird shown above.
12.
13. Why is the above bird unable to fly?
14.
15. What makes flightless birds very heavy?
16.

_____

_____

LESSON

Reproduction in birds

Reproduction is the process by which living organisms produce young ones similar to them.
Reproduction is the process by which living organisms multiply in their number.
Birds reproduce by means of laying eggs.
Birds follow the following steps during reproduction.

1. Courtship and pairing
2. Nest building
3. Mating and egg laying
4. Care for eggs
5. Care for the young ones

Courtship and pairing

It is when the birds select each other for the task of reproduction.

Nest building

This is done by parental birds in preparation for laying eggs.

Mating and laying

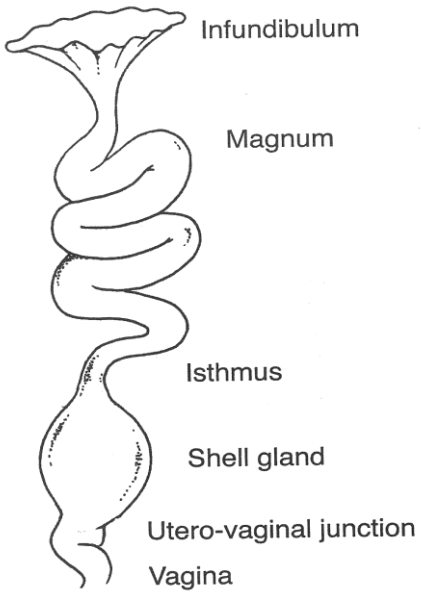
This is done when the male birds mounts on top of the female bird and deposits sperms in the vent to enable internal fertilization to take place.

Care for eggs

In most cases incubation is done by only female birds through some birds like dove incubation is done by both the male and female birds.

- Birds reproduce by means of laying eggs.
- Their eggs are fertilized internally before they are laid out.
- A hen will sit on the eggs (incubate) until they hatch into young ones.

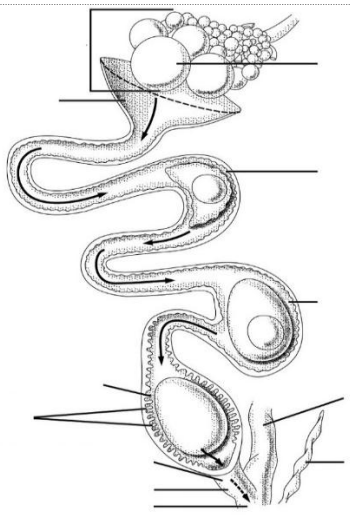
The reproductive system of the bird



FUNCTIONS OF EACH PART

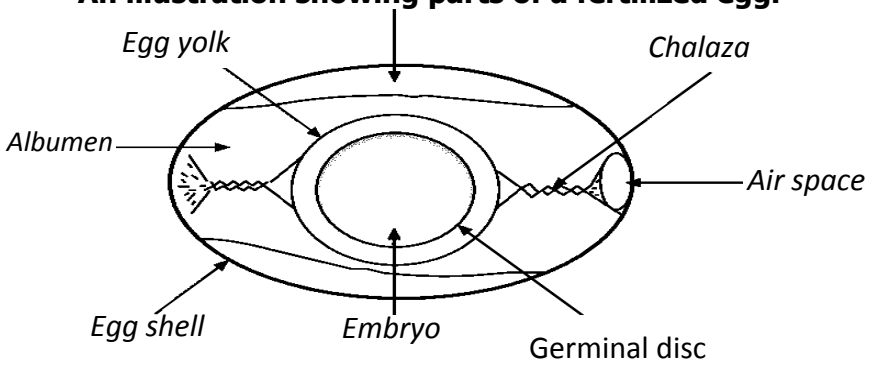
1. **Ovary** stores and produces the mature ova.
2. **Ova** are the female reproductive cells.
3. **Oviduct funnel** receives and directs the ova to the oviduct.
4. **Oviduct** is where fertilization occurs.
5. **Magnum** is where the egg white is added to the fertilized egg.
6. **Isthmus** is where mineral salts and shell membrane is added to the fertilize egg.
7. **Uterus** is where the egg shell is added to an egg.
8. **Vagina** is where an egg is given colour i.e white, brown or spotted.
9. **Cloaca/vent** acts as the passage of an egg during the laying process.

ACTIVITY



LESSON

An illustration showing parts of a fertilized egg.



Functions of the parts

1. **Egg shell**: It protects the inner parts of an egg from being damaged.
   It is porous or permeable to allow free circulation of air.
2. **Air space** keeps and provides oxygen to the embryo.
3. **Egg Yolk** provides proteins and, salts and fats to the growing embryo.
4. **Germinal disc**: It develops into a chick after fertilization.
5. **Embryo** develops into a chick under favourable conditions.
6. **Albumen**; provides water and mineral salts to the growing embryo.
7. **Shell membrane** protects the egg content from bacteria which may destroy it.
8. **Chalaza** holds the yolk and embryo in one position.
   - It also transports fresh air from the air space to the embryo

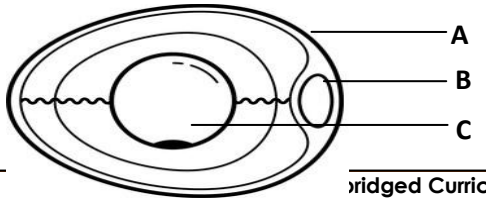
ACTIVITY

1. Name the part of an egg which develops into the chick.
   _____
   _____
2. Why is egg shell porous?
3.
4. State **two** factors that can hinder incubation to take place.
   (i) _____
   (ii)_____
5. Name the food value we get from eating eggs.

6. State any **two** common egg abnormalities.
   (i) _____
   (ii)_____
7. What is incubation period?
8.
9. State any **two** importance of chalaza to the egg.
   (i) _____
   (ii)_____
10. Mention the importance of the following parts of an egg.
11.
12. State **two** conditions under which fertilized eggs may fail to hatch.
    (i) _____
    (ii)_____
13. Give **two** characteristics of birds.
    (i) _____
    (ii)_____

State any **one** factor which makes a bird to lay soft shelled eggs.

Below is diagram of an egg. Use it to answer the questions that follow.



Name the part marked with letter

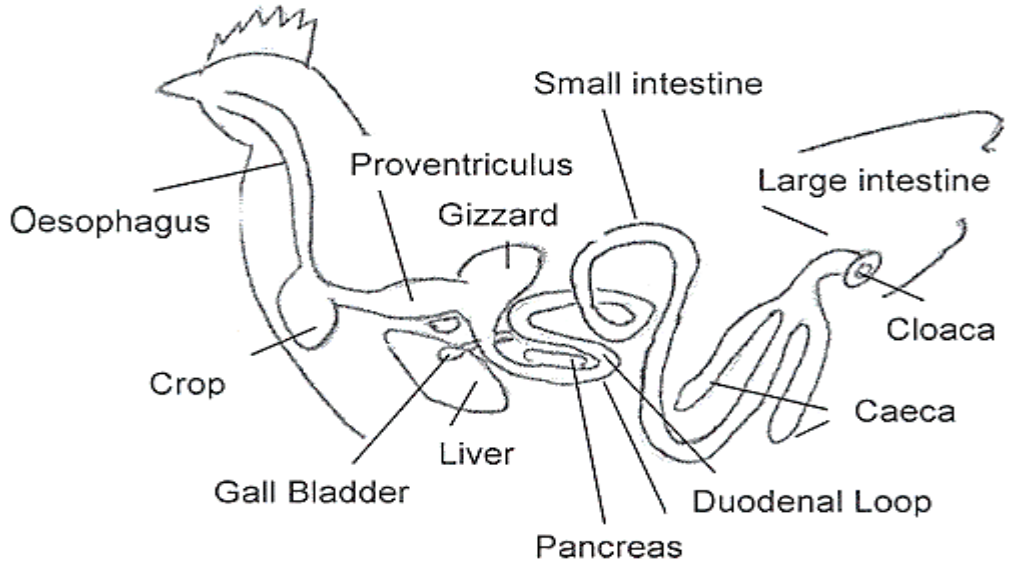
A **B** **C**

How important is the part marked B to an egg?

1. Why is the egg shell being porous useful to the developing embryo?
2.
3. Name the part of an egg which develops into the chick after fertilization and incubation.
   _____
4. Why are eggs important to the child's diet?

LESSON

Alimentary canal of the birds



Functions of each part

1. **Beak**: It is used by the bird for killing, picking and breaking up food.
2. **Gullet(Oesophagus)**: It passes food to the crop.
3. **Crop** moistens, softens and stores food before it is sent to the stomach.
4. **Stomach** is where food is mixed with digestive juices.
5. **Gizzard** contains the grits or parables which help to crush down food into small particles.
   NB: Grits (parables) are small stones found in birds' gizzard which breakdown food into small particles.
6. **Small intestines** is where digested food is absorbed in the body of the bird.
   It is where digestion is completed.
7. **Large intestines** is where water absorption is done.
8. **Caeca** is where undigested food is stored in form of droppings before it is passed out.
9. **Liver:** produces bikes, stores digested food
10. **Pancreas:** secretes enzymes for digestion in the small intestines
11. **Cloaca/ vent** passes out undigested food in form of droppings.
    It is also the passage of eggs during the laying process.

ACTIVITY

1. Of what importance is a beak to a bird?
2.
3. Name the part of alimentary canal in a bird where:
   (a) Digestion start from _____
   (b) Digestion ends _____
4. Name the part of the bird which play the same role as mouth in human beings.
5.
6. What are grits?
7.

8. State any **two** processes which take place in the crops during digestion.
9.
10. Which part of alimentary canal in a bird does water absorption take place?
11.
12. Name the part of alimentary canal in a bird where absorption of food to the body take place.
13.

LESSON

Uses of birds to people

1. Birds are source of feathers which are used for decoration and costumes for cultural dances.
2. Some birds help to carry out pollination like sun birds.
3. Some birds are source of food to man in form of eggs and meat.
4. Birds' bones are used to make glue.
5. Some birds like scavenger birds help to clean up the environment by eating up the leftover meat of dead animals.
6. Some birds help to carry out seed dispersal like eating birds.
7. Some birds like poultry are source of income to farmers.
8. Birds are used for customary purpose like paying bride price.
9. Some birds are used as pets at home.

Disadvantages of birds in the environment

1. Some birds are pests (They are spoil farmer's crops)
2. Some birds cause noise pollution in the environment.
3. Some birds kill and eat poultry.
4. Some birds keep vectors like mites
5. Some birds cause accidents on run ways of aeroplanes
6. Some birds are birds of prey and predators to poultry

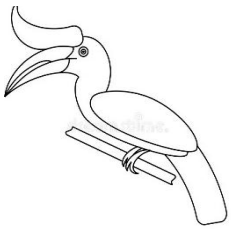
ACTIVITY

1. Which type of birds are commonly seen near abattoirs?
2.
3. Name the meat we get from chicken.
4.
5. Apart from protection, state any other function of the beak to a bird.
6.
7. Name the type of birds which helps to clean up the environment.
8.
9. Give **one** economic importance of birds kept at home.
10.
11. Mention any **one** bird that cause noise pollution in the environment.
12.
13. State the role of grits in the birds' gizzard.

_____

14. Apart from being pests, how else are weaver birds harmful in the environment

Below is a diagram of a bird. Use it to answer the questions that follow.

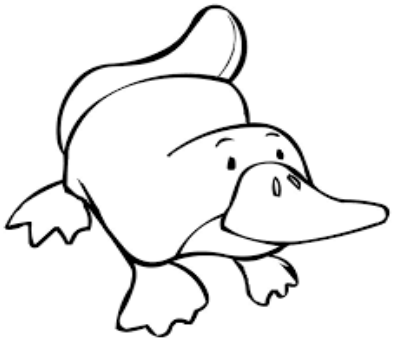


15. Name the type of bird shown above
16.
17. How is the bird above important to the plants.
18.
19. How is it a disadvantage to farmers?
20.
21. State any **two** uses of birds kept at home.
22.
23. Mention any **two** problems caused by birds kept at home.

LESSON

MAMMALS

- ✓ These are warm blooded vertebrates that have mammary glands.
- ✓ These are warm blooded vertebrates whose skin is covered with hair.
- ✓ Most mammals give birth to their live young ones part from the egg laying mammal i.e the duck billed platypus and spiny ant eater



Duck billed platypus is one of the egg laying mammals

Characteristics of mammals

1. They have mammary glands
2. They have well developed (pinna) ear lobes to trap sound waves.
3. They have fur on their bodies.
4. They have the large brain protected by the skull (cranium)
5. They respire by means of lungs
6. They undergo internal fertilization
7. They have four chambered hearts.
8. Most mammals give birth to their young ones alive except the egg laying mammals
9. They take care for their young ones i.e providing them with food and protection
10. They have back bones.
11. All mammals are warm blooded.

Specific characteristics of mammals

1. Their bodies are covered with fur.
2. They have mammary glands.
3. They feed their young ones on breast milk produced by the mammary glands.

ACTIVITY

1. Define the terms mammals.
2.
3. State the skeletal structure which protects the brain of the mammals.
4.
5. Mention any **two** delicate body parts of animals protected by the skull.
6.
7. Mention any **two** ways in which mammals care for their young ones.
8.
9. Define each of the following terms.
   (a) Homoeothermic animals
   (b)
   (c) Poikilothermic animals
   (d)
   (e) Viviparous animals
   _____
   (f) Omnivores
   _____
   _____
   e) What do you understand by the term:
   Carnivores
   Herbivores
10. How do mammals respire?
11.

12. Of what importance are mammary glands to the mammals?
13.
14. State **two** similarities between birds and mammals.
15.
16. Which type of fertilization do mammals undergo?
17.
18. State the importance of mammary glands to mammals.
19.

LESSON

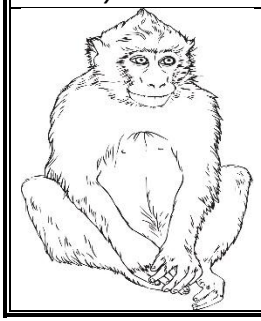
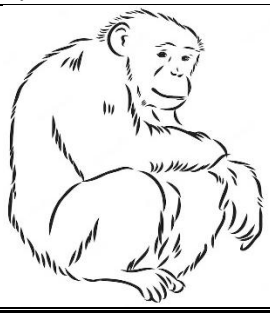
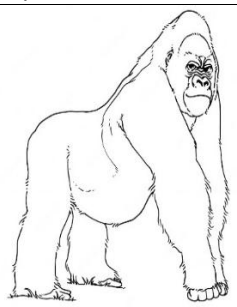
Groups of mammals

a) Primates(most advanced mammals)
b) Rodents (gnawing mammals)
c) Ungulates(hoofed mammals)
d) Chiropteras (flying mammals)
e) Marsupials(pouched mammals)
f) Insectivores (insect eating mammals)
g) Cetaceans (marine mammals)
h) Carnivorous mammals (flesh eaters)
i) Monotremes (egg laying mammals)

A. PRIMATES

Primates are the most advanced group of mammals with well-developed brains.
They are mammals which have ability to judge, reason and learn.
This is because of the large brains they have.

Examples of primates

Monkey	*Baboons*	*Ape*	*Chimpanzee*
			

Characteristics of primates

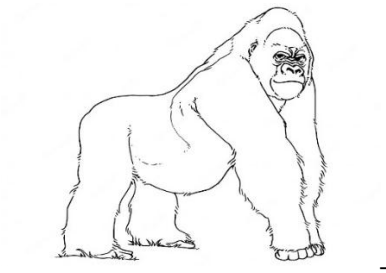
1. They have five fingers on each hand and five toes on each foot.
2. They have a well-developed set of teeth (32)
   - Incisors for cutting and biting food
   - Canines for tearing flesh
   - Molars and premolars for grinding, chewing and crushing down food
3. Primates have well developed and advanced brain.
4. They use their front limbs for holding things while hind limbs for walking.
5. All primates are omnivores (They feed on both flesh and vegetables)

Other examples of primates include

(a) Man (c) bush baby
(b) Orangutan (d) gibbon

ACTIVITY

1. To which group of mammals does man belong?
2. Name the mammal shown below.



_____

3. To which group of mammal can you group the animal above?
4.
5. State the importance of the following types of teeth to the primates.
   a) Incisor teeth: _____
   b) Canine teeth: _____
   c) Molar teeth: _____
6. What are omnivorous animals?
7.
8. State any **two** examples of omnivorous animals.

9. State any **two** ways in which primates are different from other mammals.
10.
11. Mention any **two** uses of well-developed brains of the primates.
12.
13. How important are hind limbs to primates?
14.
15. State any **two** examples of primates.
16.
17. Name the glands that produce milk in a cow.

    _____

    _____
18. Why are primates referred to as mammals?

LESSON

EGG –LAYING MAMMALS (Monotremes)

These are mammals which reproduce by means of laying eggs.
They are also called primitive mammals.
They are also called oviparous mammals because they reproduce by laying eggs

Examples of monotremes

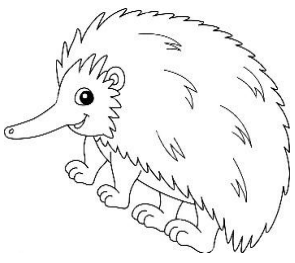
- Duck billed platypus
- spiny anteater(echidna)

characteristics of monotremes

a) They lay eggs
b) They feed their young ones on milk from mammary glands.
c) They have common rear openings cloaca for passing out urines and faeces.

Illustrations showing monotremes

Duck billed platypus



Spiny anteater

ACTIVITY

1. In which way are the monotremes different from the rest of the mammals?
2.
3. Why are monotremes regarded as mammals?
4.
5. In which way is duck billed platypus similar to a spiny ant eater?
6.
7. Give any **two** examples of primates
   (i) _____
   (ii)_____
8. Mention any **two** common characteristics of mammals.
   (i) _____
   (ii)_____
9. Why is a duck billed platypus grouped under mammals?
   _____
   _____
10. State the main reason why monotremes are referred to as oviparous mammals.
11.
12. In which way is the reproduction in monotremes similar to that of the birds?
13.
14. Name any **two** examples of egg laying mammals.
   (i) _____
   (ii)_____

LESSON

FLYING MAMMALS (CHIROPTERA)

These are mammals whose fore limbs are modified into wings for flying.
They have fold skin attached to the fore limbs which act as wings.

Bats are the only true examples of chiropteras.
Bats are bot birds much as the fly.

Reasons why bats are not considered as birds

1. They have well developed teeth instead of beaks.
2. They give birth to young ones alive.
3. Their bodies are covered with fur instead of feather.
4. They feed young ones on breast milk from mammary glands.

Nocturnal Animals that is active at night.
Diurnal: Animals those are most active during the day.
Bats are the only mammals that fly.
There are three types of bats namely;

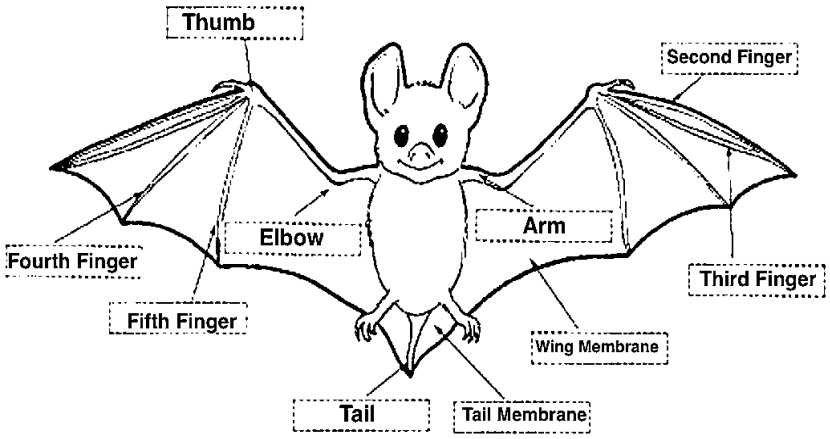
1. Fruit eaters or foresters.
2. Insect eaters.
3. Blood suckers (vampires)

Insect eating bats: Are bats which feed on insects like ants, mosquitoes, mites, grasshoppers, locusts
NB: They are good because they control insect vectors and insect pests by feeding on them.
Fruit eating bats: Are bats which feed on fruits like berries, guavas, mangoes, tomatoes, pawpaws, grapes.
NB: The fruit eating bats are dangerous because they are pests to farmers' crops but they are also good because they help in seed dispersal.

Blood sucking bats (vampire bats):
Blood sucking bats are bats which suck blood from animal bodies like horses, camels, cows and buffalos.

- ✓ Bats are nocturnal animals i.e.; they are more active during the night.
- ✓ Bats use echoes to locate their food at night and dodge obstacles on flying.

Parts of a bat



Importance of bats in the environment

1. Fruit eating bats help in seed dispersal.
2. Insect eating bats help to eat vectors that would spread diseases.
3. Fruit eating bats also pollinate flowers.

Disadvantages of bats

1. Vampire bats suck blood from animals.
2. Droppings from bats lead to a bad smell in a house.

ACTIVITY

1. How are bats different from all other mammals?
2.
3. Name **one** example of Chiroptera.

   _____

   _____
4. Mention **two** reasons why bats are not considered as birds.
   (i) _____
   (ii)_____
5. Name any **two** of bats.
   (i) _____
   (ii)_____
6. Give any **one** adaptation of a bat to flight.

   _____

   _____
7. State the importance of echoes to the bats.
8.
9. Why are bats said to be nocturnal?
10. In which way are fruit eating bats useful to man?
11. How are insect eating bats important to man?
12. How do we call the reflected sound?
13. Name the type of bats that cause anaemia in animals.

    _____
14. Mention **two** importance of bats in the environment.
    (i) _____
    (ii)_____
15. State **two** disadvantages of bats.
    (i) _____
    (ii)_____

POUCHED MAMMALS (marsupials)

Marsupials are mammals which have porched pocket on their abdomen.
They have pouches used to carry their young ones for the first ten months.

Examples of pouched mammals
Kangaroo, Koala bear, wallabies, opossums
An illustration showing a kangaroo

Kangaroo

Young kangaroo

Pouched pocket

The word **marsupial** means a pouch or a bag
A kangaroo can leap or jump a great distance from one point to another.
Characteristics of pouched mammals.
1. They carry their young ones in pouch
2. They have strong hind legs for leaping
3. They give birth to young ones
4. They are also called primitive animals. This is because they reproduce giving birth to young ones.

ACTIVITY

1. Apart from a kangaroo, list only other **two** examples of a pouched mammal.
2. How useful is a pouch to a kangaroo?
3. Mention any two examples of marsupials.
4. To which group of mammals do kangaroos belong?
5. How is a long tail useful to the kangaroo?
6. Why are wallabies referred to as porched animals?
7. Name the structure in female porched animals where young ones are kept
8. State the unique difference between the marsupials and other mammals.

D. FLESH EATING MAMMALS (carnivores)
These are mammals with well-developed canine teeth used for tearing flesh.
Carnivorous mammals are mammals which feed mainly on flesh.
A predator animal is an animal which hunts and kills its prey.
A prey is animal which is hunted and fed on by a predator.
Characteristics of flesh eating mammals
- They have a good speed(they are very fast)
- The have good sense of smell and vision even at night.
- They have well developed sharp claws (talons) for holding, killing and tearing their prey.
- They have soft pads feet to enable them run after their prey without making noise.
- They have a very good sense of hearing
- They feed on meat(flesh) majorly
- They have well developed canine teeth for tearing flesh of their prey.

Groups of flesh eating mammals include:
1. Dog family carnivores
2. Cat family carnivores

a) Cat family:
These are animals whose body formation resembles that of a domestic dog.
They have features similar to those of domestic cats.
Examples: lion, cheetah, leopard, tiger.

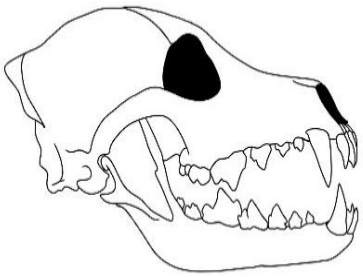
b) Dog family:

These are animals whose body formation resembles that of a dog.
They have features similar to those of domestic dogs.
Examples: dog, hyena, Jackals, Fox, wolves.

Note; Some carnivores are scavengers and therefore feed on flesh killed by other carnivores.
Examples are hyenas, jackals, dogs
Carnivores are also called preying mammals and **predators**.
A predator is an animal that hunts and kills its prey.
Note: Animals that feed on only plants are called herbivores.
Animals that feed on both plants and flesh are called omnivores.
Primates, carnivores, sea mammals, rodents, flying mammals are collectively called placental mammals because they possess a placenta.
Placental mammals have their embryo growing inside the mother until birth.

ACTIVITY

1. What do you understand by the word predators?
   _____
   _____
2. What are carnivorous animals?
3.
4. How are carnivorous animals adapted to hunting their prey at night?
5.
6. In which way are soft pads feet important to carnivorous animals?
   _____
   _____
7. **Below is a skull of an animal. Use it to answer the questions that follow.**



(a) To which group of animals does it belong?
(b) Name the type of teeth marked with letter **A.**
(c) Name the sub class of mammals in which it belongs.
(d) What kind of food does it feed on?

8. Mention any **two** examples of carnivorous scavengers.
   (i) _____
   (ii)_____
9. State **two** examples of carnivorous mammals under the:
   a) Cat family
   (i) _____
   (ii)_____
   b) Dog family
   (i) _____
   (ii)_____
10. Define preying mammals.
    _____
    _____
11. Mention any **two** examples of preying animals.
    (i) _____
    (ii)_____

1) State two ways in which carnivorous animals are adapted to their mode of feeding

2) Give any two ways in which scavengers are useful in the environment
3) Identify a group of a carnivorous animal in which the following animals belong
   i) Leopard ii) Domestic dog
4) State one difference between a preying mammal and a predator

SEA MAMMALS (CETACEANS)

Cetaceans are animals which commonly live in water of seas and oceans

Characteristics of sea mammals

1. Their fore limbs are modified into flippers which they use for swimming.
2. They have streamlined bodies.
3. They have blubber that prevents heat loss from the body and it stores food.
4. They breathe through the lungs.
5. They reproduce by means of giving birth to their young ones.
6. They feed their young ones on milk from mammary glands**.**
7. They have fur on their bodies.
8. They are warm blooded

Examples of sea mammals

Whale, dolphins, porpoise, seals and dugongs

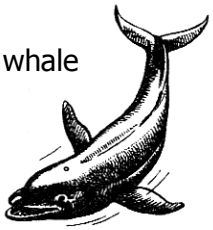
- The whale is not a fish.
- Whales are the largest mammals.

Note; whales are divided into two namely, blue whale and sperm whale.

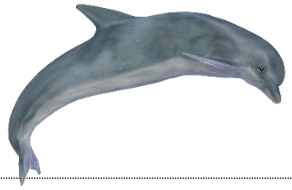
1. A whale is the largest mammal.
2. A whale is over 30m long and over 150 tones in weight.
3. A thin layer of blubber insulates the body against heat loss and it is an important food store.
4. Whales are hunted by people for their high-quality oil.

Drawn structures showing different examples of sea mammals

A whale



Dolphin



Seals

Porpoise

LESSON

1. What name is given to the animals which live in the seas?
2. Of what importance is a blubber to a sea mammal?
3. Mention any two examples of sea animals.
4. Name the largest sea mammals in the world.
5. Apart from seas, mention any **one** place where cetaceans live.
6. State the main reason why people hunt for the whales.
7. In which way is breathing in whale similar to that of mammals?
8. How do cetaceans reproduce?
9. State any **two** similarities between whales and mammals.
10. How useful are the streamlined bodies to the cetaceans?
11. Why is it wrong to say that a whale is a big fish?

LESSON

GNAWING MAMMALS (RODENTS)

The term gnaws means rapidly chewing food.

Rodents are mammals with well-developed incisor teeth used to chew food rapidly and powerfully.

Examples of rodents include:

1. Beavers	2. Squirrels	3. Mice

4. Hares	5. Guinea pigs	6. Bears
7. Rats	8. Porcupines	9. Moles

Most gnawing mammals are very harmful to the crop farmers because they are crop pests.

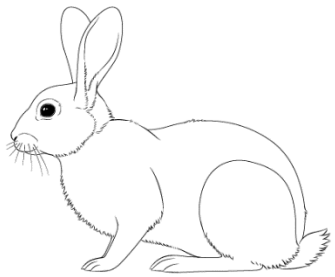
Characteristic of rodents

- ✓ They have well developed incisor teeth for biting and chewing rapidly.
- ✓ They are vegetarians (They mainly gnaw on tuber crops)
- ✓ They do not have canine teeth.
- ✓ Most gnawing mammals are vegetarians therefore, feed on vegetables.
- ✓ Most rodents are small for easy running very fast.
- ✓ Most rodents make holes in soil called burrows for protection and as a habitat.
- ✓ They have sharp strong claws for digging up root crops.

Disadvantages of rodents to crop farmers

- ✓ All rodents are crop pests.
- ✓ They destroy farmer's crops by causing damage to them.
- ✓ Some destroy stored harvested crops in the granaries especially the rats.

Drawn structure showing rodents

		
Rat	Rabbit	Squirrel

Exercise

1. Name the largest mammals
   _____
   _____
2. In which way is blubber important to the sea mammals?
   _____
   _____
3. Write **one** sentence to explain the meaning of the word gnawing mammal.
   _____
   _____
4. Why are squirrels called gnawing mammals?
5.
6. Name the rodent that destroy stored cereals.
7. How can the above rodents be controlled biologically?
8. Mention any **two** characteristics of rodents.
   (i) _____
   (ii)_____
9. Name the type of teeth missing in all the rodents.
   _____
   _____
10. Give **two** ways in which rodents are a disadvantage to people.
    (i) _____
    (ii)_____
11. State any **two** importance of rodents to the crop farmers.
    (i) _____
    (ii)_____

LESSON

UNGULATES (HOOFED MAMMALS)

These are mammals which feed on vegetables and have hooves on their toes.

Characteristics of ungulates or hoofed mammals

- ✓ They are mainly herbivorous animals
- ✓ They mainly feed on plant materials.
- ✓ Some ungulates are ruminant and chew cud.
- ✓ Ruminant ungulates have four chambered stomachs.
- ✓ Some ungulates do not chew cud and have one true stomach.

Note: Cud is food an animal brings back from the stomach to chew again.
This is called **rumination**.
Ruminant animals are animals with four chambered stomachs and chew cud.

They have toes divided into two namely.

(i)Even toed ungulates

These are ungulates with even number of hooves on their feet i.e 2 or 4 hooves.

Examples

cows, goats, sheep. Deer, camels, Antelopes, Giraffe, Pigs

(ii) Odd toed ungulates

These are ungulates with odd number of hooves in their feet. i.e 1 or 3 hooves.

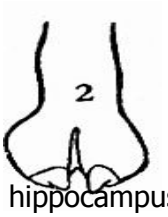
Examples

Elephants, horses, zebra, donkeys, rhino

Drawn structure showing different toes of ungulates

Cow

Elephant



pigs

hippocampus

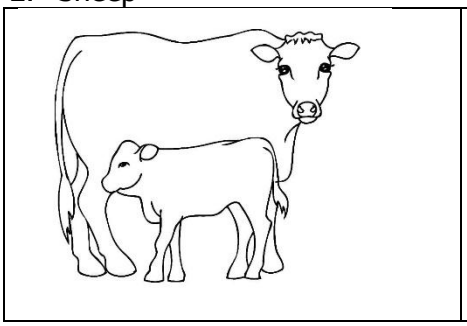
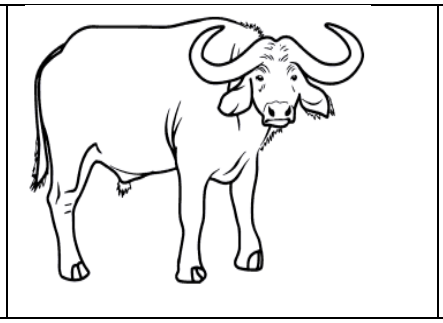
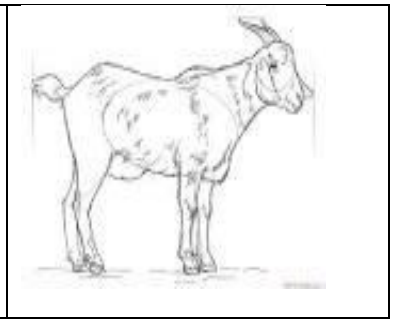
Some ungulates are ruminants and others are non-ruminants.
Ruminant animals are animals which chew cud.

<u>Cud</u>:

This is the food which is sent back in the mouth of the ruminant animals for re-chewing.

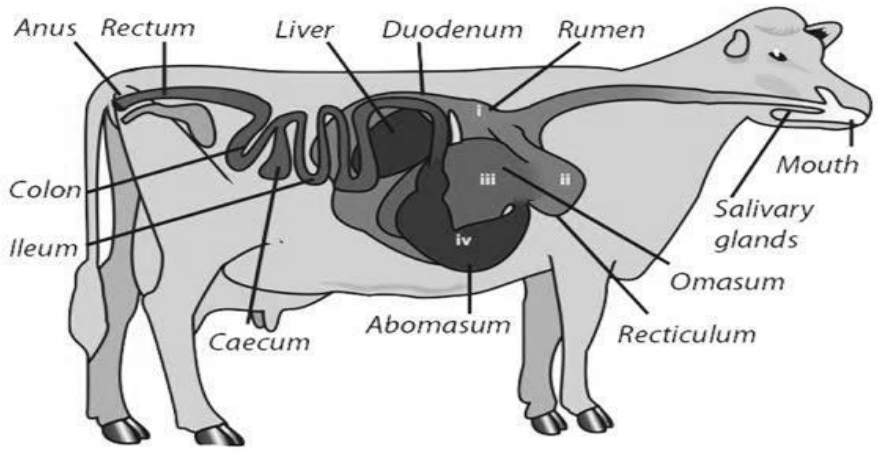
Examples of ruminant animals

1. Goats
2. Sheep
3. Cows
   Giraffe
   Camels
   Buffaloes

Ruminant animals have got four stomach chambers i.e Rumen, Reticulum, Omasums and Abomasum

Illustration of a stomach of a ruminant animal



An illustration of a stomach of a ruminant animal

Non-ruminant animals:
These are animals which don't chew cud.
Examples of non- ruminant animals
Hippopotamus, pigs and warthogs.

ACTIVITY

1. Give **two** examples of even toed ungulates.
   (i) _____
   (ii)_____
1. Mention any **two** examples of ungulates with odd number of hooves in their feet.
2. Why are most ungulates called herbivorous animals?
3. Mention any **two** examples of herbivorous animals.
4. Define the term:
   (a) Cud
   (b) Rumination
5. State any **two** stomach chambers in ruminant animals.
6. What are ruminant ungulates?
7. What are non-ruminant ungulates
8. Mention any **two** examples of non-ruminant wild animals.
9. Why are domestic pigs unable to chew cuds?
10. Name **two** common characteristics of ruminant animals.
    (i) _____
    (ii)_____

LESSON

H. INSECTIVORES

- These are mammals that feed on insects.
- They have long and strong claws for digging the soil and anthills to get insects.
- Most of them are nocturnal.

Examples of insectivores

Hedgehog, Antbear, ant eater, pangolins, porcupine and Shrew

- Ant eaters have long sticky tongues for trapping insects.

Characteristics of insectivorous mammals

1. They have a sensitive snout or a good sense of smell.
2. They have got the strong claws for digging the ground to get insects
3. They have good speed
4. They mostly hunt at night and sleep during day time (they are nocturnal)
5. Most of them are toothless (endetanta) e.g pangolin
6. Most insectivorous mammals have got sharp pointed scales on their back called spines for protection e.g. Hedge hog

Things to note:

- A hedgehog stops and hides its head in curls or rolls into a ball for protection.
- A porcupine has spines for protection.

Learner's Exercise

2. What are insectivores?

   _____

   _____

3. Mention **two** examples of insectivores.
   (i) _____
   (ii)_____
4. Why do most insectivores have long and strong claws?
5. How are spines important to the insectivores?
6. How are long sticky tongues important to the insectivores?
7. How does a porcupine protect itself against its enemies?
8. How is a hedgehog able to protect itself against its enemies?
9. What are nocturnal animals?
10. State any two ways in which insectivores benefit from the soil.
11. Mention any **two** examples of nocturnal animals?

LESSON

Defence and protection in mammals

Defence strategy	Description	Examples
Claws on feet	Sharp and curved claws to scratch attacker	cats
Horns	Long skin outgrowth on the head	Cows, goats, buffaloes, sheep
Spines		Porcupines
Escape	Moving away from dangers by sliding, jumping, running	Cats, cheetah, dogs
Teeth	Sharp incisors used to bite enemies	Lions, dogs, cats
Hard skins	Hard skin is difficult to destroy	Hippo, crocodile, python
camouflage	Having colours similar to that of the environment	Tortoise, leopards

ACTIVITY

LESSON

REPTILES:

Reptiles have 4 limbs apart from the snakes which are limbless

Reptiles are cold blooded vertebrates that moves by crawling.

- The word reptile comes from reptalia meaning crawlers.
- Reptiles commonly live-in warm countries.

Characteristics of reptiles

1. All reptiles are cold blooded (poikilothermic)
2. Reptiles respire through their lungs.
3. They reproduce by means of laying eggs.
4. All reptiles have their bodies covered with scales.
5. Reptiles do not take care of their young ones
6. They have three chambered heart i.e., two atria and one ventricle.
7. They have external ears but no ear lobes
8. They have teeth which is almost the same
9. They undergo internal fertilization.
10. They have water proof skins

Groups of reptiles

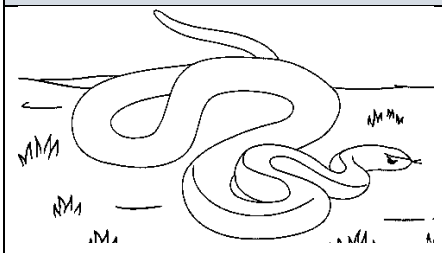
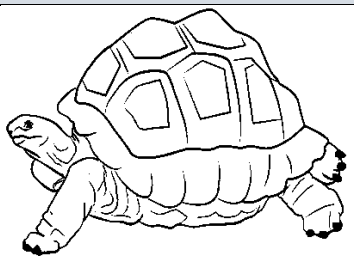
(a) Snakes (c) Tortoises (e) Crocodiles
(b) Lizards (d) Alligators (f) Turtles

(g) Terrapins (h) Chameleons (i) Geckoes

ACTIVITY

1. What term is used to mean animals which move by crawling?
2. How do most reptiles move?
3. Mention any **two** examples of reptiles found in the school environment.
4. How do reptiles reproduce?
5. Why are reptiles groped under cold blooded animals?

Below is a diagram of reptiles used them to answer questions that follow.

Reptile A	Reptile B	Reptile C
		

6. Name the reptiles shown above
   (a) Reptile A: _____
   (b) Reptile B _____
   (c) Reptile C _____
7. State any two common similarities among all the three reptiles above.
8. How is reptile **A** different from reptile **C** in the way of their movement?
9. How does reptile **B** protect itself from its enemies?
10. State any **two** similarities between reptile **A** and birds.
11. How important are external ears to the reptiles?

LESSON

Snakes

- ✓ Snakes are groups of reptiles with no limbs and move by **gliding/slithering/crawling** caused by contraction of their muscles.
- ✓ A snake has a sensory ear bone called columella used for detecting vibration from the grounds and on trees.
- ✓ They moult to grow a new skin and increase in size.
- ✓ Snakes commonly move with their tongues out for protection and easy trapping of its prey.
- ✓ Snakes are carnivorous animals.

Characteristics of snakes

1. Snakes have no limbs.(They are limbless)
2. They move by gliding or concentration of body muscles
3. They are able to sense danger by using the ear drum to detect sound waves on the ground.
4. They are mainly carnivorous
5. They always undergo moulting or ecdysis in order to increase in size
6. They have the forked tongue for smelling and tasting food
7. They have many ribs and vertebrae
8. They don't have eyelids
9. They have backward pointing teeth
10. They mostly protect themselves by biting their enemies
11. moult.

Note: Moulting is the shedding of animal skins to allow them to grow new skins and increase in size.

ACTIVITY

1. How do snakes increase in sizes?
2. What is moulting?
3.
4. How do snakes move?

5. State **one** reason why snakes are called limbless animals.
6. What brings about movement in snakes?
7. State **one** reason why snakes moult?
8. The snake doesn't have ears, how is it able to detect sound?

   _____
   _____
9. How are snakes different from the rest of other reptiles?
10.
11. How do snakes reproduce?
12.
13. State any **one** common place where snakes live.
14.
15. How do snakes protect itself?
16.
17. How do most snakes reproduce?
18.
19. Why are snakes said to be defensive but not offensive?

    _____
    _____
20. How are snakes different from all other reptiles?

    _____
    _____

LESSON

Types of snakes

a. Poisonous snakes.
b. Non-poisonous snakes
c. Constrictors.

POISONOUS SNAKES

These are snakes with poison glands and fangs.
They have a pair of fangs used to inject venom from the poison glands into the victim's body they bit.

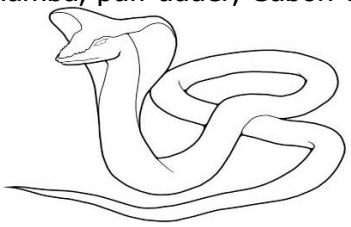
a) This poison from snakes is called **venom**.
This is a poisonous liquid (fluid) snakes inject in the body of the enemy in order to weaken them.

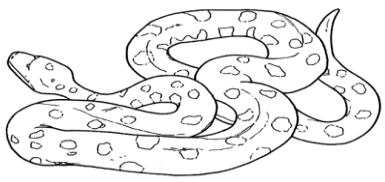
b) Snake venom clots blood

c) Snake venom can be used to make serum used for providing treatment against snake bites.

Examples of poisonous snakes.

Cobra, black mamba, puff udder, Gabon viper





Characteristics of poisonous snakes

1. They have poison glands and produce venom
2. They have square heads
3. They have a pair of fang teeth
4. They leave two marks of fang teeth in the bitten part
5. They move when their forked tongue is suspended out
6. They have shining skins
7. They first kill their pray before swallowing them
8. They have triangular or square heads
9. They have short tails

Effect of snake poison on blood

Venom clots blood

Effect of snake poison to a victim

It paralyses the nervous system

It causes difficulty in breathing

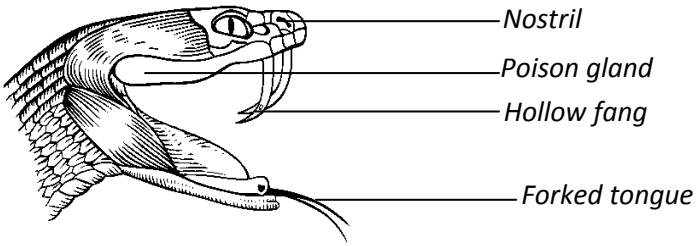
They causes blood clotting

Ways how poisonous snakes release venom

a) Through biting their prey or enemies

b) Through spitting on the eyes of their enemies.

Diagram show a head of a poisonous snake



Function of different features found on the head of a snake

- **Fangs:**
  They are used to inject venom in the enemies' body
- **Forked tongue**
  It is used by snakes for tasting food and smelling
- **Poison gland:**
  It stores and produces the venom

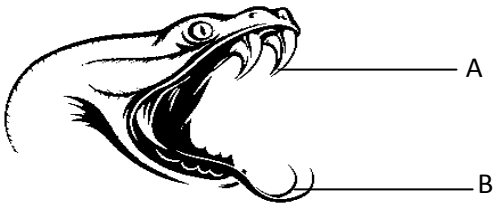
Some snakes have their poison gland situated at the back on the mouth while others have them nearer the front part of the mouth.

NB: Snakes are defensive but not offensive because they only bite for protection.

- Every snake has got its own kind of venom
- Some snakes like cobras can bite or spit venom to the enemy which can make the enemy blind.
- Not all snakes reproduce by laying eggs, some snakes give birth to their young ones like puff adders.

ACTIVITY

1. Name the poisonous substance injected by snakes to weaken their enemies.
2.
3. Name the type of snakes which leave two fang marks on the bitten part of an animal.
4.
5. Give **one** way you would identify a poisonous snake.
6. _____
7. _____
8. Why are crocodiles said to be carnivorous?
9. _____
10. _____
11. In which way does a constrictor snake kill its prey?
12. _____
13. _____
14. Name any **one** example of snakes which give birth to the young ones.
15.
16. How is a puff adder differ from all other snakes?
17. _____
18. _____
19. **Below is the head of a snake. Use it to answer the questions that follow.**

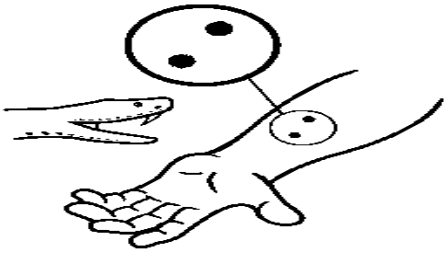


20. Name the type of snake shown above.
21.
22. Name the part marked with the letters:
    A: _____ B: _____
23. State the importance of each of the following to the type of snake shown above.
24. i) forked tongue
25.
    Hollow fangs
26. Of what importance is a poison glad to the poisonous snakes?
27.

LESSON

First aid for snake bites.

The following steps can be taken when giving the first aid for a person with a snake bite



1. Calm the causality.
2. Identify the fang marks
3. Tie the tourniquet between the bitten part and the heart but near the area bitten.
4. Keep on releasing the tourniquet for a short time.
5. Make small cuts on the bitten part using the razorblade.
6. If you don't have the wound in the mouth, suck the blood from the cut area and spit or apply the black stone to suck out the venom
7. Take the causality to the nearest health unit.

NB:

Avoid moving the bitten part to prevent faster movement of blood with venom to the heart.

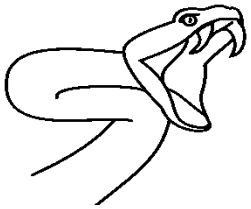
- When the venom reaches the heart it makes the heart muscles paralyzed and the persons shortly dies.
- The snake must be killed and taken along with the patient to the hospital for the doctor to identify the right serum (anti-venom) against the bite.
- Anti-venom or serum is a drug used for treatment against the snake bite.

We always tie the tourniquet to prevent blood from carrying venom to the heart.

ACTIVITY

1. What are serum?
2.
3. State only **one** importance of venom.
4.
5. Which part of the body is mostly affected by the venom?
6.
7. Mention any **two** examples of poisonous snakes.
8.
9. State one reason why we should tie the tourniquet between the bitten part and the heart.

10.
11. How are poisonous snake able to defend themselves against their enemies?
12.
13. Name the substance tied around the bitten part to avoid blood mixed with venom from being carried to the heart.
14.
15. What makes the person bitten by the snake die if not attended to?
16. _____
17. What is anti-venom?
18. _____
19. _____



20.
21. Name the accident caused by the above animal.
22.
23. Name the type of snake shown above.
24.
25. State any two common places where the above animal live.
26.
27. How is the above type of snakes different from the rest of other snakes?

28. How does a snake get its prey?
29. _____
30. _____

Lesson

NON-POISONOUS SNAKES

These are snakes which have fangs but no venom.
They kill their prey by suffocating them to death

Characteristics of non-poisonous snakes

1. They don't have fangs
2. They have sold teeth which they use for biting but they don't produce venom
3. They eat rats, mice, frogs and other small snakes
4. They move faster
5. They kill their prey and swallow them as a whole
6. They don't have poison gland and can't produce venom

Examples; Green snakes, brown house snake.

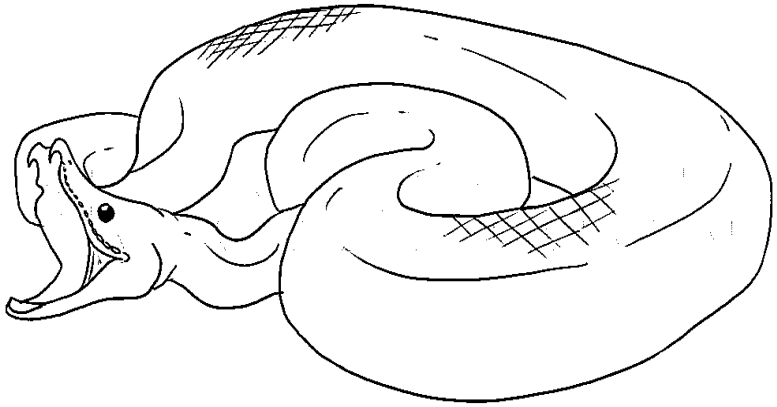
Non-poisonous snakes help to feed on other organisms such as frogs, rats and mice.

CONSTRICTORS

They are big non-poisonous snakes with strong elastic muscles used to kill and crush their prey.

1. They kill their prey by coiling, crushing and suffocating them to death.
2. They lick their prey making it slippery for easy swallowing.
3. They have well developed teeth

Examples: pythons, anaconda, boas.



A python is an example of a constrictor

Reproduction in snakes

- Some snakes lay eggs e.g.: cobras, mambas, adders
- Giving birth to live young ones e.g.: boas, green anacondas, Gabon vipers, rattle snakes.

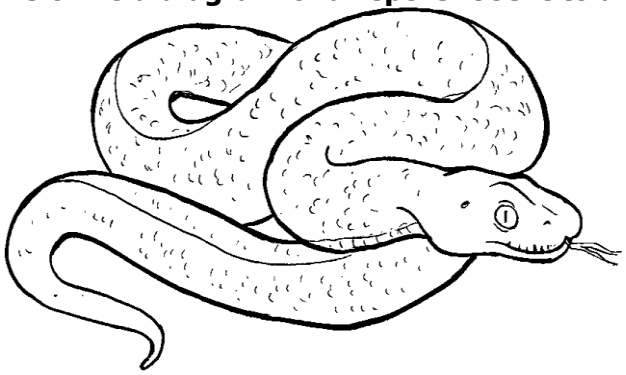
Importance of snakes to people

- Non-poisonous snakes help to feed on pests like rats and mice.
- For producing anti-venom.

EXERCISE

1. Name the teeth that poisonous snakes use to inject venom into their victims.
   _____
   _____
2. Mention **two** external features of a non-poisonous snake.
   (i) _____
   (ii)_____
3. How do constrictors kill their prey?
   _____
   _____
4. What is the importance of moulting to snakes?
   _____
   _____
5. Give **one** use of snake venom to people.
   (i)
   _____
   (ii)_____
   _

Below is a diagram of a reptile. Use it to answer the questions that follow.



6. Name the reptile shown above.
   _____
   _____
7. Why do we group the above reptile under vertebrate?
   _____
   _____
8. State any **two** common places where the above reptile live.

_____

_____

9. How does venom produced by the reptile above affect blood of a person ?
10.
11. How do the above animal protect itself from its enemies?

_____

_____

LESSON 20: CROCODILES AND ALLIGATORS.

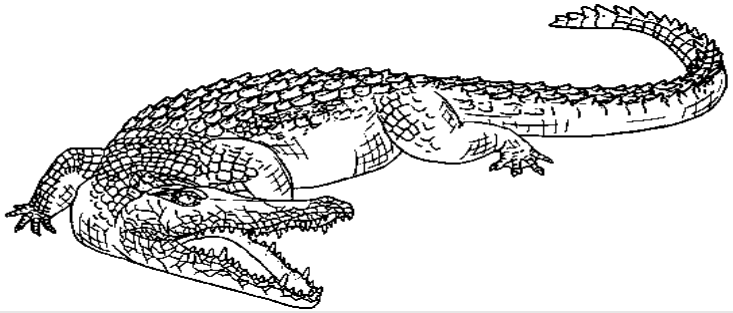
- ✓ These are the largest and most dangerous reptiles. They are mostly found in lakes and rivers.
- ✓ They are carnivorous i.e they feed on flesh of animals
- ✓ They are very lazy and lethargic.
- ✓ They have a long strong jaw for feeding on some aquatic animals.
- ✓ They have a long powerful tail for swimming and attacking their prey.
- ✓ The female lays hard-shelled eggs in sand or mud.
- ✓ Alligators have similar features to the crocodiles however, they live in big waters.
- ✓ They live on both land and in water depending on changes in atmospheric temperatures.

How crocodiles protect themselves.

1. By using their strong tails to hit their enemies.
2. By biting their enemies using their sharp jaws and teeth.

NB: Crocodiles open their mouth and expose their tongue and trap houseflies which land on it.

A crocodile



Activity

1. Name the largest and most dangerous reptile.

_____

_____

2. Why are crocodiles grouped under carnivorous animals?

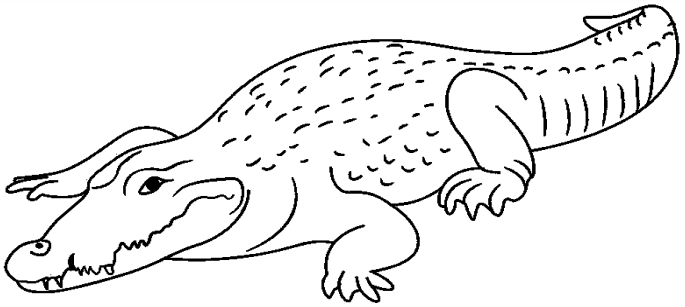
_____

_____

3. Apart from crocodile, mention any **two** examples of carnivorous animals.

_____

Below is a drawing of a reptile. Use it to answer the questions that follow.



4. Name the reptile above.

_____

5. Why is the above reptile called a vertebrate?

_____

6. How are the reptile above similar to the cow?
7.
8. Mention any **two** ways in which the above reptile protect itself.

(i) _____
(ii)_____

9. State **one** reason why the above animal is able to live on both land and water.

_____

_____

10. State **two** differences between the reptile above and the fish.
(i) _____
(ii)_____
11. State any **two** similarities between crocodiles and the alligators.
(i) _____
(ii)_____
12. State any **two** differences between crocodiles and the alligators.
(i) _____
(ii)_____
13. How is the fish different from the reptiles in terms of fertilization?

_____

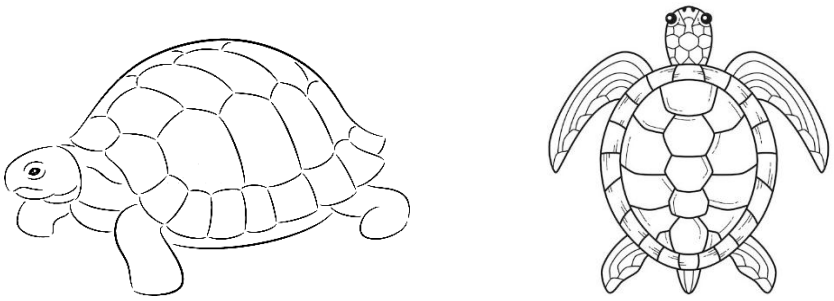
_____

LESSON

Tortoises, Turtles and Terrapins

1. Tortoises are reptiles enclosed in a complete hard shell made of bony plates.
2. They protect themselves by hiding in their hard shell.
3. They do not have teeth but have sharp cutting edges for proper digestion of their food.
4. They withdraw and hide in their hard shell in case of danger.
5. Turtles have flippers for easy swimming in water
6. All tortoises/terrapins and turtles use lungs for breathing.
7. They reproduce by means of laying eggs commonly laid in sand.
8. Tortoises commonly live on land while turtles live in muddy waters.

Structure showing a tortoise and a turtle

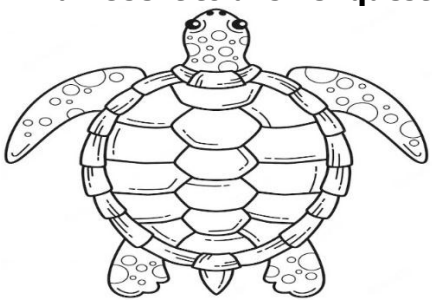


Note: Some tortoises eat plants while others eat small insects.

ACTIVITY

1. In which way are hard shells useful to the tortoise?
2.
3. State one difference between turtles and the tortoise.
4.
5. Why is camouflaging useful to chameleons?
6.
7. How are Geckoes and common lizards able to walk?
8.
9. To which group of reptiles are chameleons classified?
10.
11. How do turtles and tortoise protect themselves?
12.
13. In which way do reptiles help to control the spread of some diseases to people?
14.
15. How does the crocodile protect itself from enemies?

16.
17. How are the eggs laid by fish differ from those laid by the reptiles?
18.
19. **Below is a diagram of an animal. Use it to answer questions that follow.**



20. How does the animal above move?
21.
22. In which way is the above animal:
    Similar to the tortoise: _____
    Different from the tortoise? _____

LESSON

LIZARDS

Lizards have two pairs of limbs used for movement

Groups of lizards include:

The common examples of lizards are:

Common lizards, monitor lizards, geckoes and chameleons.

All lizards are harmless apart from the monster lizard which have got the poison glands

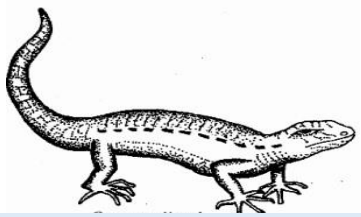
Komado Dragon lizard is the biggest lizard in the whole world.

Characteristics of lizards

- ✓ They have a fleshy forked tongue for easy trapping of their prey.
- ✓ They have movable eye lids.
- ✓ They moult to grow new skins and increase in size.
- ✓ Geckoes are commonly found in houses and move up side down the ceilings.
- ✓ They have suction pads on their feet to enable them walk upside down the ceilings.
- ✓ A chameleon has building eyes close to the top of its head to see in all directions, back, sideways and forward)
- ✓ Chameleons feed on insects such as mosquitoes, house flies using its sticky forked tongue.
- ✓ Chameleons camouflage to protect themselves from enemies and easy location of their food.

Diagrams of a common lizard and chameleon

Common Lizard



Chameleon

Activity

1. In which way are tortoises different from turtles?
   _____
   _____
2. State the main function of flippers to turtles.
   _____
   _____
3. How does tortoise protect itself from enemies?
   _____
   _____
4. In which way is a fleshy forked tongue useful to the reptiles?

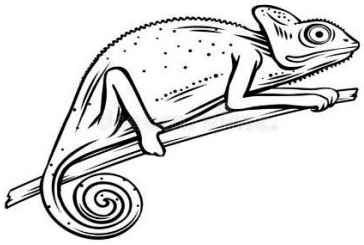
_____

_____

5. Name **one** animal which camouflage.
6.
7. Mention any **two** reasons why chameleons camouflage.
   (i)_____
   (ii)_____
8. State **one** importance of reptiles to the leather making industries.

   _____

   _____
9. How can lizard control the spread of malaria at home?
10. **Below is a diagram of an animal. Use it to answer the questions that follow.**



(a) Name the animal above.
(b)
(c) State **two** similarities between the animal above and the common lizard.

(i) _____
(ii)_____

(d) Why is the above animal grouped under vertebrates?
(e)
(f) State **two** common characteristics that make it successful in feeding.

(i) _____
(ii)_____

_____

_____

LESSON

CHAMELEONS

These are reptiles which have two pairs of limbs, fresh tongue and movable eyelids.
Chameleons camouflage or change their colours to resemble the surroundings because of the following reasons.

Reasons why chameleons camouflage.

- To protect themselves from enemies
- To easily get their prey

A chameleon is able to trap its prey easily because it has a long sticky tongue. Camouflaging in chameleons is an act of changing columns by chameleons to resemble the nearby surrounding.
NB:

- Geckos are yellow brown lizards that live in trees and houses. They have suction pads in their feet that enable them to climb walls and trees.

Importance of reptiles

1. Some reptiles are sources of food to some people.
2. Snakes provide skins for making leather.
3. Reptiles attract tourists who bring foreign income to our country.
4. Reptiles eat harmful insects that would spread diseases.

How reptiles protect themselves

a) Snakes use poisons
b) They can move away in foster speed in case of danger
c) Some reptiles have hard shells for protection.
d) Some reptiles camouflage

ACTIVITY

1. What are aquatic animals?
2. Mention any **two** examples of aquatic reptiles.
3. How do chameleon protect itself?
4. State any **two** reasons why chameleon camouflage.
5. How do chameleons reproduce?
6. Of what important are section pads to the geckoes?
7. State the importance of the following to the chameleon:
   (a) Long sticky tongue
   (b) Tail
8. Apart from chameleon, mention any two other examples of lizards.
9. How important are reptiles to the leather industries?
10. State any **two** other importance of reptiles to people.
11. Mention any **two** dangers caused by the reptiles.

LESSON

AMPHIBIANS:

Amphibians are cold blooded vertebrates which move by leaping.
The word amphibians comes from the Greek words amphibos (**Amphi**- both, **bois**- life)
They are cold blooded vertebrates that live both on land and in water.
Amphibians are said to be double life vertebrates because they spend the first life in water when they are young and come on land when they are adult.
- Young Amphibians respires by means of gills
- A young amphibian is called a tadpole

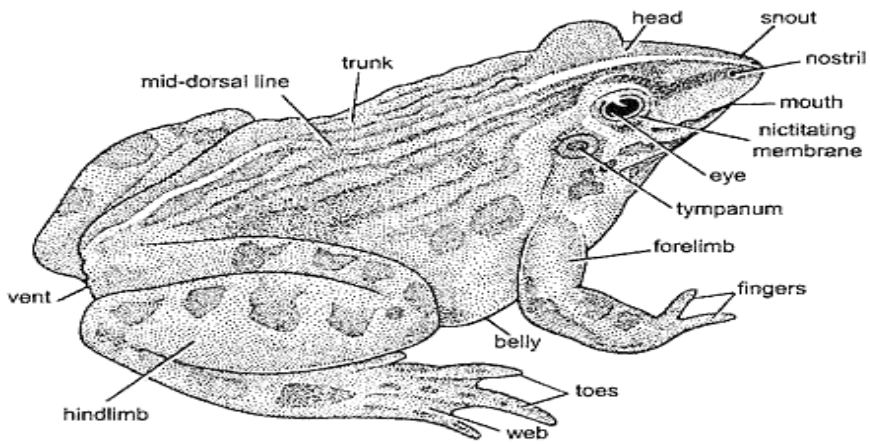
Examples of amphibians

Toads, newts, frogs and salamander

Characteristics of amphibians

1. On land, they use lungs while in water; they use moist skin to breathe.
2. They live both on land and in water.
3. All amphibians are cold blooded animals (poikilothermic)
4. They reproduce by means of laying soft shelled fertilized eggs.
5. They have webbed feet for easy swimming in water.
6. Their young ones called tadpole have a tail and breathe through gills like fish.
7. They undergo external fertilization
8. A newt and a salamander have tails compared to a frog and a toad.
9. They have back bones.

A structure showing external features of a frog

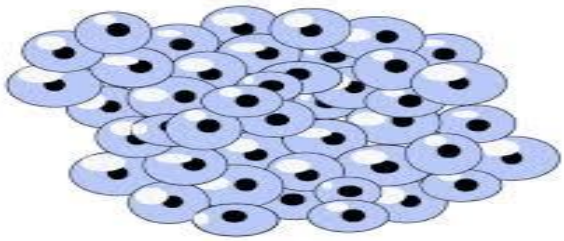
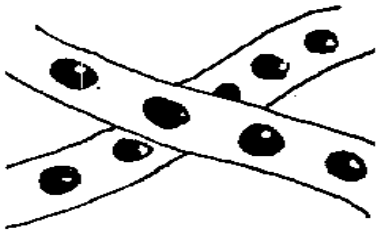


NB: - The young ones of amphibians are called tadpoles.
- Newts and salamanders have tails compared to frog and toads.

Differences between a frog and a toad

Frog	Toad
It lays eggs in big masses (cluster) batches	It lay eggs in a double ribbon-like structure called spawn
It breathes through their moist skin and the lungs	It breathes through lungs only
It commonly lives in water at late stages.	It commonly lives in water at early stages and on land at late stages.
It has long flexible hind legs to make long jumps	It has short hind legs and make short jumps
Their tadpoles are brown	Their tadpoles are black
It has teeth in the upper jaws	It has no teeth in the upper jaws
It has a smooth shinny and slippery skin It has no poison glands	It has a dry rough warty skin It has poison glands

Illustrations of the eggs of a toad and a frog

Eggs of a frog	Eggs of a toad
	
Eggs in clusters	Eggs in ribbons of spawn

The eggs of the amphibians are covered with jelly like or liquid substance which has got unpleasant smell.

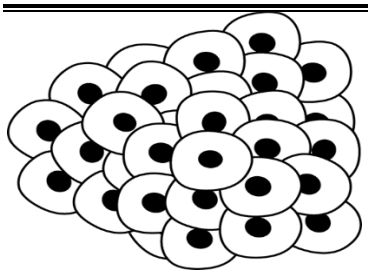
Importance of jelly like substances found on the eggs of amphibians

a) Protect the eggs against predators
b) They helps to hold the eggs together
c) They keep the eggs moist
d) They help the eggs to receive oxygen

Nocturnal animals are which are more active at night and inactive during day time.
Examples of nocturnal animals are Toads, Bats

Diurnals:
Are animals which are more active during day time and inactive at night. e.g frogs, man

ACTIVITY



LESSON

RESPIRATION IN AMPHIBIANS

What do Amphibians use for breathing?

Amphibian	a. On land	b. In water

A frog	Lungs	Moist skin/ mouth cavity
A toad	Lungs	Mouth cavity
Tadpole		The external gills

How amphibians respire.

1. A frog breathes through its moist skin and mouth cavity in water and lungs for breathing on land.
2. A frog keeps its skin moist by secretions from the mucus glands.
3. A toad also uses lungs and mouth cavity for breathing.
4. Amphibians do not have diaphragms and ribs.
5. A tadpole uses external gills for breathing.

Movement;

- ✓ The hind limbs of amphibians are used for crawling and leaping.
- ✓ The front legs of amphibians are used for absorbing pressure of the shock of landing.
- ✓ Frog move by leaping and toads move by crawling.

Feeding:

- Frogs and toads are carnivorous since they feed on worms, beetles, cockroaches, houseflies and other insects.
- They trap their prey using their sticky tongues.
- Tadpoles are herbivorous and feed on plants in water.

Note: Toads and frogs hibernate (Aestivate, this is when the body activities like feeding are slowed down. It is done when the weather is harsh (dry weather)

Differences between adult amphibian and a tadpole

1. Tadpole moves by swimming while adult moves by hopping or leaping.
2. A tadpole breathes through gills while the adult uses lungs, mouth or moist skin.
3. A tadpole is an herbivorous while the adult is carnivorous.

Adaptations of a frog to living in water

- ✓ Frogs have streamlined bodies to enable them move easily in water.
- ✓ Frogs have fully webbed hind feet for swimming in water.
- ✓ Frogs use their moist skins and mouth cavity for breathing while in water.
- ✓ Frogs can close nostrils when under water to prevent water from entering the body.

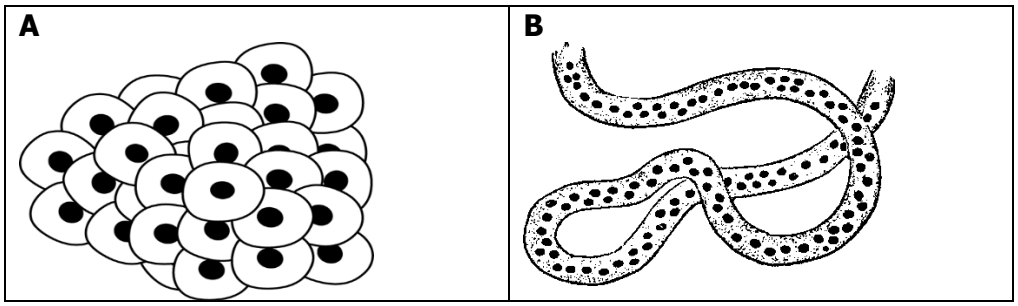
ACTIVITY

1. Give **one** difference between a tadpole and a frog in their way of breathing.
   _____
   _____
2. Define hibernation as used in amphibians.
   _____
   _____
3. How are amphibians adapted to living on land and in water?
   _____
   _____
4. Name the breathing organ of frogs
   on land:
   _____
   _____

a) In water:
_____
_____
_____

5. Apart from toads and frogs, name **two** other example of amphibians.
   (i) _____
   (ii) _____

6. Use the diagrams below to answer the questions that follow.



7. Name the animal which lay the eggs marked

A_____

B_____

10. Name the breathing organ for the animal whose eggs are shown in **B** above.

_____

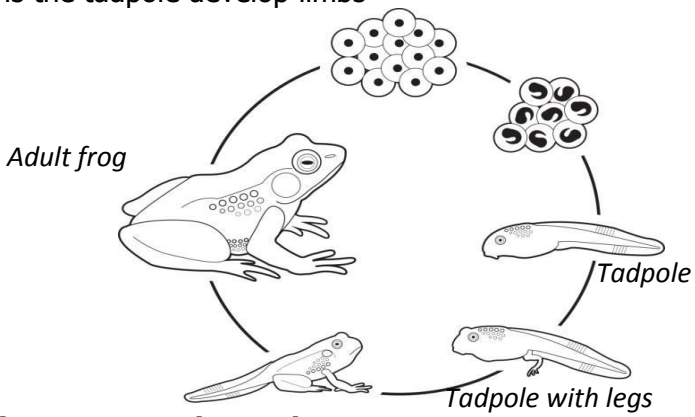
_____

Respiration in amphibians

- The young amphibians (tadpoles) respires by means of gills.
- The adult amphibians by means of lungs on land and moist skin when they are in water

Reproduction in amphibians

- Amphibians reproduce by laying eggs
- During mating time, the male amphibians and the female one gather together in a pond or a stream then the male frog clings on top of a female frog. Then the female frog lays the eggs as the male frog sheds sperms on them and eggs become fertilized externally.
- In 1-3 days the eggs hatch into tadpoles and they start to use external gills to breathe.
- In 2 months the tadpole develop limbs



Ways how amphibians protect themselves

a) Some amphibians release unpleasant substances from the glands of the skin
b) They produce slimy mucous which makes it hard for the prey to catch them
c) The can escape from predators by jumping over long distance.

Advantages of amphibians

(a) Some amphibians are source of food to man
(b) Some amphibian eat some insect vectors that help to control the spread of some diseases

ACTIVITY

1. Why are amphibians said to be double life vertebrates?

_____

_____

2. How are tadpoles similar to fish in terms of respiration?

_____

_____

3. In which way does a young amphibian respire?

_____

_____

4. Apart from frogs and toads, state any other **two** examples of amphibians.

i) _____

ii) _____

5. Why are frogs able to live both on land and in water?

_____

_____

6. Point out two physical differences between frogs and toads.

i) _____ ii) _____

7. Which type of fertilization do amphibians undergo?

_____

_____

8. Which amphibian lays the eggs in clusters?

9. State **two** similarities between the fish and amphibians.

i) _____ ii) _____

10. Identify **two** differences between the fish and amphibians.

i) _____ ii) _____

11. Why does the tadpole die shortly after being removed from water?

_____

_____

12. State the importance of the jelly like substance found on the eggs of the amphibians.

_____

_____

13. Why are frogs said to be diurnals?

_____

_____

14. What are nocturnal animals?

_____

_____

15. How does an adult amphibian respire?

_____

_____

LESSON 24: FISH.

These are cold blooded vertebrates that live in water and use fins for swimming.

Characteristics of fish

1. They are cold blooded
2. They respire by means of gills
3. Most of them have scaled slippery bodies
4. They reproduce by laying eggs (oviparous)
5. They have streamlined body shape which help them to reduce viscosity friction during swimming
6. They have fins for swimming and protection
7. They undergo external fertilization
8. They have the lateral line for detecting movements in water
9. They have nostrils for smelling in water
10. The fish only lives in water (it is aquatic animal)
11. Fish has got two chambered heart

A young fish is called a fry.

A streamlined body is the body shape with the pointed ends

A streamlined body shape enables the fish to reduce the viscosity friction during swimming in water.

Viscosity friction

Viscosity friction is the force that opposes motion in gases and liquids.

A fish can only use gills to trap the dissolved oxygen for breathing in water and when it is removed from water it dies after sometime

On land the fish lack oxygen to be used by the gills for breathing.

ACTIVITY

1. How does the fish respire?

_____

2. Which type of fertilization does the fish undergo?

_____

3. In which way are feelers of insects similar to the lateral line of the fish?

_____

4. What are oviparous animals?

_____

_____

5. How is the fish's body protected from damage?

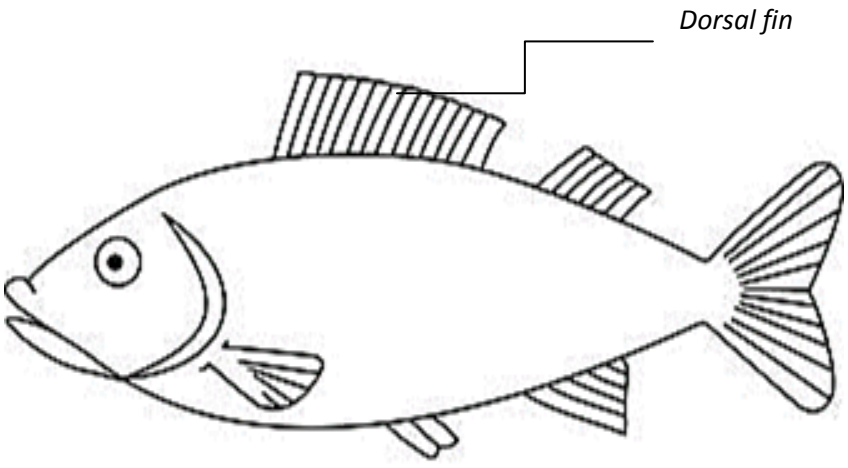
_____

_____

6. Why does the fish die shortly after being removed from water?
7. _____
8. _____
9. State the importance of the swim bladder to the tilapia fish.
10. _____
11. _____
12. Why are fish called aquatic animals?
13.
14. Which food value is mainly obtained from eating the fish?
15. _____
16. How does external fertilization occur in the fish?
17. _____
18. _____

LESSON

An illustration showing the external parts of a fish



Functions of the parts

Scales protects the internal parts of a fish from external damage.

Gill cover/ operculum protect the gills from external damage.

Gills are used for breathing by absorbing the oxygen dissolved in water.

Candal fin: It is used by the fish to swim forward and change direction during swimming.

Nostril is used for smelling food substances in water.

Tail fin/caudal fin is for steering on swimming/ changing directions.

Median fin (Dorsal fin and ventral fin)

They enable the fish to balance in water during swimming

Dorsal fin for protection against predators

Paired fins:

These include Pectoral and pelvic fins

- Pectoral fins and pelvic fin are used by the fins to slow down or to brake during swimming.
- They also prevent the fish from rolling in water during swimming.
- Pectoral fin and pelvic fin also enable the fish to swim upwards and down wards.

Mouth is a passage of food and passage of water with dissolved oxygen to the gills.

Lateral line is used by the fish to detect enemies in water by picking the movements using water waves.

Eye enables a fish to see while in water.

Swim bladder: It is an air filled space in some fish which enables the fish to stay buoyant in water. It controls the depth at which the fish is swimming.

Activity

1. How are fins useful to the fish?
2. _____
3. Name the part of the fish which helps it to detect enemies in water using sound waves.
4.
5. Why is the fish's body streamlines useful to the fish during swimming?

6. Identify the force that retards the fish's speed of swimming in water.
7. Why does a fish die when put out of water?
   a. _____
   b. Fish undergo external fertilization. What do you mean by this?
8. _____
   _____
9. How is caudal fin different from dorsal fin intern of their functions in a fish.
10. _____
    _____
11. Name any two fins which make up :
    Paired fins
    Median fins
12. Mention any **two** adaptations of the fish to living in water.
13. _____
14. (ii)_____

TYPES OF FISH

1. Bony fish 2. Cartilaginous fish 3. Lung fish

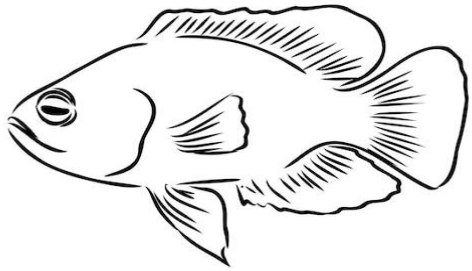
Bony fish

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

Their gills are covered with gill cover.

They have the swim bladder in order to keep them buoyant in water

Most fish are vegetarians, therefore they feed on algae and other water plants (planktons) worms and frogs.
After feeding, the food goes through the alimentary canal to the stomach where the
Examples include
Tilapia, Nile perch, herrings, Salmon fish trout, pike



Cartilaginous fish
These are fish with no true bones but just soft bones called the cartilage.
Characteristics of Cartilaginous fish
1. They have tough and spiny scales
2. They have skeletons made out of cartilages
3. They do not have a swim bladder and gill covers.
4. They do not have gill cover but instead they have gill slits on the surface of their bodies.

Examples of cartilaginous fish
Shark, dog fish, rays, skates.

Lung fish

These are fish commonly found in dirty waters of pools, swamps and rivers.
The commonly hibernate during the dry season and continue living in wet season.
Examples of lung fish include;
Emmamba, diponi, epiceratodus, are the common examples of lung fish.
Characteristics of lung fish
1. They have swim bladder and gill covers.
2. They live in dirty pools and swamps.
3. They have long thin pectoral and pelvic fins
4. They hibernate in dry season

HIBERNATION
This is the tendance of the animals staying inactive due to the changes in the temperatures of the surrounding.
Difference between bony and cartilaginous fish

Bony fish	**cartilaginous fish**
skeletons is made up of bones	skeleton made up of cartilage
gills covered in operculum	no operculum, gills open into gill silts
it has a swim bladder	has ho swim bladder
poorly developed fins	large well developed gills
both lobes of the tail are equal in length	upper lobe of the tail is usually longer than the lower one
cycloid scales	placid scales
mouth usually terminal	mouth usually located on lower side

ACTIVITY

LESSON

Reproduction in fish

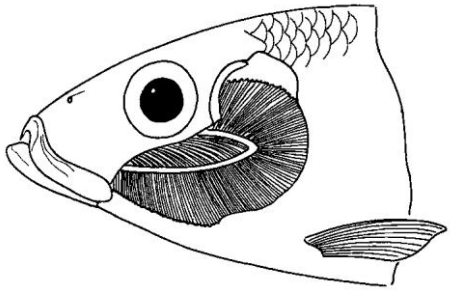
✓ The fish reproduce by laying eggs
Female fish lay eggs in shallow water where the male sheds sperm over them and the eggs become fertilized externally

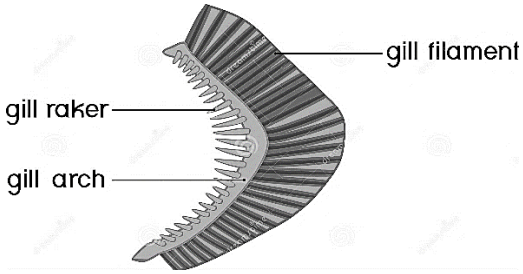
✓ Many eggs are laid but only a few hatches and develop into adults.
Note; most fish do not take care of their young ones except the **tilapia fish**.
Therefore, the fish undergoes external fertilization
The young fish is called Alevin
The group of young fish is called fry or fingerling

RESPIRATORY SYSTEM OF THE FISH
The fish respires by means of gills
NB: The gills are adapted to gaseous exchange because they have got very many gill filaments which increase the surface area for gaseous exchange.
The fish dies shortly after being removed from water because its gills cannot absorb dry oxygen unlike in water.

BREATHING OF THE FISH
- ✓ Fish breathe in dissolved oxygen in water using gills.
- ✓ Dissolved oxygen in water is allowed to enter through the mouth cavity and trapped by the gill filament.
- ✓ Gill rakers help to trap any foreign body or solid particles that enters with water to avoid damaging the filaments.
- ✓ Gill bar helps to hold the gill filament.
- ✓ Gaseous exchange takes place in the gill filament.
- ✓ A fish has several gill filaments to increase the surface area for respiration (intake of oxygen).

Note: A fish will die shortly in case it is removed from water due to lack of dissolved oxygen.
An illustration showing parts of the gills of a fish.





Functions of each part
Gill rakers
They trap sold materials swallowed with water to prevent damage of the gill filaments
Gill bar/ Gill arch
It gives the attachment for the gill filaments and gill rakers
Gill filaments
It is where gaseous exchange occurs
Adaptations of the fish to living in water
1. Fish use gills for breathing.
2. They are stream lined to overcome viscosity when swimming in water
3. Fish use swim bladder for buoyancy in water.
4. Some fish are slippery to escape easily from their enemies.
5. Fish have lateral line to detect sound waves in water.
6. They have fins for easy swimming in water.
7. Fish have swim bladder for buoyancy.

ACTIVITY

1. What is the function nostril to a fish?

_____

2. How are the gills of a fish adapted for breathing?

_____

_____

3. How are gills protected against dangers?
4.
5. Name the structure that protect internal parts of a fish from external damage.

_____

6. Mention any **one** example of fish which do not have a swim bladder and gill covers.

_____

_____

7. State the reason why fish die quickly after being removed from water.
8.
9. How does a fish similar to a tadpoles?
10. In which way is water pollution harmful to the fish?
11.
12. Gaseous exchange takes place in the gill filament. Name the structure that hold the gill filament.

_____

_____

Ways how the fish protect themselves.

1. The fish's body is covered and protected from injuries by the scales.
2. The fish has got the lateral line which helps it to detect danger by detecting the movements of enemies in water.
3. The fish uses the dorsal fin to pierce its enemies and use other fins to swim and escape from the enemies.
4. Some fish have got electric organs which produce high voltage of electricity to shock their enemies.
5. Some fish inject poison in the enemies bodies.
6. A fish has got the slippery body which enable it to easily escape when caught by an enemy in water.
7. Some fish have got different shades of colours in order to hide from their enemies.

Adoptions of the fish to living in water successfully.

1. The fish's body is streamlined to enable it swim smoothly in water.
2. They fish has got fins for swimming and protection against enemies.
3. Some fin has got the swim bladder which help to keep the fish buoyant in water.
4. Fish has got the lateral line to detect danger in water.
5. The fish's body is covered and protected from injuries by scales.
6. The fish has got the slippery body that enable it easily escape from enemies.
7. The fish have got gills for breathing in the dissolved oxygen in water.

Importance or uses of fish to man

1. Fish is a source of proteins to man.
2. Fish is a source of bones used for making glue and poultry feeds that provide.
3. Fish is a source of income once it is sold.
4. Fish is a source of employment to man like fishermen.
5. It helps to control the breeding of mosquitoes by feeding on the mosquito larvae ponds.
6. Fish is used locally as medicine for measles.
7. Fish is the source of foreign exchange when it is exported.
8. Fish is used for decoration in aquarium at home and in offices.

ACTIVITY

1. What is an aquarium?

_____

2. How can fish introduced in the pond help to control mosquitoes at home?

_____

_____

3. State the economic importance of rearing fish.

_____

_____

4. In which way is algae useful in aquarium?

5. Why can't the fish stay alive on land?

_____

_____

6. In which way is fish rearing beneficial to the poultry project?

_____

_____

7. What is hibernation?
8. _____
9. _____
10. In which way is the fish able to reduce the viscosity friction during swimming?

_____

_____

11. Identify any **one** disease controlled through eating fish.

_____

12. State the importance of plankton to the fish.

_____

13. Why is the fish included in the child's diet?

_____

14. Point out **one** way the fish defends itself against enemies in water.

_____

_____

15. State **one** way the fish is adapted to swimming successfully in water.
16. _____
17. _____
18. Why does the fish die when its gills are removed or damaged?
19. _____
20. _____
21. The fish is said to be oviparous. Give the reason for this.
22.

LESSON

INVERTEBRATES/ NON – VERTEBRATES

Invertebrates;

These are animals with no back bone or vertebral column/spine.
Most have got an exo-skeleton and do moult.

Groups of invertebrates

These are basically six groups of invertebrates namely;

1. Coelenterates
2. molluscs
3. Echinoderms
4. sponges
5. worms
6. Arthropods.

Characteristics consider when classifying invertebrates

a) Lines of body symmetry
b) Mechanism of movement
c) Types of skeletons
d) Development of segments

Characteristics of invertebrates

- These are animals with no back bones or vertebral columns/spines.
- They have got an exo-skeleton.

GROUPS OF INVERTEBRATES /NON- VERTEBRATES

➢ Coelenterates	➢ Echinoderms	➢ worm
➢ molluscs	➢ sponges	➢ Arthropods

Coelenterates

These are stinging animals with one body opening.

They have stinging cells on their tentacles.
Their opening works as both the mouth and anus surrounded by tentacles.

Examples of coelenterates

Hydra, jelly fish, sea anemones and corals

ACTIVITY

1. What are invertebrates?
2. State any **two** common characteristics of invertebrates.
3. Mention any **two** groups of invertebrates
4. How are tentacles useful to the coelenterates**?**
5. Mention any **two** differences between vertebrates and invertebrates.
6. Name the type of skeleton commonly found in most of the insects.
7. State any **two** examples of Coelenterates
8. Mention any **one** invertebrate that has a shell.
9. Why are words called invertebrates?

LESSON

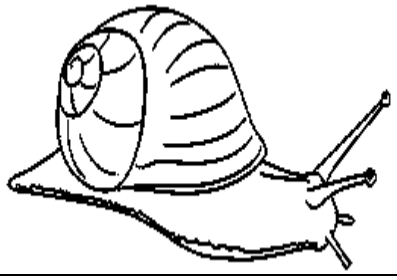
MOLLUSCS

These are soft bodied invertebrates with tentacles.

1. The tentacles are used for hearing, feeling, seeing, smelling , temperature and sucking food.
2. They live in shells in seas and other fresh water bodies.
3. Some of them live on land.
4. Sea molluscs have gills for breathing while land molluscs use simple lungs.

Examples of molluscs

Oyster, octopus, cuttlefish, mussels, fresh water snails, slugs, squids, common garden snails.

			
Fresh water snail	**slug**	**octopus**	**Cuttlefish**

Mollusc die when one pours salt on its body because the salt dehydrates them.

- Snails have got shells where they always hide for protection against enemies
- Sea molluscs use gills for breathing
- Hard molluscs have special kind of lungs used for breathing.

Characteristics of molluscs

a) They have tentacles for sensitivity
b) They have no body segments
c) Most of them live in water
d) They have soft bodies protected by secreting a shell
e) They reproduce by laying eggs
f) They use gills got gas exchange and feeding

How important are molluscs to people?

1. Some of them are eaten as food
2. Their shells are used to make animal feeds like poultry feeds
3. Their shells are used for decoration

Dangers of molluscs to people

- Fresh water molluscs are vectors to people.
- molluscs like water snail spread schistosome worms that cause bilharzias.
- A person can get bilharzia through drinking un boiled water containing Schistosoma worms

ACTIVITY

1. Give the meaning of invertebrates.

2. _____
_____
3. Identify the molluscs which is a vector to people.
4. _____
5. Why does a snail or slug die when one pours salt on its body?
6. _____
_____
7. In which way **are** sea molluscs and land molluscs different in term of their breathing mode?
8. _____
_____
9. State **one** danger of molluscs to people.
10. _____
_____
11. How can the spread of bilharzia be controlled at home?
12. Identify the protection mechanism for the snail.
13. What causes bilharzia?
14. What do snails feed on?
15. State the role of tentacles to a snail.
16. Why does a snail die when oil is poured onto its skin?
17. State the benefit poultry farmers can obtain from molluscs.
18. Why is bilharzia said to be a water borne disease?

LESSON

Echinoderms and sponges

These are invertebrate animals which live in seas.

- ✓ They have spiky skins
- ✓ They have unsegmented bodies

Examples of echinoderms

star fish, sea urchins, Sea lilies and sea cucumbers

SPONGES (PORIFERA)

- ✓ They are sea invertebrates
- ✓ They look like plants but they are animals
- ✓ They live in fresh water and in colonies.
- ✓ Sponges also live-in fresh water and commonly live-in colonies.
- ✓ They breathe and feed through many holes on their bodies.
- ✓ Food and oxygen are absorbed as water flows through their holes on the body.

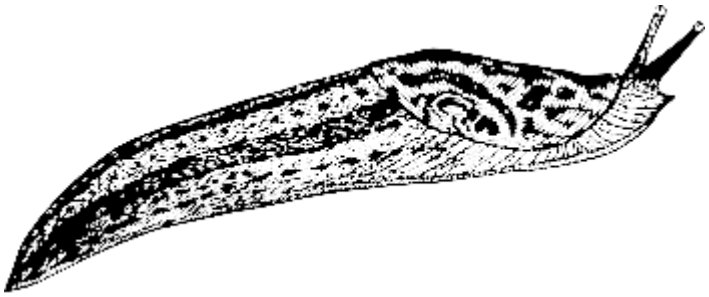
They breathe and feed through the holes on their bodies.

Examples of sponges

1. Common bath sponge
2. Simple sponge

ACTIVITY

1. Give **one** example of echinoderm.
2. State any **two** characteristics of echinoderms.
3. _____
_____
4. In which way are molluscs harmful to the human health?
5. Give two examples of molluscs.
6. State the main characteristic of invertebrates.
7. **Below is a diagram of an invertebrate. Use it to answer questions that follow.**



8. Name the invertebrate above.
9. To which group of invertebrate does it belong?
10. State any **one** disease spread by the invertebrate above.
11. Mention any **two** ways in which diseases caused by the invertebrate above can be controlled.
12. How do coelenterates protect themselves against enemies?

LESSON

WORMS

Worms are long thin and soft bodied invertebrates.

- ✓ They use their moist skins for breathing.
- ✓ They have hydrostatic type of skeleton.

Categories of worms

Worms are grouped into three major groups

a) Segmented worm (annelids)
b) Round worms (nematodes)
c) Flat worms.

Segmented worm

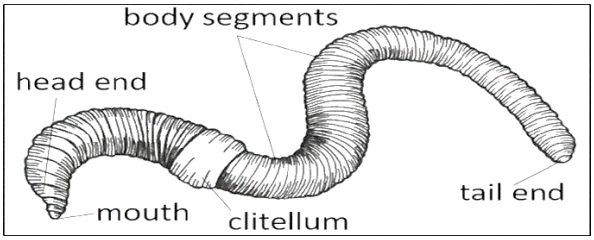
These are worm with body segments (rings)
They live in water and soil.

Examples of segmented works

Earthworms, bristle worms, leeches and lugworms.

Diagram of bristle worms

Diagrams of worms



Note; An earthworm is a hermaphrodite. i.e., have both female and male reproductive organs.

hermaphrodite are animals with both male and female reproductive organs
other examples of hermaphrodites are

1. tape worms
2. snails

Importance of earthworms

- ✓ Earth worms help in aeration of soil
- ✓ They decompose organic matters
  - ✓ Earth worms also soften the soil.
  - ✓ Their excreta help in the formation of humus.
  - ✓ Earth worms feed on plant materials.

- ✓ Earth worms come out of the soil when it has rained to get oxygen for breathing in.
- ✓ They reproduce by laying eggs.

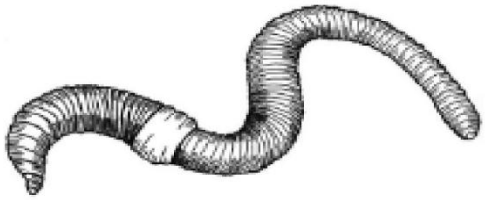
How earthworms move.

Earth worms die when oil is poured on its skin because the oil will block the oxygen supply onto the moist skin.
Earthworms move by contraction of their body muscles.

ACTIVITY

How does earthworms reproduce?

Below is a diagram of an earthworm. Use it to answer the questions that follow.



Why is the above invertebrate called hermaphrodite?
Why do earthworms come out when it rains heavily?
Name the breathing organ for earthworms.
How is clitellum important to the earthworms?
Why do earthworms die when oil is poured on to its body?
How do earthworms move?
Name the type of skeleton found in earthworms
State any **one** way in which fishermen benefit from the existence of earthworms.
State any **two** important of earthworms to the:
Soil
farmer
what do earthworms feed on?
Mention any **two** places where segmented worms live.

LESSON

FLAT WORMS
These are worms with flat and segmented bodies made up of three layers.
They are parasites to animals and live in the animals' intestine.
They feed on animals digested food.
Example of flat worms:
Tape worm and liver flukes

TAPE WORMS
They are endo-parasites

A parasite is a living organism that depend on another organism for shelter and food without killing it but causing harm to them

- ✓ They live in the small intestines in animals and feed on the digested food
- ✓ They have hooks to attach themselves on the walls of the stomach.
- ✓ They have suckers for sucking digested food from the stomach walls.
- ✓ Their bodies are covered with mucus to protect themselves from hot substances sent to the stomach.

How tapeworms enter the body

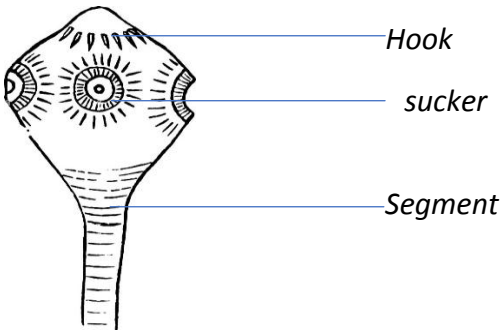
- ✦ Through eating undercooked meat from an infected animal.
- ✦ Through drinking un boiled water containing tape worm eggs.
- ✦ Through eating un washed raw contaminated green vegetables.
- ✦ Through eating un washed contaminated fruits.

Signs of tapeworms infection

1. Passing out faeces containing tape worm eggs and segments.
2. Passing out watery stool
3. Constant hunger
4. Stomachache (Abdominal pain)

5. Swelling of the abdomen

Diagram showing parts of a tape worm.



FUNCTIONS OF EACH PART

Hook enable the tapeworms to attach itself on the walls of the intestines.

Suckers enable a tape worm to attach itself on the walls of the intestines.

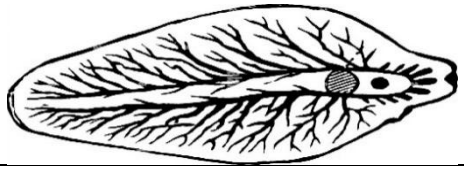
Effects of tape worm infection

1. It causes malnutrition and poor growth in children.
2. It causes stomach discomfort (abdominal pain)

Ways of controlling tape worms

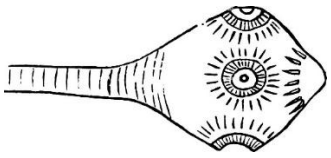
▪ Through eating well cooked or properly cooked meat (beef/pork)

Diagram of a liver fluke



ACTIVITY

1. Mention any **two** examples of flat worms
2. What are parasites?
3. State any **two** examples of :
   Internal parasites
   External parasites
4. Below is a part of a tapeworm. Use it to answer the questions that follow.



5.
6. Name the part marked with letters A and B.
7. How useful is part marked A and B to the organism above
   state any two signs of tapeworms infections.
8. Mention any two ways how tapeworms enter our bodies.
9. Name the flatworm which:
10. Affects the liver
11. Causes malnutrition in children.
12. What does tapeworms feed on?
13. What general name is given to the head of tapeworms?

LESSON

4. Pin worms

- ✦ They live in the intestines and feed in the digested food.
- ✦ They enter the body through eating un washed contaminated and raw green vegetables
- ✦ They can also be spread through drinking un boiled contaminated water
- ✓ Liver flukes are paper like and live in the liver of the affected animal causing damage to it

5. ROUND WORMS

- These are worms with cylindrical bodies and pointed ends.
- Some live in water and others in soil.

They are also parasites to animals and people.

Some live-in water and others in soil
The commonest type of round worms lives in animal's small intestine and usually seen through faeces of infected animals

Examples of round worms

- Hook worms, Pin worms, Guinea worms, Ascaris, Filarial worms, Eel worms and Thread worms.

Dangers of roundworms to people

They suck blood hence causing anaemia.

Ways of preventing round worm infection

- ✓ By wearing scandals/shoes when visiting dump places such as latrines.
- ✓ By washing hands after visiting a latrine.
- ✓ By washing fruits before eating them in raw form.
- ✓ Through proper disposal of human wastes e.g., use of latrines or toilets.

Activity

1. Give any **one** example of a segmented worm.
2. _____
   _____
3. Why do earthworms come out of the soil when it has rained?
4. _____
   _____
5. Which mosquito disease is caused by a worm?
6. _____
   _____
7. Name any **two** examples of organism which use moist skins for breathing.
   _____
   (ii)_____
8. Name the type of skeleton in worms.
9. _____
   _____
10. How do the following works enter our bodies?
    Tapeworms
    Pinworms
11. State the mode of reproduction in worms.
12. Why are worms said to be invertebrates?
13. **Below is a diagram showing an example of an endo parasites.**

14. Name the endo-parasite above
15. _____ b) Name the parts marked a _____ b
    _____ c
16. How useful is part marked (a) to the organism above?
17. State one effect of the above parasite to children.
18. State the best way of controlling the above parasite.
19. Why are people advised to eat properly cooked pork?

_____

_____

LESSON

HOOK WORMS

- Hook worms are found in blood streams.
- They suck blood from the blood streams.

How hook worms enter our bodies.

- Through penetrating through the skin of the feet when we walk with the bare feet in the dirty wet places like latrines.

Ways of controlling hook worm infection

- By wearing shoes or sandals when working or walking in the dirty wet places.
- **A DIAGRAM OF A HOOKWORM**

Effects of hookworm infection.

Hook worms suck blood from our bodies and cause hook worm anaemia to the person.
Anaemia is the condition in which a person does not have enough blood in the body.

ACTIVITY

1. Identify the best way hook worm infection can be controlled.
2. Why do people always wear gumboots when working in the dirty places?
3. What is deworming?
4. Define the following terms
    a. Endo-parasites
    b. _____ b) Ecto-parasites
5. Which type of worms are
    a. Tape worms
    b. Hook worms
6. **Below is a diagram of a parasite. Use it to answer the questions that follow.**

7. 
8. Name the parasite above.
9. How does it enter our bodies?
10. In which way is the parasite above differ from the tapeworm in the way they feed?

11. Name the disease caused as a result of hookworm infection.
12. Why are worms considered as parasites to animals?
13. _____

    _____
14. Mention **one** danger of hookworms to people.
15. _____

    _____

LESSON

SINGLE-CELLED INVERTEBRATES

- ✓ These are very tiny (microscopic) animals whose bodies are made up of a cell membrane, cytoplasm, and a nucleus.
- ✓ They are also known as unicellular organisms.
- ✓ Such single-celled animals are called protozoa.
- ✓ Many of them are found living in ponds, ditches, seas, lakes, rivers and inside bodies of other animals.
- ✓ They are too small to be seen by our naked eyes. Therefore they are observed through an instrument called microscope.

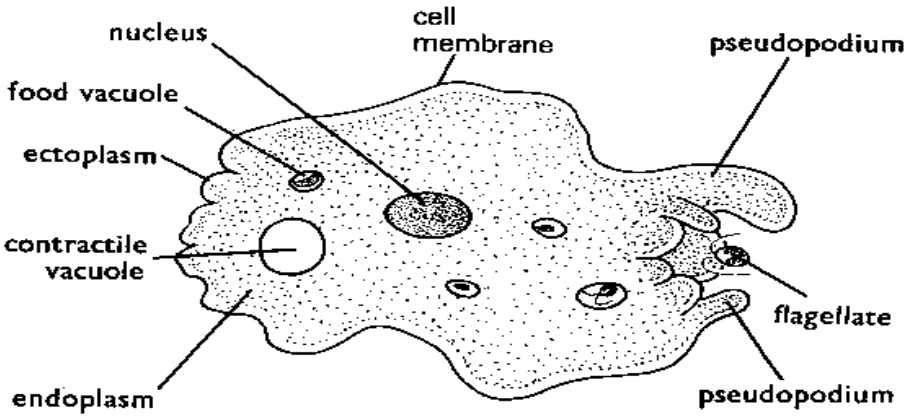
Examples of single celled organisms

1. Amoeba
2. Paramecium
3. Plasmodia
4. Chlamydia
5. Trypanosomes

Characteristics of amoeba

1. They live in water to protect them against drying up.
2. They reproduce by binary fission
3. They feed by engulfing food particles.
4. They move by means of pseudopodia (false legs).
5. They are single-celled-unicellular in nature.

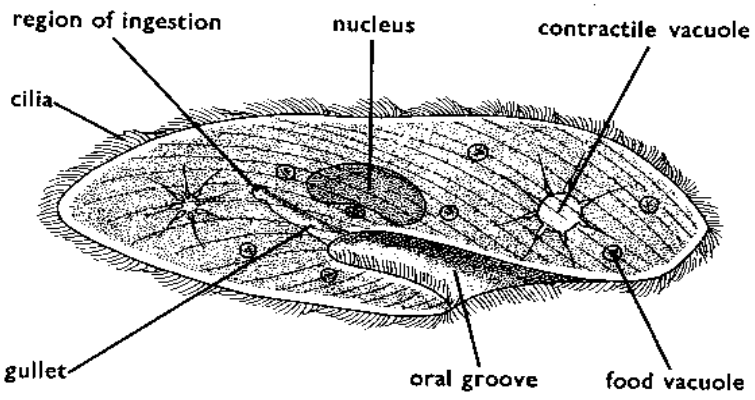
Structures of an Amoeba



Characteristic of a Paramecium

1. It is a unicellular organism.
2. It has a nucleus, cell membrane and cytoplasm.
3. It moves by the help of cilia.
4. It also reproduces by binary fission
5. Its body is covered by cilia.

Structures of paramecium



Dangers of Protozoa

1. Most protozoa cause diseases to people. e.g.
   - Amoeba- amoebic dysentery.
   - Plasmodia- malaria
   - Chlamydia- trachoma
   - Trypanosomes- sleeping sickness to people and Nangana to animals.

Activity

1. What are unicellular organisms?

   _____

   _____
2. State **two** examples of single celled organisms

   (i) _____

   (ii)_____
3. Mention **two** common characteristics in amoeba and in paramecium.

   (i) _____

   (ii)_____
4. Mention **one** danger of Protozoa.

   _____

   _____
5. State **one** human diseases caused by the protozoa.

   _____

   _____

LESSON

GROUPS ARTHROPODS (MYRIAPODS)

These are animals with jointed legs and segmented bodies.

CHARACTERISTICS OF ARTHROPODS

1. They have segmented bodies.
2. They have jointed legs.
3. Their bodies are covered with an exo-skeleton.
4. The exo skeleton controls their growth and size.
5. Arthropods moult to remove their exo-skeleton to grow a new one and increase in size.

Sub groups of arthropods.

Myriapods, arachnids, crustaceans, insects

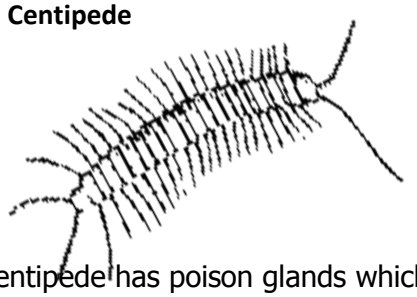
MYRIAPODS:

Myriapods are arthropods with many jointed legs.

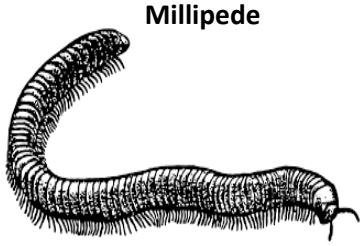
Examples: millipedes and centipedes.

Diagram showing a centipede and millipede

Centipede



Millipede



A centipede has poison glands which produce poison that is injected in its prey and used for protection.

- ✓ A centipede has one pair of jointed legs on each segment.
- ✓ A centipede is a carnivore and feeds on insects and other small worms.
- ✓ A millipede is an herbivore and makes holes in soil hence helping in soil aeration.
- ✓ A millipede protects itself from enemies by curving up into a ball like structure/by coiling.
- ✓ Some small millipedes produce a smelly fluid for protection.
- ✓ They also roll on their backs when disturbed to scare their enemies

Similarities between centipedes and millipedes

1. Both have jointed legs on each segment
2. Both have an exoskeleton
3. Both roll on their backs when disturbed to scare their enemies

Differences between centipedes and millipedes

- ✓ A centipede is a carnivore while a millipede is an herbivore
- ✓ Unlike a centipede a millipede has more legs
- ✓ A centipede has poison glands for protection while a millipede protects itself by coiling.

ACTIVITY

1. What are arthropods?
2. State any **two** sub group of arthropods
3. What name is given to the arthropods with many jointed legs?
4. Mention any **two** examples of the arthropods mentioned above.
5. How does a centipede protect itself against danger?
6. State any two ways in which millipede protect themselves against dangers.
7. State any **two** things on which centipedes feed?
8. How is mounting important to the arthropods?
9. Mention **one** way in which millipedes are:
   a) Important to the farmers
   b) A problem to farmers.
10. Name the type of skeleton in millipede.
11. State any **two** similarities between centipedes and millipedes
12. Mention any **two** differences between centipedes and millipedes

LESSON

ARACHNIDS

Arachnids are arthropods which have four pairs of legs.

Characteristics of arachnids

1. They have two main body parts (cephalothoraxes and abdomen).
2. They have four pairs of legs (eight legs).
3. They have no antennae.
4. They breathe through the lung books.
5. Have a simple eye and also compound eyes.
6. They reproduce by laying eggs.

Examples of arachnids

Ticks, scorpions, mites and spiders

Spiders

1. Spiders are commonly seen on walls of houses.
2. They use **lung books** for breathing
3. They make webs for their nests and for trapping prey.
4. Spiders are carnivorous, trap small insects and suck their fluids for food.
5. The males also use the web to trap the females for mating.

Reasons why spiders are not classified as insects

- ✓ They have two main body parts instead of three
- ✓ Spiders have four pairs of jointed legs instead of three.
- ✓ Spiders use lung books for breathing while insects use spiracles.

Importance of spiders

They eat insects like house flies, mosquitoes that would spread disease germs.

Scorpion

- A scorpion has a large tail with poison which it injects into its enemies after stinging them.

- A scorpion produces live young ones.

Ticks
They suck blood from animals and spread tick borne diseases to animals.
Examples of tick-borne disease include:
East coast fever, red water, heart water, anaplasmosis
They are all caused by protozoa spread by ticks to cattle.

Note: Tick borne diseases can be controlled on the farm by:

- ✓ Dipping and spraying the animals with acaricides.
- ✓ Grazing animals on new pasture.
- ✓ By double fencing (best method).

Drawn structures showing a tick, spider, scorpion and a mite
tick scorpion Mite spider

Activity

1. State the importance of a web to a spider?
2.
3. How does a scorpion produce?
4.
5. Mention any **two** organisms with exo skeleton.
   (i) _____
   (ii)_____
6. State **two** similarities between spiders and scorpions.
   (i) _____
   (ii)_____
7. Mention **two** differences between centipedes and ticks.
   (i) _____
   (ii)_____
8. Name the organism which uses lung books for breathing.
   _____
   _____
9. Why do ticks grouped under arachnids?
   _____
   _____
6. Mention **two** reasons why spiders are not classified as insects.
   (i) _____
   (ii)_____
10. Name the **two** main body division of the arachnids.
11.
12. Mention any **two** examples of endo parasites.
13.
14. What are parasites?
15.
16. Mention **one** importance of spiders
    _____
    _____

LESSON

INSECTS

Insects are arthropods with three main body parts.

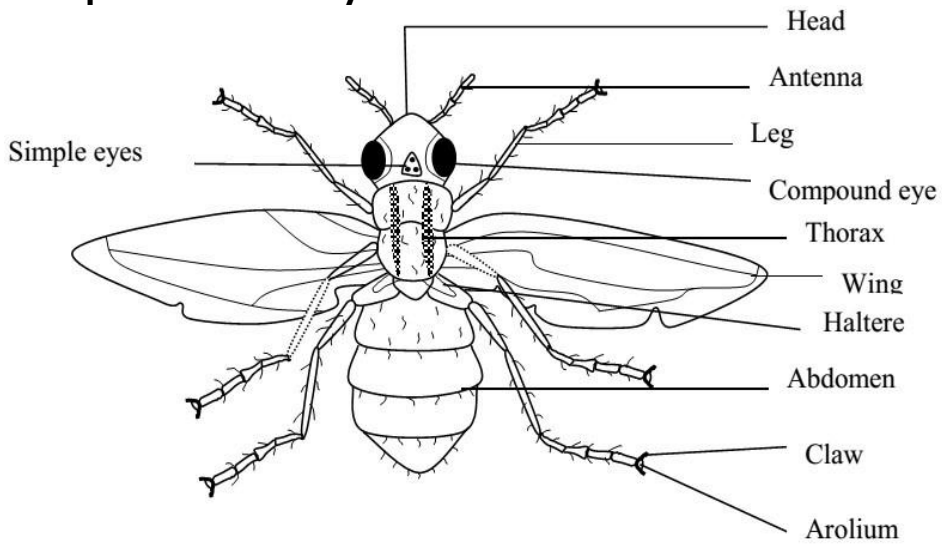
Characteristics of insects

1. They have three pairs of jointed legs.
2. Insects breathe through spiracles.
3. Have one pair of antennae/feelers.
4. Insects have an exo-skeleton and do moult.
5. They have three main body parts.
6. They have a pair of compound eyes.

Examples of insects:

Houseflies, tsetse flies, dragon flies, mosquitoes, termites, butterflies, grasshoppers, cockroaches, moth, bees, etc

External parts of a housefly



Function of the above parts.

1) **Compound eyes:** used for vision or sight.
2) **Antennae**: for smelling and feeling.
3) **Proboscis**: for sucking food or fluids.
4) **Mandibles**: for chewing its food.
5) **Wings**: for flying.
6) **Halteres**: for balancing in air while flying.
7) **Spiracles**: for gaseous exchange/breathing.

Importance of the thorax to the insect

1. Provides attachment of wings.
2. Is where wings and jointed legs are attached
3. Has halteres used by the insect to balance in air during flight.

LESSON

1. State the reason why a spider is not consider as an insect.
2.
3. Mention any **two** body divisions of an insect.
4.
5. State any **two** important features found on the thorax of an insect.

6. Mention **two** common characteristics of insects.
   (i) _____

(ii)_____

7. Write down **two** examples of insects.
   (i) _____
   (ii)_____
8. In which one way is the reproduction in cockroach;
   a) Similar to that of the housefly?
   _____
   _____
   b) Different to that of the housefly?
   _____
   _____
9. How are mandibles in insects similar to teeth in human beings?
   _____
   _____
10. Why are insects called oviparous creatures?
11. Mention any **two** importance of antennae to the insects
12. Name the part of an insect which have the same role as human teeth.
13. Mention **two** importance of the thorax to the insect.
    (i) _____
    (ii)_____
9. Of what importance is a sanction pads to the insects?
10.
11. Apart from insects, mention any **one** other living things which has sanction pads.
12.
13. How is proboscis different from mandibles in term of feeding?

LESSON

REPRODUCTION IN INSECTS

Reproduction in insects

Most insects reproduce by means of laying eggs.

There are basically two types of metamorphosis

- ✓ Complete metamorphosis
- ✓ Incomplete metamorphosis.

Complete metamorphosis

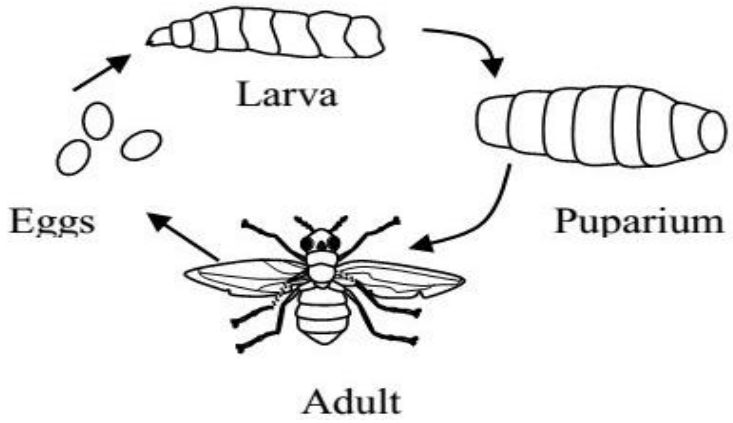
This is a type of metamorphosis in which an insect undergoes four distinct stages of development. These include eggs, larva, pupa and adult.

Note: The larva stage of a housefly is the most active stage while the pupa stage is the most dormant stage

The larva stage of the following insects

- ✓ Housefly-Maggots
- ✓ Mosquito-Wrigglers
- ✓ Butterflies-Caterpillar
- ✓ Cockroach-Nymph

A diagram showing a complete metamorphosis of a housefly



Examples of insects that undergo complete life cycles

1. Houseflies
2. Mosquitoes
3. Bees
4. Wasps
5. Butterflies
6. Moths.

Incomplete metamorphosis

This is type of life cycle in which insects undergo three stages of development.

Examples of insects which undergo incomplete metamorphosis

1. Cockroaches
2. Grasshoppers
3. Locusts.
4. Crickets

A diagram showing Incomplete metamorphosis

Activity

1. Name the mean of reproduction in insect.
   _____
   _____
2. Define metamorphosis.
   _____
   _____
3. Mention **two** stages of complete metamorphosis.
   (i) _____
   (ii)_____
4. What name is given to the:
   (a) Adult stage of a housefly? _____
   (b) Lava stage of a housefly?_____
5. State **one** reason why houseflies lay their eggs in rotting matters.
6.
7. Name the type of mosquito which lays the eggs.
8.
9. Name **one** place where the type of mosquito name above can lay eggs.
10.
11. State any **two** examples of insects which undergo complete life cycles
    (i) _____
    (ii)_____
12. What name is given to the lava stage of the following insects?
    (a) Mosquitoes _____
    (b) Houseflies _____
    (c) Butterflies _____
13. Briefly explain incomplete metamorphosis.

_____

_____

14. State any **two** examples of insects that undergo incomplete metamorphosis.

(i) _____

(ii)_____

LESSON

CRUSTECEANS

The term crustacean comes from the word crust. A crust is hard substance.
Crustaceans are arthropods with hard crusty skins

CHARACTERISTICS OF CRUSTACEANS

a) They have four pairs of legs.
b) They breathe through the gills.
c) They have two pairs of feelers.

Examples of crustaceans

Crabs, lobsters, prawns, wood lice, barnacle, Cray fish, Cyclops, shrimps

Importance of crustaceans

Prawns and lobsters are eaten.

LESSON

Advantages and disadvantages of insects

Advantages of insects

(a) Some insects carry out pollination in farmers crops
(b) Some insects aerate the soils
(c) Some insects are eaten as food e.g grasshoppers
(d) Insects like bees are source of honey and bee wax
(e) Maggots of houseflies reduce volumes of faeces in latrines.

Disadvantages of insects

(a) Some insects are crop pests.
(b) Crop pests are living organisms which destroy our crops.

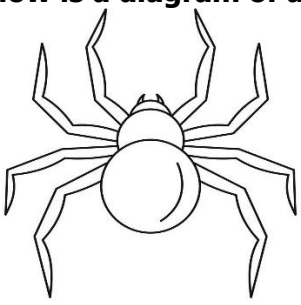
Examples of insect pests

Caterpillars of butterflies
Termites

(c) Some insects sting people causing pain in them
(d) Some insects are external parasites to people and animals.

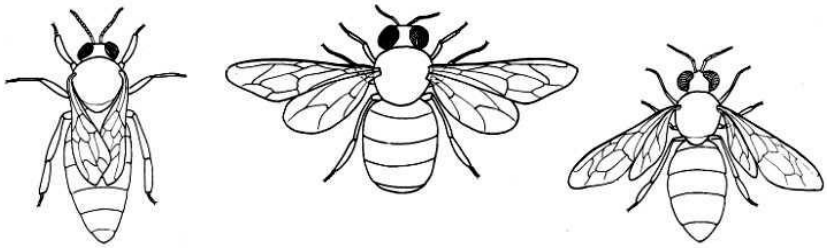
ACTIVITY

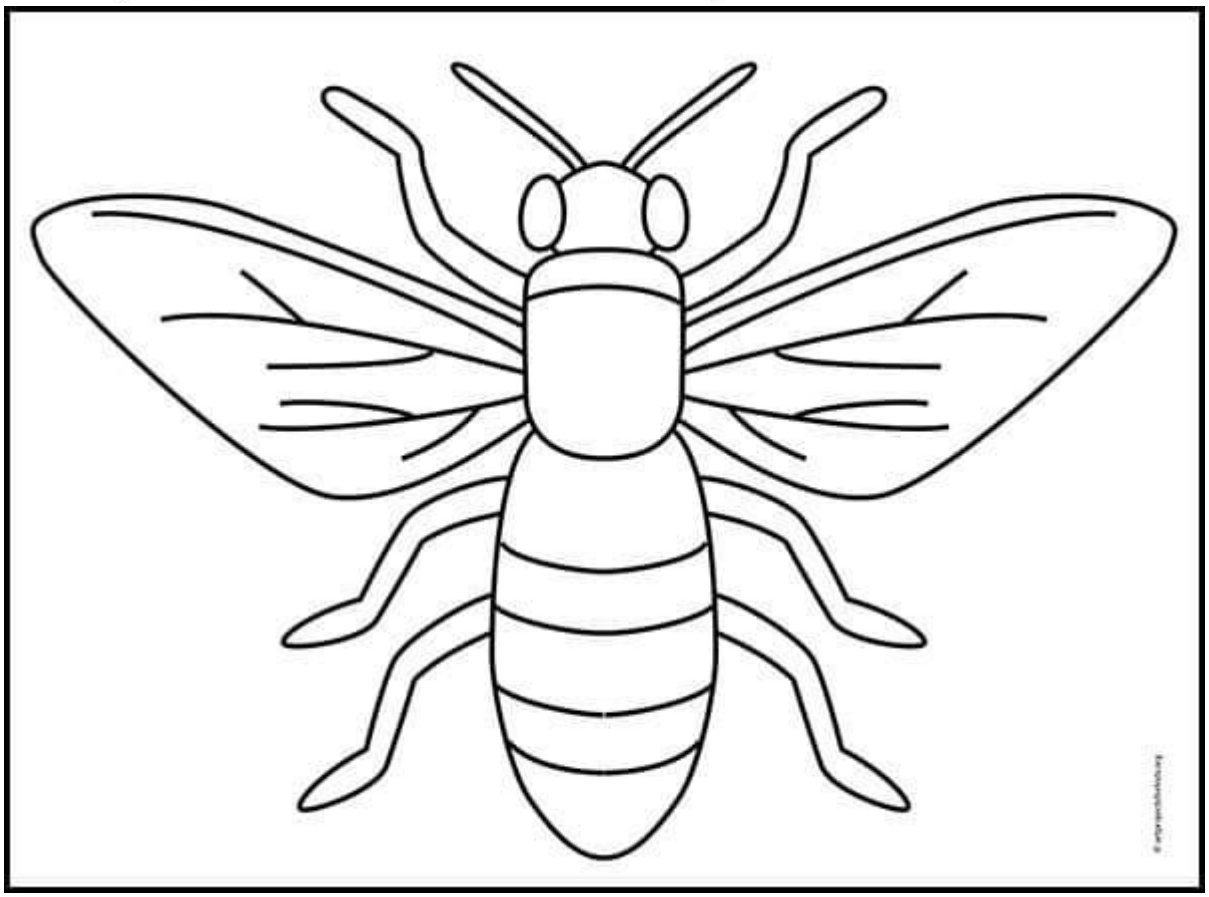
Below is a diagram of a spider. Use it to answer questions that follow.



Name the common place where spiders ae found.
Why is a spider not considered as an insect?
State any one importance of spider to people.
What is pollination?
State any **one** common insects which pollinate flowers.

Name the insect above
Below is a diagrams of bees. Use





Care and protection of vertebrates and invertebrates

1. Treat the sick animals.
2. Clean their habitats
3. Conserve the natural habitats and species of animals.
4. Provide feeds to the animals.
5. Discourage poaching of wild life.

Activity

1. Give the meaning of the word arthropods.
   _____
   _____
2. Why is a spider grouped as an insect?
   _____
   _____
3. How are halters important to an insect?
   _____
   _____
4. Give any **one** difference between a nymph of a cockroach and it's an adult form.
   _____
   _____
5. Mention **two** useful invertebrates.
   (i) _____

(ii)_____

6. Mention any **two** importance of invertebrates
   (i) _____
   (ii)_____

LESSON

Conservation of vertebrates and invertebrates

conservation of animals refer to the ways of protecting animals and their habitats.

Reasons for the conservation of animals

To prevent extinction of animal species

To provide employment to people

To conserve nature

Ways of caring and protecting animals

1. By vaccinating animals
2. By treating sick animals
3. By Gazetting bush land and forests
4. By keeping endangered species in zoos, sanctuaries and game parks
5. By using good fishing methods instead of using poisons
6. By controlling swamp drainage
7. By avoiding Bush burning
8. By avoiding game park encroachment.
9. By giving animals food and water.

ACTIVITY

1. Name the sea animal that people hunt for its high quality oil.
2. State any **two** reasons why we need to conserve animals
3. What are endangered species of animals?
4. Mention any **two** animals whose habitats are conserved by guarding forests against fire.
5. What is swamp drainage?
6. State any **two** reasons why people carryout swamp drainage.
7. Mention any **two** effects of draining swamps to the natural environment.
8. Suggest any **two** places where endangered species of animals should be kept.
9. Why do we need to vaccinate animals?
10. State any **two** animals which live in the swamps.
11. State any **two** ways of caring for invertebrates
12. Mention any **two** vertebrates that we need to care them.

THEME: MATTER AND ENERGY

TOPIC 2: SOUND ENERGY

- Sound is a form of energy produced by vibration of an object.
- Sound is the firm of energy that stimulates the sense of hearing in some animals through waves.

Vibration

- This is the movement of an object to and from or up and down.
- Sound is regarded as a form of energy because it enables us to do work.

Kinds of sound

(i) Music (ii) Noise

Music: This is organized sound with regular intervals.

Noise: This is disorganized sound with irregular intervals.

Sources of sound

A source of sound is an object where sound waves originate from.

Or it is anything which vibrates to produce sounds.

✓ Sound travels through a medium by sound waves.

✓ Sound travels fastest in solids, faster in liquids and fast in gases.

N.B. Sound does not travel through a vacuum.

Reason; there is no medium in a vacuum.

Natural sources of sound

These are materials that produce their own sound naturally.

Examples of natural sources of sound

a. A dog barking.
b. Thunder.
c. Birds singing.
d. Human being talking.
e. Volcanic eruption
f. Wind blowing
g. Rainfall
h. Waterfalls
i. Earthquakes
j. Grasshoppers and crickets
k. Bees and mosquitoes
l. All mammals

Artificial sources of sound.

These are people made materials used to produce sound.

Examples of artificial sources of sound

Guitar, drum, keyboard, flute, tube fiddle, xylophones, radios, cars, whistles, bungles

How is sound produced?

Sound is produced by vibration of an object.

✓ Vibration is the rapid to and from movement of an object

✓ Vibration is the up and down movement of an object rapidly.

Nature of vibrations

Big/ high vibration makes loud noise

Small or low vibrations make soft sounds

Low vibrations make low pitches sounds

How living things produce sound.

a) Mammals - by vibration of their vocal cords.

b) human change the tongue and the lips to produce sound

c) Birds - by vibration of the rings of cartilage in the trachea.

d) Bees and mosquitoes- by rapid flapping of their wings.

e) Grasshoppers/crickets/ locust - by rubbing their hind legs against **their wings.**

Types of sound: - Loud sound
Soft sound
High sound
Low sound

Activity

In one sentence explain the term sound

1. List two main sources of sound

_____

_____

2. How is sound produced?

_____

_____

3. Give a difference between noise and music.

_____

_____

4. How does the voice of a human being produce sound State any one natural source of sound.

_____

_____

5. How is sound produced by an object?

_____

_____

6. How do mammals produce sound?

_____

_____

LESSON 2

MUSICAL INSTRUMENTS

Musical instruments are material used to produce sound.

Importance of musical instruments

- They are used to accompany or give a beat to the flow of music.

Groups or types of musical instruments

a) Percussion instrument
b) String musical instruments (chordophones)
c) Wind musical instruments (aero phones)

1. **PERCUSSION MUSICAL INSTRUMENTS.**

These are musical instruments which produce sound by vibration of their skins or wood after hitting them.

Examples of percussion musical instruments

Xylophones, drums, long drum, bells, thumb pianos, brass band, drums, rattles, clappers/ strikers.

Diagrams showing different examples of percussions

A long drum	xylophone	A drum	bell
			

Learners' Activity

1) Write one word to mean instruments that produce sound by hitting.

_____

_____

2) List **two** examples of such instruments.

_____

_____

3) How does a drum produce sound?

_____

_____

4) In which way drums similar to xylophones

5) In the space below draw one example of a percussion instrument

WIND MUSICAL INSTRUMENTS (AERO PHONES).

Wind musical instruments are instruments which produce sound by the vibration of air blown inside them.

Examples of wind musical instruments

Flute, trumpet, pan pipes, empty bottles, horns, panpipes, whistles, bugle and organ.

LESSON 4: STRING INSTRUMENTS (CHORDOPHONES)

Instruments that produce sound by vibration of the string when they are plucked/bowed
They are mainly played by plucking of their strings or by bowing.

Examples of string musical instruments

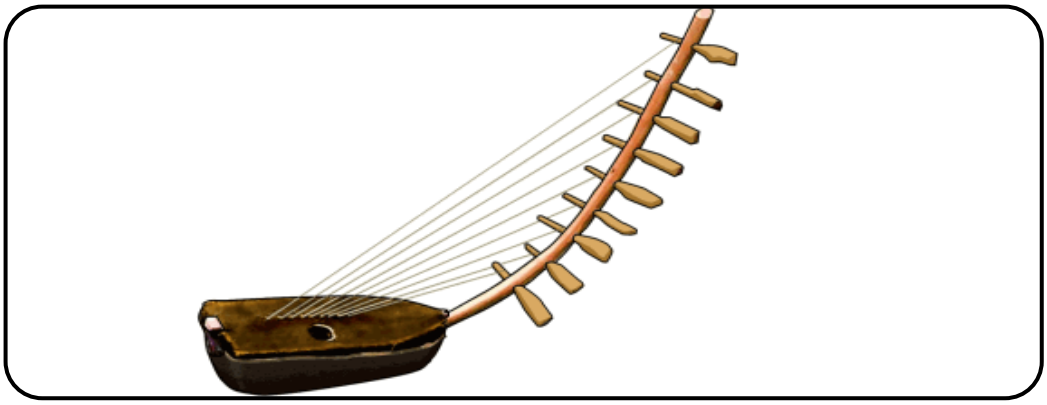
Guitar, tube fiddle, lyre, a harp, violin

EXERCISE

1. To which group of musical instruments does a long drum belong?

2. How does a flute produce sound?

3. Name the musical instrument shown below.



4. Why is panpipe called a wind instrument?

5. Apart from panpipes give any two other examples of wind musical instruments

6. How would you change the pitch of sound in a bottle half filled with water?

a) In order to produce a high pitch

b) In order to produce a low pitch

7. In the space below draw and name any one wind musical instrument

1. Name one percussion musical instrument made using animal skin.
2. Give one reason why a drum is grouped together with a brass drum.

PRODUCTION AND TRANSMISSION OF SOUND

How sound is produced?

1. Through vibration of an object.
2. When an object vibrates.

Note: When a substance is struck, particles vibrate on the position that is hit. Each particle passes vibrations to the next particle until sound is heard at a distance.

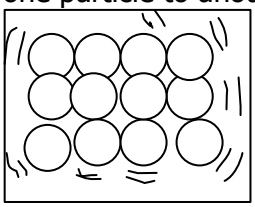
The vibration of particles forms waves. Sound waves travel through matter (solid, liquid or gas) and carry energy from the source to other points.

How sounds travel

a. Sound travels by means of sound waves.
b. For sound to travel there must be a medium.
c. Sound needs a medium to transmit sound waves from the source to the destination.
d. A medium should be a state of matter such as solids, liquids and gases.
e. Sound doesn't travel through a vacuum because it does not have molecules /air/matter
   A vacuum is space without matter.
f. Sound travels fastest in solids, faster in liquids and fast in gases.
g. The speed of sound in normal air is 330/sec.

Class activities:

a) **How sound travels through solids.**
   Speed at which sound travels in substances is affected by how close particles of a substance are to each other.
   Particles in solids are very close to each other, hence sound can easily be carried by vibration from one particle to another.



Place a watch on one end of a wooden table place your ear on the other end, you will clearly hear the tickling of the clock hands.

b) **How sound travels through liquids.**

Put a stone in water and hit it using another stone from normal air.

The sound heard in loud showing that sound travels in liquids

Factors affecting the speed of sound

1. Wind
2. heat (temperature).
3. Altitude
4. Heat

Wind: Wind carries sound further if it is blowing in the same direction; but if it is blowing against the sound it obstructs the sound waves.

Temperature: During the night when the temperature is low, the waves travel very near the ground level. This is why we hear very clearly and easily at night than during the day.

Altitude: Sound waves move easily along a lower altitude than climbing or going up a hill or mountain. This is why someone at the lower end on a hill can hear properly someone at a higher level but the one on a higher level cannot easily hear sound properly from someone at a level lower than him.

Heat: The heat of the day makes the sound waves rise high making if difficult to hear.

PITCH, VOLUME AND FREQUENCY OF SOUND

LESSON 6: ECHOES:

An echo is a reflected sound.

It is formed by obstruction of sound waves.

- Smooth hard surfaces are the best reflectors of sound while rough soft surfaces are the best absorbers of sound.

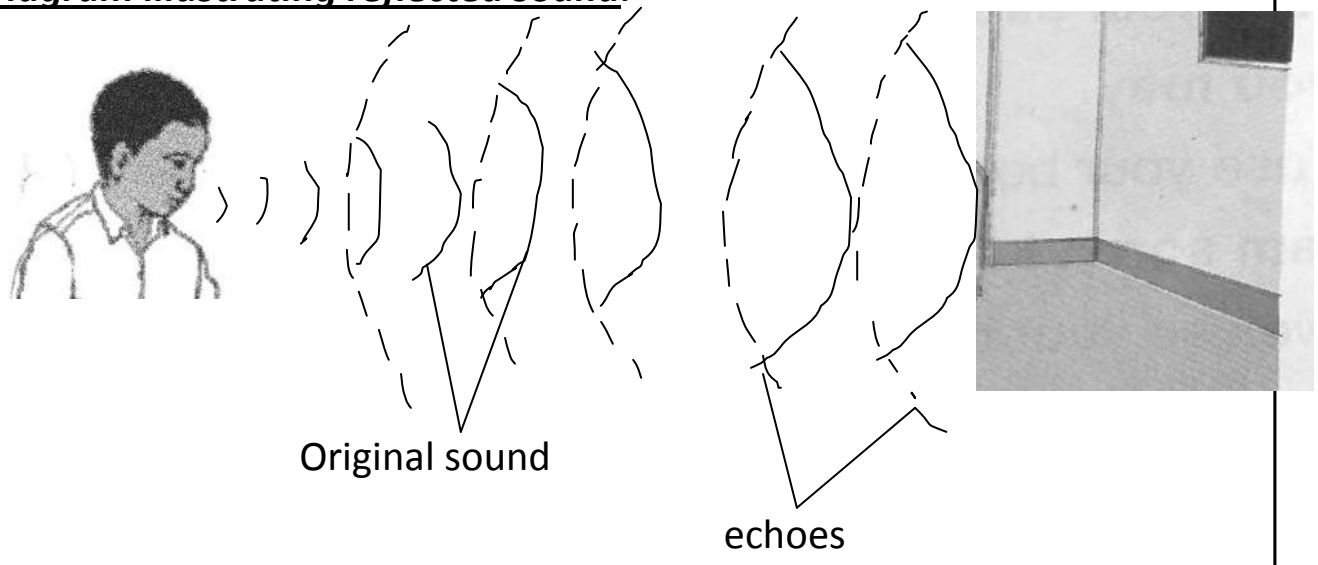
Examples of good reflectors of sound

Concrete walls and rock cliffs

Examples of good absorbers of sound

Soft boards, thick curtains and blankets

Diagram illustrating reflected sound.



Advantages of echoes:

a. Bats use echoes to trap prey at night.
b. Bats use echoes to dodge obstacles at night.
c. Pilots use echoes to dodge obstacles.
d. Sailors and sea men use echoes to determine the depth of the sea.
e. Whales and dolphins use echoes to get their prey and also know if there is an obstacle in front.
f. Blind people use echo location to avoid obstacles on their way by the help of an echo stick.
g. Pilots use echoes from hills and mountains to avoid accidents.

Note: The instruments used by sailors to measure sea depth are known as sonar or **fathometer**. It sends sound to the bottom of the water body, measures the time the sound takes to come back and then calculates the depth.

Disadvantages of echoes

a. Echoes make sound difficult to interpret.
b. Echoes interfere with communication
c. Echoes cause accidents and noise pollution.
d. They cause irritating sounds and noise to the ears.

What kind of surfaces produces the best echoes?

- ✓ Smooth hard surfaces
- ✓ Soft surfaces absorb sound.

How are echoes reduced in cinema halls and theatres?

a. Covering the walls with thick curtains, soft boards and bamboo reeds.
b. Fixing porous materials such as soft boards on the walls of the theatres.
c. Use soft materials to make ceilings in the theatres

Examples of soft porous materials which can be used to reduce echoes in buildings

1. Soft wood
2. Soft boards
3. Woolen carpets
4. Cloth curtains.
5. Rubber sheets

How do soft porous materials help to reduce echoes in building?

Soft porous materials absorb sound waves and prevent reflection of sound.

Why are words in an echo not heard clearly?

The echo has a lower frequency than the original sound.

Activity

1. How does sound travel through air?

_____

_____

2. Why can't sound travel through a vacuum?

_____

3. Mention **two** disadvantages of echoes

_____

_____

4. How are echoes reduced in radio studios and theatres?

_____

5. Mention **one** example of good reflector of sound.

_____

1. Sailors need sound in order to travel safely.
2. What form of sound do they need?
3. What is the purpose of that sound.
4. How do sailors use that sound?
5. Nakalule entered an empty hall. She shouted loudly and heard many other similar shouts after her own.
6. What term refers to the other similar sounds?
7. How are such sounds produced?
8. Name two ways how such sounds can be controlled.
9. Give two advantages of such sounds in everyday life.
10. Why are the walls of the theatres and studios covered with soft porous materials?
11. How do soft porous materials help to reduce echoes in building?
12. Why are words in an echo not heard clearly?

The diagram below show a string instrument. Use it to answer the questions that follow.

How does the above musical instruments produce sound?
Which string will produce sound of the highest pitch?
Which string will produce sound of the lowest pitch?
How can **one** change a pitch of a sound in each string to obtain:
High pitched sound
Low pitched sound

LESSON

Frequency

- Frequency is the number of vibrations produced per second.
- The units used to measure frequency are the hertz.

Volume of sound

- Volume is the loudness or softness of sound.

PITCH OF SOUND

- Pitch of sound is the highness or lowness of sound.

Factors that affect pitch of sound.

a) Frequency.
b) Nature of material used to make the instrument.
c) Tension of the vibrating object
d) Size of the vibrating object/Length of the string.
e) Surface area for vibration.
f) Length of a string

Size of a vibrating object.

A small object produces a high sound while a big one produces low sound. Smaller objects produce faster vibrations than bigger ones. The faster the vibrations, the higher the sound. The slower the vibrations the lower the sound.

Tension in the vibrating object.

Tension refers to tightness or looseness of an object. A tight object produces a higher pitch while a loose one produces a lower pitch.

Length of a vibrating object.
Long strings produce low sound while short strings produce high sound.

Nature of the vibrating material

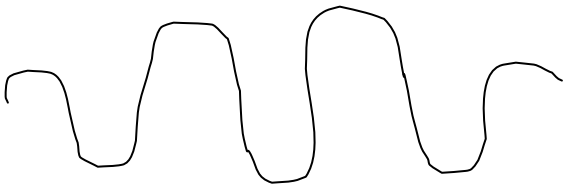
The type of material used determines the pitch of sound e.g wood, plastic or metallic objects produce different pitches if they are of the same size and length.
Frequency: When the frequency is high, the pitch of sound produced is high.

Volume of sound

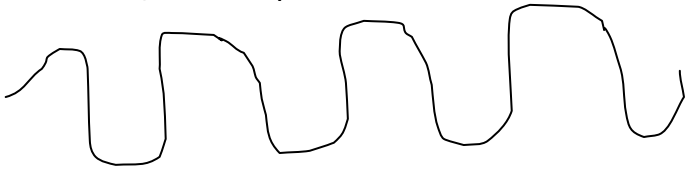
This refers to the loudness or softness of sound.
Frequency is the number of times an object vibrates per second.
High frequency produces high pitched sound.
Low frequency produces low pitched sound.

Waves of a high pitched sound, faster vibrations, high frequency.

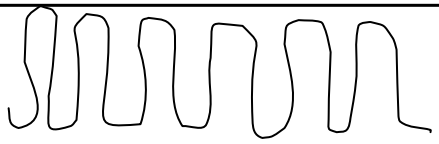
Waves of low pitched sound, slower vibrations, low frequency



What factor does volume of sound depend on?
The volume of sound depends on its amplitude.
Amplitude: This is the width of vibrations or sound waves. The greater the amplitude, the louder the sound, the smaller the amplitude, the softer the sound
Soft sound, small amplitude



Loud sound greater amplitude



An experiment showing pitch of sound

Bell A	Bell B	Bell C
		

Observation:

Bell A produces sound of the highest pitch because it has the smallest space for rapid vibration.
Bell C produces the lowest pitched sound because it has the largest surface of vibration.

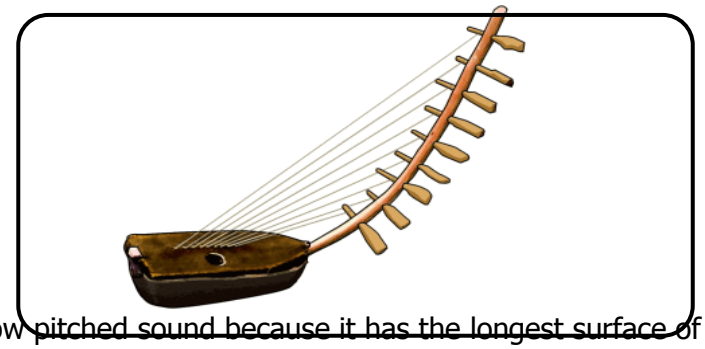
Experiment 2

Drum A	Drum B	Drum C
		

Observation:

Drum A produces sound of the highest pitch because it has the smallest surface for vibration.
Drum C produces the lowest pitched sound because it has the largest surface of vibrates.

Experiment 3



- String A will produce low pitched sound because it has the longest surface of vibration.
- String D will produce high pitched sound when plucked because it has the shortest surface of vibration.
- **Experiment 4**

Bottle A	Bottle B	Bottle C
		

- **Observation:**
- **Bottle A** produces sound of the highest pitch because it has the smallest space for vibration.
- **Bottle C** produces the lowest pitched sound because it has largest space for vibrate.

EXERCISE

1. Give any **two** factors that affects pitch of sound.

2. What creates variations in pitch of a stringed instrument?

3. How does tension affect pitch of sound?

CALCULATIONS ON SPEED, TIME AND DISTANCE INVOLVING SOUND.

Speed of sound.

The speed of sound in air is taken as 330 metres per second (330m/sec).

To calculate distance travelled by sound, we use:

Distance travelled = Speed of sound x time taken

This means in 2 seconds, sound travels a distance given by

Distance travelled = speed of sound x time taken

= 330m x 2

= 660m

Distance travelled by an echo. The distance travelled by an echo is twice that from where the source of the sound is. This is because an echo is produced when sound waves have been reflected off a surface.

2 x distance btn. source = speed of sound x Time of sound and receiver taken to hear an echo

Example:

A gun is fired. If a man heard a gunshot after 3 seconds, how far was he from the firing point?

Distance = Speed x Time taken

= 330m x 3

= 330m x 3

= 990m

Example 2

A man was chopping wood using an axe. If it took 3 seconds fro him to hear the echo, how far was he from the reflecting surface?

2 x Distance = speed x Time taken

2 x Distance = 330m x 3 sec

sec

2 x Distance = 330m x 3

2

Distance = 990m

2

= 495 m

~~Example 3~~

A tree is seen falling a distance away. Then sound is heard after 4 seconds. How far is the tree from us?

2 x Distance = Speed x Time taken

~~2~~ x Distance = 330m x 4 ~~sec~~2 sec

Distance = 330m x 4

2

660

Distance = ~~1320 m~~

Distance = 660 m

Activity

Kate shouted and heard the bounced sound after two seconds. How far was Kate from the object that bounced the sound?

Amooti was standing across a valley. If she heard the echo from the valley after 5 seconds, how far was she from the valley?

CALCULATIONS ON SPEED, TIME AND DISTANCE INVOLVING SOUND.

Example: I

A bomb went off at 900 m away. How long will it take to hear the sound?

Let time taken be y seconds.

Distance = speed x Time taken

900m = 330m x y
Sec

$\frac{300}{}$

$900\text{m} \times \text{sec} = \frac{330\text{m} \times y}{330\text{m}}$

110

$\frac{30}{}$

$300\text{sec} = y$

11

$30 = y$

11

$Y = 2\frac{8}{11}$ seconds

Example II

Kato was standing 990m away from Wasswa who called him by clapping. How long did it take him to hear the clapping?

Time = Distance
Speed

= 990 m ÷ 330m
Sec

3

$= \frac{990\text{m} \times \text{sec}}{330\text{m}}$

Time = 3 sec

Example III

Akot is standing across the valley which is 660m away from the cliff. If she shouts, how long does it take her to hear the echo?

Time = 2 x Distance
Speed

= (2 x 660m) ÷ 330m
Sec

= 1320 m ÷ 330 m
Sec

4

$= \frac{1320\text{m} \times \text{sec}}{330\text{m}}$

1

Time = 4 sec

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

Time = Distance
Speed
= 990m ÷ 330m
Sec
3
= ~~990~~m x sec
~~330~~m
Time = 3 sec

Example III
Akot is standing across the valley which is 660m away from the cliff. If she shouts, how long does it take her to hear the echo?

2 x Distance = speed x Time Time = 2 x Distance
Speed
= (2 x 660m) ÷ 330m
Sec

4
~~1320~~m x sec
~~330~~m
1
Time = 4 sec

Activity
Okello was standing 165m away from his father who called him by clapping. How long did it take him to hear the clapping?
Ssekitto was chopping wood with an axe. He was 495m away from the reflecting surface. How long will it take him to hear the echo?
Time = 2 x Distance
Speed
Time = 2 x Distance
Speed
Time = (2 x 495m) ÷ 330m
Sec
= 990m ÷ 330m
Sec
3
= ~~990~~m x sec
~~330~~m
1
Time = 3 sec

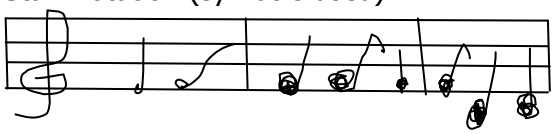
STORING AND REPRODUCING STORED SOUND
Storing and reproducing stored sound.

Sound energy can be stored and later reproduced for future use and reference.
Methods of storing sound
- ✓ By writing (Notation method).
- ✓ By recording method.

Sound energy can be stored by notation. Notation means writing sound in form of symbols or syllables instead of words.

Types of notation

Staff notation (symbols used)



Sol-fa notation (syllables used) s/m:d:s/m:d:s/m:-:-/d:-:-/r:r:r/r:-:r/m:-:-/-:-:s How is sound stored by writing (notation) reproduced?
- ✓ By singing or reading sol-fa.
- ✓ By playing musical instruments.

Recording:

To store sound by recording, a machine is used to transform the sound waves into an electrical form.

Methods of storing sounds

By writing
By recording

Devices used to store sound by recording.

- Magnetic tapes
- Compact discs (CDs)
- Digitals video Discs (DVDs)
- Cassette tapes
- Video tapes
- Vinyl records
- Floppy discs
- Flash discs
- Film strips
- Mobile phones / cell phones
- Memory cards
- Computer diskettes
- Mp3 / MP4 discs

How is sound stored by recording reproduced?

By playing back the devices which store sound / re-playing.
a. By replaying CDs in CD players.
b. By replaying DVDs in DVD players.
c. By replaying VCDs in VCD players.
d. By replaying cassette tapes in cassette players
e. By reading\singing

Devices used to reproduce stored sound.

Radio cassettes (vi) Video decks
DVD players (vii)Video disc players
CD players (viii)Grammo phones
Cell phones (ix) Film projectors
Computers (x) Record players

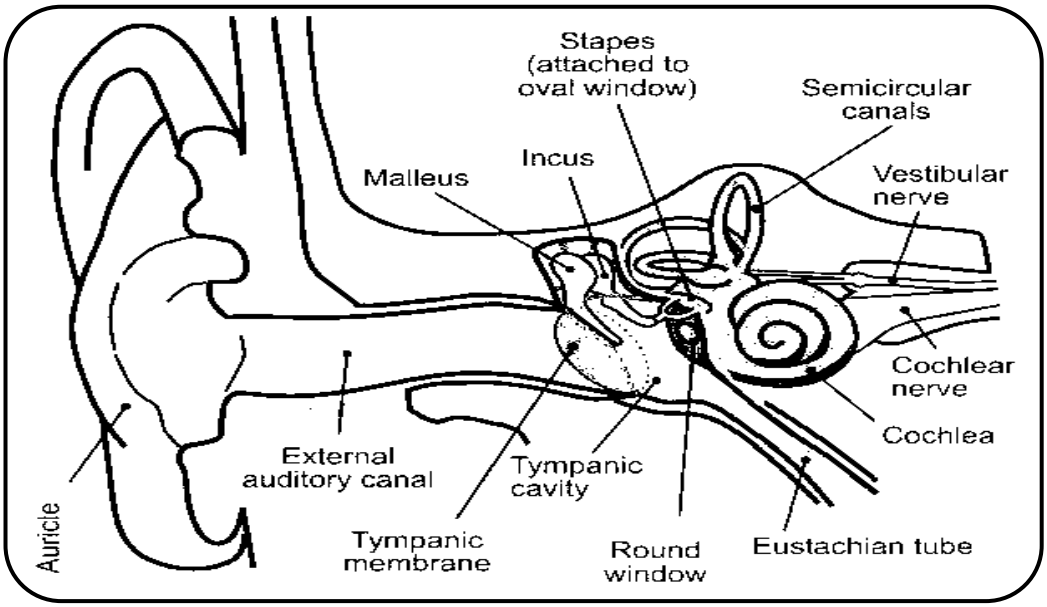
Activity

1. Write two ways of storing sound.
2. State any four devices on which sound can be stored for future references.
3. State how stored sound in solfa notation can be reproduced.
4. Mention four devices that can reproduce stored sound.
5. Name one device used to reproduce sound stored by solfa notation.
6. Give two importance of sound energy in the environment.
7. Give any **one** way of storing sound.
8. _____
9. How is sound stored by writing be reproduced?
10. _____
11. Write down any **one** device used to store sound.

LESSON: 8 Human ear

The ear is a sense organ used for hearing sound.
It is also used in balancing the body.

STRUCTURE OF THE MAMMALIAN EAR



Regions of the human ear.

a) The outer ear.
b) The middle ear.
c) The inner ear.

Parts of the ear.

The outer ear(made up of the pinna and auditory canal)

- **The pinna** -collects sound waves and direct them to the auditory canal.
- **Auditory canal** – transports sound waves to the middle ear.
- **The outer ear** has hair that traps dust and other foreign bodies that enter the ear.

The middle ear(made up of the ear drum, ossicles. i.e.mallets (hammer), incurs (anvil) and stapes (stirrup) and the Eustachian tube**).**

- **The ear drum** changes sound waves into sound vibrations.
- **The ossicles** amplify sound and sends the vibrations to the inner ear.
- **The Eustachian tube** balances air pressure on both sides of the ear drum.

The inner ear. (Made of the cochlea, semi-circular canals and the auditory nerves)

- **The cochlea**- converts sound vibrations into nerve impulses\ messages.
- **The auditory nerve** - carries sound impulses to the brain for interpretation.
- **The semi-circular canals**- balances the body in a right posture.

HEARING PROCESS

How are we able to hear?

The pinna collects sound waves and directs them to the auditory canal as they strike the ear drum.
The pinna is folded to increase its surface area for collecting sound waves.
The ear drum vibrates and the sound vibrations shake the malleus, incus and stapes. (iii) The ossicles (malleus, incus and stapes) vibrate and pass the vibrations to the cochlea in the inner ear.
The fluid in the cochlea vibrates and turns sound vibrations into nerve signals (impulses).
The auditory nerves pick up the nerve signals from the cochlea and send them to the brain.
The brain interprets the nerve impulses and sends the message back to the ear and then we are able to hear and identify different sound.

ACTIVITY

1. What are the two main functions of the ear?
2. How is the eardrum adapted to its function?
3. What general name is given to the three bones found in the ear.
4. What part of the ear balances the air pressure between the ear and atmospheric pressure?

5. State the difference between semi-circular canal and Eustachian tube in terms of function?

6. Name the part of the ear where the sound vibrations are converted into nerve impulses.
7. Apart from hearing, state another function of the human ear.
   _____
8. Identify the part of the human ear that changes sound waves to vibrations.
   _____
   _____
9. Why is it dangerous to remove wax found in the ears using sharp stick?
10.
11. Give any **one** way of caring for the ears.
12. _____

LESSON

DISEASES OF THE HUMAN EAR

Otalgia (Ear ache): It is caused by bacteria. It affects the middle hidden part of the ear connected to the Eustachian tube.

Signs and symptoms of otalgia

1. Cold or stuffy or blocked nose in children
2. Fever
3. Pus discharge from the ear
4. Child often cries while rubbing the ear.

Control and treatment measures for otalgia

Treating infected people with antibiotics.
Infected children should not blow their nose hard.

Otitis

It is caused by bacteria, fungus or mechanical dangers.
Otitis externa -- Bacterial infection of the outer ear.

Signs and symptoms of otitis externa.
Inflammation (swelling) of the outer ear.
Wounds appear on the pinna.
Pus is seen on the wounds.

Otitis media
Signs and symptoms of otitis media.
Inflammation of the middle ear.
Severe pain in the middle ear.
Pus discharge from the semi-circular canals.
Child cries and keeps on pulling the ear.

Otitis interna
Signs and symptoms of otitis interna.
Pain in the inner ear.
A thick sticky and smelling pus drains from the ear.
Red and painful pinna.

How can otitis be controlled?
Take the infected person to a health worker for treatment.

Ear defects / disorders of the ear.
a.Permanent deafness

This is a condition when one cannot hear completely and cannot be corrected. Permanent deafness may be inherited from parents which causes a child to be born when it is deaf.
N.B: Permanent deafness can also be caused by rapture of the ear drum.

Partial deafness
Partial deafness is a condition in which a person is unable to hear properly. This usually results from having too much wax in the auditory canal.

Correction of partial deafness
Remove the ear wax using ear buds.
Remove the wax using a syringe filled with warm water. This is called ear syringing.
Sensory deafness
This is a condition where the affected person cannot tell the difference between sounds i.e. the person hears but cannot understand.

Causes of sensory deafness
1. Old age
2. Diseases or injury of the auditory nerves
3. Serious fracture of the skull

How to control sensory deafness
1. Having a balanced diet enables one keep healthy even at old age.
2. Treat any ear infection as soon as the symptoms are noticed.
3. Avoid travelling in vehicles which are under bad mechanical conditions.

Ways of caring for our ears.
1. Use soft material to clean the ear. Sharp objects can break the ear drum.
2. Wash the ears every day with soap and clean water.
3. Avoid listening to very loud sounds.
4. Avoid boxing each other on the ears.
5. Remove excess wax from the external ear to prevent temporary deafness.
6. Treat infections of the ear.
7. Have regular checkups (health examination).
8. Don't allow children to push foreign objects like seeds into the ears.

Importance of wax found in the ear.
1. It traps dust and some foreign bodies in the ear.
2. It cleans the ear canal.
3. It protects the ear against infections.
4. Wax contains chemicals that kill germs.

Note: Too much wax can lead to partial deafness.

Comparing hearing organs of different animals

Hearing in fish:
Fish use lateral line to detect and pick up sound vibrations in water.

Hearing in snakes:
Snakes do not have actual ears, but they have inner ear systems such as cochlea in mammals. In snakes, the cochlea is connected to jaw bones and enables it to sense ground vibrations.

Hearing in birds:
Birds have ears covered by soft feathers called **auricular** which protect ears and are used to direct sound into their ears.

Hearing in insects:
Some insects like mosquitoes collect sound vibrations using their antennae (feelers). Others like butter flies, moth and caterpillars use small hairs called setae found on their body surfaces to pick sound vibrations.
Adult butterflies also detect sound vibrations through veins on their wings.

Hearing in amphibians:
All amphibians have ears.
The hearing organ for amphibians is called **amphibian papilla**.

Activity:
State one importance of wax in the ear
State one danger of too much was accumulating in the ear.
State two ways in which we can care for our ears
Why do people who work in noisy places put on ear plugs?
Why is it dangerous to remove wax from the ear using sharp objects?

Comparison of human ear with other animals

Animal	**Organ for hearing**
Fish	Lateral line
Snake	Skin
Frog	Tympanum\eardrum
Insects	Antennae\ feelers

Care for the human ear
1. Eating a balanced diet.
2. Avoid staying near noisy places.
3. Treat infections as soon as a symptom appears.
4. Avoid pushing sharp/piercing object into the ear.
5. Clean the ear daily with clean water and soap.

Activity

1. Give **one** effect of staying in an area with loud noise to the ear.

_____

2. Write down any **two** diseases that affects the human ear.

_____

_____

3.State any **one** way of caring for your ear.

_____

Name the organ found in fish which plays the same role with human hears.

_____

How are the skin of a snake similar to lateral line in fish interim of their function?

_____

THEME: THE HUMAN BODY

TOPIC 3: THE CIRCULATORY SYSTEM

A circulatory system is a group of organs that work together to move blood to all body parts.

Components of the circulatory system
Components of the circulatory system are the features that connect to allow smooth flow of the body fluids. These are:
- The heart
- The blood
- Blood vessels

Diagram showing the main blood circulation

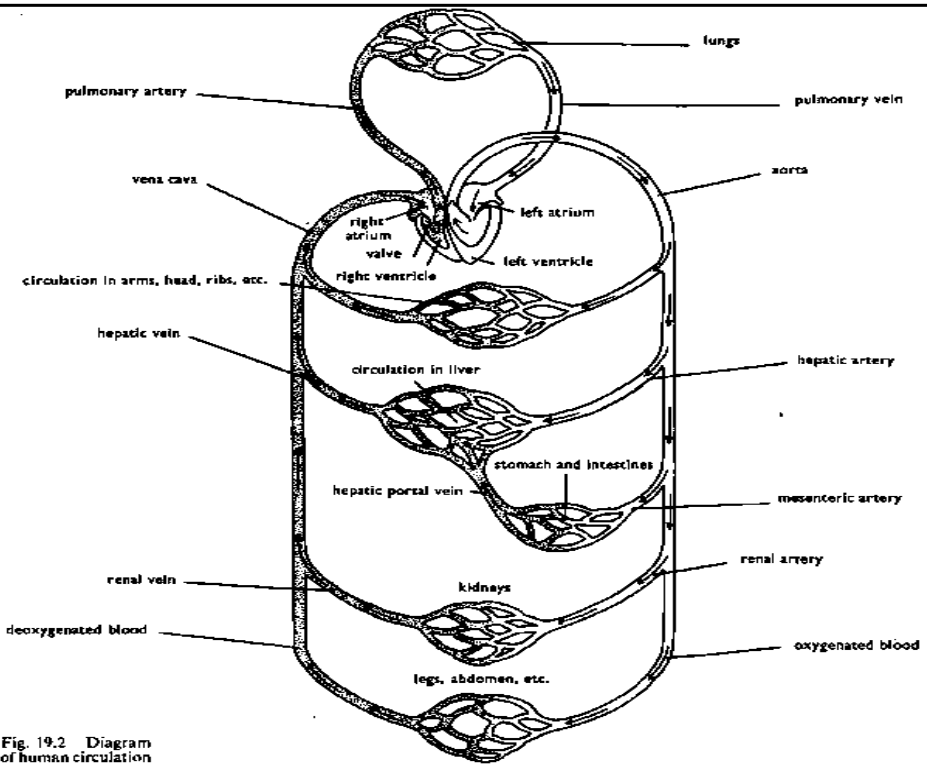
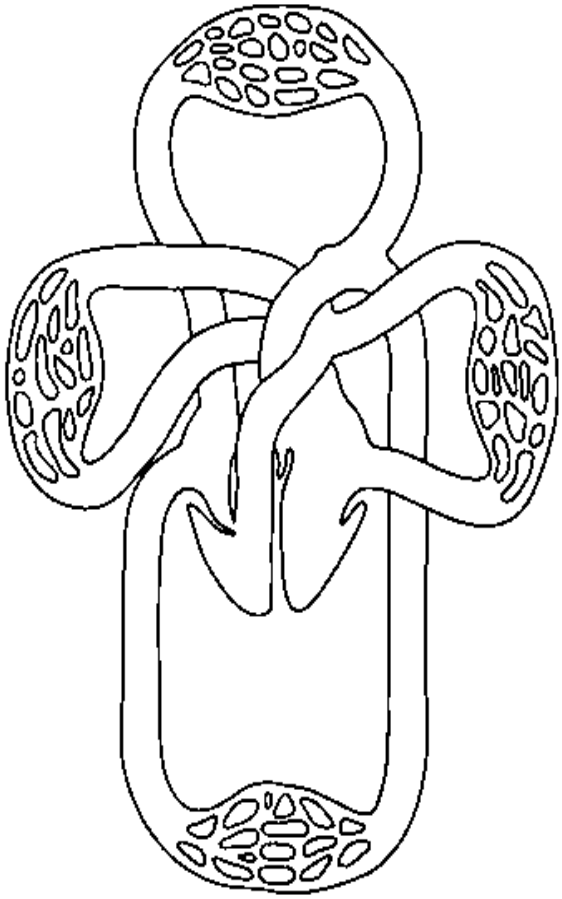


Fig. 19.2 Diagram of human circulation



Activity

1. What in blood circulation?

   _____

   _____

   _____

2. Why is blood pumped to the lungs?

_____
_____
_____

3. Mention **one** component of blood circulator system.

_____
_____
_____

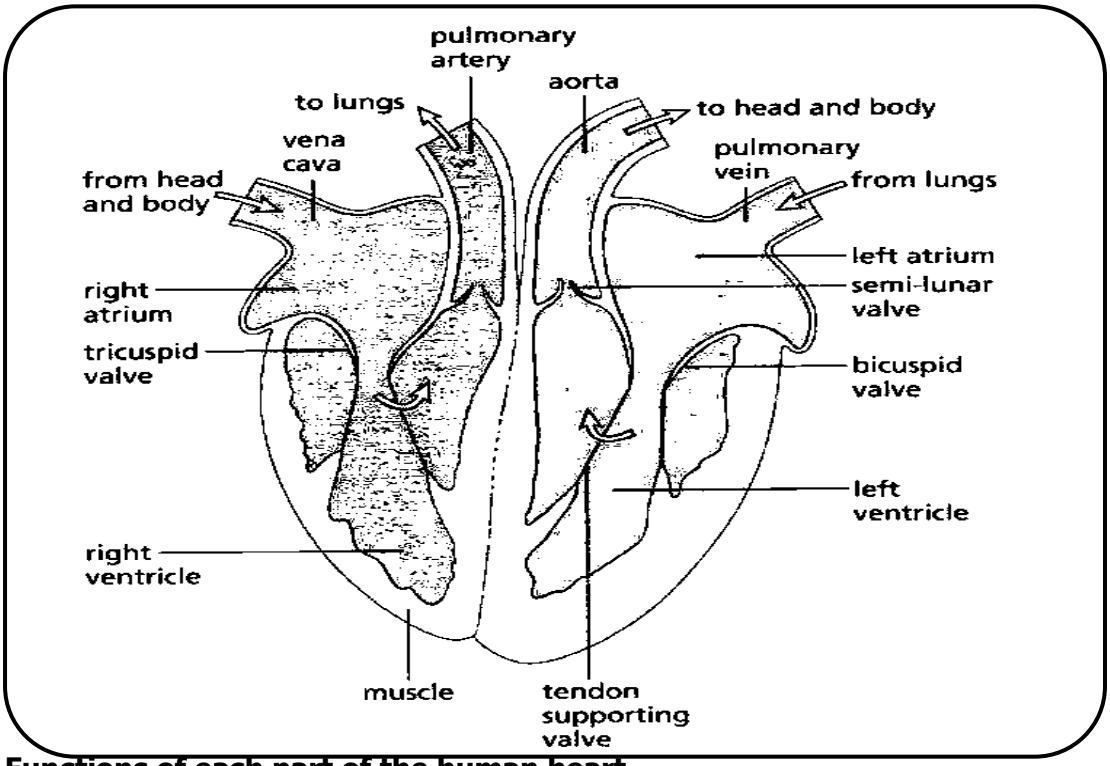
4. Identify the blood vessel that takes blood with digested food from the ileum to the liver.

_____
_____
_____

The heart

- It is an organ in the body that pumps blood to all body parts.
- It is enclosed in a membrane called pericardium.
- It has four chambers (two upper atriaor auricles and two lower chambers (ventricles).
- It is made up of cardiac muscles.
- It is protected by the ribcage.
- The normal person's heart pumps 72 times per min.

The structure of the human heart



Functions of each part of the human heart

a) **Vena cava** – transports deoxygenated blood from all parts of the body to the heart.
b) **Pulmonary artery –** transports deoxygenated blood from the heart to the lungs.
c) **Pulmonary vein** transports oxygenated blood from the lungs to the heart.
d) **Aorta –** transports oxygenated blood from the heart to all body parts.
e) **Septum** - separates the left side of the heart from the right side.
f) **Valves –** they prevent blood from flowing back into the atria.

ACTIVITY

1. How is the blood carried in the right side of the heart different fro the blood carried in the left side of the heart?
2. State two reasons why blood goes to the lungs
3. What is the main function of the :
4. Pulmonary artery
5. Pulmonary veins?

6. What type of blood is carried in the aorta?
7. Name the biggest vein in the heart.
8. State any two diseases of the heart.
9. State one use of septum in the heart during blood circulation

LESSON

How the heart works;

Circulation of blood in the heart is supported by four main vessels. These are; Vena cava, pulmonary artery, pulmonary vein and aorta

Vena cava: it receives blood with less oxygen called deoxygenated blood from all parts of the body to the heart.

- ✓ Blood is then pushed down from the right upper auricle, to the ventricle and then to the lungs via the pulmonary artery.
- ✓ Blood visits the lungs to pick oxygen and drop off carbon dioxide.
- ✓ Oxygenated blood (blood with more oxygen) is then carried back to the heart through the pulmonary vein to be pumped to all parts of the body through the aorta.
- ✓ The heart has valves to prevent backward flow of blood in the heart.
- ✓ It is also separated into two sides by the septum to avoid de-oxygenated blood from mixing with the oxygenated blood from mixing with the oxygenated blood.
- ✓ The left part of the heart is made up of thick walls due to its resistance to high blood pressure.
- ✓ Doctors are able to listen to the flow of blood or heart beat using an instrument called stethoscope and asplymometer for the blood pressure.

EXERCISE

1. Name the instrument use by doctors to listen to the flow of blood or heartbeat.
2. What is the pulse rate of a normal human beings?
3. What name is given to the upper chambers of the heart?

   _____
4. State the function of valves in the heart.

   _____
5. Why is the left ventricle of the heart thick walled?

   _____

Below is the diagram of the human heart. Use it to answer the questions that follow.

Name the part of the heart marked with letter A,B, C
How many chambers make up human heart?
Mane the muscle that are located in the heart.
State the main function of the human heart.
Name the part of the skekrtal system that protest the heart.

Apart from the heart, give any one other component of the circulatory system.
Why doesn't blood flow backward in the heart

LESSON

Blood

Blood is the red liquid that continuously flows in the body through blood vessels.

Types of blood

- Oxygenated blood - It is bright red.
- De-oxygenated blood - It is dark red.

Components of blood

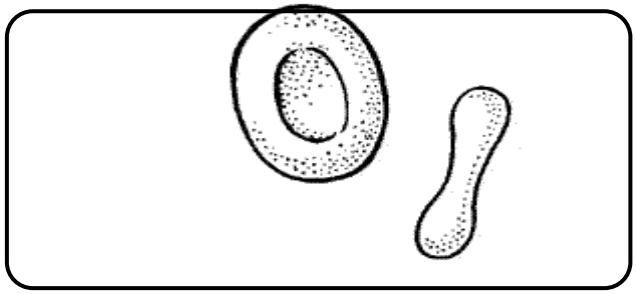
1. Platelets (thrombocytes)
2. Plasma (fluid of blood)
3. White blood cells (leucocytes)
4. Red blood cells (erythrocytes)

Red blood cells

They are circular disc shaped component of blood.

- They are made in the red bone marrows of short bones.
- They appear red due to the existence of the **hemoglobin**.
- When hemoglobin combines with oxygen it forms oxy-hemoglobin which is bright red

Diagram of a red blood cell



Function of red blood cells.

It helps to carry oxygen around the body.

Blood plasma

It is the liquid or watery part of blood.

Components of plasma

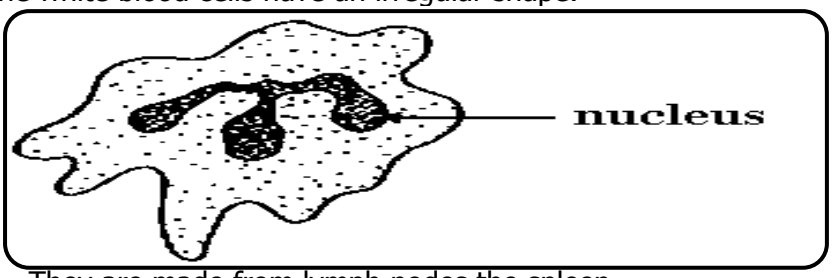
Blood proteins, digested food and mineral salts, water

Importance of plasma

1. Blood plasma transports carbon dioxide from all body parts to the lungs.
2. Blood plasma transports digested food to all parts of the body.
3. Blood plasma also transports hormones from the glands to where they are needed.

White blood cells (Leucocytes)

They are blood cells with a nucleus but with no hemoglobin in their cytoplasm.
The white blood cells have an irregular shape.



- They are made from lymph nodes the spleen.
- They fight against diseases causing germs in the body

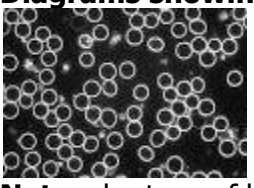
How do the white blood cells defend the body against diseases?

- By engulfing
- Producing anti bodies.

Blood platelets (thrombocytes)

1. They are made in the red bone marrows.
2. They help to reduce over bleeding by clotting around the wound.
3. They have no nucleus.

Diagrams showing blood platelets



Note: shortage of blood platelets results into uncontrolled bleeding in case of a wound.

EXERCISE

1. Identify the component of blood that transports oxygen in the body.

   _____

   _____

   _____

2. State **one** structural difference between a red blood cell and a white blood cell

_____
_____
_____

3. Give the function of blood plasma.

_____
_____
_____

4. How do the white blood cells defend the body against diseases?

_____
_____
_____

LESSON: 6

Blood groups

Blood is grouped according to the presence of antigens A or B in the red blood cells.
There are basically four different blood groups

- Blood group A
- Blood group B
- Blood group AB
- Blood group O

✓ When a person bleeds and becomes anaemic victim needs to replace the lost blood. This can be done through blood transfusion.
✓ **Blood transfusion** is the transfer of screened blood from one person of the same group to another.
✓ A person who receives the donated blood is then called **a blood recipient**.
✓ One who gives out blood is called **a blood donor**.
✓ A universal recipient is a person who can receive blood from any other blood group, however can donate blood to persons with blood group AB.
✓ blood group O is also called a universal blood donor because can donate blood to any other blood group but receives blood from blood group O only
✓ Blood before transfusion should be screened and stored safely in the blood bank. In Uganda it is done at Nakasero blood bank.

BLOOD VESSELS

They are muscular tubes that transport blood in the human body.

Types of blood vessels

a. Arteries
b. Veins
c. Blood capillaries.

ARTERIES

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

✓ They have thick walls to withstand the pressure of the oxygenated blood.
✓ They have narrow blood passage (lumen).
✓ They lack valves.
✓ Blood in arteries flows at a high pressure.

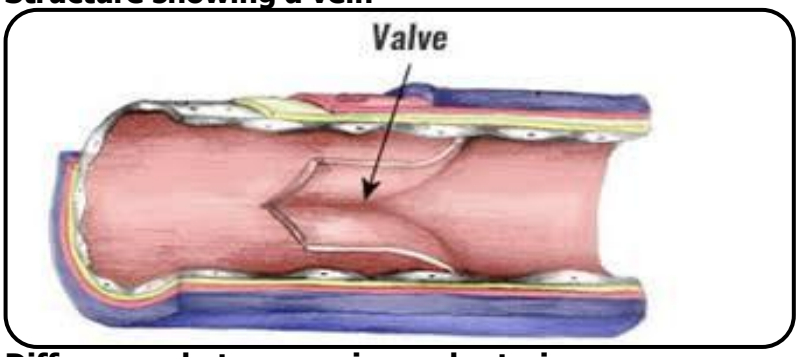
Note: All arteries carry oxygenated blood **except** pulmonary artery which carries deoxygenated blood from the heart to the lungs. The biggest artery is the **aorta**

VEINS:

a. These are blood vessels that carry blood towards the heart.
b. They have valves that prevent the back flow of blood.
c. They have wider lumen.
d. They have thin walls.
e. Blood in veins flows at a low pressure.

f. All veins carry deoxygenated blood **except** the pulmonary vein which carries oxygenated blood from the lungs to the heart. The biggest vein is the **vena cava.**

Structure showing a vein



Differences between veins and arteries

a) Structural differences.

a. Veins have wider lumens than arteries.
b. Veins are thin walled while arteries are thick walled.
c. Veins have valves while arteries do not have valves.

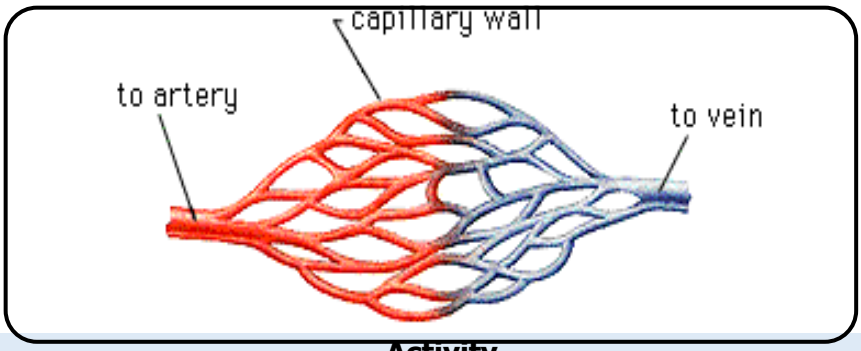
Functional differences

- Veins carry blood towards the heart while arteries carry blood away from the heart.

Capillaries

These are the smallest blood vessels that help to connect the veins to arteries.
Capillaries help to allow the exchange of blood materials.

Structure showing blood capillaries



Activity

1. Identify the type of blood vessels that carry blood to the heart.
   _____
   _____
   _____
2. State any **one** structural difference between arteries and veins.
   _____
   _____
   _____
3. How are valves important in veins?
   _____
   _____
   _____
4. What is blood transfusion?
   _____
   _____
   _____
5. How is a blood recipient different from a blood donor?
   _____
   _____
   _____

6. Which blood vessels carry blood away from the heart?

   _____

   _____

   _____

7. Name the blood vessels that carry blood towards the heart

   _____

   _____

   _____

Diseases of the circulatory system

Blood diseases

These are disease which commonly attacks the blood components. They include:

a. Malaria
b. AIDS
c. Leukemia(blood cancer)
d. Anaemia - caused due to lack of iron in one's diet.
e. Hemophilia
f. Diabetes
g. Sickle cell anaemia – makes the red blood cells appear like a new moon.

AIDS (Acquired Immune deficiency Syndrome)

It is caused by HIV (Human Immunodeficiency Virus)

It destroys the white blood cells and weakens the immune system making the body lack defense to infections.

- HIV does not kill the victim, it's the secondary infections untreated that kill the victim.

Ways through which HIV / AIDS is spread.

1. Having unprotected sex with an infected person.
2. Sharing skin piercing objects with an infected person.
3. Through transfusion of unscreened blood.
4. Through some cultural practices such as circumcision

Effects of AIDS

a) To an individual

- AIDS weakens one's immunity making the body prone to infections.
- AIDS leads to death of the victim.
- It causes suffering to an individual.

b) To a family

- Leads to orphans.
- Leads to poverty in a home.

C) To the community

- Leads to lose of important people.
- AIDS increases the number of street children.

Ways of controlling the spread of HIV and AIDS.

1. Having protected sex with trusted sex partners
2. Avoid sharing skin piercing objects with an infected person
3. Through transfusion of screened blood.

Ways of caring for AIDS victims

1. Encouraging them to keep clean.
2. Feeding them on a balanced diet.
3. Giving them drugs in time.

Activity

1. Mention the disease of the circulatory system that attacks red blood cells.

   _____

   _____

   _____

2. Write HIV in full.

_____
_____
_____

3. Give **one** effect of AIDS to the community.
_____
_____
_____

4. State **one** way of caring for AIDS victims.
_____
_____
_____

5. Mention **two** ways through which HIV / AIDS is spread.
_____
_____
_____

6. Give **two** cultural practices that can spread HIV/ AIDs.
_____
_____
_____

7. In which **one** way can HIV/ AIDs leads to poverty in a home?
_____
_____
_____

8. Mention **two** ways of controlling the spread of HIV and AIDS.
_____
_____
_____

Diseases that attack the heart (Cardiac diseases)

1. Coronary thrombosis
2. Heart attack
3. Hypertension
4. Stroke

Hypertension

- It affects the walls of the arteries reducing the size of their lumen.
- It is caused due to smoking poisonous drugs contained in tobacco.
- The poisonous drugs damage the cardiac muscles reducing their functioning.

Coronary thrombosis

- This is a disease that affects the heart and is caused due to the blockage of the coronary arteries that supply oxygenated blood and digested food to the heart.
- It makes the cardiac muscles weak and may stop working due to limited oxygen and digested food supply.

Disorders of the circulatory system

a. Coronary thrombosis
b. Cuts
c. Heart burn
d. Thrombosis
e. string
f. Hiccups

Care of the organs of the circulatory system

1. Eating a balanced diet.
2. doing regulatory physical exercises
3. Regular visits to hospital for medical check up
4. Avoid eating too fatty/oily food stuffs.
5. Avoid rough games.
6. Take much care to accidents.

Ways of increasing volume of blood in circulation.

1. Eating a balanced diet.
2. Eating foods mainly rich in iron e.g. greens, animal liver and kidneys

3. Taking ferrous tablets with advice from a medical worker.

Activity

1. Mention **one** disorder of the circulatory system.

   _____

   _____

   _____

2. Give **one** way one can care for the circulatory organs.

   _____

   _____

   _____

3. How can the volume of blood be increased in the body?

   _____

   _____

   _____

4. Write PIASCY in full.

   _____

   _____

   _____

5. Mention **two** examples of cardiac diseases

   _____

   _____

   _____

6. Name the heart disease caused by the blockage of the coronary arteries.

TOPIC 4: ALCOHOL SMOKING AND DRUGS IN THE SOCIETY

ALCOHOL

Alcohol is a chemical substance that makes people drunk once taken in excess.

Types of alcohol.

- Ethyl (ethanol) alcohol
- Methyl (methanol) alcohol

Reasons why people drink alcohol.

1. Due to excitement or happiness
2. To celebrate their success
3. To forget their problems
4. To quench thirst
5. To fit in their social groups.

Methods of producing alcohol.

- Fermentation method.
- Distillation method.

Fermentation method.

Fermentation is the process of turning plant sugars into alcohol by the help of yeast.

Distillation method.

- This is the obtaining of pure alcohol from fermented alcohol by evaporating and condensing of alcohol vapour.

Processes involved in distillation method

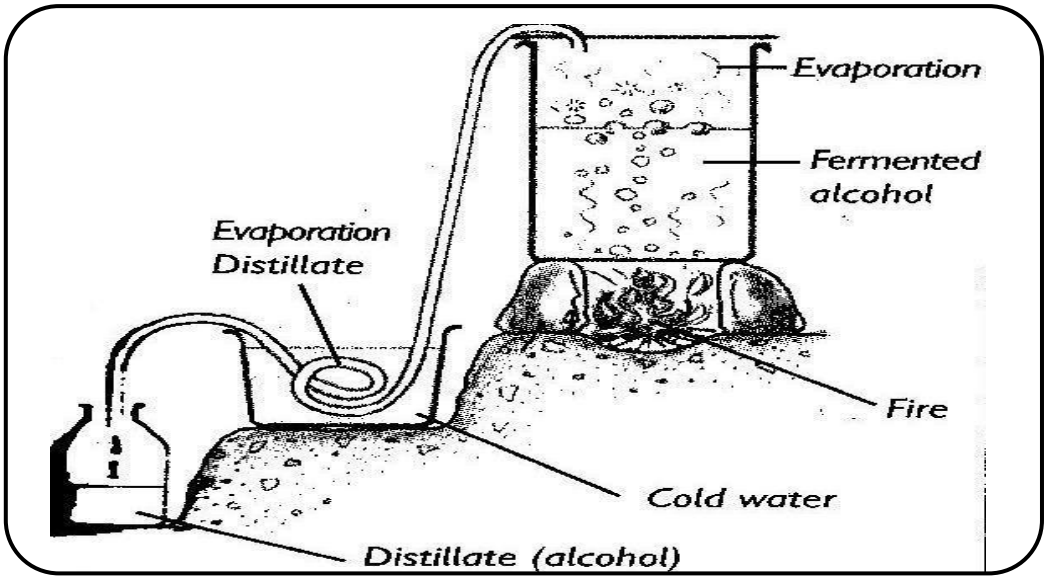
- Evaporation
- Condensation

NB: The liquid obtained using this method is called **a distillate.**

Examples of alcoholic drinks obtained through this method.

- waragi, enguli, Kasese, Liralira whisky, rum gin, vodka.

Diagram showing distillation method of making alcohol



- Heat source provides the heat to cause evaporation.
- Cold water helps to condense the alcohol vapour.
- The delivery tube is coiled when it reaches the water for effective condensation of the alcohol vapour.

Note: Home distillation of alcohol is illegal due to the likely accidents that may occur.

Activity

1. What is alcohol?

   _____

   _____

2. Mention **two** types of alcohol.

   _____

   _____

3. State **two** reasons why people drink alcohol.

   _____

   _____

4. Mention **two** methods of producing alcohol.

   _____

   _____

1) State the importance of each of the following during distillation; a] cold water ii] heat source
2) In one sentence, give a reason why home distillation of alcohol is illegal.
3) Give any three examples of plant local materials used to produce fermented alcohol

   _____

   _____

5. Define the term **distillate**?

   _____

   _____

6. Mention **two** processes involved in distillation method

   _____

   _____

7. State **two** examples of alcoholic drinks obtained through distillation method.

   _____

   _____

Uses of alcohol in the society

- Alcohol is an important drug in the society recommended on most celebrations.
- Doctors use alcohol to sterilize medical instruments that cannot be boiled on cleaning.
- Alcohol can be used in some thermometers.

- Alcohol (methylated spirit) can be used to clean the skin before an injection is taken.
- Alcohol is also used as a disinfectant on wounds.
- Builders can use alcohol to mix paints and dyes.

Alcoholism

- This is a condition that results from the prolonged use of alcohol.
- Addiction to alcohol is a condition when one's body cannot function well when he has not use alcohol.
- A person who is addicted to taking alcohol for his or her normal body functioning is called **an alcoholic.**

Factors that may lead one to take alcohol

1. Stress
2. Sad news
3. Peer pressure from friends and families
4. Family background or life styles.
5. Seductive advertisement.

EXERCISE

1. Write down any **two** types of alcohol.

   _____

   _____
2. State **two** clinical uses of alcohol.

   _____

   _____
3. State any **two** factors that can lead one to alcoholism.
4.
5. In which **one** way can stress cause alcoholism?

   _____
6. Name the alcohol used to clean the skin before an injection is taken

   _____

   State any one physical process involved in distillation of alcohol.

   _____
7. Name the method of producing alcohol from plant sugar with the help of yeast

   _____

LESSON 4

EFFECTS OF ALCOHOLISM

Effects of alcoholism to the Individuals

1. It damages body organs such as, liver, brain and stomach.
2. Leads to self-neglect.
3. Leads to loss of appetite for food resulting into stomach ulcers.
4. Leads to poverty since most of the money is spent on buying alcohol.

Effects of alcoholism to the family

1. It leads to family poverty.
2. It leads to family neglect.
3. It leads to spouse abuse.
4. It leads to child abuse.
5. It leads to loss of family respect
6. It leads to broken homes.
7. It causes immorality in children as the copy from their parents.

Social problems caused by alcoholism to the family

1. Lack of parental love and attention
2. Child abuse
3. Family neglect

Effects of alcoholism to the community

1. It leads to increased road accidents.

2. It leads to increased crime rates in the community.
3. It leads to poor job performance.
4. It leads to loss of jobs
5. It leads to death
6. It leads to lack of respects among individual community members

EXERCISE

1. State **two** human body organs damaged by alcohol.

   _____

2. How do alcoholism leads to Poverty?
3.
4. Mention any **two** effects of alcoholism to the community.
5.
6. Why are drivers not allowed to drink while driving?
7.
8. State any **two** social problems caused by alcoholism to the family
9.
10. How can alcoholism increase crime rates?

    _____

    _____

11. What is child abuse?
12. Mention any two examples of child abuse caused by alcoholism.
13.
14. Give any **two** effects of alcoholism to a family.

    _____

15. State the law in Uganda that forbids children from taking alcohol.

    _____

    _____

Life Skills that can protect one from alcoholism

1. Assertiveness
2. Self-awareness
3. Decision making
4. Critical thinking
5. Join good social groups
6. Never believe in advertisements that praise alcohol as good drinks

Ways of overcoming alcoholism

1. Developing self determination to overcome alcoholism
2. Church leaders should pray for alcoholics to leave alcohol
3. Joining peer groups whose members do not take alcohol
4. Family members should talk to the alcoholics about the dangers of alcoholism
5. Avoiding peer influence

Laws governing alcohol in Uganda

1. Persons below 18yrs of age are not allowed to drink alcohol in public places.
2. All public places dealing in alcohol should be licensed after fulfilling certain standards.
3. Drivers are not allowed to drive under the influence of alcohol.
4. Customers are not allowed to drink from unlicensed places like shops, butchers, groceries, supermarkets
5. All forms of home distillations, transportation and possession of alcohol is illegal.

EXERCISE

16. State **one** use of methyl alcohol to people.

    _____

17. Write down any two life skills which will help us from being alcoholics.
18.
19. Why are drivers not allowed to drink while driving?

    _____

    _____

20. How can alcoholism increase crime rates?

    _____

    _____

21. Give any **two** effects of alcoholism to a family.

    _____

22. State the law in Uganda that forbids children from taking alcohol.

    _____

    _____

SMOKING

Smoking is the regular and frequent use of tobacco by a person.

Smoking is drawing in of some smokes from burning tobacco through the nose.

Commonly smoked drugs:

Njaga, marijuana, Bhangi, opium, cocaine

Tobacco.

This contains dangerous chemical substances such as Nicotine and tar

It is sniffed through the nose.

Tobacco contains a dangerous gas called carbon monoxide.

Dangerous substances found in Tobacco.

- Nicotine –Causes high blood pressure.
- Tar– causes lung cancer

Ways people use tobacco.

1. Through the burning pipes.
2. Through burning cigarettes.
3. By sniffing tobacco powder.
4. By chewing the leaves of tobacco.

Types of smoking

- Active smoking.
- Passive smoking.

Active smoking

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

Passive smoking

Passive smoking is the inhaling of air filled with tobacco smoke from an active smoker.

Reasons why people smoke tobacco

1. Some smoke to warm their bodies.
2. Some smoke due to peer pressure.
3. Some smoke to concentrate on their work.
4. Some smoke to look sophisticated /important.
5. Some smoke to feel confident
6. To appear different from others
7. To fit in the groups
8. To pass time
9. To fit in the groups

ACTIVITY

1. What is smoking?

   _____

   _____

2. Name the dangerous substance found in tobacco which cause high blood pressure.

   _____

   _____

3. State the dangerous gas found in tobacco.

   _____

   _____

4. Mention **two** different ways people use tobacco.

   _____

   _____

5. Mention **two** types of smoking.

   _____

   _____

6. Give **two** reasons why people smoke.

   _____

   _____

LESSON

Diseases caused due to smoking

Lung cancer
Cancer of the mouth and the throat
Emphysema
Bronchitis

Examples of diseases worsened by smoking

Stomach ulcers
Pneumonia
Whooping cough
Tuberculosis

Body organs destroyed by smoking

Lung
Heart

Body parts affected by smoking

1. Throats
2. Mouth
3. Gullets
4. Stomach walls

Activity

1. Name the body system affected by smoking.
2. State any **two** diseases that result from smoking
3. Mention any **two** examples of diseases worsened by smoking
4. Mention any **two** body organs destroyed by smoking.
5. Name any **two** body parts affected by smoking

EFFECTS OF SMOKING.

Tobacco smoking is harmful to one's health.
Tobacco contains poisonous chemicals and a gas.

a) To an individual.

- ✓ It leads to Lung cancer and emphysema.
- ✓ It worsens Tuberculosis, bronchitis and pneumonia.
- ✓ It leads to self-neglect.

b) To pregnant mothers

- ✓ It causes miscarriage/abortion.
- ✓ It causes pre mature birth
- ✓ It causes still births.
- ✓ It causes underweight babies.

c) To the community.

- ✓ Smoking can easily result into fire out breaks in an area.
- ✓ Smoking causes air pollution.
- ✓ It is a bad example to children.
- ✓ It worsened the conditions of people suffering from some diseases

d) To the family.

- ✓ Young children copy bad habits from elders who smoke.
- ✓ It can also lead to loss of family income.
- ✓ Leads to passive smoking to family members.

How to avoid smoking

1. Keeping busy during free time by involving in football, volleyball, and music to avoid thinking about smoking.
2. Avoid joining peer groups of people who use tobacco.
3. Advise friends who smoke about the dangers of smoking.
4. Decide never to smoke again
5. Learn more facts about smoking
6. Join good social groups
7. Destroy all things connected to smoking

Life skills to safeguard against smoking

1. Keep away from people who smoke
2. Gather more information about dangers of smoking
3. Avoid information from the people who smoke
4. Involve yourself in activities like games and sports
5. Never allow somebody to convince you to smoke
6. Report your friends who smoke to responsible people

ACTIVITY

1. Give the meaning of the term smoking.
   _____
2. State **two** effects of nicotine to a smoker.
   _____
   _____
3. Give **one** effect of smoking to unborn baby.
   _____
4. Identify the type of smoking in which a person takes in air filled with tobacco smoke.
   _____
   _____

DRUGS:

A drug is any chemical substance which can cause physical or mental state of our bodies.
A drug is any chemical substance introduced in the body that affects the functioning of the body systems.

Ways drugs are introduced in the body.

- ✓ By swallowing (tablets)
- ✓ By injections (injectables)
- ✓ By drinking (syrups)
- ✓ By smearing (ointments)

Types of drugs

- Essential drugs.
- Narcotic drugs.

Narcotic drugs

Narcotic drugs are drugs which cause addiction after a prolonged use or dependency.

Examples of narcotic drugs

Tobacco, alcohol, marijuana, opium etc

Essential drugs

These are drugs that meet peoples' common health problems.

Examples of essential drugs

Panadol, quinine, chloroquine

Categorizes of essential drugs

- ✓ Pain killers – for reducing pain.
- ✓ Curative drugs – used to cure diseases.
- ✓ Preventive drugs commonly vaccines used to prevent diseases
- ✓ Contraceptives –mainly used in family planning.

Qualities/characteristics of essential drugs

1. They should be common and affordable.
2. They cure diseases.

3. They have less side effects
4. They should meet people's health problems.
5. They should have value for money.

TYPES OF ESSENTIAL DRUGS

- Traditional drugs.
- Laboratory manufactured drugs.

Learners 'exercise

1. Give any **two** examples of narcotic drugs.
   _____
   _____
2. State any **two** characteristics of essential drugs.
   _____
   _____
3. Write **one** disadvantage of using traditional drugs.
   _____
   _____

Traditional drugs are drugs which have existed before the introduction of science and technology to human health

- Traditional drugs can also be modernized in the laboratories.

Examples of traditional drugs

- ✓ Blackjack cures wounds.
- ✓ Bombo' grass for cough
- ✓ 'Enkejje' for measles
- ✓ mango leaves,
- ✓ lemon tree,
- ✓ aloe vera,
- ✓ eucalyptus leaves for cough

Characteristics of traditional drugs

1. They are mainly used in raw form.
2. They have unknown side effect on human health
3. Their purity and quality normally change.
4. They have no expiry date
5. They are not packed and sealed.

Laboratory manufactured drugs

These are drugs which are made from laboratory.

Examples include:

Cough mixtures, chloroquine, paracetamol, piriton, ORS for rehydration, capsules etc.
These drugs are commonly found in clinics, hospitals and other health units.

Characteristics of laboratory manufactured drugs.

1. They are well packed and sealed to prevent easy contamination, pests and moisture.
2. Have expiry dates.
3. They have labels, names and what they cure.
4. Their stability and strengthen are known.
5. They have same purity and quality.
6. Have same content.

Activity

1. State **two** advantages of using laboratory manufactured drugs.
2. State the difference between traditional drugs and laboratory drugs.
3. Give **two** examples of traditional drugs.
4. Outline any **two** characteristics of traditional drugs.
5. List down any three characteristics of laboratory manufactured drugs
6. State any **two** parts of the plants used as medicines.
7. Give any **two** examples of laboratory drugs

DRUG PRESCRIPTION

This is the written information given by a health worker on how to use a certain drug.

Factors considered before prescribing a drug

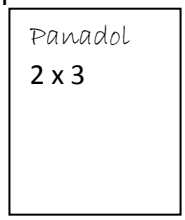
1. The age of the patient
2. Weight of the patient
3. Type of illness
4. Sex or gender
5. Duration or length of illness.

Prescribed drug consists of the following information

- ✓ Name of the drug,
- ✓ The disease it cures,
- ✓ Time of taking the drug,
- ✓ The expiry date
- ✓ The dosage.

Importance of drug prescription

- It prevents people from taking underdose
- It prevents people from taking overdose.
- It helps the patient to avoid drug misuse and drug abuse.



From the prescribed drug above, the patient will take 2 tablets every after 8 hours.

ACTIVITY

1. What is drug prescription

   _____

   _____

   _____

2. Mention **two** factors to consider before prescribing a drug

   _____

   _____

   _____

3. Mention **two** components of a prescribed drug

   _____

   _____

   _____

4. Give any **two** importance of drug prescription to the patients.

   _____

   _____

LESSON

DRUG MISUSE

Drug misuse; is the act of using a drug without or against the recommended advice.

It is the wrong use of a drug

Examples of drug misuse.

- ✓ **Under dosage**; is when one takes less than the recommended dose
- ✓ **Over dosage**; is when one takes more than the recommended dose

Reasons why people abuse drugs

1. For stimulation
2. To relax or to sleep
3. To improve performance
4. To concentrate on work
5. To forget

6. Fear of rejection
7. For pleasure
8. To stay awake
9. Ignorance
10. Wrong drug prescription
11. For companionship
12. Self-medication

Ways drugs are misused

1. Sharing drugs prescribed for one patient.
2. Taking an underdose
3. Taking an overdose.
4. Taking a drug when you are not sick.
5. Taking a drug at a wrong time.

Effects of Drug misuse.

1. Makes germs resistant to the drug. This delays recovery
2. Overdose can lead to poisoning.
3. They cause weaknesses to the body
4. It leads to loss of appetite
5. It causes brain damage.

Dangers of buying drugs from shops or markets

1. Drugs may be harmful or expired.
2. Such drugs are not well prescribed and
3. Drugs may be poorly stored and contaminated
4. They may be spoilt/damaged
5. They may be fake drugs.

Activity

1. Define drug misuse

   _____
   _____
   _____

2. Give **two** ways drugs are misused in your community today.

   _____
   _____
   _____

3. Mention **two** effects of drug misuse.

   _____
   _____
   _____

4. Give **two** dangers of buying drugs from shops or markets.

   _____
   _____
   _____

LESSON 10:

DRUG STORAGE

1. Drugs need to be kept in a clean cool dry place to prevent them from contamination.
2. Cold chains are used to keep vaccines safe in areas where there is no electricity.
3. Drugs should also be kept far from children to prevent child poisoning at home.

Dangers of poor storage of drugs

1. Drugs may easily become contaminated
2. It makes drugs lose their curative value.
3. Poorly stored drugs instead become poisonous to one's health.
4. Keeping drugs in children's reach can easily cause poisoning.

Drug abuse:

Drug abuse is the use of a drug in way that is harmful to the body.

Reasons why people abuse drugs

1. To quench thirst.
2. To improve on sexual performance.
3. To concentrate on work.
4. To feel warm.
5. To celebrate success
6. Ignorance
7. Wrong drug prescription

Commonly abused drugs

a. Opium.
b. Cocaine
c. Alcohol
d. Tobacco

Effects of drug abuse

1. It damages body organs such as the brain, liver pancreas etc.
2. Drugs abuse can cause abnormalities or improper body function.
3. Drug abuse can easily result into death.
4. It leads to domestic violence.
5. It leads to divorce among spouses
6. It leads to child abuse

DRUGS OF DEPENDENCY

Drugs of dependency are drugs which cause addiction in case of prolonged use.

Drug dependency is when one's body becomes addicted to a certain drug.

Life styles to safe guard against drug dependency

a) Keeping busy with sports and games during free time.
b) Avoid peer groups which exercise the use of common drugs.
c) Engage in good social clubs.

Life skills to safe guard against drug dependency

a. Self-esteem.
b. Correct decision making.
c. Assertiveness
d. Critical thinking.
e. Effective communication
f. Problem solving

Activity

1. What is drug misuse?
   _____
   _____
   _____
2. Why do people abuse drugs?
   _____
   _____
   _____
3. Give any **one** effect of drug abuse to an individual.
   _____
   _____
   _____
4. Explain what is meant by the term drug dependency.
   _____
   _____
   _____
5. State any **one** life skill of safe guarding against drug dependency.
   _____
   _____
   _____