P.4 SCIENCE LESSON NOTES FOR ALL TERMS

THE PLANT LIFE.

FLOWERING PLANTS

1. Flowering plants are plants, which bear flowers.
2. The flowering plant has two major parts namely:
   a) Shoot system
   b) Root system

Root system.

Part of the plant that grows downwards into the soil.

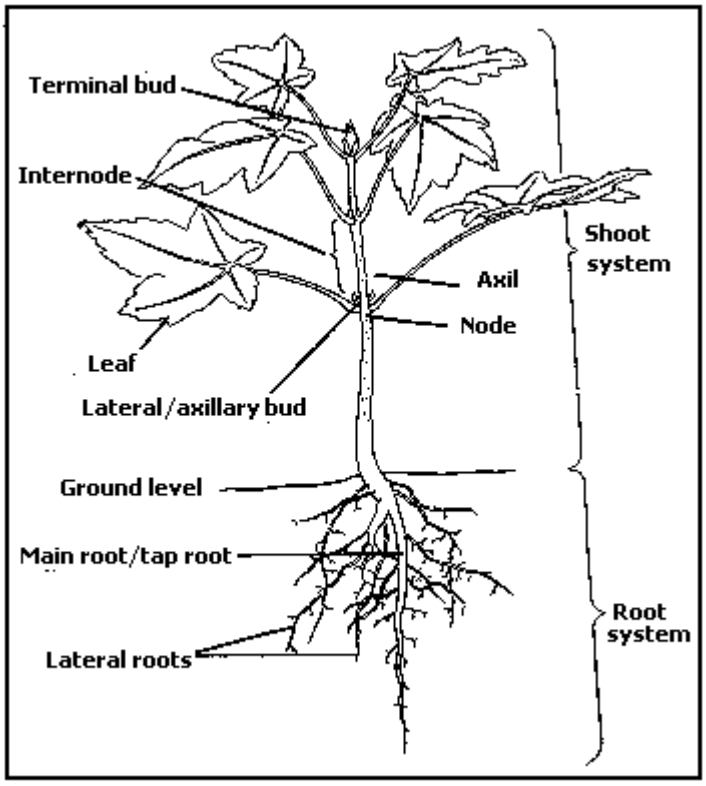
Shoot system

1.Part of the plant that grows above the ground.
2.The shoot system consists of the stem, leaves, axillary buds, fruits, flowers, internodes and nodes.

Parts found on the shoot system.

a) Stem,
b) Leaves,
c) Axillary buds,
d) Terminal bud,
e) Fruit,
f) Flower,
g) Node.
h) Internodes

Parts of a flowering plant.



THE LEAVES OF A PLANT

Parts of a leaf

Functions of some parts of a leaf

Mid vein

a) Conducts water and mineral salts to the leaf from the roots.
b) Conducts already manufactured food to the lower parts of the plant.

Veins

Distributes water and mineral salts in the leaf.

Leaf base

Holds the leaf firmly to the branch.

Leaf stalk.

a) Conducts manufactured food to the lower parts of the plant.
b) Conducts water to the leaf

Stomata.

These are tiny openings through which the plants breathe.

Uses of leaves to a plant

a) Leaves manufacture food for the plant
b) Some leaves store food for the plant
c) Leaves help the plant to breathe
d) Leaves help plants during transpiration.
e) Some leaves are used for propagation e.g bryophyllum leaf.

Note: The main function of a leaf to a plant is to make food.

Uses of leaves to man

a) Some leaves are used as food.
b) Some leaves are used as local medicine to cure disease.
c) Some leaves are used to thatch some houses.
d) They are used to mulch gardens.
e) Some leaves can be used as decorations
f) Some leaves can be used in making craft materials.
g) Some leaves can be used as costumes ie cultural dances like Imbalu dance.

Plants that store food in their leaves

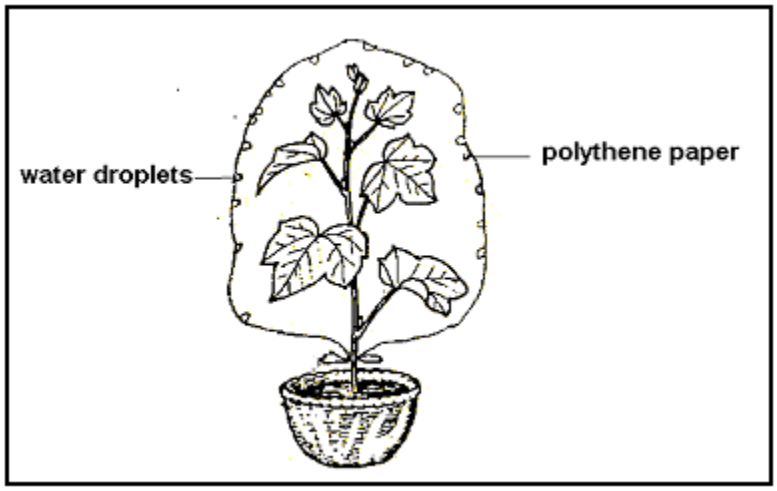
a) Cabbages
b) Onions
c) Sisal plants
d) garlic

TRANSPIRATION

Transpiration is the process by which plants lose water vapour to the atmosphere through the stomata.

An experiment to show that plants lose water

1. Get a transparent polythene paper with no hole on it.
2. Look for a plant, which is well placed in sunlight.
3. Tie the polythene paper on one of the branches or around the shoot as shown.
4. Leave it there for sometime.



Results

Droplets of water are found on the inside of the polythene bag.

Conclusion

Plants give off water in the form of water vapour.

Importance of transpiration to plants

a) Transpiration helps to cool the plants
b) Transpiration gives room for the plant to get fresh water.

How plants reduce / control the rate of transpiration

a) Some leaves have a layer of wax which helps to cover the stomata.
b) Some plants shed their leaves during dry seasons.
c) Some plants control the rate of transpiration by growing small leaves.
d) Some plants have their leaves reduced into thorns e.g. cactus plant.

Importance of transpiration to the environment

It helps in the rain formation

TYPES OF LEAVES

1. There are two main types of leaves.
2. These are:

a) Simple leaves
b) Compound leaves.

Simple leaves

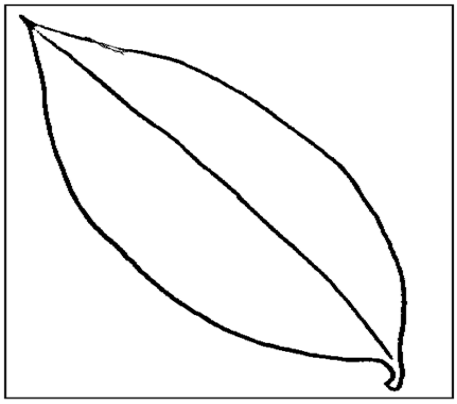
Simple leaves are leaves that have one leaf blade on the stalk.

Examples of simple leaves:

a) Simple serrated leaf
b) Simple entire leaf
c) Simple palmate leaf
d) Simple lobbed leaf.

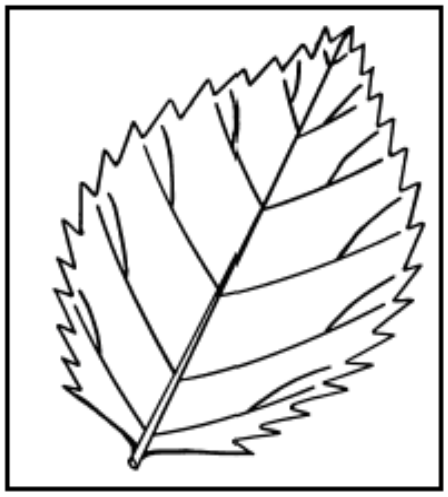
Structures of simple leaves

Simple entire leaf.

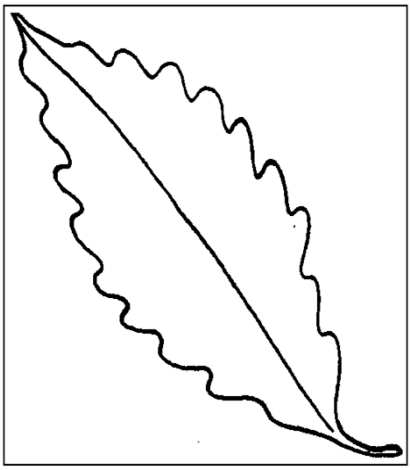


Simple palmate leaf

Simple serrated leaf .



Simple Lobbed leaf.



Compound leaves

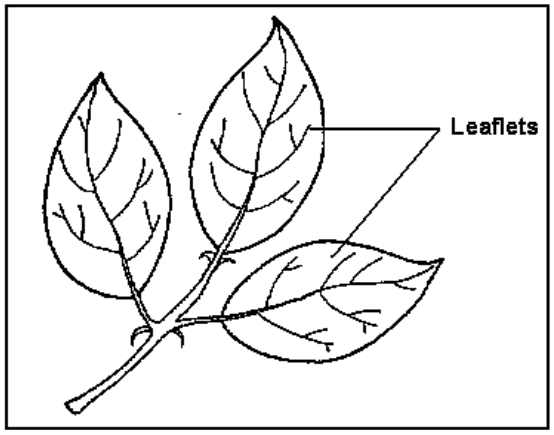
1. Compound leaves are those whose leaf blades are divided into leaflets.
2. The leaflets are divided up to the leaf stalk.

Examples Compound leaves:

a) Compound trifoliate
b) Compound digitate
c) Compound pinnate
d) Compound bipinnate

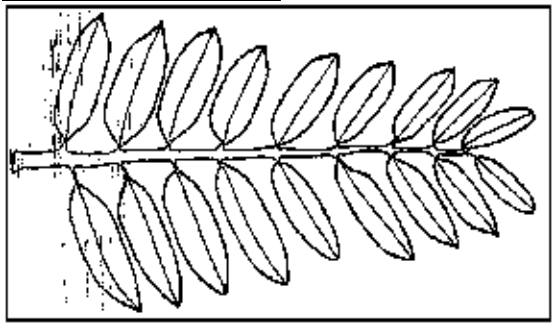
Structures of compound leaves

Compound trifoliate.

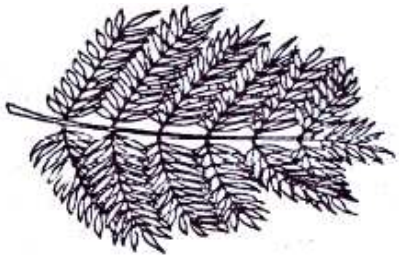


Compound digitate

Compound pinnate.



Compound Bipinnate. .



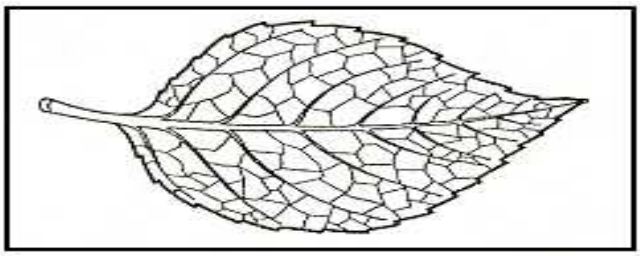
LEAF VENATION

Leaf venation is the arrangement of veins in a leaf.

Types of leaf venation

a) Network Venation
b) Parallel Venation

The network venation

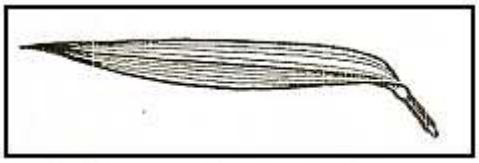


In network Venation the veins sometimes are like a net.

Examples of plants with network veins.

a) Beans
b) Peas
c) Hibiscus plant.
d) Ground nuts
e) Mango plant and many tree plants.

The parallel venation



In parallel venation, there are many veins running parallel to one another.

Examples of plants with network veins

a) Maize
b) Sugar cane
c) Millet
d) Wheat
e) Rice
f) Grass etc.

PHOTOSYNTHESIS

1. Photosynthesis is the process by which green plants make their own food. (starch)
2. Photo means light
3. Synthesis means making.
4. The food made by photosynthesis is starch.

Conditions necessary for photosynthesis:

a) Chlorophyll
b) Water
c) Carbondioxide
d) Sunlight.

Raw materials of photosynthesis:

a) Water
b) Carbondioxide.

The products of photosynthesis.

a) Starch - Main product stored.
b) Oxygen - by product given off

Chlorophyll:

a) This is the green colouring matter found in leaves.

b) Its main function is to trap light energy from the sun.

Water
Combines with carbondioxide to form starch.

Carbondioxide:
a) This gas passes through the small holes on a leaf called stomata.
b) Carbondioxide combines with water to form starch.
c) During the process of photosynthesis, carbondioxide is used and oxygen is given off.

Sunlight
This gives light energy for carrying out the process of photosynthesis.

ROOTS
1. This is the part of a plant which grows in the soil.
2. A true root system develops from the radicle of the embryo.
3. Roots of plants which don't grow from the radicle are called adventitious roots.

Importance of roots to plants
1. Roots hold the plant firmly into the soil.
2. Roots absorb water and mineral salts from the soil by the process of osmosis.
3. Some roots store food for the plant. E.g. cassava roots, sweet potato roots, carrot roots etc.
4. Some roots give extra support to the plant to stand upright.

Importance of roots to man
a) Some roots provide man with food. e.g. Cassava, Sweet potatoes and Carrots.
b) Some roots can provide man with local medicine.
c) Some roots are used to make craft materials.

Note:
Roots which store food are called root tubers.

Root systems
a) Tap root system
b) Fibrous root system

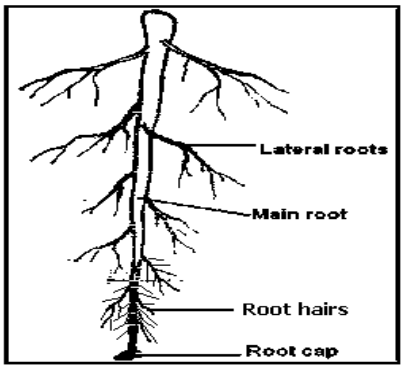
Types of roots
a) Tap roots
b) Fibrous roots
c) Prop roots
d) Buttress roots
e) Clasping roots
f) Breathing roots
g) Stilt roots
h) Adventitious roots
i) Aerial roots
j) Storage roots (root tubers).

Tap roots
1. These are the main roots from which lateral roots develop.
2. They grow deep in the ground.

Examples of plants with tap roots

a) Mango tree
b) Mvule tree
c) Mahogany tree
d) Guava tree
e) Beans, etc

Structure of a tap root



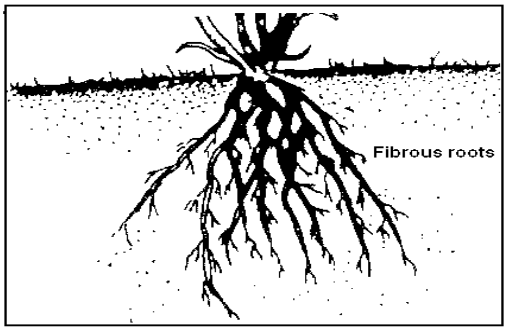
Fibrous roots

1. This is a type of root system where there are many roots growing randomly.
2. There is no main root.
3. They don't go deep in the ground.

Examples of plants with fibrous roots

a) Maize
b) Sorghum
c) Sugar cane
d) Millet
e) Grass.

Structure of fibrous roots



Prop roots

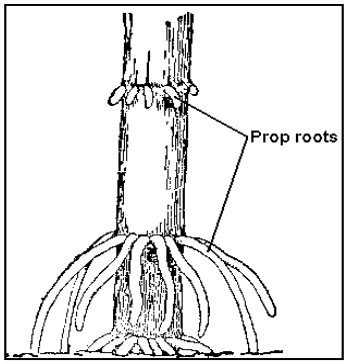
1. These are roots which give extra support to plants.
2. They develop from nodes near the ground level.

Examples of plants with prop roots:

a) Maize
b) Sorghum

c) Sugar cane etc.

Structure of prop roots



Adventitious roots

These are roots that grow from any other part of the plants e.g. stems and leaves.

Plants that have adventitious roots:

a) Ginger plant
b) Onions
c) Bananas
d) Pumpkins
e) Sweet potatoes.

Storage roots/ Root tubers

These are roots which store food mainly starch.

Examples of storage roots:

a) Carrots
b) Cassava
c) Sweet potatoes

Carrots

1. A carrot is a swollen taproot with a very short stem at the top.
2. The stem has a terminal bud surrounded by leaf bases.
3. It is a swollen taproot because it stores food.

NB: A root tuber is a swollen root containing stored food.

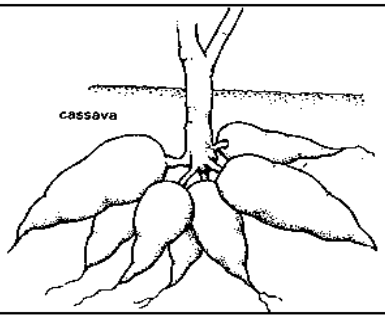
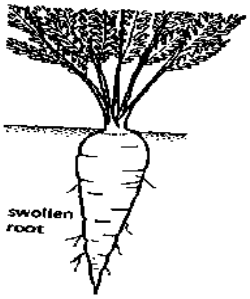
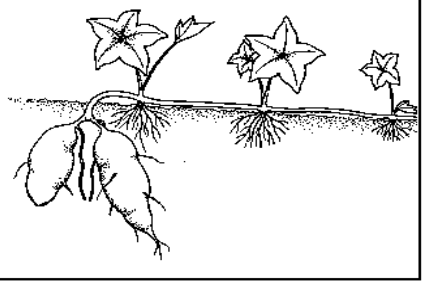
Cassava root tuber

1. Cassava is a swollen root tuber.
2. It is an adventitious root which branches from the stem.
3. It is swollen because it stores food. (starch).

Sweet potato tuber

1. It is an adventitious root which develops from nodes of a creeping sweet potato stem.
2. The adventitious roots become swollen because they store food (starch).

Structures of storage roots

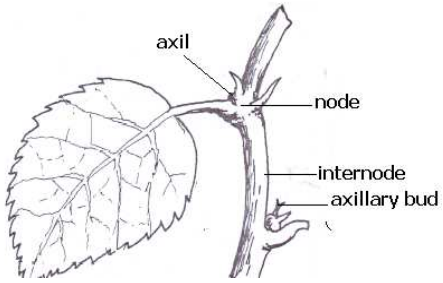
Cassava	carrot	sweet potatoes
		

STEMS:
These are parts of a flowering plant on which leaves, flowers and fruits are born.

Functions of a stem to plants
1. It supports the structures of the shoot. i.e. branches, leaves, flowers,etc.
2. It spaces out the leaves so that they receive enough air and sunlight.
3. It conducts water and mineral salts from roots to the leaves.
4. It conducts food from leaves to other parts of the plant.
5. Some stems store food for the plant e.g. sugarcane, ginger, yams, irish potato etc.
6. Green stems help in the process of photosynthesis.

Uses of stems to man
1. Many stems are used as firewood.
2. Some are used as local medicine to cure different sickness.
3. Some stems are used as food. eg Sugar canes, Ginger plant, Irish potatoes, etc
4. Some stems are a source of timber.
5. Stems are used to make poles.

Parts of a stem



1. Terminal bud is the growing tip of a plant.
2. Axil is the angle between each leaf and the stem.
3. In the axil is the axillary or lateral bud.
4. The axillary bud can grow into a branch or flower.
5. A node is the part of a stem where a leaf is fixed.
6. An internode is the distance (region) between two nodes.

KINDS OF STEMS
1. Upright stem/ erect stem
2. Underground stems
3. Climbing stems
4. Creeping stems.

Upright/erect stems

1. These are the common stems found on either dicotyledons or monocotyledon plants.
2. They grow straight in space.

Examples of plants with Upright/erect stems:

1. Trees e.g Muvule etc.
2. Beans
3. Peas
4. Maize etc.

Climbing stems.

1. These are weak stems which cannot support themselves up right.
2. So they climb other plants.

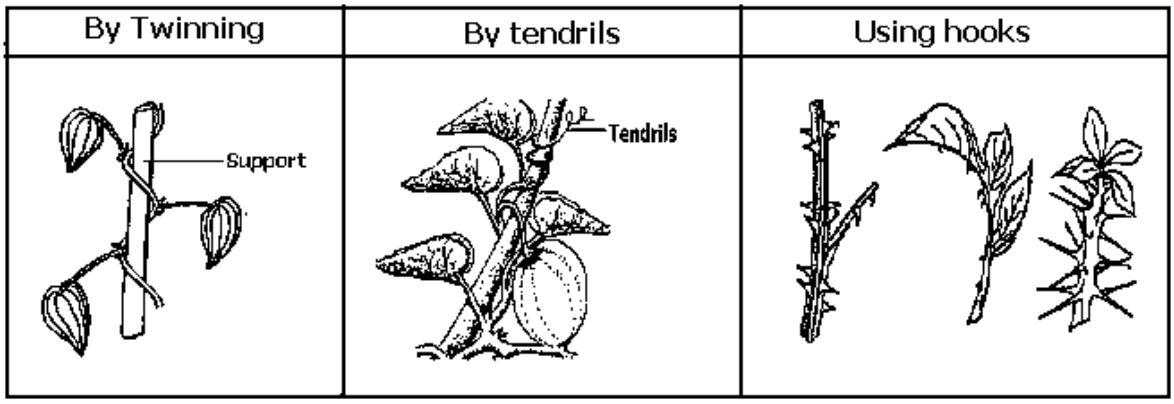
Why plants climb others.

1. Plants climb others to get enough/ sufficient sunlight.
2. For support
3. To expose their fruits for seed dispersal.
4. To expose their flowers for pollination
5. To get enough air

How plants climb others.

a) By use of tendrils e.g passion fruits, pea plant and some beans etc.
b) By twining e.g some yams, some beans. Morning glory money plant etc.
c) By use of hooks & thorns e.g. Rose flower.
d) By clasping.

Illustration of climbing stems



CREEPING STEMS.

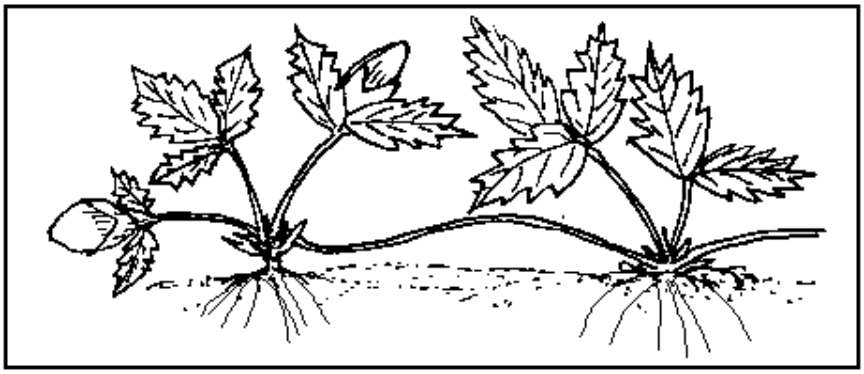
These are stems that run along the ground.

Examples of plants with creeping stems.

a) Water melon
b) Pumpkins

c) Sweet potatoes
d) Cucumber
e) Straw berry
f) Morning glory

Illustration of creeping stems.



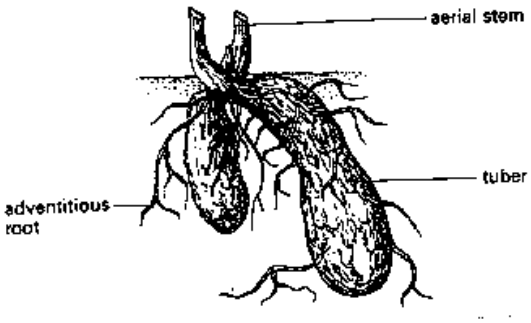
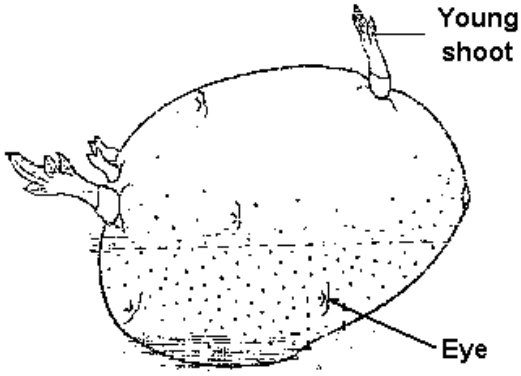
UNDER GROUND STEMS OR STORAGE STEMS.
These are stems that mainly grow underground.

Examples of underground stems
a) Stem tubers
b) Bulbs
c) Rhizomes
d) Corms

STEM TUBERS
1. These are swollen underground stems which store food.
2. We eat them as food.

Examples of stem tubers:
a) Irish potatoes.
b) Yams

Structures of stem tubers

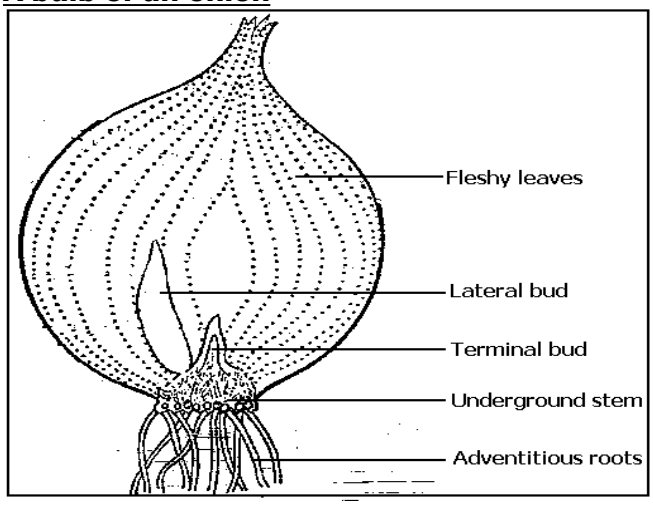
Yam	Irish potato
	

BULBS
1. A bulb is an underground stem.

2. Food in a bulb is stored in the fleshy leaves.
3. Bulbs have adventitious roots.

Examples of bulbs:
a) Onions
b) Garlic
c) Leek
d) Shallots

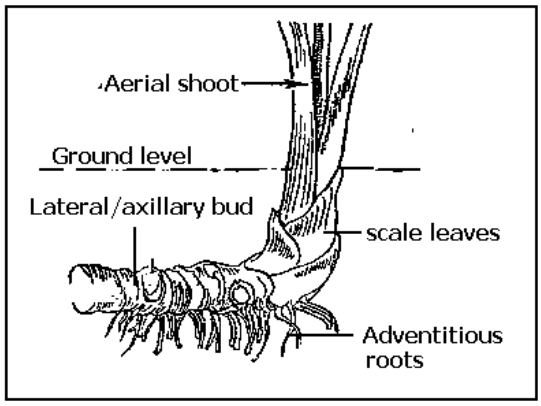
A bulb of an onion



RHIZOMES

1. A rhizome is a horizontal underground stem.
2. Rhizomes develop adventitious roots.
3. Rhizomes store food in the stem.
4. An example of a rhizome is ginger.

Structure of a rhizome



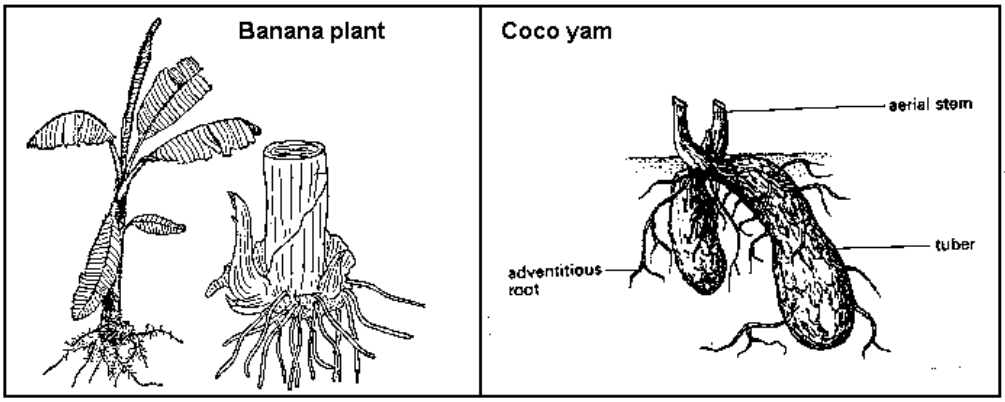
CORMS:

1. A corm is a short vertical underground stem.

2. It is swollen with stored food
3. It has scale leaves, lateral buds and adventitious roots.

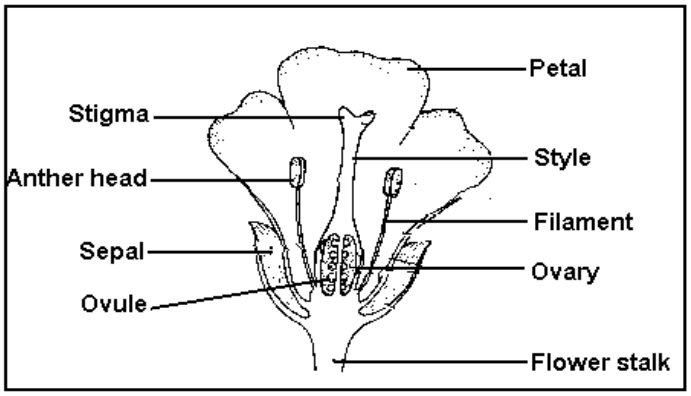
Examples of corms:
a) Coco-yam.
b) Crocus
c) Banana
d) Pineapple
e) Sisal, etc.

Structures of coco yams.



THE FLOWER
1. A flower is the reproductive part of a flowering plant.
2. The main function of a flower is to produce fruits and seeds.

Parts of a flower



Fl

Sepals
1. They protect the flower when still in a bud stage.
2. A group of sepals is called **calyx**

Petals
1. They attract pollinating agents.
2. They are brightly coloured and Scented to attract pollinating agents.
3. A group of petals is called **corolla.**

Filament
Supports the anthers to a right position for pollination.

Anthers
Produce and store pollen grains.

Stigma
Receives pollen grains from the anthers

Style
Holds the stigma in the right position for pollination.
Joins the stigma to the ovary

Ovary
Produces and stores ovules

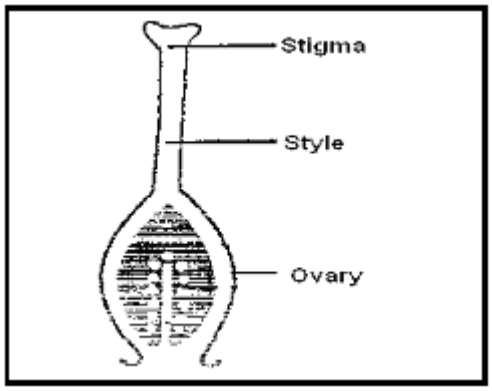
Flower stalk
The stalk holds the flower on the stem.

THE PISTIL AND STAMEN

The Pistil
This is the female part of a flower**..**

Parts that make up the pistil:
a) Stigma
b) Style
c) Ovary

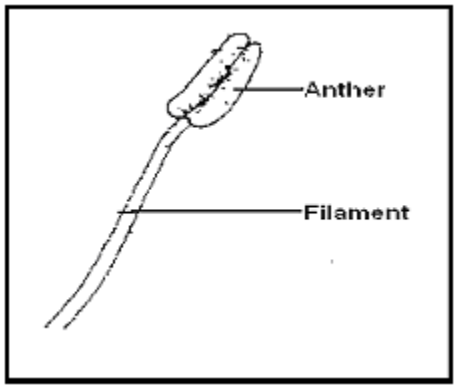
Structure of the Pistil



The Stamen
This is the male part of a flower..

Parts that make up the stamen:
a) Anther
b) Filament

The structure of the stamen



POLLINATION
Pollination is the transfer of pollen grains from the anthers to the stigma of a flower.

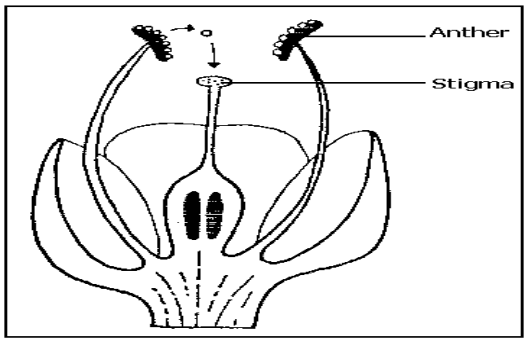
Agents of pollination:
These are things responsible for the transfer of pollen grains to the stigma.

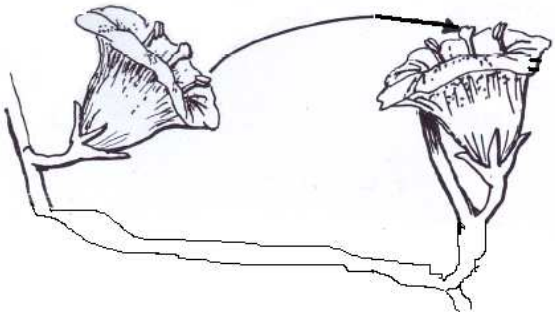
Examples of agents of pollination
1. Wind
2. Water
3. Animals
4. Birds
5. Bees
6. Butterflies
7. Moth

Types of pollination
1. Self pollination
2. Cross pollination

Self pollination

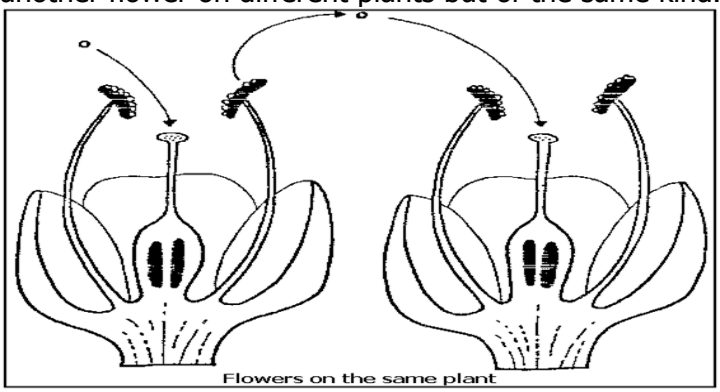
Self-pollination is the transfer of pollen grains from the anthers to the stigma of the same flower or different flowers on the same plant.





Cross-pollination

Cross-pollination is the transfer of pollen grains from the anther of one flower to the stigma of another flower on different plants but of the same kind.



Characteristics of insect pollinated flowers.

1. Have brightly coloured petals
2. Have nectar
3. Have good smell/ scent.
4. Have stigmas above the anther heads
5. Produce few pollen grains
6. Produce sticky pollen grains.

Characteristics of wind pollinated flowers.

1. Produce many pollen grains.
2. Have dull petals
3. Have no nectar
4. No smell / scent
5. The pollen grains are light
6. Anthers are above the stigma

Importance of flowers to man

1. Flowers are used for decoration on various functions.
2. Some flowers are used in making of perfumes.
3. Some flowers can be sold to get money.
4. Some flowers are used in the making of insecticides e.g Pyrethrum.
5. They are used to make dyes.
6. Some flowers are a source of food.

Importance of flowers to the plant

Flowers produce fruits and seeds.

FERTILIZATION

1. Fertilization is the union of the nuclei of female and male cells to make a zygote.
2. Fertilization in plants takes place in the ovary.
3. In flowering plants, the male gametes are the pollen grains and the female gametes are the ovules.

Note: After fertilization, the ovules develop into seeds and the ovary develops into a fruit.

SEEDS

A seed is a fertilized Ovule of a flower.

Importance of seeds to man

1. We plant seeds to get more plants
2. We get money by selling seeds
3. We eat seeds e.g. Beans, maize grain, groundnuts, etc.
4. Some seeds are used to make decorations.

Types/ Classes of seeds

1. Dicotyledonous seeds (dicots)
2. Monocotyledonous seeds (monocots)

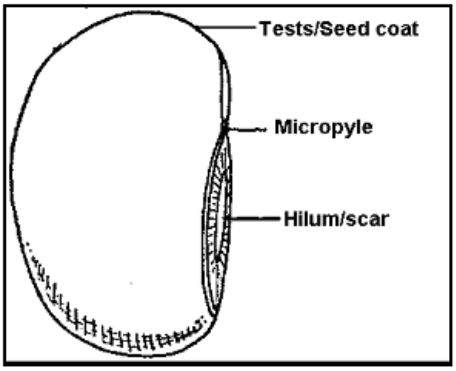
Dicotyledonous seeds

1. These are seeds with two cotyledons.
2. Di means two.

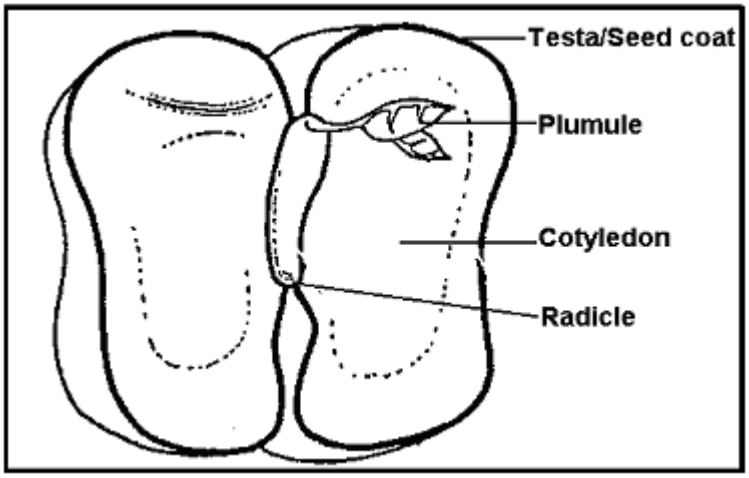
Examples of Dicotyledonous seeds:

1. Bean seeds	2. Pea seeds
3. Ground nut seeds	4. Soya bean seeds
5. Coffee seeds	6. Mango seeds
7. Avocado seeds	8. Orange seeds
9. Pumpkin seeds	10. water melon seeds etc.

External parts of a bean seed.



Internal parts of a bean seed



Functions of parts of a bean seed

Testa/ seed coat
It protects the inner parts of a seed

Micropyle
This is a small hole, which allows air and water into the seed during germination.

Hilum / scar
It attaches the seed to the Ovary or pod or fruit.

Cotyledon
It provides food.
Note: During germination, the cotyledon provides food to the embryo.

Radicle
It develops into a root system after germination

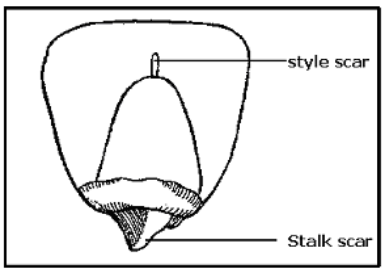
Plumule
It grows into the shoot system after germination.

Monocotyledonous seeds
1. These are seeds with one cotyledon.

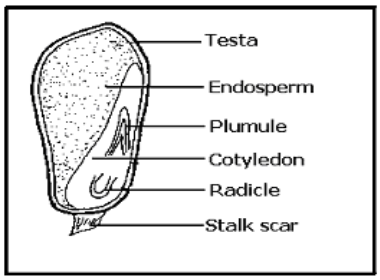
2. Mono means one

Examples of monocotyledonous seeds:
1. Maize
2. Millet
3. Sorghum
4. Rice
5. Wheat
6. Barley
7. Oats

External parts of a maize grain



The internal parts of a maize grain



Functions of parts of a maize grain

Testa/ seed coat
It protects the inner parts of a seed

Cotyledon
Passes food from the endosperm to the embryo.

Radicle
It develops into a root system after germination

Plumule
It grows into the shoot system after germination.

Endosperm
1. It stores food for the embryo
2. Provides food to the embryo during germination.

Note : The embryo of a seed is made up of plumule and radicle.

Style scar
Part where the style was attached.

Stalk scar.
Part where the fruit was attached to the cob

Characteristics of dicotyledonous and monocotyledonous seeds

Dicotyledonous seeds	Monocotyledonous seeds
1. Have two cotyledons	Have one cotyledon
2. Dicotyledonous seeds undergo epigeal germination	Monocots undergo hypogeal germination
3. Stores food in the cotyledon.	Stores food in the endosperm.

GERMINATION

1. Germination is the growing of a seed into a young plant.
2. A young plant is called a seedling.

Types of germination

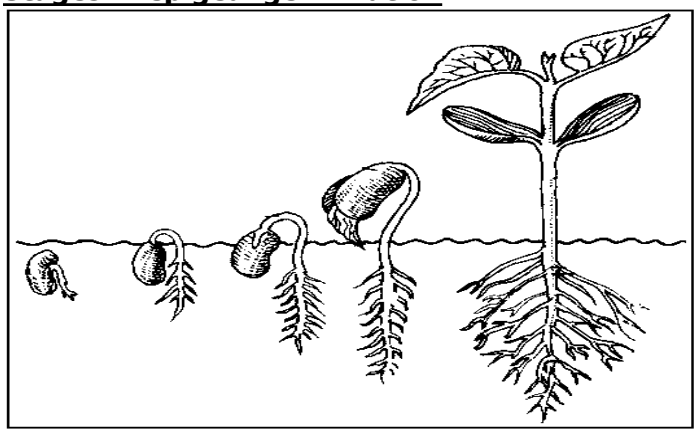
1. Epigeal germination
2. Hypogeal germination.

Epigeal germination:
Epigeal germination is when a germinating seed carries its cotyledon above the ground.

Examples of seeds that carry out epigeal germination.

1. Beans seeds
2. Soya bean seeds
3. Groundnut seeds
4. Coffee seeds
5. Orange seeds
6. Mango plants
7. Pumpkin seeds
8. Watermelon seeds

Stages in epigeal germination



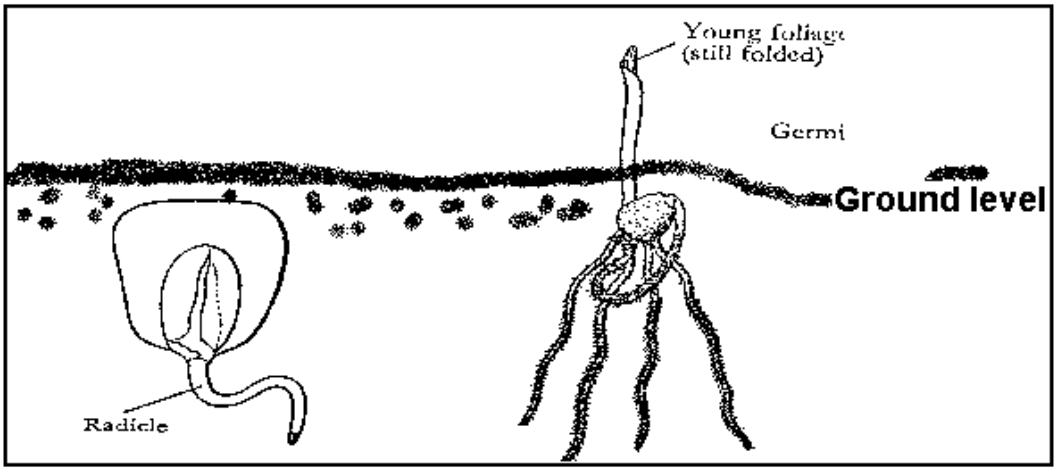
Hypogeal germination

1. Hypogeal germination is when a germinating seed leaves its cotyledon under ground.
2. All mono-plants carry out hypogeal germination.

Examples of seeds that carry out hypogeal germination.

1. Maize seeds
2. Sorghum seeds
3. Millet seeds
4. Wheat seeds
5. Rice seeds
6. Oats seeds etc.

Stages in hypogeal germination



Conditions needed for a seed to germinate

a) Water
b) Oxygen
c) Warmth.

Uses of the conditions needed for gernimation

Water

a) It softens the testa or seed coat.

b) It dissolves the food for the embryo to use.

Oxygen

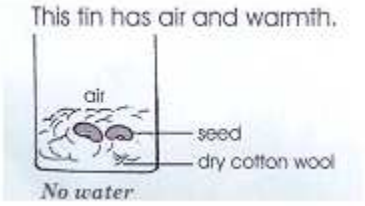
Helps the embryo to carry out respiration

Warmth

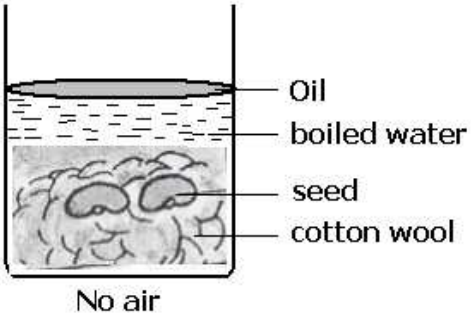
Gives the enzymes necessary conditions to digest food for the embryo.

Experiments about the conditions necessary for germination

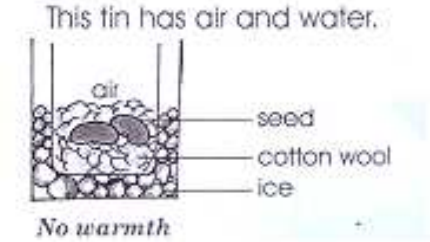
a) Testing for water whether it is necessary for germination.



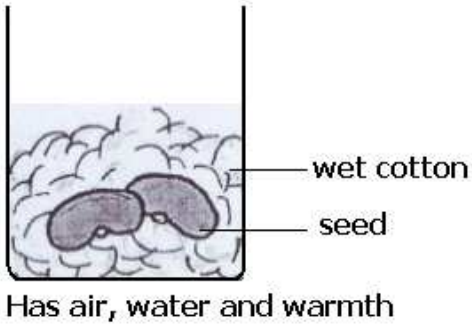
b) Testing for oxygen whether it is necessary for germination.



c) Testing for warmth whether it is necessary for germination.



d) Testing on germination.



Seed viability

This is the ability of seeds to germinate when all conditions are present.

Testing for seed viability

Test i

1. Sort the seeds to find those with holes, rotten, wrinkles and soft.
2. Count the seeds in each category.

Test ii

1. Put them in water to remove those that floats. Usually they have low viability.
2. Count them and record.

Test iii

1. Plant some of the good seeds and some of the bad seeds and them.
2. Water the seeds regularly.
3. Record what you at every stage i.e record how many seeds were planted and how many germinated.

Note

1. If the seeds have a high level of viability, the number that germinates should be more than the number that does not germinate.
2. Rotten seeds didn't germinate.
3. Some seeds with holes germinated and others didn't.
4. Some wrinkled seeds germinated and others didn't.
5. Seeds are sorted to find the most viable seeds.
6. Seeds are put in water to use the element of density as a likely viable seeds.

General importance of plants

1. Natural forests are tourists attraction.
2. Some plants are a source of timber.
3. Some plants provide materials for crafting.
4. Some plants are used as local medicine.
5. Some plants provide food to both man and animals.
6. Plants help in controlling soil erosion.
7. Plants provide oxygen to animals during photosynthesis.
8. Crops are also grown for selling.
9. Some plants are cut to make firewood and charcoal.

GROWING CROPS AND FOOD PRODUCTION

GROWING CROPS

Crops are plants grown by man.

Types of crops commonly grown

1. Fruit crops
2. Cereals/grain crops,
3. Vegetable crops,
4. Legume crops
5. Root crops.

Fruit crops

1. Apple crops
2. Orange crops
3. Mangoes crops
4. Pineapples crops

5. Paw paw crops

Cereals/grain crops

Cereals are plants that bear grains.

Examples:

1. Rice crops
2. Wheat crops
3. Maize crops
4. Oat crops
5. Sorghum crops
6. Millet crops

Vegetable crops

1. Cabbage crops
2. Cucumber crops
3. Spinach crops
4. Lettuce crops

Root crops

1. Cassava crops
2. Sweet potato crops
3. Carrot crops

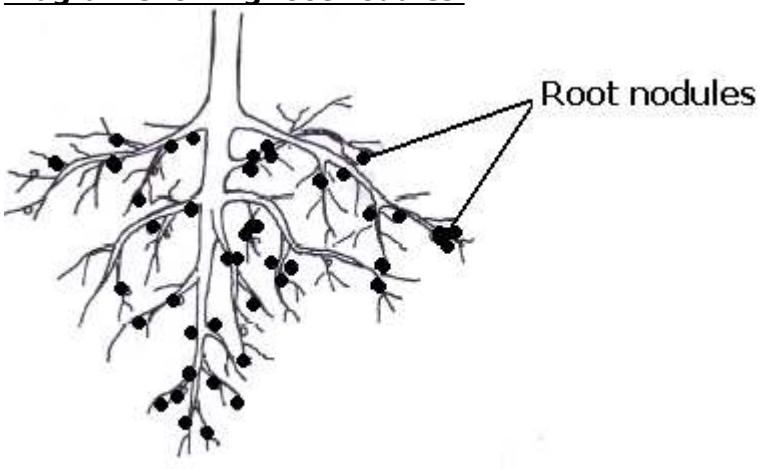
Legume crops

Legumes are plants with root nodules on their roots.

Examples:

1. Bean crops
2. Pea crops
3. Ground nuts crops
4. Soya bean crops

Diagram showing root nodules.



Note:

1. Root nodules keep nitrogen fixing bacteria.

2. Nitrogen fixing bacteria fix nitrogen in the soil.
3. Nitrogen improves soil fertility.

Groups of crops

Annual crops

1. These are crops which complete life within a year/season.
2. We harvest them only once.

Examples of Annual crops:

a) Maize,
b) Rice,
c) Beans,
d) Cotton,
e) Cabbage etc.

Perennial crops

1. These are crops which take more than a year/season to give its first yield.
2. But we can harvest them each year.

Examples Perennial crops :

a) Coffee,
b) Tea,
c) Banana,
d) Oranges,
e) Sugar cane,
f) Mangoes etc.

GARDEN TOOLS, EQUIPMENT AND MATERIALS

These are simple machines farmers use to carry out some activities in the garden.

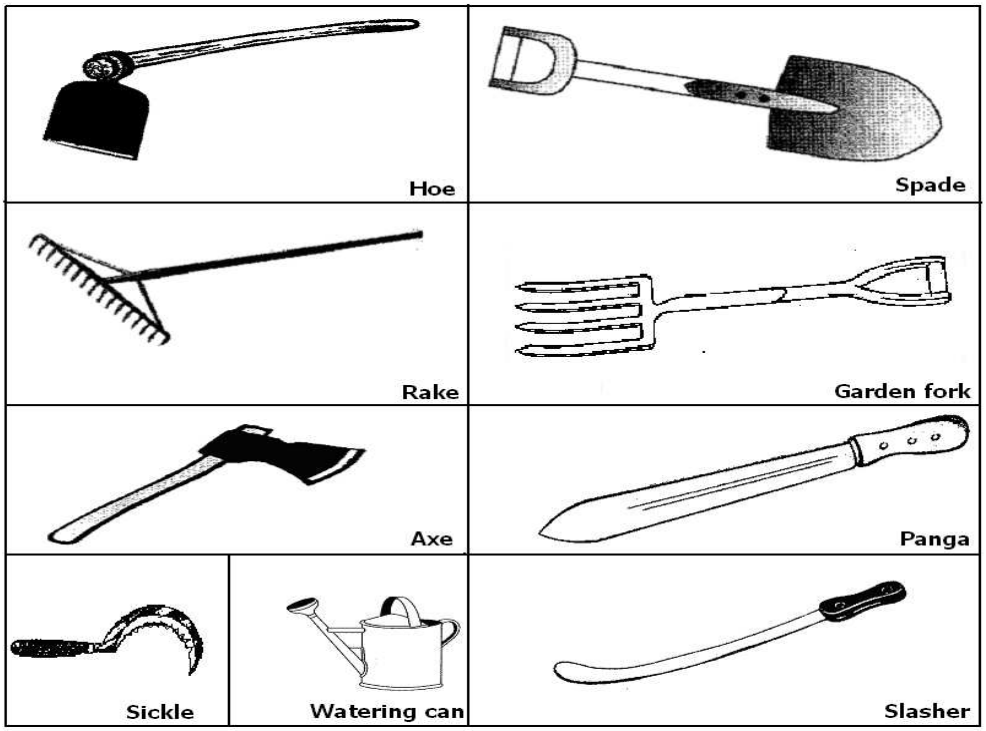
Activities that need garden tools.

1. Land clearing
2. Digging
3. Weeding
4. Collecting weeds and rubbish
5. Watering
6. Pruning

Examples of garden tools

1. Hoe - used for digging, weeding and harvesting
2. Panga - used for cutting small trees and harvesting.
3. Rake - used for collecting rubbish, manure and leveling soil
4. Watering can - used for watering crops.
4. Slasher - used for slashing weeds
5. Trowel - used for transplanting seedlings from a nursery bed.
6. Wheelbarrow - used for transporting manure, tools, harvested crops etc.
7. Axe - used for cutting big trees
8. Pruner - used for pruning.

Diagrams of garden tools



Caring for garden tools

a) Garden tools must be kept in a dry.
b) Remove soil and grass from tools after use.
c) Sharpen cutting tools regularly.
d) Replacing spoilt parts
e) Painting, oiling/greasing tools to prevent rusting.

CROP GROWING PRACTICES

a) land clearing
b) digging/ ploughing
c) selecting planting materials
d) planting/ sowing
e) caring for crops e.g weeding, mulching, pruning, thinning etc
f) harvesting
g) drying
h) storing

Land clearing

1. Its done to remove the bush, trees and grass on the soil.
2. Its better to clear land in the dry season.

Digging/ Ploughing

1. This is done to make the soil loose, soft and also to burry weeds.
2. It allows water and air to enter the soil.
3. It is done using hoes, tractors, ox ploughs and forked hoes.

Harrowing the land

1. This is the breaking of big lumps of soil which are left after Ploughing.
2. It makes the surface of the soil leveled.
3. Also it kills weeds which could have started germinating after Ploughing.
4. It is done using a tractor with disc harrows, ox plough, forked hoe and hand hoe.

Selection of planting materials

Planting materials are the different parts of a plant used for planting.

Examples of planting materials

a) seeds
b) stem cuttings
c) vines
d) suckers
e) bulbs
f) stems

Factors to consider when selecting planting materials

1. Materials should be free from diseases and pests.
2. Should not be damaged.
3. Seeds should be mature and well dried.
4. Stem cuttings should bear lateral buds.

Planting seeds

1. Some seeds are planted directly into a well-prepared garden.

Examples

a) Maize
b) Beans
c) Peas
d) Cotton
e) Groundnuts etc.

2. Others are first planted in a nursery bed.

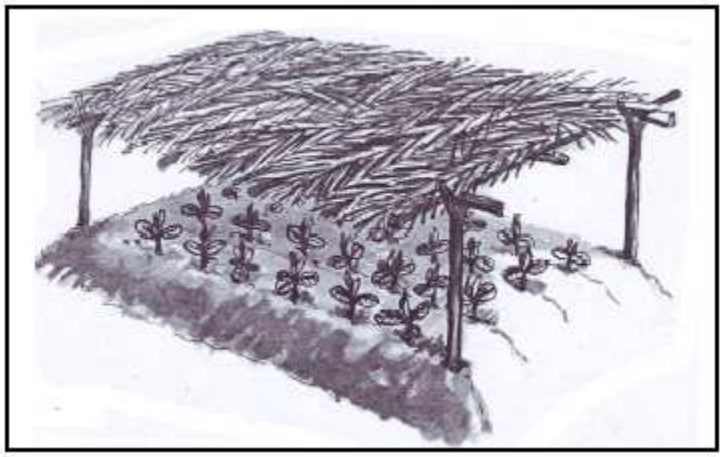
Examples of seeds first planted in a nursery bed

f) Rice
g) Tomatoes
h) Onions etc
i) Cabbage,
j) Egg plants
k) Paw paw,
l) Lettuce, spinach etc

A nursery bed

A nursery bed is a special place where seedlings are raised before taken to a prepared garden.

Structure of a nursery bed



Note: Seeds of these crops cannot grow when covered with heavy soils.

.

Site for a nursery bed

1. Should be in a place protected from direct wind.
2. A place with good drainage.
3. A place near a water source.
4. A place far from bushes.
5. A place protected from animals.

Activities carried out on a nursery bed

a) Watering
b) Spraying with chemicals
c) Weeding
d) Hardening off

Note:

Hardening off is the gradual removal of the shelter to make seedlings get used to harsh weather conditions.

Transplanting

1. Transplanting is the transfer of seedlings from a nursery bed to a well prepared garden.
2. It is done using a garden trowel.
3. It is best done in the evening to avoid excess loss of water through transpiration.

Importance of a nursery bed

a) It protects the seedlings from harsh weather conditions e.g
   i. Direct sunlight
   ii. Direct rain drops etc
b) It helps in proper selection of good seedlings.
c) It gives farmers time to prepare the main garden.
d) It helps in proper care of seedlings.

Time/Season of planting

1. Planting should be done during the wet season.
2. It is good to plant early during the first rains because:

a. Crops make proper use of rainfall for that season.
b. Crops grow fast enough and compete well with weeds.
c. Helps to control pests and diseases.
d. Crops mature fast and get good market.

Methods of planting

1. Row planting
2. Broad casting

Row planting

This is the planting of seeds/ seedlings in a line.

Examples of seeds planted using row planting:

1. Beans
2. Maize
3. Ground nuts
4. Cotton
5. Soya beans

Advantages of row planting

1. Few seeds are used.
2. It is easy to weed the crops.
3. Spacing in lines helps to control pests.
4. It easy to spray the crops.
5. It is easy to harvest the crops.

Disadvantages of row planting

1. Takes alot of time/tiresome.
2. It wastes land
3. It requires a lot of skills.

Broadcasting

This is when seeds are thrown randomly using hands in a garden.

Examples of seeds planted using broadcasting:

1. Millet
2. Sorghum
3. Sim-sim

Advantages of broadcasting

1 Time saving.
2 Requires small labour force.

Disadvantages of broadcasting

1. It wastes seeds.
2. It is difficult to weed, spray and harvest crops.
3. Many seedlings may grow in the same area.
4. There is easy spread of diseases.
5. Burdens the farmer to thin.

Gap Filling

1. This is the act of planting of seeds/seedlings in spaces where they didn't germinate.
2. It is done not to waste land.

Thinning

Thinning is the removal of some seedlings from areas where they are over crowded.

Examples of crops that need thinning

1. Maize,
2. Cotton,
3. Rice,
4. Millet,
5. Sorghum, etc.

Methods of thinning:
1. Uprooting/digging out the plant.
2. Cutting the plant at the base area.

Tools used for thinning
1. Panga
2. Hoe.
3. Hands

Importance of thinning
1. Thinning reduces hiding places for pests.
2. It gives good space for weeding, pruning, spraying and harvesting.
3. It reduces competition for sunlight, air, minerals and water among crops.
4. Thinned materials can be used for mulching.
5. Crops grow bigger and yield more.

Pruning
Pruning is the removal of some branches or leaves from a plant.

Examples of plants usually pruned
1. Banana
2. Coffee
3. Cocoa
4. Lemons
5. Oranges
6. Tomatoes

Garden tools used for pruning
1. Secateurs
2. Pruning sow
3. Shears

Importance of pruning
1. Reduce hiding places for pests.
2. Reduce weight on the plant.
3. Reduce competition for sunlight, air, water and minerals.
4. Pruning encourages branches to grow big and yield more.
5. Pruned materials are used for mulching.
6. Pruning gives good space for harvesting.

Mulching
1. Mulching is the covering of soil with dry plant materials.
2. Examples plants commonly mulched include: banana plants, tomatoes, cabbage etc.

Plant materials that can be used:

1. Dry maize plants
2. Dry leaves
3. Coffee husks
4. Wood shaving
5. Dry banana fibres

Advantages of mulching

1. Mulching controls soil erosion.
2. Mulching improves soil fertility.
3. Mulch maintains soil moisture.
4. Mulch controls the growth of weeds.
5. Protect the soil from the hot sun and heavy rainfall

Disadvantage of mulching

1. Mulches hide pests.
2. Mulches can easily catch fire and destroy crops.
3. When materials with seeds are used, seeds grow into weeds.
4. When a thick layer of mulches is put, it prevents rain water to reach the soil.

Manuring

1. Act of adding manure to soil.
2. Manure are natural fertilizers.
3. Manure is got from dead plants, animals and animals dung.
4. Manure helps to improve soil fertility.

Types of manure:

1. Compost manure made from dead plants and animals.
2. Farmyard manure made from animals dung and urine.
3. Green manure made from green plants when ploughed into soil.

Watering

1. Act of providing water to crops when there is little water in the soil.
2. It is done to prevent crops from drying and dying.
3. Watering can also be done to newly transplanted seedlings.
4. It is done using a watering can.
5. It is done early in the morning and late in the evening.

WEEDING

1. Weeding is the removal of unwanted plants from the garden.
2. Weeds are the unwanted plants in a garden.

Examples of common weeds:

1. Wandering jew
2. Spear grass
3. Black jack
4. Star grass
5. Wild finger millet
6. Couch grass

Importance of weeds

1. Weeds are source of food for both people and other animals.

2. Legume weeds improve on the soil fertility by adding nitrogen.
3. Controlling soil erosion by providing good soil cover.
4. When weeds rot, they improve on the soil fertility.

Dangers of weeds

a) Weeds lead to poor growth of crops.
b) Weeds habour pests and diseases.
c) Weeds compete with crops for sunlight, air, soil nutrients and water with crops.
d) Weeds make it hard for farmers during pruning, spraying of pesticides and harvesting.
e) Farmers spend a lot of money on chemicals and labour to control weeds.
f) Some are poisonous to animals.

Importance of weeding

a) Weeding reduces hiding places for pests.
b) Weeding reduces competition for sunlight, air, soil nutrients and water between crops and weeds.
c) Weeding reduces over crowding of the garden with plants.
d) Weeding gives good space for pruning, spraying and harvesting.

Ways of controlling weeds

a) Spraying with herbicides.
b) Mulching.
c) Uprooting.
d) Slashing (slashing is normally carried out in crops with wide spacing eg. Coffee and banana plantation)
e) Cultivating (Farmers use hoe, tractor or oxen)
f) Rearing natural enemies to feed on the weeds.
g) Crop rotation

COMMON CROP PESTS

	Crops	Pests	Affected part
1	Cassava	Green cassava mite Mole rats	Tips of cassava shoot Roots
2.	Sweet potato	a Sweet potato weevil	Leaves, stem and roots
		b Squirrel	Roots
		C Eel worms d Mole rats	Roots
3.	Irish potato	Irish aphid	Leaves
4.	Carrots	Eel worms	Roots
5.	Sugar cane	a. Stalk borers	Stems
		b. Aphids	Stems
6.	Banana	a. Banana thrips	Fruits
		b. Banana weevils	Stem (corm)
9	Cabbage	Cut worm	Stem
10	Coffee	Mealy bugs	Leaves
11.	Maize	Maize stalk borer Weaver birds Termites	Stems Grains

COMMON DISEASES OF CROPS

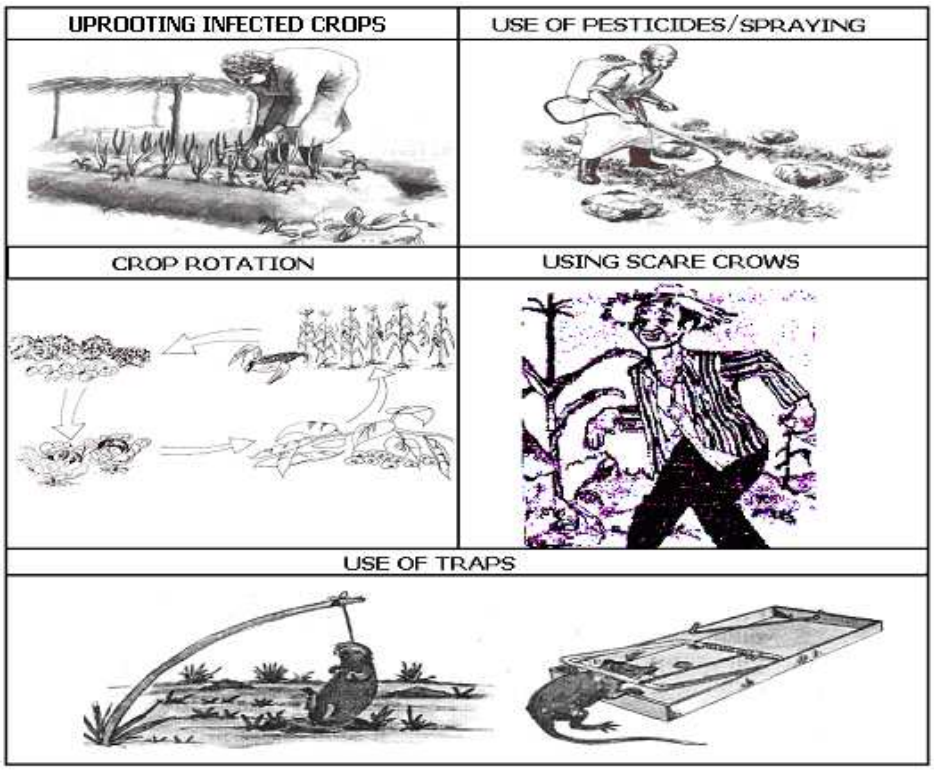
	Crop	Diseases		Affected part
1	Cassava		Cassava mosaic	Leaves
		b	Brown streak	Leaves and tubers
2	Sweet potato	Sweet potato blight		Leaves and stem
3	Coffee	a	Coffee berry disease	Coffee beans
		b	Wilt disease	Leaves
	Banana	a	Panama disease	Leaves and stem
		b	Wilt disease	Leaves
			sigarloka	
			cigar end rot	
6	Sugar cane	Ratoon stunting disease		Stem
7	Ground nuts	Rosette disease		Leaves
8	Maize	Maize streak		Leaves

Common signs of pest and disease damage

1. Holes in leaves, fruits, seeds, roots and stems of crops.
2. Change of colour in leaves, fruits and tems.
3. Rotten plant parts.
4. Premature ripening.
5. Deformed parts.
6. The root crops which develop are of a poor quality and do not have the right taste.
7. Stunted growth. (plants fail to increase in size).

Methods of controlling & treatment of pests & diseases of crops.

a) Uprooting infected crops
b) Proper spacing
c) Early planting
d) Spraying with chemicals
e) Using scare crows
f) Setting traps
g) Fencing
h) Crop rotation
i) Planting good seeds
j) Chasing
k) Use of natural enemies.



Harvesting of crops

1. Harvesting is the collecting or removal of ready crops from a garden.
2. Harvesting should be done when the crops are ready.
3. Most crops that need drying should be harvested in dry season.

NOTE:

Harvesting is done during the dry season because there is enough sunshine to dry the harvested crops.

Methods of harvesting crops

Cutting

Examples of crops harvested by cutting:

1. Banana
2. Sugar cane
3. Millet
4. Sorghum
5. Wheat
6. Rice, etc

Picking/Plucking

Examples of crops harvested by picking

1. Coffee
2. Tomato
3. Egg plants

Uprooting using hands

Examples of crops harvested by uprooting using hands

1. Ground nuts
2. Onions
3. Carrots

Digging out the crop

Examples of crops harvested by digging out the crop

1. Cassava
2. Sweat potato
3. Yams
4. Coco yam
5. Irish potato, etc

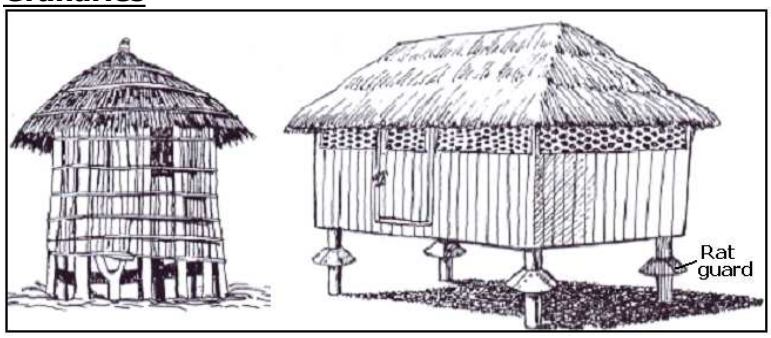
Disadvantages of early harvesting

1. The seeds contain moisture so they may rot.
2. The quality of seeds is poor.
3. The grains are small and shrunk.
4. The seeds will not be good for planting.

Storing harvested crops

1. Harvested crops are commonly stored in granaries, stores, silos, etc.
2. Perishable harvested crops can be stored in specially made structures with coolers.
3. Non-perishable can be stored in granaries, silos, sacks and stores.

Granaries



Conditions for proper storage

1. The grains should be stored when they are dry.
2. The roofs of stores should not leak.
3. Stores should have good ventilation.
4. Rat guards should be fixed on the granary.
5. Root crops should be dried first before storing them.
6. The seeds should be dusted with pesticides to protect them from pests.

Importance of storing food

1. It prevents wastage.
2. Helps to get what to eat in the dry season.
3. Helps farmers to sell their produce when there is good market.
4. It helps to have constant supply of food to eat and sell.
5. It helps farmers to keep what to plant in the next season.

FARM RECORDS

Farm records are written information showing the different inputs and outputs on a farm.

Examples of Records kept by crop farmers:

1. Planting records.
2. Harvesting records.
3. Pest and disease control records.
4. Sales records, etc

Uses of farm records

1. Records help the farmer to know whether the farm is making profits or losses.
2. Records help the farmer to identify areas that need improvement.
3. Records help the farmer to budget for the farm.
4. Records help the farmer to avoid repeating mistakes.
5. Records help the farmers to secure loans.

CHANGES IN WEATHER AND CLIMATE IN THE ENVIRONMENT

Weather

Weather is the condition of the atmosphere of a place at a given/ particular time.

Types of weather

1. Rainy weather
2. Windy weather
3. Sunny weather
4. Cloudy weather etc

Elements of weather

1. Rain
2. Cloud cover
3. Sunshine
4. Temperature
5. Humidity
6. Air pressure/ Atmospheric pressure

CLOUDS

1. Clouds are condensed masses of water vapour floating in air.
2. Clouds are formed when the rising water vapour condenses in the atmosphere.
3. Clouds are grouped according to their heights and general shape.

Types of clouds

1. Cirrus clouds.
2. Cumulus clouds.
3. Stratus clouds.
4. Nimbus clouds.

Cirrus clouds

1. They look like feathers in the sky.
2. They are the highest in the sky.
3. Cirrus clouds appear in dry weather and often indicate storm.

Cumulus clouds

1. They are white clouds, which resemble cotton piles
2. They can develop into thunderclouds and thus they indicate rain.

Stratus clouds

1. They are nearest the earth than cumulus clouds.
2. They spread in the sky widely in calm flat layers.
3. They show a sign of bad weather.

Nimbus clouds

1. These are clouds that bring or give us rain.
2. They don't have any special shape.

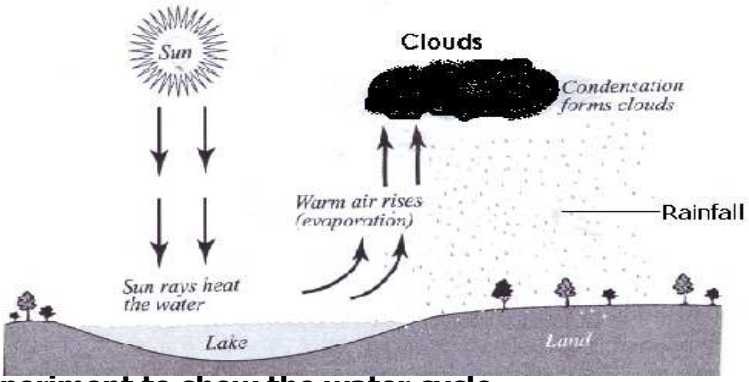
Advantages of clouds

1. Clouds protect us from direct sunshine.
2. Clouds help in the formation of rainfall.
3. Clouds keep the earth warm at night.
4. Clouds cool temperatures in certain places.

WATER CYCLE.

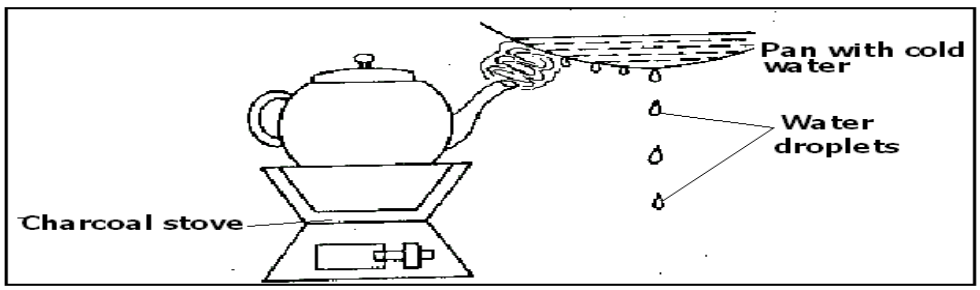
1. A water cycle is a process by which rain is formed.
2. In the water cycle, the sun heats the water in water bodies and changes to vapour, the vapour condenses to foam rain clouds.
3. Animals also add water vapour to the atmosphere through respiration.
4. Plants also add water vapour to the atmosphere through transpiration.

A diagram to illustrate a water cycle



An experiment to show the water cycle

1. Make a charcoal stove and make sure that it produces or gives enough heat.
2. Put water in a kettle and cover the top outlet leaving only the spout open.
3. Put the kettle full of water on a charcoal stove and leave it to boil.
4. When water boils, it will give out steam. (Watervapour) through the spout.
5. Get a bottle full of cold water and put it near the spout where water vapour comes from.



Explanation

1. A charcoal stove represents the sun.
2. Kettle of boiling water represents the water bodies.
3. Steam from boiled water in the kettle represents water vapour from water bodies after the sun has heated the water.
4. A bottle full of cold water represents condensation point.
5. Condensed vapour on the surface of a cold bottle represent clouds.

Importance of rain

a) Rain gives us water for cooking, bathing etc.
b) Rain-washes away dust in space and we breathe in fresh air.
c) Rain softens the soil.
d) Rain gives water bodies water.
e) Rain provides plants with water that supports their growth.

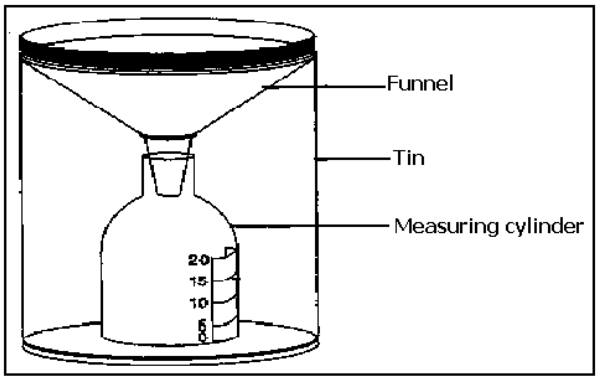
Disadvantage of rain

1. Too much rain brings floods which destroy property and lives.
2. During rain, lightening can kill people and animals.
3. Too much rain leads soil erosion.

A RAIN GAUGE

1. A rain gauge is an instrument used to measure the amount of rain received in an area.
2. It is put in an open space so that water is not prevented from entering the rain gauge.

A diagram of a rain gauge



Sources of water

Natural sources of water

1. Rain (main source)
2. Lakes
3. Oceans
4. Seas
5. Streams
6. Rivers

ARTIFICIAL SOURCES

1. Boreholes
2. Ponds
3. Wells

4. Valley dams
5. Springs

Uses of water in the environment

1. People use water for domestic purposes like bathing, washing plates and clothes etc.
2. Water animals get their food and oxygen from water.
3. Running water helps to produce hydro- electricity.
4. Water is used for watering crops.
5. Animals drink water, etc

WEATHER INSTRUMENTS

1. Weather instruments are found at a weather station.
2. At a weather station, delicate instruments are kept in a white box called a Stevenson screen.
3. These instruments include the barometer, hygrometer and maximum and minimum thermometer.
4. The sunshine recorder, wind vane, wind sock, rain gauge and anemometer are placed in the open space of the weather station.

Weather instruments and their uses

1. Thermometer - Measures temperature.
2. Sunshine Recorder - Measures the length of time it has shined on a particular day in a particular place.
3. Wind vane - Shows the direction of wind.
4. Windsock - Shows the strength of wind.
5. Anemometer - Measures the speed of wind
6. Hygrometer - Measures humidity.
7. Barometer - Measures atmospheric pressure.
8. Rain gauge - Measures amount of rain received in an area.

TEMPERATURE

1. Temperature is the hotness or coldness of a body or place.
2. The instrument used to measure temperature is called thermometer.
3. A thermometer is read in two scales namely:
   i) Fahrenheit.
   ii) Centigrade or Celsius.
4. Temperature is measured in **degrees.**

Types of thermometers

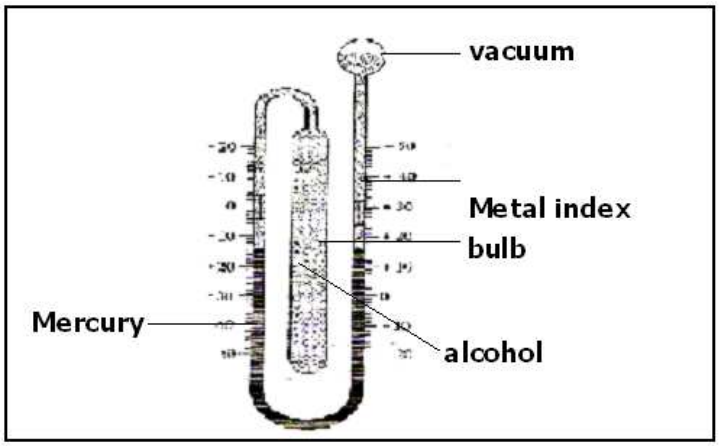
1. Clinical thermometer.
2. Maximum and minimum thermometer.

Maximum and Minimum/Six's thermometer

1. This is some times called the six's thermometer because it was first made by James six.
2. The minimum and maximum thermometer is used to measure the lowest and highest temperature of the day.
3. It uses both alcohol and mercury.

.

The maximum and minimum thermometer

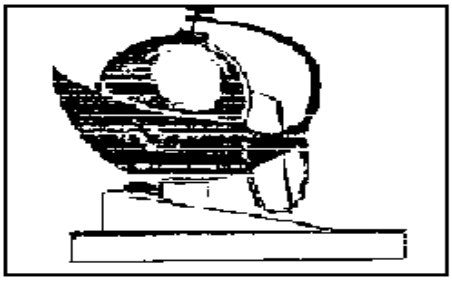


To read the temperature look at the lower ends of each index.

SUNSHINE

1. When the sun is in the sky around mid-day the condition is not the same as it is in the morning or evening.
2. Sunny weather is highly determined by the brightness or less brightness or non-existence of sunshine.
3. The length of time it has shined on a particular day in a particular place is measured by an instrument called sunshine recorder.

A sunshine recorder



Advantages of sunshine

1. Sunlight helps our crops to make their own food.
2. Sun heat dries our harvested crops.

3. Sun heat helps in the formation of rainfall.
4. Sunlight helps our skins to make vitamin D.
5. Sunshine helps to kill some germs.

Disadvantages of sunshine

1. Too much sunshine makes the day very hot.
2. Too much and pro-longed sunshine can dry up the soil making it difficult for the crops to grow.
3. Prolonged sunshine causes rivers and lakes to dry up or have little water due to evaporation.

Effects of the changes in the atmosphere

1. Too much rain causes floods.
2. Drought leads to very high tmperatures in the atmosphere.
3. Drought leads to weathering of vegetation leading to lack of food and water for animals.
4. Strong wind destroys plants and buildings.
5. Too much rainfall leads to soil erosion, etc.

PERSONAL HYGIENE

Personal hygiene is the cleanliness of ones self and the things he/she uses.

Parts of the body that needs proper cleaning:

a) Fingers/Finger nails
b) Hair
c) Face
d) Teeth

Things used to clean the body:

a) Clothing
b) Beddings
c) Tooth brush
d) Shoes etc

Importance of keeping our bodies clean

a) Remove dirt.
b) Remove germs.
c) Avoid bad smell.
d) To be healthy.
e) To make the body fresh.
f) Prevent breeding of disease vectors
g) To remove sweat.

Ways of keeping clean

a) Bathing using safe water and soap.
b) Cutting finger nails short.
c) Washing the face/eyes after sleep.
d) Washing the hands whenever they are dirty.
e) Shaving old hair.
f) Combing hair using clean combs.
g) Washing clothing and beddings.

h) Brushing teeth regularly.
i) Ironing washed clothes and beddings.
j) Brushing shoes.

Things used for keeping our bodies clean

a) Bathing sponge
b) Safe water
c) Towel
d) Soap
e) Bathing sponge
f) Shavers
g) Combs
h) Tooth brush and tooth paste
i) Razor blades
j) Nail cutters
k) Dental floss

Keeping beddings and clothing clean

a) Washing them using water and soap/detergents.
b) Ironing them when washed.
c) Spraying disinfectants/perfumes on them.
d) Keeping them in clean safe places if not in use.

Things used to clean beddings and clothing.

a) Soap/ Detergents
b) Washing brushes
c) Water
d) Flat iron/ Iron box
e) Suit cases

Importance of keeping beddings and clothing clean

a) To remove dirt.
b) To remove germs.
c) To remove eggs of disease vectors.
d) To keep away bad smell.
e) To look smart.
f) To prevent disease vectors from breeding.
g) Ironing removes wrinkles and kills eggs of parasites from clothing and beddings.

FOOD AND NUTRITION

Food:
Food is any thing eaten which is nutritious to the body.

Nutrition:
Nutrition is the process by which living things receive the food necessary for them to grow and be healthy.

Feeding:
Feeding is the taking in of food.

Why do people eat?

1. There are many reasons why people eat and drink.
2. Some are connected to the 5H's.

The (Five) 5H'S

Habit:
At different times of the day we need to eat and drink.

Hunger:
This is when our stomachs are empty and therefore we need food.

Hospitality:
This is a custom to offer food to visitors or guests.

Happiness:
We enjoy eating certain foods to feel happy or when we are happy.

Health:
Some foods and drinks are needed for good health.

Uses of food in the body

a) Food gives the body energy and heat.
b) Food is used for bodybuilding and repair of tissues.
c) Food makes the body healthy.

CLASSES OF FOOD

a) Carbohydrates (Go foods)
b) Proteins (Grow foods)
c) Vitamins (Glow foods)
d) Mineral salts (Glow foods)
e) Fats and oils
f) Roughages
g) Water

The main classes of food;

a) Proteins
b) Vitamins and mineral salts
c) Carbohydrates

The nutritive (valueful) classes of food :

a) Proteins
b) Carbohydrates
c) Vitamins
d) Mineral salts
e) Fats and oils

The above form the 3G 's i.e
G- Go foods
G- Grow foods
G - Glow foods

Non nutritive classes of foods

a) Roughage
b) Water

Classesses of food and their values

CLASS	VALUE
1. Carbohydrates	Give energy and heat to the body.
2. Proteins	Build and repair the body.
3. Vitamins	Makes the body healthy.
4 Fats and oils	Give energy and heat to the body.
5. Mineral salts	Make the body healthy.

PROTEINS

1. Proteins are body building foods or grow foods because:
   a. They build the body.
   b. They repair worn out body tissues.
2. Proteins are classified into two:
   a. Animal proteins
   b. Plant proteins

Food stuffs that give us proteins

Animal Proteins	Plant Proteins
1. fish	1. beans
2. meat e.g. beef, pork	2. ground nuts
3. eggs	3. peas
4. grasshoppers	4. soya beans
5. winged termites	5. sim - sim
6. cheese	6. sunflower seeds
7. yorghurt	7. cashew nuts
8. chicken	
9. milk	

3. Lack of proteins causes a deficiency disease called **Kwashiorkor**.

CARBOHYDRATES

1. Carbohydrates are foods that give us energy and heat to the body.

Examples of food stuffs rich in carbohydrates:

a) Cassava
b) Posho
c) Maize
d) Rice

e) Wheat
f) Millet
g) Sorghum
h) Irish potatoes
i) Yams
j) Sugar canes
k) Jam
l) Chocolates
m) Sweets
n) Honey
o) Biscuits etc.

2. Lack of carbohydrates in the diet causes Marasmus or starvation.

Note:
All starchy foodstuffs and sugary foodstuffs are rich in carbohydrates.

MINERAL SALTS

Iron

1. Iron is necessary to form the red pigment or substance in the blood called Haemoglobin.
2. Haemoglobin transports oxygen from the lungs to the rest of the body.
3. Lack of iron in the diet causes anaemia.
4. Anaemia is also caused by lack of red blood cells or Haemoglobin.

Sources of iron (food stuffs rich in iron)

a) Beans
b) Meat
c) Liver
d) Green vegetables
e) Groundnuts
f) Eggs
g) Fish
h) Peas
i) Kidney

Iodine

1. Lack of iodine causes goitre
2. This is a swelling in the neck region.

Food sources of iodine

a). Sea fish
b). Iodized salt
c). Oysters
d). Sea water

Calcium

1. It is necessary for the formation of strong bones, teeth and nails.
2. It regulates heart, nerve and muscle activities.
3. Lack of calcium causes stunted growth and rickets.

Sources of calcium (food stuffs rich in calcium).

a) Milk
b) Small dried fish
c) Pounded egg shells
d) Egg yolk
e) Beans
f) Cauliflower
g) Cheese

The food value gained from mineral salts:
Health (body protection)

Fats and oils

1. These provide the body with more energy and heat than carbohydrates.
2. In animals, fats are stored under the skin.

Sources of fats and oils

a) Milk
b) Butter
c) Cheese
d) Egg yolk
e) Ground nuts
f) Sim – sim
g) Ghee
h) Palm oil

VITAMINS (Glow Foods)

1. Vitamins are foods needed to make the body strong against diseases.
2. Keep the body healthy.
3. The following are vitamins, sources and the diseases the body suffers if it does not get the vitamin.

VITAMIN	FOOD RICH IN VITAMIN	DISEASE
A	Green vegetables, milk, carrots, paw paws, liver, orange, animal fats, butter, margarine	-Poor sight -Night blindness
B_1	Unpolished rice, (cereals) palm vine, lean meat, kidney, bread, groundnuts, milk	Beriberi
B_2	Yeast, groundnuts, meat and egg white	Pellagra
C	Fresh fruits, green vegetables, red pepper, prepared concentrated drinks	Scurvy
D	Liver, egg yolk, fish, margarine, - It is formed in the skin by sunlight.	Rickets

ROUGHAGE

Roughages are mainly indigested fibres from the cell walls of plants.

Importance of roughage

a) Roughage allow easy movement of food through the walls of the small and large intestines.
b) Prevents constipation.
c) Reduces colon cancer.

Sources of roughage

a) Green leafy vegetables
b) Sweet potatoes
c) Cassava

Note: Lack of roughages in the diet causes constipation.

WATER

Uses of water in the body

a) Water helps in easy digestion and absorption of food.
b) Water helps in controlling body temperature by sweating.
c) Water is present in the synovial fluids so it reduces friction.
d) Water forms the most part of the blood.
e) It assists in the removal of waste products like urine and sweat.

N.B

a. Because of the above reasons, if some one gets an accident and loses blood, he is first given water through drip.
b. It is also advisable for a person to drink a glass of water every after a good meal to help in good digestion and absorption of food.

Food sources of water

a) Tea
b) Coffee
c) Soup
d) Fruit drinks
e) Fresh fruits
f) Milk
g) Concentrated bottled drinks etc.

A BALANCED DIET

A balanced diet is a meal containing all food values in their right amount.

Below is an example of a balanced diet.

Proteins	***Carbohydrates***	***Roughages***
Meat	rice	Green vegetables

Mineral Salts
Common salts

Vitamins
Fresh fruits like oranges or mangoes

Fats and Oils
Kimbo

Water

DEFICIENCY DISEASES

1. Deficiency diseases are diseases caused by lack of certain classes of food in one's diet.
2. When there is a shortage of some food values in the body, people become weak and suffer from deficiency/ maltritional diseases.

MARASMUS

1. Marasmus is a deficiency disease caused by lack of enough carbohydrates in the body.
2. People who do not get enough food to eat also suffer from marasmus.

Signs and symptoms of marasmus

a) The eyes are very bright.
b) The face looks like that of an old man.
c) One becomes very thin.
d) The child is under weight.
e) Potbelly.
f) Diarrhoea at times.

Prevention

It can be prevented by giving the child foods rich in carbohydrates.

KWASHIORKOR

Lack of proteins causes a deficiency disease called Kwashiorkor.

Signs and symptoms of kwashiorkor

a) Swollen moon face.
b) Brown hair.
c) Swollen hands and feet.
d) A child does not want to eat.
e) The child does not grow.
f) The child gets anaemia.
g) The child gets diarrhoea.
h) Swollen stomach.

Prevention and control of kwashiorkor

a) Feed the child with food rich in proteins.
b) Take the child to hospital.

SCURVY

1. A person who does not eat enough vegetables and fruits may get scurvy.
2. This is so because he/ she lacks enough vitamin C.

Signs of scurvy

a) Bleeding gums in the mouth.
b) Wounds do not easily heal.
c) The person is very weak.

Prevention of scurvy

Feed the person on foods rich in vitamin C.

RICKETS

1. Rickets is caused by lack of enough vitamin D in the body.
2. Rickets mainly attack children who keep in-doors all the time.
3. Vitamin D can be got from fatty foods like, fish, milk and eggs.
4. Sunlight is another source of vitamin D to our bodies.

Signs of rickets

a) Bones are soft and swollen.
b) Bones are weak and bow- shaped.

Preventing rickets

a) Bring a child into sunshine for a short time every morning.
b) Give the child foods rich in vitamin D.

NIGHT BLINDNESS

1. Some times some people are not able to see properly when there is little light.
2. For example, they may not see properly in the evening when it is getting dark or in the room which is not well lit.
3. Such people are suffering from night blindness.
4. Night blindness is caused by shortage of vitamin A in one's body.

Preventing night blindness

Eat foods rich in vitamin A.

GOITRE

This is a deficiency disease caused due to lack of iodine in the body.

BERI-BERI

This is a deficiency disease caused due to lack of Vitamin B1.

Proper handling of food.

1. Food is good but it can become harmful when not handled well.
2. Germs get to it and cause diseases to us when we eat it.
3. There are different ways of proper handling of food.

Ways of handling food

a) Cooking food helps to kill germs.
b) Washing food helps to remove germs.
c) Keeping cooked food covered. Covering of food keeps disease carriers away from it.
d) People should also cover their mouth while coughing and sneezing.
This prevents germs from getting to the food when it is being served.

How food gets dirty

a) Serving food with dirty hands.
b) Serving food in dirty utensils.
c) Flies contaminate food when they sit on it.
d) Dust contaminates food when it settles on it.
e) Sneezing over food when serving it
f) Serving and eating food from a dirty place can also make food contaminated.

PRESERVING FOOD.

Food preservation is the keeping of food under good methods for future use.

Ways of preserving food

a) Smoking
b) Tinning / Canning
c) Sun drying
d) Salting
e) Refrigeration

BAD EATING HABITS AND THEIR DANGERS.

Bad eating Habits	What comes from the Bad eating Habits
1. Eating with unwashed hands.	-You can get diarrhoeal diseases.
2. Talking with food in the mouth.	-It can choke you.
3. Chewing food with the mouth open	- Food particles can fly out to other People's

4. Improper sitting while eating. 5. Swallowing food which is not chewed properly.	food or clothes -Shows lack of respect for it. It is a sign of Indiscipline. -It causes stomach pain.

PREPARING LOCAL DISHES/FOOD

1. Foods that we eat are prepared in different ways
2. Examples of these ways include:
   a) Boiling
   b) Roasting
   c) Frying
   d) Steaming
   e) Squeezing
   f) Stewing
   g) Mingling

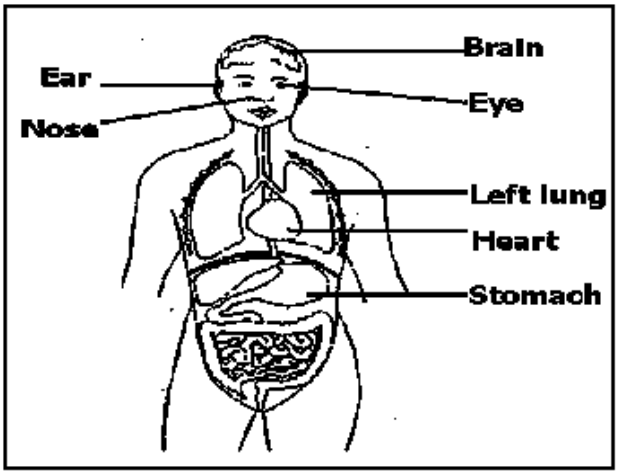
Ways of preparing some of the common foods

Food	Preparations required	Ways of cooking	Name of dish
1. Cassava Matooke Potatoes	Peeling Washing Mashing Covering	Boiling Roasting Deep frying Steaming	Katogo Cassava bread Mashed Roasted Boiled Deep fried (chips)
2. Rice Beans Peas Groundnuts	Sorting Washing	Boiling Frying Roasting	Boiled Fried (pilawo) Roast Stew
3. Millet flour Maize flour Sorghum flour	Sieving Mixing into a paste	Boiling Mingling	Millet/posho Sorghum/bread porridge
4. Fruits	Washing Cutting Squeezing	-	Juice Salad
5. Vegetables	Sorting Washing Cutting	Boiling Steaming Frying	Salad Boiled Steamed
6. Meat Chicken	Washing Cutting	Roasting Boiling Stewing Frying	Roasted Boiled Stewed Deep fried

HUMAN BODY ORGANS

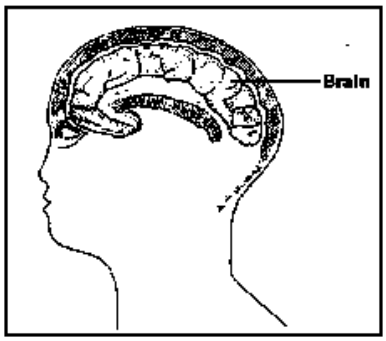
1. The human body is made up of many parts called organs.
2. An organ is a part of the body that does a special work.
3. Some organs can be seen i.e. external organs e.g. eyes, nose, ears and tongue.

4. Others are inside the body i.e. internal organs e.g. lungs, heart, kidney, liver and brain.



Body organ in the head and its function

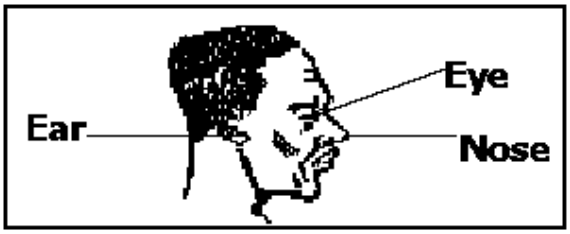
1. The brain is the body organ in the head.
2. It controls all the body actions i.e. tells the body what to do, when to do it and how to do it.
2. Some of the body actions controlled by the brain include;
   a) Sitting
   b) Raising your arms
   c) Kicking
   d) Rolling etc.



Body organs on the head and their functions

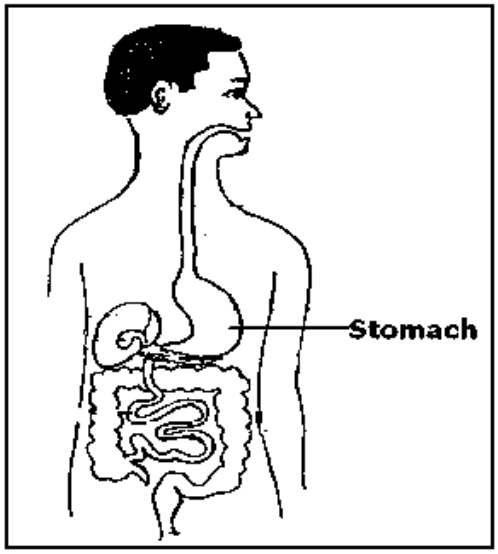
Body organs on the head include;

a) Eyes for seeing
b) Ears for hearing
c) Nose for smelling



Body organ in the abdominal cavity

1. The stomach is like a bag, which holds food for some time.
2. The food enters through the mouth and moves along the gullet to the stomach.



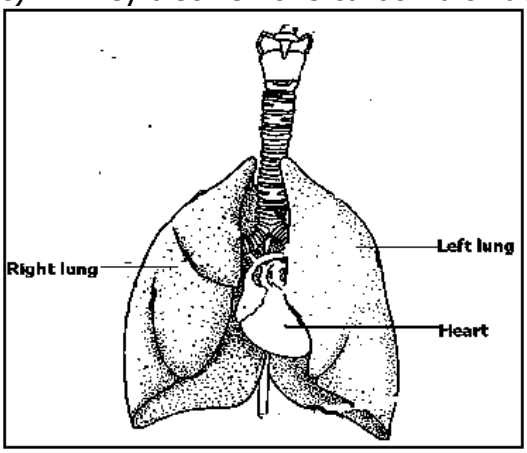
Body organs in the chest cavity (heart and lungs)

The Heart

a) The heart is a body organ found in the chest near the left lung.
b) The heart pumps blood to all parts of the body.

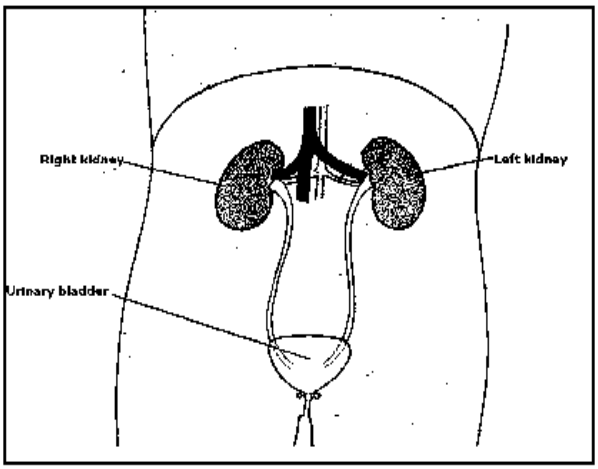
The Lungs

a) Human beings have got 2 lungs i.e. right and left lungs
b) Lungs pick oxygen needed by the body from the air we breathe in.
c) They also remove carbon dioxide, which is not needed by the body as we breathe out.



Kidneys and urinary bladder

1. Human beings have two kidneys i.e. the left and right kidneys.
2. Kidneys are connected to the urinary bladder.
3. Kidneys remove urine from the body.
4. The urinary bladder stores urine.



How the human body works

1. The body does four basic things.
2. The body takes in food, water and air.
3. Carries food and oxygen to all its parts.
4. Uses the food and oxygen to get energy.
5. It removes wastes.

How the body takes in air and food

Air

1. The lungs help us to breathe in air / oxygen through the nose.
2. From the lungs oxygen enters the blood.

Food

1. Food enters the body through the mouth and goes down the stomach through the gullet.
2. It is then stored and later digested for body use.

TEETH

Functions of teeth to man

a) The teeth help in eating.
b) The teeth help in giving proper shape to the animal's mouth.
c) Teeth help us in proper talking.

Sets of teeth

There are two sets of teeth:

a) Milk teeth
b) Permanent teeth

The milk teeth

1. This is the first set a person develops.
2. They are not as strong as the permanent teeth.
3. Children begin to grow milk teeth at about the age of six months.
4. The milk teeth are 20 in number and are as follows:

	Incisors	**Canine**	**Premolars**	**Total**
Lower Jaw	4	2	4	10
Upper Jaw	4	2	4	10
Total	**8**	**4**	**8**	**20**

The permanent teeth

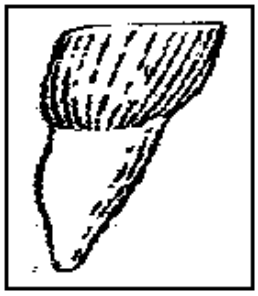
1. These teeth last for the rest of one's life if cared for properly.
2. An adult has 32 teeth.
3. The permanent set comes after losing the milk teeth one by one in childhood.

Types of teeth

a) Incisors
b) Canines
c) Premolars
d) Molars

Incisors

1. There are 8 incisor teeth in man.
2. There are 4 in the lower jaw and 4 in the upper jaw.
3. The incisors are chisel shaped and used for cutting or biting food.
4. The incisors are the first teeth to grow in a child.

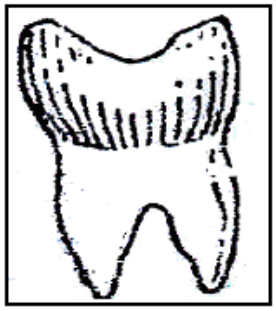


Canines

1. They are pointed and stronger than the incisors.
2. They are used for tearing food.
3. In man they are two in each jaw.

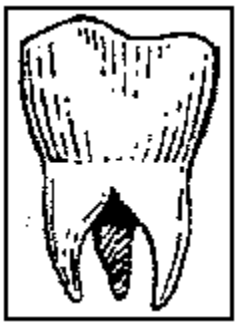
PREMOLARS

1. They have flat tops for chewing, crushing or grinding food.
2. In man there are 4 premolars in each jaw.
3. They are smaller than molars.
4. The premolars have one or two roots.



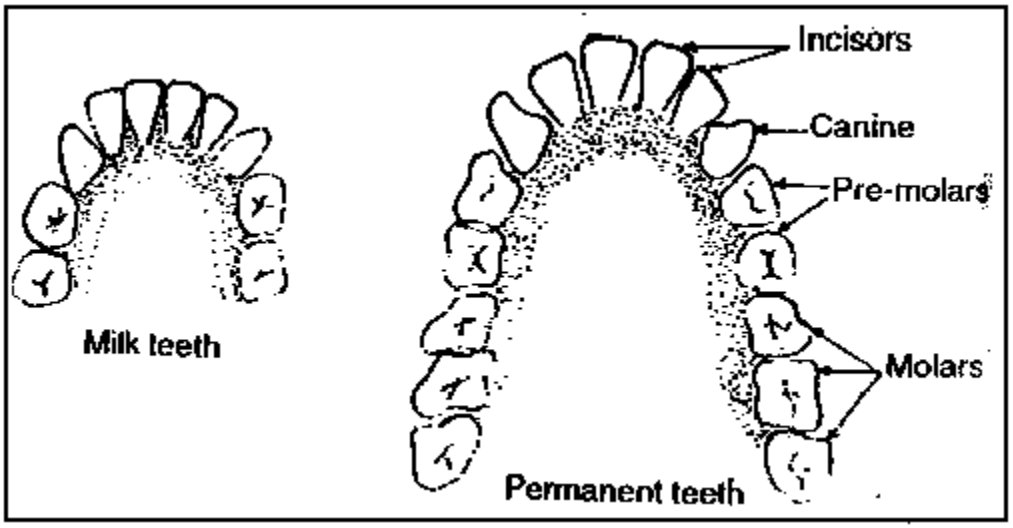
Molars

1. They have flat tops like the pre- molars for crushing or grinding.
2. They are 6 molars in each jaw.
3. The molars teeth have two or three roots.



Dentition in man

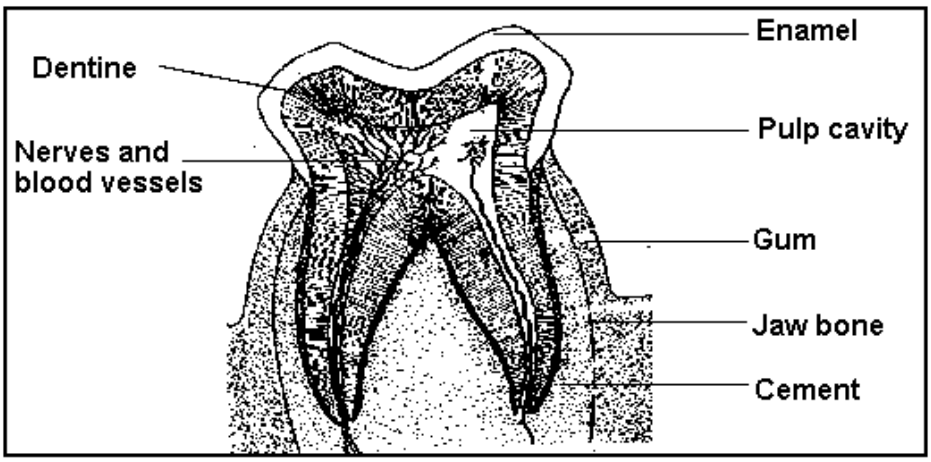
Dentition is the arrangement of teeth in the mouth of animals.



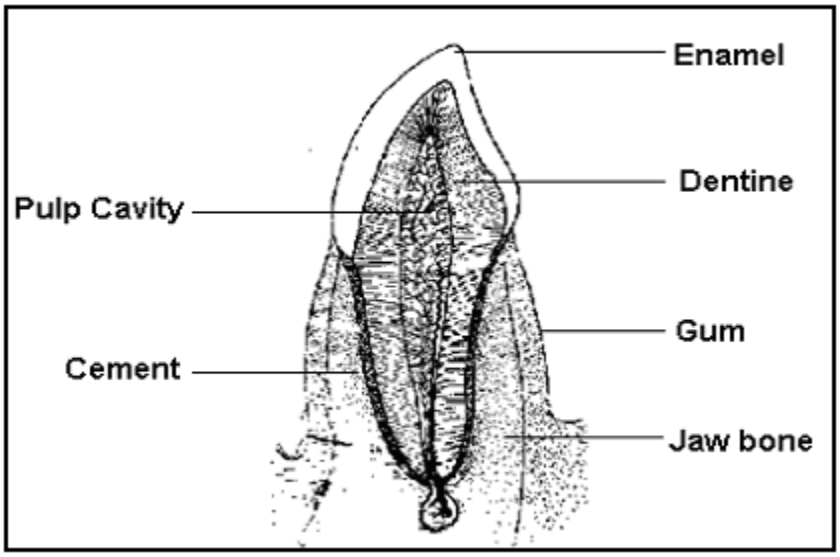
FUNCTION AND NUMBER OF TEETH

Types of teeth	Function	Shape	Upper Jaw	Lower Jaw	Total
Incisors	Cutting/ biting	Chisel	4	4	8
Canines	Tearing	Pointed	2	2	4
Pre-molars	Crushing Grinding Chewing	Rough flat surface	4	4	8
Molars	Crushing Grinding Chewing	Rough flat surface	6	6	12
Total	-	-	**16**	**16**	**32**

PARTS OF A MOLAR TOOTH



PARTS OF A CANINE TOOTH



Functions of each part

Enamel -The enamel prevents wear of teeth.

Note:
a) This is the hardest part of the teeth.
b) The enamel is made from a mineral salt called Calcium.

Dentine- It contains living cells and channels through which the dentine receives food.

Pulp cavity

a) This part contains blood vessels and nerve endings.
b) The blood vessels bring digested food to the teeth.
c) The tooth will start paining when tooth decay reaches the pulp cavity.

Cement

Holds the tooth firmly into the jawbone.

Gum

It gives extra support to the tooth into the jaw.

Jawbone

It holds the teeth in position

DISEASES OF THE TEETH

Dental Cavity / Decayed Teeth

1. When we eat food, some food particles stick between the teeth.
2. These food particles rot and attract bacteria that causes tooth decay.
3. A person with tooth decay develops a hole in a tooth.
4. If the dentist sees the hole early, it can be filled with dental amalgam (cement).
5. If the cavity is not reported to the dentist in time, it becomes bigger and more painful.
6. Once the tooth becomes more painful it can be removed or nerves may be destroyed to stop the pain.

Periodontal disease(Gum disease)

1. This is caused by plague.
2. But in this, the bacteria cause the gum to swell and the acid spreads to other parts.
3. With time the tooth become loose and may fall out or may have to be extracted.

Care of teeth

a) Brush your teeth after every meal.
b) Avoid eating too many sweets or starchy foods, they weaken the enamel.
c) Rinse your mouth with clean water and salt after every eating. (Salt kills germs)
d) Do not eat or drink very hot or very cold foods. They weaken the enamel.
e) Eat plenty and fresh fruits, they help to clean your teeth.
f) Visit a dentist every 6 months even if you don't have pain.
g) Keep your brush and toothpaste in clean places to prevent germs.
h) Do not use teeth to open bottles or bite metallic objects.
i) Floss between the teeth to remove any food particles.

SANITATION

1. Sanitation is the general cleanliness to promote public health.
2. Sanitation is one of the elements of P.H.C.

Activities carried out to promote sanitation.

a) Sweeping
b) Mopping
c) Slashing bushes
d) Scrubbing latrines/toilets and urinals, etc

Things used to promote sanitation:

a) Broom
b) Brush
c) Hoe
d) Scrubbers
e) Dust bin
f) Rake
g) Mops
h) Water
i) Detergents
j) Wheel burrow, etc

Importance of good sanitation in our environment

a) Controls easy spread of germs.
b) Good sanitation avoids bad smell in the environment.
c) Reduces the number of vectors in the environment.

GERMS AND DISEASES

1. Germs are small living organisms that cause diseases.
2. A disease is any illness or sickness that makes the animal's body or plant feel unhealthy.
3. Germs are so small that we cannot see them by our naked eyes.
4. They can only seen by an instrument called a microscope.

Examples of diseases caused due to poor sanitation

a) Diarrhoea,
b) Dysentery,
c) Typhoid,
d) Cholera, etc.

Types of germs include

a) Bacteria
b) Virus
c) Protozoa
d) Fungi

Places where germs can be found

a) Dirty places

b) Dirty food
c) Dirty water
d) Dirty clothes
e) Latrines/ Toilets
f) Contaminated air
g) Rubbish pit
h) Dust bin etc.

How germs are spread

Germs are spread through the following ways:

a) Sharing clothes with infected people.
b) Sharing sharp instruments with infected people.
c) Body contact with people who have the germs.
d) Coming into contact with dirty places.
e) Bites from infected animals and insects.
f) Eating contaminated food.
g) Eating with dirty hands.
h) Breathing in contaminated air.
i) Drinking contaminated water/juice.

Entrance of germs into our bodies

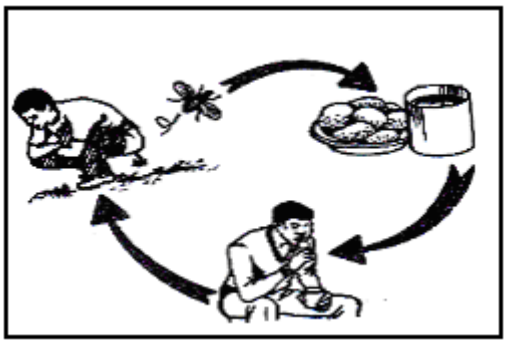
a) Nose
b) Mouth
c) Bites
d) Wounds
e) Cuts
f) Skin pores

The 4Fs germ path

1. Flies go to the faeces and pick the germs.
2. Flies visit the open food and drop the germs.
3. The person uses fingers to eat food that has germs.
4. This makes the person fall sick.

ORDER OF THE 4F'S

a. Faeces b. Flies c. Food d. Fingers



How germs cause rotting

1. Germs cause rotting by feeding on the material.
2. When cooked food stays for a long time it can go bad.
3. Ripe fruits go bad when they are not eaten quickly/ when ready.
5. Rotten food smells bad, changes colour, have maggots.

How to prevent cooked food from rotting:

a) Eating it quickly.
b) Heating it. Heat kills germs.
c) Covering it.
d) Put it in refrigerators, etc

Ways of protecting against germs and diseases in our environment

Areas in the environment we need to keep clean;

a) Kitchen
b) Compound
c) Latrine/Toilet
d) Urinals
e) Water sources
f) Dormitories

Things used to keep the environment clean;

a) Brooms
b) Brush
c) Rake
d) Scrubbers
e) Wheel burrow
f) Hoes
g) Slashers

Activities carried out to clean the environment;

a) Slashing the bushes around our homes/ school.
b) Mopping
c) Scrubbing latrines/toilets
d) Weeding grass from the compound
e) Collecting rubbish and putting it in rubbish pit or dust bin
f) Spraying vectors
g) Proper disposal of faeces and urine

KEEPING OUR CLASSROOM AND SCHOOL COMPOUND CLEAN

Classrooms are part of our environment, so we must keep it clean.

Items used to keep our classrooms school and compound clean:

a) Broom

b) Slasher
c) Hoe
d) Brush
e) Mops
f) Dust bin
g) Rubbish pit, etc

Activities carried out to keep classrooms and school compounds clean

a) Slashing
b) Weeding
c) Mopping
d) Sweeping, etc

KEEPING THE KITCHEN, URINALS, LATRINES/TOILETS CLEAN

Items used

a) Brooms
b) Brush
c) Scrubbers
d) Wheel burrow
e) Detergents
f) Water
g) Soap etc.

Activities done;

a) Sweeping
b) Mopping
c) Dusting
d) Scrubbing etc.

SANITATION AT WATER SOURCES AND ON OUR ROADS

1. Water is a home for many living things.
2. Many germs are found in water.
3. We need to keep our water safe and water sources clean by:

    a) Avoid dumping rubbish in water sources.
    b) Avoid urinating or defecating near or in water sources
    c) Do not share water source with domestic animals
    d) Slash bushes around water sources.
    e) Put protective covers on open wells
4. Roads are also part of our environment.

5. We need to keep our roads clean
5. Do not dump rubbish, urinate or defecate on the road or path.

COMMUNICABLE INTESTINAL DISEASES AND WORM INFESTATION

A communicable disease is a disease that can be passed on from an infected person to a healthy one.

Examples of communicable diseases.

a) Diarrhoea
b) Dysentery
c) Typhoid
d) Cholera

Diarrhoea

1. Diarrhoea is the frequent passing out of watery stool.
2. Diarrhoea is caused by bacteria or a virus.
3. The germs can be got from eating contaminated food and water with the diarrhoea germ

How diarrhoea is spread

1. Diarrhoea is spread through the 4FS germ path. The 4Fs are:
   Faeces Flies Food Fingers
2. Infected faeces contain germs.
3. Flies pick the faeces with germs and carry them to uncovered food.
4. The food is then contaminated.
6. When a healthy person eats the food, the germs get into the body.
7. Then he suffers from diarrhoea.

Effects of diarrhoea

a) Dehydration
b) Death

The 3D'S

a) Diarrhoea
b) Dehydration
c) Death

Dehydration

1. Dehydration is a condition when the body does not have enough water and mineral salts.
2. A dehydrated person loses water, energy and salts like sodium, potassium, etc.

Causes of dehydration

a) Severe diarrhoea
b) Severe vomiting
c) Severe sweating

Signs and symptoms of a dehydrated person

a) Have sunken eyes
b) Have dry mouth.
c) Passes out little or no urine.
d) Have little or no sweat.
e) A dehydrated baby has a sunken fontanel.
f) A pinch on the skin goes slowly to original position.

Treatment of dehydration

a) Giving the patient Oral Rehydration Solution.
b) Giving a patient Sugar Salt Solution.

Note: The solution helps a person to get back the lost water, salts and energy.

Rehydration

1. Rehydration is the replacement of lost body fluids.
2. In rehydration, we use
   a) **ORS** - Oral Rehydration Solution
   b) **SSS** - Salt Sugar Solution
   c) Plenty of water, fruit drinks and soup to drink.
3. ORS is made in factories and SSS can be made locally at home.

How to make salt sugar solution

a) Wash your hands clean with safe water and soap.
b) Measure one litre of safe water into a clean container.
c) Measure one leveled teaspoon of salt and 8 leveled tea spoon of sugar.
d) Add the mixture until the salt and sugar disappears/dissolves completely.

How to prevent diarrhoea

a) Scrub the latrines.
b) Wash hands after visiting the latrine.
c) Put all faeces in latrine.
d) Boil drinking water.
e) Cover left over food.
f) Wash hands before and after eating.

Dysentery

1. Dysentery is the passing out of watery stool with blood.
2. Dysentery is caused by bacteria.
3. It can also be caused by a germ called amoeba.

4. The person loses both water and blood.
5. One becomes dehydrated and may die from lack of enough blood.
6. These germs are passed on through infected faeces.
7. Dysentery is spread by a house fly.
8. They both lead to dehydration and death.

Cholera

1. Cholera is caused by bacteria germs.
2. A person with cholera has severe watery diarrhoea and severe vomiting.
3. This diarrhoea and vomiting make a person lose a lot of water.
4. He can die if he takes a whole day without getting treatment from a health worker.

How cholera is spread

1. It can be spread through drinking water that has cholera germs.
2. Flies can carry germs from faeces of an infected person to people's food.
3. Dirty hands can also bring cholera germs to food.
4. Eating contaminated food.

How to avoid cholera

1. We must always boil drinking water.
2. We should wash hands before eating or serving food.
3. Cooked food should be kept covered.
4. We should wash our hands after visiting the latrine.
5. Put all faeces in the toilet or pit latrine
6. Re heat left over food.

Typhoid

1. Typhoid is caused by bacteria germs.
2. It can be got from food and water that has typhoid germs.
3. A person with typhoid may have diarrhoea, fever and headache.

Prevention of Typhoid

Typhoid is prevented in the same way as cholera.

INTESTINAL WORMS

1. Worms are parasites, which live inside our bodies and feed on either blood or digested food.
2. A parasite is living organism that depends on another living organism for its needs and cause harm to the host.
3. A host is a living organism from which a parasite gets its needs.

Kinds of worms which enter our body

a) Round worms
b) Tape worms
c) Thread worms

d) Bilharzia Flukes
e) Pin worms
f) Whip worms

Hookworms

1. Hookworms live in the small intestine.
2. They hook themselves to the walls of the intestine with their hooked mouths.
3. Hookworms feed on our blood.
4. They enter our bodies by boring through the skin especially through bare feet.
5. They penetrate the skin and enter the blood vessels, where the blood carries them to the lungs.
6. From the lungs, the young hookworms gain entrance to the air passage, making their way to the throat, and are swallowed.
7. In this way, they finally reach the small intestine where they develop into full-grown worms.

Signs and symptoms of hookworms

a) Hookworms come out in human faeces.
b) A person may develop diarrhoea.
c) Abdominal discomfort.
d) A person feels weak and tired.
e) A person loses weight.
f) Anaemia

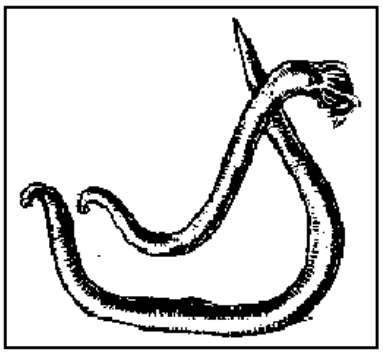
Prevention of hookworms

a) Wear shoes especially in wet places.
b) Always use latrines and wash hands with clean water and soap.

Treatment of hookworms

Carryout deworming.

Structure of hookworms



Round worms

1. Round worms can be got through eating contaminated food, which already has either eggs or larva.
2. The female produce large numbers of eggs.
3. The eggs are found in places contaminated with faecal material.

4. Children playing in contaminated dirt around houses, in gardens get the eggs in their fingernails.
5. When one eats with unwashed hands, or unwashed vegetables and fruits, the eggs get into the mouth, stomach and into the intestine where they hatch and remain feeding on digested food.

Signs and symptoms of round worms

a) Abdominal pain
b) Swollen belly.
c) One feels hungry all the time.
d) Sore throat.
e) Coughing
f) Fever, diarrhoea and restlessness.

Prevention of round worms

a) Wash your hands before eating any thing.
b) Do not play in dirty places.
c) Do not share plates because others may not wash their hands.
d) Wash hands after visiting the toilet.
e) Defecate in latrines only.
f) Cook vegetables.
g) Cut fingernails short to avoid round worms.
h) Wash fruits before eating.

Treatment of round worms

If you think you have round worms, carryout deworming.

Structure of the round worms

Tapeworms

1. Tapeworms enter our body through eating under cooked beef or pork.
2. They live in our small intestine.
3. They hook themselves on the walls of the small intestine and suck digested food.
4. When mature, the tapeworm shed their end segments containing thousands of mature eggs that are passed out in faeces or stool.
5. The mature egg can stay up to one year on grass until either a cow or pig eats the grass with eggs.
6. When either a cow or pig swallows the eggs, they enter their blood and go for another stage of development in the muscles.
7. At this stage if a cow or pig is slaughtered and beef or pork is eaten under cooked by a human being, the worms will be released to the intestine and they grow into a new tapeworm and the cycle will continue.

Signs and symptoms of tape worms

a) The person becomes weak.
b) The person passes out stool with tapeworms, mature eggs or segments.
c) The person passes out watery stool.

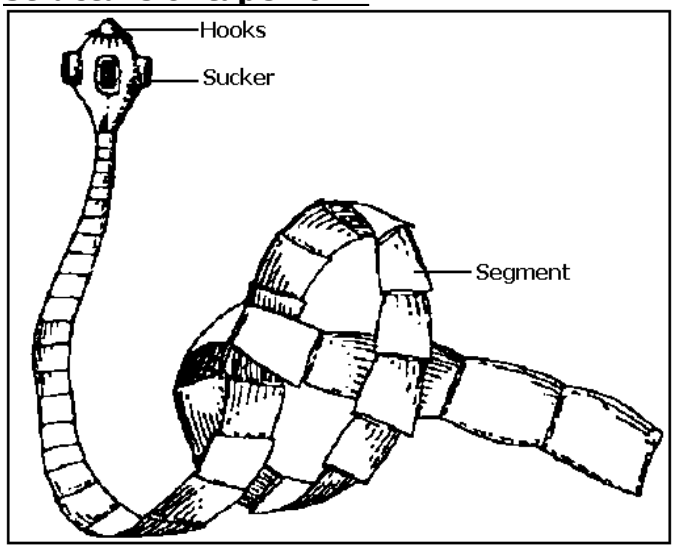
Prevention of tapeworms

a) Eat fully cooked beef or pork.
b) Put all faeces in a pit latrine.

Treatment of tapeworms

Carryout deworming.

Structure of tapeworm



Thread worms

1. Threadworms resemble hookworms but they are smaller than hookworms.
2. They look like threads.
3. They enter our body through our bare feet and travel through the blood to lungs.
4. In the lungs they are swallowed to the small intestine.
5. The adults lay eggs and hatch out while still in the intestine.
6. The larva come out with stool and contaminate the soil from where they again enter a new host through bare feet.

Signs and symptoms of threadworms

a) The person becomes weak.
b) The person passes out stool with larvae.
c) Coughing like some one suffering from bronchitis a disease of lungs.
d) Watery diarrhoea.

Prevention of threadworms

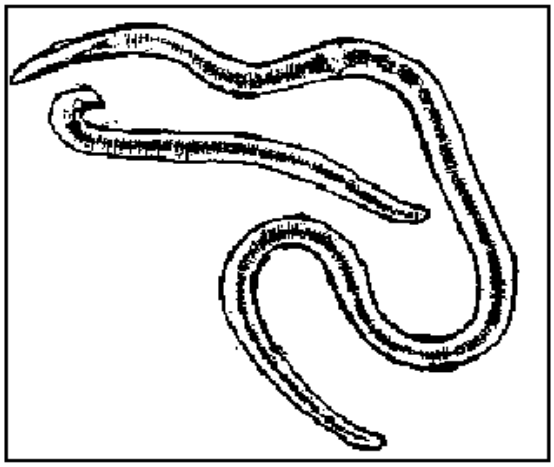
a) Wear shoes especially in wet places.

b) Always use latrines.
c) Wash hands before eating and after visiting the latrine.

Treatment of thread worms

Carryout deworming.

Structure of threadworms



Pinworms

1. Pinworms live in the large intestine especially in the rectum.
2. The female crawls out at night through the anus and lay eggs around the skin.
3. They cause much itching especially at night.
4. The worms are small and white in colour.
5. When the affected person scratches the itching part and later handles food or put fingers in the mouth, the eggs are swallowed.
6. I f the eggs are swallowed, they migrate back through the mouth to the large intestines.
7. However, if the infested person shares anything edible with some one without washing hands, the eggs are spread and the next person will become infested.
8. The eggs can contaminate beddings, under wears, knickers and can be spread this way.
9. It is difficult to clear up the infestation in one member of a family unless the others are treated at the same time.

Signs and symptoms of pinworms

a) Itching of the anal region.
b) Abdominal pain.
c) Lack of sleep.
d) Restlessness.

Prevention and control of pin worms

a) Have an infested person wearing tight fittings to prevent picking of eggs when scratching of the anus.
b) Change under clothing and beddings daily.
c) Scrub toilet seats with soap and water properly.
d) Wash hands with soap and water properly.
e) Fingernails should be cut short and kept clean.

Treatment of pin worms

Deworm all family members.

Structure of Pinworms

Whipworms

1. The head is smaller than the tail.
2. This is why they are called whipworms because they look like whips.
3. They live in the large intestines without causing any symptom.
4. They produce large numbers of eggs.
5. If great in number, they cause diarrhoea and intestinal discomfort.
6. The are eggs passed out with stool and hatch out in the soil.
7. The worms can be got through eating contaminated food, which already has either eggs or larvae.

Structure of whipworms

DISEASE VECTORS.

1. A vector is a living organism that spread disease germs.
2. A germ is a small living organism that causes diseases.

VECTOR	DISEASE
1. A female anopheles mosquito	- Malaria fever
2. A tsetse fly	- Sleeping sickness - Nagana in cows
3. Culex mosquito	- Elephantiasis
4. Lice	- Typhus fever
5. Ticks	- Relapsing fever
6. House fly	- Trachoma - Dysentery - Cholera - Diarrhoea - Typhoid
7. Aedes mosquito (tiger mosquito)	- Yellow fever /dengue fever
9. Rat flea	- Plague
10.Bed bug	Typhus fever
11.Mad dogs	Rabies

MOSQUITOES

A female anopheles mosquito

1. Female anopheles mosquitoes are the vectors for malaria fever.
2. When an infected female anopheles mosquito bites the already infected person, it will get affected with malaria parasites.
3. The malaria parasites are called the plasmodia(singular-plasmodium)
4. The infected female anopheles mosquito will then carry the malaria parasite to another person.
5. As the mosquito goes to suck blood from another person, it injects the parasites into that person.

Signs and symptoms of malaria

A person having malaria has the following signs and symptoms

a) Headache
b) Pain in the joints
c) Body weakness
d) Fever or High body temperature

e) Vomiting
f) Stomachache

Effects of malaria

a) Anaemia
b) Miscarriage in pregnant mothers

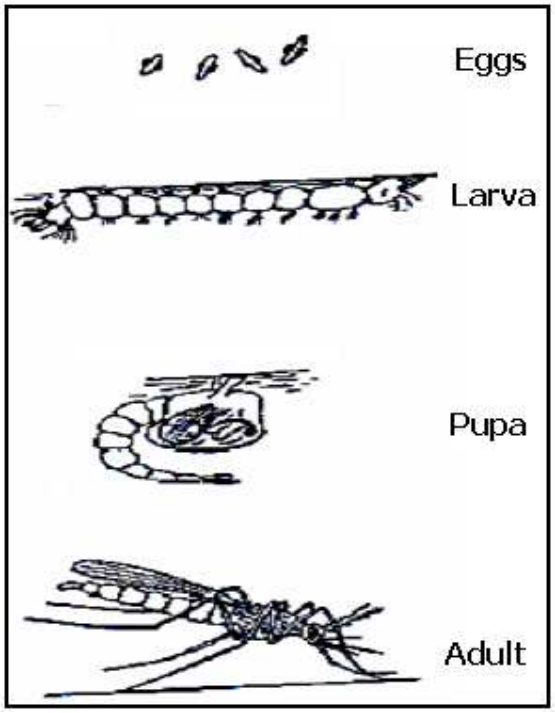
How to control the spread of malaria

a) Drain stagnant water.
b) Spray mosquitoes with insecticides.
c) Clear the bushes around your home. This keeps away the mosquitoes.
d) Sleep under a mosquito net.
e) Pouring oil on stagnant water.
f) Rearing fish in ponds to eat up mosquito larvae.
g) Closing windows and doors early in the evening.
h) Make use of mosquito repellants.

The life cycle of an anopheles mosquito.

a) A female anopheles mosquito lays its eggs in stagnant water.
b) The eggs stay floating on water.
c) After some time, the eggs hatch into larvae called wrigglers.
d) The Larvae swim and look for food on their own.
e) The Larvae grow into Pupa.
f) The Pupa does not feed until it grows into an adult.

The life cycle of an anopheles mosquito.

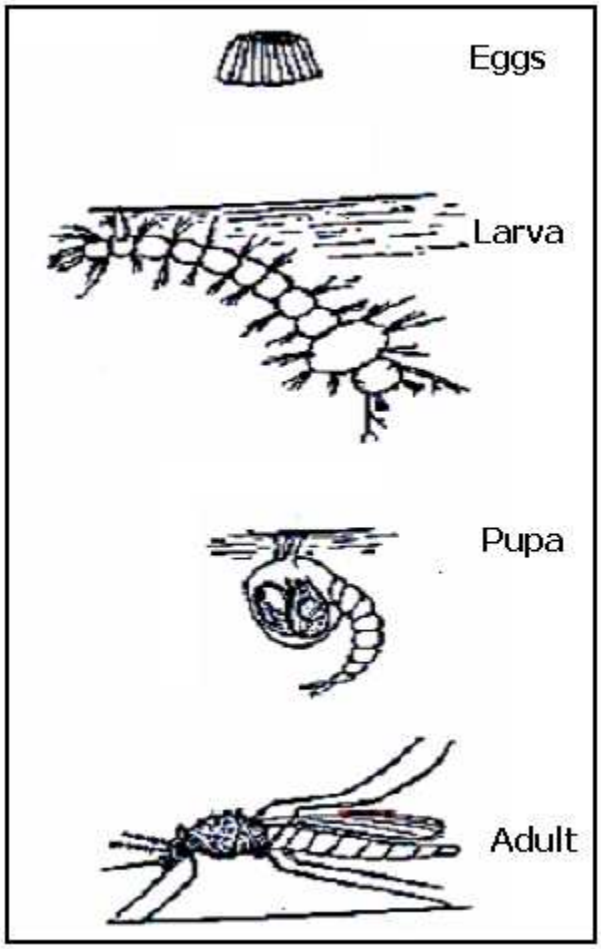


A culex mosquito

1. A culex mosquito lays eggs in stagnant water.

2. A culex mosquito lays eggs in rafts i.e tied up together.
3. The eggs keep floating on water until they hatch into Larvae.
4. The Larvae keep swimming in water looking for food.
5. The Larvae later grows into Pupa.
6. The pupa does not feed.
7. The pupa at times comes to the surface of water in order to breathe.
8. A culex mosquito spreads a disease called elephantiasis. The germ that causes elephantiasis is worm- like & is called a FILARIA worm.

Life cycle of a culex mosquito.



How to control mosquitoes

a) Draining stagnant water.
b) Pouring oil on stagnant water.
c) Breeding fish in ponds.
d) Cutting bushes around our homes.

Tsetse flies

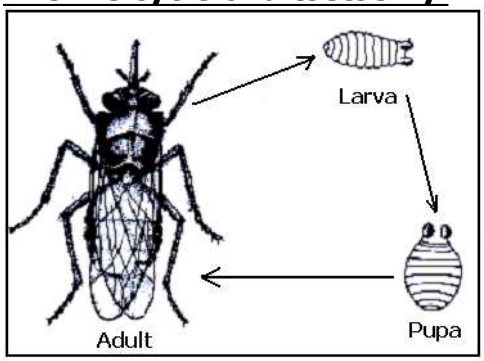
1. Tsetse flies spread sleeping sickness to man and nagana to animals.
2. The disease is caused by a germ called Trypanosome.
3. Sleeping sickness is also called Trypanosomiasis.

4. Trypanosome germ is spread through bites of tsetse flies.

Breeding places for tsetse flies

1. Tsetse flies live near rivers and streams because they need water to drink.
2. They also live in bushy areas, which have moisture.
3. A tsetse fly deposits its larva in the moist soil of the forest.
4. Most adult tsetse flies do not like strong sunlight.

The life cycle of a tsetse fly.



1. The eggs are fertilized inside the mother tsetse fly.
2. The egg hatches into a Larva (Maggot) inside the mother tsetse fly.
3. After about one week, the mother tsetse fly produces the Larva in a moist ground or shady place.

Controlling tsetse flies

1. Use of tsetse fly traps.
2. Spraying tsetse flies with insecticides.
3. Clearing bushes around homes and near where animals are kept.
4. Don't take animals to graze very early in the morning and late in the evening.

COCKROACHES

1. Cockroaches are insects with flat bodies.
2. Cockroaches are active at night because there is a lot of darkness.
3. Cockroaches lay their eggs in dark corners in houses, cupboards, wall cracks and clothes.

Diseases spread by cockroaches.

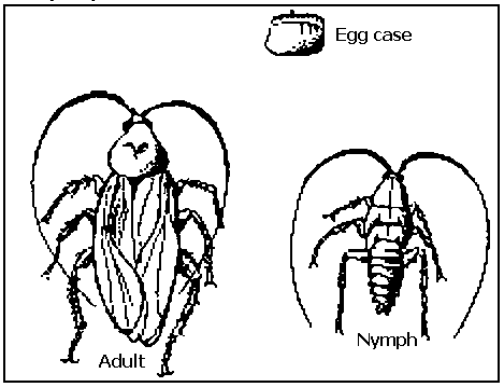
a) Diarrhoea
b) Typhoid
c) Dysentery
d) Cholera

How to control cockroaches

Cockroaches can be controlled by spraying insecticides.

Life cycle of a cockroach.

1. The female cockroach lays eggs in an egg case.
2. The egg hatches into a nymph.
3. A nymph looks like an adult cockroach but it has no wings.



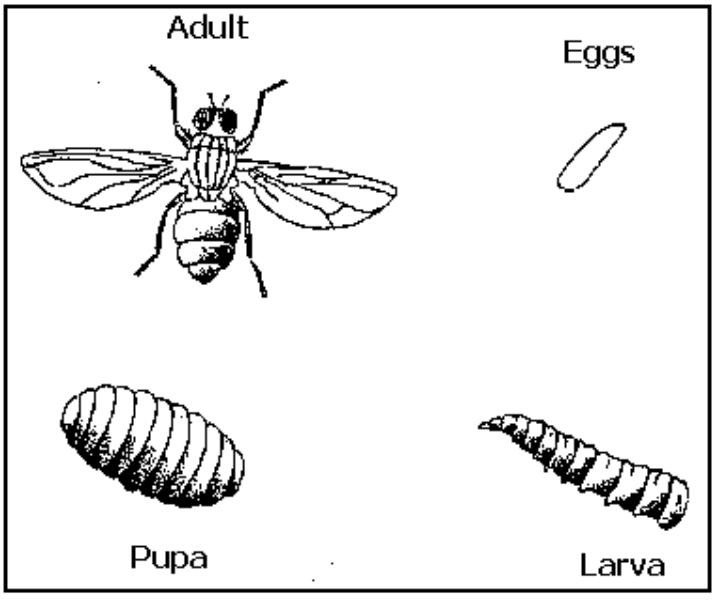
HOUSE FLY

1. Houseflies carry germs that spread many diseases.
2. Environment should be kept clean in order to keep away flies.

Life cycle of a house fly

1. A housefly undergoes a complete life cycle or complete metamorphosis.
2. A housefly lays eggs in warm dump places e.g. decaying matter.
3. The eggs hatch into larvae; the larvae feed on food in dirty places and then develop into pupae and later into adult houseflies.
4. The larva of a housefly is called a maggot.
5. The adult house fly is called imago

Life cycle of a housefly



Diseases spread by a housefly

a) Cholera
b) Trachoma

c) Diarrhoea
d) Typhoid
e) Dysentery

Note: The larvae of a housefly help in reducing the volume faeces in pit latrines.

How houseflies spread diseases

1. Houseflies have hairy bodies which carry germs when the fly visits dirty places.
2. The germs stick on the hairy body.
3. When they sit on the food they leave the germs on the food.

Prevention and control of diseases spread by a housefly

a) Ensuring proper disposal of faeces and urine.
b) Collecting and burying rubbish.
c) Always cover cooked food.
d) Wash hands before handling food.
e) Wash hands after visiting the latrine.

BED BUGS

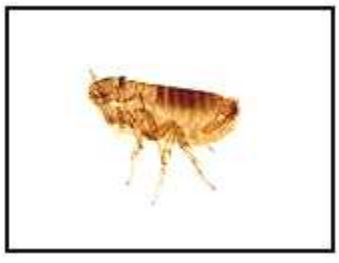
1. Bed bugs are flat red brown insects without wings.
2. They live in cracks of walls and floor, furniture and beddings.
3. Bed bugs suck blood of people and cause irritation.
4. They spread typhus fever.

Diagram

FLEAS

1. Fleas are tiny wingless insects.
2. They live in cracks of walls, hair of animals, dusty floors, dirty clothing and bedding.
3. It sucks blood and causes skin rash.
4. It carries germs that cause bubonic plague.

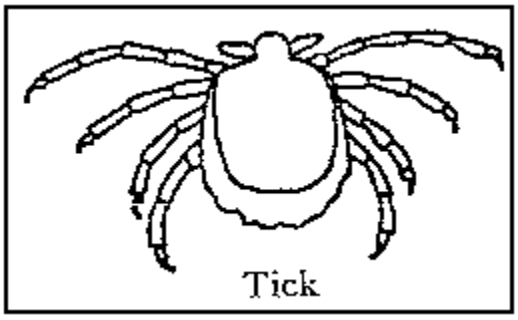
Diagram of a flea



TICKS

1. Ticks are parasites.
2. It has long hind legs for jumping through long distances.
3. They feed on blood of other animals.
4. Have no wings but have eight legs and two main body parts.
5. Ticks are found in the grass, bush and bodies of animals.
6. Ticks spread relapsing fever to people.

Diagram of a tick



ITCH MITES

1. Itch Mites have eight legs and two main body parts.
2. They spread worms that lives and multiply inside our skins.
3. They are transmitted from one person to another through direct casual skin contact with an infected person.
4. The worms cause scabies that affect the skin between fingers, toes, ankles and buttocks.
5. Scabies cause a lot of itching and scratching of the skin.

LICE

1. They suck blood, cause itching and irritation.
2. They spread diseases called typhus fever and relapsing fever.
3. Head lice are spread by infected combs, hair brushes and hats.
4. Body lice live in clothes and their eggs are found in seams and folds of clothing.

Controlling lice

a) Bathing regularly
b) Cleaning and combing hair with clean combs.
c) Cut old hair short.
d) Wash and iron clothes, etc

Diagram of a louse

ACCIDENTS AND FIRST AID.

1. An accident is an unexpected happening that causes harm or injury to the body.
2. First aid is the first help given to a casualty before being taken to the hospital.
3. A casualty is an injured person in an accident.

Where accidents occur;

a) Places of work e.g. industries, building site etc.
b) At home.
c) At school.
d) Road, games sports and hunting grounds.
e) Water bodies.
f) In the sky

Reasons why casualities should be given first aid.

a) To stop bleeding/ reduce loss of blood incase of a cut.
b) To promote quick recovery.
c) To save.
d) To reduce pain.
e) To prevent the condition from becoming worse.

Qualities of a good first aider.

a) A good first aider should be sympathetic.
b) A good first aider should have the knowledge about first aid.
c) Quick in responding to situations.
d) Should be courageous.
e) A good first aider has to be tolerant.
f) Should be observant.

First aid box/kit.

1. A first aid box is a tool or container in which first aid materials are kept.
2. The following are some of the things found in a first aid box.
   a) Safety pin
   b) A pair of scissors
   c) Razor blades.
   d) Cotton wool
   e) Bandages
   f) Surgical spirit
   g) Painkillers e.g. Aspirins, Panadols,etc

Importance of a first aid box

It helps to keep first aid materials and protect them from any physical damage

Common accidents.

a) Fractures
b) Burns and Scalds
c) Chocking
d) Fainting.
e) Near drowning.
f) Bites and stings.
g) Nose bleeding.
h) Electric shocks.
i) Poisoning
j) Bruises.
k) Cuts, etc

Road traffic accidents

These are the accidents that normally occur on roads and involve traffic.

Examples of road traffic accidents.

a) Over turning of vehicles.
b) Collisions
c) Loss of control accidents, etc

People who are normally involved in road traffic accidents:

a) Pedestrians.
b) Passengers.
c) Cyclists.
d) Motorists (drivers)
e) Aviation staff and passangers.

Causes of road traffic accidents.

a) Over loading vehicles.
b) Speeding.
c) Bad weather conditions.
d) Unskilled drivers.
e) Drunkard drivers.
f) Double parking.
g) Playing on roads.
h) Driving vehicles under Dangerous mechanical conditions
i) Ignoring road signs.
j) Roads in bad conditions, etc.

Controlling road traffic accidents.

a) Follow road traffic signs.
b) Vehicles should not be over loaded.
c) Avoid speeding.
d) Indicate signs when changing direction.
e) Avoid taking alcoholic drinks while driving.

f) When crossing the road, look right, Look left and right again and after ensuring that the road is safe, cross as quickly as possible.
g) Do not play on roads.
h) When crossing busy roads, make sure that you use a zebra crossing.

FRACTURES

A Fracture is a broken or cracked bone.

Causes of fractures.

a) Falling from a very high point.
b) Motor accidents.
c) Playing rough games, etc

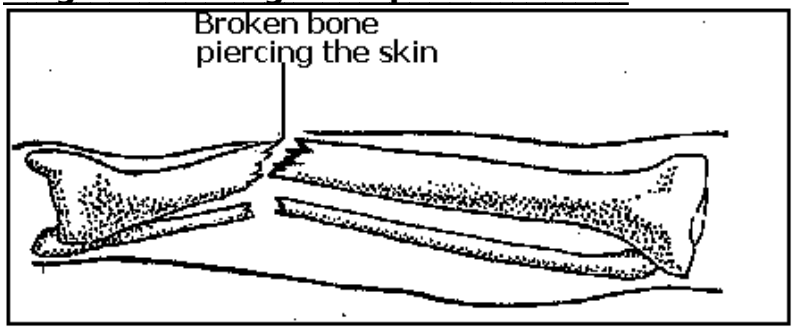
Types of fractures

There are four types of fractures namely:
a) Compound fracture
b) Simple fracture
c) Comminuted fracture
d) Green stick fracture.

A compound fracture.

1. This is a type of fracture where the bone breaks and cuts through the skin.
2. It is also called an open fracture.
3. This type of fracture is dangerous because germs may enter through the cut.

Diagram showing a compound fracture.



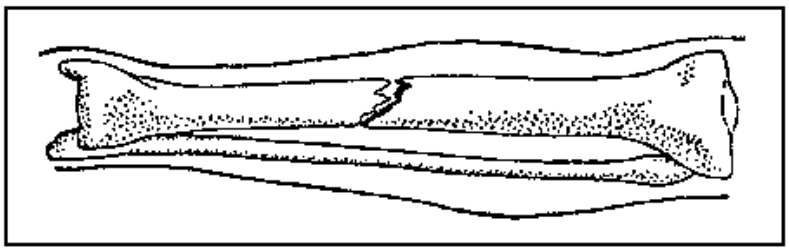
Signs and symptoms of compound or open fracture.

a) The bone cuts through the skin.
b) The patient feels a lot of pain.
c) Swelling of the fractured part.
d) There is a wound and bleeding on the fractured part of the body.

A simple fracture

1. This is a type of fracture where by the broken bone remains inside the flesh.
2. It is also called a closed fracture.
3. The muscles and blood vessels surrounding the bone can be damaged.

A diagram showing a simple fracture



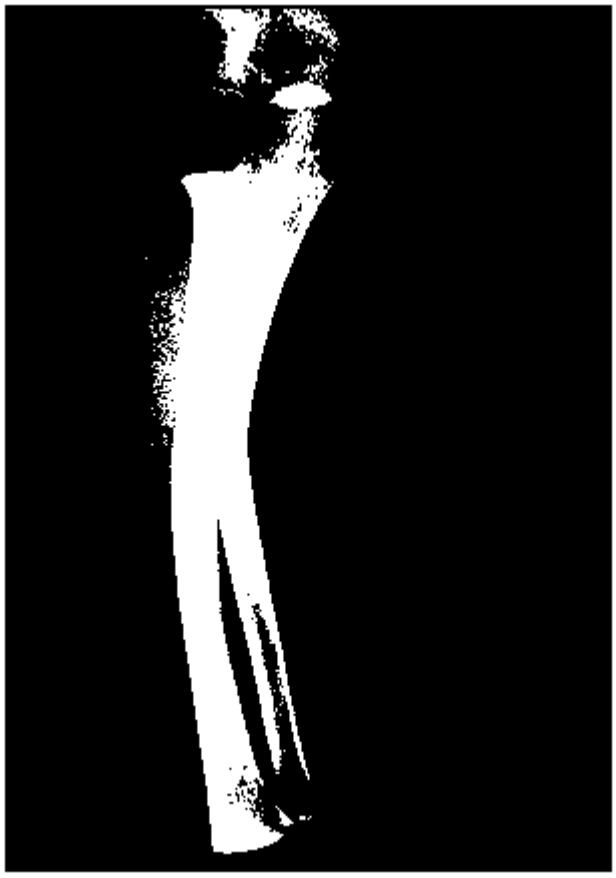
Signs and symptoms of a simple fracture.

a) The fractured part swells.
b) The broken bone remains inside the flesh.
c) A lot of pain.
d) Tenderness around the broken region.

The green stick fracture.

1. This is the type of fracture where by a bone bends or cracks but does not break completely.
2. This type of fracture is common in young children because they have soft bones.

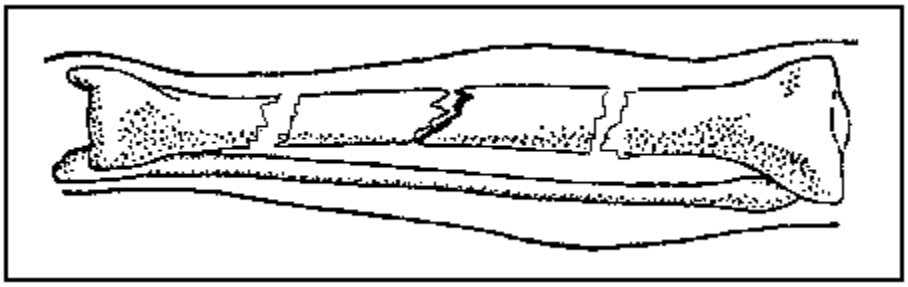
A diagram showing a green stick fracture



A comminuted fracture

1. This is the most dangerous type of fracture.
2. The bone breaks into many parts.

A diagram showing a comminuted fracture.



Signs and symptoms of a comminuted fracture.

a) A lot of pain.
b) Swelling of the fractured part.

First aid for fractures.

a) Keep the fractured part in a resting position.
b) Tie pieces of wood (Splints) on the two sides of the limb to reduce movement and support the injured part.
c) If the Casualty cannot walk, carry him/her on a stretcher to hospital
d) Don't attempt putting the bones in the fractured area in position.

Items used in administering first aid for fractures.

A SPRAIN

A sprain is an over stretched or torn ligament.

Signs and symptoms of a strain.

a) A lot of pain at the point of injury.
b) Swelling around the injured part.
c) Difficulty in moving the injured limb.
d) Tenderness around the strained area.

STRAIN

A strain is an over stretched or torn muscle.

Signs and symptoms of sprain

a) A lot of pain at the injured joint.
b) Swelling around a joint.
c) Difficult in moving the injured joint.
d) Tenderness around the sprained joint.

First aid for sprains and strains.

a) Keep the injured part in a resting position
b) Massage on the injured part, this reduces swelling and pain
c) Wrap a bandage on the injured part. A wet bandage or cloth reduces the swelling.
d) Apply cold ice compression.

DISLOCATION

This is when bones move out of their normal position at a joint.

Causes of dislocation

a) Stepping in a ditch
b) Losing step

Signs and symptoms of dislocation of bones.

a) Severe pain.
b) Difficulty in moving the injured part.
c) Swelling of the injured part.
d) Tenderness around the dislocated joint.

Note:

a) Never try to put the dislocated bones back to original position, you may cause more injuries.
b) Take the casualty to the hospital.

CUTS

1. These are injuries that damage the skin and the flesh leaving open wounds.

Objects that cause cuts:

a) Knives
b) Razor blades.
c) Pins
d) Pangas
e) Sharp stones, etc.

Types of cuts

There are two types of cuts namely:

a) Deep/ major cuts.
b) Simple/ minor cuts.

First aid for deep cuts.

a) Tie the wound with a clean cloth.
b) Tie a tourniquet at a pressure point between the heart and the injured part.
c) Raise the injured part higher than the heart. This reduces the flow of blood to the injured part.

Note:

A tourniquet is a piece of cloth tied tightly at a pressure point to control blood flow.

First aid for simple cuts.

a) Clean the wound with clean water and a clean piece of cloth.
b) Hold it hard with your fingers to stop bleeding.
c) Put spirit to prevent infection.

BURNS AND SCALDS

1. A burn is an injury on the skin caused by dry heat.
2. This is caused by hot objects like metals, burning charcoal, acid sun.
3. Scalds are injuries on the skin caused by wet heat e.g. hot liquids like water, milk, steam, etc.

First aid for burns and scalds

Put the injured part of the body in cold safe water.

Reasons for dipping burns and scalds in cold water;

a) To cool the burn.
b) To reduce pain.

N ote

If it is a serious or severe burn, rush the patient to hospital for treatment.

The 3B'S when giving first aid:

a) Breathing
b) Bleeding
c) Broken bones.

POISONING

1. Children are the most victims of poison that is swallowed.
2. Adults often suffer poisoning from:
   a) Spilled chemicals
   b) Exposure to insecticides/pesticides
   c) Breathing poison fumes
   d) Insects and animal bites

Causes of poisoning at home and school

a) Keeping paraffin in soda bottles.
b) Keeping drugs in the reach of children.
c) Keeping poisonous substance near food.
d) Eating expired food.
e) Taking expired drugs.

Prevention of poisoning at home and school

a) Labeling poison and medicine clearly.
b) Keeping poison away from children's reach.
c) Children should be helped to identify poisonous plants.
d) Clearing bushes that hide snakes.
e) Do not keep poison in bottles of beverages like soda,juice,etc.
f) Keeping drugs out of children's reach.

First aid for corrosive poison

a) Give the victim a lot of cold milk to dilute the poison.
b) Take the victim to hospital.

Note:

Never induce vomiting because the poison may cause double damage to the throat.

First aid for Non-corrosive Poison

a) Induce vomiting to eliminate poison.
b) Give plenty of cold of cold milk to dilute the poison.

Poisoning due to bites and stings

1. Insect stings like that of wasps and bees inject poison into the body.
2. Some people are allergic to such stings and may swell and even lose consciousness.

First aid for bites and stings

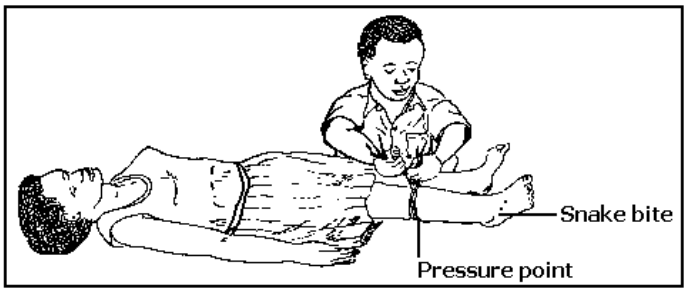
a) Apply a thick paste of baking soda to the stung area.
b) Apply cold/wet compresses to the area.

c) Keep the person calm and watch for signs of shock/serious reactions, if the person is allergic, have trouble in breathing or break out in a rash.
d) Bites by snakes, spiders and scorpions can be serious causing headaches, fever, sweating fainting, shock, double vision and paralysis. Sometimes cause death especially snake bites.

First aid for snake bites

a) Have the person lie calm so as to avoid spreading the poison more rapidly through the body.
b) Keep the bitten part at a lower level than the heart.
c) Tie a tourniquet at pressure point between the bite and the heart to prevent the poison from spreading.

Diagram Showing how to give first aid to a snake bite.



KEEPING ANIMALS

RABBITS

Why we keep rabbits

a) Meat
b) Manure
c) Source of income (money)
d) As pet (pleasure)
e) Skin
f) Fur

Advantages of keeping rabbits over other animals

a) Rabbits take a small space
b) Rabbits are cheaper to buy
c) Rabbits reproduce faster.

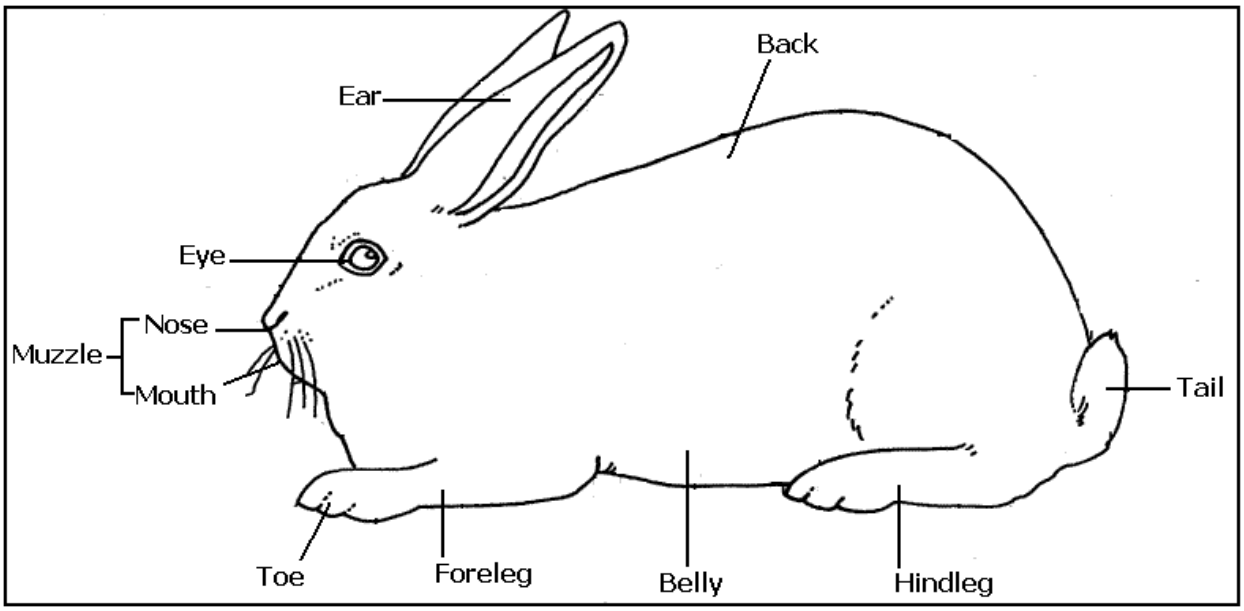
d) Easy to handle
e) Cheaper to feed.

How to select a healthy rabbit

When selecting a healthy rabbit one should consider the following.

a) It should have shiny fur.
b) It should have bright eyes without a discharge.
c) It should be fat with a back filled with meat.

Parts of a rabbit



Types of rabbit breeds

There are two main types of breeds of rabbits namely:-

a) Local breed (indigenous)
b) Exotic breed (foreign)

Local breeds of rabbits

These rabbits:-

a) Stay or live in the bush.
b) Have different colours.
c) Small in size than exotic ones.
d) Are resistant to diseases
e) Grow slowly.
f) Barrow the ground to live and produce.

Exotic breed

Exotic breeds of e rabbits are those that are imported.

Examples of Exotic breed

a) Chinchilla
b) Angora

c) Ear lops
d) Californian
e) Newzealand white.

Characteristics of each rabbit breed

Chinchilla	1. Grey in colour. 2. Has good fur. 3. Kept for meat.
Angora	1. White in colour. 2. Produces good meat. 3. Has fine silky fur.
Newzealand white	1. White in colour. 2 Eyes are pink in colour. 3. Legs are short. 4. Produces good meat.
Ear lops	1. They are bigger compared to other rabbits. 2. The ears drop at the side of the head. 3. They are very slow in maturing.

Terms used in rabbit keeping

Buck
A buck is a male rabbit.

2.

Doe
A doe is a female rabbit.

3.

Litter
Litter is a group of young rabbits produced in the same birth.

Kindling
Kindling is giving birth to litter.

5.

Kitten
A kitten is a young one of a rabbit.

House of rabbits

1. There are two types of rabbits houses:
   a) Hutch
   b) Barrow

Note:
Rabbit dig barrows underground.

Different types of hutches

Morrant hutch
It is used for feeding rabbits

Diagram of a Morant hutch.

2. **Caged hutch**
This is where the rabbits sleep and breed.

Conditions for rabbit hutches

a) A hutch should always be kept clean.
b) A hutch should be kept dry.
c) A hutch should have enough air entering it.
d) A hutch should not leak when it rains.
e) A hutch should be raised

Reasons for raising a rabbit hutch

a) To prevent crawling enemies from entering the hutch.
b) Preventing running water from entering the hutch.

Feeding rabbits

.

Weeds eaten nby rabbits

a) Black jack
b) Wondering jew.
c) Cabbage leaves
d) Maize
e) Wheat brand
f) Banana peelings
g) Sweet potato leaves.

Commercial feeds like;

a) Oats
b) Maize brand
c) Flaked maize
d) Pellets
e) Fish meal

Note; A block of salt should be given to rabbits to give them mineral salts.

Rabbit diseases

a) Coccidiosis
b) Pneumonia
c) Snuffles / colds
d) Ear canker

Coccidiossis

It is common in young rabbits.

Signs and symptoms of coccidiosis

a) Rabbits have swollen stomach.
b) Rabbits develop diarrhoea with blood.
c) Rabbits become thin.

d) They have rough fur.

Note; Coccidiosis affects rabbits, calves and poultry (birds)

How to prevent coccidiossis
a) Clean the hatch regularly.
b) Add coccidiostats in feeds and water.

Snuffles (cold)
It affects rabbits of all ages.

Signs and Symptoms
a) The rabbits begin sneezing.
b) They develop discharge of mucus.

How to prevent snuffles
a) Kill the affected rabbits
b) Clean the hutch and keep them dry.
c) Feed the rabbits well with plenty of vegetables
d) Avoid over crowding rabbits in one hutch.
e) Always call a veterinary doctor to check on their health.

Ear canker

Signs and Symptoms
a) The rabbit's ears itch and they scratch.
b) Ears develop wounds with discharge and become painful.

How to control ear canker
a) Apply canker powder on the wounds.
b) Clean the hutch regularly.
c) Use l paraffin and clean cotton to clean the ears.
d) Do not over crowd rabbits in a hutch.

Pneumonia
Rabbits get pneumonia during cold weather when they become cold and wet.

Signs of pneumonia
a) Shivering.
b) Have difficulty in breathing
c) Have high temperature
d) Loss of appetite.

How to prevent pneumonia
a) Keep the hutch dry and clean
b) Isolate sick rabbits.
c) Ensure proper ventilation.

Scours

Signs and Symptoms

a) Rabbits stop feeding.
b) Pain in the stomach.
c) Diarrhoea.

How to control scour

a) Do not give rabbits wet or moldy greens.
b) Do not give rabbits young grass.
c) Clean hutches and spray regularly.

Ways of preventing diseases in rabbits

a) Always keep the rabbit hutch clean.
b) Avoid rain falling in the hutches.
c) Isolate sick rabbits.
d) Avoid overcrowding rabbits in one hutch.
e) Always call a veterinary doctor to check on their health.

Parasites in rabbit keeping

1. A parasite is a living organism that depends on another living organism for its needs and cause harm to the host.
2. Some of the parasites in rabbit keeping include; fleas, ticks, mites, etc.

Ways of controlling parasites in rabbits

a) Spraying with chemicals.
b) Hand picking of parasites.
c) Keep proper hygiene in the hutch.
d) Dusting the animals with powder that kills parasites.

Keeping of a doe

a) It should mate for the first time at 6 months.
b) A doe stays pregnant for 30 days.
c) After 30 days, it produces litter of 8-10 blind rabbits with no hair.
d) Does should be allowed to mate 6 weeks after producing not on the same day.
e) A buck should be separated from the daughters once they have grown and are ready to mate.
f) Bring in another buck to avoid inbreeding i.e mating of closely related rabbits.

Keeping rabbit records

To keep our rabbits well, we need to keep records about the activities that we carryout.

Activities that need records

a) Hutch construction
b) Stocking of rabbit feeds and drugs.
c) Cleaning of hutches.
d) Spraying of rabbits and hutches.
e) Mating of rabbits.
f) Days of kindling