# SIR APOLLO KAGGWA SCHOOLS

## P.5 SCIENCE LESSON NOTES 2016

## POULTRY

Poultry refers to all kinds of domestic birds kept for a purpose. Examples: Chicken, Turkeys, Ducks, Geese, Doves Guinea fowls etc. Poultry keeping refers to the rearing of domestic birds or fowls. Why do people rear poultry?

For meat and egg production eggs and meat are good sources of proteins to our bodies.

People keep poultry for cultural purposes like dowry, rituals

Poultry keeping is a source of income and employment

Poultry droppings are used as farm yard manure to improve on soil fertility.

Exercise:

### Terms used in Poultry rearing.

Hen — Adult female

Cock- Adult male

Cockerel — Young male from 8 weeks onwards

Capon — castrated male

Pullet — Young female

Chick — very young birds

Incubation — The process by which an egg is given necessary conditions to hatch into chicks.

Moulting — the process by which birds shed their feathers to replace them.

Culling — removal of unproductive or unwanted birds from a flock

Brooding — giving special care to young chicks

Brooder — special structure where requirements are provided to keep young chicks alive.

Debeaking — is the shortening of the upper part of the birds beak

External features of a bird Diagram

Comb and wattle

Spur — for protection or defence

Beak — picking food and protection / support the bird during mating.

Feathers:

Provide warmth to the bird.

Cover the body of a bird to protect it from mechanical injury

Enable birds to fly

Provide shape and colour for easy identification
Structure of a Quill feather and naming its parts (diagram)

**Types of feathers:**

**Parts of a feather**

Quill feathers, body feather, filoplume (hair feathers), convert feathers

**Difference between a hen and a cock.**

A hen has a small comb and wattle on its head while a cock has a big comb and wattle

A cock has a long spur than that of a hen

A cock has a long tail feathers than those of a hen

A cock has brightly hackel feathers than those of a hen

**Types of Chicken**

A type of chicken means a class of birds kept for a special purpose.

| Type | Purpose |
|---|---|
| i) Layers | kept for egg production (laying eggs) e.g the white leg horn |
| | the brown egger, Ancona, Minorca , SYKES |
| ii) Broilers (Heavy breeds) table birds | kept for meat production e.g Light Sussex, the Ply mouth rock |
| iii) Dual Purpose | kept for both meat and egg production e.g New Hampshire, Rhode |
| | island red Black Australorp , kroilers |

**Breeds of Chicken**

a) Local breeds

Characteristics of Local breeds

They are more resistant to diseases and parasites.

They can withstand harsh climatic conditions than the exotic

They have a slow growth rate

They lay small and few eggs during each laying season

NB: they can be improved by cross breeding

Cross breeding improves their quality of performance

Definition of Cross Breeding

b) Exotic breeds

**1. Dual purpose**

These are birds which are layers and also produce good quality meat.

Examples of dual purpose breeds

i) Rhode Island red

ii) Black australorp

iii) New Hampshire

iv) Kroilers

**2. Abnomalities in eggs**

i) Double yolked egg.

ii) Shell less / seff shell

iii) Wind eggs

iv) Blood spot

**3. Conditions that may fail a fertilized egg from hatching included.**

i) Cracked shell

ii) Shell less egg

iii) Very small eggs

How can a farmer identify a fertilizer egg from an unfetilised one?

**By candling**

Diagram / experiment of egg candling

Note : A fertilized egg does not allow light to pass through it.

**Characteristics of exotic breeds**

They grow and mature in a short time

They produce many eggs

They need a lot of care because they are not used to harse weather conditions

i) Advantages of keeping local breeds over exotic breeds

- They are more resistant to disease
- They can survive on harsh weather conditions
- They produce high quality meat and eggs

ii) Reasons why farmers prefer exotic to local breeds

- They grow and mature faster than local breeds
- They produce more meat and eggs

Advantages of keeping local breeds over exotic breeds and vice versa.

**Reproduction**

Birds reproduce by laying eggs which are fertilized internally. A hen lays fertilized eggs which are incubated for 21 days to hatch into chicks

Internal structure of an egg (diagram)

**Functions of each part**

The shell- protects the inner egg content

Allows gaseous exchange since its porous.

Its made of mineral salt called calcium

Chalaza - holds the yolk and embryo in position

Yolk - source of proteins and fats for the embryo

Germinal disc — develops into chick after fertilization

Albumen — source of protein and water to growing embryo

Air space — keeps and provides fresh air to the embryo.

## FEEDING CHICKEN

The Food(Mash) given to birds must always be put in clean feeding troughs and clean water in the water trough.

Diagrams to show water trough and feeding trough.

### Poultry feeds

| Age | Type of feed (Mash) |
|---|---|
| 1 day — 8 weeks | Chick mash (for faster growth) |
| 8weeks — 16 weeks | Growers mash (layers)<br>Broilers mash (broilers) |

NB Laying birds should be given greens to supply vitamins, mineral salts and to keep them busy to reduce vices. Birds should be given feeds with stones to help in crushing food.

Digestive system of a domestic fowl

Diagram

### Functions of each part

Beak: Picks food

Crop: Stores, moistens and softens food

Gizzard: Food is crushed into small particles by the stones (grit)

Small intestines — Absorbs digested food material into the blood stream.

Large intestines — Absorption of water

Granular

Stomach - mixes food with enzymes

## SYSTEMS OF POULTRY KEEPING

**A Free range system (open range system)**

In this system birds are left free to roam and feed themselves

Advantages of free range system

It cuts down feeding costs as the birds look for their own food

The birds eat a balanced diet from natural sources

The birds get enough physical exercise

**Disadvantages of Free range system**

Eggs are difficult to collect or may be lost easily

Birds can easily be eaten by predators.

Its difficult to control pests and diseases.

Record keeping of individual birds is difficult

Birds can easily stray and destroy crops

**B Deep Litter System**

In this system birds are kept and fed indoors.

The floor of the deep litter house is covered with litter from saw dust, wood shavings, coffee husks, and crushed maize cobs to prevent dampness in the room.

**Litter**

These are materials put on the floor of a deep litter house.

**Advantages of litter**

- It helps to prevent eggs from breaking during laying.
- It helps to absorb moisture from poultry droppings hence keeping the floor dry.
- It helps to provide warmth to the birds.

**Advantages of deep litter system**

- Many birds can be kept in a small house
- Birds are protected from thieves and wild animals.
- Litter can be used as manure.

NB: Deep litter system is commonly used in urban areas and suitable for commercial purposes.

**Disadvantages of deep litter system**

- More money is needed to start the system and maintain the birds.
- There is easy spread of diseases in case of improper care.
- Birds lack enough exercises.

**Battery Cage System**

In this system, birds are kept in separate cages indoors

**Advantages of the battery cage system**

- Birds are protected from wild animals
- Easy collection of clean eggs
- Control of diseases and pests is easier.
- A record of individual birds can be kept easily.
- Cutting is done easily.
- Food and water is not contaminated

**Disadvantages**

- It is very expensive to maintain and set it up.
- Birds do not get enough exercises
- Cages can bruise the birds
- Birds may not be able to get a balanced diet.
- Requires a qualified personnel

**Fold pen system**

In this system, birds are kept in cages which are moved to new places daily.

**Advantages of fold pen system**

- It is cheaper compared to the deep and battery cage system.
- Chance of worm and parasite infestation are reduced.
- Manure from chicken droppings is easily collected.

**Disadvantages of Fold pen system**

- It is expensive to construct.
- It is tiresome to keep moving it around
- The folds get old in a short time due to frequent movement
- The birds do not get enough physical exercises
- The system is not suitable for swampy or flooded areas.

**Fowl Vices**

Vices are bad habits which develop among birds that are kept together indoors

**Examples of Fowl vices.**

Cannibalism

Egg eating

Feather pecking

Toe and skin pecking

**Causes of Fowl Vices**

- Over crowding of birds in a house
- Insufficient feeding or poor feeding
- When the birds are bored.

**Prevention of Fowl Vices**

- Install purches
- Hang bundles of greens to occupy the birds
- Debeak all the birds
- Isolate the pecked birds (cull)
- Provide enough feeds in time to birds
- Improve on housing, lighting and setting better laying places.

**Effects of poultry vices**

- Reduced production.
- High cases of body injuries (wounds)

**Parasites:**

A Parasite is a living organism which depend on other living organism for food and shelter for survival.

Parasites cause harm to their hosts.

**Types of Parasites**

A, Ecto Parasites — these are parasites which attack fowls from outside their bodies e.g lice, redmites and depluming mite

**Prevention**

Dust birds with ecto parasite pesticides

B Endo parasites — these are parasites which attack the bird from inside its body especially the alimentary canal. E.g. Tape worms, round worms, hook worm e.t.c

**Prevention**

- Deworm the birds regularly
- Observe good hygiene the poultry houses.
- Regular cleaning of troughs

**Effects of diseases and parasites to poultry**

- They affect growth of a bird
- They affect production of layers
- They affect profit and income from poultry farming
- They affect the quality of bird products

**Poultry Diseases**

A Coccidiosis: caused by a protozoa and it attacks the liver, small intestines and large intestines

**Signs**

Blood stained droppings/ diarrhoea

Ruffled feathers

Dullness and dropping of wings

**Prevention**

Use coccidiostats in feeds.

Cull and slaughter the infected ones

Provide clean feeds in clean troughs.

**B Fowl Pox: caused by a virus spread through feather and skin pecking**

**Signs**

Tiny wounds on comb wattle and wings

Ulcers in the mouth.

Excessive discharge of fluids from eyes and nostrils

Difficult breathing.

**Prevention of fowl pox**

Routine vaccination and strict hygiene

Practice good hygiene

Cull and slaughter the infected.

Wash and disinfect the poultry house.

**Newcastle Disease — caused by a Virus**

**Signs**

Greenish yellowish diarrhea

Staggering, dropping of wings and bending of neck

Moulting of feather

Poor egg shell formation

Lameness and difficult breathing

**Prevention**

Vaccinate the birds regularly

Cull slaughter and bury in infected.

**Fowl Typhoid: caused by bacteria**

**Signs**

White yellowish or green diarrhoea

Rough feathers

Sleepy eyes

Anaemia, combs and wattles get shrunken and pale yellow

**Prevention**

Vaccinate regularly

Keep poultry house clean dry and well ventilated

Cull and slaughter the infected ones

Other diseases includes

i) Avian lencosis (birdflu) virus

ii) blackhead (protozoa)

iii) Gumboro disease (Virus)

**Incubation**

Incubation is the process by which an egg is given necessary conditions to hatch into chick.

| Bird | Incubation period |
|---|---|
| Chicken | 21 days |
| Ducks | 28 days |
| Turkey | 28 days |
| Pigeons | 17 days |
| Geese | 30 days |

**Methods of Incubation**

**Natural incubation:**

This is where a mother hen lays eggs, turns broody and sits on them for 21 days to hatch out chicks.

**Advantages of natural incubation**

It is cheap to maintain and manageable

There is little attention to the incubating hen

The chicks get extra care from the mother.

**Disadvantages of natural incubation**

Few chicks are hatched at a time.

The broody hen can easily be attacked by Vermin

The hen used may not be good at incubating.

**Artificial incubation**

This is a method where an incubator machine is used to hatch the eggs.

Some incubators use a lamp to supply heat while others use electricity

**Diagrams**

i) An electric incubator

**Advantages of Artificial incubation**

i) Very many eggs can be hatched at the same time

ii) Artificial incubation can be used for commercial purpose

**Disadvantages of Artificial incubation**

It is an expensive method to manage

It needs special attention and care

There must be someone to always supervise it.

NB:The separating of chicks that is cocks from hens is called chick sexing

**Brooding Chicks**

Brooding is the giving of special care to young chicks from the time of hatching to nearly eight weeks.

**Types of Brooding**

**A** Natural Brooding

This is where a mother hen provides warmth, security care and food to young chicks.

**Advantages**

It is cheap in terms of expense

The hen looks for food for its chicks

The hen provides security for the chicks

**Disadvantages**

Loss of chicks due to poor protection from predators

It cannot be done on large scale

Incase of death of mother bird, chicks will be left without care.

**B** Artificial brooding.

This is a method where chicks are kept in a brooder. A brooder is a special structure (house) for keeping chicks below the age of 8 weeks.

**Types of Brooders**

i) Kerosene brooder(Paraffin brooder)

This is where a paraffin lam is used to provide warmth to birds.

**Advantage**

i) It is cheaper to manage

Disadvantes

- It promotes accumulation of vapour and soot.
- Birds can easily be burnt by a hot lamp.

**Note:** To avoid accidents of burns to chicks then the lamp should have metal guards.

**Infra red brooder**

This is where electricity is used as a source of light and heat.

**Advantages**

- Birds get enough warmth

**Disadvantage**

Its expensive in terms of electricity bill payment

**Brooding**

This is the act of giving special care to young chicks below eight weeks

**Types of brooding**

i) Natural brooding

ii) Artificial brooding

**Advantages of artificial brooding**

- Many chicks are kept at ago.
- Chicks are protected from predators.
- It can be used for commercial purposes.
- It is easier to feed chicks from one place.

**Disadvantages of artificial brooding**

- It is expensive to buy feeds for chicks
- The chicks need constant and a special person to look after them
- Toe pecking among the chicks is difficult to control
- Chicks can die if there isnt enough heat and warmth.

**Record keeping**

## Farm records

These are written daily activities carried out on a farm

## Examples of farm records

- Health records
- Feed records
- Marketing records
- Breed records
- Income and expenditure records
- Profit and loss records
- Production records

## Advantages of farm records

- They help the farmer for future planning
- They help to ascertain profits and losses made.
- They help to know the history of the farm
- They help in fair taxation of a farmer
- They help a farmer to get loans from banks

## A PICULTURE

Apiculture is the rearing of bees for honey and bee wax.

### Reasons why people keep bees.

Bees provide honey to man.

Honey can be sold to get money

Honey is used to sweeten tea and bread

Honey is a source of carbohydrates.

Bees provide man with bee wax

### Products from bee wax

Crayons

Candle wax

Cosmetics

Polish for shoes and floors

Bees provide man with pollen which when eaten contain proteins.

Bees pollinate crops or plants for easy fertilization.

### Groups / Kinds of bees

A Social bees: these are bees which live, move and work together e.g. Termites, red ants, honey bees wasps. They live in an organized group called a Colony.

B. Solitary bees: these are bees which dont live and work together / These are bees which move, live and work alone e.g. grasshoppers, mosquitoes, crickets

### Types (casts) of bees

i) The Queen bee

ii) The Drone bee

iii) The Worker bee

**Roles of Casts of bees in the hive**

**The Queen bee**: its main function is to lay eggs in the hive

It uses the ovipositor to lay eggs

It is much larger than the others with a large abdomen and longer legs

It is fed on special food called Royal Jelly by the Nurse bees.

**The Drone bee:**

Its main function is to mate with the virgin queen

They make a buzzing sound when flying

They are the male bees in the hive.

They are much larger than the worker bees, more hairy with broad blunt abdomen with no sting

**The Worker bees:**

They are female sterile bees in the hive

Why? They cannot lay eggs and do not have the ovipositor.

They are the smallest in size but very many in number.

They do not have an ovipositor instead they have a sting.

**Their duties**

Work bees build combs (diagram of structure of combs)

They clean, guard and protect the hive by stinging the enemy

They collect nectar and feed the grubs. They use proboscis to collect nectar and use pollen baskets on hind legs to collect pollen.

NB: they use their proboscis to collect nectar

They use pollen baskets found in the hind legs to collect pollen.

NB: They use propolis from trees to smoothen the interior of a hive, water proof it and repair cracks

B Parts of a honey bee

Diagram

Life cycle of a honey bee

Diagram

Honey bees undergo a complete metamorphosis. Queen bee lays fertilized eggs which change to Larva (grubs) pupa then to adult bees.

## SWARMING

A Swarm is a group of moving bees.

Swarming is the massive movement of bees from one place to another.

### Reasons for Swarming in bees

Over crowding of bees in the hive.

When another queen bee is produced.

Shortage of food and water within the area

Dampness and bad smell around the hive.

Presence of enemies, disease and pest around the hive.

Overheating through direct sunlight and lack of adequate ventilation

Disturbance and damage done to combs.

### Apiary:

This is a farm of bees.

This is a group of beehives with bees

## BEE HIVES

A Hive is a natural habitat for bees.

Types of bees hives

i) modern

ii) traditional

Common bee hives

a) Dug out log hive
b) Kigezi bee hive — Traditional hives
c) Box hive
d) Top bar hive
e) Tin hive — Modern hives

Diagrams to show each type of hive

Internal structure of a hive (diagram)

The Brood chamber. The queen lays eggs and the eggs hatch into larva pupa and adult

The Honey chamber For Storage of honey and pollen

The queen excluder prevents the queen from crossing to the honey chamber to mix eggs with honey.

## Siting the Hive

This refers to the process of selecting a suitable place in which to put the hive.

### A Factors to Consider

- A Place sheltered from strong sunlight and wind
- Presence of flowering plants around the a piary
- A Place free from noise and other disturbances
- A Place free from bee enemies.

## STOCKING THE HIVE

Stocking refers to putting bees into an empty hive or refers to the process of encouraging bees to occupy an empty hive.

How it is done

Setting up the hive in its permanent place. Smear the inside with bee wax and wait for the bees to occupy on their own.

Use of a catcher box

Catching a swarm with a swarm catching net.

Diagram

**Feeding Bees**

During drought or in shortage of food, bees can be fed on:

i) Ordinary sugar mixed with water to make sugar solution

ii) Ordinary water

Harvesting Honey

Harvesting of honey is done in the evening when the bees have all settled inside.

**Equipment (Tools) when handling bees**

1. A Bee Veil
2. A Bee Keepers Glove — to prevent him/herself from being stung by bees
3. Suitable protective clothing (overall)
4. A Bucket for honey collection
5. A Smoker — smoke scares and paralyses the bees; Fuel used in a Smoker: Wood shavings, old sacks, Dry grass
6. Knife
7. Gum boots

Diagram to show a Farmer ready to harvest honey.

**Steps for Harvesting Honey**

1. Blow the smoke into the hive through the entrance through the entrance to drive away bees
2. Lower the hive to the ground.
3. Cut and remove combs from the top to the bottom

NB: Ensure that some combs with honey remain in the hive for bees to feed on before they build new ones.

**Extraction of Honey**

Extracting honey refers to the removing of honey from the honey combs

**Methods of harvesting honey**

1. Floating the wax method
2. Pressing honey method
3. Centrifuging method of extraction of honey

**Enemies of bees**

1. Ants e.g. wood ants, sugar ants safari ants
2. Honey badgers — damage the hive, kill bees and eat honey
3. Wax moths — hive beetles, wasps, hawk moths

**MEASUREMENT**

**Lesson 1**

**LENGTH**

Length is the distance between two points.

Length is measured using the following units;

Millimetre (mm)

Centimeter (cm)

Metre (m)

Decametre (Dm)

Hectometre (Hm)

Kilometer (km)

The most commonly used units for measuring length are; centimeter, metre and kilometre. The basic unit for measuring length is metre.

Instruments used to measure length ;

Foot ruler, metre ruler, tape measure (modern )

Traditional (arms pans, footsteps , strides , stricks , string, hand spans )

Activity

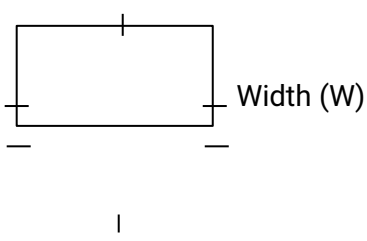
**Lesson 2**

**Area**

This is the total surface space occupied by a figure. Area can be found after knowing the length and width of the figure.

Length is the longer side of a figure while width is the shorter side of the figure.

Illustration

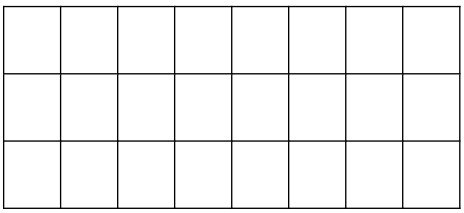


Length (L)

**Finding area**

Area is calculated by multiplying the longest side (length) by the shorter side (width). Length is represented by letter L and with is represented by letter W.

Find the area of the figure below



3 squares

8 squares

Area = length x width

= L x W

= 8 x 3

= 24 square units

**NB: Basic units for area are square units** e.g. $cm^2$, $m^2$, $km^2$ etc

Activity

**Lesson 3**

**Volume**

Volume is the space occupied by an object. Volume is measured in cubic units i.e. $cm^3$, $m^3$ or $mm^3$.

The basic unit for measuring volume is litre (l).

**Types of shaped objects**

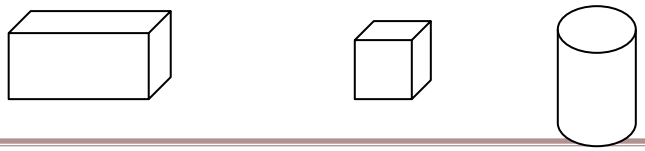
There are two types of shaped objects namely;

a) Regular shaped objects

b) Irregular shaped objects

**Regular shaped objects**

These are objects which have a proper shape e.g. a cube, cuboid, blocks, tins, piece of chalk etc



Cuboid cube tin

**Irregular shaped objects**

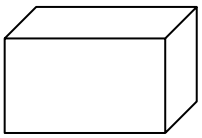
These are objects which dont have proper or well defined shape e.g. stones, keys, needles, shoes, sweet potato tuber, cassava tuber etc

Finding volume of regular shaped objects

The volume of regular shaped objects can be found after knowing their length, width and height. We therefore use the formular. This method is called substitution method

Volume= Length (l) x Width (w) x Height (h)

V = L x W x H

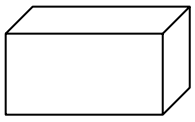


Height (h)

Width (w)

Length (l)

Example: find the volume of the cuboid shown below



3cm

2cm

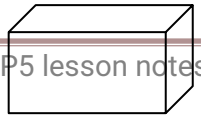
6cm

V = L x W x H

V = 4cm x 2cm x 3cm

= 24cm$^3$

Find the height of the figure below, if the volume is 36cm$^3$



h

2cm

5cm

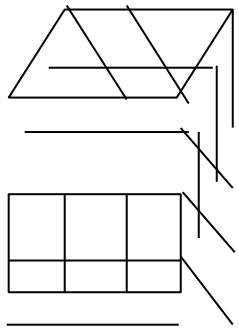
V = L x W x H

36 = 6 x 2 x h

$^{36}/_{12} = {}^{12h}/_{12}$

3cm = h

Find the volume of the figure below.



Activity

**Lesson 4**

Finding volume of irregular shaped objects.

The volume of irregular shaped objects is measured by using the displacement method.

There are two instruments used in the displacement method namely;

The measuring cylinder.

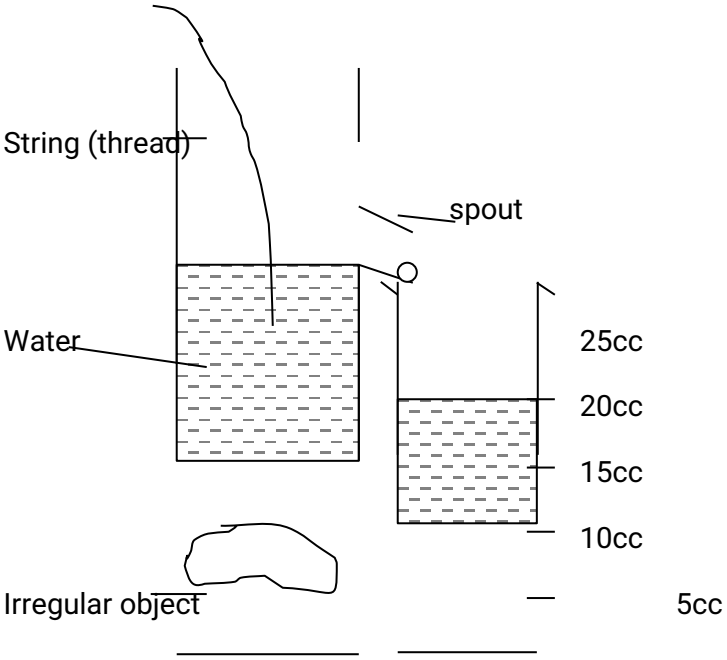
The overflow can (Eureka can)

**Differences between mass and weight**

| Mass | Weight |
|---|---|
| - Mass is constant (does not change ) | - Weight changes on different planets |
| - Mass is measured in grams (g) | - Weight is measured in Newton (N) |
| - Mass is a mount of matter in an object | - Weight is force due to gravity |

It is called the displacement method because an irregular object displaces the amount of water equal to its volume.

**1. Using both the overflow can and measuring cylinder**




The volume of the irregular object is 25cc.

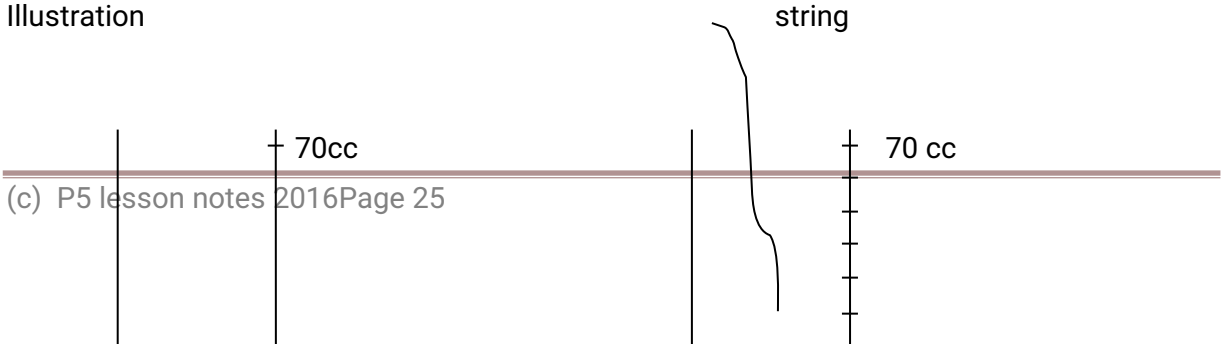
**NB:** The importance of the string is to lower the irregular object gently in water.

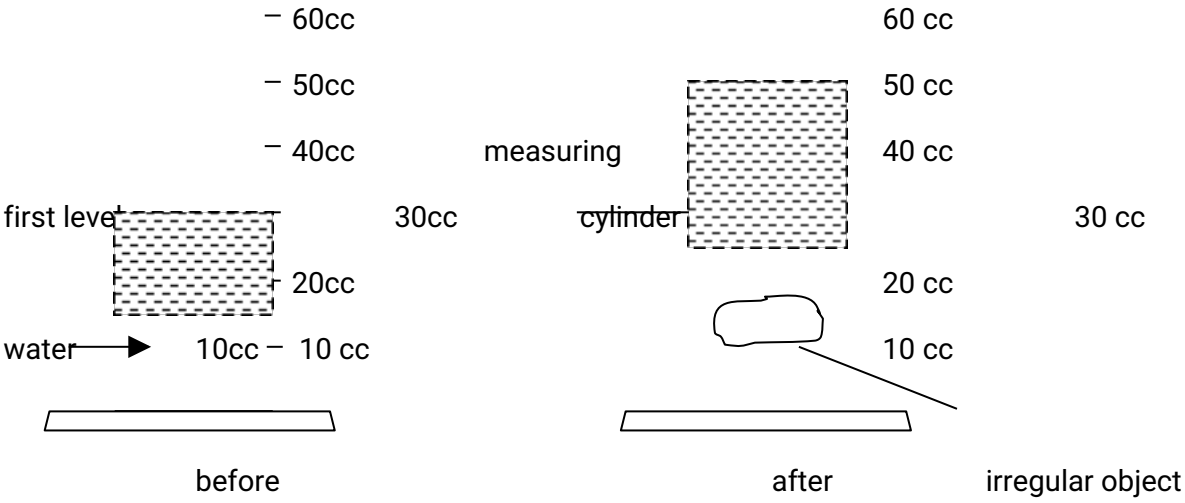
**2. Using a measuring cylinder**

Requirements;

Water, measuring cylinder, stone or sweet potato etc

Illustration






Volume = second level — first level

50cc — 30cc

= 20cc

**Note the following**

Displacement method. Its used to measure the volume of an irregular object.

The string — helps in lowering an irregular object into an overflow can (Eureka can)

The spout — it directs water into the measuring cylinder.

Measuring cylinder- it has markings that determine the volume of water displaced by an irregular object.

Note: When an object is dipped (immersed) in water, it displaces water equal to its volume.

**Lesson v**

**Weight and mass**

Is force an object exerts due to gravitation force. The weight of an object is determined by the following;

Size of the object

Material from which an object is made

The pull of the force of gravity

The basic unit for weight is Newtons (N).

Mass is the quantity of matter contained in an object. Mass is constant i.e. it doesnt change and it doesnt depend on the pull of gravity.

The units for mass are grammes (g) or kilogrammes (kg). weight and mass are both measured using the following instruments.

- Beam balance
- Spring balance
- Set of scales
- Scale balance

Illustrations

Diagram showing weighing scales (comp: Scie BK 4 pg 214)

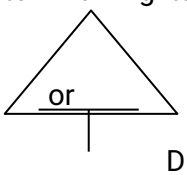
**Lesson VI**

**Density**

Density is mass per unit volume. The density of an object is found after knowing its mass and its volume. The fomular for finding density is;

Density (D) = mass (m) or weight $\quad D = \frac{M}{V}$

Volume




The units for density are grammes per cubic units i.e.

Finding units for density

$D = \frac{M}{V}$ mass = grams (g)

volume = cubic centimeter (cc)

$D = \frac{g}{Cc}$

D = g/cc or D = g/ $cm^3$

Grammes per cubic centimetres (g/cc)/ g/$cm^3$

Grammes per cubic mililitres g/$ml^3$

**Densities of liquids**

Liquids have different densities.

Density of liquids is measured by an instrument called a hydrometer.

(Diagram)

**Finding density**

Example: Find the density of an object of mass 150g and volume of 30cc.

Soln: $D = \frac{M}{V}$ mass = 150g

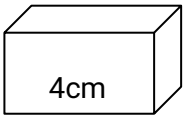
volume = 30cc

$= \frac{150}{30}$

D = 5g/cc

Example

If the mass of the cuboid below is 480g, find its density.




2cm

6cm

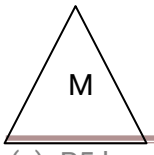
Volume = L x W x H

= 6 x 2 x 4

= 48cm$^3$

Density = $\frac{Mass}{Volume}$ $D = \frac{480}{48}$ Density = 10g/cm$^3$

Calculations about volume and mass






a) Finding volume given mass and density

b) Finding mass given volume and density

Activity

## Floating and sinking

### Floating

This is when an objet is put in water and it stays on top of it. Objects float on water because they are less dense than the density of water.

OR: Objects float on water because their density is less than the density of water.

Examples of things which float on water include cork, wood, plastic, rubber, feathers, a leaf, papers, paraffin, petrol etc

### Sinking

This is when an object is put in water and it goes to the bottom of the water. Objects sink because their density is greater than the density of the water.

OR: Objects sink in water because they are denser than water.

Examples of objects that sink are stones, sand, soil, metal, glass, nails, sugar, salt etc

### Illustration

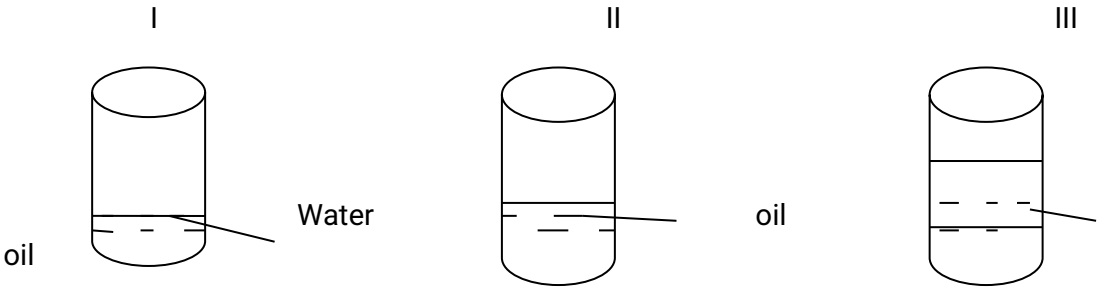
**NB:** A sinking object displaces water equal to its volume while a floating object displaces water equal to its weight.

Activity

Comparing densities of other liquids with water

Eg mercury and $H_2O$ , oil and H2O

Exp



water

water

Mercury

Mercury

**Activity**

1. Name any one liquid which

a) Float on water

b) Sink in water

2. Why do some liquids float on water?

3. What happens to mercury when mixed with water?

4. Give a reason to support your answer in (3) above

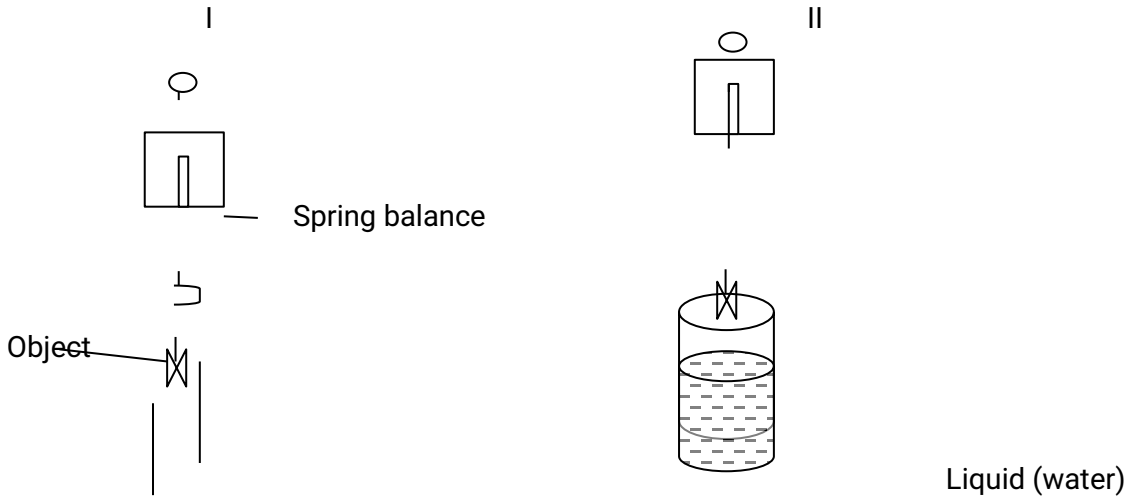
Up thrust force

Defin

Is the force that liquids exert on to objects put in them.

**NOTE** : up thrust make objects weigh less when put in liquids

Exp




Weight in air

**Conclusion**

Objects weigh less in liquids. This is due to the up thrust force in liquids._____

**IMMUNITY AND IMMUNISATION**

Immunity is the bodys ability to resist diseases causing germs

## Types of Immunity

Natural immunity

Artificial immunity / acquired

## How the body gets immunity

From mother to baby

After recovering from an illness

Through immunization

Natural immunity

The body acquires natural immunity in two ways

a) A Pregnant woman to her unborn baby

A Pregnant woman may pass on antibodies to her unborn baby.

A newly born baby can get natural immunity through the mothers breast milk during suckling

This particular natural immunity is called maternal immunity.

b) Immunity from illness

When one catches a disease, the body produces antibodies to fight the disease causing germs for that disease.

## Artificial immunity / acquired immunity

A Person gets artificial immunity when the vaccines are introduced into ones body

This is mainly done by injection or by oral method. Artificial immunity is got through immunization

Importance of immunity

- It keeps the body healthy and productive.
- It reduces death rates.
- It strengthens the immune system of the body.

## Activity ( before immunisation)

Identify diseases immunized

a) birth

b) at 9 months

c) at an interval of 4 weeks

e) 3 times

f) once

g) girls between 15 years to 49 years

h) pregnant women

DPT vaccine is known as a triplet (triple) vaccine

**Reason**: It is used to immunize three infant killer diseases.

The three childhood diseases are Diptheria, Pertusis(whooping cough) and Tetanus

**Polio and Tuberculosis**

Polio and Tuberculosis are immunized at birth

**Reason**: A child is born with low natural immunity against polio and Tuberculosis.

**Measles:**

Measles is immunized at the age of 9 months (36 weeks)

**Reason**: A child is born with natural immunity against measles with lasts up to 9 months.

**Storage of vaccines:**

They are stored in cool places like refrigerators , ice cubes , in vacuum flasks (villages)

**Vaccines**

Vaccines are special drugs introduced to the body to make it resistant against specific immunisable diseases

**Types of Vaccines**

There are three types of vaccines namely: Toxoids: (Poisonous substance) Attenuated: (Weak disease causing germs), Dead organism vaccines: (Dead disease causing germs)

## Examples of vaccines

| Vaccine | Age at which vaccine is given | Disease protected against | How the vaccine is admininistered | Site |
|---|---|---|---|---|
| BCG | At birth | Tuberculosis | Injection on the right upper arm | Right upper arm |
| Polio vaccine | At birth<br>6 weeks<br>10 weeks<br>14 weeks | Polio | Putting drops in the mouth | Mouth |
| DPT<br>Hep B + Hib | 6 weeks<br>10 weeks<br>14 weeks | Diptheria<br>Pertussis(whooping cough)<br>Tetanus<br>Hepatits B<br>Haemophilus<br>Influenza type b | Injection on the left thigh | Left upperthingh |
| Measles vaccine | 9 months | Measles | Injection on the left upper arm | Left upper arm |

Diagram showing immunization sites

## Immunization

Immunization is the introduction of vaccines into the body to make it resistant against disease by producing antibodies.

## Antibodies

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

Note: Substances that situmulates the production of antibodies are called Antigens

**Why is immunization important?**

It makes the body resistant to disease

It reduces infant mortality rate

It makes the body produce antibodies immunisable

It helps to protect children against the six killer diseases

**Childhood immunisable diseases**

The diseases attack children below six years of age. these diseases keep on increasing in number time to time.

Why?

Their body immunity is still weak.

| Disease | Cause | Signs | Symptoms | Treatment prevention |
|---|---|---|---|---|
| Tuberculosis | Bacteria | Chronic cough | Mild fever | Treat with antibiotics |

| | | | | |
|---|---|---|---|---|
| | | Loss of weight<br>Loss of skin colour<br>A lot of night sweating | Loss of weight<br>Pain in the chest or in the upper back | Visit a health worker for treatment<br>Eating a balanced diet<br>Isolatin |
| Measles | Virus | Sores in the mouth<br>Running nose<br>Skin rash<br>Dry cough<br>Red eyes | High temperature<br>Itching rash<br>Loss of appetite<br>Weakness | Isolation |
| Pertussis (whooping cough) | Bacteria | Runny nose<br>Severe coughing<br>Vomiting<br>Quick deep breaths through the mouth | A cold and fever at the beginning | Use of antibiotics |
| Diphtheria | Bacteria | Swollen neck<br>Sore throat | Fever<br>Difficulty in breathing | Prevent through immunization<br>Seek medical treatment<br>Isolation |
| Tetanus | Bacteria | Stiff muscles<br>Sudden and strong<br>Tightening of muscles when touched<br>Baby stops sucking | Fever | Immunization<br>Wounds and cuts should be dressed<br>Using only clean cutting objects during birth |

| | | | | |
|---|---|---|---|---|
| Polio (poliomyelitis) | Virus | Lameness of the bones | Paralysed limbs | Drinking boiled water<br>Proper disposal of faeces<br>immunization |

**Other immunisable diseases**

| Disease | Cause | Sign and symptoms | |
|---|---|---|---|
| Hepatitis B | Virus<br>Water borne | - Eyes turn yellow<br>- Vomiting<br>- Tiredness<br>- Darker urine<br>- Loss of appetite | - Have enough rest<br>- Take a lot of fluids eg chicken soup or orange |
| Hib<br>Haemophilus influenza b | Bacteria<br>Its air borne | - Fever<br>- Body weakness<br>- Stiffness of the neck<br>- Vomiting | - Treat the patient in isolation |

**Cholera**
Caused by bacteria
Spread through contaminated water and food
Food can be contaminated by house flies
Cholera can also spread when a sick person touches a normal person.
**Signs and symptoms**
Serious colourless watery diarrhea
Vomiting violently
Cramps, shock and dehydration
Weakness, collapse and death

What kills a person suffering from cholera is not the germs but dehydration
Dehydration is a condition when the body does not have enough water in it.
**Causes**
Severe diarrhoea
Severe vomiting
Diarrhoea and vomiting can lead to loss of water and important salts, sodium and potassium
**Signs of dehydration**
Sunken eyes
Dry mouth

Sunken fontanelle(soft spot)
Little or no urine is passed out
A pinch of the skin goes back to shape slowly

**Treatment for Dehydration**

Give extra fluids
Give ORS

**How to mix ORS (SSS) at home**

1. Wash hands with clean water and soap
2. Measure a litre of boiled but cooled water in a container
3. Measure one leveled tea spoon of salt in water eight leveled teaspoons of sugar in the water
4. Mix the salt and sugar into the water to make a solution
5. Taste the solution, it should never taste salty
6. Give the drink to the person with diarrhoea or dehydration

**When making ORS;**

Water works as the solvent
Salt and sugar work as solutes

**Prevention and control of cholera**

Immunization
Drink clean boiled water
Cover all food to avoid houseflies from contaminating it.
Take the infected person to the hospital as soon as possible
Use latrines to dispose faeces
Wash hands before eating food and after using the latrine
Reheat all cold foods
Give a lot to ORS to prevent dehydration
Observe good food hygiene

**Meningitis**

Caused by bacteria and virus
Spread through air

**Yellow fever**

Caused by a virus
Spread by the aedes or tiger mosquito

**Small pox**

Caused by a virus
Spread through air
Edward Jenner an English Doctor was the first to discover the vaccine and vaccination of small pox in 1700.
Child health card
Defn :
It is a document used to monitor the health of a child. Or Its a written record that monitors the childs health.
Important features of a health card.

- Childs name
- Parents names
- Age
- Sex
- Date of birth
- Immunization schedule
- Birth weight

**Importance of a child health card to**

**Parents / guardians**

1. reminds the parent on when to give the next dose

2. To monitor the childs growth rate.

**Health workers (doctors)**

1. Monitors the childs growth rate.

2. To know the next vaccine to be given

3. To identify the given vaccine

**School health committees**

- To identify whether the child was fully immunized or not.
- To determine the childs age.
- To identify the vaccines that were given.

**Roles played by the following in immunizations**

- Individual
- Families
- Communities

**Individuals**

1. Gathering different members to organize immunization centres

2. Mobilise in people in the area for immunization

Families

1. To take their children for immunization

**Community**

- Builds immunization centres
- Sensitises community members on the importance of immunization.
- Encourages members to take children for immunization.

UNEPI

Uganda National Expanded programme on immunization

**Roles of UNEPI**

- It provides vaccines

- It sensitizes communities about the importance of immunization
- It organizes National Immunisation Days

**Typhoid**
Caused by bacteria known as salmonella typhi
Spread through contaminated water or food by a housefly
**Influenza**
Caused by a virus
Spread through air
**Rubella (German Measles)**
Caused by virus
It is a highly infectious disease which causes a rash and fever
It usually affects older children and adolescents
**Typhus**
Caused by bacteria
Spread when lice bites an infected person and then it bites a healthly person
**Plague**
Caused by bacteria
Spread by rat fleas
**Rabies**
Caused by a virus which affects the nervous system
Spread by a bite of an infected dog or fox

## DIGESTION

Digestion is the process by which food is broken down into simple soluble particles which can be absorbed by the body.

Terms in digestion

Digestion :

Is breakdown of food into smaller soluble substances that can be used by the body.

### Ingestion

Is the act of taking in food

### Indigestion

Condition when food is not properly digested

### Egestion

Is the removal of undigested matter from the body

### Food absorption

Is when digested food is taken into the blood streams

### The alimentary canal

It is a muscular tube running from the mouth to the anus. It is part of the digestive system. The alimentary canal is composed of the following parts;

Mouth, gullet, stomach, duodenum, ileum, colon, appendix, rectum and anus.

### The digestive system (diagram)

### Types of digestion

### Physical (mechanical ) digestion

This type is carried out by the action of teeth and tongue.

It takes place in the mouth

Chemical digestion

It is carried out by the action of the enzymes.

It starts from the mouth to ileum.

## ENZYMES

### Definition

Enzymes are chemical substances that speed up food digestion

Examples of enzymes

Salivary amylase (ptylin), pepsin , rennin , lipase , trypsin , panaeatic amylase

| Site | Digestive juice | Enzyme |
|---|---|---|
| Mouth | Saliva | Salivary amylse |
| Stomach | Gastric juice | Pepsin & Renin |
| Duodenum | Pancreatic juice | Lipase , trypsin pancreatic amylase |
| | Bile juice | No enzymes |

NB : The ileum produces intestinal juice with enzymes that completes the digestion of food.

Characteristics of enzymes

- They work on a specific type (class) of food
- They work within a narrow temperature range.
- They can be affected by heat.
- They work under acidic or alkaline conditions.

Example of enzymes under each condition

Alkaline

- Amylase
- Lipase
- Trypsin

Acidic

- Pepsin
- Rennin ( only in breast feeding babies )

### Food in the mouth

Food is broken down into smaller particles through chewing. Saliva is mixed with the food to soften and lubricate it for easy swallowing. Chewed food is rolled into bolus by the tongue and pushed into the gullet.

Saliva is produced by the salivary glands. It contains an enzyme called salivary amylase or ptyalin which begins digesting cooked starch in the mouth.

During swallowing, the epigilottis closes over the opening of the trachea to prevent food from entering into it.

### a) Roles of saliva during digestion

- It softens and moistens food
- It cools down food in case it is hot.

**b) Roles of the tongue during digestion**

- It mixes food with saliva.
- It rolls food into a bolus.
- It pushes food into the gullet

**c) Roles of the teeth during digestion**

- To break down food into small particles ( They aid mechanical digestion )
- They protect the tongue.

**Food in the gullet (oesophagus)**

The gullet is a muscular tube that passes food from the mouth to the stomach. Food is moved through the gullet into the stomach by a process called peristalsis.

**Food in the stomach**

Food is thoroughly churned into the chyme by the action of peristalsis of the stomach. The walls of the stomach produce a juice called gastric juice and hydrochloric acid. The work of the hydrochloric acid is to kill any germs which escape with food during swallowing. Gastric juice contains two enzymes;

Pepsin which digests proteins

Rennin which clots milk in babies.

No absorption of food takes place in the stomach apart from little water, salt, alcohol, little glucose and some medicine.

**Food in the duodenum**

The duodenum receives bile juice through the bile duct.

Bile juice is produced by the liver and stored in the gall bladder.

Bile juice doesnt contain any enzyme but contains bile salts.

The work of bile juice is to break down fats.

The duodenum receives pancreatic juice through the pancreatic duct.

The pancreatic juice is produced by the pancreas. It contains the following enzymes; pancreatic amylase, trypsin, lipase.

No absorption of food takes place in the duodenum.

The first food to be digested in the duodenum is fats.

### Food in the ileum

Digestion if food is completed here and the digested food is absorbed in the body. Absorption is the process by which digested food is taken into the blood stream. The walls of the ileum produce an intestinal juice which contains enzymes that complete the digestion of food. The ileum has structures called villi through which digested food passes to enter the blood. The hepatitic portal vein takes blood rich in digested food from the ileum to the liver.

### Adaptations of the ileum to food absorption

- Its fairly long to create a large surface area for food absorption.
- It has villi structures
- It has a dense work of blood capillaries

Diseases and disorders of the digestive system. Ie causes , signs and symptoms and their control.

### The large intestine

There is no digestion in the large intestine, no enzyme is produced here. Absorption of water takes place in the colon. The undigested food materials passes out through the anus as feaces, stool or excreta.

### Diseases and disorders of the digestive system

### Diseases

Appendicitis

Peptic ulcers

Cholera

Typhoid

Dysentery

Diarrhea

### Disorders

Constipation

Indigestion

Intestinal obstruction

Vomiting

Diarrhea

Ways of maintaining the efficiency of the digestive system.

- Have a balanced diet
- Do regular body exercises
- Drink boiled or treated water
- Eat well cooked food
- A void smoking & drinking alcohol
- Wash hands with clean water before handling food.
- Having enough rest.

**Food hygiene**

This is the way of keeping food clean.

**Ways in which food is made dirty**

Handling it with dirty hands.

When houseflies land on the food when left uncovered

Putting food in dirty containers

Leaving food uncovered and dust drops on it.

**How to prevent food contamination**

Washing hands before handling food.

Always keep leftover food covered.

Keeping food in clean containers.

Serving food from clean places

Heating of reheating the food to kill germs before eating it.

**Good eating habits**

Washing hands before eating food

Chew food properly and eat slowly

Eat food that make up a balanced diet

Have regular and healthy meals

Wash hands after eating food

Never eat left over smelly food

Wash fruits and vegetables before eating

Eat well cooked food for easy digestion

**Dangers of bad eating habits**

Swallowing big lumps of food can cause choking.

Eating hurriedly can result into constipation and stomachache.

Talking with mouthful of food one can bite his/her tongue, can swallow un chewed food that can cause choking.

Biting very hard things can damage the teeth.

Drinking too much liquid while eating prevents one from eating enough food and also can dilute digestive juices.

## TERM II 2016

**TOPIC ONE**

## SOIL

Soil is the top layer of the earth

It is the medium in which plants grow and where they get water and nutrients

## TERMS USED IN SOIL

Land reclamation: this is the bringing back waste land to use

Drainage: this is the method of removing excess water from a water logged area.

Irrigation: this is the artificial method of providing water to crops in dry areas

Soil sampling: this is the taking of sample of soil from different parts of the field to analyse it in a laboratory

Soil texture: this means the different sizes of soil particles in an area

Soil structure: this is the way in which particles are arranged in the soil.

Soil profile: This is the vertical arrangement of the various soil layers.

## IMPORTANCE OF SOIL

It holds water for plants

It contains nutrients for the growing plants

It contains air which plants need

It holds plants firmly into the ground

It is a home to small animals

## COMPONENTS OF SOIL

Soil consists of the following

a. Humus(organic matter)
b. Water
c. Air
d. Particles of clay and sand (rock particles)

e. Dissolved mineral salts (in-organic matter)

**Examples of minerals needed by plants**

1. Magnesium and iron
2. Potassium
3. Calcium
4. Phosphorus
5. Nitrates and phosphates

**EXPERIMENTS TO SHOW THAT:**

I. Soil contains water

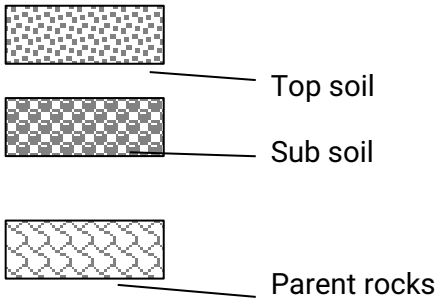
II. Soil contains air

**SOIL PROFILE**

Soil profile is the vertical arrangement of soil layers. It is made up of three layers namely;

- Top soil
- Sub soil
- Parent rocks

Diagram




Top soil: This is the most important one because it contains most of the nutrients needed for plant growth.

Which soil layer is suitable for plant growth?

The top layer is the best for plant growth. This is because it contains humus.

**TYPES OF SOIL**

There are three types of soil namely:

1. Loam soil
2. Clay soil
3. Sandy soil

**LOAM SOIL**

It has the following properties.

a) It contains balanced particles of sandy and clay.

b) It contains more humus than clay and sandy

c) It is well aerated than clay.

d) It contains all soil components in a balanced amount.

Therefore it is the best for crop growing.

**CLAY SOIL**

It has the following properties.

a) It has little humus

b) It has fine particles

c) It is poorly aerated

d) It retains a lot of water (its poorly drained)

e) It is sticky and heavy

f) It is suitable for pottery.

**SANDY SOIL**

It has the following properties

a) It is well drained

b) It has poor rate of capillarity

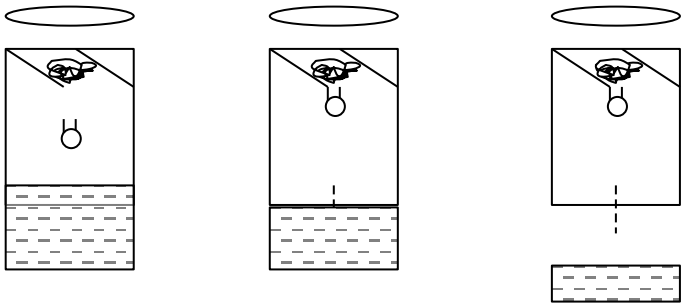
c) It has large and rough particles

d) It is well aerated

e) It dries quickly (its well drained)

f) It is suitable for construction or modelling

**Experiment to find out drainage of water through the types of soil**



Sand loam clay

Equal volume of measured water was poured in each funnel. After sometime, water was collected in each jar. **Observation**

More water was collected in a jar containing sand soil followed by the jar containing loam soil and least water in the jar containing clay soil.

**Conclusion**

Sand soil is more permeable than the loam and clay soil.

sand soil has the best drainage than other types of soil

**SOIL CONSERVATION**

It is the practice of keeping soil in one place and fertile.

If soil is not looked after property it can lead to soil exhaustion

Soil exhaustion is the loss of soil fertility.

**Ways used in soil conservation**

- By crop rotation
- By mulching gardens
- By applying artificial fertilizers
- By marking the gardens
- By cover cropping
- By bush fallowing
- By practicing agroforestry
- By growing legumes

**Methods used to conserve soil on hilly areas**

- Terracing
- Contour ploughing
- Strip cropping

**Causes of soil exhaustion**

a) Soil erosion

b) Leaching

c) Monoculture

Leaching is the washing away of soil nutrients from the top layer to the lower layer.

Causes of leaching

a) Soil erosion

b) Deep ploughing

**Soil fertility**

This is the ability of the soil to support plant growth

**Methods of improving soil fertility**

- Adding manure or artificial fertilizers in the soil
- By mulching the gardens
- By growing legumes
- By bush fallowing

Human activities that can cause soil erosion

- Swamp drainage
- Deforestation
- Overstocking/Overgrazing

- Over cultivation
- Uncontrolled bush burning

**Note:** Activities like swam drainage, deforestation, overgrazing and bush burning leave the soil bare exposing it to agents of soil erosion

## SOIL EROSION

Soil erosion the washing away of top soil.

Agents of soil erosion

An agent of soil erosion is the factor that helps soil erosion to take place.

They include:

a) Wind

b) Running

c) Man

d) Animals

## CAUSES OF SOIL EROSION

### Deforestation

This is the massive cutting down of trees

### Overgrazing

It is the keeping of animals on the small piece of land for a long time.

### Over cultivation

This is the growing of crops on a piece of land year after year without leaving the land to rest.

### Bush burning

It is the removing of plant cover using fire and leave the land bare.

### Mono cropping

This is the growing of one type of crop repeatedly on the same piece of land

### Poor farming methods

These include

Ploughing along the slopes

Planting crops along the slopes.

## Types of Soil Erosion

They include:

a) Sheet erosion. This is when flowing water takes away the top soil and begins making shallow channels in the ground

b) Gully erosion. this is when a lot of soil is carried away by running water and big channels called gullies are made in the ground.

c) Rill erosion. This is when flowing water takes away the top soil and begins making shallow channels in the ground

d) Wind erosion

## METHODS OF CONTROLLING SOIL EROSION

Terracing. This is the cutting of steps (terraces) across the slopes to the speed of running water.

Contour ploughing. This is the digging of lines of contour across the slopes to slow the speed of running water.

Strip Cropping (Bunding). This is the growing of crops and strips of grass are left in the spaces to reduce the speed of running water.

Afforestration. This is the planting of trees in areas where they have never been before.

Reafforestration. This is the planting of trees in areas where they have been before.

Bush fallowing. This is the practice of leaving the land to grow bushy for some time.

Mulching. This is the covering of the soil with dry plant materials

The main purpose of mulching is to keep moisture in the soil.

The materials used to cover the top soil are called mulches.

Examples of Mulches

Dry grass like spear grass, elephant grass etc. , Dry banana leaves, Coffee husks, Maize straw, Sorghum straw, Wood shavings

## ADVANTAGES OF MULCHING

a) It controls soil erosion

b) It improves on soil fertility

c) It controls weed growth

d) It conserves soil moisture.

e) It moderates soil temperature

f) It increases water infiltration in the soil.

## DISADVANTAGES

a) Mulches can be fire hazards

b) Mulches may hide pests.

c) Mulching is tiresome and expensive

d) Mulches may act as breeding places for crop pests.

e) Mulches may be a source of seeds of weeds.

Crop Rotation. This is the growing of different crops on the same piece of land seasonally. Crop rotation was discovered by Lord Shed Town

## FACTORS TO CONSIDER WHEN CARRYING OUT CROP ROTATION

- Legumes are rotated with other crops
- Crops in the same family should not follow each other.
- Cover crops should be alternated with less vegetative leaf crops
- Deep rooted crops to be rotated with shallow rooted crops.
- Crops easy to weed to be alternated with those difficult to weed.
- There should be resting phase

## ILLUSTRATION

**First Season**

| | | |
|---|---|---|
| Beans | Maize | Cabbage |

**Second season**

| | | |
|---|---|---|
| Cabbage | Beans | Maize |

**Third season**

| | | |
|---|---|---|
| Maize | Cabbage | Beans |

## ADVANTAGES OF CROP ROTATION

a) It controls crop pests and diseases.

b) Legumes add nutrients to soil

c) It maintains soil fertility

d) It controls soil erosion

e) It improves crop yields.

Cover Cropping. This is the growing of crops which cover the soil. Such crops are called Cover crops.

Examples : Pumpkins, Peas, Tomatoes, Groundnuts etc.

Inter cropping. This is the growing of two or more crops on the same piece of land.

**Groups of Fertilizers:**

1. Natural Fertilizers
2. Artificial fertilizers

**1.NATURAL FERTILIZERS**

These are organic fertilizers which are made from decayed plant and animal remains

They include:

a) Green manure. This is got from decayed green plants which are buried in soil.

b) Farm yard manure. This is got from decayed and animal dung and urine.

c) Compost manure. This is obtained from decayed household refuse like left over foods, rubbish and other plant remains.

**ADVANTAGES OF NATURAL MANURE**

1. They improve soil texture
2. They improve water retention in the soil
3. They release nutrients slowly
4. They stay longer in soil
5. They are made from organic matter, i.e. plants and animals.

**DISADVANTAGES**

1. They smell badly
2. They are tiresome to make
3. Plant and animal matter may not be easily got.

**ARTIFICIAL FERTILIZERS**

These are fertilizers which are made in factories.

**Types of artificial fertilizers**

- Straight fertilizers

- Compound fertilizers

**Straight fertilizer**

These are fertilizers that supply a single (one) nutrient (mineral ) to the soil

**Examples of straight fertilizer**

**Potash** - It provide ( supplies ) potassium

**Nitrogenous** — It supplies nitrates

**Phosphorus** — it supplies phosphates

SSP ( single supper phosphate ) it supplies calcium phosphate or calcium sulphate

**Compound fertilizers**

These are fertilizers that supply (contain) more than one nutrient (mineral ) to the soil

Examples of compound fertilizers

- Dramonium phosphate
- N.P.K ( Nitrates , potassium and phosphorus )
- Can (calcium , Amonium Nitrates )
- Munate of potash and urea

**Qualities of good fertilizers**

- It should be easy to apply
- It should be easy to handle and store
- It should supply the required nutrient

**Activities in primary tillage** — slashing , deforestation , bush burning , ploughing

**Activities in secondary tillage** — harrowing , detrashing , remove tree stumps, collecting weeds

**ADVANTAGES OF ARTIFICIAL FERTILISERS**

a) They are quick in improving soil fertility

b) They contain the right nutrients in the right amounts

c) They are applied basing on the nutrient lacking.

**DISADVANTAGES**

a) You may not know which type to use

b) They destroy the soil texture if used for so long

c) They are expensive to buy

d) They are easily leached out of soil by water.

e) They are applied at specific times only.

f) They spoil crops if applied wrongly

g) Over usage can pollute the soil

## TOPIC TWO

## MATTER AND ENERGY

Definition of energy

## MATTER

What is matter?

Matter is anything that has volume and mass OR Matter is anything that has weight and occupies space.

What is Volume?

Volume is the amount of space occupied by an object.

What is Mass?

Mass is the amount of matter contained in an object

States of Matter

Matter exists in three states namely

a) Solids

b) Liquids

c) Gases

Examples of each state of matter

| Solids | Liquids | Gases |
|---|---|---|
| Wood | Water | Air |
| Stones | Oil | Steam |
| Iron | Petrol | Smoke |
| Bricks | Soda e.t.c | smoke |

**Properties of matter**

Matter has weight

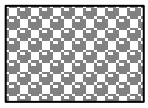
Matter occupies space

Matter exert pressure

**Characteristics of each state of matter**

Solids

I. Solids always have certain(definite) shapes
II. Some solids change into liquids by heating
III. Solids dont change the form of state when cooled
IV. Some solids expand when heated
V. Have molecules closely held together
VI. The force of attraction between molecules is great (cohesion)

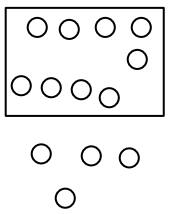


Molecules held together

Liquids

a. Have no definite shapes i.e take the shape of the container
b. Some liquids change into gases by heating
c. Some liquids change into solids by freezing
d. Liquids expand more when heated

e. The cohesion force is weak and that is why molecules move about freely inside the liquids.



molecules

Gases

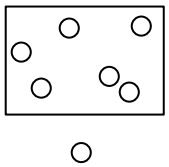
I. Have molecules far apart

II. Some gases cannot be seen but can be felt

III. Gases have neither definite shapes nor volumes

IV. Gases expand the most when heated

V. Gases cannot be touched



molecules far apart

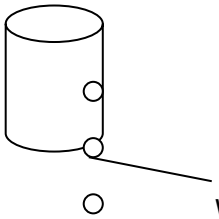
molecules are small particles that make up matter.

An atom is the smallest molecule in matter.

**Cohesion and adhesion forces**

Cohesion is the force of attraction between molecules of the same substances. E.g. water and water, wood and wood.

Adhesion is the force of attraction between molecules of different substances e.g. water and glass



Water droplets on a glass. These are held on a glass by adhesion forces.

## Changes of states of matter

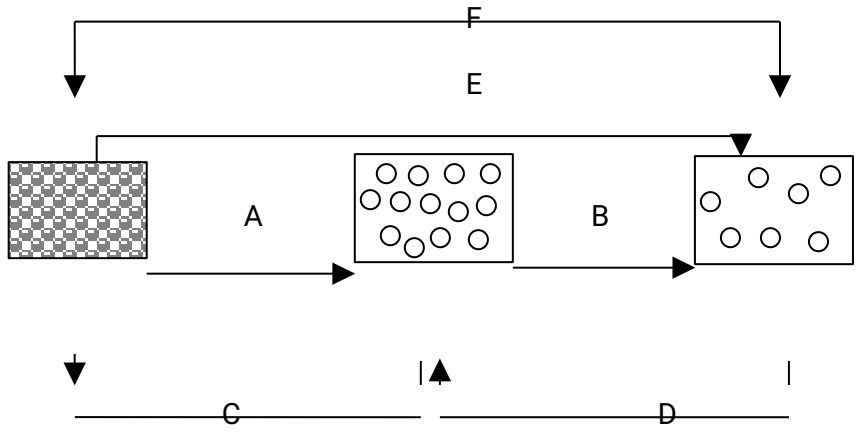
Matter can change from one state to another. The change can be caused by change in temperature. Heat energy is the energy responsible for changing matter from one state to another.

Some substances can easily change from one state to another

What is a substance?

A substance is a material that is made up of only one kind of matter

## Processes in changes of states of matter




**Melting** Is the process by which a solid changes into a liquid (ice changes into water)

**Evaporation** Is the process by which a liquid changes into a gas. (water changes into steam) it is also called vaporization.

**Freezing** Is the process by which a liquid changes into a solid (water changes into ice). It is also called solidification.

**Condensation** Is the process by which a gas changes into a liquid (steam changes into water)

**Sublimation (E and F)** Is the change of state from solid to gas or gas to solid directly.

Solutes , solvents and solutions

### A solute :

Is a substance that can easily dissolve in a liquid

Examples of solutes include , salt , sugar , glucose

### A solvent

Is a liquid that dissolves a solute.

Examples of a solvent is water.

NB: Water is called a universal solvent as it dissolves most solutes.

Substances which do not dissolve in a solvent such as water, is said to insoluble

Examples of insoluble substances includes stones , ash and sand.

**A solution**

Is a substance formed after a solute has dissolved (disappeared ) in a solvent

Mixing and separating mixtures

**1. Separating mixtures of solids and liquids**

When separating mixtures of solids and liquids we use the following methods

- Filtration
- Decantation
- Distillation
- Evaporation to dryness

Filtration

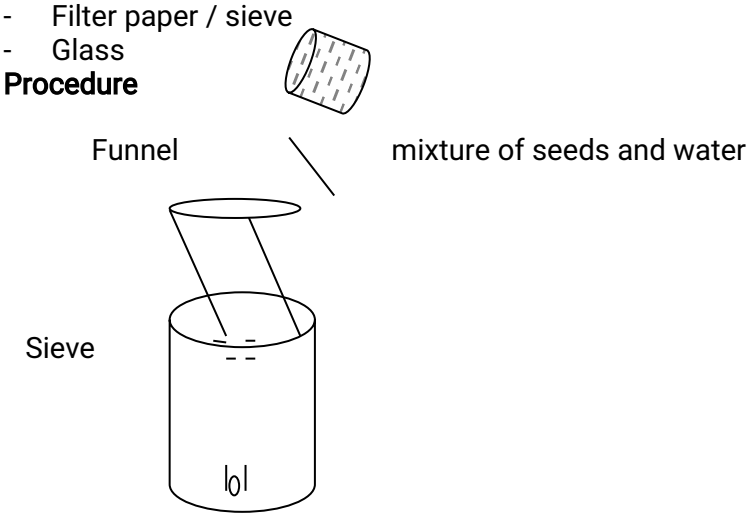
This is a process of separating solid insoluble substance (particles) from a liquid

- The method involves the use of a filter paper , sieve , apiece of cloth and a funnel
- The solid particles that remains on the filter or sieve are called residues and the liquid that goes through the filter / sieve is refered to as a filtrate.
- Filtration at home is used when
- Removing seeds from juice
- Removing tea leaves from tea
- Experiment about filtration

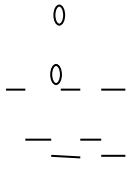
**Things of use**

- A mixture of juice and seeds
- Funnel
- Filter paper / sieve
- Glass

**Procedure**



Residue



Filtrate

**Observation**

The solid particles (seeds) remain on the sieve while the liquid part flows down the glass.

Conclusion

The solid remain on the sieve is the residue while the liquid part which flows down is the filtrate.

**Application in daily**

- Making juice
- Separating tea leaves from tea
- Removing suspended matter from water

**Separating mixtures of liquids. (liquids from liquid)**

When two or more liquids are mixed together, they can be separated using methods below;

- Fractional distillation
- A separation funnel

**Fractional distillation**

This is a method used to separate liquids of the same density but evaporates at different temperatures.

- If water and alcohol are mixed together alcohol will evaporate first.

**Separating funnels**

This is a method used when separating liquids that dont mix easily eg water and oil , petrol and separate liquids of different densities.

Experiment to separate oil from water

Illustration

Separating funnel

Oil

Water

Tap

Separating mixtures of solids ( solid from a solid )

When separating solid mixtures together they can be separated using the following

- Floating (flotation )
- Using a magnet
- Hand picking (sorting )
- Sieving

**Flotation method**

This method is used to separate solid substances where one floats on the other e.g. saw dust and sand.

**Using a magnet**

This is a method used to separate solid mixtures where one is magnetic and the other is non magnetic.

Eg when a needle / pins falls in maize flour.

**Sieving method**

This is a method used to separate big particles from a mixture using a sieve e.g. big stones from sand.

**Energy**

Energy is the ability to do work.

**Types of energy**

Kinetic energy

Potential energy

Kinetic energy is the energy possessed by a moving object (an object in motion) e,g. a stone thrown in air, a leaf falling on the ground, a boy running.

Potential energy is the energy possessed by a body at rest. E.g a  car parked, a stone resting on the ground, a book placed on a table.

**Forms of energy**

Forms of energy are produced by objects.

Heat energy

Sound energy

Light energy

Electric energy

Chemical energy

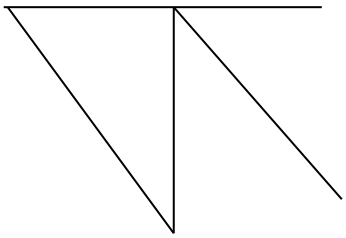
Solar energy

**Energy interconversion**

Energy can be converted from one form to another.

- A chemical energy stored in the candle wax is converted from  to heat energy to  light energy.
- A ball kicked, it hits the goal post. Changes in energy are: potential to kinetic to sound then to heat energy.

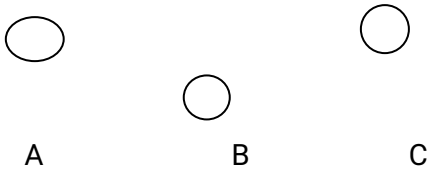
Using a stone or a pendulum swinging in the air.



At A, the stone possesses potential energy.

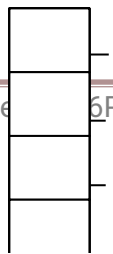
At B, the stone possesses kinetic energy

At C, the stone possesses potential energy




The higher the object, the more the potential energy.

Illustration



— $5^{th}$ brick

— $4^{th}$ brick

$3^{rd}$ brick

- $2^{nd}$ brick

– $1^{st}$ brick

On the above illustration brick 5 has more potential energy than brick 1 and brick 4 has more potential energy than brick 2.

## HEAT ENERGY

What is heat?

Heat is a form of energy that causes matter to become hot or warm OR Heat is a form of energy that increases the temperature of matter making it hot or warm.

Units for heat is colones or joules

## SOURCES OF HEAT

A Source of heat is anything that provides heat

Examples:

a. Sun — this is the main natural source of heat in the environment
b. Fire(fuels) from burning objects e.g firewood, charcoal
c. Electricity
d. Friction or objects rubbing against each other
e. Food
f. Decaying matter

### Uses of Heat energy

Heat energy is useful in many ways.

I. It enables our bodies to function
II. It enables us to cook food
III. It helps in rain formation
IV. Hot objects produce light which enables us to see
V. We use heated bodies to iron clothes
VI. Heat is used to kill germs
VII. Heat from the sun provides warmth to seeds to germinate
VIII. Heat helps animals to feel warm
IX. People use heat to roast food.

**EFFECTS OF HEAT ON MATTER**

Heat causes temperature of matter to increase

Heat can cause some solids to change to liquid and liquids to gases.

Heat can also cause some objects to expand (increase in size)

**EXPANSION AND CONTRACTION**

Expansion is the increase in size of an object

Most substances increase in size when heated

Contraction is the decrease in size of an object

Solids, liquids and gases all expand and contract at different rates

Gases expand fastest, followed by liquids and solids expand least.

Gases expand greatest because their molecules are farther apart and free to move

**Experiments to show expansion in different states of matter.**

**Expansion in solids (diagram)**

Ball and a ring

Things to use

- Metallic ball
- Two metallic rings of the same size
- Source of heat

**Procedure**

**Illustration**

**Observation**

- Before heating the ball it was small in size thereby able to go through the ring.
- When the ball was heated. It increased in in size thereby unable to pass through the ring.

**Conclusion**

Metals expand when heated.

**Experiment to show that gasses expand**

**Things to use**

- Ballon
- Bottle
- Source of heat

**Procedure**

Illustration

**Observation**

The ballon on the cold bottle is small in size.

After the air in the bottle has been heated the bottle has been heated , the balloon increases in size.

Explanation

The air in part II expands due to heat

**Conclusion**

Gases expand when heated.

Experiment to show that liquids expand when heated

**Things to use**

- Coloured water
- Flash
- Narrow tube
- Heat
- Beaker

**Procedure / set up**

**Observation**

When the water in the beaker is heated.

It will heat the coloured water which rises up the narrow tube

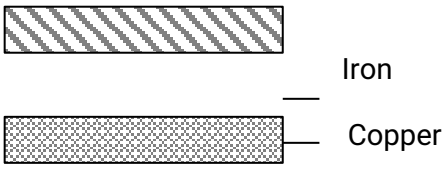
**Conclusion**

Liquids expand when heated

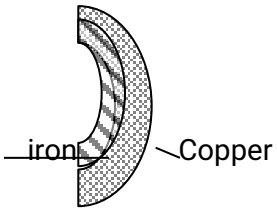
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**A bimetallic strip**

**Before heating**




**After heating**




Copper expands faster than iron.

Reason: Its on the convex side of the bimetallic strip OR copper is longer than iron after expansion.

**PREVENTING BAD EFFECTS OF EXPANSION AND CONTRACTION**

a) Gaps should be left between railway lines to allow expansion on hot weather

b) Electric wires should be loosely fixed on poles to allow contraction on cold weather

c) Spaces should be left in soda bottles to allow the expansion of liquids inside when frozen.




**Expansion in gases**

Gases have the greatest rate of expansion.

Experiment 1

Experiment 2

The water heats the bottle and the air inside the bottle expands causing the balloon to expand.

**HOW HEAT TRAVELS**

There are three ways how heat travels from one place to another. These are:

I. Conduction

II. Convection

III. Radiation

**Conduction**

This is the process by which heat passes (travels) through solids

In solids heat is transferred from one heated molecule to another. This transfers heat until the whole solid object is heated.

EXPERIMENTTO SHOW HOW HEAT TRAVELS BY CONDUCTION

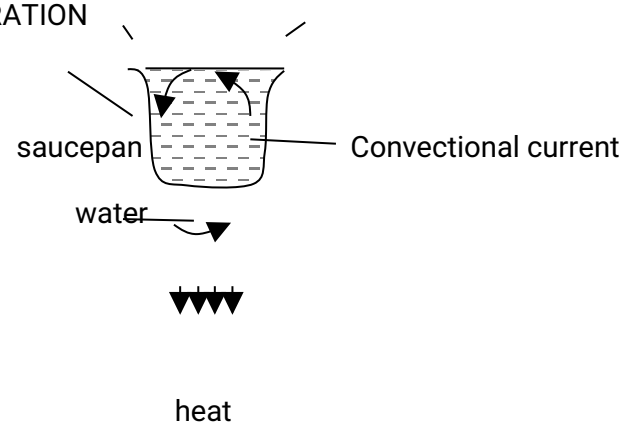
**Convection**

This is the process by which heat travels through liquids and gases.

Heat in liquids and gases travels in form of convectional currents.

The particles which are heated become light and move upwards while the cooler and heavier particles move downwards.

ILLUSTRATION




The particles nearest to the source of heat are heated and become light and move upwards while the cooler and heavier particles move downwards.

**Radiation**

This is the process by which heat travels through vacuum

When heat travels by radiation, it doesnt need any medium of transmission.

**Examples of radiation in nature**

Heat from the sun reaches us by radiation.

When you sit near a fire place, charcoal stove (sigiri) or cooker or even ironing clothes using a flat iron, you receive heat by radiation.

ILLUSTRATION

**Importance of conduction**

1. Conduction of heat enables us to iron our clothes.
2. It helps us to cook
3. Enables us to roast meat

**Importance of convection**

4. Convection currents help to drive out bad smell through vent pipe of a VIP latrine.
5. Smoke is driven out of houses through chimneys by means of convection currents
6. A lit cigarette is kept burning by convection current
7. A Charcoal stove, flat iron and a lantern lamp continue burning by convection currents
8. Convection currents help us to get fresh air in our houses.
9. Water in a kettle on fire boils by convection current

**Importance of radiation**

10. Radiant heat from the sun helps to dry our clothes and harvested crops
11. Heat from the fire reaches our bodies by radiation
12. Radiant heat from the sun helps in rain formation.

**A VACUUM FLASK**

Why is it called a Vacuum flask?

It is called a Vacuum flask because it has a vacuum

**Illustration**

Cork — prevents heat loss by conduction

Vacuum — prevents heat loss by conduction. It also prevents heat gain by convection

Metal case — protects the double walled glass

Cup- it is used to take what is put in the flask

The double walled glass are silvered to reflect heat

The double sided walls prevent heat loss by radiation. The double silvered glass is so shinny to reflect heat.

A Vacuum flask is not commonly used mostly in rural areas because:

I. It is expensive
II. It is delicate i.e it is not easy to handle

## CONDUCTORS AND INSULATORS

A Conductor is any material that allows heat to pass through it.

Examples

Metals like Iron, Steel, Copper, Aluminum, mercury etc

All materials which allow heat to pass through them are termed as good conductors of heat

Aluminium is commonly used to make utensils because;

- It is cheap
- Does not rust
- It has a low density

Silver is the best conductor of heat but it is not commonly used because;

- It is very expensive
- It is heavy

### Bad or poor conductors of heat

Poor conductors of heat are materials which do not allow heat to pass through them. They are also called insulators.

Examples

Rubber, Plastic, Cork, Wood, cotton wool, cloth, feathers e.t.c

All materials which do not allow heat to pass through them are termed as poor conductors of heat

### Application of insulators in our daily life

Handles of saucepans, frying pans, flat irons, electric kettles are covered with plastic or wood to prevent our hands from getting burnt.

### Experiment to show that water is a poor conductor of heat

Water boils at the area being heated, while ice remains unmelted. The water does not conduct heat to the bottom.

### Heat reflectors and heat absorbers

- When heat falls on a shinny face, it is reflected.

- When it falls on a dull surf ace, it is absorbed.
- When it falls on a rough surface, it is absorbed.
- Black objects absorb most of the heat while shinny polished surfaces reflect most heat.

**Note**

Most buildings are painted white inside to reflect heat and remain cool inside.

Refrigerators are painted white to reflect most heat and remain cool inside.

A person who puts on a black shirt feels a lot of heat than the one putting on a white one because black absorbs most heat while the white one reflects it.

## TEMPERATURE

Temperature is the hotness or coldness of an object or a place

Temperature is measured by an instrument called a **thermometer** which gives the units in **degrees.**

## TYPES OF TEMPERATURE SCALES

There are two types of temperatures scales namely;

I. Centrigrade or celcius scale

II. Fahrenheit scale

On the centrigrade scale, the freezing point or the lower fixed point is 0°C and the boiling point or the upper fixed point is 100°c.

On a Fahrenheit scale, the freezing point or the lower fixed point is 32°F and the boiling point or upper fixed point is 212°F

## THERMOMETERS

A Thermometer is an instrument which is used to measure temperature.

Types of Thermometers

a. Clinical thermometer
b. The Sixs minimum and maximum thermometer
c. The Ordinary (wall) thermometer

## CLINICAL THERMOMETER

A Clinical thermometer is the type of thermometer used to measure the temperature of a human body. It is also called a doctors thermometer. A Clinical thermometer is commonly found in Health centres, Clinics and Hospitals

## Characteristics of a Clinical Thermometer

I. It has an arrow that points to 37°C to show the normal body temperature

II. Its scale starts from 34°C and ends at 42°C

III. It has a constriction or kink

**Diagram of a Thermometer (Clinical)**

A — mercury

B — bulb

C — kink or constriction

D — glass

**NB**: A kink prevents the backflow of mercury

When taking the temperature of a person, the thermometer can be placed in these places.

I. Under the armpit

II. In the mouth

III. In the anus

Why should a health worker shake the thermometer before using it on another person?
It is because shaking makes the mercury to go back to the bulb.

## THE SIXS MINIMUM AND MAXIMUM THERMOMETER.

This type of thermometer measures the minimum and maximum temperature of the day.

Maximum temperature is recorded during the day. While minimum temperature is recorded during the night.

This thermometer is commonly found in places like:

I. Research stations

II. Schools

III. Universities

IV. Weather stations

Diagram of the Sixs Minimum and Maximum Thermometer

## WALL THERMOMETER

This is the type of thermometer which is hung in our houses and offices.

- It measures temperature in that room
- It uses mercury
- Normal room temperature is $25^0C$

## LIQUIDS USED IN THERMOMETERS

There are two liquids used in thermometers namely:

I. Mercury

II. Alcohol

## REASONS WHY MERCURY IS USED IN THERMOMETERS

a. Mercury is easily seen

b. Mercury does not stick on the glass

c. Mercury is a good conductor of heat

d. Mercury does not boil easily

e. Mercury has even and regular expansion

## ADVANTAGES OF USING ALCOHOL OVER MERCURY

I. It does not solidify easily

II. Alcohol expands more than mercury

III. Alcohol is cheaper than mercury

## DISADVANTAGES OF USING WATER IN THERMOMETER

- It is colourless so it not easily seen
- It sticks on the wall glass of the tube
- It is a bad conductor of heat
- It needs a lot of heat to expand
- Its expansion is not uniform
- It evaporates when heated

## CONVERSION OF SCALES

a) Converting from Centrigrade scale to Fahrenheit scale

$\frac{9C}{} + 32 = F$

5

9C + 160 = 5F

Derived from the formula $\frac{180}{100} + 32 = {}^{0}F$

b) Changing from Fahrenheit scale to Centrigrade scale

Derived from the formula $\frac{100}{180} (F - 32) = {}^{0}C$

$\frac{5}{9} (F - 32) = {}^{0}C$

Difference between heat and temperature

**BURNING AND RUSTING**

Burning is a chemical reaction in which heat and light are produced

The gas that is given out during burning is carbondioxide

The gas that is needed for burning to take place is oxygen

**EXPERIMENT TO SHOW THAT OXYGEN SUPPORTS BURNING**

**ZONES OF A BURNING CANDLE**

I. Blue zone
II. Yellow zone
III. Pale blue zone
IV. Central zone of unburnt zone

**An experiment to show that oxygen supports burning**

Burning candle

Carbondioxide remains in the glass

**PUTTING OFF FIRE**

I. Using fire extinguisher
II. Using dust
III. Using sand
IV. Using water
V. Wrapping yourself in a thick blanket
VI. Rolling yourself on the ground

**Reasons why Water is not used to put off fire caused by petrol**

Petrol is less dense than water therefore it floats on water and fire continues burning

**Rusting**

Rusting is a chemical reaction which needs the presence of water and oxygen. A metal gets a brown coating called rust. Oxygen and water are the requirements needed for rusting to take place.

**REQUIREMENTS OF RUSTING**

In order iron to rust the following must be available

I. Oxygen
II. Moisture (water)

NB: When an iron bar rusts it forms a product called iron oxide.

**EXPERIMENT ON RUSTING**

**DISADVANTAGES OF RUSTING**

a) It results in wearing away iron and steel equipment
b) It changes and spoils the colour of metals.
c) Bolts become hard to unscrew after rusting
d) Keys fail to fit in padlocks after rusting
e) Water from rusty containers becomes poisonous

f) Rusting makes cutting materials blunt.

**HOW TO PREVENT RUSTING IN METALS**

By oiling and greasing

By painting

By using tar

By galvanizing

By enameling

By making iron stainless steel

**COMPARING BURINING AND RUSTING**

**SIMILARITIES**

a. Both require oxygen to take place

b. Both are chemical reactions

**DIFFERENCES**

Burning needs only oxygen to take place while rusting needs both oxygen and moisture to take place

## TOPIC THREE
## GROWING CROPS
### Importance of a school garden to the school
- It helps the children to learn: how to dig, how to care for crops
- Children get the food to eat for lunch
- The school gets money after selling excess food

### Factors to consider when planning a School garden
- Availability of capital
- Availability of enough modern tools
- Enough well drained fertile piece of land
- Availability of disease free seeds or seedlings
- You should consider the land make up

### Ways of acquiring capital
- Through acquiring loans
- Through fundraising
- Given in kind
- Through mortgaging of personal property

**Stages of preparing of land**

Primary tillage

This is the clearing (removal) of the natural vegetation cover.

**Secondary tillage**

This involves loosening of soil in preparation of planting

### Garden tools

| Tool | Diagram | Use |
|---|---|---|
| 1. Trowel | | For transplanting seedlings |
| 2. Watering can | | Watering crops |
| 3. Secateurs | | Pruning |
| 4. Shears | | Timming hedges |
| 5. Axe | | Cutting tree stump |

| | | |
|---|---|---|
| 6. Rake | | Collecting rubbish |
| 7. Forked hoe | | Loosening hard or rocky soil |
| 8. Garden fork | | Turning manure |
| 9. Knapsack sprayer | | Spraying crops |

**Planting**
Planting is done in the wet / rainy season because there is enough rain water to support plant growth
**Types of Planting**

**Row planting**:
This is a method which involves planting of crops in rows
Diagram showing broadcasting method



**Advantages**
It reduces risks of crop pests and diseases
It allows easy weeding and harvesting
Better and more crop yields are produced
It minimizes competition for sunlight and plant nutrients
It leads to wastage of land

**Broadcasting method**
This method involves scattering of seeds in a well prepared garden especially small seeds like sim sim, millet, rice, beans sorghum
Diagram showing broadcasting method

**Advantages**
It saves time during plant
Maximum utilization of land in the garden
It doesnt need any skilled person and not tiresome
**Disadvantage**
**It promotes overcrowding of crops**
Its difficult in weeding, pest control and harvesting
Poor or low crop yields are produced
**Qualities of good planting materials**
They should be disease free
They should be disease resistant varieties
They should be able to germinate (viable)

**A Nursery Bed/ seed bed**
A nursery bed is a place where seeds are first planted before taking them to a well prepared garden
**Advantages of a nursery bed**
It provides shelter to seedlings against direct sunlight and storm
It allows proper selection of seedlings before transplanting
It allows in water infiltration into the soil before transplanting

**Factors to consider when setting a nursery bed**
Shelter against run off water
Shelter against direct sunlight, storm and harsh weather

**Examples of seeds planted in a nursery bed**
Tomatoes, tobacco, cabbages, carrot, egg plants, rice etc
Examples of seeds planted directly in the main garden
Maize, beans, groundnuts
**Caring of seedlings or plants**
Transplanting: this is the transfer of seedlings from a nursery bed to a well prepared garden
A seedling is a young plant in a nursery bed
**Pruning:** this is the cutting off of excess branches on a plant. E.g oranges, lemons, coffee, cocoa, tea, bananas, guava, etc.
Diagram of a garden tool used to prune

**Advantages**
Pruning reduces the rate of transpiration
Reduces competition for sunlight and air
Reduces overweight and over crowding of the plant
**Thinning**
This is the removal of excess and poor growing seedlings in a nursery bed and plants in the garden
**Advantages**
Reduced competition for nutrients from the soil
Reduces hiding places for pests
It allows easy testing and pest control
**Plant training or staking**
This is the provision of support with a stick frame to a plant to grow up right
Plants which are staked include: tomatoes, passion fruits
**Advantages**
Allows easy spraying and pruning
Allows easy harvesting of cops and weeding
All the parts of the plants receive enough light

**WEEDS**
Weeds are unwanted plants growing in the garden
E.g. Elephant grass, Star grass, Coach Grass, Finger millet weed, Black jack, wondering Jew, sword grass, spear grass.
**Advantages of weeds**
Some weeds are used as vegetables to man
Some weeds are eaten by wild animals
Weeds help to control soil erosion since they cover the soil
Weeds rot and turn into manure
**Disadvantages of weeds**
Weeds compete with crops for plant nutrients
Some weeds are poisonous to man and livestock
Weeds lower the crop yields
Weeds are alternative food for some pests.
Ways of controlling weeds

- By mulching
- By crop rotation
- By slashing
- By spraying using herbicides
- Biological weed control method.
- By uprooting and burning .

**PESTS**

A Pest is a bird, insect or animal which destroys plants or A pest is an organism which spoils crops

**Effects of pests to plants**

They reduce the yield of the crop
They make plants unhealthy
They lower the quality of the crops

| STORAGE CROP PEST | FIELD | CROPS DESTROYED |
|---|---|---|
| Bean weevils | Aphids | Beans, ground nuts, carrots, cabbages |
| Maize weevils | | Maize |
| Red flour beetles | | Maize |
| Rats | | Maize |
| | Termites | Cereals |
| | Locusts | All cereals |
| | Stalk borer | Sugarcane, maize, rice, sorghum |
| | Cut worms | Tomatoes, potatoes, cabbage, beans |
| | Banana weevil (legless grub) | Banana |
| | Rats and moles | Maize, cassava, rice, wheat |
| | Monkeys | Maize, cassava |
| | Thrips | Tea, coffee, onions, beans, bananas |

**Methods of controlling Crop pests**

Practice crop rotation - to starve life cycle of pests
Spray or dust with Agro-Vet chemicals
Practice early planting
Planting clean varieties and disease free and resistant varieties

**Crop Diseases**

| Disease | Crop | Cause |
|---|---|---|
| Bacteria wilt | Tomatoes, sweet potatoes | Bacteria |
| Bacterial blight | Cotton | Bacteria |
| Black rot | Cabbage | Bacteria |
| Maize streak | Maize | Virus |
| Ratoon stunting disease | Sugar cane, sorghum | Virus |
| Mosaic | Cassava, potatoes, tobacco tomatoes | Virus |
| Rosette | Groundnuts | Virus |
| Panama | banana | |

**Methods of controlling diseases**

Practice crop rotation
Dust with chemicals
Plant disease free and resistant varieties

**Ways of controlling weeds in a garden**
Uprooting and burning them
Regular weeding to prevent them from flowering
Cut and bury the weeds
Spray with herbicides
Mulching and shading the crops

**Types of crops grown**
Cereals crops (grain crops) e.g. sorghum, millet, rice, wheat, maize
Fruits e.g. Apples, oranges, mangoes, pawpaw, pineapples, guava
Vegetables e.g. cabbages, cucumber, spinach, lettuce
Root crops e.g. cassava, sweet potatoes, and carrots

**Legumes (leguminous crops)**
These are crops which have root nodules on the roots and store their seeds in pods.
E.g beans, peas, ground nuts, soya beans

**Diagram of a Legume root system**

Root nodules store Nitrogen fixing bacteria
Nitrogen fixing bacteria trap Nitrogen from air in the soil and turn into nitrates
Nitrates is used by plant as plant food
Plants also use nitrogen and starch to make plant proteins

**Root crops**
These are crops that store food in their roots. They are also called root tubers.
Examples; Cassava, sweet potatoes, carrots

**Mode of propagation**

| | | |
|---|---|---|
| Stem cutting | - | cassava |
| Sweet potato vines | - | sweet potato |
| Seeds | - | carrots |

**Harvesting**
Harvesting is the removal of ready crops from the garden usually done in a dry season
Why?
To allow easy drying of crops since there is enough sun heat.

**Methods of harvesting root crops**
Uprooting of the crop
Doffing with hoes, sticks and any hard tool.

**Harvesting tools includes**

| Tool | Diagram |
|---|---|
| - Knife<br>- Panga<br>- Hoe<br>- Sickle | |

**Preservation of food**
Some crops can be preserved by:

Sundrying like root crops, cereal, legumes
Smoking
Refrigeration etc

**Storage of crops**

In granaries (diagram)
In silos

**Structures and function**

Rat guards
Stands
Shelter

**Conditions for proper storage**

The grains should be stored when they are dry
Stores should have good ventilation
Presence of rat guards and shelter on the store
Regular dusting of crops with pesticides

**Qualities of a good food store**

- It should be well ventilated
- It should be water proof
- It should be kept dry and clean at all times
- It should be raised from the ground to prevent dampness.

**Marketing**

Marketing is the buying and selling of crop produce.

**Co-operative societies**

Co-operative societies consist of groups of people who join together to do things or business they cannot do successfully as individuals

**Functions of cooperative societies**

Buy farmers produce at reasonable price
Extend loans to farmers to buy tools, pesticides, etc
They offer advisory services to farmers
They find markets and market farmers produce

**Examples of co-operative societies which used to exist.**

East — Mengo Cooperative society
West — Mengo cooperative society
Busoga Growers Co-operative Society
Bugisu Co-operative Society

**Young farmers clubs in schools**

**Functions**

Teach school children how to grow and care for crops
Help in food production
Grow crops and sell them to get money
Keeping and using farm records

**Farm records**

Are written information about the activities on the farm.

**Importance of records**

They help to know your expenditure
They help to know the profit and loss the farmer is making after selling his produce
They help in proper future planning

They help in fair taxation of the farmer

## TOPIC FOUR
## BACTERIA AND FUNGI
### BACTERIA

Bacteria are tiny organisms made up of one cell. They are so small that they cannot be seen using naked eyes. They are seen using a microscope. This is why they are called micro organisms

Where are bacteria found?
Bacteria can be found everywhere but they are mostly found in places like:

a) In water
b) Soil
c) In air
d) Bodies of animals and plants
e) Latrines and rubbish pits

Bacteria feed saprophytically

**How do bacteria reproduce?**

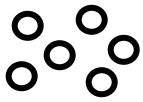
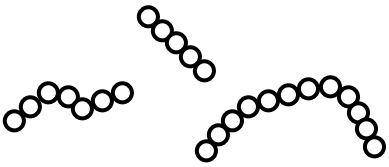
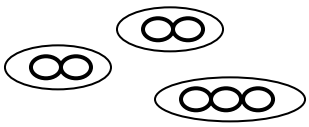
Bacteria reproduce by the process called Binary fission or cell division
Bacteria need warmth and food to reproduce
Some bacteria need oxygen to breathe these are called aerobic bacteria

Other bacteria do not need oxygen theses are called anaerobic bacteria
Many anaerobic bacteria cause diseases

**Types of Bacteria**
Bacteria are grouped according to their shapes
There are four types of bacteria namely:

### 1. The Spherical bacteria
These cause boils, sore throat, pneumonia etc
Examples: Staphylococcus cause boils, Streptococcus cause sore throat, Streptococcus diplococus cause pneumonia

**DIAGRAMS**

| | | |
|---|---|---|
|  |  |  |
| Staphylococcus | Streptococcus | Streptococcus diplococus |

### 2. Rhode shaped or cylindrical bacteria
These are called bacilli
Some of these cause anthrax, typhoid and food poisoning
Examples: bacillus anthrasis cause anthrax, salmonella typhi cause typhoid fever , mycobacterium causes tuberculosis.

**DIAGRAMS**

| | | |
|---|---|---|
| | | |
| Salmonella typhi | | Mycobacterium |

### 3. Spirilla and spirochaete
The spirilla bacteria do not move while the spirochaette move. Example triponema cause syphilis

### 4. Vibrios
These are comma shaped bacteria
Example
Vibrio cause cholera
Diagram

**USEFUL BACTERIA**
- Bacteria help in the rotting of materials.
- Help in the breaking of volumes of faeces in latrines
- Some are used in the making of vitamin B12
- Some are used in making cheese and yoghurt by fermenting milk
- Bacteria found in nodules on roots of legumes help to improve soil fertility

**HARMFUL BACTERIA**
- They cause diseases
- They make food to go bad e.g milk

**FUNGI**
Fungi are living organisms which feed on dead decaying matter as saprophytes
They grow in moistened places
Their bodies are made up of branched threads called hyphae

The hyphae make their bodies called Mycelium
Most fungi reproduce by means of spores apart from yeast which reproduces by cell budding.

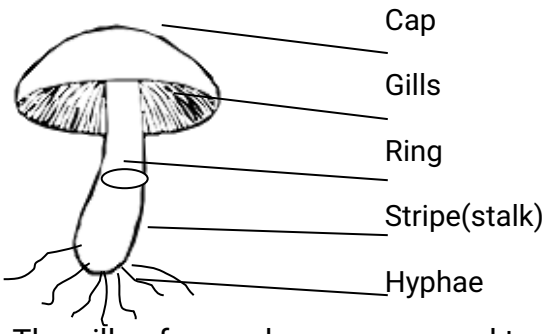
## EXAMPLES OF FUNGI

a) Mushroom
b) Toad stools
c) Puff ball
d) Yeast
e) Moulds

## USEFUL FUNGI

- Some fungi are eaten e.g mush room
- Yeast is used to give flavor to cheese
- Yeast is used when baking bread
- Yeast is also used in brewing beer
- Yeast is a good source of vitamin B1
- Penicillin moulds are used to make antibiotic called Penicillin
- Mushrooms are also a source of income after selling.

**A mushroom**




The gills of a mush room are used to produce and store spores
Mushrooms are unable to make food because they dont have chlorophyll
They absorb food nutrients from dead decayed matter as saprophytes

## HARMFUL FUNGI

a) Some fungi are poisonous e.g toad stools
b) Some fungi cause diseases like; ring worm, athletes foot, eczema, finger nail deformation
c) Fungi also cause diseases in plants e.g : Potato blight, Maize rust, Tomato blight, Rice blast
d) Some fungi make food to go bad e.g mould grows on food

**Differences between bacteria and fungi**

| Fungi | Bacteria |
|---|---|
| Reproduce by means of spores | Reproduce by brinary fisnsion |
| They are multicellular | They are single celled |
| Fungal diseases are not immunisable | Bacterial diseases are immunisable |
| Some are eaten as food | No bacteria are eaten as food |
| Fungal diseases are spread through close body contact | Bacterial disease are spread through air, water and insects |

**Ways of controlling fungal and bacterial diseases**
**Heat**

Strong heat kills germs. This is why

a) We boil drinking water
b) We iron clothes
c) We cook food before eating
d) We boil milk before drinking
e) Some medical equipment are sterilized by steaming or boiling

**Sunlight**

Most germs breed in dark moistened places
So we must allow light into our rooms through windows

**Cleanliness**

We must maintain hygiene and sanitation in order to keep away germs

**Fresh air**

Enough fresh air keeps away germs
This is why living houses must be well ventilated

**Chemicals**

Using some chemicals help to kill germs
Examples

a) Vim b) Jeyz c) Doom e.tc

**Using essential drugs**

Essential drugs are drugs used to prevent diseases, cure diseases and reduce signs and symptoms
Examples: Penicillin, septrin, chloroquine, quinine

**PIONEERS OF SCIENCE**

1. Edward Jenner (1749 — 1795). He first immunized someone against a disease.
2. Louis Pasteur. He discovered that fermentation, decay and various diseases are caused by bacteria. He also discovered that milk goes bad because of germs. He developed the methods of immunizing against anthrax and rabies.
3. Sir Ronald Ross. He was the first to discover the cause of malaria
4. Sir Alexander Fleming. He discovered an antibiotic called Penicillin
5. Joseph Lister. He discovered antiseptic which prevents wounds from becoming septic.
6. Robert Koch. He discovered the bacteria which causes anthrax and tuberculosis.
7. Sir. William Harvey. He was the first scientist to discover that blood circulates around the body
8. Karl Landsteiner. He discovered the blood groups.

# PRIMARY FIVE SCIENCE NOTES TERM III

## TOPIC ONE

## CHANGES IN THE ENVIRONMENT

Changes in the environment are divided into two

a) Natural changes e.g rotting, germination, growth, seasons

b) People made changes

### Natural Changes in the environment

These are changes that happen on their own and we have no control over them.

Groups of natural changes in the environment

a) Biological changes

b) Chemical changes

c) Physical change

d) Changes in the atmosphere

### Biological changes

These are natural changes that take place in living things. Examples of biological changes in animals and plants

Animals: falling sick and recovering

Hatching of eggs

Ripening of fruits

Shedding leaves in a dry season

Moulting

Growth and development in animals

Changes of colour in chameleons and plants

Germination

### Characteristics of biological change

- They occur in living things
- New substances are formed

### Chemical changes

These are changes that are irreversible: Examples of chemical changes

| | | | | |
|---|---|---|---|---|
| Burning wood to ash | Rusting | Digestion | Fermentation | Weathering |
| Rotting | Respiration | Boiling of an egg | | Decomposition |

**Characteristics of Chemical changes**

New substance with different composition are produced

The change is not easily reversed

Chemical and Physical properties change

**Physical changes**

These are changes that are reversible

**Examples of Physical Changes**

- Evaporation
- Condensation
- Melting
- Freezing
- Sublimation
- Dissolving of solutes

**Characteristics of Physical changes**

The substance does not change

The changes are reversible

Physical but no chemical properties are changed.

No heat or light is given out or absorbed

**Changes in the Atmosphere**

These are changes which take place in the atmosphere e.g.

- Movement of clouds
- Movement of wind
- Formation of rainfall
- Changes in shapes of the moon
- Change in seasons
- Floods
- Earthquakes

- Seasons

**People made changes**

These are changes caused by people and they can be controlled

Examples of people-made changes

| | |
|---|---|
| Tree planting | Building houses |
| Bush burning | Road construction |
| Mulching | Extraction of minerals |
| Clearing of vegetation | Overfishing in water bodies |

**Effects of changes in the environment to people animals and plant**

**Positive effects of changes in the environment**

- Biological changes lead to continuity of life
- Physical changes produce rain and water
- Planting of trees controls soil erosion
- Planting of trees increases amount of rainfall in the environment
- Houses protect people and their property from bad weather.
- Roads help to improve transport.

**Negative effects of changes in the environment**

- Some chemical changes lead to pollution on the environment
- Some changes destroy life
- Environmental degradation
- Some atmospheric changes lead to famine

## TOPIC TWO

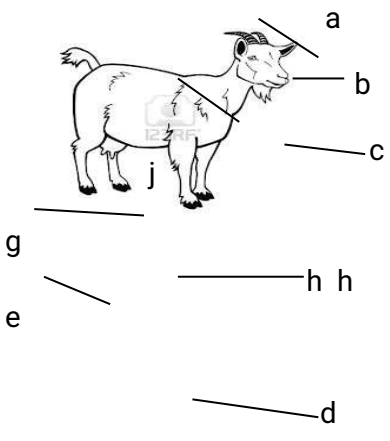
## KEEPING OF GOATS, SHEEP AND PIGS

### Goats

Terms used in relation to goat keeping.

| | |
|---|---|
| Nanny goat | A female goat |
| Billy goat | A male goat |
| Kid | Young goat |
| Kidding | Act of producing a kid |

### Diagram of a goat




External parts of a goat

a) Eye
b) Ear
c) Muzzle(mouth and nose)

d) Hoof

e) Breast

f) Tail

g) Belly

h) Thigh

i) Hock

j) Neck

**Reasons why people keep goats**

- They are kept for social functions like paying dowry and ritual
- They are kept for meat production
- They are kept for milk production
- They are kept for selling.

**Uses of goats**

- They provide meat
- Some goats provide milk
- Their skins are used for making belts, bags, shoes drum, tops, dancing costumes etc
- Their droppings are used as farm yard manure
- They are sold for money.

**Advantages of keeping goats**

- Goats feed on almost any vegetation
- They have low water demand
- They are tolerant to diseases
- They are tolerant to high temperature

**Breeds of Goats**

Examples of breeds of goats

a) The small East African goat

b) Mubende goat

c) Somali goat

d) Boer goat

e) Saanen

f) Toggenburg

g) Ango-Nubian

h) Samburu

**Groups of breeds of goats**

i. Local breeds

ii. Exotic breeds

**Local breeds** example: Mubende goat, Somali goat, Small East African Goat Samburu

**Exotic breeds of goats**

a) Boer goat, b) Saanen c) Toggenburg d) Anglo-Nubian

**Gestation period in goats**

Gestation period is the time from fertilization to birth in animals.

The gestation period of a goat is 150 days or 5 months.

**Feeding goats and housing**

**Housing**

A goats household should;

- Protect animals from rain, drought and heat.
- Be cheap to construct and easy to clean (to avoid diseases)
- Be well ventilated (to allow circulation of air)
- Have a slanting floor made of concrete (for easy cleaning)

**Feeding of goats**

Goats eat green grass and shrubs.- This act of feeding is called browsing

Green grass contains nutrients needed for energy, body repair and growth.

Goats can also feed on leftover food and peelings.

Milk breeds of goats should be provided with water.

**Types of breeds of goats**

There are mainly two types namely:

a) Meat producers. The meat breeds

b) Milk producers or dairy breeds

**Meat producers**

1. The small East African Goat
2. Mubende goat
3. Somali goat
4. Samburu

**Milk producers/ The Dairy Breeds**

Saanen Anglo-Nubian, Toggenburg

**Characteristic of dairy breeds**

They have large udders

They produce a lot of milk

They are not muscular although they have large bones.

**Methods of grazing goats**

1. Extensive method
2. Semi-Intensive method
3. Intensive method

**Extensive method**

The goats are herded together with cattle in an open area. It is commonly used in areas with scanty vegetation. Goats graze on natural pastures without fencing or housing.

**Advantages**

- Goats eat a variety of feeds.
- Goats have enough body exercises.
- It involves less labour.
- It is cheap.
-

**Disadvantages**

- Goats can be killed by wild animals
- Goats can be easily stolen by thieves.

- Goats can easily acquire diseases.

**Semi-Intensive**

The goats are grazed in fenced area or paddocks or tethered.

**Advantages**

- Diseases and parasites are easily controlled.
- Goats do not destroy peoples crops.

**Disadvantages**

- It is expensive to set up.

**Intensive method**

Goats are kept in their houses

The farmers collect grass and other feeds for their goats

**Advantages**

- Goats are protected from thieves.
- It is easy to control diseases
- It is expensive to feed the goats

**Disadvantages**

- It requires much attention
- It is expensive to feed goats

**Keeping Sheep**

**External parts of Sheep "Diagram of a Sheep"**

a) Back
b) Tail
c) Thigh
d) Hock
e) Belly
f) Face
g) Neck
h) Rump
i) Ear
j) Hoof

**Reasons why people keep sheep**

- Sheep are kept for mutton
- People sell sheep and get money
- Sheep are kept for cultural and religious purposes
- Sheep are kept for wool

**Uses of sheep to people**

- Sheep provides mutton
- Wool from sheep is used for making coats and blankets
- Sheep is used for cultural and religious purposes
- Sheep is sold to generate income.

**Terms used in rearing sheep**

1. Ram: is a male sheep.
2. Ewe: is a female sheep
3. Lamb: is a young sheep
4. Lambing: is the giving birth to a lamb by an ewe
5. Mutton: is meat from sheep
6. Shearing: is the removal of sheeps wool by cutting with a shearing machine.
7. Docking: is the cutting short of a sheeps tail.

**Breeds of Sheep**

Merino, Somalia, Corriedale, The Romney Marsh, Masai, Black headed Persian.

**Groups of breeds**

**a) Local breeds**

Masai

Black headed Persian

Somali sheep

**b) Exotic breeds**

Corriedale

Merino

Romney marsh

Persian fat tail

Ramboullet

Dorper

Hampshire down

**Types of Sheep**

a) Wool

b) Mutton

c) Dual purpose

**Wool sheep**

Merino sheep

- It has a white face and pale skin on the muzzle.
- It is the best producer of wool.

Romney marsh

- It produces long and fine wool.
- It has a white face and short legs.

**Mutton sheep**

Masaai sheep

Black headed Persian

Somalia sheep

**Dual purpose sheep**

These produce both wool and mutton e.g. corriedale

**Gestation period**

The gestation period of an ewe is 150 days or 5 months.

**Housing and managing of sheep**

**Qualities of a good house for sheep**

a) It should be well ventilated and with enough lighting

b) It should have a floor kept clean and dry

c) It should have a roof that can protect animals from bad weather condition

**Importance of proper housing**

a). It prevents easy spread of some diseases

b) It protects the animals against bad weather.

c) It protects the farm records and feeds

d) it protects the animals against predators and thieves.

**Management of sheep and goats**

**Practices activities done on the farm for sheep and goats**

a) Hoof trimming

b) Castration

c) Docking

d) Dehorning

e) Deworming

f) Shearing

**Hoof trimming**

This is the shaping of overgrown hoofs of sheep or goat

Overgrown hoofs interfere with animal movement

Overgrown hoofs encourage foot rot disease.

**Docking**

Docking is the shortening of a lambs tail.

**Importance of docking**

a) To ease mating.

**Shearing**

This is the cutting of wool from a sheep using a shearing machine. A shearing machine is used to cut wool from a sheep.

Shearing should be done during the dry season.

**Reason:** To prevent sheep from being affected by coldness

**Dehorning**

This is the removal of horns from animals

Dehorning prevents animals from hurting each other.

It creates space in animal houses.

**Deworming**

Deworming is the killing of worms in animals

Deworming is done in two ways

a) By Drenching- this is the giving of liquid medicine through mouth

b) By dozing — this is the giving medicine in tablet form

**Castration**

Castration is the removal of testes from male animal. Why farmers castrate farm animal

a) It makes animals tamed and more easy to handle

b) Castrated animals grow fat and fast

c) To prevent STDs

d) To prevent inbreeding

e) Castrated animals do not have bad smell in their meat.

**Methods of castration.**

- By use of a burdizzo/closed castration
- By use of a rubber band use of a loop
- Open castration

**Closed castration**

An instrument called a burdizzo is used with great force to crush the sperm duct.

Diagram showing a burdizzo

**Open castration**

A sharp knife used to cut open the scrotum and remove the testes.

**Use of a loop**

An elastic rubber band is used to squeeze the testes until the sperm cords and blood vessels die.

**Diagram showing use of an elastic rubber band**

**Diseases and Parasites**

Diseases are caused by germs. There are four common groups

Groups of germs

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

**Diseases of sheep and goats**

a) Pneumonia
b) Foot rot
c) Foot and Mouth
d) Nagana
e) Lamb dysentery
f) Rift valley disease
g) Coccidiosis
h) Heart water
i) Mastitis
j) Anthrax

**a) Pneumonia**

It is caused by bacteria

**Signs and symptoms**

a) Difficulty in breathing
b) Coughing
c) Loss of appetite
d) Discharge from the nose

**Treatment and Control**

Isolate affected animal

Treat early with antibiotics

**b) Foot rot**

It is caused by a bacterium

**Signs and Symptoms**

Limping

The hoof swells and pain

Hoofs develop pus and smell

**Control and Treatment**

Cleanliness in the animal house

Let animal bathe their feet in antiseptic

Trim the hoofs

Take sheep to dry pastures

Remove sharp objects from the farm

Treat with antibiotics

**c) Foot and Mouth disease**

It is caused by a virus

**Signs and Symptoms**

Lameness

Blisters on the tongue and mouth

Salivation

Reduction in milk production

Loss of appetite

**Control/ Prevention**

Let animals bathe their feet in antiseptic

Give recommended drugs

Vaccination every six months

**d) Nagana**

It is caused by a trypanosome (protozoan)

**Signs and symptoms**

Eye will be watery

Does not like to eat

Swollen lymph nodes

High fever

**Control and Treatment**

Clear bushes

Use tsetse fly traps

**e) Lamb dysentery**

It is caused by bacteria

**Signs and symptoms**

Diarrhoea with blood stains

Dullness

Staring eyes and staggering

Sudden death

**Control and Treatment**

Vaccinate twice a year

Isolate affected animals

Regular deworming and drenching

**f) Coccidiosis**

It is caused by protozoa

**Signs and symptoms**

Diarrhoea

Weakness

Loss of weight in kids

Abortion

**Control and treatment**

Cleanliness of food, water and house

**g) Anthrax**

It is caused by bacteria

**Signs and symptoms**

High fever

Diarrhea with blood stain

Sudden death

### h) Heart water

It is caused by Protozoa (rickettisia)

**Signs and symptoms**

Fever

Loss of appetite

Animals move in circles

Eye lids found twitching

Control and treatment

Early treatment

Control ticks

### i) Mastitis

It is caused by bacteria

**Signs and symptoms**

Swollen udder

Pus and blood in the milk

Mother does not allow suckling

Udder may stop producing milk

**Control and treatment**

Clean the milking place

Treat with antibiotics

See a veterinary officer to seek advice

### j) Riftvalley disease

It is caused by a virus

**Signs and symptoms**

High fever

Diarrhea and staggering

Loss of appetite

Abortion

Discharge from the mouth and nose

**Control and treatment**

Vaccination

Control mosquitoes

**Parasites in goats and sheep**

Parasites are organisms that live and depend on another living organism called host.

Groups of parasites

a) Ecto parasites
b) Endo parasites

Ecto parasites. These are parasites that live on the body of the host.

Examples of ecto parasites

1. Ticks
2. Mites
3. Fleas

Endo parasites. These are parasites that live in the body of the host.

Examples of endoparasites

1. Tape worms
2. Round worms
3. Liver flukes

**Effects of parasites**

They suck blood from animal

Some parasites spread diseases to animals

They damage the skin of the animals

Endo parasite may prevent proper growth of animals.

**Control and prevention of parasites**

Keeping the feeding containers clean

Spraying animals with chemicals

Dipping animals in chemicals regularly

Deworming the animal

Keeping the animal house clean and dry.

**Products from goats and sheep.**

Both sheep and goats are kept for meat

They produce milk used to make cheese

Sheep produce wool for making sweater, blanket, jackets carpets

Skins from sheep are used to make ornaments

Horns and bones are used to make ornaments, necklaces, buttons and animal feeds

**PIGGERY**

This is the keeping of pigs

**Reasons for keeping pigs**

a) Pigs are kept for pork, bacon, ham and lard product

b) Pigs are a source of income when sold

c) Some people keep pigs as pets

**Uses of pigs**

- Pigs provide pork
- Pigs provide lard
- Hair from pigs is used to make brushes
- People sell pig products and get money.

**Terms commonly used in piggery**

a). Boar - the name given to a male pig

b) Sow - the name given to a female pig

c) Gilt - the name given to a young female pig

d) Piglet - the name given to a young pig

e) Pork — Meat from a pig

f) Bacon and Ham — different types of meat got from pigs

g) Lard — the name given to fat got from pigs

h) Farrowing — the act of producing young piglets by a sow

i) Hog — the name given to a castrated male pig.

**Groups of breeds of pigs**

There four main groups

a) The exotic breeds
b) The local or indigenous breeds
c) Wild pigs commonly called warthogs
d) Cross breeds

**Local breeds or indigenous breeds**

Examples are;

Black pigs

Old spotted pigs

**Characteristics of local breeds**

They grow slowly

They produce poor quality pork

They are small in size

They are not easily attacked by diseases

NB: they can be improved upon by cross breeding.

**Exotic Breeds**

These are pigs that were imported from overseas because of their qualities

**Examples of exotic breeds**

a) Large white
b) Landrance

c) Wessex saddle back

d) Middle white

e) Large black

f) Hampshire

g) Poland China

**Characteristics of Exotic breed**

They have specific colours

They grow very fast

They flatten quickly

They produce high quality pork

They are easily attacked by diseases

**Wild pigs:** these are pigs found in bushes

Examples are the Warthogs found in game parks and reserves

**Cross breeds**

These are pigs got after mating two different breeds .i.e exotic breeds and local breeds

**Housing pigs**

A Pig house is called a sty

**Features of a good pig sty**

It should have a strong floor which is easy to clean

It should have a proper roof

It should be properly ventilated and well lit

It should be dry and warm

It should have space for storage of feed water and equipment

The floor should have concrete and slanting towards the end

It should have a pen for farrowing.

It should have a guard rail to prevent mother from crashing the young one

**Advantages of housing pig**

It protects the pigs against bad weather

It protects the pigs against predators

It prevents from getting diseases easily

It gives the farmer space for keeping record books and feeds for pig.

**Systems of keeping pigs**

There two main systems namely

a) Extensive

b) Intensive

**Extensive system**

This is where pigs are allowed to move about and later gather for feeding and treatment

**Advantages of extensive system**

It is cheap to maintain since a farmer does not feed pig regularly.

The Pigs get a variety of food to eat

It is not tiresome

**Disadvantages of extensive system**

The animals are not safe from predators

The pigs can easily get infected with worms, pests and disease

The pigs can destroy crops

**Intensive system**

This is where a farmer keeps pigs in a closed place or room where they are fed

**Advantages of intensive system**

The animals are free from infections and predators

The farmer gets high quality products

The animals get a balanced diet

The animals do not destroy peoples crops

The animals grow and mature quickly because of supplements

The animals are well looked after.

**Disadvantages of Intensive system**

It is tiresome as animals need a lot of attention

It is expensive providing the animals with feeds, treatment and shelter

## Feeds for Pigs

Pigs can eat grass and both cooked and uncooked food

Piglets feed on their mothers milk until weaning time.

### Groups of pig feeds.

a) Creep feeds

b) Sow and Weaners meal

c) Finishers or Fatteners meal

Weaning is the introducing of semi solid food to piglets other than breast milk.

Ages and types of Pigs fed on the Concentrates

a) Creep meal — piglets from ten days up to 8 weeks

b) Sow and Weaner — breeding stock i.e sows, boar gilts

c) The fattener/ finisher meal — pigs ready to be sold off.

## Advantages of feeding pigs

Animals grow faster

Animals produce quality meat

Animals are not easily attacked by diseases

## Weaning piglets

Weaning is the separating of a mother pig from her litter. It is done by removing a saw from the farrowing pen. Weaning is done at 8 weeks or when pigs reach 5 kg normal weight.

### Importance of weaning piglets

- The sow maintains body weight.
- It takes a shorter time to get on heat.
- Less diseases are transmitted from the sow to piglets.

### Methods of deworming pigs

Pigs should be dewormed regularly to kill common worms that attack pigs

a) Round worms

b) Liver flukes

c) Tape worms

**Deworming can be done in two ways**

a) By drenching — giving animals liquid medicine using a bottle or drenching gun

b) By Dozing - giving animals drugs in table form

**Heat period in pigs**

Heat period is the time when the female animal is ready to be served.

**Breeding**

Breeding is allowing male animals to mate with female ones.

**Signs of heat in pigs**

- The sow becomes restless
- It allows to be mounted on
- The Vulva swells and turns red
- White mucus discharge comes from the vagina
- The animal does not want to eat
- The animal urinates frequently

The gestation period of a pig (sow) is 3 month 3 weeks and 3 days

**Farrowing** is the process of giving birth to piglets by a sow

**Steaming up:** This is feeding of a pregnant animal on food rich in protein.

**Advantages of steaming up**

- The animal builds up its body in preparation for farrowing
- Steaming up encourages the foetus or embryo to grow well
- Steaming up increases persistence and lengthens the peak lactation
- Steaming up prevents low birth weight or even dead ones

**Diseases and Parasites**

**Common diseases of pigs**

African swine fever, foot and mouth, pneumonia, anthrax, foot rot, nagana

**African Swine fever**

This is caused by a Virus

**Sign and symptoms**

High fever for 4 days

Weakness and staggering

Difficult and fast breathing

Diarrhoea or constipation

Loss of weight and death

**Prevention Control and Treatment**

Keeping wild pigs away by fencing

Incase of an outbreak all pigs must be slaughtered and premises disinfected

**Foot and Mouth disease**

This is caused by a virus which spread when an infected animal shares food or water with healthy ones.

**Signs and symptoms**

Fever

Dullness

Loss of appetite

Flow of saliva from the mouth

Lameness due to wounds in coronet on all legs

Wounds or blisters on the tongue, gum and palate

**Control, Prevention and Treatment**

Vaccination every six months

Affected animals should be slaughtered

Quarantine application

**Pneumonia**

This is caused by bacteria or virus

**Signs and symptoms**

Difficult breathing and coughing

Loss of appetite and dullness

Animals reluctance to move

Nasal mucus discharge

**Control, Prevention and Treatment**

Treat early cases with antibiotics

Nursing them in warm shelter

Providing soft feeds and water

**Anthrax**

This is caused by bacteria

**Signs and Symptoms**

High fever

Shivering

Loss of appetite and dullness

**Dysentery**

Dark waterly blood flowing from anus vulva, mouse and nose

Prevention Control and Treatment

Treat early cases with antibiotics

Vaccinate yearly

If dead, dispose off carcass by burying or burning

**Foot rot**

This is caused by bacteria

**Signs and Symptoms**

Swollen painful hooves making animal become lame

Parts of the hoof contain pus and smell rotten

**Prevention and Control**

Treat early cases with antibiotic

Isolate the infected animals

**Piglet Anaemia**

**Prevention and Control**

Give red ant hill soil

Inject iron

Give tablets containing iron

Common parasites

Mites, Fleas, Lice Ticks

**Control and Prevention**

Spray the animals with acaricides

Keep the sty clean and dry

Starting a Piggery Project

**Factors to consider starting a piggery**

) Capital

) Land

c) Labour

d) Market

**Factors considered when selecting a piglet**

The breeds of pigs you are going to keep

The colour of the piglet

The physical appearance of the piglet

The health of the piglet

Factors affecting the piggery industry

People dont want to keep pigs because they eat food eaten by people

Pigs sty produce a bad smell therefore cannot be kept in residential areas.

Pork is not eaten by Moslems because it is a food taboo to them.

**Factors affecting the piggery industry**

- People do not want to keep pigs because they eat food eaten by people.
- Pigsty produce a bad smell therefore cannot be kept in residential areas.
- There is smaller market for pork because of food taboos.

**Farm records**

Farm records refer to written information about the activities carried out on a farm.

**Examples of records kept in piggery**

Farrowing records

Litter records

Operation records

Feed records

**Importance of keeping records**

- They help the farmer to make decisions.
- They help the farmer to plan for the farm
- They help the farmer to work out profits and losses.

## TOPIC: THREE
## FOOD AND NUTRITION

**What is food?**
Something that is good to eat

**What is nutrition?**
Process of supplying food nutrients and their intake by the body for its proper growth and functioning

**What is feeding?**
Feeding is the taking in of food

**Why do people eat food?**
The reasons may be represented with 5Hs namely: Hunger, Habit, Health, Happiness, and Hospitality

**Food taboos and beliefs**
A taboo is a cultural or religious custom that forbids people to eat certain types of food

**Examples of food taboos.**
Moslems are not allowed to eat pork
Moslems are not allowed to eat meat of an animal slaughtered by non-moslem

Catholics are not allowed to eat meat during lent on Fridays
Certain clans in Ugandas tribes are not allowed to certain plants and animals flesh because they are totems
**A food belief** is a feeling that is established by certain tribes to be true or real about food.
**Examples**
Women and girls are not supposed to eat chicken.
Men are not supposed to eat oil nuts.
Children and babies are not supposed to eat eggs.
**Advantages of food taboos and beliefs**
Certain people and tribes have plenty of food stuffs to eat.
Certain animals may be preserved in game reserves by those who do not eat them like Baganda
**Disadvantages**
Food beliefs and taboos can result into nutritional deficiency diseases
Pregnant women may become malnourished and produce underweight babies.

**Breast feeding**
Breast feeding is the act of feeding a baby on breast milk produced by the mothers mammary glands
**Advantages of breast feeding to a baby**
- Breast milk is a complete balanced diet for the new born baby
- Breast milk has some antibodies which help to protect babies against some diseases
- Breast feeding increases love between the mother and the baby.
- Breast milk is always at the right body temperature
- Breast milk is easily digestable

**Advantages of breast feeding to a mother**
- Breast feeding can delay the next pregnancy
- Breast feeding is cheap to the family and mother in terms of expenditure
- Breast feeding is time saving, convenient and available whenever the baby needs it.
- Breast feeding improves the health of the mother she has to eat in order to maintain breast feeding

**Bottle feeding**
**Disadvantages of bottle feeding**
- Bottles can easily be contaminated
- Bottles are difficult to clean
- Bottle milk can easily get contaminated
- Powdered milk is time consuming and difficult to prepare
- Cows or tinned powdered milk is expensive to buy
- Some cows milk or powdered milk may be diluted so much causing milk lack complete diet.

**Vulnerable groups**
**Who are vulnerable groups of people?**
These are groups of people who are easily harmed by not having enough food or enough different types of food to eat or : These are groups of people who can easily be harmed due poor feeding.
**Examples of vulnerable groups**
Pregnant women and their unborn children
Breast feeding women and their breast fed children weaning children
Sick people

**Pregnant women and their unborn children**
A pregnant woman needs a balanced diet containing
**Proteins:** to build the body tissues of the growing baby; to repair her worn out cells
**Carbohydrates:** to give her enough energy to carry the baby in womb
To give her enough energy to do work
**Iron:** to build hemoglobin in her own and in her babys body
**Calcium:** to build strong bones and teeth of the baby inside her womb
**Vitamins:** to protect her unborn baby from catching infection

**Breast feeding women and their breast fed children.**
Breast milk is the only food required for a baby up to four months.
A breast feeding mother needs to eat foods and drink fluids that will help her produce enough milk for her baby
**Fluids:** to stimulate milk production in her breast e.g clean boiled water, milk, fruit juices, bushera, porridge etc
**Calcium:** to replace the calcium in her body that the child is taking in breast milk.

**Weaning children**
Weaning is to acustom a child to solid foods other than breast milk alone. OR
Weaning is the gradual introduction of semi solid foods to a baby other than breast milk alone. It is better to start weaning the child at four months because:
The babys body needs more nutrients for its growing body
The baby needs to get iron from other foods
To prevent deficiency disease e.g kwashiorkor and marasmus

**How to start weaning children**
- Start with semi-liquid food like porridge
- Introduce one type of food at a time.
- Feed frequently using weaning foods like porridge, mashed weaning matooke, mashed posho, mashed rice, mashed fruit

Children have small stomachs so they need many meals a day
Children should be given mashed foods because they have no teeth to chew food

**Sick people**
Sick people need good food and extra fluids
Foods needed by sick people include:
Proteins
Fluids
Vitamins and mineral salts
**Elderly people**
When people grow old, they often lose their teeth.
They can get health problems such as:
Indigestion
Constipation
**Needs of the elderly people**
Foods which are easy to eat such as: Minced meat, fish without bones, mashed fruits etc
Frequent feeding

**Malnutrition and deficiency diseases**
Malnutrition is a condition when the body does not receive enough of all the essential food values OR Malnutrition is poor or bad feeding

**Diseases that can result from malnutrition**
**Kwashiokor**
Disease caused due to lack of proteins in the diet
**Signs and symptoms**
Swollen moon face
Brown hair
A swollen stomach full of air
Swollen hands and legs
When you press the skin, it takes long to come back in position
**Prevention and cure**
Feed children on food containing more proteins e.g meat, fish, beans, peas, cow peas, ground nuts, milk cheese, eggs,etc

**Marasmus**
Disease caused due to lack of enough foods in a diet or disease caused due to lack of enough carbohydrates
Marasmus is also known as over Starvation
**Signs and symptoms**
The eyes are very bright
The face of a child looks like that of an old man
The child is underweight
The child has a pot belly stomach
**Prevention**
Give the child good food in the right amount
Mothers should breast feed their children for at least two years
**Other deficiency diseases**
**Night blindness**
Caused due to lack of foods containing vitamin A in the diet
**Signs and symptoms**
Sore eyes
Colds
Reduced night vision
**Prevention**
Eat foods containing vitamin A. e.g. liver, egg yolk, green leafy vegetables, carrots, butter, margarine, cod liver oil

**Beriberi**
Caused due to lack of vitamin B1 in a diet
**Signs and symptoms**
Retarded growth
Lack of appetite
Body weakness
Paralysis
**Prevention**
Eat foods containing vitamin B1
e.g unpolished cereals like maize, rice, palm wine, beans, lean meat, egg York, milk, kidney, bread and ground nuts
**Pellagra**
Caused due to lack of vitamin B2
**Signs and symptoms**
Skin disorders
Eye and mouth sores

General body weakness
**Prevention**
Eat foods like those of vitamin B1

**Scurvy**
Caused due to lack of foods containing vitamin C
**Signs and symptoms**
Bleeding from gums
Reduced resistance to infection
Anaemia and poor healing of wounds
**Prevention**
Eat foods containing vitamin C e.g fresh fruits like: guavas,oranges, pawpaws, red pepper, frsh dark, green vegetables, prepared concentrated fruit drinks

**Rickets**
Disease caused due to lack of vitamin D and mineral salts called calcium and phosphorus
Signs of rickets
Poor teeth and bone formation
Bow legged
Haemophilia
Disease caused due to lack of food containing vitamin K in the diet
Poor clotting of blood around wounds
Poor healing of wounds
**Prevention**
Eat foods containing vitamin K e.g liver, green leafy vegetables, egg yolk, unpolished cereals

**Anaemia**
Condition in the body in which it doesnt have enough blood or iron in it
Signs and symptoms
Pale lips
Pale eyelids
Pale palms and sole of the feet
**Prevention**
Eat foods containing iron e.g meat, liver, kidney, egg yolk, green leafy vegetables,cocoa

**Goitre**
Condition which results due to lack of foods containing iodine.
Goitre is a swelling which appears in the neck of a person
**Signs**
A swollen thyroid gland in the neck.
**Prevention**
Eat foods containing iodine
e.g sea water foods, sea weeds like algae, iodised salt

**TOPIC FOUR**
**PRMARY HEALTH CARE (P.H.C)**
**Primary Health Care (P.H.C)**
Primary Health Care is the essential health care which involves individuals, families and communities working together to solve their common health problems.
Health is a state of complete well being physically, mentally and spiritually.

**Elements of P.H.C**
- Water and sanitation
- Food and nutrition
- Immunization
- Control of communicable disease ©
- Control of diarrhoeal disease (CDD)
- Family planning
- First aid and basic curative services
- Information and health education

**Principles of PHC**
- Essential health care (EHC)
- Individual, family and community participation
- Use of commonly available resources
- Prioritizing health concerns
- Prevention rather than treatment

**Participating in P.H.C**
**Individual:**
a) Teaching other family members about elements PHC
b) Observing personal hygiene to keep oneself healthy
c) Cleaning the environment
d) Sensitizing other members about dangers of poor sanitation and hygiene.
e) Encouraging parents to take their children for immunization.

**The Family can participate by:**
a) Teaching other families about PHC
b) Observing proper family hygiene like sweeping compound, smoking pit latrines, having rubbish pits
c) By encouraging immunization of family members good nutrition etc
d) By observing health family lifestyles like boiling drinking water, avoiding smoking

**The Community**
A Community is a group of people living and working together within the same locality.

People with special needs in the community and how to care for them

**People with special needs.**

- The sick
- The elderly
- The young
- The disabled

**Care for the sick**

- Showing them love
- Feeding them on a balanced diet
- Taking them to hospital for proper treatment
- Giving them medicine at right time.
- Giving support and counseling to people suffering from AIDS

**Care for the elderly and the young**

- Washing for them clothes and beddings
- Escorting them to hospitals
- Helping them to bathe
- Feeding them on a balanced diet
- Protecting them from dangerous animals
- Helping them to have enough rest
- Preparing for them soft foods

**Care for the disabled**

**Examples of disabled people**

- The lame
- The blind
- The deaf
- The dump
- The crippled

**Care**

- Construction of rehabilitation centres for disabled
- Providing equipment to the lame to ease movement
- Equipping them with skills to help them earn a living
- Public places should be made easy to access by the disabled
- People can learn to communicate to the deaf with gestures.
- Directing the blind to their places of convenience

**Ways of controlling diseases without treatment**

- Through observing proper hygiene of the body and food
- Always observe proper sanitation
- Having a balanced diet
- Ensuring adequate rest and sleep
- Cover or reheat leftover food before eating
- Having regular body physical exercises

**Importance of physical exercise to the body**

- They improve the blood supply to the heart muscles
- Reduced risks of heart disease and high blood pressure
- Promotes flexibility of bones and joints
- Promotes loss of excess body weight
- They help to reduce excess or high levels of fats in the body
- Promotes and maintain proper working of body systems
- They keep the body physically fit.

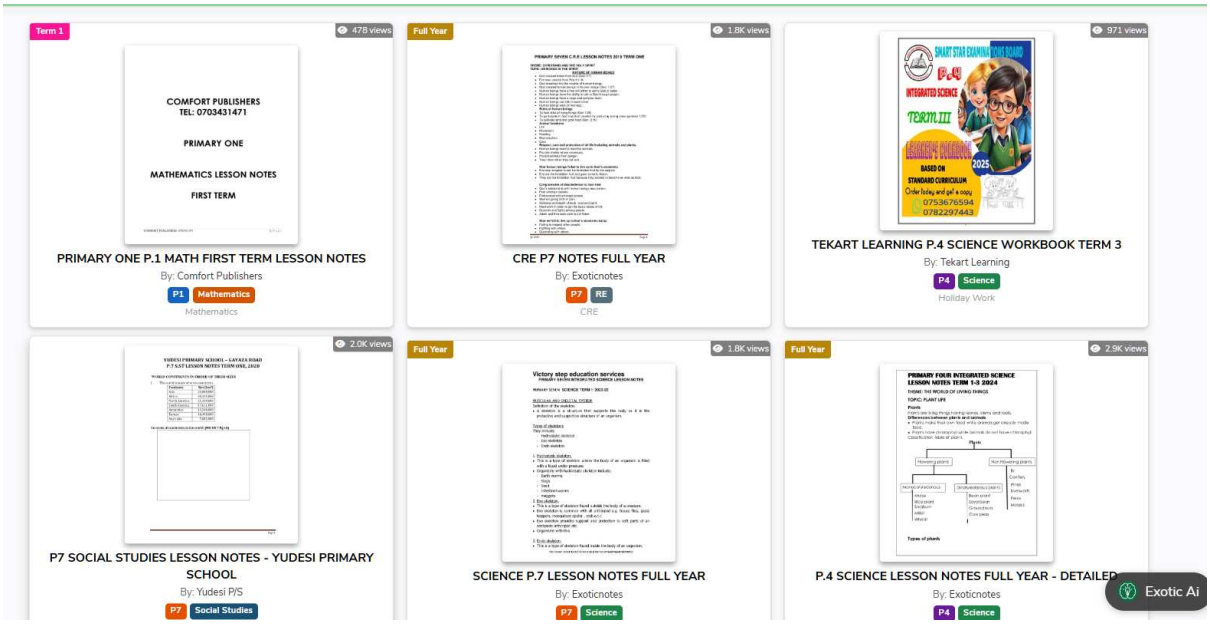
**Health committee**

A Health committee is composed of selected able people from a certain group (class) to perform the duties which can improve on health.

**Importance of health committees (school or village)**

a) Disease control through health talks and discussions
b) Prevention of diseases through immunization
c) Organize cleaning campaigns, providing hand wash facilities and public toilets and waste management measures.

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