P.5 SCIENCE LESSON NOTES

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 bird's 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

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) 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
It's 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 isn't 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 don't 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 Keeper's 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

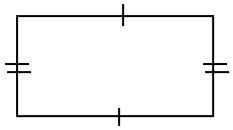
Enemies of bees

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

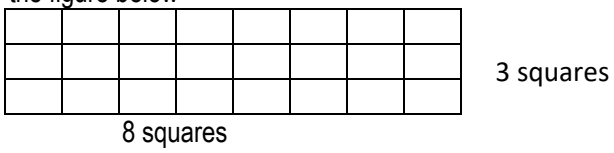
MEASUREMENT
Lesson 1
LENGTH
Length is the distance between two points.
Length is measured using the following units;
Millimetre (mm)
Centimeter (cm)
Metre (m)
Decametre (Dm)
Hectometre (Hm)
Kilometer (km)
The most commonly used units for measuring length are; centimeter, metre and kilometre. The basic 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



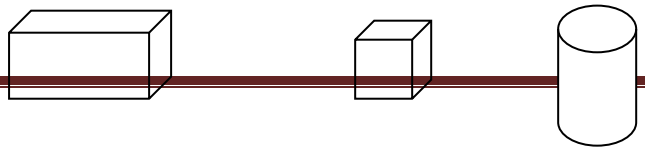
Finding area
Area is calculated by multiplying the longest side (length) by the shorter side (width). Length is represented by letter L and with is represented by letter W.
Find the area of the figure below



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

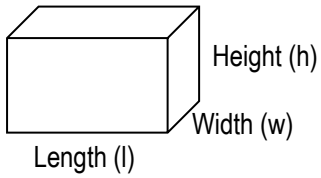
Regular shaped objects
These are objects which have a proper shape e.g. a cube, cuboid, blocks, tins, piece of chalk etc



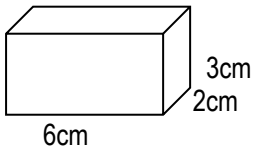
Cuboid cube tin

Irregular shaped objects
These are objects which don't have proper or well defined shape e.g. stones, keys, needles, shoes, sweet potato tuber, cassava tuber etc

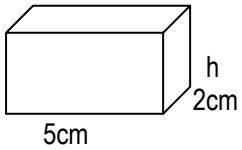
Finding volume of regular shaped objects
The volume of regular shaped objects can be found after knowing their length, width and height. We therefore use the formular. This method is called substitution method
Volume= Length (l) x Width (w) x Height (h)
V = L x W x H



Example: find the volume of the cuboid shown below

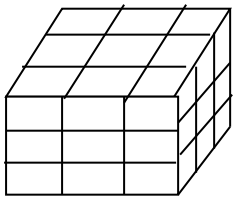


V = L x W x H
V = 4cm x 2cm x 3cm
= $24cm^3$
Find the height of the figure below, if the volume is $36cm^3$



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.

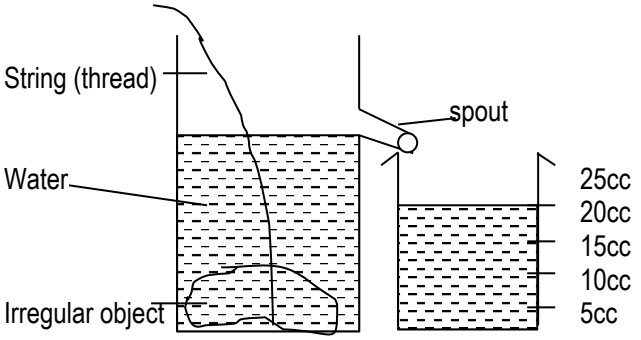
There are two instruments used in the displacement method namely;
The measuring cylinder.
The overflow can (Eureka can)

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

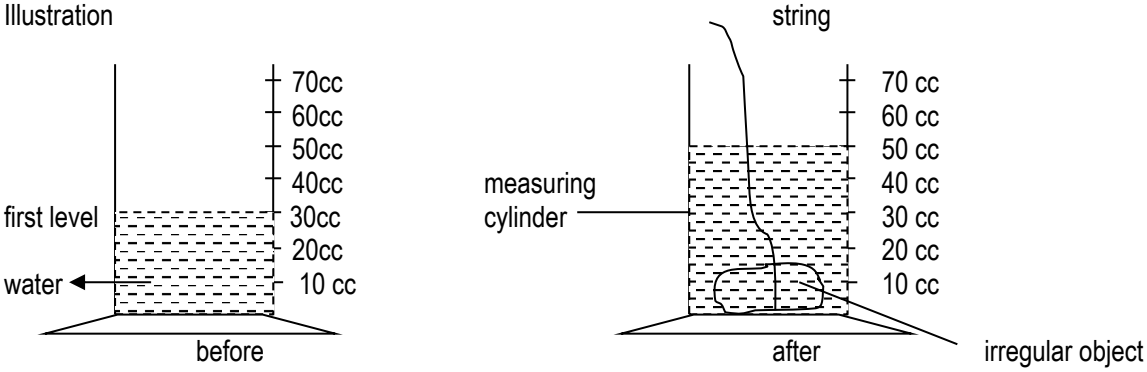
It is called the displacement method because an irregular object displaces the amount of water equal to its volume.

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. It's 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

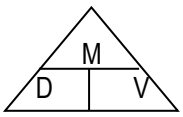
Is force an object exerts due to gravitation force. The weight of an object is determined by the following;
Size of the object
Material from which an object is made
The pull of the force of gravity
The basic unit for weight is Newtons (N).

Mass is the quantity of matter contained in an object. Mass is constant i.e. it doesn't change and it doesn't 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) = $\frac{\text{mass (m) or weight}}{\text{Volume}}$ $D = \frac{M}{V}$ or



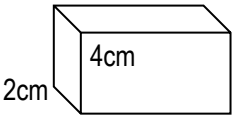
The units for density are grammes per cubic units i.e.
Finding units for density
$D = \frac{M}{V}$ mass = grams (g)
volume = cubic centimeter (cc)

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



6cm

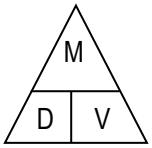
Volume = L x W x H

= 6 x 2 x 4

= 48cm^3

Density = Mass / Volume D = 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

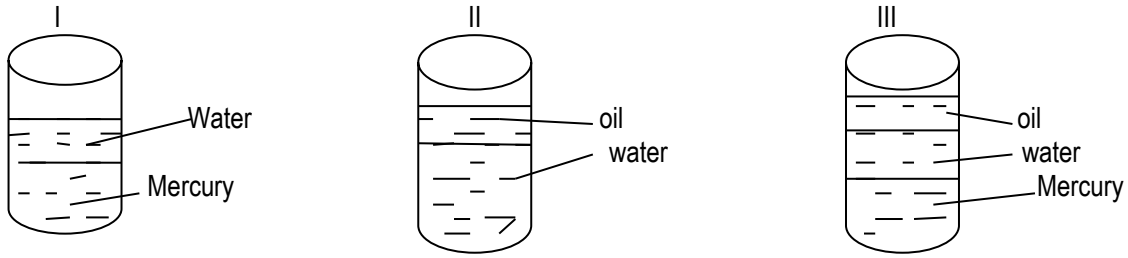
NB: A sinking object displaces water equal to its volume while a floating object displaces water equal to its weight.

Activity

Comparing densities of other liquids with water

Eg mercury and H_2O , oil and H2O

Exp



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

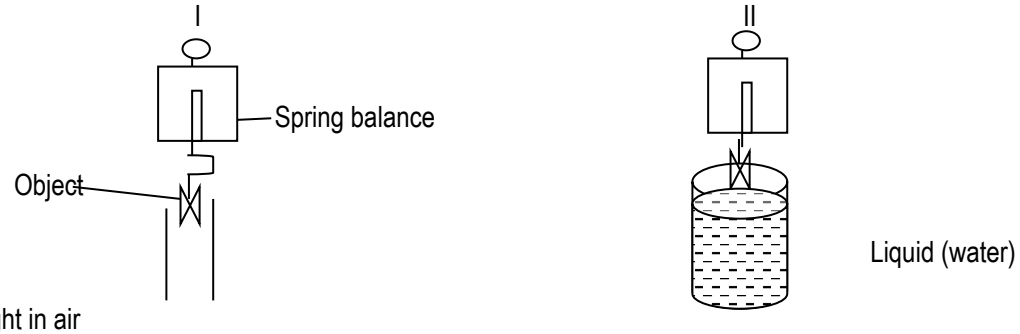
Up thrust force

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 body's 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 mother's 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 one's 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 6 weeks 10 weeks 14 weeks	Polio	Putting drops in the mouth	Mouth
DPT Hep B + Hib	6 weeks 10 weeks 14 weeks	Diptheria Pertussis(whooping cough) Tetanus Hepatits B Haemophilus 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 Loss of weight Loss of skin colour A lot of night sweating	Mild fever Loss of weight Pain in the chest or in the upper back	Treat with antibiotics Visit a health worker for treatment Eating a balanced diet Isolatin
Measles	Virus	Sores in the mouth Running nose Skin rash Dry cough Red eyes	High temperature Itching rash Loss of appetite Weakness	Isolation
Pertussis (whooping cough)	Bacteria	Runny nose Severe coughing Vomiting Quick deep breaths through the mouth	A cold and fever at the beginning	Use of antibiotics
Diphtheria	Bacteria	Swollen neck Sore throat	Fever Difficulty in breathing	Prevent through immunization Seek medical treatment Isolation
Tetanus	Bacteria	Stiff muscles Sudden and strong Tightening of muscles when touched Baby stops sucking	Fever	Immunization Wounds and cuts should be dressed Using only clean cutting objects during birth
Polio (poliomyelitis)	Virus	Lameness of the bones	Paralysed limbs	Drinking boiled water Proper disposal of faeces immunization

Other immunisable diseases

Disease	Cause	Sign and symptoms	
Hepatitis B	Virus Water borne	- Eyes turn yellow - Vomiting - Tiredness - Darker urine - Loss of appetite	- Have enough rest - Take a lot of fluids eg chicken soup or orange
Hib Haemophilus influenza b	Bacteria Its air borne	- Fever - Body weakness - Stiffness of the neck - 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 It's a written record that monitors the child's health.
Important features of a health card.

- Child's 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 child's growth rate.

Health workers (doctors)
1. Monitors the child's 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 child's 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 doesn't 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

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

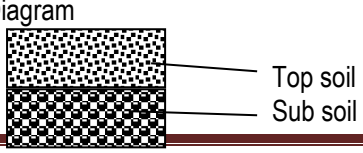
II. Soil contains air

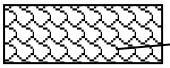
SOIL PROFILE

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.

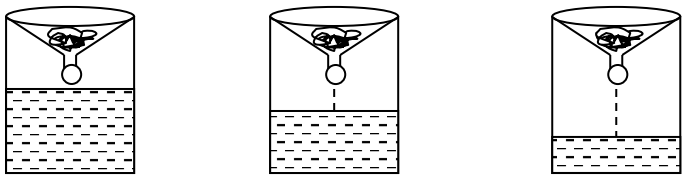
a) It has little humus
b) It has fine particles
c) It is poorly aerated
d) It retains a lot of water (it's poorly drained)
e) It is sticky and heavy
f) It is suitable for pottery.

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 (it's 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

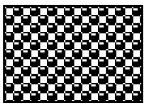
Solids	Liquids	Gases
Wood	Water	Air
Stones	Oil	Steam
Iron	Petrol	Smoke
Bricks	Soda e.t.c	smoke

Properties of matter
Matter has weight
Matter occupies space
Matter exert pressure

Characteristics of each state of matter

Solids

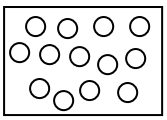
I. Solids always have certain(definite) shapes
II. Some solids change into liquids by heating
III. Solids don't change the form of state when cooled
IV. Some solids expand when heated
V. Have molecules closely held together
VI. The force of attraction between molecules is great (cohesion)



Molecules held together

Liquids

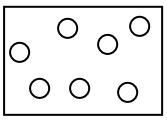
a. Have no definite shapes i.e take the shape of the container
b. Some liquids change into gases by heating
c. Some liquids change into solids by freezing
d. Liquids expand more when heated
e. The cohesion force is weak and that is why molecules move about freely inside the liquids.



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

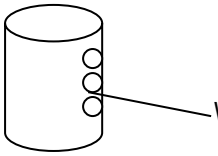


molecules far apart

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.

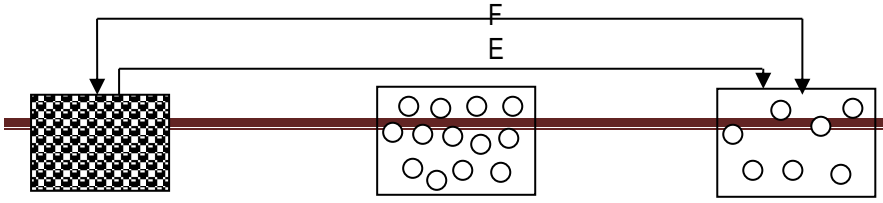
Changes of states of matter

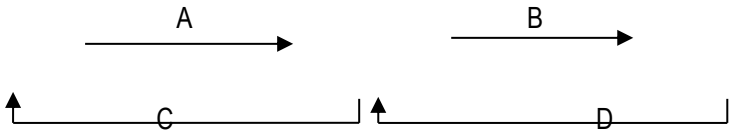
Matter can change from one state to another. The change can be caused by change in temperature. Heat energy is the energy responsible for changing matter from one state to another.

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

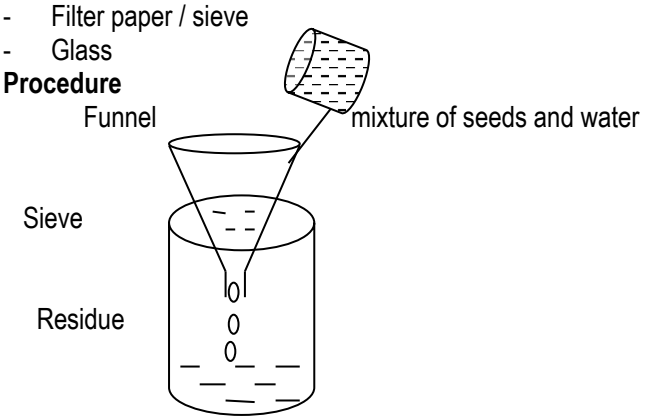
Examples of insoluble substances includes stones , ash and sand.

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



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 don't 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

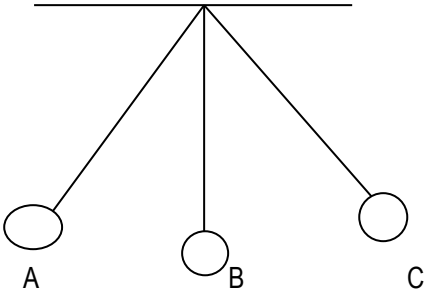
Forms of energy are produced by objects.
Heat energy
Sound energy
Light energy
Electric energy
Chemical energy
Solar energy

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.

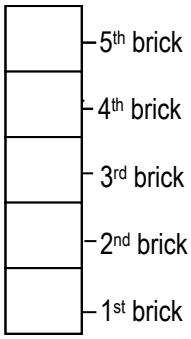
Using a stone or a pendulum swinging in the air.



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



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

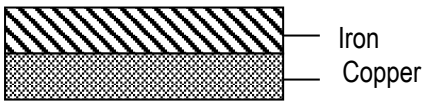
Conclusion

Liquids expand when heated

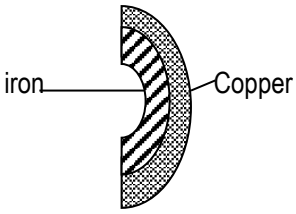
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A bimetallic strip

Before heating



After heating

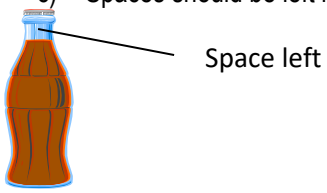


Copper expands faster than iron.

Reason: It's 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

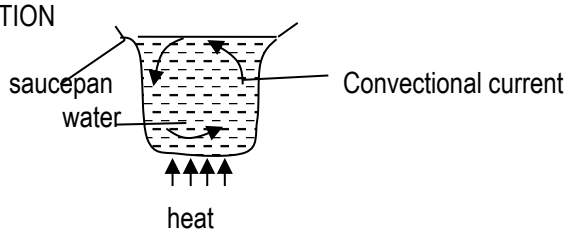
Convection

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 doesn't 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 Six's 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 doctor's 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 SIX'S 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 Six's 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

$\frac{9C}{5} + 32 = F$

$9C + 160 = 5F$

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

b) Changing from Fahrenheit scale to Centrigrade scale

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

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

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 doesn't need any skilled person and not tiresome
Disadvantage
It promotes overcrowding of crops
It's 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 - Panga - Hoe - 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 farmer's produce at reasonable price
Extend loans to farmers to buy tools, pesticides, etc
They offer advisory services to farmers

They find markets and market farmer's 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

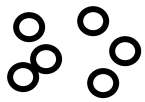
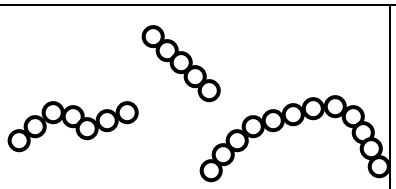
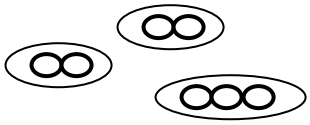
Types of Bacteria

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

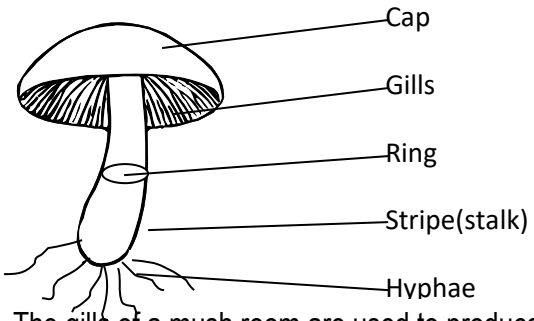
FUNGI

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 don't 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

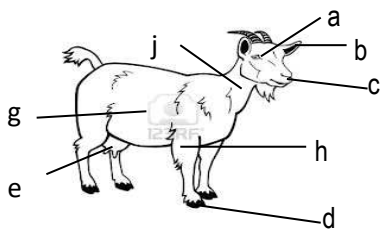
KEEPING OF GOATS, SHEEP AND PIGS

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 goat's 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 people's 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 sheep's wool by cutting with a shearing machine.
7. Docking: is the cutting short of a sheep's 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 lamb's 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 people's 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 mother's 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
a) Capital
b) 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 don't 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 5H's 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 Uganda's 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 mother's 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
- Cow's or tinned powdered milk is expensive to buy
- Some cow's 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 baby's 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 baby's 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 doesn't 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.

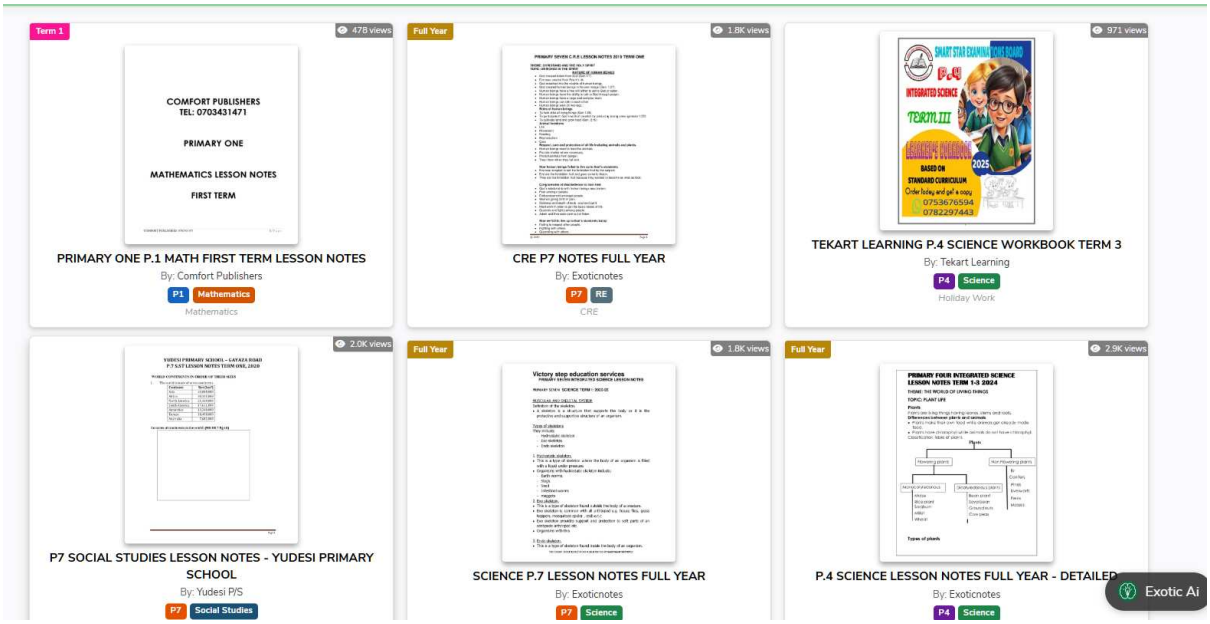
Health committee

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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