DIVINE EDUCATION CENTRE(DEC)

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SCIENCE

LESSON NOTES TERM TWO 2023

(Abridged curriculum)

PRIMARY SIX

TOPIC 3: CLASSIFICATION OF FLOWERING AND NON FLOWERING PLANTS

PLANT KINGDOM

Plants are divided into two groups viz:

i. Non flowering plants
ii. Flowering plants

NON – FLOWERING PLANTS

These are plants which don't bear flowers. Groups of non flowering plants

- Spore bearing plants
- Coniferous plants

Spore bearing plants

These are plants that reproduce by means of spores.

They include:

- Ferns
- Mosses
- Liverworts
- Horsetails

A spore is a single cell which is able to develop into a new plant. A spore is protected by a spore case.

FERNS

- Have chlorophyll and can make their own food.
- Have proper roots, stems and leaves.
- Reproduce by means of spores, spores are produced at the lower side of the leaves in spore cases.
- They grow in shady moist places.

Diagram



MOSSES

- These are small green plants grow on house roofs, verandah, tree trunks, logs, rocks, and soil in damp shady places.
- Reproduce by means of spores.
- Contain chlorophyll and makes its own food.

Diagram



LIVERWORTS

- Grow in wet moist places.
- Have chlorophyll and make their own food.
- Reproduce by means of spores.



CONIFERS



- These bear seeds in structures called cones.
- Have small needle shaped green leaves.
- Don't have flowers but produce pollen and ovules in cones.

Examples include;

- Pine
- Cedar
- Fir
- Cypress
- Cycades
- Podo
- Ginkgo

Economic value of conifers

- Give us soft wood timber.
- Act as wind breaks.
- Produce soft wood for making papers, match sticks, ceiling boards.
- Earns foreign exchange.

FLOWERING PLANTS

These are plants that bear flowers and reproduce by means of seeds.

Groups of flowering plants

- Monocotyledonous plants
- Dicotyledonous plants.

Monocotyledonous plants

These are plants that bear seeds with one cotyledon.

Examples

Millet	maize
Sorghum	rice
Barley	wheat
Oats	

Characteristics of monocotyledonous plant

- Produce seeds with one cotyledon
- They undergo hypogeal germination.
- Have fibrous roots.
- Have leaves with parallel leaf venation.

Dicotyledonous plants

These are plants which bear seeds with two cotyledons.

Examples:

Legumes e.g. beans, peas, groundnuts, bambara nuts e.t.c.

Characteristics of dicotyledonous plants

- Produce seeds with two cotyledons
- Undergo epigeal germination
- Have a network leaf venation
- Have a tap root system.

A flowering plant consists of two systems

i. Root systems
ii. Shoot system.

Parts of a flowering plant.

Diagram.

Functions of parts of a flowering plant.

Terminal bud – Growing tip of the plant.

Auxiliary bud – grows into branch, flower etc.

Node – Point on a stem where a leaf grows.

Internode:- The region between two nodes

Root cap:- Protects the tip of the tap root .(main root)

ROOTS

A part of a plant that grows in the soil. It develops from the radicle.

Functions of roots

- Absorb water and mineral salts from the soil.
- Hold the plant firmly in the soil.

- Some roots store food for the plant.
- Some roots help the plant to breathe.

Uses of roots to man

- Some are sold to get income.
- Some roots are sources of food.
- Some roots are used as herbal medicine.
- Some provide wood fuel.

ROOT SYSTEMS

These are two main root systems

i. Fibrous root system.
ii. Tap root system.

Diagrams

Types of roots

i. Prop roots

These give extra support to a plant such plants include;- maize, sorghum, etc.

Diagram



ii. Buttress roots
iii. Clasping roots
iv. Stilt roots

v. Breathing roots
vi. Storage roots e.g. carrots, cassava, sweet potatoes etc

With diagrams

OSMOSIS

This is a plant process where fluids (plant nutrients move from a region of low concentration through a semi-permeable membrane.

Osmosis mainly takes place in the root hairs of plants.

An experiment to illustrate osmosis.

STEMS

Functions of the stem to plants.

- They hold leaves and branches in position to get sunlight.
- Hold the flower for pollination
- Help in transpiration
- Some stems make food for the plant.

Functions to man.

- Some are sources of food.

- Some are sources of income.
- Some provide herbal medicine.
- Some are used for propagation.
- Some provide timber.

Types of stems

- Upright stems.
- Creeping stems
- Underground stems.

With diagrams

Reasons why plants climb others.

- To get support
- To obtain sunlight.

Ways how plants climb others

- Use of tendrils
- Use of hooks
- By twining or clasping

Underground stems

Examples are:

- Bulbs
- Rhizomes
- Stem tubers
- Corms

Bulbs

Examples are;

Onions, garlic etc

diagram of onion

Rhizomes

Examples are: turmeric, ginger etc

Stem tubers

Examples are; Irish potato, white yams etc

Corms

Example is cocoyam

Plant stem propagation

This is the way plants can be grown using stems.

Examples

- Bulbs
- Rhizomes
- Corns
- Stem tubers
- Suckers

With diagrams

LEAVES

The structure of a leaf , parts and their functions.

Types of leaves.

- Simple leaves
- Simple serrated
- Simple divided
- Simple lobed.

With diagrams

Compound leaves

- Bipinnate
- Pinnate
- Digitate
- Trifoliate

With diagrams

Functions of leaves to both plants and man (animals)

PHOTOSYNTHESIS

The process by which green plants make their own food.

Photo – means light.

Synthesis – means to build up.

Raw materials for photosynthesis

- Water
- Carbondioxide.

Conditions necessary for photosynthesis

- Chlorophyll
- Water
- Sunlight
- Carbondioxide.

Importance of Photosynthesis

- It helps in food production
- It helps to purify the environment by using atmospheric carbondioxide

Adaptations of leaves for photosynthesis

- Have a broad flat shape to increase surface area for sunlight.
- Have thin walls to allow carbondioxide
- Have stomata for gaseous exchange.
- Have veins for translocation.

TRANSPIRATION

The process by which plants lose water as water vapour to the atmosphere though leaves.

An experiment to show transpiration.

Importance of transpiration

- To cool the plant.
- Helps plants to absorbs water and mineral salts.
- Helps in rain formation

Factors affecting rate of transpiration

- Temperature
- Light intensity
- Wind
- Nature of the leaf
- Humidity
- Stomata

Ways of reducing transpiration

- Plants shed their leaves
- Forming a layer of wax on the leaf surface.
- Reducing the size of leaves to thorns.

REPRODUCTION IN FLOWERING PLANTS

There are two types of reproduction in plants.

Asexual reproduction (Vegetative propagation)

Sexual reproduction.

THE FLOWER

The structure of a flower (Its parts and functions)

POLLINATION

The transfer of pollen grains from anthers to the stigma.

Types of pollination

- Cross pollination
- Self pollination

SELF POLLINATION

The transfer of pollen grains from anthers to the stigma of the same flower.

NB: A paw paw undergoes self pollination.

Diagram

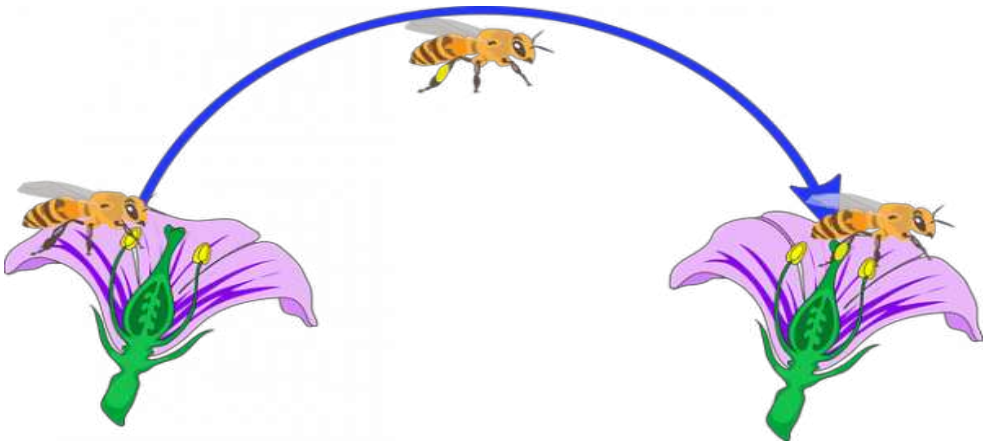


Cross pollination:

The transfer of pollen grains from the anther of one flower to the stigma of another flower of the same kind..

NB: A maize plant undergoes cross pollination

Diagram



<u>Agents of pollination</u>

- Animals
- Wind
- Flowing water

Characteristics of insect and wind pollinated flowers

Wind	Insects
Have no nectar	Have nectar
Dull coloured petals	Bright petals
A lot of pollen grains	Few pollen grains
Have no scent	Have scent

Importances of pollination

- It allows fertilization to take place in crops
- Leads to high yields in farmers harvest.

Uses of flowers

- For decoration on various functions
- Making of insecticide
- Perfume making
- Used to get dyes
- Sources of income by growing / selling
- Sign of love.
- Sign of respect for the dead.

FERTILISATION

The union of a male and female gamates to form a zygote.

After pollination, pollen tubes develop reaching down the ovules.

After fertlisation in the ovary, ovules become seeds and an ovary develops into a fruit.

Diagram

SEEDS

A seed is a fertilised ovule that develops into a new plant.

Classes of seeds

- Monocotyledonous seeds
- Dicotyledonous seeds

Monocotyledonous seeds

These have one coytledon.

Examples

Dicotyledonous seeds

These are seeds with two cotyledons.

Examples

Structure of abean seed

GERMINATION

The development of a seed into a seedling.

Types of germination

- Epigeal germination
- Hypogeal germination

EPIGEAL GERMINATION

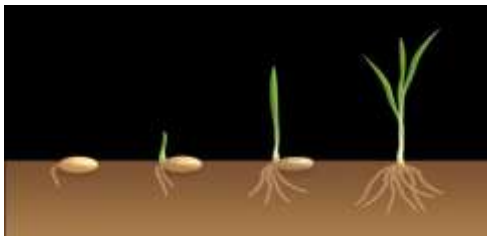
The type of germination where the cotyledons come above the ground level. It occurs in all legumes. E.g. beans, peas, G.nuts, etc.



HYPOGEAL GERMINATION

This is the type opf germination where the cootyedons remain below the ground level. It occurs in all monocotyledonous plants e.g wheat, maize, sorghum etc.

Diagrams



Conditions necessary for germination

- Air (oxygen)
- Water (moisture)
- Warmth
  Difference between dicots and monot plants

MONOCOT	**DICOT**
Have one cotyledon	Have two cotyledons
Have fibrous root system	Have taproot systems
Have parallel leaf venation	Have network leaf venation
Undergoes hypogeal germination	Undergoes epigeal germination
	Forms true wood.

FRUITS

A fruit is a developed ovary containing seeds. Fruits have two scars. Style stalk and stalk scar. Fruits protect seeds and assist in dispersal.

Types of fruits

- Succuent fruits
- Dry fruits

SUCCULENT FRUITS / JUICY FRUITS

These are fruits whose pericarp and mesocarp become juicy and fleshy and can be eaten. They are divided into three groups.

- Berries
- Drupes
- Pomes.

Berries

These are fruits with many seeds. The soft pericarp is divided into three layers.

- Epicarp
- Mesocarp
- Endocarp

Examples

- Oranges
- Tomatoes
- Pawpaw

Diagram of an orange fruit.



Drupes

These are fruits wih one seed inside a hard endocarp. Drupes have three layers;

- Epicarp
- Mesocarp
- Endocarp

Examples

- Mangoes
- Avacadoes
- Coconuts
- Palm oil
- Cashew nuts.

etc

Diagrams

Pomes

These are fruits in which the receptacle becomes juicy and modified as a fruit while the inner core is the pericarp.

Examples

- Apples
- Figs
- Pears etc

Diagram

FRUIT AND SEED DISPERSAL

This is the scattering of seeds and fruits from parent plants to a new environment.

Importance of seed dispersal

- Prevents over crowding
- Reduces competition for light and nutrients.
- Enables plants to colonise new areas.
- The farmer gets new species of crops.

Agents of seed dispersal

- Water
- Animals

- Wind
- Explosive mechanism

Explain the characteristics of each and their diagrams.

TROPISM

Tropism is growth movement of plants in response to a stimulus

A stimulus is any change in the environment which the plant is sensitive to

Kinds of tropism

Phototropism

This is growth movement of plants towards light eg when a plant is placed in the dark box with a small opening towards the plant tends to grow

Diagram

Geotropism

This is a growth movement of a plant towards the direct of force of gravity plant root grow wards due to force of gravity.

Diagram for illustration

Hydrotropism

This is a growth movement of some parts of certain plant in response to touch one side. This stimulus helps twinning plants such as beans , passion fruits and yams climbs by use of tendrils , hooks

Chemotropism

This is the growth movement of plant parts towards the source of chemical eg pollen tubes grow the style to reach the ovules

PLANT PROPAGATION

Plant propagation refers methods used in growing crops

There are two basic methods of propagation

i) Seed propagation

ii) Vegetative propagation

SEED PROPAGATION

most flowering plants are propagated by means of seeds eg beans , maize, coffee , mango etc

vegetative propagation

in this method a part of a parent plant is planted to give rise to a new plant.

Parts if plants used in vegetative propagation are :-

- Stems
- Leaves
- Buds

Types of vegetative propagation

- Natural vegetative propagation

- Artificial vegetative propagation

Natural vegetative propagation

Plants	Methods of propagation
Yams (white yams)	Stem tubers
Irish potatoes	Stem tubers
Ginger	Rhizomes
Banana , pineapple, sisal	Suckers
Pineapples	Crowns , slip
Sisal	Bulbils
Onions	Bulbs
Straw berry	Runners
Pyrethrum	Split

Artificial vegetative propagation

This involves use of special skill and techniques to produce high quality and high yielding crops which are resistant to diseases

Example of artificial vegetative propagation

a) Stem cutting

Description & Diagram

b) Layering

Description & Diagram

c) Grafting

Description & Diagram

d) Budding

Description & Diagram

e) Marcotting

Description & Diagram

ECONOMIC VALUES OF PLANTS TO MAN

- Plants provide food to man.
- Plants help in controlling soil erosion
- Plants are needed in construction and building industry.
- They provide raw materials for agro based industries
- Agricultural industry is a source of revenue for government

TOPIC4: RESOURCES IN THE ENVIRONMENT

A resource is something or object which is used for certain purpose.

Some resources are got from non-living things while others are got from living things.

Types of resources

1. Non renewable resources
   These are resources which can't be replaced naturally once they are used up.

Examples are:

i) Minerals ores

ii) Crude oil (petroleum)

iii) Coal

2. Renewable resources
   These are resources which can be replaced naturally before they get exhausted (used up)

Examples are:

i) Soil

ii) Water

iii) The sun

iv) Air (wind)

v) Plants

vi) Animals

Resources from non living things

A non living thing is one without life.

Example

- Soil
- Water
- Air and wind
- Rocks and minerals

a) Soil

Soil is a natural layer which covers the earth's surface.

Soil is a renewable resource.

How is soil used as a resource?

It is used for growing crops

Soil is used for building houses in our societies

b) Water

Water is a renewable resource when used carefully.

How water is used as a resource?

- Water helps plants to grow
- Water is used to turn turbines for hydro-electric power generation.
- Water helps to dissolve food for easy absorption in the body of animals.

c) Air and Wind

Both are renewable resources

Air is a mixture of gases

Wind is moving air.

How wind is useful

- Wind turns wind mills to produce electricity
- Wind drives wind mills to draw water from the underground
- Wind helps in winnowing of harvested crops.

d) Sun

It is a renewable resource

How the sun is used as a resource

- The sun provides sunlight energy to green plants to make starch.
- The sun provides solar energy that gives out heat and light energy to man.
- The sun helps our bodies to make vitamin D

- The sun helps in generation of solar electricity.

Rocks and minerals

A mineral is any thing that occurs naturally like a rock in the earth.

They are non-renewable resources.

Examples of minerals

- Crude oil (petroleum)
- Chalk
- Clay
- Copper
- Gold
- Tin etc

Minerals are non-renewable resources.

N.B: Minerals from which metals are got are called ores.

Rocks

A rock is a substance made up of minerals tightly packed together to form a solid.

Types of rocks

i) Igneous rocks
ii) Metamorphic rocks
iii) Sedimentary rocks

Igneous Rocks

These are rocks formed when magma pours outside the earth as lava and solidifies

They are generally hard and impervious.

Examples

- Basalt
- Granite
- Quartz

Sedimentary Rocks

These are rocks formed from broken particles of sand clay and mud setting in different layers. (strata) at the beds of water bodies like seas, lakes, rivers etc.

Sedimentary rocks are soft and porous.

Examples

- Sandy rocks
- Limestone etc

FOSSILS

- Fossils are remains of plants and animals buried underground many thousands of years ago.
- They are found deep inside the earth in sedimentary rocks.
- These remains are usually of bones or teeth of animals and roots, leaves or stems of plants.
- Some times the remains are of mould of a whole body e.g. of a fish.

Uses of fossils

- Fossils help geologists to determine the age of a place or rock.
- Fossils help geologists to know how different plants and animals have existed and changed.
- Fossils help to tell how land looked before.
- Fossils show us how and where the different sedimentary rocks were formed.
- Fossils help to tell what the animal or plant looked like, what it ate, where it lived etc.

Importance of rocks

- Rocks form soil, which is important to our survival
- Rocks make good materials for building and roads.
- They tell us about the earth's history.
- They contain many valuable minerals

ALLOYS

An alloy is a mixture of two or more metals

Alloy	Combination	Uses
Brass	Copper and Zinc	- Decorating ornaments - Making wires, tubing cases for bullets.

Dentist Amalgam	Gold and Copper, gold, copper and mercury	- Making coins.
Solder	Lead and Tin	- Joining metals
Bronze	Copper and Tin	- Used for ornaments , bells , statues

STEEL

Steel consists of Carbon dissolved in iron.

Different alloys are made from steel

Examples of alloys made from steel

i) Manganese steel

It is a mixture of steel and manganese

This is a very tough alloy.

It is used where friction may cause wear e.g. in railway points.

ii) Nickel steel

It is a mixture of nickel and steel

This alloy does not rust. It is used for making cooking and kitchen utensils and cutlery.

iii) Stainless steel

It is a mixture of cobalt and steel

This alloy is used to make permanent magnets because they retain their magnetism over a long period.

Why are alloys made?

- To make the metal harder
- To lower the melting point of the metal.
- To make the metal more resistant to corrosion i.e. wear and tear
- To increase the electrical resistivity of metals.

FUELS

A fuel is anything that burns to produce heat and light energy.

Examples of fuels

- Fire wood
- Charcoal
- Crude Oil (Petroleum)
- Coal

- Fire wood and charcoal are renewable resources while crude oil and coal are non-renewable resources.
- Coal was formed from marshy vegetables and plants which lived long ago and were buried under ground but due to heat and pressure they changed to coal.
- Coal is burnt to get thermal electricity.
- Crude Oil (petroleum) is refined through the process of fractional distillation.
- The products after refining crude oil (petroleum) are; Petrol, diesel and kerosene.
- These products are burnt to produce heat and light.
- Petrol and diesel are used to run engines.
- Oil was formed from animals remains which buried underground long ago and were changed to crude oil due to heat and pressure

Resources from living things.

- A living thing is one which has life.
- Living things include plants and animals.
- Most of the resources from living things are renewable resources once they are looked after properly.

How are plants used as resources?

- Some plants give us natural plant fibres like cotton, sisal, jute and linen.
- Cotton and linen are used to make clothes while sisal and jute are used to make ropes.
- Some plants are used as herbal medicine to cure certain diseases.
- Some plants are eaten as food by man and other animals.

How are animals used as resources?

- Some animals like merino sheep provide wool, used to make clothes, suits, blankets, carpets, curtains, bed sheets etc.
- Silk worms provide silk used to make different types of cloths.
- Some domestic animals provide skins and hides used to make bags, shoes, belts, etc
- Cattle provide horns and hooves used to make glue.
- Bees help to pollinate farmers' crops, provide honey and bee wax.
- Some animals like oxen and donkeys provide labour.

Conservation of resources

- Conservation is the protection and proper management of resources in our environment.
- Both renewable and non-renewable resources need to be conserved.
- Resources like forests, wild life, water, soil, rocks, minerals need to be conserved.
- Conservation of resources is done to keep them doer future use.

Conserving renewable resources

i) Conserving renewable resources

- Wild life refers to animals and plants in our environment.
- Many kinds of animals have disappeared from earth and they are extinct.
- Other animals are about to disappear and we say they are endangered.
- Animals may become endangered or extinct because they are killed for their skins, horns, tusks.
- Some plants have also become endangered or extinct due to the increasing demand for wood and local medicine.

Advantages (importance) of conserving wildlife

- Some mammals, plants and birds are a source of food for man.
- Some animals and birds are valued as cultural heritage by some countries and clans.
- Plants are homes of many animals, birds and insects.
- Trees or forests help in the formation of rainfall.
- Mammals, birds and trees species earn foreign exchange for the government through tourists.
- Plants improve the atmosphere by balancing the amount of carbon dioxide and nitrogen.
- Plants provide shade to man and other animals.

How to conserve and protect wild life.

- Animals are protected by law in their habitat through the Uganda Wildlife Authority (UWA).
- A habitat is a natural environment or home of a plant or animal.
- Uganda wildlife Authority is a department which is responsible for wildlife in Uganda.
- The animals are being taken care of in national game parks and game reserves.
- Banning the selling and buying of wildlife trophies helps to reduce their being killed.
- Fishes can be conserved by controlled fishing.
- Some rare animals should be caught and let to breed in wildlife educational centre.

Conserving non renewable resources

- Soil erosion should be controlled.
- Soil should be kept fertile by using manure and fertilizers.
- Plastic wastes like broken Jerrycans, polythene papers should be recycled.
- Vehicles in dangerous mechanical conditions should be repaired to conserve fuel.
- Petroleum products should be used wisely to prevent further exploitation of oil.

Conserving the natural vegetation

- Over grazing should be discouraged because it causes soil erosion.
- Bush burning should be restricted to certain areas.
- Over stocking is dangerous because it leads to over grazing.
- The government should limit population growth because more people means more land to be destroyed for housing and agriculture.

- Cattle farmers should practice rotational grazing which later causes soil erosion.
- Afforestation should be practiced.
- Swamps and wetlands should be declared restricted areas.

HARVESTING RESOURCES

This is the collection of materials from the environment for the purpose of using them

a) Harvesting non – living resources

- Obtaining sand from dry river beds: scooping it with spades and machinery
- Mining sand from the ground

Harvesting minerals

- By mining
- Fossil fueling like oil
- By drilling

Harvesting energy from the sun

Energy from the sun is known as solar energy

- It can be harvested in the following ways
- Uses of solar panels
- Use of solar cookers
- Use of solar driers
- Use of solar heaters

NB : Solar panels trap sunlight and convert it into solar electricity

Solar heaters + cookers trap rays from the sun and changes into heat energy

Harvesting water

Ways of harvesting water

- It can be collected from roofs using tanks and big drums
- Rain water flowing on the ground is directed into dams .
- Water can be drawn from wells and brought to the surface using wind loss and electric pumps.

Harvesting energy from air

- Wind can be trapped and used to drive wind mills
- It can be tapped using sail to drive sail boat + dhows

Harvesting living resources

Plants resource

- Hand picking ripe coffee berries , cotton balls
- Plucking tea leaves from tea plants
- Ready maize cobs are harvested by hands
- By cutting sisal leaves

Harvesting wood

- By pollarding
- By coppicing
- By lopping
- By selective felling

Pollarding

It is the cutting off of the top part of a tree for use.

Diagram

Coppicing

It is the cutting off of the main part of the main part of the tree stem leaving the stump to give rise to new shoot.

Diagram

Lopping

This is the cutting of the side branch for use

Diagram

Harvesting animal resources

a) Meat

Animals are slaughtered , skinned and meat cut off from the carcass.

b) Skins and hides

Animals are slaughtered and skins carefully removed from the carcass.

c) Horns

The horns are cut or sawn off with the saw from the head of the slaughtered animals

d) Milk

it is obtained by milking using either hands or machines

d) Honey :

it is extracted from honey combs.

THE ENVIRONMENT

What is environment?

Environment refers to all things that surround man. These things can be air water , plants temperature , fuel , people building etc.

COMPONENTS OF ENVIRONMENT

The environment is composed of the following

- Water
- Land (soil)
- Air (wind)
- Plants
- Animals
- Temperature
- Mountains (hills)
- Minerals
- Sun

TYPES OF ENVIRONMENT

Environment is divided into two types:-

Biological environment (Abiotic / non physical environment)

This is the type of environment which consists if living things eg plants and animals

Physical environment (a biotic environment)

This is the type of environment which consists of non – living things eg mountains , lakes , rivers , temperature , wind (air) vapour.

FOOD CHAIN

A food chain is the way how organisms in an environment get their food. In the environment , plants make their own food and are called producers .

The organisms which depend on food made by plants (producers) are called consumers are consumers

Consumers are divided into the following groups

Primary consumers

These are organisms which feed directly on producers eg goats , cattle , rabbits, sheep etc

Secondary consumers

These are organism which feed on primary consumers eg foxes , dogs , lions

Tertiary consumers

Tertiary consumers which feed on secondary consumers eg. leopards , man birds of prey etc.

NB: In a food chain , organism like fungi and bacteria help in reducing food to its component parts (decay / rot) are called decomposers

The sun is the main source of sunlight energy in a food chain from which energy flows to other organism in the environment

Illustration of a food chain

Producer – primary consumer – secondary consumers – Tertiary consumers – plants grasshoopers – lizard – Hawks

A FOOD WEB

A food web is a more complicated interrelationship of how organism in an environment obtain their food.

A food web involves many organism in an ecosystem how they get food from many other living things

Illustration of a food web

Ecosystem

An ecosystem is the community of livingthings (organisms) in a habitat plus the non living part in the environment
.

A habitat

A habitat is a home of a living organism in the environment

DEGRADATION

Degradation is the way of lowering (spoiling) the quality , stability and usefulness of a resource.

Environment degradation

Is the lowering the quality , stability and usefulness of resources in the environment

Types of environment degradation

- Soil / land degradation
- Degradation / deforestation
- Wetland drainage
- Air / atmospheric pollution
- Water pollution
- Wild life destruction (degradation)

Causes of environmental degradation

There are two main causes of environmental degradation

a) Human activities

b) Natural causes

HUMAN ACTIVITIES THAT CAUSES ENVIRONMENTAL DEGRADATION

a) Mining / quarrying

b) Construction and road work

c) Poor waste disposal

d) Bad agricultural practices eg bush burning , over grazing etc

NATURAL CAUSES ENVIRONMENTAL DEGRADATION

- Soil erosion / leaching
- Silting
- Hurricanes
- Tornados
- Whirl wind / whil pools
- Earth quakes
- Hailstones
- Land slides
- Floods
- Tsunamis
- Volcanic eruptions
- Global warning

a) Soil / land degradation

This is the destruction / lowering the quality or usefulness of land by human activities or natural causes.

Leaching

Is a process through which mineral salts or nutrients sink deeper into the soil layers where they can not be reached by plants

It is caused by too much rain.

Soil erosion : Is the washing / blowing away of top soil by agents of erosion.

Silting

Is the process by which fine sand , mud or other things are carried into the water body.

Causes of silting

- Soil erosion
- Cultivation near water sources
- Allowing animals to drink from water bodies
- Swamp drainage
- Burning / destroying vegetation in the swamp

Effect of silting

- It destroys habitat for animals that live live in water
- Lower water level and so dries out water bodies
- Destroys source of food for fish and other aquatic animals
- Kills fish of other animals and plants in water
- Destroys eggs of fish and other aquatic animals.

Deforestation

Deforestation is also called devegetaion ie cutting down large number of trees / plant with out replacing them.

Causes of deforestation

- Population growth leading to need for land for settlement , farming and recreation
- Industrialization (development of industries in an area)
- Wild fires / bush burning
- Clearing forests for fire wood , charcoal , building poles timber etc

Effects of deforestation

- It leads to reduction of rain fall causing drought / desertification
- Loss of habitat for different plants and animal species
- Soil erosion leaving infertile soils
- Silting of water bodies.

Wet land

A wet land is any area which has water and growing vegetation through out the year

Examples of wet lands

- Swamps
- Marshes
- Bogs
- Lakes and rivers

Importance of wet lands

- They are habitats to many plant and animals speces
- They control floods by sucking the water
- They filter muddy water by trapping the impurities
- They regulate the climate by influencing the temperature and humidity
- They provide water
- They provide water for domestic and industrial use.
- They are sources of food e.g. fish
- They provide raw materials for arland crafts e.g. clay, papyrus etc
- They are sources of building materials

POLLUTION

Pollution is the addition of harmful (dangerous) chemicals into the environment

Pollution takes place naturally or through human activities.

CAUSES OF POLLUTION

- Waste gases from industries
- Industrial waste / chemical
- Exhaust fumes from vehicles
- Oil spills from ships in the ocean
- Chemical sprays
- Non bio-degradable wastes eg polythene , glass plastics etc
- Smoke from burning tyres , oil or bushes
- Dust

TYPES OF POLLUTION

a) Air pollution - caused by smoke and fumes / poisonous gases.

b) Soil pollution – caused by agricultural sprays, industrial waste , refuse etc

c) Water pollution - By silt , oil spills , refuse , human waste and industrial waste washed into it.

d) Noise pollution – Due to too many vehicles or industries in the environment loud music etc

EFFECTS POLLUTION

- Poisoning of soil and water by chemical wastes dumped on them.
- Death and disappearance of biodiversity (variety of plants and animals living things)

- Out break of disease in the environment
- Loss of soil fertility leading to poor yields
- Formation of acidrains due to gases from industries and vehicles as they dissolve in rain.
- Destruction of habitats for many plants and animals
- Less production of plants such as fibers , timbers fruits and other construction materials

CONTROL AND PREVENTION OF POLLUTION IN THE ENVIRONMENT

- Uses of alternative energy source eg. bio gas , natural gas , solar energy , wind power , hydro electricity
- Ensure proper disposal of domestics and industrial wastes
- Educating people about the dangers of pollution
- Using good method of farming

TOPIC 5: TYPES 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 6: OCCUPATION IN THE COMMUNITY

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

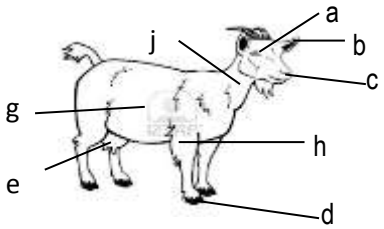
TOPIC 7: KEEPING OF GOATS, SHEEP AND PIGS

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

<u>Importance of proper housing</u>

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.

THEME: SCIENCE IN HUMAN ACTIVITIES AND HUMAN OCCUPATION

TOPIC8: KEEPING CATTLE

LESSON : IMPORTANCE OF KEEPING CATTLE

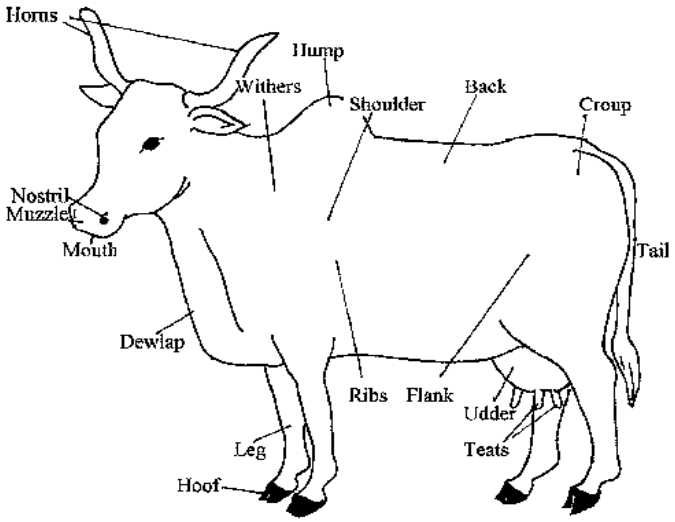
♣ Keeping cattle refers to the act of rearing bulls, cows, calves, buffalos and heifers.

♣ Animal husbandry refers to the act of rearing farm animals or livestock.

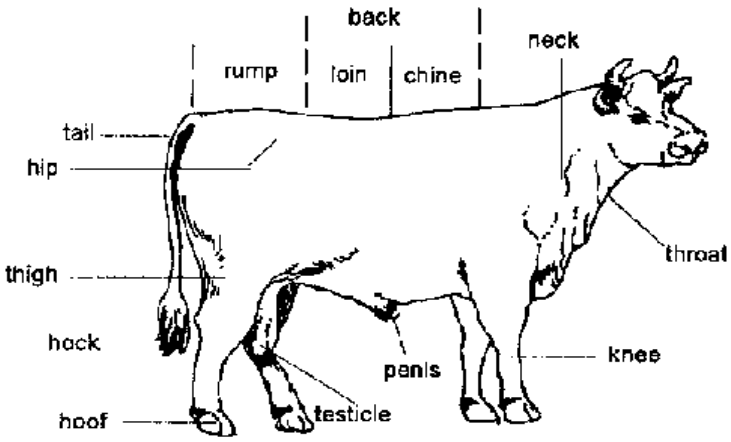
Farm animals include;

Pigs	Goats	Rabbits
Sheep	Cattle	

A drawn structure showing the external features of a cow and a bull.



A bull



Importance of keeping cattle.

The following are the reasons why people keep cattle;

- Cattle provide people with milk and meat which are sources of proteins.
- Waste materials (dung) from cattle acts as natural manure used to improve soil fertility.
- Hooves and horns are used to make enamel items like plates and cups.
- Hides from cattle are used in making leather products.
- Cow dung can be used in building local houses and making biogas.
- Keeping cattle is a source of employment.

Learner's activity

1- Write one sentence to show the meaning of the following terms.
   a) Keeping cattle
   b) Animal husbandry

2- State one reason why many Ugandans have taken up cattle keeping as a business.

3- What is the importance of horns and hides to an industrialist?

WEEK

LESSON 1: TYPES OF CATTLE

A type of cattle is a class of cattle kept for a specific purpose. Specific purpose may be;

- For milk production
- For meat (beef) production
- For provision of animal labour
- For both milk and meat production

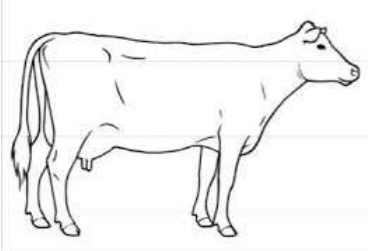
Examples of types of cattle

- ❖ Dairy cattle for milk production
- ❖ Beef cattle for beef (meat) production
- ❖ Dual-purpose cattle for both milk and meat.

Characteristics of dairy cattle

- ★ They have a thin body that carries little meat.
- ★ They have a wide and well set hind limbs.
- ★ They have big udders with four medium teats and produce a lot of milk.
- ★ They have triangular body shape and usually docile / humble.

A drawn illustration showing body shape of dairy cattle.



Dairy cow seen from the side **a dairy cow seen from above**

Examples of dairy cattle include;

- Friesian
- Ayrshire
- Guernsey
- Jersey
- Jamaican hope
- Brown Swiss cattle

Lesson 2: Beef and dual purpose cattle

Beef cattle are groups of cattle kept for meat (beef) production.

Examples of cattle kept for meat production include;

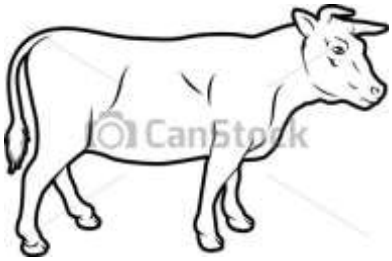
- ❖ Aberdeen angus (weighs 720-900kgs)
- ❖ Here ford (weigh about 1000kgs)
- ❖ Charolais (creamy in colour)
- ❖ Short horn
- ❖ Galloway (it's small and long haired black)
- ❖ American beef master,

Characteristics of beef cattle;

- They have a broad rectangular body shape.
- They mature quickly and give plenty or high quantity of meat.
- They are very stubborn with no horns.

- They have thick muscles

An illustration showing the shape of beef cattle



A beef cow seen from the side **A beef cow seen from above**

Dual purpose cattle

- These are groups of cattle kept for both milk and meat production.
- They are mainly local meat products.

Examples include;

- Sahiwal (Its brown-red in colour and large in size)
- Red poll(has a medium size with no horns)
- Milking short horn (don't grow very fast like others but produce hard meat)

Note: dual purpose cattle have characteristics of dairy cattle anad beef cattle

Learner's activity

1- What do you understand by the term type of cattle?
2- List any two types of cattle.
3- Identify the type of cattle with a rectangular body shape.
4- Give two examples of dairy breeds of cattle.
5- Name the commonest exotic dairy breed of cattle reared inyour locality.

Lesson 3: Breeds of cattle

A breed of cattle is a family of cattle having specific characteristics

Specific characteristics may include;

- ☹ Colour of cattle
- ☹ Size of the animals
- ☹ Productivity of the animals

Breeds of cattle include;

- ❖ Local breeds of cattle (indigenous)
- ❖ Exotic breeds of cattle.

❖ Cross breeds

Local breeds or indigenous cattle are breeds of cattle that have lived in East Africa for a long time. They are also called the native breeds kept for both milk and meat production.

Examples include;

- Small east African zebu
- Boran cattle
- Nsagala or sanga cattle
- Ankole cattle

Characteristics of local breeds of cattle

⌘ They are resistant to tropical diseases.

⌘ They have the ability to walk long distances.

⌘ They produce good naturally flavoured products

⌘ They can survive on poor pasture and tropical weather conditions.

Disadvantages of local breeds of cattle

- They produce less meat and milk
- They have a slow growth rate.

Exotic breeds of cattle

❖ These are groups of cattle breeds imported into Eats Africa.

❖ They are dairy, beef or dual-purpose cattle.

Characteristics of exotic breeds of cattle.

❖ They grow quickly with no horns.

❖ They are no resistant to diseases.

❖ They need a lot of attention or care.

❖ They produce high quantities of milk and beef.

❖ Their products are not as sweet as for the local breeds of cattle.

Note:

Cross breeds are obtained after mating a local breed with an exotic breed.

This is the best way of improving upon the poor local breeds of cattle.

Learner's activity

1- Give the difference between a breed of cattle and a type of cattle.

2- Mention any two breeds of cattle commonly kept in Uganda.

3- Identify a breed of cattle you would prefer to keep in your locality.

4- Give a reason for your answer in (3) above.

5- Cite out the best way of improving on our local breeds of cattle.

Lesson 4: <u>Breeding in cattle</u>

Breeding is the act of maintaining or improving the desired characteristics in cattle.

Desired characteristics may include;

- ❖ Size of the animal
- ❖ Resistance to diseases.
- ❖ Animal's skin colour.
- ❖ Productivity of the animals.

<u>Types of breeding</u>

There are basically five types of breeding namely;

- Line breeding
- In breeding
- Cross-breeding
- Out breeding
- Upgrading

<u>Line breeding:</u> Is the act of mating closely related animals such as cousins.

This type may result into poor production in animals.

<u>Inbreeding</u>: Is the act of mating closely related animals such as a brother and a sister.

This method if not properly practiced, it may also produce poor quality animals.

<u>Out breeding:</u> Is the practice of mating related animals but from different flocks or herds.

This method helps to restore the qualities in cattle that may be disappearing from a flock.

<u>Cross breeding:</u> Is the practice of mating a local breed with an exotic breed of cattle.

After cross breeding, a cross breed is obtained or a hybrid.

Cross-breeding helps to improve animals with poor qualities.

<u>Upgrading</u>: This is the mating breeds of superior qualities several times to obtain good breeds in the herd.

<u>Learner's activity</u>

1- In one sentence show the meaning of breeding as used in cattle keeping.

2- List down two types of breeding in cattle.

3- State why inbreeding is discouraged in the management of cattle breeding.

4- How can a local farmer improve ion his local breeds of cattle?

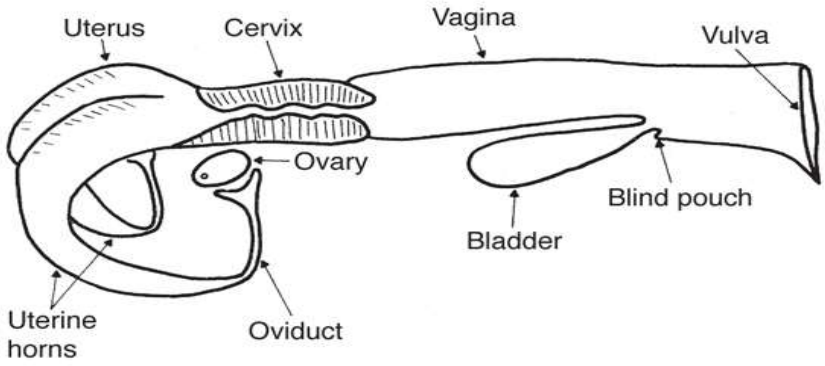
5- Briefly describe how a hybrid is obtained.

Lesson 5: <u>Reproduction in cattle</u>

- Reproduction is the ability to increase in the number of a species of living things.

- Cattle reproduce naturally when bulls mate with cows on heat.
- Cows undergo sexual reproduction which involves mating and production of gametes.
- A gamete is a reproductive cell. In animals the male gametes are called sperms. While the female gametes are called ova(plural) and an ovum (singular)

The reproductive system of a cow.



Functions of different parts

Vulva: Receives and guides the penis.

Vagina: It's where semen is deposited.

Cervix: Closes the lower end of the uterus during pregnancy

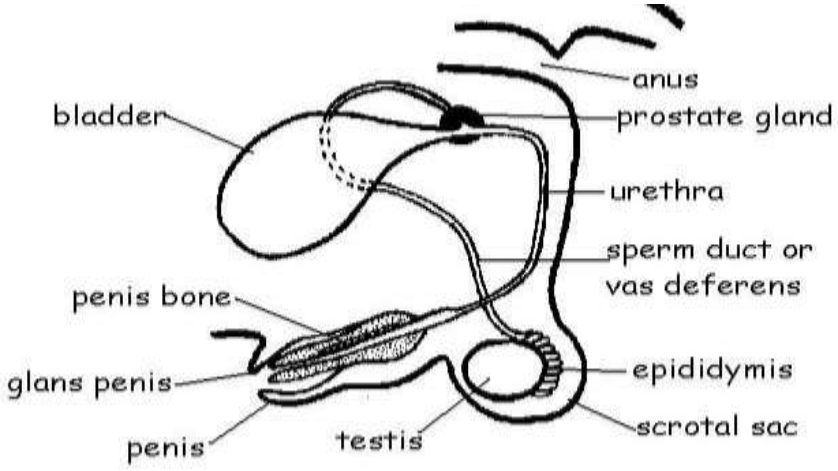
Ovary: produces the ova and hormones that help to control the sexual cycle.

Ova: Are the reproductive cells produced by the ovary.

Oviduct / fallopian tube: IS the place where fertilization takes place.

Uterus: It's where implantation takes place (development of the foetus)

Reproductive system of a bull



Functions of parts

Testes: Produce sperms

Sperm ducts: Carry sperms

Urethra: Passes out urine and sperms

Penis: Delivers semen in the vagina of a cow.

Learner's activity

1- Draw the female reproductive system of a cow and name the following parts.

(i) Oviduct (ii) Vulva (iii) Uterus

2- Using an arrow, show on your diagram the part where implantation takes place.

3- Write the function of the following parts of the system

(i) Cervix (ii) Testis (iii) Ovary

Lesson 6: Heat period and insemination (services)

Heat period

This is the time when a cow is in need of a bull for mating.

Mating takes place only when a cow is on heat.

Signs of a cow on heat.

- ⌘ It becomes restless.
- ⌘ It mounts other cattle.
- ⌘ It stands while others are lying down.
- ⌘ It urinates frequently
- ⌘ It puts its tail on the side to enable its vulva to be seen.
- ⌘ There is a mucus discharge from the vulva.
- ⌘ Its vulva swells and changes its colour.
- ⌘ There is a drop in its milk production.
- ⌘ The cow makes a lot of noise (bellows frequently)

Insemination (service)

Insemination or service is the act of depositing sperms into the female reproductive organ of the cow.

For insemination to take place, the cow or a heifer should be on heat i.e after showing signs.

Types of insemination

- ❖ Natural insemination
- ❖ Artificial insemination

Natural insemination involves the use of a bull to mount the cow on heat in order to deposit the sperms into the vulva.

Advantages include;

- Natural insemination saves time.
- It does not need a trained inseminator in order to carry it out.

Disadvantages

- ❖ More sperm are wasted in one cow.
- ❖ It's very expensive to buy and maintain a bull.
- ❖ Stronger bull can cause injury to weak cows.
- ❖ Once the bull dies, sperms are also lost.

Artificial insemination

Refers to the act of introducing sperms in the vagina or vulva of a of a cow by the help of a trained veterinary officer.

Semen used is got from health bulls and with desired characteristics.

Sperms are injected into the vagina using an insemination syringe.

Advantages

- It reduces the cost of keeping many bulls on the farm.
- It's cheap to buy semen than buying and maintaining a bull.
- It prevents injury to small cows and heifers by bigger or heavy bulls.
- It helps to control inbreeding and unwanted pregnancies in cattle.
- It promotes selective breeding.

Disadvantages;

- ❖ It's difficult and expensive to maintain proper storage of sperms.
- ❖ It can't be applied to animals whose signs of heat can't be easily identified.
- ❖ It requires a trained experienced inseminator.
- ❖ Animals are denied chance to enjoy sex.

Learner's activity

1- Briefly explain the term insemination.
2- Give two ways in which natural insemination can be dangerous to a livestock farmer.
3- How does artificial insemination control unwanted pregnancies on a farm?
4- Identify three signs of a cow on heat.

Lesson 1: Other practices carried out on cattle farms

Castration

Castration is the removal of the essential male sex organs called testes.

The main aim of castration is to make the bull unable to fertilize a cow.

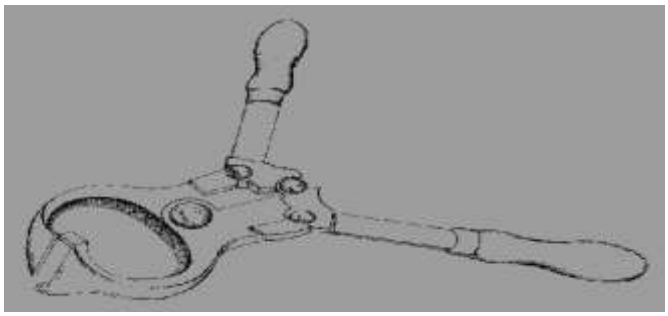
Methods of castration

- Open castration method.
- Closed castration method.
- Use of the loop or elastrator method.

In a closed castration method, an instrument called a burdizzo is used to crush the tubes leading to the scrotum.

We can also use a rubber ring to seal the sperm ducts and thus killing the epididymis.

A drawn structure showing a burdizzo



Note:

When the jaws of the burdizzo are closed, the spermatic cord is crushed destroying the spermatic nerves.

Advantages of castration:

- Castrated bulls grow faster and fatten.
- Castrated bulls are calm, humble and easy to handle.
- Castration helps to prevent inbreeding (unwanted pregnancies in the herds)
- Castration also helps to prevent diseases on a farm.

Disadvantages of castration

- Animals are denied chance to enjoy natural sex.
- There is loss of blood from the animal leading to anaemia.
- The wounds may become septic and animal may die if not treated well.

Note:

The use of the ring prevents blood from flowing into the testis that will cause them to shrive and fall off.

In an open castration, the scrotum is cut open using a razorblade or a sharp knife and the testes are removed.

Learner's activity;

1- Briefly explain the term castration.
2- Give two reasons why livestock farmers castrate farm animals.
3- Cite out any two methods of castrating animals.
4- Why do you think bulls which are not castrated usually get STDs?

Lesson 2: De-worming and dehorning

Deworming is the act of giving drugs to animals to kill internal worms.

Deworming is done in two ways

- ☞ Drenching is the act of giving liquid medicine to animals through the mouth. It can be by using a drenching gun.
- ☞ Dozing is the act of giving solid medicine to animals in order to kill internal worms.

Importance of deworming.

Deworming kills internal parasites like tape worms etc.

Dehorning: Is the removal of horn buds from the calf to prevent growth of horns.

Dehorning should be done when the calf is about 2-3 months.

Methods of dehorning

- ★ By use of chemical (done between 3-14 days)
- ★ By use of a hot iron (between 7-30 days)
- ★ Use of spoon dehorners (between 1-2months)

Advantages of dehorning

- It makes the animal easy to handle.
- In increases the space in kraals, milking shades and in vehicles during transportation.
- Many animals can be kept in a small space.
- It reduces the risk of injury among cows.

Learner's activity

1- Give a difference between drenching and dozing.
2- State a reason why livestock farmers should deworm their animals.
3- State the importance of dehorning from animals.

Lesson 3: Steaming up and calving

Steaming up is the act of feeding in calf-cow on feeds rich in proteins.

In calf cow is one which has shown up signs of pregnancy such as;

- The udder increases in size and filled up with milk.
- There is mucus discharge around the cervix.
- The uterus enlarges in size between 2-3 months.

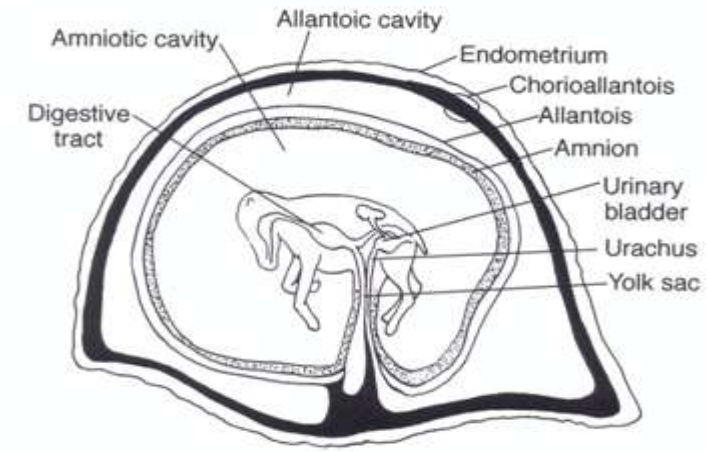
Lactation period is a period when a cow produces milk after giving birth.

Calving is the act of giving birth by a cow.

Advantages of steaming up.

- It enables the foetus to grow well.
- It helps to increase the period of lactation.
- It also prepares the cow for calving.

An illustration showing developing foetus.



Note:

The placenta stores oxygen and digested food before reaching the foetus.

Umbilical cord is a passage of food and oxygen to the foetus.

Umbilical cord also transports wastes from the foetus to the placenta.

Amniotic fluid acts as a shock absorber for any external pressure.

Calving

Calving is the act of producing calves by a cow.

Signs of calving in cows

- ★ Discharge of a lot of fluids from the vulva
- ★ Restlessness
- ★ Loss of appetite
- ★ Labour pains
- ★ Isolation

Colostrums

Colostrums - the first milk produced by a cow after calving.

Importance of colostrums

- ❖ Open the digestive tract of a calf.
- ❖ Provide a calf with a balanced diet.
- ❖ Boosts the immunity of a cow.

Fertilization

This is the union of a male and female gamete to form a zygote. This takes place in the oviduct or fallopian tube.

Learner's activity

1- Briefly explain the following terms
   a) Steaming up
   b) Drying off
   c) Calving
2- How is colostrums important to a calf?
3- Why do you think a cow should be separated from the herd before calving?
4- List down any two signs of a cow on heat.

Lesson 4: milking in cattle

Milking: Is the method of obtaining milk from the cow's udder.

- Milk is got by squeezing the teats of a cow.
- Milk is secreted from the mammary gland of a female animal.
- Milk contains over 85% water and 15% proteins, fats, calcium, phosphorous

Types of milking.

- ❖ Hand milking
- ❖ Machine milking

Hand milking is the act of squeezing the teats of a cow using hands.

This method can be used to 1-3 animals.

Machine milking is the act of using a machine to squeeze the teats of a cow.

Machine milking is the best for more than five animals.

Note:

A cow can hold up or hide milk if it's disturbed.

Disadvantages of machine milking

- ☹ Needs a trained person to operate the machine

- ☹ The machines are expensive to buy.
- ☹ The udder may be injured in case of a machine fault.

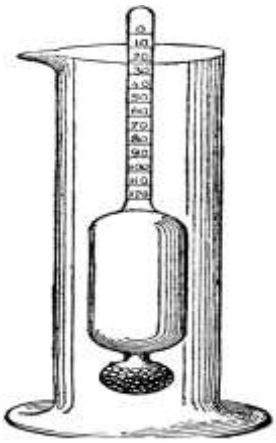
Ways of obtaining clean milk.

- ✓ Prepare the milking place clean and free from dust
- ✓ Wash all the milking containers clean.
- ✓ Wash the teats of the cow with warm water to stimulate milk let down.
- ✓ Tie the hind legs of the cow and give the cow some feeds to keep it busy and relaxed.
- ✓ After milking filter the milk and use a strip cup to detect mastitis in milk.
- ✓ Put the milk in clean containers and cover.

Note:

A lactometer is used to detect the presence of water in milk and separates fats from milk.

Structure of a lactometer



A drawn structure showing a strip cup



- ❖ Before actual milking is done, the milker should smear milk jelly or cream to the teats to prevent them from cracking.
- ❖ A cow having mastitis should be milked last and its milk should be poured as treatment goes on.

Learner's activity

1- Identify the type of milking commonly used in your locality.

2- State how the following equipments are useful to a live stock farmer.

a) A strip cup b) A lactometer

3- List down three ways of obtaining clean milk.

Lesson 5: Preservation of milk and milk products

Milk products

The following are the products got from well processed milk.

Milk products	How it's made	Usage
Cheese	Made by sour milk then thickening it by salting.	Milked into dishes
Fresh milk	Boiling and refrigerating	Drunk and added to dishes
Skimmed milk	Separating fats from milk	For frying foods
Yoghurt	Turning milk after removing fats	Used to be mixed into rice and other foods
Ghee	Made by boiling butter	For frying foods

Preservation of milk

Milk should be protected from contamination by bacteria for future use.

This can be done by;

- Pasteurization
- Sterilization refrigeration
- Boiling and quick covering

Sterilization involves killing bacteria in milk with maximum boiling followed by covering it on cooling.

Pasteurization involves strong heating and sealing milk before germs enter.

This method was discovered by Louis Pasture.

Note:

Boiling is not preferable method because some milk is lost during evaporation.

Reasons why farmers should keep milk.

- To know the amount of milk produced per a cow at a certain period of time.
- It enables a farmer to select animals with less productivity rate for treatment.

Learner's activity

1- State what you understand by the term milk preservation.

2- Give two ways of preserving milk.

3- State how yoghurt is made from milk.

4- State the importance of the following milk products to people.

a) Cream

b) Ghee

c) butter

5- Give two reasons for preserving milk.

Lesson 6: <u>Cattle parasites</u>

A parasite is an organism that depends on another organism for food and shelter without killing it.

Cattle parasites are divided into two;

(i) External parasites (ecto-parasites)

(ii) Internal parasites (endo-parasites)

<u>External parasites (ecto parasites)</u>

These are parasites that live outside the body of the animal. They suck blood from the animal.

<u>Examples include;</u>

- Ticks
- Lice
- Mites
- Tsetse flies
- Fleas etc

Ticks suck blood from the animals and spread tick borne diseases such as

- ❖ East coast fever
- ❖ Red water
- ❖ Heart water
- ❖ Anaplasmosis

Tsetse flies spread germs that cause nagana or trypanosomiasis to cattle.

<u>Internal (endo) parasites</u>

These are parasites that live inside the body of the animals and mainly in the intestines. They suck blood and feed on the digested animal's food.

They are mainly worms.

<u>Examples include;</u>

- ❖ Hook worms feed on blood.

- ❖ Tape worms feed on digested food.
- ❖ Liver flukes live in the bile duct or liver.

Ways of controlling cattle parasites

- Spraying the animals using acaricides.
- Practicing rotational grazing to avoid tick borne diseases.
- Dipping cattle into chemicals.
- De-worming cattle to kill intestinal worms.

Learner's activity

1- What do you understand by the term parasites?

2- Name the two types of parasites.

3- How do parasites gain entry into the animal's body?

4- Give two examples of external cattle parasites.

5- Briefly explain two ways of controlling parasites on a farm.

Week 6

Lesson 1: cattle diseases

Cattle diseases are classified into three groups according to the causative agents i.e

- ❖ Bacterial diseases
- ❖ Protozoa diseases
- ❖ Viral diseases.

Causes of sickness in cattle

- ♣ Lack of essential nutrients in their feeds.
- ♣ Un hygienic conditions like dirty feeding troughs.
- ♣ Overcrowding of animals.
- ♣ Physical injuries and infections caused by micro- organisms.

Signs of a sick animal include;

- ★ Animal appears gloomy and restless.
- ★ Body temperature may be high or low.
- ★ It may pass out urine with strange colours.
- ★ Difficulty in breathing or even coughing.
- ★ Diarrhoea or scouring may occur.

Name of the disease	How its spread and caused	Signs and symptoms	Prevention control and treatment

Bacterial diseases			
Anthrax	Caused by bacteria spreads through body contacts and contaminated feeds.	High fever Loss of appetite to graze. Sudden death Blood stained dung	Bury deeply dead animals Burn the dead animals Vaccinate animals every year. Separate infected animals
Mastitis	Caused by bacteria Spreads through body contact with an infected animal	Milk with blood stains or pus Swollen and painful teats and udder. A cow refuses to be milked and suckled	Early treatment by using antibiotics Use a strip cup regularly.
Pneumonia	Caused by bacteria Spreads from contaminated air and dirty living pens.	Difficult breathing, coughing, nasal discharge Loss of appetite High fever	Use well ventilated dry and clean pens. Treat the animal at the early stage of the disease.
Tuberculosis	Breathing in air with tuberculosis bacterial Spreads through milk of infected cows	Coughing Loss of weight Loss of appetite	Kill infected animals Separate infected animals from health ones. Have proper sanitation Early treatment using antibiotics.
Viral diseases			
Foot and mouth disease	Spreads through sharing feeding containers Through body contacts with infected animals	Swollen teats and lameness Blisters on top of hooves and mouth (muzzle) High temperature Reduction in milk	Separate sick animals Vaccinate after every 6months Application of a quarantine

		production	
Rinder pest	Spread through body contact with an inected animal	Soars in the mouth Sunken eyes Nasal discharge Tears from eyes High temperature Diarrhoea with blood stains	Separate sick animas Regular vaccination Slaughter the infected ones.
Protozoan disease			
Nagana (trypaanosomiasis)	Spreads through the bites of infected tsetse flies	Loss of weight Anemia Loss of appetite High fever	Spread the tsetse flies using insecticides.
East coast fever	Through bites of infected ticks (brown ear tick)	Nasal discharge Diarrhea Loss of appetite High temperature Weakness	Dipping and spraying animals with acaricides to control ticks
Heart water	Spread through tick bites (red ticks)	Animals walk in circles. Animals place their heads on objects When the animal falls, legs keep padding in air.	Dipping and spraying animals with acaricides to control ticks Treat early cases with tetracycline antibiotics and sulphadilimidine
Red water	Spreads through tick bites (red tick)	High fever Reddish urine due to damaged liver. Animal licks soil	Vaccinate regullay. Dip and spray with the acaricides to kill ticks.

Learner's activity

1- Give a difference between viral and bacterial diseases.

2- Point out any one cause of sickness in cattle.

3- Identify the infection of cattle that attacks

a) Udder and teats

b) Respiratory system of the animal.

4- Give two ways of controlling cattle diseases.

Lesson 2: grazing / feeding in cattle

Methods of grazing

There are three methods of grazing cattle namely;

(i) Rotational grazing

(ii) Zero grazing

(iii) Herding or free range system

Rotational grazing

This is the type of grazing in which animals graze on one portion of pasture at a time.

This can be done using the following systems:

- Paddocking
- Strip grazing
- Tethering

Paddocking

This is when a farmer feeds his animals on a big pasture land divided into paddocks. Cattle are fed on grass in a paddock and when the grass is no longer enough they move to another paddock.

An illustration of paddock grazing

Advantages of paddock grazing

- Paddocks help to avoid over grazing.

- Paddocking controls pests and diseases.
- Paddocking enables the animals to have grass all the time.
- It lessens the labour used to look after the animals after setting up paddocks.
- The dug and urine of the animals are evenly distributed.

This allows for new grass to grow well in all paddocks.

Disadvantages of paddocking

- ☹ The materials needed are expensive.
- ☹ Animals have no choice of the type of plants to eat.
- ☹ It requires a big portion of land.
- ☹ The barbed wires can tear the skin of the animals.

Strip grazing

This is where small sections called strips are created using temporary electric wires to restrict movements of animals.

Animals graze in gazetted areas

Advantages

- ❖ Pasture is evenly used.
- ❖ Diseases and vectors are controlled.
- ❖ Labour is reduced on the farm.

Disadvantages

- ❖ It is expensive to start and maintain.
- ❖ It requires few animals to be kept.

Tethering

This involves tying the animals on a tree or peg using a rope to graze in a limited area.

This is the most common method used in East Africa.

A structure showing tethering method

Advantages of tethering method

- It is cheap and appropriate to maintain.
- No fencing is required.
- Pasture chosen by the farmer is always the best.

Disadvantages

- It can only work best for few animals.
- Animal feeding is only limited to areas around the peg.
- It requires the farmer to keep transferring the animals when pasture is over.

Learner's activity

1- In one sentence show the meaning of the phrase rotational grazing.

2- Give two advantages of rotational grazing.

3- Identify any two methods of rotational grazing.

4- Briefly explain how strip grazing can be a disadvantage to a livestock farmer.

5- Give two advantages of paddock grazing to a farmer.

Lesson 3: Herding and zero grazing

Herding (free range grazing)

This is a system where animals are left free to graze on different types of pasture as monitored by a herdsman.

This system is mainly practiced by nomadic pastoralists

Advantages

- Animals are able to do some exercises as they graze
- It does not require any fencing
- The animals graze on different pastures of their choice

Disadvantages

- Animals need a herdsman to look after them all the time.
- Animals can easily stray and destroy farmer's crops
- In breeding is difficult to control

Zero grazing

This is a system where animals are kept under a special structure and water or feeds are provided.

Small cubicles are made for resting of the animals or feeding.

An illustration of zero grazing

Advantages of zero grazing

- It's easy to collect manure (Farm Yard Manure)
- Animals are easy to control and monitor.
- Feeds are not wasted since animals are given only what is enough.
- Animals are protected from bad weather like sunshine and heavy rains.

Disadvantages of zero- grazing

- ❖ It's very expensive to start and maintain.
- ❖ The farmer gets over worked.
- ❖ There is easy spread of disease and pests
- ❖ In involves of either buying feeds or growing fodder crops.
- ❖ Much labour is required to feed and monitor the animals.

Learner's activity

1- Explain the following terms;

a) Herding

b) Zero grazing

2- Outline any three advantages of herding

3- How can zero grazing be a disadvantage to a farmer?

Lesson 4: Housing of cattle and fencing

Like any other animals, cattle need good housing. They should be provided with shelter for the following reasons;

- ☞ To protect them from bad weather like heavy rain and strong sunshine.
- ☞ To protect cattle from thieves and attacks by wild animals.
- ☞ To maintain their health and ease their feeding.

Qualities or characteristics of a good house of cattle

The house for cattle is called a byre / kraal

It has the following characteristics;

- Well ventilated for free air circulation
- Has a strong floor made of concrete for easy cleaning
- Has a slanting to enable urine drain out.

Materials used to build cattle houses include;

- ❖ Wood
- ❖ Metals
- ❖ Plastics
- ❖ Concrete
- ❖ Bricks
- ❖ Stones etc

Fencing

A fence is a barrier of life or dead materials divided in areas of land.

There are two types of fences namely;

(i) Planted fences

(ii) Constructed fences

Planted (natural) fences are made by planting certain types of plants along margins of a given piece of land.

Constructed (artificial) fences, are fences were people-made materials are used to create a barrier along a particular piece of land.

The materials used when constructing artificial fences include;

- Treated poles
- Bubbled wires.
- Bricks
- Wire nets
- Chain links etc

This type of fence is the most popular one.

Importance of fencing

- ❖ Natural fences act as wind breaks thus controlling soil erosion.
- ❖ Natural fences can maintain soil fertility by adding humus to soil.
- ❖ Fencing controls the spread of pests and diseases to animals.
- ❖ It also prevents animals from destroying people's crops.
- ❖ It allows proper use of pasture and makes culling easy.

Learner's activity

1- Give two reasons for housing cattle.

2- What name is given to the house for cattle?

3- List any two qualities of a good house for cattle.

4- What do you understand by the term "fence"?

5- Identify any two reasons for fencing farm animals.

Lesson 5: <u>starting a live stock farm</u>

Livestock refers to the animals kept on a farm. These may include;

- Poultry
- Sheep
- Cattle
- Goats
- Pigs

Livestock farming si the rearing of farm animals.

<u>It's important to people in the following ways;</u>

- ❖ It's a source of income when animals and their products are sold.
- ❖ It's a source of food.
- ❖ It provides employment opportunities to people.

Requirements for starting a livestock farm

<u>Land</u> : This is a place on which the farm is started. It may be obtained in the following ways;

- By buying
- From donation
- Through inheritance

<u>Capital:</u> This is the money used to buy things needed to start a farm.

Some of the things the money may be used fro include;

- ❖ Buying land if it is to be bought.
- ❖ Constructing anima houses, stores, office and stationary.
- ❖ Preparation of pasture.
- ❖ Bringing water on the farm.
- ❖ Paying workers and experts for the treatment an vaccination of the farm animals before the farm starts producing.
- ❖ Buying drugs, acaricides and necessary equipments for the farm.

<u>Labour:</u> This include people who do activities on a farm both skilled and unskilled workers.

<u>Market:</u> In live stock farming, marketing refers to the demand for cattle or their products.

Demand for cattle products means the desire and ability to apy for the products.

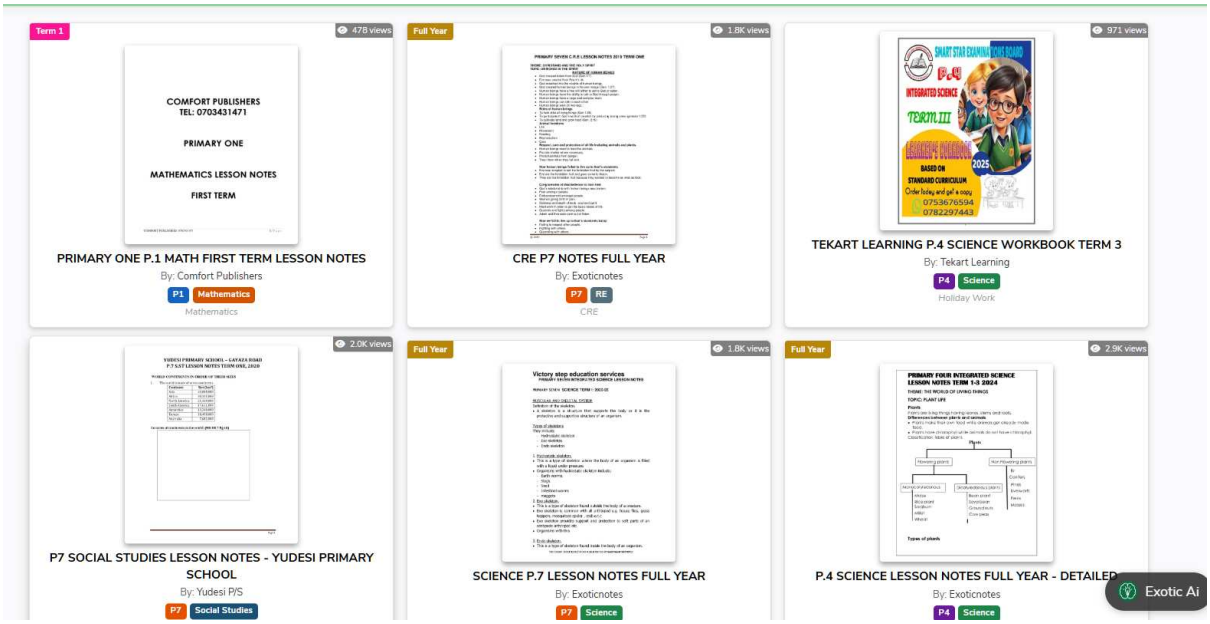
Therefore, it's important to know whether people are ready to buy the products from the farm.

They type of livestock, the farmer needs to identify which animals does he or her wish to keep.

Learner's activity

1- Give a difference between livestock and livestock farming.
2- Today in Uganda, many people prefer livestock farming to crop growing. Give two reasons for this.
3- Identify any two ways of obtaining land for starting a livestock farm.
4- List any two activities done by skilled and non skilled worker on a farm.
5- Give two ways in which capital can be used in starting a livestock farm.

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