

CROPS

A crop is a plant grown for a purpose.

Types of crops

- Cereals
- Legumes
- Tuber crops
- Fruit crops
- Vegetables

Cereals

These are crops that store their food in grains.

Note: All cereals are monocots.

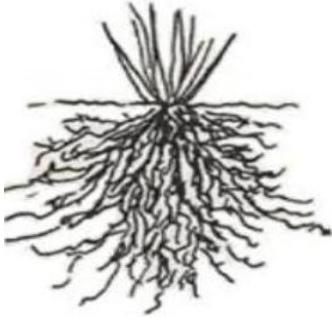
Examples of cereals/Monocots

- Maize – Rye - Wheat
- Millet - Barley
- Sorghum
- Rice
- Oats

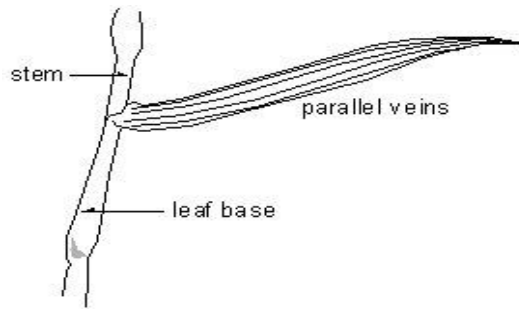
Characteristics of cereals

- They have parallel leaf venation
- They have fibrous root system
- They undergo hypogeal germination
- Their seeds have one cotyledon each

A diagram showing fibrous roots



A diagram showing parallel leaf venation



Importance of grain crops/cereals

- They are eaten by people (Source of carbohydrates)
- They can be used as feeds for livestock
- Their stems and leaves can be used as mulches
- They are a source of income when sold
- Barley to brew beer and distil whisky
- Sorghum and millet – for making malwa and tonto
- Maize and millet for making kwete and waragi
- Sorghum for making muramba and Bushera

Methods of harvesting

- Cutting
Garden tool – Sickle

Pests that mainly attack cereals

- Weaver birds

Methods of growing

- Broadcasting

Disease – Rust fungus

Leguminous crops (Legumes)

These are crops that have nodules on their roots.

OR

These are crops that have root nodules.

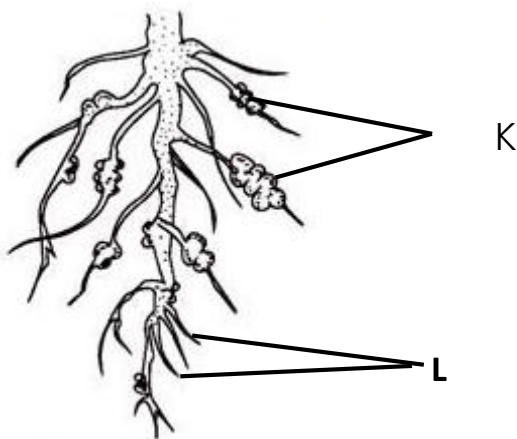
Examples of legumes

- Beans
- Peas
- Ground nuts
- Soya beans
- French beans
- Okra

Characteristics of legumes

A structure showing a leguminous crop.

Use the diagram below to answer questions that follow.



- a) Which group of crops have such a root?

Legumes

- b) Give any two examples of plants with such a root.

Beans

Ground nuts

Soya beans, etc

c) Name the parts marked

K-root nodules

L-root hairs

d) State the importance of each of the following parts;

k-to store nitrogen fixing bacteria

L- to absorb water and mineral salts from the soil

e) Name the living organism found in part K.

Nitrogen fixing bacteria/rhizobia

f) By what process does part L do its function?

By osmosis

g) How is part L adapted to its function?

It is semipermeable

h) Name the root system shown above.

Tap root system

i) How do legumes improve on soil fertility?

They fix nitrogen into the soil

j) How is nitrogen useful to plants?

Helps plants to make plant proteins

Method of growing legumes

➤ Broadcasting

Method of harvesting legumes

➤ Uprooting

Pests that commonly attack beans in stores

➤ Bean weevils

TUBER CROPS

These are crops with swollen underground stems or roots.

Types of tuber crops

- Root tubers
- Stem tubers

Root tubers

These are swollen underground roots with stored food.

Examples of root tubers and how they are propagated.

- Carrots – by means of seeds
- Sweet potatoes – by means of potato vines
- Cassava – by means of stem cutting
- Beetroots- by leaf cuttings
- Turnips- by means of seeds

Examples of stem tubers and how they are propagated.

- White yams – by stem cuttings
- Irish potatoes – by stem cuttings.

Food value got from tuber crops

- Carbohydrates except carrots and beetroots which provide vitamins.

Method of harvesting tuber crops

- Digging

Garden tool

- Hoe

Pests that attack tuber crops

- Rats

- Mice
- Squirrels
- Porcupines
- Rabbits

Characteristics of pests that attack tuber crops

- They have strong claws
- They have well developed incisors

Diseases of tuber crops

Cassava

- **Cassava mosaic** -caused by **virus** spread by **white fly**.
- **Brown streak** caused by **virus** and attacks leaves.

Sweet potatoes

- Bacterial wilt caused by bacteria
- Crown gall caused by bacteria
- Little leaf caused by bacteria
- Black rot caused by fungi
- Charcoal rot caused by fungi

Irish potatoes

- Potato blight – caused by fungi
- Bacterial wilt – caused by bacteria

Fruit crops

These are crops grown purposely for their fruits.

Examples of fruit crops

- Mangoes
- Apples

- Pumpkins
- Paw paws, etc.

Methods of harvesting fruits

- Picking / Hand picking

Vegetable crops

Types of vegetables

- Leaf/leafy vegetables
Cabbages, Spinach, Lettuce, chard, leeks,
celery, fennel
- Root vegetables e.g. carrots
- Fruits vegetables e.g. tomatoes, egg plants, etc.

GROUPS OF CROPS

- Annual crops
- Perennial crops

Annual crops

These are crops that mature and die within one year.

Note: All cereals, legumes, vegetables and tuber crops are annual crops.

Examples of annual crops

- Rice
- Millet
- Sorghum
- Beans
- Ground nuts
- Maize
- Carrots, etc.

Qn. Why are beans called annual crops?

They mature and die within a year

Perennial crops

These are crops which are harvested year after year.

Note: All fruits with woody/upright stems are perennial crops.

Examples of perennial crops

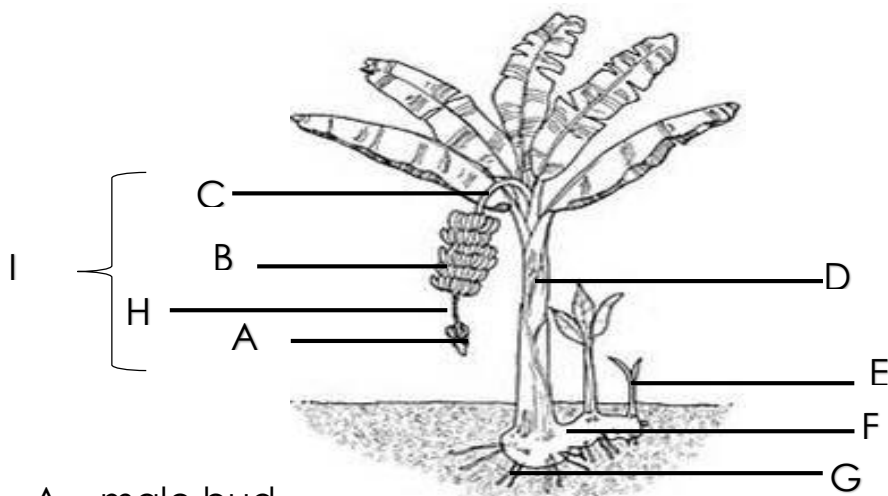
- Mangoes
- Oranges
- Avocado
- Jackfruits
- Tea
- Coffee
- Bananas, etc.

Qn. Why is coffee called a perennial crop?

Coffee is harvested year after year

Bananas

A diagram showing a banana plant.



A – male bud

B – female bud

C – true stem

D – pseudo stem

E – sucker

F – corm

G – Adventitious roots

H – rachis

I - Inflorescence

Qn: How are bananas propagated?

By means of suckers

Qn: Write down any 3 diseases of bananas

Banana bacterial wilt
Banana disease
Cigar end rot

} caused by bacteria

Qn: Write down any 3 pests that attack bananas

- Monkeys
- Birds
- Banana weevils
- Thrips

Qn: State any two ways of caring for bananas

- By staking
- By pruning
- By weeding, etc.

Qn: Why should bananas be staked?

To prevent them from falling.

Qn: How can bananas be safeguarded against strong wind?

By staking them.

Qn: How are bananas harvested?

By cutting

Qn: Name the garden tool used for harvesting bananas.

Panga

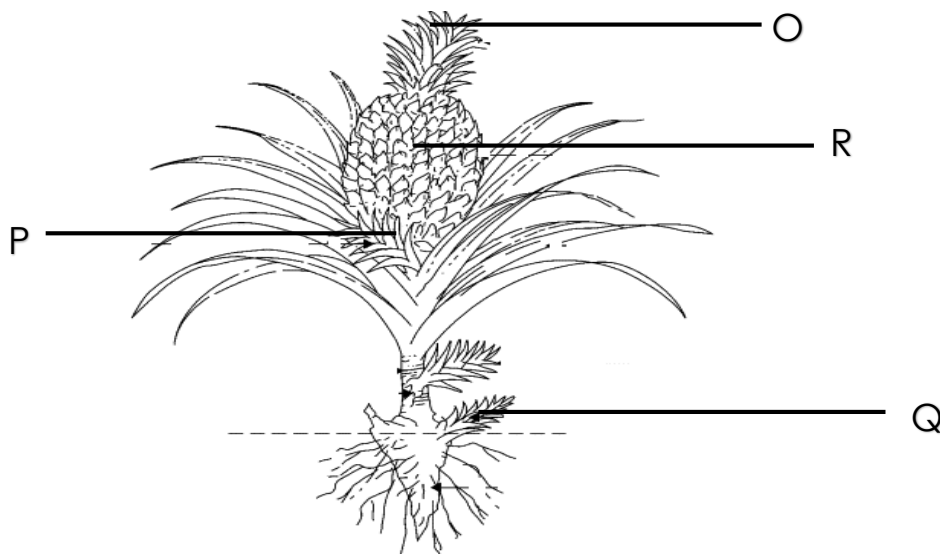
Qn: State any two signs of a diseased banana plant.

- Yellow leaves/Yellowing of leaves
- Premature ripening of the banana fruit
- Rotting of the pseudo stem

Qn: Which part of a banana plant is eaten by people?

Fruit

A diagram showing a pineapple plant



a) Name the parts marked with letters

O-crown

P-slip

Q-sucker

b) How are pineapples propagated (State 2 ways)?

- i. By using suckers
- ii. By using crowns
- iii. By using slips

c) Which letter shows the part eaten by people?

Letter R

d) Which food value do we get from eating pineapples?

1. Vitamins
2. Roughages

e) Why would you advise a person suffering from constipation to eat many pineapples?

Pineapples contain roughages which stimulate peristalsis

f) **Give any one pest which attacks pineapples.**

Monkeys – mealy bugs – beetles - termites

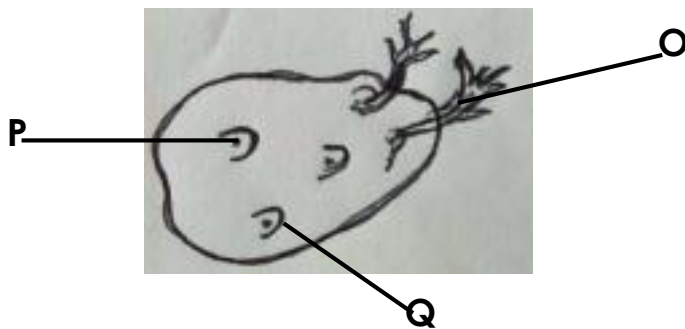
g) **Write down any one disease of pineapples.**

- Bacterial heart rot
- Butt rot
- Black rot
- White leaf spot

h) Mention any other two crops which can be propagated by suckers apart from pineapples.

- i. **Bananas**
- ii. **sisal**

A diagram showing parts of an Irish potato.



O – shoot

P – axillary bud

Q – scale leaf

Qn: Why is the above shown part of an Irish potato swollen?

- To store food

Qn: How are irish potatoes propagated?

- By means of stem tubers

Qn: What food value do we get from eating irish potatoes?

- Carbohydrates

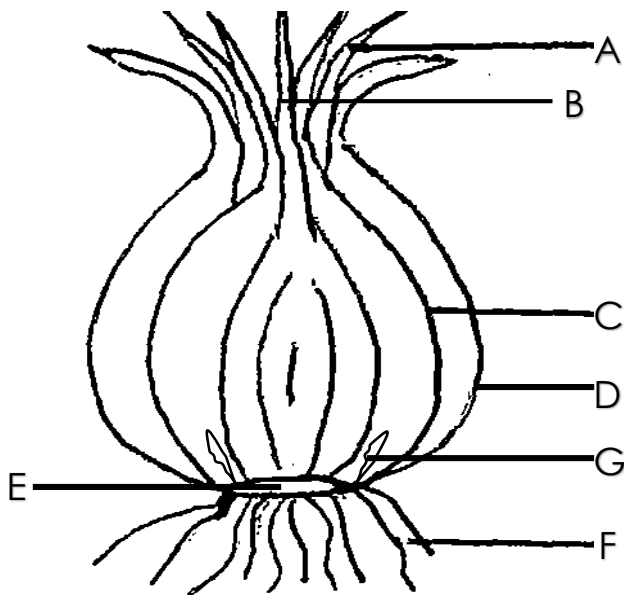
Qn: Which characteristic of an irish potato tuber makes it adapted to propagation?

It has axillary buds

Qn: Write down any two diseases of Irish potatoes.

- Potato blight
- Bacterial wilt
- Black scurf

A diagram showing parts of an onion.



A – Foliage leaves

B – Terminal bud

C – Fleshy leaves

D – Scaly leaves

E – Stem

F – Adventitious roots

G – Axillary bud

Functions of parts

- Foliage leaves

They make food for the plant.

- Adaptation

They have chlorophyll

- Fleshy leaves

They store food for the plant

- Adaptation

They are swollen

➤ Stem

Provides attachment for leaves and roots

➤ Scale leaves

They protect the fleshy leaves

➤ Adventitious roots

They absorb water and mineral salts from the soil.

They hold the plant firmly in the soil

➤ Terminal bud and axillary buds

They grow into a new plant

Ways onions are propagated

➤ By means of bulbs

➤ By means of seeds

➤ By means of bulbils

Food values got from eating onions

➤ Carbohydrates

➤ Vitamins

Other examples of bulbs

➤ Garlic


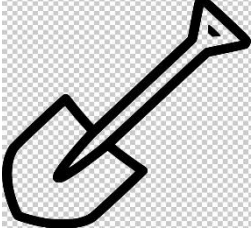



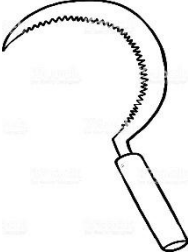

Ways of harvesting onions

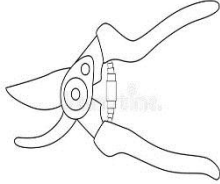



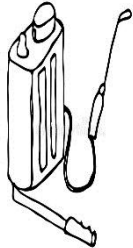
➤ Digging




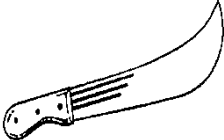

➤ Uprooting

Garden tools

Garden tools are devices farmers use to do garden activities

| Name | Diagram | Function |
|---------------|---|---|
| Garden trowel |  | For transplanting |
| Spade |  | For loading manure For lifting soil |
| Garden fork |  | For turning manure |
| Forked hoe |  | For digging in hard soils For digging in stony areas |
| Rake |  | For collecting dry weeds For levelling soil |
| Sickle |  | For harvesting cereals For cutting grass |
| Dibber |  | For digging holes |

| | | |
|--------------------------------|---|----------------------------------|
| <p>Secateurs/pruner</p> |  | <p>For pruning</p> |
| <p>Shears</p> |  | <p>For pruning</p> |
| <p>Pruning saw</p> |  | <p>For pruning</p> |
| <p>Watering can</p> |  | <p>For watering crops</p> |
| <p>Knapsack sprayer</p> |  | <p>For spraying crops</p> |

| | | |
|---------------------------|---|---|
| Wheel barrow |  | For carrying harvested crops For carrying manure For carrying farm tools |
| Axe |  | For cutting big trees |
| Hoe |  | For digging For weeding For harvesting tubers |
| Panga |  | For cutting small trees |
| Mattock / pick axe |  | For digging out stones |

Ways of caring for garden tools

1. By cleaning them every after use
2. By keeping them in clean and dry places
3. By repairing broken tools
4. By painting metallic tools

Why should metallic garden tools be painted?

To prevent them from rusting

How does painting prevent metallic garden tools from rusting?

Paints cuts off water and oxygen supply to the metals

CROP GROWING PRACTICES

1. Land preparation

Ways of preparing land include:

- Digging – To soften/loosen soil
- Ploughing – To allow water into the soil
- Clearing/slashing
- Cutting big trees
- Harrowing – To break down big soil particles
- De-trashing – Removing tree stumps

Garden tools used in preparing land

- Hoes
- Tractors
- Slashers
- Pangas
- Axes
- Rakes
- Ox ploughs

Importance of clearing land

- Helps to soften/loosen soil
- Allows water into the soil (digging and ploughing)
- Cutting away big trees opens space for crops to get enough sunlight.

Best season for preparing land

Dry season

Why?

- To prevent weeds from germinating again
- To prevent soil from sticking on the hoe

2. Selecting viable planting materials

Examples of planting materials

- Seeds
- Suckers
- Stem cuttings
- Rhizomes
- Bulbs

Note: A planting material is any part of a plant which is used to raise a crop.

Qualities of good planting materials (seeds)

- They should be mature – should be dry
- They should be free from diseases
- They should not be damaged
- They should not be too old
- They should be of the same type.
- They should be resistant to diseases

Importance of selecting/sorting planting materials (seeds)

- It prevents wastage of land
- It prevents wastage of time
- It prevents wastage of labour
- It ensures quality plants

Dressing seeds

This is the treating of seeds with certain chemicals before they are planted.

It prevents seeds from being destroyed by pests.

Seed viability

Seed viability is the ability of seeds to germinate.

Factors that favour seed viability

- Presence of moisture
- Presence of oxygen
- Presence warmth

Seed dormancy

Seed dormancy is a condition where seeds which are capable of germinating do not germinate.

Causes of seed dormancy

- Too hard testa
- Too old seeds
- Immature seeds
- High temperature

Methods of breaking seed dormancy

- Soaking seeds for some time before planting them
- Using reagents e.g. potassium nitrate, concentrated sulphuric acid and ethylene.
- Mechanical scarification – rubbing seeds between two sheets of sand paper coated with silicon carbide.

3. Planting/sowing

Planting is the putting of a planting material into the soil to germinate.

Best season for planting

Wet season

Reasons why wet season is good for planting

- There is enough water for seeds to germinate.
- The soil is soft for easy growth of seeds.

Methods of planting crops

- Row planting
- Broadcasting method

Row planting

This is the planting of crops in lines.

It is recommended for crops with large seeds and those propagated by vegetative methods.

Advantages of row planting

- It provides enough space for crops to grow.
- It makes weeding and harvesting easy
- It prevents wastages of seeds
- It controls easy spread of crop diseases.

Disadvantages of row planting

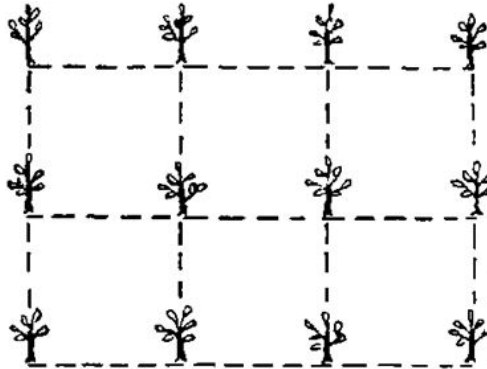
- It needs a big piece of land
- It needs much labour – It allows use of machines
- It consumes a lot of time
- It encourages soil erosion

Examples of plants planted by row planting

- Maize
- Coffee
- Tea
- Bananas

- Pineapples Note: All fruits
- Mangoes
- Avocadoes
- Egg plants

Illustration showing row planting method.



Qn: Why is maize able to be planted in rows?

Maize has big seeds

Qn: Why is it difficult to plant millet and rice using row planting?

They have small seeds

Broadcasting method

This is the planting of seeds by scattering them.

It is common with crops with small seeds.

Examples of plants planted by broadcasting

- Millet
- Rice
- Simsim
- Sorghum

Advantages of broadcasting method

- It is time saving

- It controls soil erosion
- It does not need a lot of labour

Disadvantages of broadcasting method

- Seeds are wasted
- It makes weeding and harvesting difficult.
- Crop diseases cannot easily be controlled/pests and diseases easily spread

Illustration showing broadcasting method



Drill sowing

Drill sowing is the planting of seeds in long shallow trenches which are then covered with soil. It is mainly done by machines.



47.—Dibbling, for Sowing Seed.



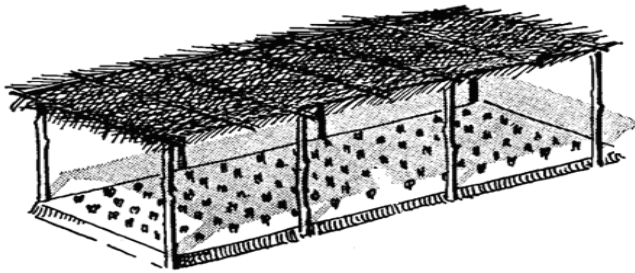
Starting a nursery bed

A nursery bed is a small garden where seedlings are raised before they are transplanted.

Factors considered before starting a nursery bed

- Drainage of soil
- Fertility of the soil
- Nearness to the water source
- Accessibility to the land

An illustration showing a nursery bed



Examples of plants that can be raised from a nursery bed

- Tomatoes
- Onions
- Coffee
- Cabbages
- Passion fruits
- Water melons
- Paw paws
- Mangoes
- Oranges , etc

Note; all fruits can be raised from a nursery bed

Types of nurseries

- Nursery bed
- Seed boxes
- Soil blocks

Ways of caring for seedlings in a nursery bed

- By watering
- By thinning
- By pruning
- By hardening off

Q. Name the best garden tool for watering crops

Watering can

Q. Give a reason a reason for the answer above

A watering can sprinkles water without displacing soil

Hardening off

Hardening off is the making of seedlings get used to harsh weather conditions

Ways of hardening off

- By removing shade from a nursery bed gradually
- By reducing watering

Transplanting

Transplanting is the transfer of seedlings from a nursery bed to the main garden

Q. Name the garden tool used for transplanting

Garden trowel

why is a garden trowel good for transplanting?

It scoops the seedling without damaging roots

What is the best time of the day for transplanting?

Evening time

Reason

There is low transpiration

Or

To prevent seedlings from wilting

What is the best season for transplanting?

Wet season

Reason

There is less sunshine to cause wilting of crops

Importance of a nursery bed

- Protects seedlings from harsh weather
- Helps water to sink deeply into the soil
- Helps farmers to select quality seedlings for transplanting

Factors considered when transplanting

- Seedlings should be hardened off
- A trowel should be used not to harm the roots

Ways of caring for transplanted seedlings

- By watering them
- By providing them with shade for a few days

Advantages of early planting

- It controls pests
- It enables crops to grow fast enough and compete with weeds for nutrients
- It enables crops make full use of rainfall for the season

Disadvantages of late planting

- Crops are affected by pests
- Weeds may out compete crops for nutrients
- Crops use little rainfall

Gap filling

Is the planting of seeds or seedlings where they did not germinate in the garden

OR

Is the replacement of plants that may have died or not germinated

Advantages of gap filling

- It enables a farmer to achieve correct plant population
- It enables a farmer to get high yields

Note; gap filling should be done early to prevent crops from maturing unevenly.

Ways of caring for crops

- By thinning
- By watering
- By weeding
- By manuring
- By staking
- By mulching
- By pruning

PRUNING

Pruning is the removal of excess parts of a plant.

PARTS OF A PLANT THAT CAN BE PRUNED

- Excess Leaves
- Excess Branches
- Growing points
- Diseased leaves and branches

Note: The pruning of growing points of a plant is called **topping** or **pinching off/out**

Advantages of pruning

- Makes harvesting easy
- Makes spraying easy
- Reduces plant weight
- Controls pests
- Controls diseases
- Improves crop yields
- Pruned materials can be used as mulches

Q. How does pruning control crop pests?

Pruning reduces the hiding places for crop pests

Q. How does pruning improve crop yields?

- Pruning reduces competition for sunlight
- Pruning controls pests

Q. How does pruning make spraying and harvesting easy?

Creates paths in the garden

Thinning

Thinning is the removal of excess seedlings from the garden

- Makes harvesting easy

- Makes spraying easy
- Controls pests
- Controls diseases
- Improves crop yields
- Thinned seedlings can be used for gap filling
- Gives crops enough space to grow

Note;

1. When thinning is done, seedlings left behind should be the strongest and healthiest
2. Excess seedlings which are removed can be used for gap filling if they are still strong and healthy

How does thinning control the spread of crop diseases?

Thinning reduces congestion of crops

How does thinning control crop pests?

It reduces the hiding places for pests

How does thinning improve crop yields?

- Thinning reduces competition for nutrients and sunlight
- Thinning controls pests

Plant training

Plant training is a crop growing practice done to control the shape, size and direction of plant growth

Methods of plant training

- Staking
- Using cages
- Using strings
- Topping

Examples of plants which can be trained

- Tomatoes
- Passion fruits
- White yams

Staking

Staking is the provision of extra support to plants with weak stems using stick frames or metallic frames

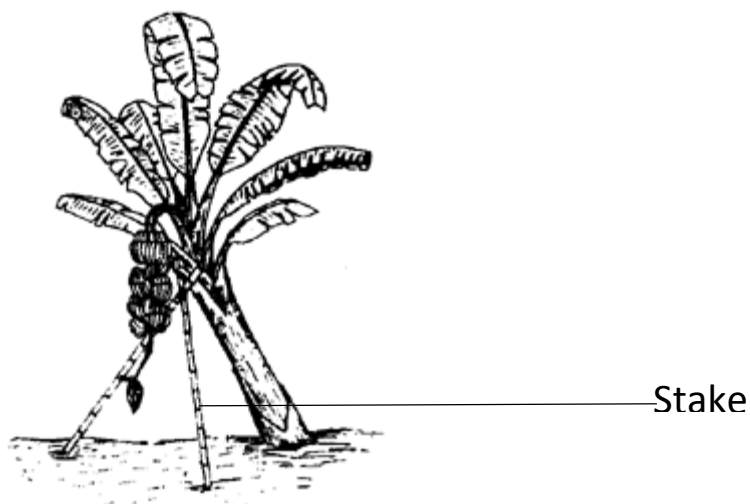
Examples of plants which can be staked

- Bananas
- Coffee

Advantages of staking

- Makes weeding easy
- Makes spraying easy
- Controls ground pests
- Makes pruning easy

A diagram showing plant staking



Weeding

Weeding is the removal of plants that grow where they are not needed

In crop growing, weeding is the removal of unwanted plants from the garden

Weeds

Weeds are plants that grow where they are not needed

In crop growing, weeds are unwanted plants in the garden

Examples of weeds

- i. Black jack
- ii. Spear grass
- iii. Coach grass
- iv. Elephant grass
- v. Wandering Jew, etc.

Ways of controlling weeds

a) Mechanically (mechanical ways)

- by uprooting weeds
- by digging out weeds
- by slashing weeds

b) chemically (chemical ways)

by spraying using herbicides

c) biologically (biological ways)

- by grazing animals on weeds
- by using beetles to eat the water hyacinth

d) culturally (cultural ways)

- by mulching
- by crop rotation

Advantages of weeding

- Controls pests
- Improves crop yields
- Gives crops enough space to grow

How does weeding control pests?

Reduces hiding places for pests

How does weeding improve crop yields?

- weeding reduces competition for nutrients and sunlight
- weeding controls pests

Advantages of weeds

- Weeds can be used as animal feeds
- Well dried weeds can be used as mulches
- Weeds in the garden control soil erosion

Disadvantages / dangers of weeds to crops

- weeds hide pests
- Weeds compete with crops for nutrients and sunlight

Dangers of weeds to farmers

- Weeds increase the cost of production.
How?
A lot of money is spent on buying herbicides and paying workers to weed
- Weeding is tiresome
- A lot of time is spent on weeding

Disadvantage of weeding

It can lead to soil erosion

Ways weeds lower crop yields

- weeds hide pests which destroy crops
- Weeds compete with crops for nutrients and sunlight

Crop spacing

Crop spacing is the leaving of open spaces between individual crops in the garden

Things used to carry out crop spacing

- Tape measure
- Strings
- sticks

importance of crop spacing

- Reduces competition for sunlight and nutrients
- Eases weeding, spraying and harvesting

Disadvantages of crop spacing

- Encourages growth of weeds
- Encourages soil erosion

Ways of controlling dangers caused by crop spacing

- By planting cover crops
- By mulching

Mulching

Mulching is the covering of top soil in the garden with dry plant materials

What do we call dry plant materials used for covering top soil?

Mulches

Examples of mulches

- Coffee husks
- Wood shavings
- Saw dust
- Dry grass
- Dry banana leaves, etc.

Advantages of mulching

- Keeps moisture in the soil
- Controls soil erosion
- Controls growth of weeds
- Improves on soil fertility

How does mulching keep moisture in the soil?

Mulches reduce evaporation of water from the soil

How does mulching control soil erosion?

Mulches reduce the speed of fast flowing water

How does mulching control the growth of weeds?

Mulches cut off sunlight supply to weeds

How does mulching improve on soil fertility?

Mulches rot and form humus

Disadvantages of mulching

- Mulches hide pests
- Mulches are fire hazards/can easily catch fire
- Mulching is tiresome

Manuring

Manuring is the putting of manure/fertilizers into the soil to make it more fertile

Fertilizers

Fertilizers are chemical compounds added into the soil to improve its fertility

Types of fertilizers

- Natural fertilizers
- Artificial fertilizers

Natural fertilizers/organic fertilizers

These are fertilizers got from plants and animal materials

Sources of organic manure

- Animal dung and urine
- Plant remains
- Green plants

Examples of organic manure/natural fertilizers

1. Compost manure----got from plant materials and animal wastes
2. Green manure-----got from buried and decayed green plants

3. Farm yard manure (F.Y.M) ---Got from animal dung and urine

Why do farmers add fertilizers into their soil?

To improve soil fertility

How does application of fertilizers improve soil fertility?

Fertilizers add mineral salts into the soil

Advantages of using natural fertilizers

- They last long in the soil
- They are cheap
- They provide many nutrients
- They improve on soil structure

Disadvantages of using natural fertilizers

- They produce bad smell
- They are heavy to carry

Artificial fertilizers/ inorganic fertilizers/synthetic fertilizers

These are fertilizers made from factories

Examples of artificial fertilizers

- Magnesium sulphate
- Phosphates
- Urea
- Single super phosphate
- Ammonium sulphate
- Sulphate of potash
- NPK (Nitrates Phosphates Potash)
- CAN (Calcium Ammonium Nitrate)

METHODS OF APPLYING FETILIZERS

- Top dressing
- Spraying

- Broadcasting
- Drilling
- Fertigation
- Ring method

Mineral salts needed by plants and their uses

| Mineral salt | Uses |
|---------------------|--|
| Potassium | <ul style="list-style-type: none"> ● Activates plant enzymes ● Enables crops to resist diseases |
| Calcium | <ul style="list-style-type: none"> ● Helps to strengthen plant stems and leaves ● Helps in making proteins |
| Magnesium | <ul style="list-style-type: none"> ● Helps in formation of chlorophyll |
| Nitrogen | <ul style="list-style-type: none"> ● Helps in making proteins |

Sources of mineral salts / nutrients in the soil

- Artificial fertilizers
- Organic manure
- Rain
- Lightning

Ways soil loses nutrients

- Through leaching
- Through soil erosion

Note: leaching is the sinking of soil nutrients to bottom layers where plant roots cannot reach. It is mainly caused by floods

Advantages of artificial fertilizers

- They work quickly
- They provide specifically required nutrients

Disadvantages of artificial fertilizers

- They are expensive to buy
- They don't last long in the soil

- They spoil soil structure

What is formed when organic matter added into the soil rots?

Humus

Importance of humus in the soil

- Provides nutrients to plants
- Binds soil particles reducing soil erosion

Uses of water in the soil

- Dissolves mineral salts for easy absorption
- Softens soil for easy ploughing
- Helps in germination
- Used by plants for photosynthesis

Advantages of natural fertilizers over artificial fertilizers

- Natural fertilizers last longer in the soil than artificial fertilizers
- Natural fertilizers are cheaper than artificial fertilizers
- Natural fertilizers improve on soil structure while artificial fertilizers spoil soil structure

Advantages of artificial fertilizers over natural fertilizers

- Artificial fertilizers are easier to apply than natural fertilizers
- Artificial fertilizers work quickly while natural fertilizers take long to work
- Artificial fertilizers don't smell badly while natural fertilizers smell badly

Crop rotation

Crop rotation is the growing of different types of crops on the same piece of land seasonally

Advantages of crop rotation

- Controls soil erosion
- Controls growth of weeds
- Improves on crop yields

- Conserves soil fertility
- Controls pests

How does crop rotation control pests?

The rotation of crops breaks the life cycle of pests

How does crop rotation improve on soil fertility?

It involves the growing of legumes which add nitrates into the soil

How does crop rotation control the growth of weeds?

It involves the growing of cover crops which cut off sunlight supply to weeds

An illustration showing crop rotation

| 1 st season | 2 nd season | 3 rd season | 4 th season | 5 th season |
|------------------------|------------------------|------------------------|------------------------|------------------------|
| cotton | Ground nuts | Sweet potatoes | Maize | Bush fallowing |

Factors to consider when designing crop rotation

- Legumes should be included in the rotation of crops. To conserve soil fertility
- Bush fallowing should be included in the rotation of crops. to enable the soil regain its fertility
- Crops with similar pests and disease should not be planted after one another. To break the life cycle of pests
- Shallow rooted crops should alternate with deep rooted crops. To maintain soil structure and balance use of soil nutrients

Which crop growing practice;

a) Reduces crop population?

Thinning

b) Reduces plant population?

Weeding

Thinning

c) Reduces transpiration?

Pruning

d) Reduces hiding places for pests?

Weeding

Thinning

e) Creates hiding places for pests?

Mulching

f) Enables a farmer to achieve correct plant population?

Gap filling

g) Reduces plant weight?

Pruning

h) Conserves soil moisture?

Mulching

i) Breaks the life cycle of pests?

Crop rotation

Intercropping

Intercropping is the growing of two or more crops on the same piece of land at the same time.

Advantages of intercropping

- Controls soil erosion
- Controls growth of weeds
- A farmer gets a variety of crops at the same time

Mixed cropping

This is the growing of different crops on different plots on the same farm

Mono-cropping

This is the growing of one perennial crop on the same piece of land seasonally

Dangers of mono-cropping

- Causes loss of soil fertility
- Encourages easy spread of crop pests and diseases

Mixed farming

This is the growing of crops and rearing of animals on the same piece of land but on different plots

Advantages of mixed farming

- A farmer gets double income
- There is maximum utilization of available land
- The farmer uses animal dung as manure

Disadvantages of mixed farming

- It needs a lot of capital to start
- It needs a lot of labour
- It needs a lot of land

Agroforestry

Agroforestry is the growing of useful trees together with crops and rearing of animals on the same piece of land but on different plots

Importance of growing trees and crops together (agroforestry)

- Trees provide shelter to other crops.
- Trees control soil erosion.
- Crops get protection from wind and strong sunshine.
- A farmer gets double income e.g. food and timber.
- Trees contribute to rainfall formation.
- Crops with weak stems get support from trees.

Qualities of trees for agroforestry

1. Should be able to grow quickly.
2. They should bear a lot of leaves
3. They should have deep growing roots to prevent them feeding on plant nutrients.

Importance of rearing animals and growing crops on the same piece of land

- Animals get food.
- Crops get manure.
- The farmer can get double income.
- Animals give carbon dioxide to crops.
- Crops provide oxygen to animals

Starting a woodlot

A woodlot is a piece of land where trees are grown

Factors considered when starting a woodlot

1. Size of land
2. Capital
3. Fertility of the soil
4. Labour
5. Security
6. Soil drainage

Qualities to consider when choosing trees or crops for planting

- Those which mature fast
- Those that give high yields
- Those that are resistant to diseases
- Those that are multipurpose

Types of trees

1. Local/indigenous trees
2. Exotic trees

Indigenous trees: These are trees that have been growing in Uganda for many years.

Examples include. Musizi, Acacia, Mvule, Mahogany

Characteristics of indigenous trees;

- Produce hard wood.
- Take long to mature.
- They can grow without special care.

Exotic trees: These are the recently introduced species of trees. Cypress, Pine, Cedar, Mango, Black wattle, Eucalyptus, Jack fruit tree and Ficus tree.

Characteristics of exotic trees

- They produce soft wood.
- They mature faster than the indigenous trees.
- Need proper care.

Methods of harvesting trees

1. Coppicing.
2. Pollarding
3. Lopping

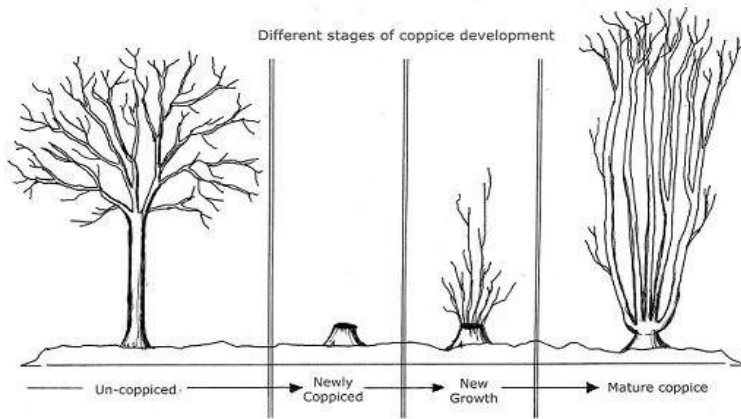
Coppicing

This is the cutting of a tree few centimeters from the ground to allow new shoots develop from the stump.

It is a destructive method of harvesting trees because the whole tree is cut.

It is used for harvesting trees for electric poles and timber

An illustration showing coppicing



Pollarding

The cutting of the top part of a tree allowing new lower branches to grow.

It is a sustainable method of harvesting wood because tree parts are cut instead of the whole tree

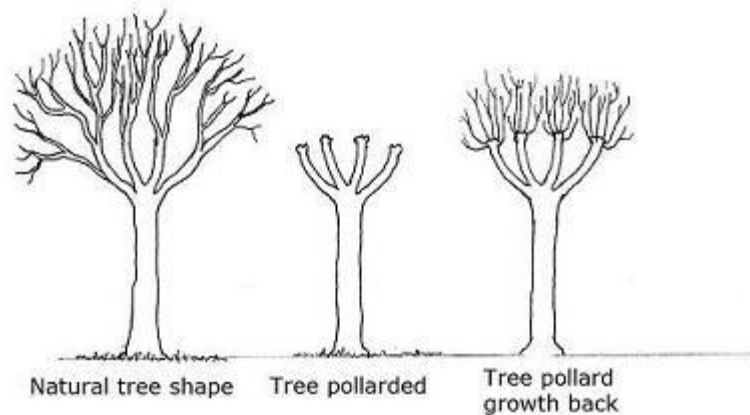
It is used for pruning shade trees in the compound

Wood harvested by this method can be used for firewood

This method helps fruit trees produce better fruits e.g. mangoes.

Also makes harvesting of fruits easy.

An illustration showing pollarding



Lopping

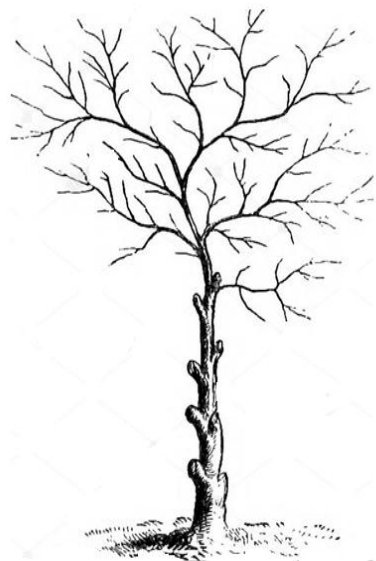
The cutting of the side branches from the tree trunk.

It is a sustainable method of harvesting wood because tree parts are cut instead of the whole tree

It enables a tree to grow tall and produce a good stem for wood.

Wood harvested by this method can be used for firewood and charcoal

An illustration showing lopping



Importance/ advantages of starting a woodlot

- Trees provide shade
- Trees provide wood fuel
- Trees are a source of income when sold
- Trees help in rain formation

Preparing wood for different purposes and storage

Uses of harvested wood

- For charcoal
- For timber
- For firewood
- For making electric poles

Wood for firewood.

- It is split, dried and then kept in a shed.
- Splitting helps water in wood to evaporate and enable wood to dry fast

Wood for charcoal

- Cut wood into pieces
- Arrange pieces together
- Cover the pieces with grass and put soil.
- Soil reduces/limits oxygen supply.
- Limited supply of oxygen prevents wood from burning completely to ash.
- Wood stores chemical energy which changes to heat and light when burnt.

An illustration showing charcoal burning



A

A- Wood is piled



B

B- Wood is covered with soil and being burnt



C

C- Charcoal

Questions

1. How is charcoal made?
2. How is the supply of oxygen reduced when making charcoal?
3. When burning wood to get charcoal, pieces are covered with soil. Give a reason why this is done.
4. What may happen if wood is burnt without covering it with soil?
5. Name these forms of energy:
 - a. Stored in wood
 - b. Produced when wood is burnt
6. What energy change takes place when wood is burnt?
7. Apart from charcoal, give one other example of wood fuel
8. Why should wood be spaced when using it for cooking?

Wood for timber

- Saw pieces of wood into timber planks of specific sizes.
- Timber planks should be placed together on a flat surface to enable them remain straight.
- Put timber planks in a cool dry place.

Seasoning of timber or wood:

Is the drying of timber in under shade.

Reasons for seasoning timber.

- To prevent it from cracking
- To prevent it from warping/bending.

Wood for poles

- Cut and remove barks from trees, dry them and treat them with preservatives.
- Preservatives include: old engine oil, tar, paint, tanex etc.
- Things that destroy untreated wood: fungi, termites, weather etc.

Reasons for treating wood for poles.

1. To prevent them from rotting.
2. To prevent them from being burnt by wild fire
3. To prevent them from being destroyed by fungi and insects

Crop pests

A pest is a living organism that destroys crops.

Types of pests

1. Field pests
2. Storage pests

Field pests

These are pests that destroy crops from the garden

Examples of field pests

1. monkeys

2. termites

3. locusts

4. squirrels

5. porcupines,

Storage pests

These are pests which destroy crops from stores

Examples of storage pests

1. Bean weevils
2. Maize weevils
3. Rats
4. Storage beetles

Examples of insect pests

1. Locusts
2. Termites
3. White flies
4. Leaf miners
5. Aphids, etc.

Vermins

A vermin is a small insect or animal that destroys crops

Examples of vermins

1. Locusts
2. Termites
3. White flies
4. Leaf miners
5. Rats
6. Aphids, etc.

Dangers of crop pests to crops

- They lower the quality of crops
- They lower crop yields
- They lead to poor growth of crops

Dangers of crop pests to a farmer

- i. They lower crop yields
- ii. They increase the cost of production

How?

A farmer spends a lot of money buying pesticides

Signs of pest damage on crops

- i. Holes on leaves
- ii. Damaged crop parts

Ways of controlling pests

- Early planting.
- Spraying with pesticides.
- trapping
- Crop rotation.
- Weeding
- Use lady birds to eat aphids
- Using scare crows

Biological ways

- Use lady birds to eat aphids
- Taming cats to eat rats

Mechanical ways

- trapping
- Using scare crows

Chemical ways

Spraying using pesticides

Cultural ways

- Early planting
- Crop rotation.
- Weeding

A table showing crop pests, crops attacked, and damage caused

| Pest | Crops attacked | Damage. |
|--|---|---|
| Mealy bug | Pineapples, coffee | Leaves turn yellow or pink. |
| Aphids | Oranges, coffee, cabbages etc. | Wilting back of terminal bud. |
| Banana weevils | Bananas | Leaves turn yellow Bananas fall easily. |
| Codling moth. | Citrus fruits like oranges and mangoes | Fruits fall off. |
| Thrips | bananas | Premature ripening of bananas Banana fruits burst. |
| Moles, rats, squirrels, mice, cane rats. | Cereals | Direct consumption of seeds and stems. |
| Citrus black fly. | Citrus fruits | The flies suck sap from leaves and tender shoots. |
| Leaf miners | Coffee, cocoa, pineapples, aloe vera, sisal | Plant's ability to make sugar is reduced. |

| | | |
|---------------------------|---------------------|-----------------------|
| Cut worms | vegetables | Leaves are destroyed. |
| Locusts | All crops | |
| Army worms | Cereals and grasses | |
| Maize stalk borer | Maize | |
| Boll worm | Cotton | |
| Antestia bug | Coffee | |
| Game animals e.g. monkeys | Oranges, mangoes | |
| Weaver birds | Maize, sorghum. | |

Crop diseases

| Disease | Crop | Cause | Sign | Control |
|-----------------------|---------------|----------|-------------------------------------|--|
| Panama disease | Bananas | | Plant Banana Wilts | Burn entire stock Plant healthy suckers |
| Cigar End rot | Banana | Bacteria | Banana tips resembles burning cigar | Burn infected crops. |
| Banana bacterial wilt | Banana | Bacteria | Banana stem rots and falls down | |
| Powdery mildew. | Mangoes | Fungi | Powdery patches on leaves | Spray with fungicides |
| Green mould | Citrus fruits | Fungi | The stem dries with a green powder | Spray with fungicides. |
| Stem pitting | Citrus fruits | Fungi | Dry patches on the stem. | Spray with fungicides. |

| | | | | |
|----------------------------|--------------------|----------|--------------------------------|--|
| Tomato blight | Tomatoes, potatoes | Bacteria | Yellow leaves | |
| Crown gall | fruits | Bacteria | Leaves shrink | |
| Fire blight. | | Bacteria | wilting | |
| Rust fungus | Cereals | Fungi | Black spot on leaves | |
| Root rot | Tea plants | Fungi | | |
| Coffee berry diseases(CCB) | Coffee | fungi | Brown spots appear on berries. | |

A table showing crops, pests and diseases

| Crop | Crop pest | Disease |
|-------------|-----------------------------|--|
| pineapples | Pineapple mealy bug | Stem pitting |
| Bananas | Banana weevils | Panama wilt, cigar end rot, bacterial wilt |
| beans | Bean aphids / bean weevils | Powdery mildew, bean rust |
| Root crops | Moles, squirrels, rats/mice | |
| cassava | White scales | Mosaic disease |
| Ground nuts | Thrips | Rosette disease, leaf spot |
| sorghum | Sorghum shoot fly , midge | Leaf blight |

| | | |
|----------------|------------------------------------|-------------------------------|
| Tomato | nematodes | Tomato blight, bacterial wilt |
| Maize | Maize stalk borer, maize weevil | Maize rust, maize streak |
| Sugar cane | Termites, white scale | Sugar cane smut, mosaic |
| cotton | American ball worm, cotton stainer | Root rot |
| Sweet potatoes | Sweet potato weevil | Potato blight, bacterial wilt |
| | Potato aphids, nematodes | Bacterial wilt |

Ways of controlling crop diseases

- i. By crop rotation
- ii. By uprooting and burning infected plants
- iii. By proper crop spacing
- iv. By spraying using chemicals
- v. Plant disease free materials
- vi. Plant disease resistant crops

Signs of diseased crops

- Rotten plant parts
- Poor/stunted growth
- Wilting of plants
- Yellowing of leaves

- Curled leaves

Dangers of crop diseases to a farmer

They increase the cost of production

They lower crop yields

Factors that affect crop production

- Crop pests and diseases.
- The use of poor methods of farming.
- The harvesting of immature seeds.
- Failure to weed in time.

Harvesting

Harvesting is the removal of ready crops from the garden

Harvesting is the last field activity in crop production

Advantages of early harvesting

- i. Prevents crops from rotting in the garden
- ii. Prevents pests from destroying ready crops
- iii. Prevents seeds from germinating again

Dangers of delayed harvesting

- i. Ready crops may be destroyed by pests
- ii. Seeds may germinate again

Ways of reducing crop losses during and after harvesting

- i. By timely harvesting
- ii. By proper drying
- iii. By proper storage

Methods of harvesting crops

| Method | Crops | Garden tool |
|---------------|---|--------------------------|
| Uprooting | <ol style="list-style-type: none"> 1. Beans 2. Groundnuts 3. Soya beans 4. Carrots, etc. | |
| Cutting stems | <ol style="list-style-type: none"> 1. Bananas 2. Sugar cane 3. Rice 4. Millet, etc. | Panga Knife sickle |
| Digging | <ol style="list-style-type: none"> 1. Sweet potatoes 2. Cassava 3. Irish potatoes 4. White yams | Hoe |
| Hand picking | <ol style="list-style-type: none"> 1. Passion fruits 2. Mangoes 3. Oranges 4. Lemons, etc. | |

Note; Harvesting should be done in the dry season because there is enough sunshine to dry harvested crops

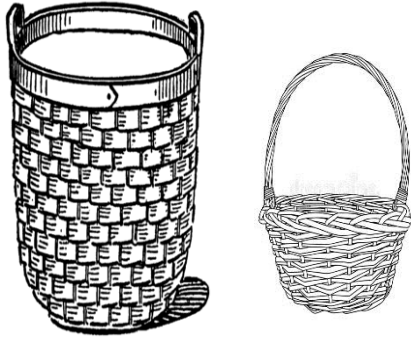
Storing crops

Reasons why farmers store food

1. To be eaten during food scarcity
2. For planting in the next season
3. To be sold when prices are high

Traditional ways of storing food

Using baskets



Using clay pots



Using underground pits

Using granaries



Modern methods of preserving food

Using silos



Using refrigerators



Qualities of a good store

Should not leak

Should be raised above the ground

Should be clean and dry

A granary



Rat guards

Note: rat guards prevent rats from entering the granary

Reasons why the granary should be raised

To keep store food free from moisture

To prevent ground pests from entering the granary

Examples of crops which are stored in granaries

1. Maize
2. Rice
3. Sorghum
4. Beans
5. Millet
6. Ground nuts

Why should crops stored in a granary first be dried?

To prevent from rotting

Why can't tomatoes be stored in a granary?

Tomatoes easily rot

Factors that affect crop yield

1. pests and diseases
2. floods
3. Poor storage
4. Poor selection of seeds
5. Poor farming methods

Food preservation

Food preservation is the keeping of food safe for a long time

Traditional methods of preserving food

| Method | How it preserves food | Examples of foods preserved |
|------------|---------------------------|---|
| Sun drying | Drains moisture from food | Millet, beans, rice, sorghum(all cereals and legumes) |
| Smoking | Drains moisture from food | fish |
| Salting | Drains moisture from food | Meat, fish |

Modern methods of preserving food

| Method | How it preserves food | Examples of foods preserved |
|---------------|--|--|
| Refrigeration | Tomatoes, watermelons, oranges, apples, etc. | Prevents multiplication of bacteria |
| Tinning | Beans, meat, milk, etc. | Tins prevent entry of bacteria into food |

Write sss in full as used in food preservation

Smoking salting sun drying

Why is carbon dioxide used in preservation of soft drinks?

Carbon dioxide does not support respiration of bacteria

Importance of preserving food

1. Prevents food wastage
2. Controls food poisoning

Food path

Food path are different stages in food production

Types of food path

1. Village food path
2. Town food path
3. Earning food path

Village food path

This is where farmers grow crops for home consumption

Stages of a village food path

1. Land preparation
2. Planting/sowing
3. Caring for crops
4. harvesting
5. cooking
6. eating

Town food path

This is where farmers produce food for sale

Stages of a town

1. Land preparation
2. Planting/sowing
3. Caring for crops

4. Harvesting
5. Drying
6. Marketing food
7. Buying food
8. Cooking food
9. Eating food

Earning food path

This is where people work and get salary which they use to buy food from markets

Stages of earning food path

1. Getting salary
2. budgeting
3. buying food
4. cooking food
5. eating food

Blocks of food path

Blocks are problems which affect food production

Examples of blocks in a food path

1. Crop pests
2. Crop diseases
3. Poor farming methods
4. floods
5. earth quakes
6. drought

Ways of increasing food production

1. By applying fertilizers
2. By using modern methods of farming
3. By crop rotation by weeding

Food processing

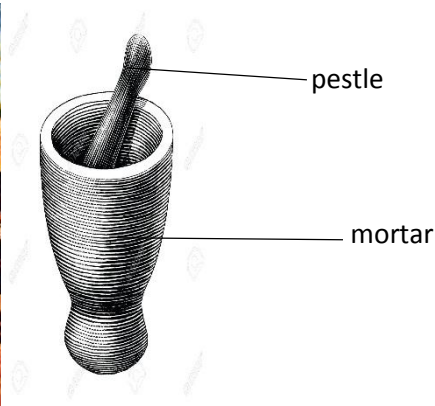
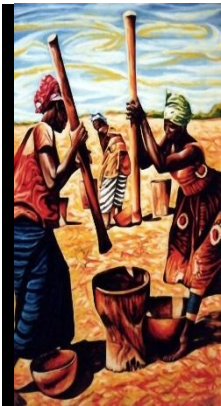
Food processing is the transformation of agricultural products into food

OR

Food processing is the transformation of food from one form to another

Local materials used for processing food

1. Mortar and pestle



Women
pounding
cassava using
mortar and
pestles

A mortar is used for pounding food.

Foods pounded using a mortar include; millet, maize, cassava, groundnuts, etc.

A mortar can be made from materials like; wood, metal, and hard stone like granite

2. Grinding stone



A woman grinding on a grinding stone



A pair of grinding stones

A grinding stone is used for grinding food. It is made from granite

Note : In the modern world, a grist mill used for grinding food

A diagram showing a grist mill



Reasons for processing food

1. For easy storage
2. For easy packaging
3. For easy transportation

Plant propagation

Plant propagation the process by which plants grow into new ones

Types of plant propagation

1. Seed propagation
2. Vegetative propagation

Seed propagation

This is the obtaining of new plants from seeds

Examples of plants propagated by seeds

- i. Carrots
- ii. cabbages
- iii. tomatoes
- iv. passion fruits
- v. beans
- vi. maize

Note: All flowering plants and conifers can be propagated by means of seeds

Vegetative propagation

This is the obtaining of new plants from other parts of a plant other than seeds

Types of vegetative propagation

1. Natural vegetative propagation
2. Artificial vegetative propagation

Natural vegetative propagation

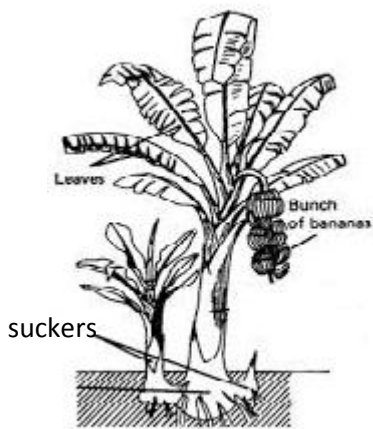
This is when an axillary bud of a plant grows into a lateral shoot and develops its own roots.

Examples of natural vegetative propagation methods

| Method | Examples |
|--------------------|-----------------------------|
| Use of suckers | Bananas, pineapples, sisal, |
| Use of stem tubers | Irish potatoes, white yams |
| Use of bulbs | Onions, garlic |

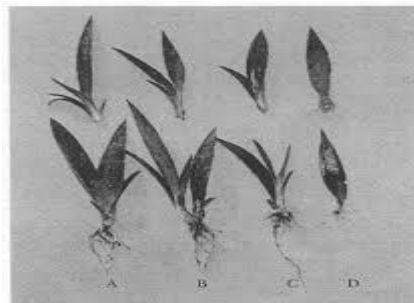
| | |
|---------------------|----------------------------------|
| Use of rhizomes | ginger, coach grass, spear grass |
| Use of corms | Cocoyams, crocus, gladiolus |
| Use of leaves | Bryophyllum |
| Use of potato vines | Sweet potatoes |

Suckers



banana

Sisal suckers



Growing sisal

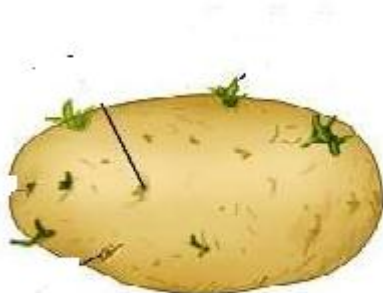


Note: sisal is mainly propagated by means of sisal bulbils

Sisal bulbils



Stem tubers



An Irish potato



White yams

Bulbs



Onions

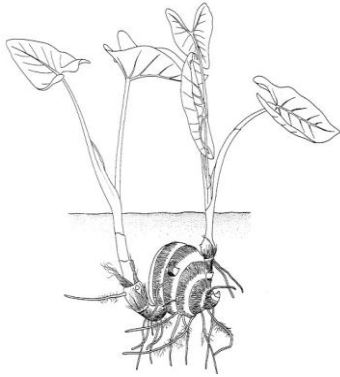
Garlic

Rhizomes



Ginger

Corms



Coco yam

Germinating bryophyllum



Sweet potato vines



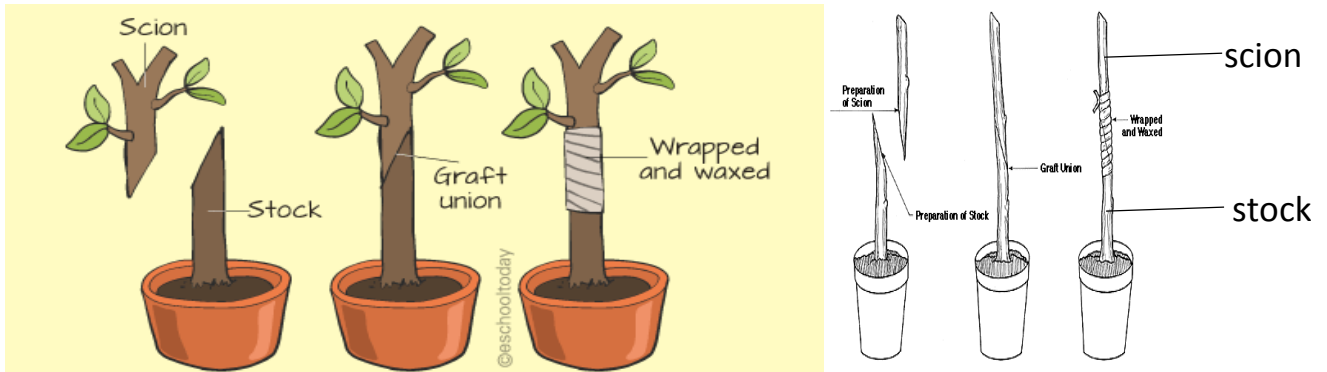
Artificial vegetative propagation

This is a type of plant reproduction that involves human intervention

Examples of artificial vegetative propagation methods

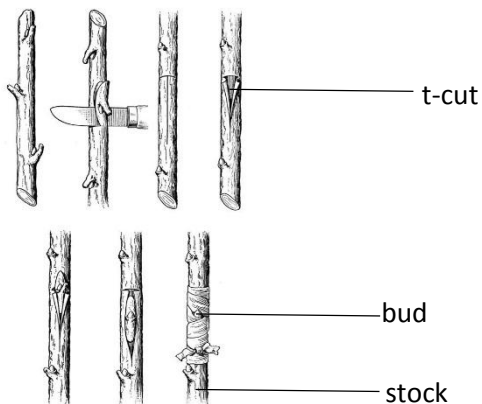
1. Grafting

This involves use of a branch of a plant called scion and the stem of another plant called stock. When the scion is tied into the cut stock, it grows into a new plant



2. Budding

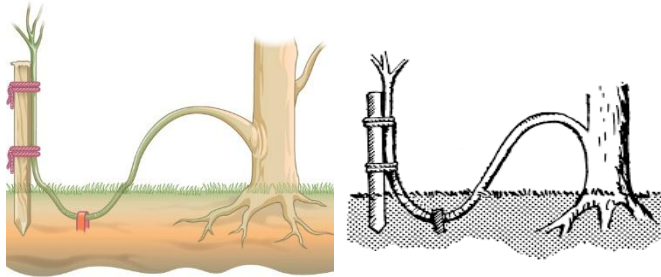
This involves use of a bud of one plant and the stem of another plant called stock. When the bud is tied into the cut in the stock, it grows into a new plant.



Note: budding and grafting are often done with fruit trees oranges, mangoes, lemons, etc.

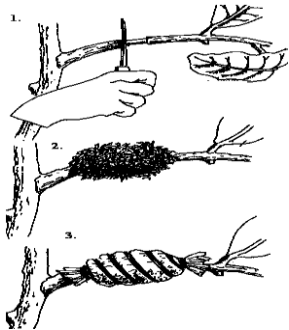
3. Layering

This involves pegging down a plant branch so that it touches the soil. A cut is made in the bark where the branch touches the soil. Through that cut, new shoots develop and the new bud grows into the air.

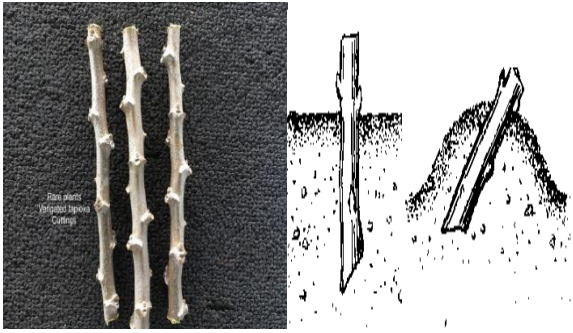


4. Marcotting

This involves cutting a ring through the bark of a branch. After the ring is cut, rich soil is applied around it until new roots develop. When the roots are established in the soil, the branch is detached from the mother plant and planted in the garden



5. **Use stem cuttings** e.g. cassava, sugar canes, clonal coffee, etc.



Advantages of vegetative propagation

1. Plants mature fast
2. Helps to improve quality of plants
3. Helps to obtain new plants from plants which do not reproduce sexually e.g. bananas and pineapples
4. Only one parent plant is involved
5. The new plant use food of its parent plant when still developing

Disadvantages of vegetative propagation

1. It may lead to maintenance of undesired qualities of plants
2. Diseases of parent plants can be passed on to new plants
3. Vegetative propagation can result into crowding of plants

INTERDEPENDENCE OF THINGS IN THE ENVIRONMENT

Interdependence is a way things in the environment benefit from each other

Environment refers to people and their surrounding

Components of the environment include:

1. Plants
2. Animals
3. Soil
4. Water
5. Air
6. The sun

Note: plants and animals are living (biotic) components of the environment while soil, air and water are non living (abiotic) components of the environment

General uses of plants in the environment

- 1) Control soil erosion
- 2) Contribute to rain fall formation
- 3) Source of building materials
- 4) Source of herbal medicine
- 5) Source of fuel
- 6) Source of food
- 7) Purify air

General uses of animals in the environment

1. For protection
2. Source of meat
3. Source of skins and hides
4. For transport
5. For ploughing

General uses of soil in the environment

1. Used for pottery
2. Used for construction
3. Used in growing of crops
4. Acts as a habitat for some animals

General uses of water in the environment

1. Used as a coolant in machines
2. Used for irrigation
3. Used for cooking, bathing, drinking, washing
4. Used by plants to make food

Air

Air is a mixture of gases

General uses of air in the environment

1. Oxygen is used during germination, combustion, respiration
2. Carbon dioxide is used to extinguish fire, photosynthesis, preservation of packed food and drinks
3. Rare gases are used in electric bulbs

The sun

1. The provides us with light
2. Heat from the sun is used for drying harvested crops
3. Heat from the sun is used for drying wet clothes
4. Energy from the sun is used to generate solar energy

Note: the sun is the main source of heat and light

How plants depend on animals

1. Plants get carbon dioxide from animals for photosynthesis
2. Plants get manure from animal waste
3. Some plants are pollinated by animals

How plants depend on other plants

1. Some plants climb others for support to get sun light.
2. Big trees provide shade to smaller ones
3. Strong trees protect weak plants from strong wind
4. Epiphytic plants get shelter from other plants
5. Parasitic plants get food from other plants

How animals depend on plants

1. Animals get food from plants
2. Animals get oxygen from plants for respiration
3. Animals get shade from plants
4. Some animals use plants as their habitats

How animals depend on other animals

1. Some animals feed on other animals
2. Parasitic animals depend on other animals for shelter and food
3. People use some animals for food

Interdependence of living things and nonliving things

How animals depend on non-living things

1. Some animals use soil as their habitats e.g. termites
2. Animals use water for drinking
3. Animals use light from the sun to enable them see

4. Oxygen is used by animals during respiration
5. People use soil for building

How plants depend on non-living things

1. Plants use water for photosynthesis
2. Plants grow on soil
3. Plants use carbon dioxide for photosynthesis
4. Wind and water helps in seed dispersal
5. Wind helps in pollination

Ways plants depend on the atmosphere

1. Plants get oxygen from the atmosphere
2. Plants get oxygen from the atmosphere

Interdependence of nonliving things on thing things

How non-living things depend on animals

1. Animals help in soil aeration
2. Animal waste improve on soil fertility

How non-living things depend on plants

1. Plants control soil erosion
2. Plants contribute to rain formation
3. Leguminous plants improve on soil fertility

Q. How do plants benefit animals?

Q. How do animals benefit plants?

Q. How do plants benefit from animals?

Q. How do animals benefit from plants?

Feeding relationships

This is how animals get food in the environment

Types of feeding relationships

1. Food chain
2. Food web

Food chain

Food chain is the transfer of energy from plants through a series of organisms with repeated **eating** and being eaten.

An ecosystem is a community of living things interacting and depending on each other for survival

Components of a food chain/trophic levels in a food chain

1. Producers
2. Primary consumers
3. Secondary consumers
4. Tertiary consumers
5. Decomposers

Producers

These are organisms that make food

Plants are the producers in a food chain because they make their own food.

Examples of producers

1. Maize
2. Beans
3. Bananas

4. Grass

5. Cabbages, etc.

Primary consumers

These are organisms that feed directly on plants(producers)

These are herbivores

Herbivores are organisms that feed only on vegetation

Examples of herbivores/primary consumers

1. Cattle

2. Goats

3. Sheep

4. Giraffe

5. Grasshopper

6. Rats, etc.

Secondary consumers

These are organisms that feed directly on primary consumers

These are carnivores but of the first degree

Carnivores are animals that hunt and kill their prey for food

Examples of secondary consumers

1. Snakes

2. Chameleons

3. Cats

4. Lizards
5. Crocodiles
6. Leopards
7. Lions, etc.

Tertiary consumers

These are organisms that feed on secondary consumers

They are carnivores of the second degree

Examples of tertiary consumers

1. Eagles
2. Kites
3. Praying mantis
4. Secretary birds
5. Vultures
6. Marabou storks

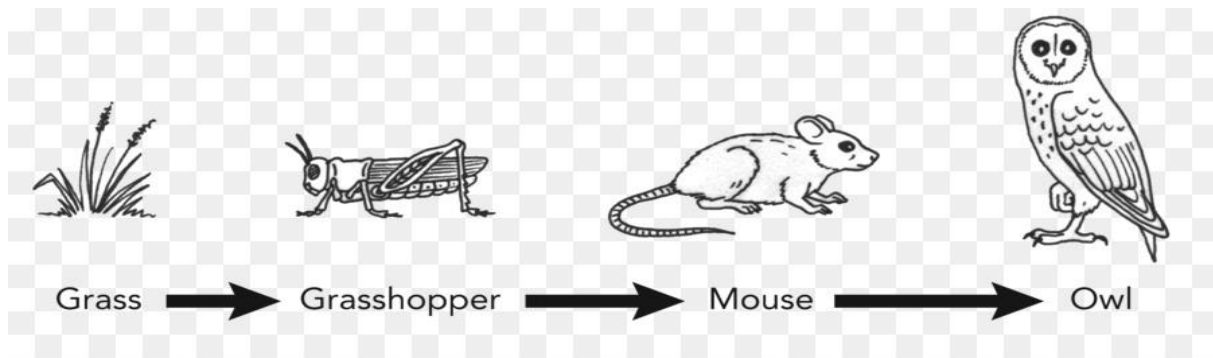
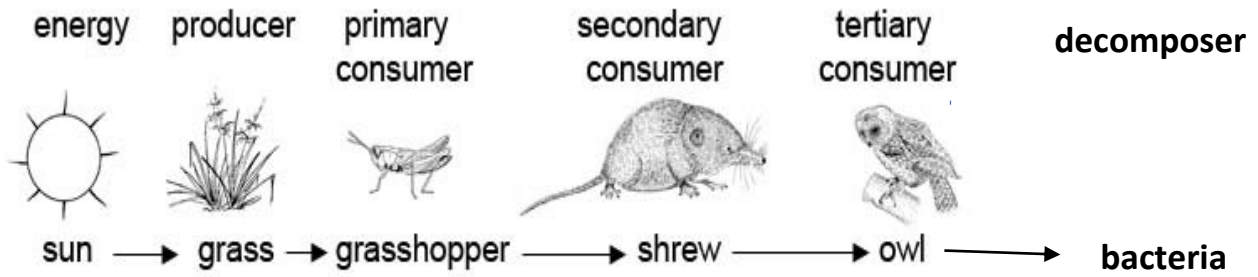
Decomposers

These are organisms which break down dead plants and animals.

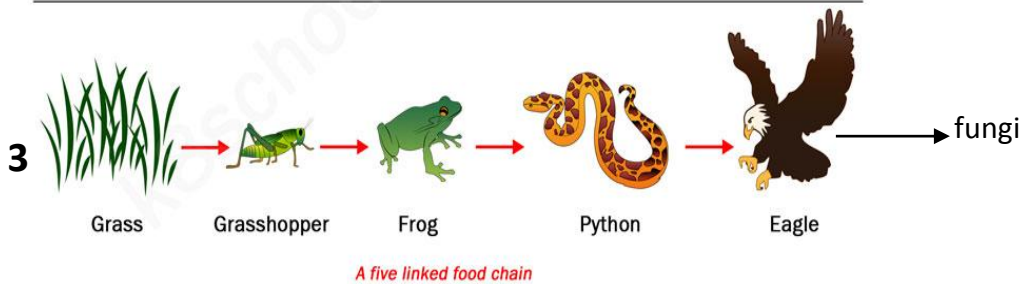
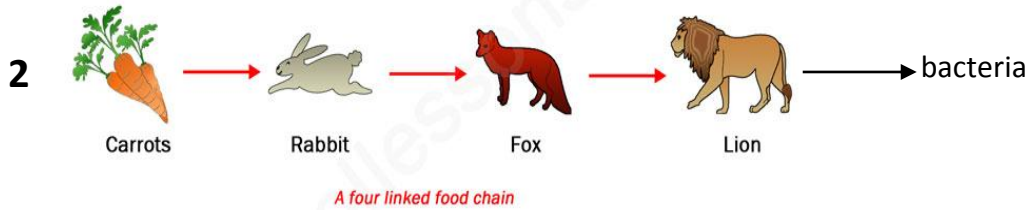
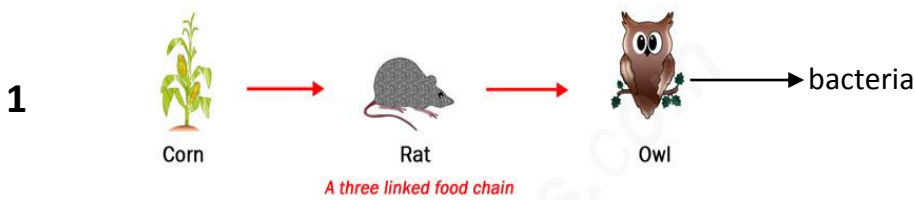
Decomposers are mainly bacteria, fungi.

Their role is to break down organic matter to form humus

Sample food chains



Food Chains



4



Food chain



maize
producer



locust
primary
consumer



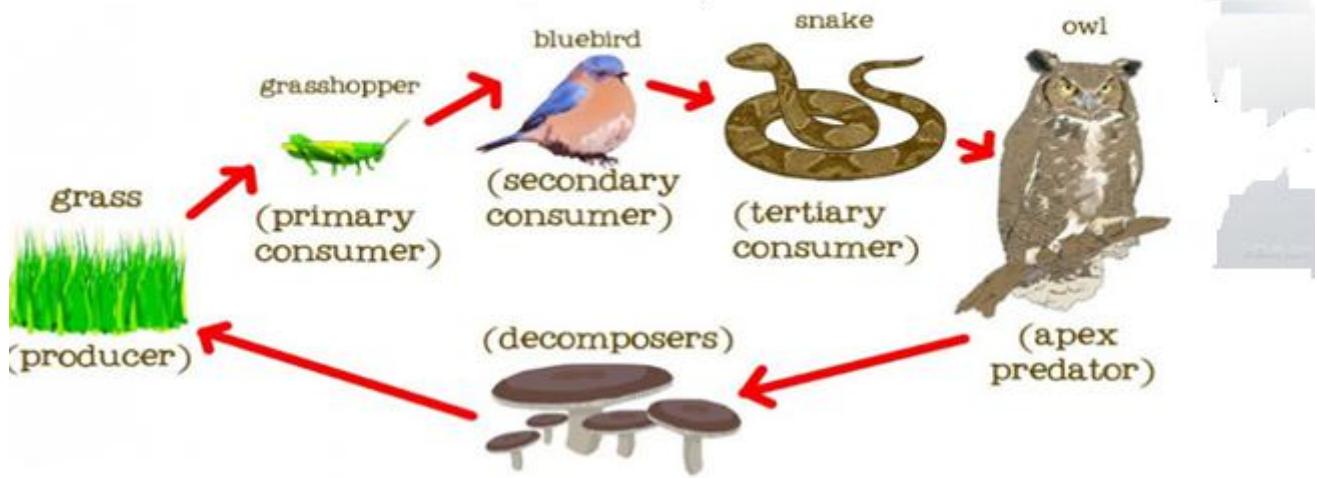
lizard
secondary
consumer



snake
tertiary
consumer

5

5



6. Grass → grass hopper → hen → eagle → bacteria

7. Maize → rat → cat → bacteria/fungi

Qn. What will happen to rats when all cats die?

Qn. Give a reason for your answer.

Qn. What will happen to cat when all rats die?

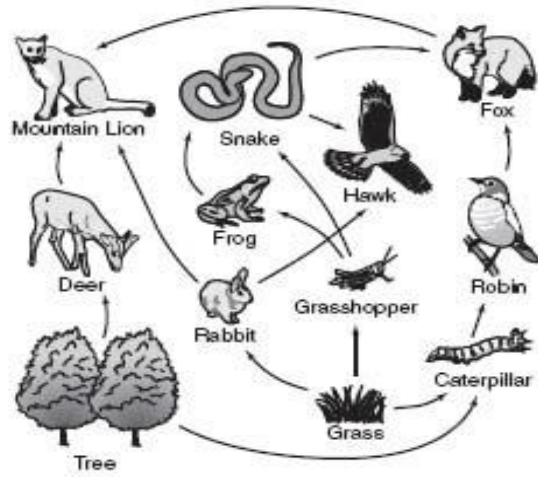
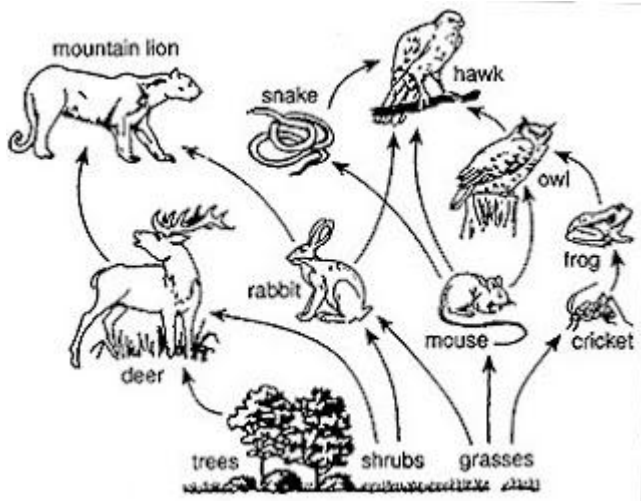
Qn. Give a reason for your answer.

Food web

Food web is a combination of several food chains.

Or Food web is a combination of different feeding relationships in an ecosystem

Illustrations of food webs



Note: 1. Arrows show the flow of energy

Or

Eaten by

3. In any food chain or food web, the sun is the main source of energy