AGRICULTURE NOTES

STRANDS COVERED

1. *Conserving our environment*
2. *Domestic animals*
3. *Gardening practices.*

4

Interprets the Agriculture grade 4 competency based curriculum Design intensively.

STRAND 1: CONSERVING OUR ENVIRONMENT.

SOIL

SOIL PARTICLES

Types of Soil.

These include:

1. Loam
2. Sand
3. Clay

Characteristics of soil

1. **Loam**

- Holds water well, but let some out
- Best for growing most crops, i.e. cotton, rice, maize, beans etc.
- Has a medium particle.
- Medium texture.

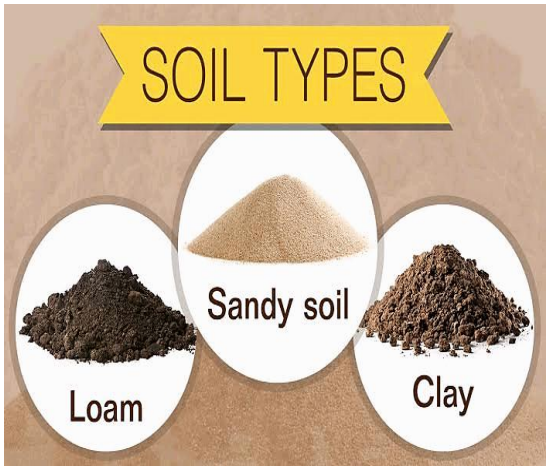

Figure i :show major types of soil found in our locality

2. **Sand**

- Does not hold water well.
- Has large particles
- Few crops can be grown in it
- Rough texture

3. **Clay**

- Sticky to touch when wet.
- Has small particles
- Holds water for long
- Has fine texture
- Moldable.

Experiment.

Ability of soil to hold water (drainage)

Materials.

- Three empty plastic water bottles.
- A pair of scissor
- Three different types of soils, i.e. sand, loam, and clay.
- Cotton wool
- Three empty jars

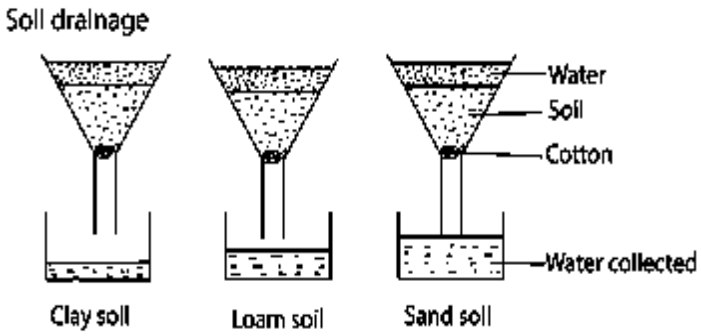

Figure ii : set up for experiment on ability of soil to hold water

Steps.

1. Cut the bottom of the three water bottles to make funnels
2. Mount them on the three empty jars.
3. Put some cotton wool on each funnel
4. Fill each funnel half way with soil as follows.
    - Funnel A with clay
    - Funnel B with loam.
    - Funnel C with sand.
5. Add equal amount of water in each of them and observe.
6. You can use stop watch to time the experiment.

Uses of soil in farming

Importance of soil

- Provides plants with surface that helps them to stand firm.
- It stores water which is used by animals and plants.
- It stores air for use by both plants and other organisms in the soil.
- It stores different types of minerals and nutrients used by plants.
- It is a home for many animals like moles, mice and some insects.
- Clay is used in pottery
- Sand soil is used for building.

Relationship between ability to hold water and uses of soil.

- *Clay* soil has very small particles which make it hold a lot of water.
- Crops such as rice that need a lot of water grow well in these types of soil.
- *Sand* soil has large particles.
- It holds very little amount of water.
- Crops such as coconut that need little amount of water grow well in this type of soil.
- *Loam* soil has medium sized particles which make it retain some water.
- Loam soil is good for crops like maize, beans, wheat, and millet among others.

Compost manure.

- Compost manure is made up of decomposed plants and animal waste.
- It produces organic manure which is used by crops.

Making compost manure.

Materials.

- ✓ Dry leaves.
- ✓ Paper wastes
- ✓ Farm and kitchen waste.
- ✓ Chicken droppings
- ✓ Grass
- ✓ Cattle dung

Steps

1) Select a suitable site.
2) Level the ground.
3) Spread the dry matter and add the animal waste on top of the dry matter, then put the green leaves.
4) Add small layer of ashes.
5) Cover with a thin layer of soil and sprinkle some water to make the materials moist.

6) Leave the compost heap for the materials to decompose.
7) You may sprinkle some little water when you find it is too dry.

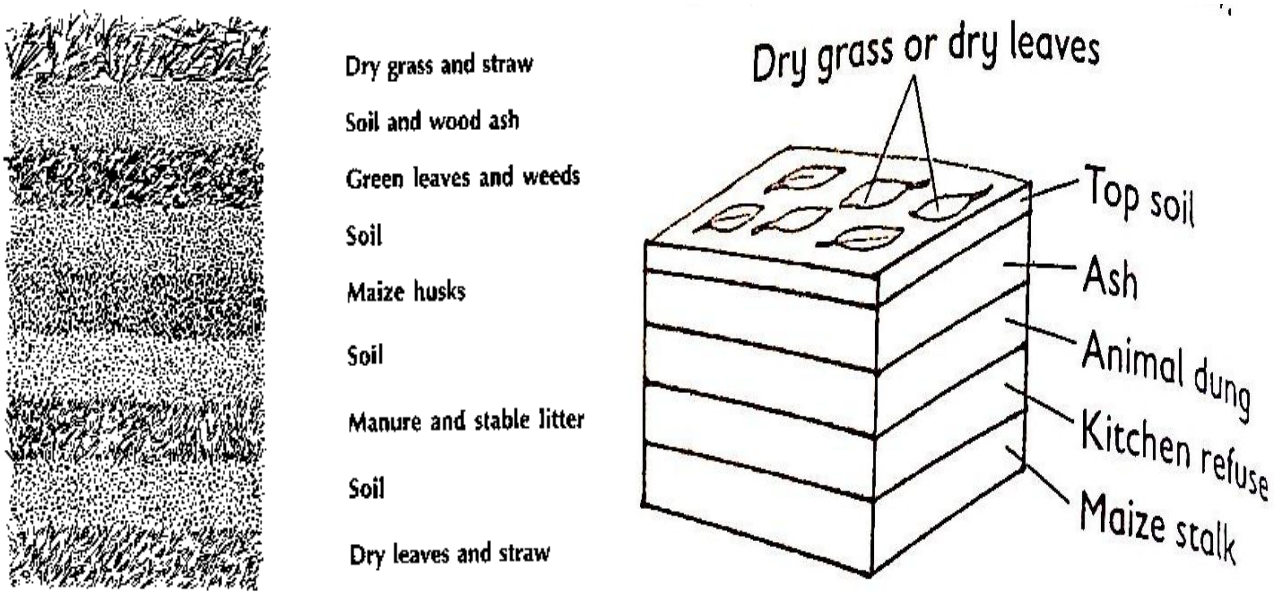

Figure iii: Compost heap/pit diagram

Note:

- ✓ You can add more layers alternately to achieve the amount of manure you need to use in your farm.
- ✓ You can consider the size of your farm and the types of crops and their need for the compost manure.
- ♦ **Water** helps in decomposition and regulation of the temperature.
- ♦ A reasonable amount (not too much or too little) should be added regularly.
- ♦ **Wood ash** helps to balance the acidity of compost. Acidic compost is dangerous to the plants.
- ♦ Wood ash should be added in thin layers.

Good materials for making compost manure

- ✓ Sawdust
- ✓ Pine needle
- ✓ Dried grass
- ✓ Straw
- ✓ Eggshells
- ✓ Shredded cardboard and paper.
- ✓ Chopped wood pruning
- ✓ Citrus rinds
- ✓ Coffee grounds
- ✓ Young weeds
- ✓ Wilted flowers
- ✓ Vegetables wastes

Materials not suitable for making compost manure.

- ♦ Animal products (fish, bones, meat, fat)
- ♦ Dairy products
- ♦ Sawdust from treated wood
- ♦ Diseased plants
- ♦ Human waste

- Weeds that bear seeds such as ivy, oxalis bulbs, burr clover and Bermuda

Importance of compost manure.

The importance of compost manure includes:

- It is easy and cheap to make and can be made on the farm.
- It slowly releases plant nutrients into the soil.
- It reduces the use of artificial fertilizers and chemicals.

Water

Uses of water in farming.

There are many uses of water in the farm;

- ✓ Watering plants
- ✓ Watering animals
- ✓ Cleaning tools and equipment
- ✓ Mixing pesticides and insecticides for spraying crops and animals.

Water conservation in farming.

Effective ways to save water in the farm

- Mulch
- Irrigate early in the morning
- Don't over-water
- Check for leaks and damages.
- Do not use hose pipe instead use watering can when watering crops.

Drip irrigation.

- Irrigation is a man – made method of giving water to plants
- In drip irrigation, water is slowly and directly given to the individual plant's roots.
- This method conserves water.

Figure iv: different types of drip irrigation; using plastic water bottle and plastic pipes laid next to the plant with holes letting out water directly to the root.

Improvising a simple drip irrigation method.

Materials.

- Nails
- Plastic water bottle
- Hammer.

Steps.

- Using a nail, make holes on the bottle cap. Take care not to injure yourself.
- Make small holes at the bottom of the bottle to make it easier for water to drip out.
- Put water in the bottle and fasten the cap.
- Your bottle is now ready for drip irrigation.
- Dig a small hole near the stem of the plant.
- Bury part of the bottle in the soil, facing downwards. The water will drip slowly to the roots of the plant.

Living better with wild animals

Small wild animals that destroy both our crops and domestic animals.

These small animals that destroy crops include:

- Weaver birds
- Moles
- Squirrels
- Monkeys

Damages caused by small wild animals in the farm.

- Moles damage roots of crops.
- Birds can destroy seeds, fruits and even plants.
- Animals such as antelopes, hares, monkeys and squirrels can cause serious damage to crops.
- They can damage the plants by feeding on them, or them, or by running over the field and stepping on the crops.

Scarecrow.

It is used to scare away small animals that that destroy crops in the farm.
Small birds destroy plants by feeding on them, or by running over the field and stepping on the crops.

Figure v: scare crow erected to scare away animals

Making a scarecrow.

Materials.

- Old sacks
- Dried grass or leaves
- Old clothes
- Old garment buttons
- Old cowboy cap or any appropriate cap
- Two poles.

Steps.

1. Cut old sacks and make a pair of trousers and a shirt.
2. Sew them together with help of the teacher.
3. Fill it with a dried grass and sew it up.
4. Fill the head part of the sack with dry grass to make a round shape.
5. Join the head to the rest of the body. You can put buttons on the face to look like eyes
6. Dress up the scarecrow. Using a pole take it to the field or school farm and fix it there.

Keeping of small animals from the farm.

The small animals will associate the scarecrow with the human beings.
They will keep off the farm.

Figure vi: sound repellant erected to scare away birds destroy rice in the farm.

Storage of photos of small wild animals.

- ✓ Learners should store photos of small wild animals in the scrap book or notebooks.
- ✓ These photos can be downloaded and the printed.
- ✓ They can also be cut from old magazines or old books.
- ✓ They can also be photographed and the printed out.

Growing fruit trees.

Fruit trees that can be grown include:

- Avocado
- Lemon
- Guava.
- Orange
- Pawpaw
- Peas

Their seeds are keenly extracted and the dried before they are planted.

Figure vii: types of fruit trees grown in our locality; banana, apple, mango.

Collecting fruit seeds from the local environment.

We can use different methods to collect fruit tree seeds.

1. Collecting from natural seed fall.
2. Shaking the tree.
3. Climbing up trees to collect fruits.

Fruit seed preparation.

- Cut the chosen fruit into two.
- Use a sharp object to extract the seeds.
- Clean the seeds with water.
- Sort the seeds and get rid of the bad ones. Retain the good seeds.
- Dry the seeds in the sun and protect them from birds.

Figure viii: fruit tree and some fruit seeds; pawpaw, orange, grapes, apple and avocado

Fruit tree nursery bed

Types of nursery bed.

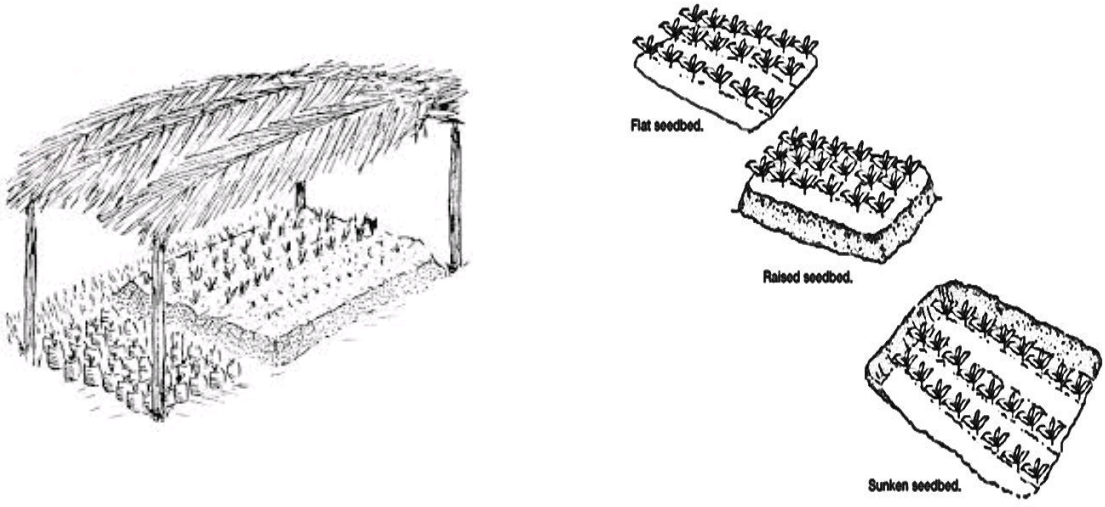

Figure ix: different types of nursery bed.

Preparing a nursery bed for planting fruit seedlings.

1. Select suitable site. The area should be slope.
2. Dig the site and level it. Ensure the soil is well fine and free from any clog

Sowing seeds into a nursery bed.

1. Create small holes and place the seeds
2. Cover the seeds with small layer of soil.
3. Water the nursery bed using watering can.
4. Spread some mulch on the nursery bed.
5. Protect it against animal destruction

Care for seedlings.

We should carry out the following to maintain good conditions for healthy growth of our seedlings:

- Mulching
- Watering
- Weeding
- Thinning
- Shading

Transplanting

Preparing of seeds for transplanting.

Steps.

1. Remove the shade from the seedbed to allow enough sunlight to harden the seedlings.
2. Reduce the amount of water during watering for hardening off.
3. Using a garden trowel, carefully remove the seedlings from the soil without disturbing the roots
4. Carefully place the seedlings in a container for transportation.

Transplantation should be done when the weather is calm and the plants are not losing a lot of water.

Transplanting seedlings to seedbed.

- Dig holes at the transplanting site wide enough for the seedling.
- Add compost manure to the soil and mix them.
- Water the mixture of manure and soil.
- Place the seedlings in the holes; pack the soil down well around the roots.

Care for young fruit trees

Protecting the fruit tree seedlings from damage.

- Fence the seedlings using woods, metal strips or wires against animal destruction.
- Put mulch to protect the fruit seedlings against bad weather this also prevent the soil from splashing on the leaves during heavy rains
- Mulch protects the soil from drying hence retention of water in the soil.
- Water the fruit seedlings to protect it against drought.
- Add some organic manure around the fruit seedling to ensure enough supply of manure.

Watering fruit tree seedlings to supplement moisture.

- Drip irrigation helps to conserve water in the fruit garden.
- Water prevents the plant from drying.

Applying mulch to conserve water.

- Mulch is any material placed on the soil to conserve moisture.
- Mulching encourages better plant growth and development.

Weeding

- **A weed** is plant growing where it is not wanted and competes with cultivated plants.

How to weed

- Use a jembe to dig out any existing weeds in the area.
- You can also pull out the weeds with your hands.

Conservation project: edible crop gardening.

Care for growing fruit trees in the environment.

- Watering
- Pruning
- Weeding adding manure.

Right stage for harvesting

- Some fruits change colour and become softer when ripe.
- When a fruit is allowed to ripen on the tree, it ripens well and tastes better.

Importance of eating fruits for nutrition.

- Fruits are source of important nutrients
- They are source of; vitamins, minerals and fibres.
- Sugar from the fruits provide energy to the body

SUMMARY NOTES

STRAND 2: DOMESTIC ANIMALS.

Domestic animals and their uses.

Domestic animals include:

1. Sheep
2. Cat
3. Hen
4. Rabbit
5. Cow
6. Donkey
7. Goat
8. Dog
9. Pig.

Domestic animals have a lot of benefit to us:

1. Source of food e.g. eggs, milk, and meat
2. Source of labour e.g. oxen can be used for ploughing.
3. Transportation e.g. Donkeys and camels are used for transportations people and goods.
4. Source of raw materials e.g. hides and skins from cows provide leather
5. Provide company e.g. cat and dogs are used by people to feel happy.
6. Source of beauty, some birds such as parrot and dove are kept in the home for beautification.

Figure x: domestic animals

NO	ANIMAL	MALE	FEMALE
1.	Ox	Bull	Cow
2.	Duck	Drake	Duck
3.	Chicken	Cock	Hen
4.	Donkey	Jackass	Jennet
5.	Horse	Stallion	Mare/Filly(young)
6.	Pig	Boar	Sow
7.	Bee	Drone	Bee
8.	Cat	Cat	Queen
9.	Dog	Dog	Bitch
10.	Sheep	Ram	Sow
11.	Goat	He - goat	She – goat

SUMMARY NOTES.

STRAND 3: GARDENING PRACTICES.

CROPS FOR GARDENING

Vegetables

A vegetable is a plant or part of plant eaten as food when fresh.
Examples include:

- ✓ Tomatoes
- ✓ Cabbage
- ✓ Cucumber
- ✓ Kale
- ✓

Figure xi: vegetables

- ✓ Carrot
- ✓ Coriander
- ✓ Pepper
- ✓ Onions.

Main vegetables grown in Kenya.

There are many types of vegetables grown in Kenya. They include:

- ♣ Kale(sukuma wiki)
- ♣ Cabbages
- ♣ Tomatoes
- ♣ Spinach
- ♣ Coriander
- ♣ Onions etc.

Classification of vegetables.

1. ***Root vegetable***

These are the vegetables whose roots are eaten as foods.
They include:

- ➢ Beetroot
- ➢ Carrot

2. ***Stem vegetables***

These are vegetable plants whose stems are used as food.
They include:

- ➢ Asparagus
- ➢ Spring onion

3. ***Leafy vegetables.***

These are vegetables whose leaves are used as food.
They include:

- ➢ Cabbage
- ➢ Kale (Sukumawiki)
- ➢ Spinach.

4. ***Fruit vegetables***

These are vegetables whose fruits are eaten as food.

They include:

- Pepper
- Tomato.

Importance of vegetables.

- ✓ Eating plenty of vegetables everyday gives us vitamins that protect us from many diseases.
- ✓ Vegetables are source minerals in our bodies.
- ✓ Source dietary fiber.
- ✓ Reduce risk of cancer
- ✓ Reduce risk of heart disease
- ✓ Improves blood pressure

Preparing vegetables for cooking.

i. Wash the vegetables well.
ii. Cut them smaller portions.
iii. Put them in a pan.
iv. Frying a little oil and keep turning over until ready.

Cereals

Main cereal crops grown in Kenya.

Cereals grown in Kenya include:

- ✓ Maize
- ✓ Rice
- ✓ Wheat
- ✓ Millet
- ✓ sorghum

Cereals provide our bodies with carbohydrates and proteins.

Preparing cereals.

i. Wash the rice in clean water.
ii. Boil enough water to cook the rice. Your parents or guardian will help you.
iii. Pour in the rice and reduce heat.
iv. Let the rice cook slowly until the water dries up.

Legumes.

The legumes include:

- ✓ Beans
- ✓ Peas
- ✓ Green gram
- ✓ Groundnuts

Legumes are grown in almost all regions in Kenya

They require high care for them to grow well.

Many varieties of legumes are grown in Kenya.

Preparing legumes for food.

i. Wash the beans
ii. Boil the beans until they are soft and cooked.
iii. Separate the beans from the excess water.
iv. Fry the beans using a little cooking oil, onions, tomatoes and some salt to taste.

Selected gardening practices.

Direct sowing of tiny seeds.

Preparing of a seedbed for crops with tiny seeds.

A seedbed is a place for planting seeds to grow until they are harvested.

Steps.

- Dig the soil of appropriate width and length.
- Raise the soil and make the soil fine.
- Level the soil
- Water the soil to make it firm
- The soil is ready for planting.

Planting

Tiny seeds are difficult to handle and not easy to see in the soil.
Seeds that can be sown directly into the seedbed include:

- ✓ Sunflower
- ✓ Wheat
- ✓ Coriander
- ✓ Carrot

We can use different methods to directly sow the tiny seed into the seedbed;

- ✓ Use shaker
- ✓ Use a sowing tool
- ✓ By hand
- ✓ Use a folded paper.

Care for tiny seeded crops.

- After sowing the tiny seeds in the seedbed, they require care for them to grow.
- The following practices will ensure that they grow well.

1. ***Mulching***
   - Helps retain moisture.
   - Speed up germination.
   - Prevent sun from hitting the seedlings directly.
2. ***Watering***
   - Regular supply of clean water is essential for plant growth
   - Use a watering can, a tin or a plastic bottle with holes at the bottom.
   - Do not use hose pipes while watering the seedlings because this may wash away the soil around the roots of the crops.
3. ***Thinning***
   - This is the removal of overcrowded plants, to make room for the healthy growth of others.

4. ***Weeding.***
    - Weeds compete with seedlings for seedlings for nutrients, water and light, they should be removed.
    - Use your hands to uproot weeds.

Gardening tools and equipment.

Tools and equipment used for gardening in seedbed.

Tools and equipment used for gardening include, *pruning knife*, *hand shovel, rake* and *watering can.*

Use of tools and equipment in gardening.

Tools and equipment used for gardening include;

- **Pruning knife** – used to remove dead, diseased, or damaged stems and branches from crops.
- **Shovel** – used for scooping and moving loose materials such as soil.
- **Rake** – used for collecting cut grass or smoothing loose soil or gravel.
- **Machete** – used for cutting or digging out weeds.

Tools and equipment used in gardening.

- ✓ Wheelbarrow
- ✓ Watering can
- ✓ Knapsack sprayer
- ✓ Pruning knife
- ✓ Garden trowel
- ✓ Pruning shears
- ✓ Garden fork
- ✓ Machete
- ✓ Jembe

Safety measures when using gardening tools and equipment.

We should be very careful when using gardening tools to reduce accidents.

The following safety measures should be observed:

- Wear gloves when working outside. Gloves protect your hands.
- This is important especially when handling farm chemicals. Children should not handle farm chemical.
- Use the right tool for the right job.
- Check your position while using tools; do not use it near other people.

Cleaning of garden tools and equipment after use.

Steps to follow when cleaning garden tools and equipment.

- Scrub the tools to remove mud and grit from the blades and handles with a brush.
- Wipe the tools dry with a rag, or let them dry in the sun.
- Care should be taken when you clean tools with sharp blades.

INNOVATIVE GARDENING PROJECT.

Container gardening.

Container gardening is the practice of growing plants in containers.

Containers we can use include:

- ❖ Plastic buckets
- ❖ Basins
- ❖ Pots
- ❖ Half barrels.
- ❖ Old tyres.
- ❖ Small Jerricans.

Preparation of a container garden and sowing of seeds.

1. Choose a container that suits what you want to plant.
2. Prepare the container; choose the right soil for your container garden, mix soil with manure.
3. Select your seeds; the seeds should be good and are likely to grow well.
4. Place seeds in the soil. Using your finger, make small holes as shown in the picture below.
5. Watering; water the seeds using a watering can.

Care for container gardens.

The following should be done in the container garden;

- Mulching
- Thinning
- Weeding.

Harvesting of container gardens.

- Crops in the container garden should be harvested at the right stage.
- Harvest them when they are at the best stage of harvesting.
- Clean them immediately after harvesting.
- Store them well to keep them fresh.

Importance of container garden.

- Income from selling the crops can help in buying other products.
- Money earned can be used to pay school fees.
- One can use the money from the sale to buy school items such as school uniforms, books, pens etc.
- The income can also be used to pay bills such as water bill, electricity and rent.

Figure xii: innovative gardening; use of containers and timber boxes as gardens.

Tools used in gardening.

Figure xiii: farm tools and equipment.

Portfolio Assessment.

- The learners should keep the collection of all the activities done in agriculture grade four syllabus in their portfolio
- This can be done by taking photos while doing the activities.
- Print them and stick them in their portfolio.
- Comment and challenges should be clearly stated.

Learners are encouraged to establish container gardens at their homes or in their places of residence.

SUMMARY NOTES.