P.6.SCIENCE EXTRA 10

COMPOUND LEAVES

- These are leaves with more than one leaflet on the stalk.
- They have many leaflets
- They have many leaf stalks

EXAMPLES OF COMPOUND LEAVES

- Compound pinnate
- Examples of plants with compound leaves e.g acacia and eucalyptus
- Compound bipinnate e.g jacaranda

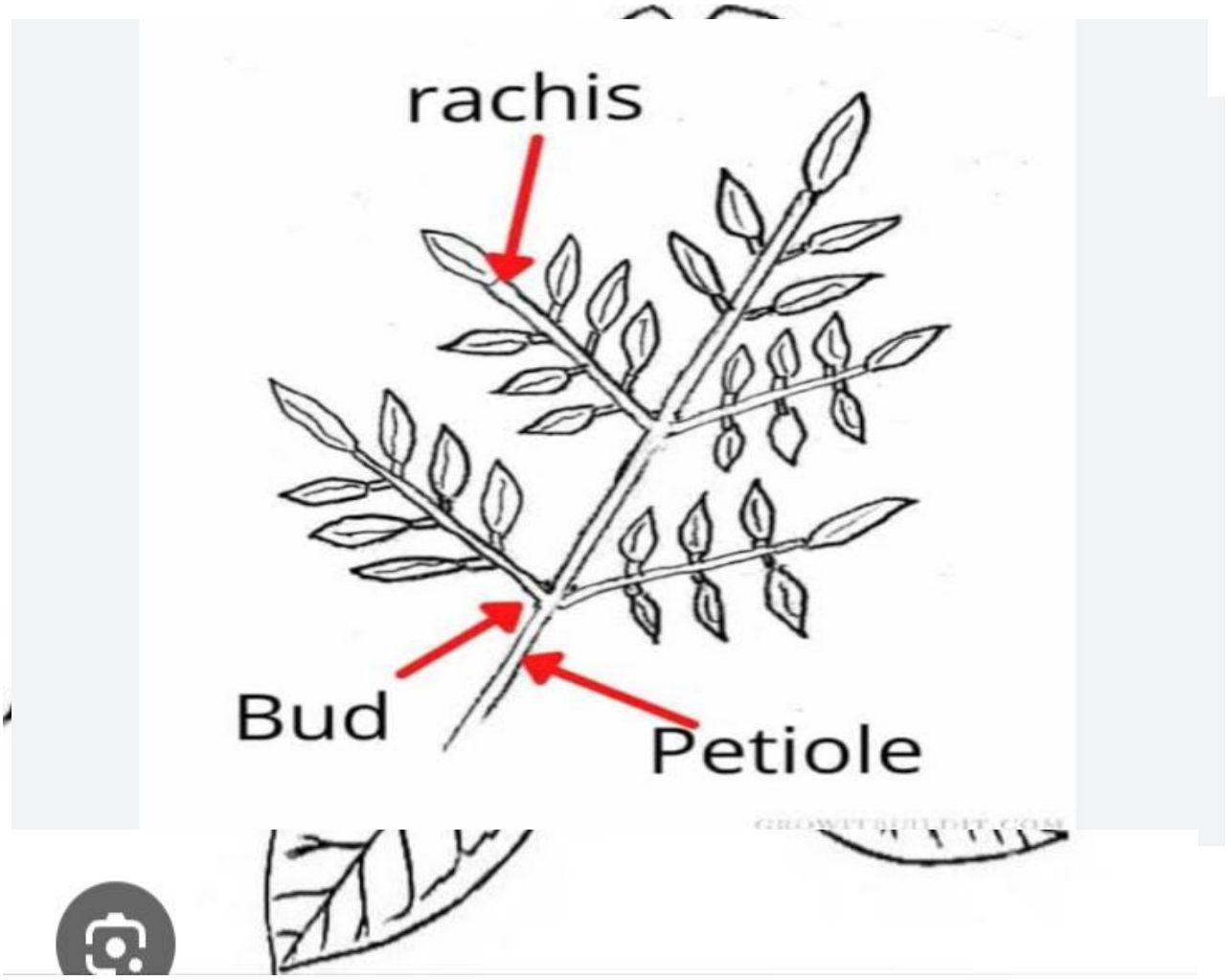
Compound digitate e.g cassava and silk cotton leaves

- **Compound trifoliate** e.g beans and soya beans
- Compound bifoliate e. g bryophyllum

Diagrams of compound leaves

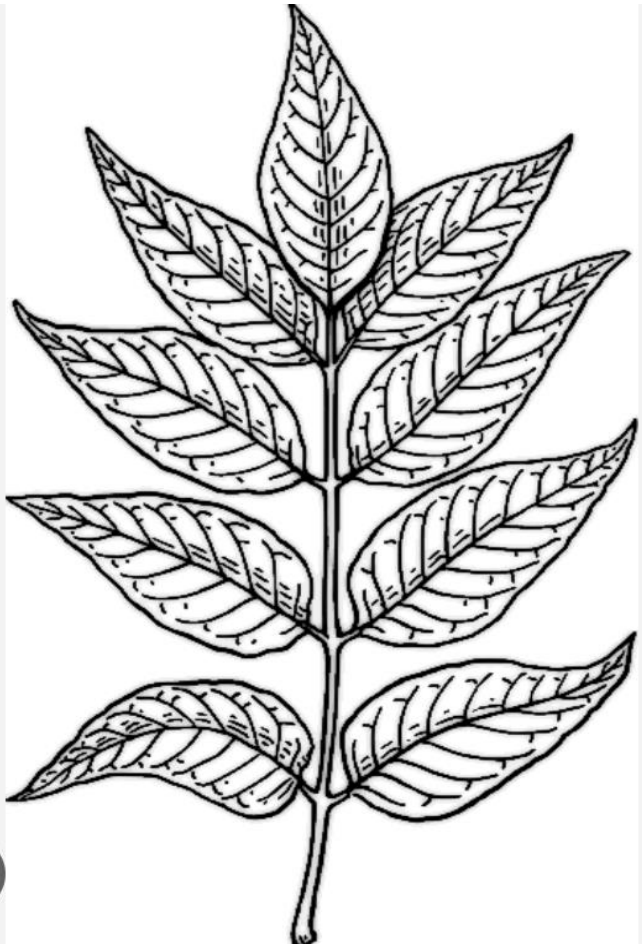
Compound bi pinnate

compound palmate



Compound trifoliate

Compound pinnate



LEAF VENATION

- This is the arrangement of veins in the leaf

Types of leaf venation

a. Network leaf venation (reticulate leaf venation)

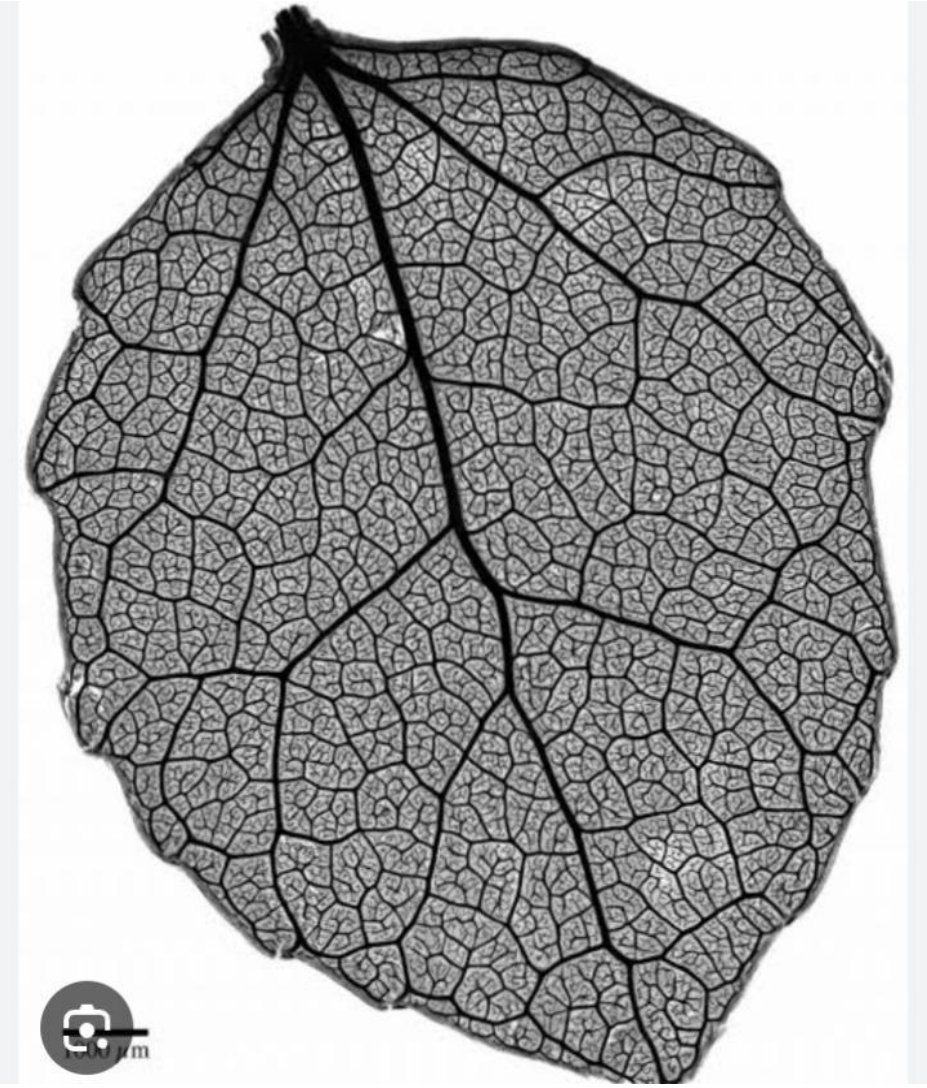
b. Parallel leaf venation

NETWORK LEAF VENATION

This is when veins form a net like a structure.

- It is found in dicotyledonous plants

A diagram showing network leaf venation



Examples of plants with network leaf venation

- Beans
- Soybeans (soya beans)
- Peas
- Groundnuts

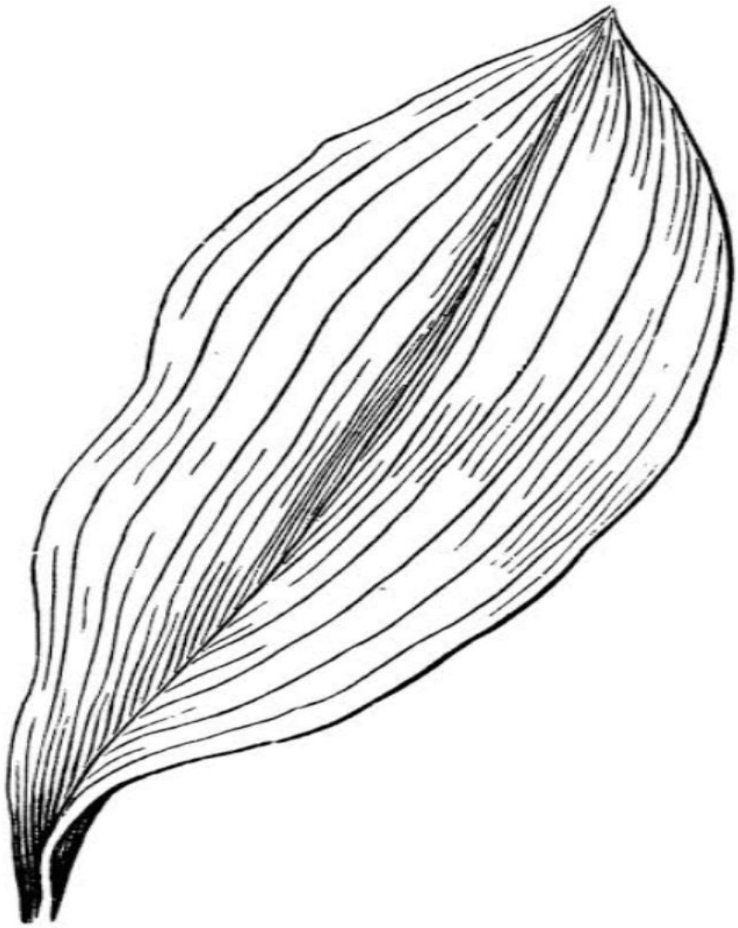
- Mango
- Orange
- Cassava
- Coffee

PARALLEL LEAF VENATION

This is when the veins are parallel to each other

- It is common in monocotyledons plants

A diagram showing parallel leaf venation



Examples of plants with parallel leaf venation

- **Millet**
- **Maize**
- **Sorghum**

- Rice
- Barley Wheat
- Oats
- Sugar cane
- Onion
- Grass

Activity

a) Name two types of leaves.

b) Which type of leaf venation do banana plants have?

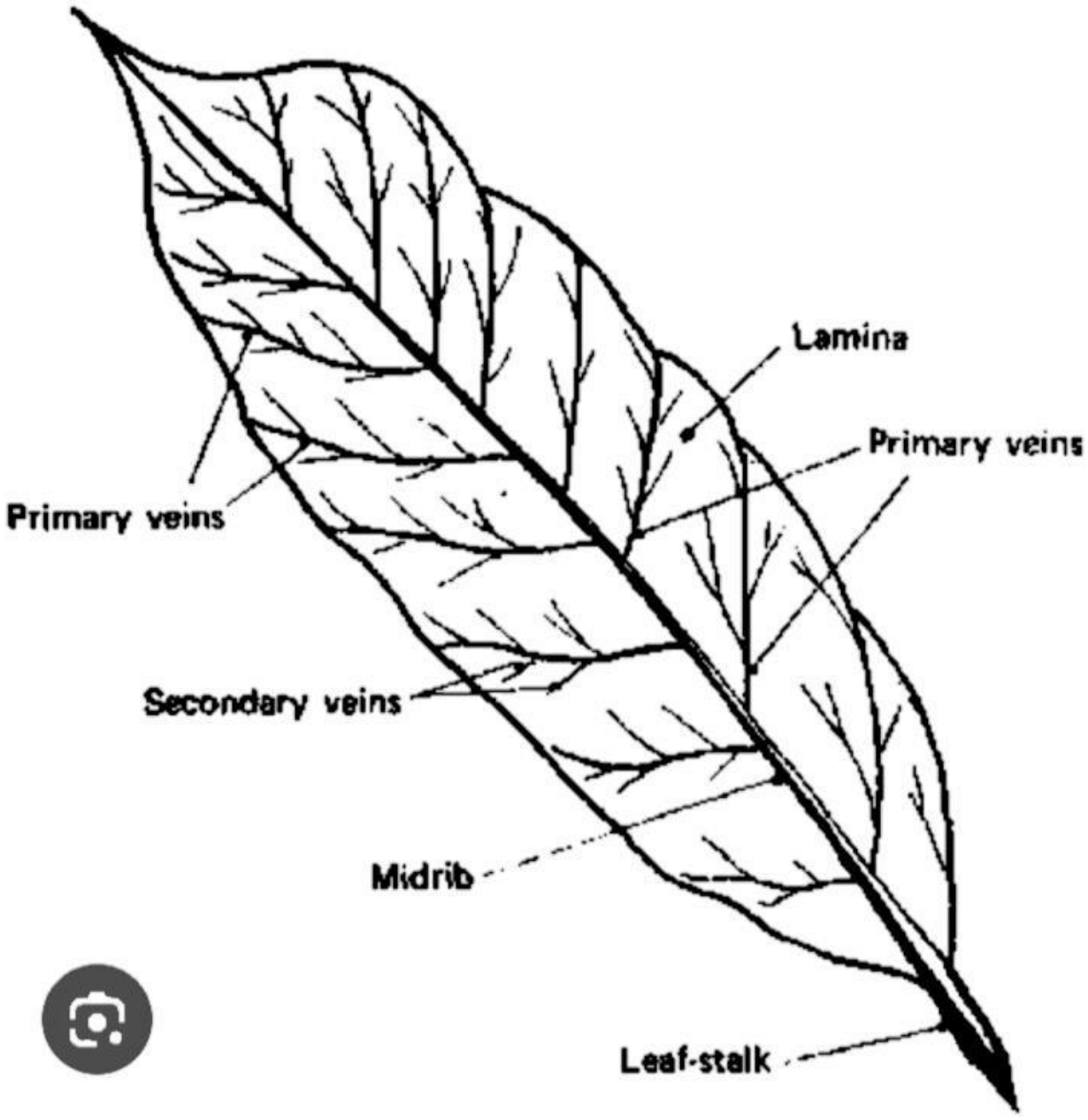
c) Give one example of a plant with network leaf venation.

d) What are compound leaves?

e) Name the type of leaf with one leaf on a leaf blade.

P.6 SCIENCE EXTRA 9

THE STRUCTURE OF A LEAF



FUNCTIONS OF EACH PART OF A LEAF

Leaf blade/lamina

- For photosynthesis
- It helps in making of starch
- For respiration
- It is where transpiration mainly takes place.
- It is where the breathing organs (stomata) are found
- Apex
- It is the sharpest tip of the leaf
- It provides protection to the leaf

Stomata

- For breathing
- Allow out water during transpiration
- Let in carbon dioxide by diffusion during day time and oxygen during night time.

Veins

- They transport water and mineral salts in the leaf.
- They transport food from the leaf blade to the main vein (midrib)

Leaf stalk (petiole)

- It holds a leaf
- It transports water from the stem to the leaf
- It transports food from the leaf to the stem

Leaf base

- It attaches the leaf to the stem
- Leaf blade (lamina)
- It is where photosynthesis occurs

FUNCTIONS OF LEAVES TO PLANTS

- They make food for the plant (carry out photosynthesis)
- They plants in breathing
- They carry out transpiration

- Some leave store food for the plant e.g cabbage and onion

FUNCTIONS OF LEAVES TO PEOPLE

- Some leaves are eaten as food
- They are sold for income
- They are used as herbal medicine
- They are used as animal feeds
- Dry leaves can be used as mulches
- Some leaves can be used for plant propagation e.g bryophyllum
- They are used for thatching houses
- For decoration
- Tea leaves can be used on beverages

TYPES OF LEAVES

- Simple leaves
- Compound leaves

SIMPLE LEAVES

- These are leaves with one leaf blade and leaf stalk
- They have one leaflet on the stalk
- They have one leaf stalk
- They have one margin
- Their leaf blade (lamina) is undivided or not completely divided

Examples of simple leaves

- Simple entire e.g mango, avocado and jack fruit
- Simple serrated e.g black jack
- Simple divided entire
- Simple lobed
- Simple palmate e.g paw paw and castor oil

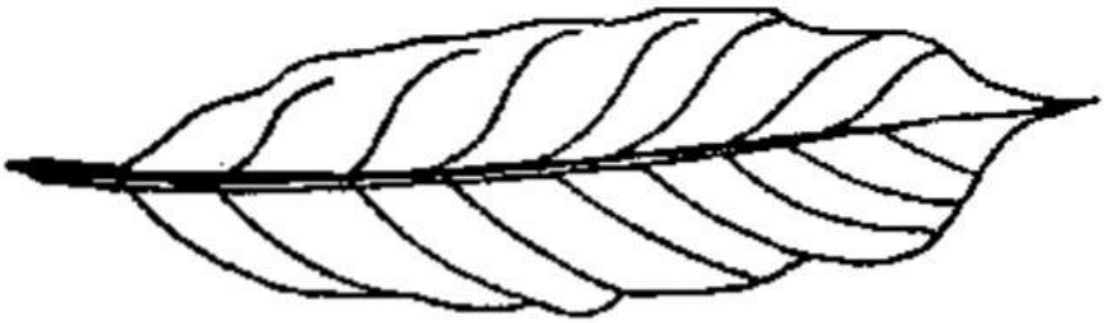
Note :

- Monocotyledons leaf (simple lanceolate leaf) e.g maize, sorghum, millet, elephant grass, rice and reeds

Diagrams of simple leaves

Simple palmate

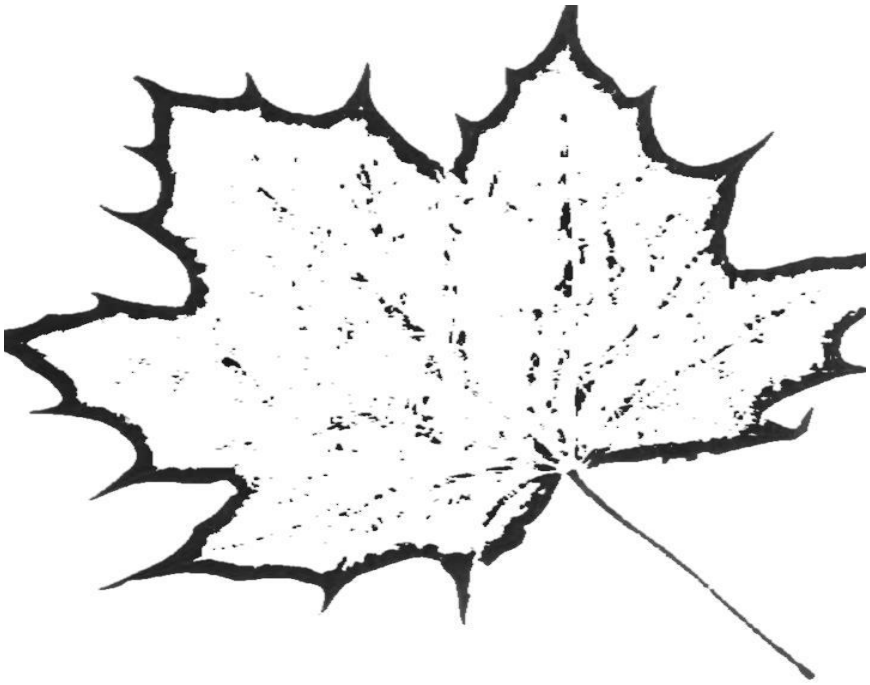
simple lobed leaf



simple serrated leaf

Simple entire leaf

Simple divided leaf



Activity

a) Name the two types of leaves.

b) Which type of leaf do banana plants have?

c) How is the rachis(leaf stalk) useful to a small leaflet

d) How do plants breathe?

e) Name the breathing structures for a plant

f) State any one use of leaves to a plant.

g) How are leaves useful to man?

h) Identity any two examples of plants whose leaves are eaten

i) How useful is the green pigment found on plant leaves to plants ?

j) Mention any one item made out of plant leaves.

P.6 SCIENCE EXTRA 8

UNDERGROUND STEMS

- They have buds, scale leaves and adventitious roots
- They are swollen because they store food (starch)

1. Why are underground stems sometimes called storage stems?

- They store food (starch)

Groups of underground/storage stems

- Stem tubers
- Bulbs

- Rhizomes
- Corms

STEM TUBERS

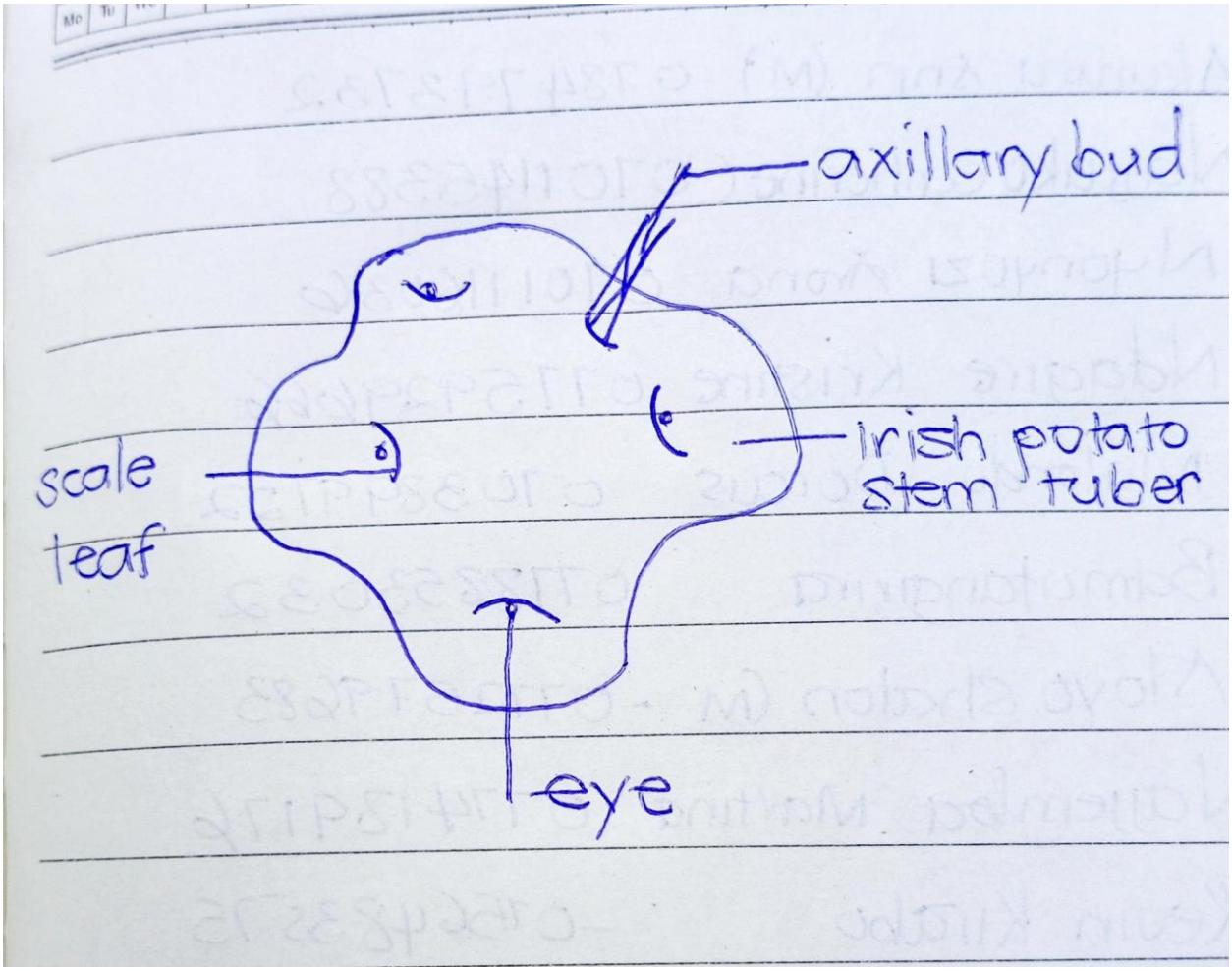
- These are swollen underground stems that store food
- We eat the stem tuber

Examples of stem tubers

- White yam
- Irish potatoes

A diagram showing a stem tuber

Irish potato



Scale leaf:

- **it protects the axillary bud**

Axillary bud:

- it develops into a shoot

Stem tuber:

- it stores starch

2. How are white yams and Irish potatoes propagated?

- By means of stem tubers

3. Why is a sugarcane plant not called a stem tuber?

- Its storage stem is above the ground w hile that of a stem tuber is found underground
- Its storage stem is not found underground

BULBS

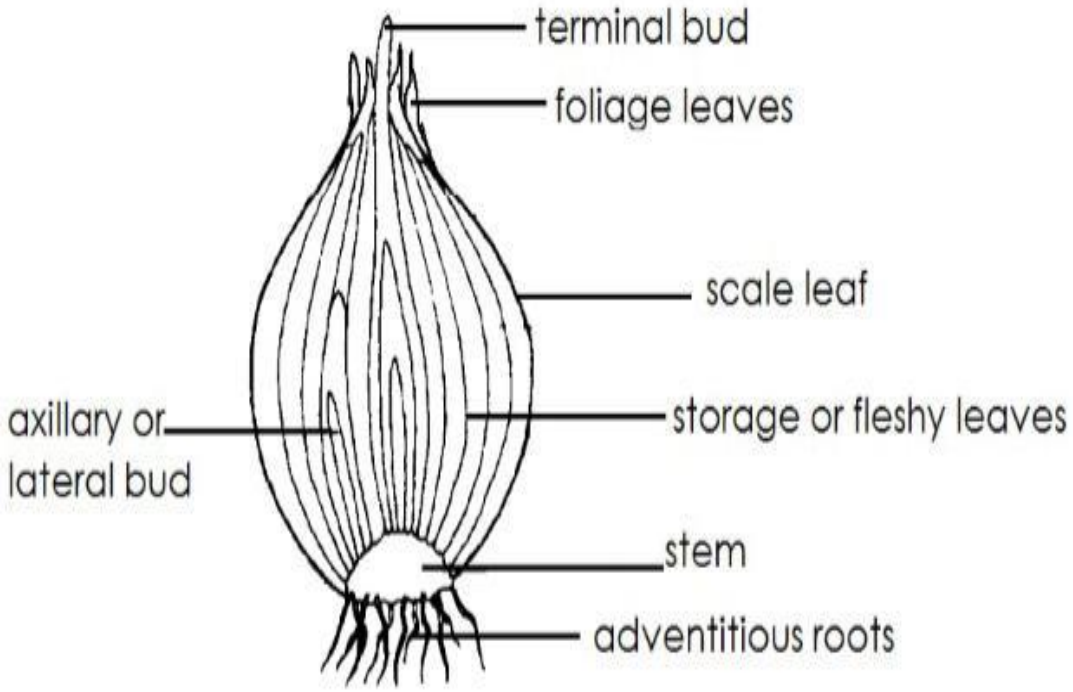
- These are swollen underground stems with swollen fleshy leaves
- They have adventitious roots

Examples of bulbs

- Onion
- Garlic
- Shallot
- Spider
- Tulip
- Daffodil (Narcissus)

A diagram showing a bulb

(onion bulb)



Foliage leaves:

- to make food

Fleshy leaves:

- to store food

Scale leaves:

- to protect the fleshy leaves

Stem:

- to hold the fleshy leaves / to conduct water and mineral salts from the roots to the leaves

Adventitious roots:

- to provide extra support / to absorb water and mineral salts
- from the soil

Terminal bud:

- to enable the plant grow taller

Axillary bud:

- to develop into a new shoot

4. How are onions propagated?

- By means of bulbs
- By means of seeds

RHIZOMES

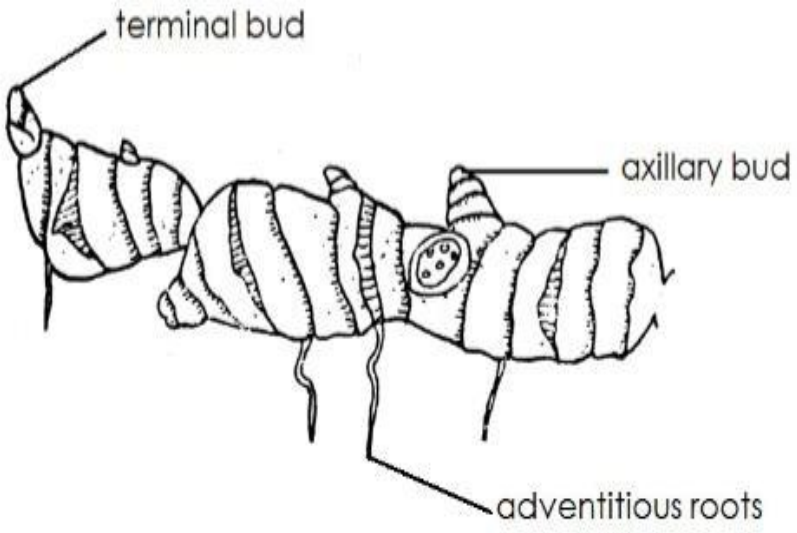
- These are horizontal underground stems that store food

- They have adventitious roots which grow from nodes of the stem

Examples of rhizomes

- Ginger
- Turmeric
- Zoyzia

A diagram showing a rhizome



ginger

-
- **Canna lily**
- **Couch grass**
- **Spear grass**

5. How is ginger propagated?

- **By means of rhizomes**

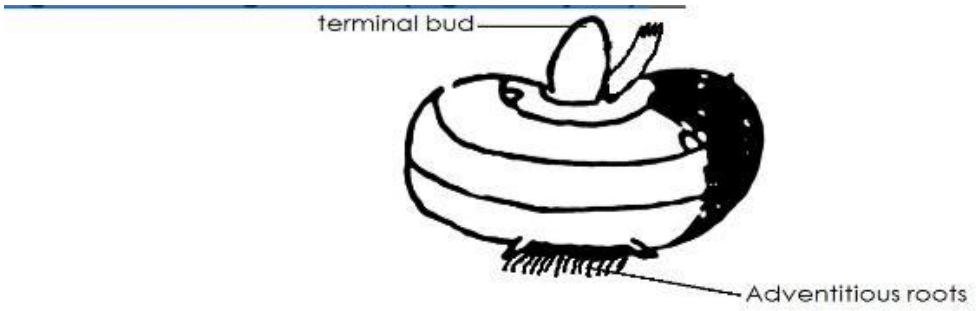
CORMS

- These are short vertical underground stems that store food

Examples of corms

- Coco yam
- Crocus
- Gladiolus

A diagram showing a corm coco yam



6. How is coco yam propagated?

- By planting of corms
- Activity

a) Give one example of a bulb.

b) How are bulbs propagated?

c) Identity the class of food obtained from feeding on onion.

d) Apart from providing the above class of food to the body, how else are onions important to a chef

e) How is a ginger rhizome propagated ?

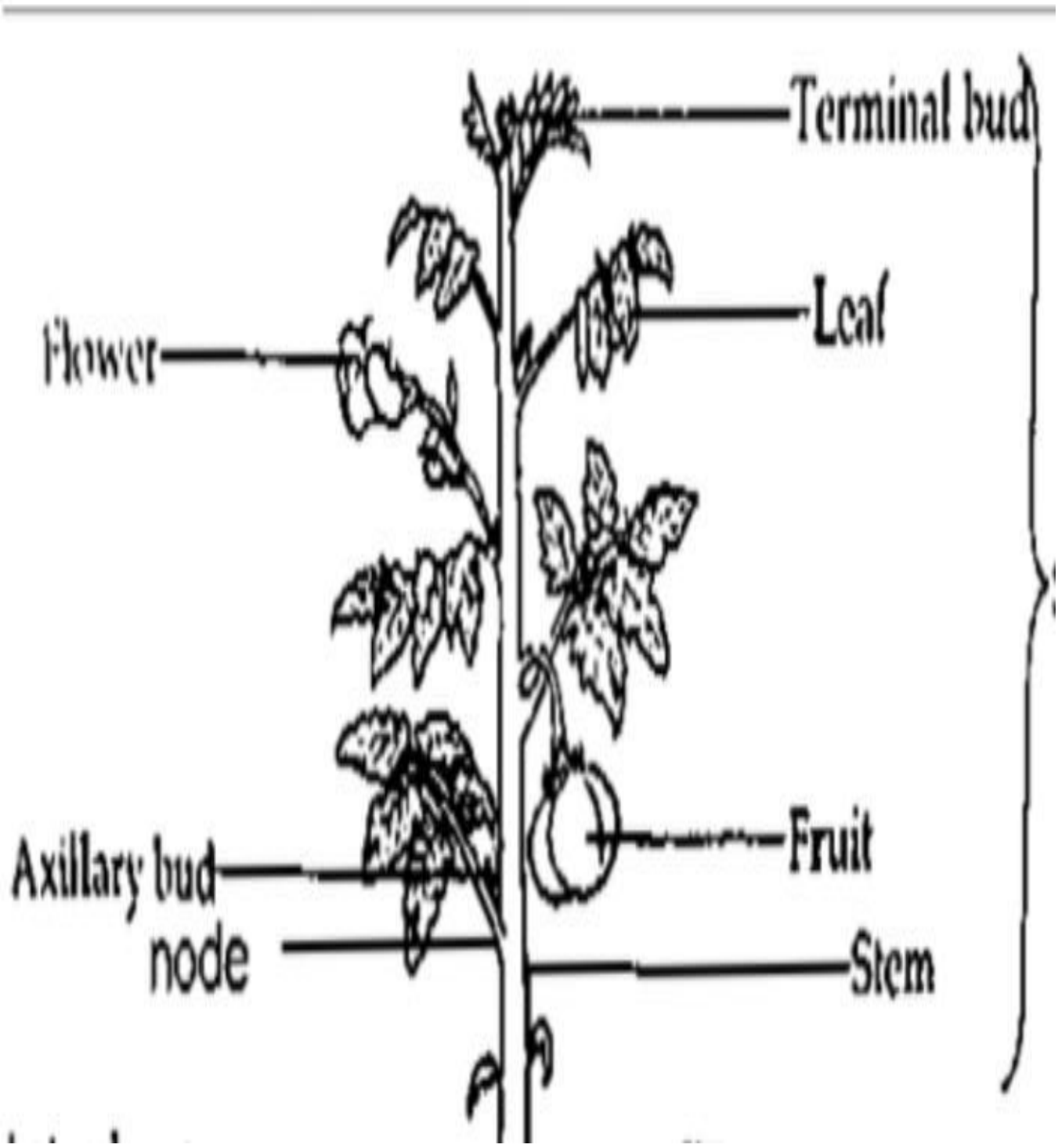
f) State the class of food obtained from ginger.

g) Apart from ginger, give one other example of a rhizome.

h)

P.6 SCIENCE EXTRA 7

A DIAGRAM SHOWING A STEM



Functions of each part of the stem

Node:

it is w here a leaf or flower is fixed (grow s from)

Internode:

it is the region between two nodes

Terminal bud:

it is the growing tip of the plant

Axillary/lateral bud:

it grow s into branch or leaf or flower

An axillary bud is found in the axil

Axil: the angle between each leaf and the stem

FUNCTIONS OF THE STEMS TO PLANTS

- **They transport water and mineral salts from the roots to the leaves**
- **They transport glucose/starch from the leaves to other parts of a plant (they help in translocation)**
- **They hold up the leaves to get sunlight**
- **They hold the flower for pollination**

- They hold fruits for proper dispersal Green stems make food for the plant
- Some stems store food for the plant.

Translocation

This is the movement of food (glucose) from the leaves to other parts of a plant

- **FUNCTIONS OF STEMS TO MAN**
  Some stems provide food to man
- Some stems provide herbal medicine
- Some stems are sold for income
- Some stems provide timber
- Some stems provide wood fuel

- Some are used in vegetative propagation

TYPES OF STEMS

- Upright stem
- Weak stems
- Underground stems
- Weak stems
- These are stems which cannot support themselves upright.

Groups of weak stems

- Creeping stem
- Climbing stems

REASONS WHY PANTS CLIMB OTHERS (WHY DO PLANTS CLIMB OTHERS?)

- To get enough sunlight
- To get extra support

WAYS HOW PLANTS CLIMB OTHERS (HOW DO PLANTS CLIMB OTHERS?)

- Use of tendrils
- e.g passion fruits, cucumber, watermelon, gourd, pumpkin and cow peas
- Use of hooks
- e.g straw berry

- **Hooks are pointing downwards to prevent the climbing plant from slipping off the plant.**
- **By twining or clasping**
- **e.g morning glory, tomato, vanilla and some beans**

Activity

a) **Why do weak plants climb others?**

b) **Name the method used by passion fruit to climb others.**

c) **What are erect stems**

d) **How useful to a straw berry plant?**

e) Name the type of tropism where plants are sensitive to touch.

P.6 SCIENCE EXTRA 6

TYPES OF ROOTS

- Adventitious roots
- Tap roots

Tap roots

These are roots which develop from the radicle.

Examples of primary roots

- bean plant
- groundnuts

Fibrous roots: e.g

- maize,
- w heat,
- rice

ADVENTITIOUS ROOTS

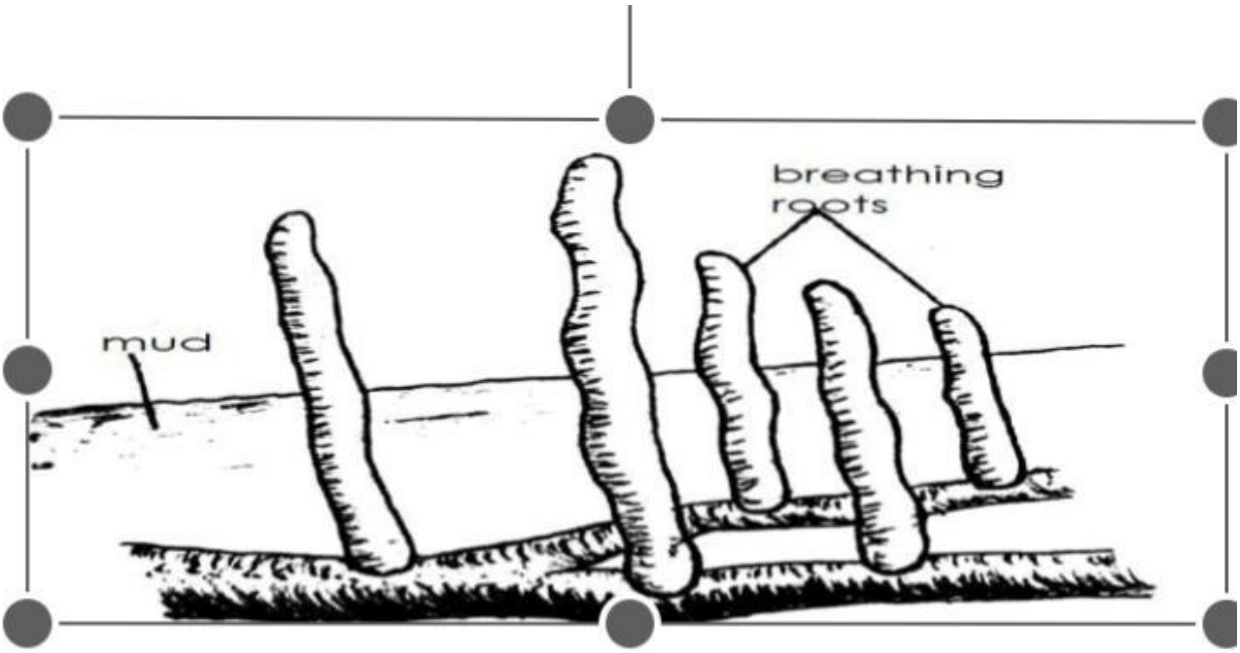
These are roots which grow from any part of the plant but not from the radicle.

Examples of adventitious roots

BREATHING ROOTS.

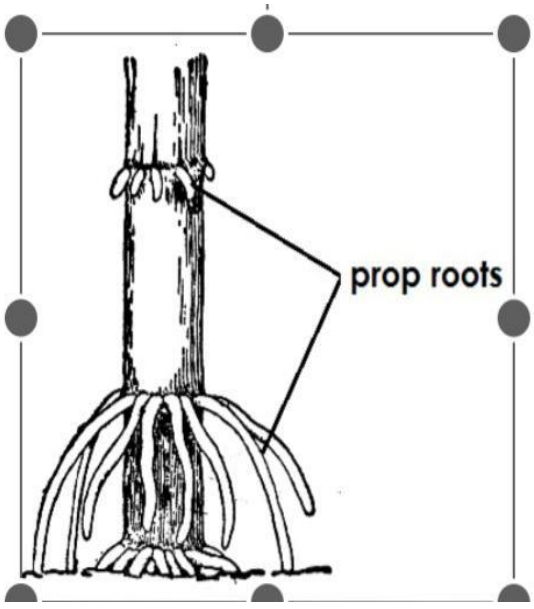
- They grow upwards above the ground.
- They are common in plants in waterlogged areas e.g mangrove
- They help the plant to breathe

Diagram showing breathing roots



PROP ROOTS.

- They grow from the nodes of the stem.
- They are mainly found in monocot plants e.g maize, sorghum, millet and sugarcane.
- They grow in tall cereals during the flowering stage to provide extra support e.g maize, sorghum and millet.



Buttress roots:

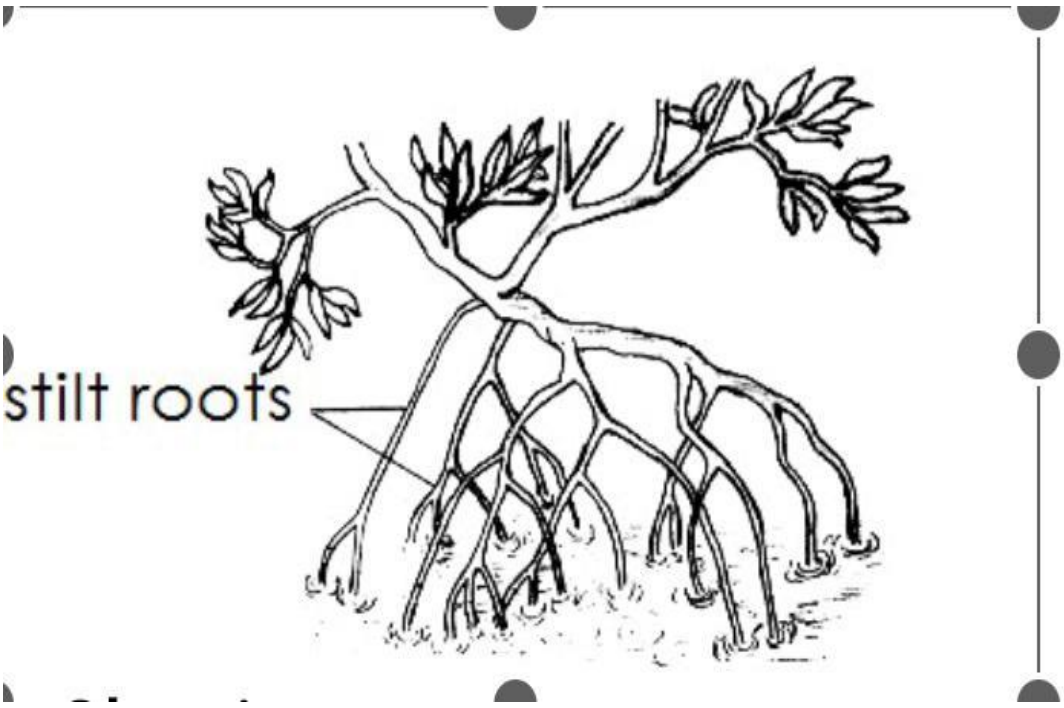
Examples are,

silk cotton trees and mahogany

STILT ROOTS.

- They are found on plants which grow in swamps.
- They give extra support to a plant.

Diagram showing stilt roots



Clasping roots

- Roots of rhizomes
- Roots of bulbs
- Roots of corms
- Roots of yams

Storage roots:

- store food for the plant
- They are swollen because they store starch.

Examples of storage roots (root tubers)

- Carrots
- Cassava
- Sweet potatoes
- Turnip
- Parsnip
- Beetroot
- Swede

- Dahlia
- Carrots are rich in vitamins e.g vitamin A

Qn. What are aerial roots?

- These are adventitious roots which grow above the ground

Examples of adventitious roots which grow above the ground

- aerial roots
- Prop roots
- Clasping roots
- Breathing roots

Functions of roots to the plant

Note:

- Absorb water and mineral salts from the soil by osmosis
- 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 roots are sold to get income.
- Some roots are source of food.
- Some roots are used as herbal medicine.
- Some roots provide wood fuel.

Dangers of roots to man

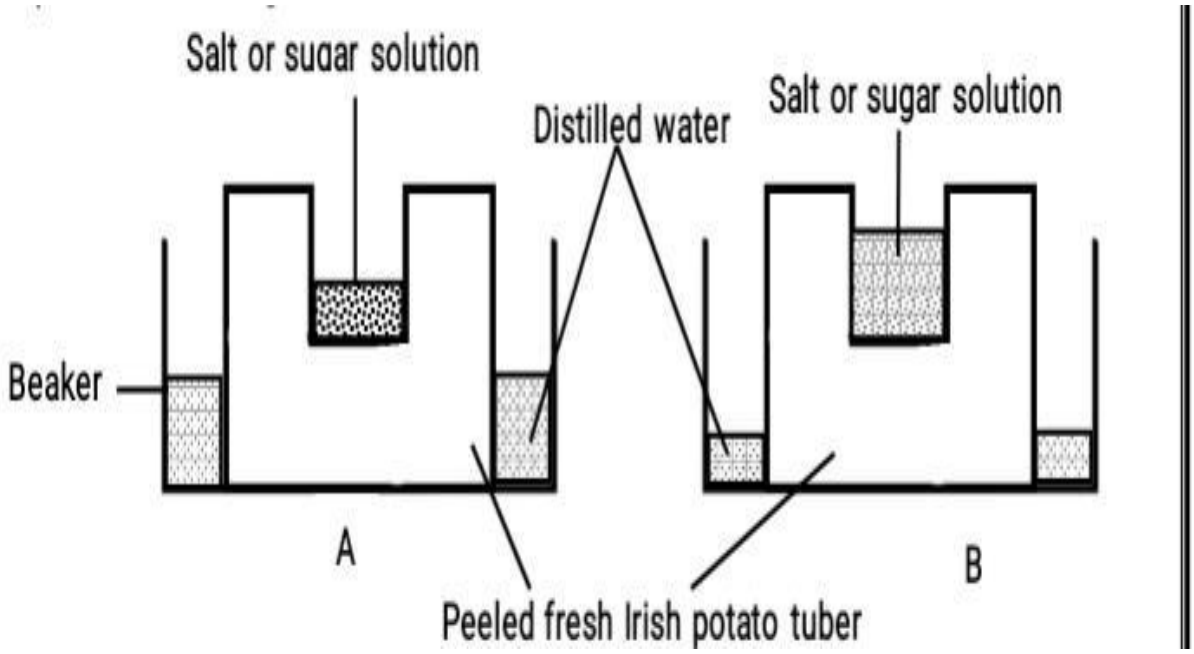
- Some roots are poisonous w hen eaten
- Some roots damage people's houses

OSMOSIS

- This is the movement of water molecules from a region of low salt concentration to a region of high salt concentration through a semi-permeable membrane.
- Absorption of . water and mineral salts (mineral salt solution) by roots is by osmosis
- Absorption of water by plant roots is by osmosis.
- Absorption of mineral salts by roots is by active transport.

Water moves from the roots to other plant parts (stems and leaves) by capillary action

An experiment showing osmosis



- Salt or sugar solution
- Distilled water
- Salt or sugar solution
- Beaker
- Peeled fresh Irish potato tuber

1. What is the experiment above about?

Osmosis

2. State the role played by peeled fresh Irish potato in the experiment above.

- It acts as a semi-permeable membrane
- It allow s movement of w ater molecules from distilled water in the beaker into the sugar or salt solution.

3. Why is salt or sugar solution placed in the cavity drilled into the Irish potato?

- To act as an area of high salt concentration.

4. Why did the water level in the beaker decrease as shown in diagram B?

- Some water molecules moved from the beaker towards salt or sugar solution. Water molecules moved from a region of low salt concentration to the region of high salt concentration.

5. What can't osmosis occur in a boiled Irish potato?

- A boiled Irish potato has dead cells yet osmosis can only occur in living cells.

Importance of osmosis to plants

- It enables absorption of water and mineral salts by the plant roots.
- It enables transportation of water from roots to other plant parts.
- It enables movement of water from one plant cell to another.

6. How do animals benefit from osmosis?

- It enables re-absorption of water
- ACTIVITY

a) Give one example of a plant with prop roots

b) Why are prop roots grouped under adventitious roots?

c) How are prop roots useful to a maize plant during flowering?

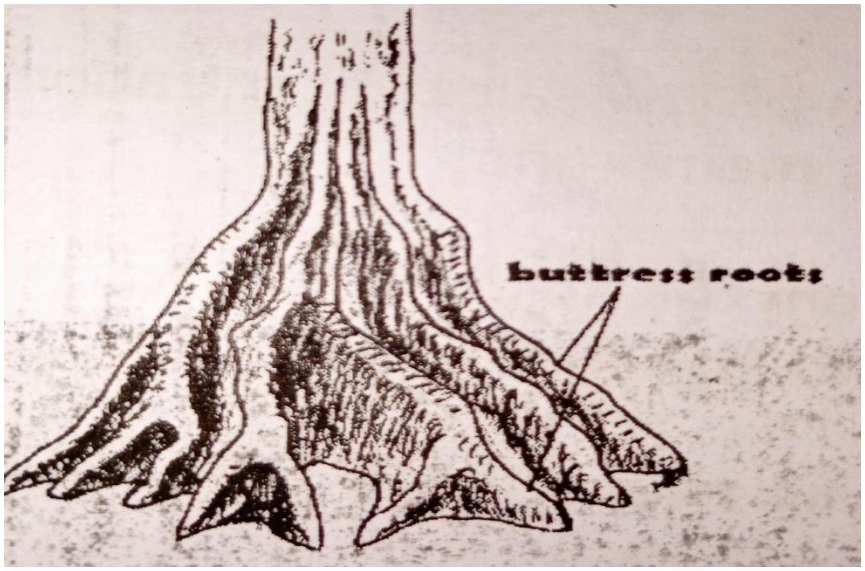
d) Apart from providing extra support, give one other function of prop roots useful to a plant

e) Give one example of a storage root.

f) Why are root tubers swollen?

g) How useful are breathing roots to mangroves plants

h) Name the type of roots shown in the diagram below.

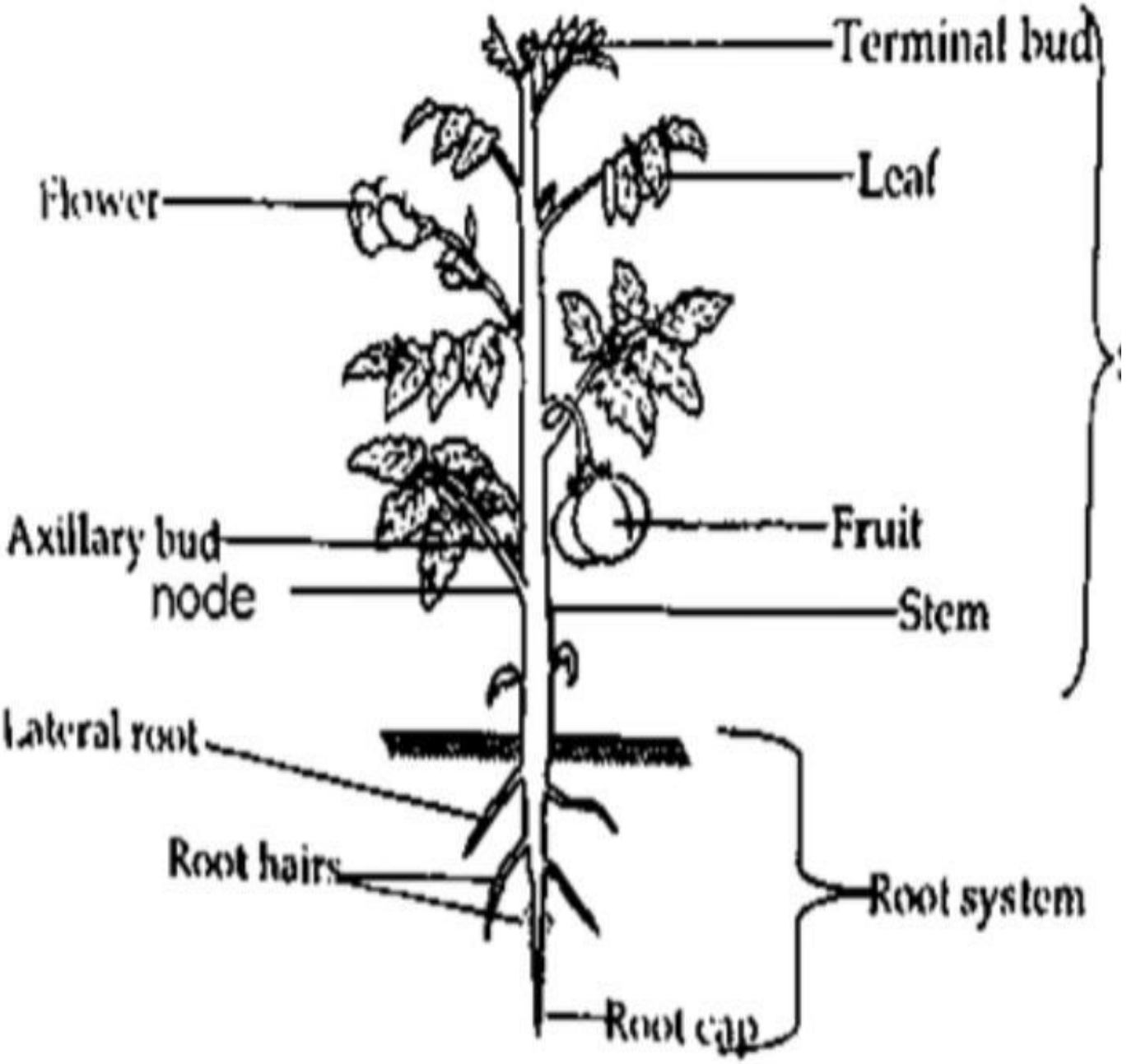


i) How useful are the buttress roots to a focus tree

j) Name the class of food obtained from root tubers.

P.6 SCIENCE ZOOM LESSON 5

PARTS OF A FLOWERING PLANT



SYSTEMS OF A FLOWERING PLANT

- Shoot system
- Root system

SHOOT SYSTEM

This is the system of a plant that grows above the ground.

- It consists of;
- the stem,
- leaves
- lateral/axillary bud,
  - terminal bud
  - flowers
  - fruits nodes
  - internodes

ROOT SYSTEM

This is the part of a plant that grows below the soil.

It consists of;

- main (tap root)
- root hairs
- lateral root
- root cap

TYPES OF ROOT SYSTEMS

- Fibrous root system
- Tap root system

TAP ROOT SYSTEM

This is w here the radicle forms a main (tap) root. with lateral roots

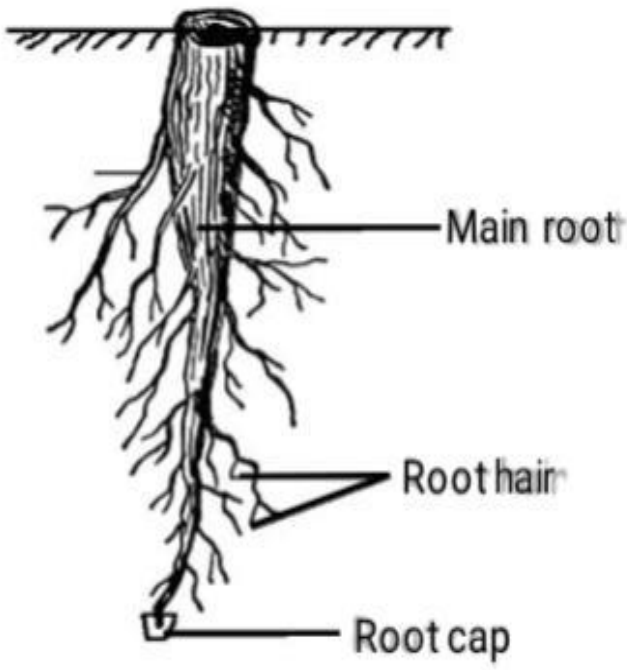
- It is found in dicotyledonous plants

Examples of plants with tap root system

- Bean plant
- Soybeans (soya beans)
- Peas
- Groundnuts
- Mango
- Orange

- Cassava
- Paw paw plant
- Avocado plant
- Jack fruit plant

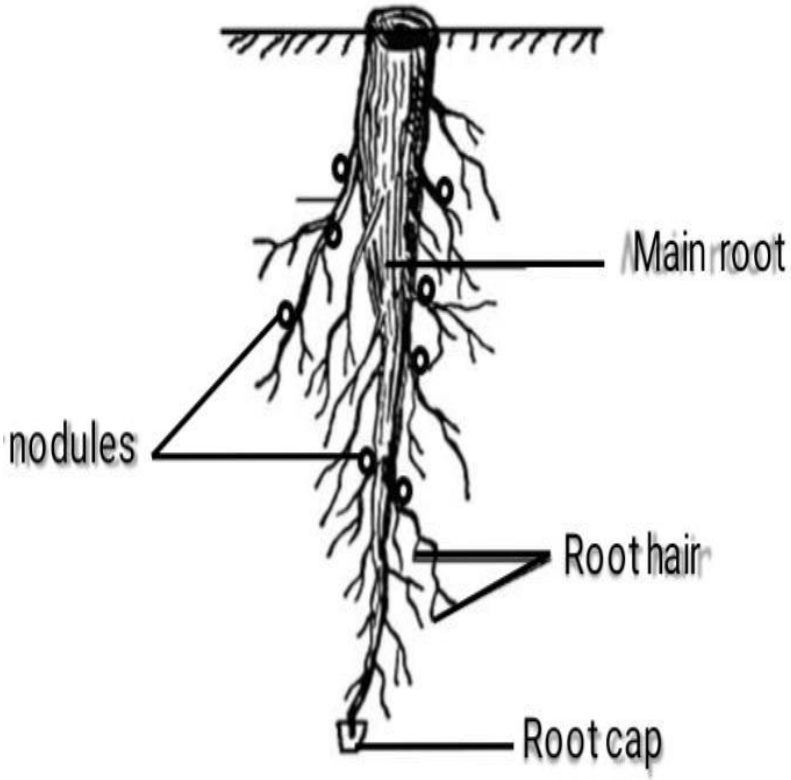
Structure of a tap root system



A diagram showing the tap root system of legumes (e.g bean plant or cow peas)

- Main root
- Root nodules

- Root hair



FUNCTIONS OF THE PARTS

- Main root

✓ To hold the plant firmly in the soil.

✓ Lateral roots

✓ They increase water uptake .

✓ They provide support to the plant in the soil.

✓ Root hairs

✓ Absorbs water and mineral salts from the soil

✓ Root hairs absorb water and minerals salts from the soil by a process called

Osmosis.

Root cap

✓ It protects the tip of the growing root from damage

Root nodules

- ✓ They store nitrogen fixing bacteria (rhizobia)

1. State the importance of nitrogen fixing bacteria stored in root nodules

- ✓ They fix nitrogen in the soil
- ✓ They help in formation of root nodules

2. State the importance of planting legumes in the garden.

- ✓ They improve soil fertility (they fix nitrogen in the soil)

FIBROUS ROOT SYSTEM

This is w here many roots of the same size and length grow from the radicle.

- ✓ It is common in monocotyledonous seeds

Examples of plants with fibrous root system

- ✓ Millet
- ✓ Maize

- ✓ Sorghum
- ✓ Rice
- ✓ Barley
- ✓ Wheat
- ✓ Oats

Diagram showing fibrous root system

- ✓ Sugar cane
- ✓ Onion
- ✓ Grass

TYPES OF ROOTS

- ✓ Adventitious roots
- ✓ Tap roots

Examples of crops with tap roots

- ✓ bean plant
- ✓ groundnuts

Crops with adventitious roots

- ✓ maize
- ✓ wheat
- ✓ rice

Note :

These are roots. which grow from any part of the plant but not from the radicle.

ACTIVITY

a) Name two types of roots Systems
b) Name one part of the shoot system of a flowering plant.
c) How is the terminal bud useful to the growing plant?
d) Name the part of the plant between the two nodes.
e) How useful is the root cap to a growing root
f) State one functional use of roots to a plant.
g) Give two examples of plants with tap root system.
h) Name the group of flowering plants with root nodules.

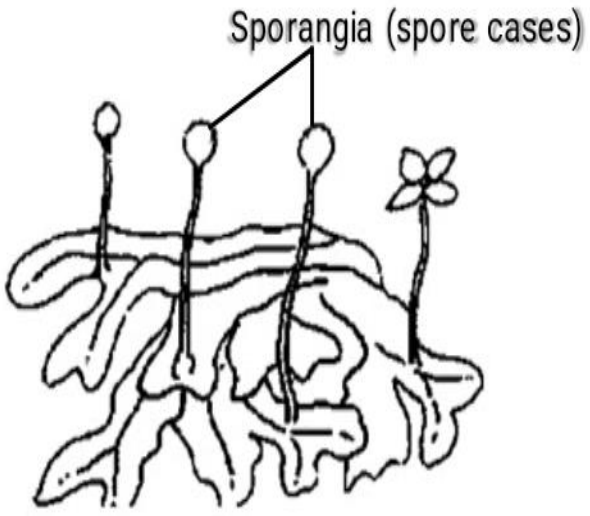
i) How useful is nitrogen fixing bacteria to the soil?
j) State the use of nitrates to leguminous crops
k) Name one source of plant protein.
l) How do leguminous crops improve fertility?

P.6 SCIENCE ZOOM LESSON .3

Liverworts

Sporangia (spore cases)

Liverworts



- They have flat liver like shape of their main body
- They have plate-like or leaf like structures with chlorophyll to make food
- They grow in warm moist places
- They reproduce by means of spores.

- Its spores are produced in a bulb like spore case (sporangium)

4. **Hornworts**

- These are the smallest group of bryophytes
- They grow in damp areas such as ditches, along edges of streams and near the shores of lakes
- They look like liverworts

Reasons why mosses, liverworts and ferns are called plants

- They have chlorophyll
- They can make their own food
- They have leaves, stems and roots

CONIFERS

- These are non-flowering plants that reproduce by means of seeds.

- They store their seeds in cones
- Most conifers have small needle -like leaves.
- They are evergreen trees

EXAMPLES OF CONIFERS

- Pine
- Spruce
- Fir
- Cedar
- Juniper
- Larch Cypress
- Redwood
- Hemlock
- Podocarpus (podo)

1. **Why is pine called a conifer?**

- It doesn't bear flowers but reproduces by means of seeds.

2. How do conifers reduce the rate of transpiration?

- Most conifers have small needle-like leaves; to reduce the surface area for transpiration.
- They cover their leaves with a waxy layer.
- They have a thick cuticle on the upper surface of their leaves.

Economic importance of conifers

- Some conifers are sold for income.
- Some conifers act as tourist attractions.
- They provide soft wood timber.

Other importance of conifers.

- Some conifers act as live fences.
- Some conifers act as wind breaks on compounds.

- They help in rain formation.
- They act as natural habitat for wild animals.
- They help to control soil erosion.
- They purify air in the environment.
- Some conifers provide food e.g pine nuts.

Uses of soft wood timber.

- For making papers.
- For making match sticks.
- For making plywoods.

ORGANISMS RELATED TO PLANTS:

- Algae
- Euglena
- Lichens

ACTIVITY

a) **How do liverworts reproduce?**

b) Give one reason why liverworts, mosses and horsetails are called plants.

c) Why are coniferous plants called so?

d) How do most coniferous plants reduce the rate of transpiration ?

e) Name one product made from soft timber.

f) State one economic importance of soft timber

g) How does algae reproduce?

h) Give any two examples of algae.

i) Mention any one use of algae to man.

j) Give any one type of algae.

P.6 SCIENCE ZOOM LESSON 4

FLOWERING PLANTS

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

GROUPS OF FLOWERING PLANTS

- Monocotyledonous plants (monocots)
- Dicotyledonous plants (dicots)

MONOCOTYLEDONOUS PLANTS

- These are plants whose seeds have one cotyledon

Characteristics of monocots

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

Examples of monocots

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

CEREALS

- These are plants which produce grains (corns).

Examples of cereals

- Maize
- Wheat
- Millet Rice

Points to note about cereals

- They produce grains
- They are annual crops

- These are crops which mature with in one year.ie Sorghum ,Barley, Oat
- **Tall cereals develop prop roots (maize**, millet, sorghum and w heat) during flowering stage.
- To provide extra support to the plant.
- They are wind pollinated (since they have flowers without petals).
- They have green leaf-like scales instead of petals
- To protect the inner parts of the flower.

Uses of cereals

- They are used as food by man (they are sources of carbohydrates)
- They are used to make alcoholic drinks
- They are used as animal feeds
- They are used to make corn oil (e.g maize)

DICOTYLEDONOUS PLANTS

- These are plants w hose seeds have two cotyledons.

Examples of dicots

- Beans
- Soybeans (soya beans)
- Peas
- Groundnuts
- Mango
- Orange
- Cassava
- Paw paw

Characteristics of dicots

- They have seeds with two cotyledons
- They undergo epigeal germination
- They have tap root system
- They have network leaf venation

LEGUMES

- These are plants with root nodules
- They store their seeds in pods

Examples of legumes

- Beans
- Peas
- Soybeans (soya beans)
- Groundnuts

Uses of legumes

- They are used as food (they are source of plant proteins)
- They improve soil fertility
- By fixing nitrogen in the soil
- They are source of income w hen sold

Some legumes can be used to make oil e.g groundnuts

DIFFERENCES BETWEEN DICOTS AND MONOCOTS.

MONOCOTS

a) Have seeds with one cotyledon while dicots Have seeds with two cotyledons

b) Have fibrous root system while dicots Have taproot systems

c) Have parallel leaf venation while dicots Have network leaf venation

d) Undergo hypogeal germination dicots Undergo epigeal germination

Activity

e) How do flowering plants reproduce?

f) To which group of plants do maize plants belong?

g) State the class of food obtained from Ugali.

h) Which type of germination do maize grains undergo?

i) What are leguminous crops?

j) Give one example of a leguminous crop.

k) Identity the type of roots that a maize plant have.

l) How are Why should a farmer include leguminous crops in a crop rotation cycle?

m) State the difference in germination between cereals and legumes

n) State the class of food obtained from ground nuts

P 6 SCIENCE EXTRA 13

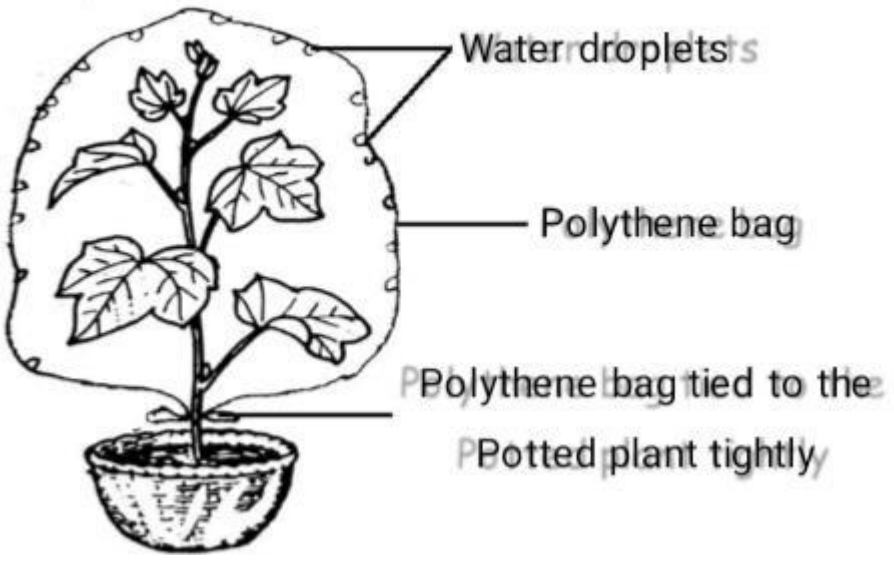
TRANSPIRATION

This is process by which plants lose water inform of water vapour to the atmosphere

Types of transpiration

- Lenticular transpiration: in the lenticels
- Stomatal transpiration: in the Stomata
- Cuticle transpiration: in the cuticle of the stem
- Transpiration occurs in the leaves and some stem.
- Most transpiration occurs in the leaves

An experiment showing transpiration



Potted plant

To carry out transpiration.

Polythene bag

To trap and condense water vapour.

1. Why is the polythene bag tied to the stem of the potted plant tightly?

- To prevent water vapour from escaping.

2. Why are water droplets formed inside the polythene paper?

- Due to condensation

Importance of transpiration to plants

- It cools the plant
- It pulls up water and mineral salts to the leaves

Dangers of transpiration (transpiration as an evil process in plants).

- It can lead to wilting

- It lowers crop yields due to less w ater left in the plant

3. Give the similarity among these processes; transpiration, sweating and panting

- All are cooling processes (they cool living things)

Importance of transpiration in the environment

- It helps in the water cycle

FACTORS THAT AFFECT THE RATE OF TRANSPIRATION

- These are conditions that either increase or decrease the rate of transpiration;
- Temperature
- Light intensity
- Wind
- Humidity
- Surface area (size) of the leaf
- Number of stomata on the leaf

Temperature

- The higher the temperature, the higher the rate of transpiration and vice versa

Light intensity

- High light intensity opens the stomata, lenticels and cuticle which increases transpiration

Wind

- Strong wind increases the rate of transpiration.
- It blows off water molecules on the plant giving space for more vapour to come out.

Surface area (size) of the leaf

- The larger the surface area, the higher the rate of transpiration and vice versa

Humidity

- Humidity is the amount of water vapour in the atmosphere
- High humidity lowers the rate of transpiration and vice versa

Number of stomata on the leaf

- The higher the number of stomata, the higher the rate of transpiration and vice versa

Factors that increase the rate of transpiration

- High temperature High light intensity Low humidity
- High number of stomata
- Large size of the leaf
- Strong wind

Factors that lower the rate of transpiration

- Low temperature Low light intensity High humidity
- Few number of stomata Small size of the leaf Gentle wind

Ways through which plants reduce the rate of transpiration.

- Some plants shed their leaves during dry season e.g deciduous trees (mvule, fig tree, elk, bassw ood, beech, maple and oak)
- Some plants cover their leaves with a layer of wax e.g banana.
- Some plant leaves are modified into thorns e.g cactus and aloe -vera.
- Some stems have tough lenticels and cuticle to prevent w ater loss.
- Some plants grow very small leaves (leaves w ith small surface area)
- . Some plants develop needle shaped leaves.
- Some plants have few stomata on their leaves.
- Some plants fold their leaves during the dry seasons.

4. How do farmers reduce transpiration among their crops?

- By cutting off leaves from suckers while planting
- By transplanting seedlings in the evening
- By putting a shade on a nursery bed

Activity

a) Give the meaning of the term transpiration.
b) Mention any one factor that affects the rate of transpiration.
c) How is tranpirasition important to the plant?
d) State the importance of transpiration in the environment.
e) Mention any one factor that leads to the high rate of transpiration.
f) How do cactus plants reduce the high rate of transpiration?
g) Why are some plant leaves modified to form thorns?

P.6 SCIENCE EXTRA 11(MONDAY)

PROCESSES THAT OCCUR IN LEAVES

- Photosynthesis
- Transpiration
- Breathing (gaseous exchange)
- Guttation: loss of water in form o f water droplets from the plant leaves

PHOTOSYNTHESIS

- This is the process by which plants make their ow n food (glucose/starch)
- It is a biochemical process in plants
- It mainly takes place in the leaves
- It can also occur in green stems and in cotyledons o f seedlings
- Photo – means light
- Synthesis – means to build up (to make)

1. On which part of a plant does photosynthesis mainly occur?

- Leaves

2. Where in the plant leaves does photosynthesis occur?

- In the chloroplasts

SUMMARY SHOWING PHOTOSYNTHESIS

Sunlight

Water + carbon dioxide. → starch+ oxygen

Chlorophyll

RAW MATERIALS FOR PHOTOSYNTHESIS.

Water

Carbon dioxide

CONDITIONS FOR PHOTOSYNTHESIS

Chlorophyll

Sunlight

PRODUCTS OF PHOTOSYNTHESIS

- Glucose/starch (it is the main/useful product)
- Oxygen (it is the by product/waste product)

REQUIREMENTS FOR PHOTOSYNTHESIS

- Water
- Carbon dioxide Chlorophyll

- Sunlight

IMPORTANCE OF THE REQUIREMENTS FOR PHOTOSYNTHESIS

- Water
- Water is got from the soil
- It provides the hydrogen needed to form glucose
- Carbon dioxide
- Carbon dioxide is got from air in the atmosphere
- It provides carbon needed to form glucose

3. By what process does carbon dioxide enter the stomata of the leaf?

- By diffusion
- Chlorophyll
- This is the green pigment in plants
- It traps sunlight
- Sunlight
- It helps to splits water into hydrogen and oxygen

4. Why can't photosynthesis occur at night?

- There is no sunlight

Importance of glucose produced by plants during photosynthesis

- It is used for respiration to produce energy.
- It is used to make insoluble starch for storage.
- It is used to make cellulose which builds cell walls.

ADAPTATIONS OF LEAVES FOR PHOTOSYNTHESIS

- They are broad and flat
- To trap sunlight easily
- They have thin walls
- To allow easy diffusion of carbon dioxide
- They have chlorophyll
- To trap sunlight
- They have stomata
- To allow in carbon dioxide
- They have veins
- To transport water to all leaf cells
- They are w ell arranged on the stem
- To get sunlight easily

FACTORS THAT AFFECT PHOTOSYNTHESIS

- Light intensity

- Carbon dioxide

concentration

- Optimum temperature

5. How do plants benefit from photosynthesis?

- Plants get food

6. How do animals benefit from photosynthesis?

- Animals get oxygen for respiration
- Some animals get food e.g herbivores and omnivores

7. How does photosynthesis purify air (control global warming)?

- It uses carbon dioxide and gives out carbon dioxide

STEPS OF TESTING A GREEN LEAF FOR STARCH

- Boil the leaf in water for some minutes
- To kill the cells
- To break the cell w all of a leaf
- Boil the leaf in alcohol (ethanol/methylated spirit)
- To remove chlorophyll
- Wash the leaf with hot water
- To remove alcohol and soften the leaf
- Put drops of iodine solution on a leaf

- It starch is present, iodine turns blue black (dark blue)
- If starch is absent, iodine will remain brown

NOTE:

- Killing the cells helps to stop all the chemical reactions in a leaf
- Breaking the cell w all enables easy removal of chlorophyll
- Removing chlorophyll enables clear observation of colour changes of iodine solution
- Making the leaf soft enables easy diffusion of iodine

Activity

a) Give the meaning of term photosynthesis.
b) Mention to raw materials for photosynthsis.
c) Name the main product for photosynthsis
d) State the by product for photosynthsis.
e) Mention any one factor that affects photosynthsis.
f) How useful is sunlight energy during photosynthsis ?

g) State one adaptation of plant leaves to help in making starch.

h) Apart from transpiration, give one other process that takes place in plant leaves.

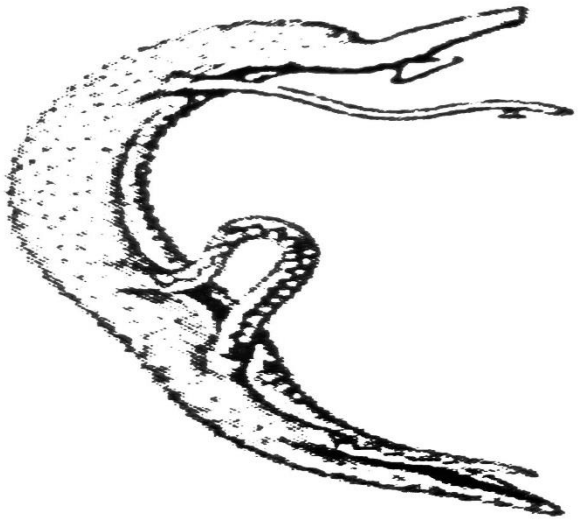
P.6 SCIENCE EXTRA 14

a) Name the type of worms with flattened bodies?

b) State one characteristics of flat worms.

c) Give one example of a flat worm.

d) Name the type of worms shown in the diagram below



e) What do tapeworms feed on?

f) How do tapeworms enter the persons body?

g) How do tapeworms feed?

h) Why does a tapeworm lack digestive system?

i) Why can’t tapeworms be digested the by the digestive tract of the host?

j) How useful are the hooks on the scolex of a tapeworm?

k) Why can’t tapeworms be moved during Peristalsis?

l) Give one sign of tapeworms infestation on one's body.

m) State one danger caused by tapeworms on one's body.

n) State one effect of tapeworms to the human body.

o) How can a school control the spread of tapeworms amongst children?

p) How are liver flukes dangerous to animals

q) Identity the group of worms with cylindrical body shape.

r) Give any one example of a round worm.

s) Name the disease caused by the filaria worm.

t) What causes river blondness?