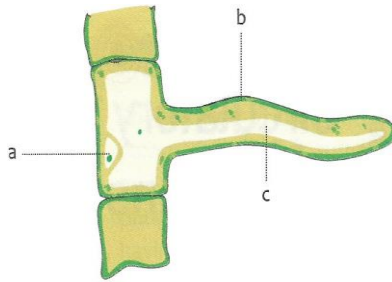


Chapter 1: Transport of food and minerals in plants

Question 1

Identify the figure and label parts a, b, c.



Answer

The figure shows a root hair. The parts labelled a, b, c are:

a → Nucleus

b → Cell Membrane

c → Cytoplasm

MCQ

1. In plants, water is transported through:

- a. xylem b. phloem
- c. stomata d. root hair

Answer: a. xylem

2. Water absorption through roots can be increased by keeping the potted plants:

- a. in the shade b. in dim light
- c. under the fan d. covered with a polythene bag

Answer: c. under the fan

3. The phloem tissue in plants is responsible for the transport of:

- a. water
- b. water and minerals
- c. glucose
- d. all of these

Answer: c. glucose

4. Which of the following helps in the upward movement of water and dissolved minerals from roots to the leaves through stem?

- a. Transportation
- b. Translocation
- c. Tropic movement
- d. Transpiration

Answer: d. Transpiration

5. Food from leaves is carried away to other parts of plants by these cells.

- a. Dead cells of xylem
- b. Companion cells and sieve tubes of xylem
- c. Companion cells and sieve tubes of phloem
- d. None of these

Answer: c. Companion cells and sieve tubes of phloem

6. Due to an increase in temperature, the rate of transpiration will:

- a. decrease
- b. increase

c. remains the same d. none of these

Answer: b. increase

7. Which of the following helps in transporting substances in plants?

- a. Xylem b. Phloem
c. Stomata d. Both a and b

Answer: d. Both a and b

8. What are the tiny pores on the leaves called through which transpiration takes place?

- a. Cuticle b. Lenticel
c. Stomata d. Root hair

Answer: c. Stomata

Q2 Give scientific reason

Give Reasons

1. Transpiration is reduced if the air is humid

Ans. When the air is humid, it can only contain a little amount of water vapour. As a result, increased air humidity slows the outward diffusion of internal water vapour through stomata, lowering the rate of transpiration.

2. Transpiration, despite resulting in loss of water from the plant, remains a crucial process for its overall well-being

Ans. The movement of the water molecules in the plant cells during this process helps maintain the plant cells turgidity. The evaporation of water in the form of vapours is the reason for the cooling effect of plants. It maintains osmosis and keeps the cells rigid.

3. Root hair help to absorb water.

Ans. Root hair are many in number offering a large surface area for absorption of water. They have a plasma membrane which is thin and semipermeable. The concentration of water molecules is higher in the soil than in the root hair cells. All these factors allow water to pass into the root hair cells by osmosis.

4. Active transport requires energy.

Ans., Active transport requires movement of particles from a region of their lower concentration to their higher concentration. This requires energy, because it is against the concentration gradient.

5. NPK salts are important macronutrients.

Ans, NPK salts are important macronutrients-nitrogen is required for protein formation, phosphorus helps in the production of energy and potassium helps to control the

opening and closing of stomata, maintains the electrolyte balance, and regulates transpiration process.

Q6. Transpiration helps in the upward movement of water.

Ans. As water is lost from the leaves, pressure is created at the top to “pull” more water from the xylem tissues. The pull of water created due to transpiration is called transpiration pull. This pull extends up to the roots, causing the roots to absorb more water from the soil.

Q7. Transpiration is faster when it is sunny and hot.

Ans. When it is sunny, the light from the sun induces the stomata to remain open. On a hot day, the temperature of the surroundings is higher. These factors facilitate more water to evaporate. Hence, the rate of transpiration is faster.

Q8 Transpiration is lower on a humid day.

Ans. Transpiration is lower on a humid day because the air already contains a lot of moisture due to which it can't take more water vapour from the leaves.

Q9. Elements like zinc and manganese are known as micronutrients.

Ans. Zinc and manganese are known as micronutrients as these are required in small quantities by the plants.

Assertion and Reason Questions

Choose the correct option:

- a. Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
- b. Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
- c. Assertion is true but Reason is false.
- d. Assertion is false but Reason is true.

1.

Assertion (A): Root hairs help in the absorption of water from the soil.

Reason (R): Root hairs increase the surface area for absorption.

Answer: a. Both Assertion and Reason are true and Reason is the correct explanation of Assertion.

2.

Assertion (A): Plants absorb minerals from the soil along with water.

Reason (R): Minerals are absorbed by osmosis.

Answer: c. Assertion is true but the Reason is false

3.

Assertion (A): Translocation helps in the upward movement of water in plants.

Reason (R): Loss of water from leaves creates a pull that draws water upward.

Answer: d. Assertion is false but the Reason is true .

4.

Assertion (A): Plants kept under a fan absorb more water.

Reason (R): Moving air increases the rate of transpiration.

Answer: a. Both Assertion and Reason are true and Reason is the correct explanation of Assertion.

5.

Assertion (A): Transpiration decreases when the leaves are covered with a polythene bag.

Reason (R): Water vapour cannot easily escape from the leaf surface.

Answer: a. Both Assertion and Reason are true and Reason is the correct explanation of Assertion.

6.

Assertion (A): Xylem parenchyma consists of thin walled dead cells.

Reason (R): Xylem fibres provides mechanical strength and support to plants.

Answer: b. Assertion is false but Reason is true.

E. Complete the following table.

Nutrient	Role	Deficiency
Nitrogen		Yellowing of leaves, retarded growth, wrinkling of cereal grains
Phosphorus	It is a constituent of protein and cell membrane.	
	It is a constituent of some proteins and enzymes.	Yellowing of leaves (chlorosis)
Zinc	It is a constituent of plant hormones and also activates enzymes.	
	It aids growth of tissue and also helps in opening and closing of stomata.	Poor and stunted growth

Table 1.1 Some essential macronutrients and micronutrients and their functions in plants

Macronutrient	Role	Deficiency
Nitrogen	It is a major constituent of protein.	Yellowing of leaves, retarded growth, wrinkling of cereal grains
Phosphorus	It is a constituent of protein and cell membrane.	Delay in seed germination, poor root growth, purple and red spots on leaves
Potassium	It aids growth of tissue and also helps in opening and closing of stomata.	Poor and stunted growth
Micronutrient	Role	Deficiency
Iron	It is a constituent of some proteins and enzymes.	Yellowing of leaves (chlorosis)
Manganese	It is a constituent of some enzymes.	Yellowing of leaves with grey spots
Zinc	It is a constituent of plant hormones and also activates enzymes.	Malformed leaves, yellowing of leaves, stunted plant growth

Find the odd one out, with reasons.

1. Sieve tube, tracheid, companion cells, phloem fibres.

Ans

Tracheid.

Reason :All others are cells of phloem tissue but it is a part of xylem tissue.

2. Trachieds, vessels, xylem fibre, companion cells.

Ans Companion cells.

Reason: Companion cells is the part of phloem while all others are parts of xylem tissue.

3. Root hair, xylem, root, phloem

Ans. Phloem.

Reason : Root hair, root and xylem are involved in the absorption and movement of water in a plant whereas phloem transports the food in a plant.

4. Tracheids, Vessels, Phloem parenchyma,

Xylem parenchyma

Ans. Phloem parenchyma; rests are cells of xylem tissue.

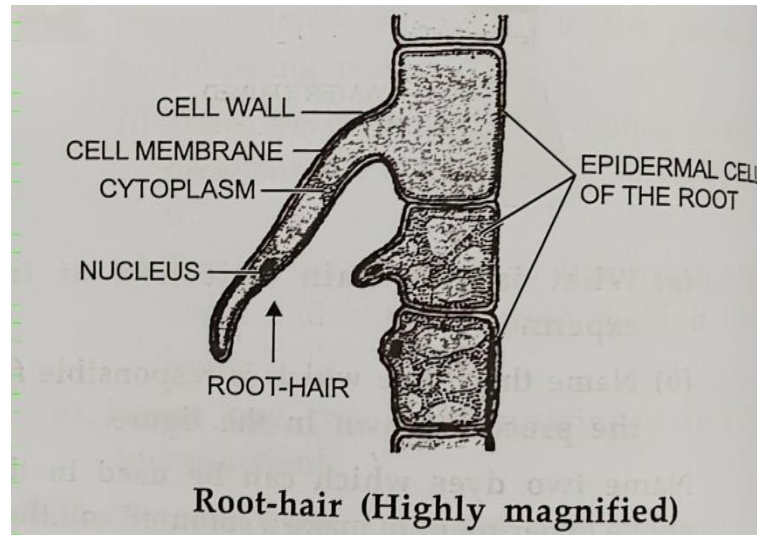
5. Nitrogen, Iron, Phosphorus, Potassium

Ans .Iron is a micronutrient but the other three are macronutrients.

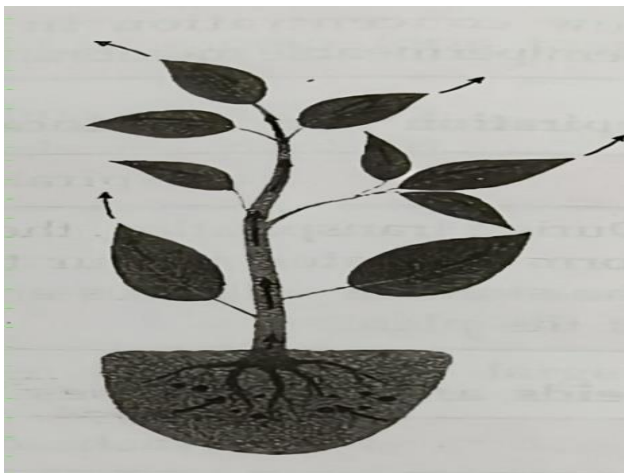
Draw a magnified view of the root hair and label all its parts neatly. From the parts labelled by you ,name the parts matching the description given below:

- a) Outermost layer of the root
- b) Unicellular outgrowth
- c) Part that is freely permeable

d) Part that is semipermeable



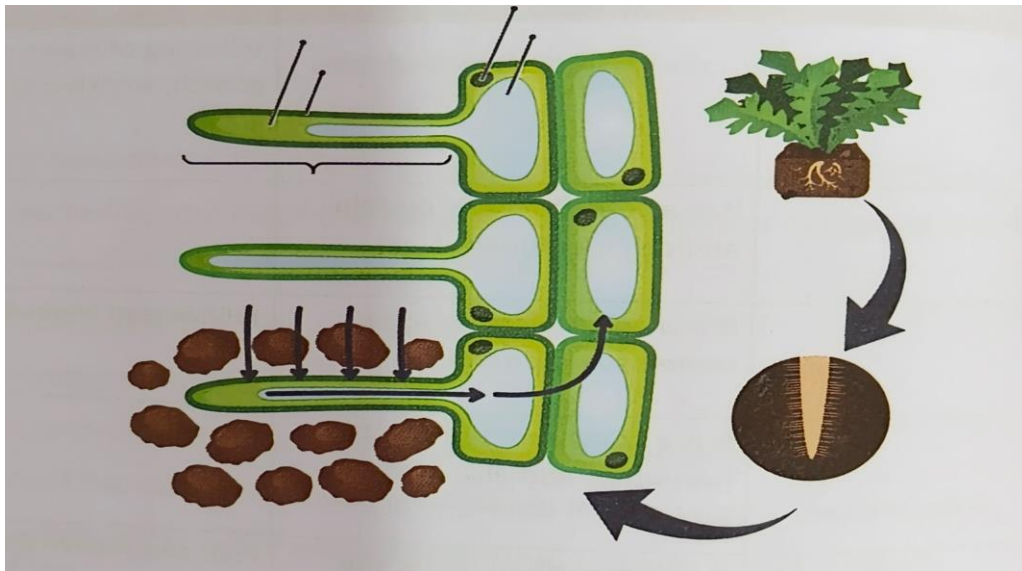
Name the process illustrated in the picture, which leads to evaporative water loss from the leaves of a plant.



- a) Define the process.
- b) Mention one significance of this process.
- c) Name three factors that affect the rate of this process.

Q Study the diagram given below and answer the following questions.

Picture-based Question



a. What does the diagram depict?

A- The diagram depicts the absorption of water and minerals by root hairs from the soil.

b. How does increase in the number of root hairs help the plant to absorb more water and minerals?

A- An increase in the number of root hairs increases the surface area of the root in contact with the soil. This helps the plant to absorb more water and minerals efficiently.

Application-based Question

The transport system in plants consists of long tubes (or vessels) called A and B. Tube A transports water and minerals from roots to leaves whereas tube B transports prepared food from the leaves to all other parts of plant.

a. Name the vessel A.

Vessel A is Xylem.

b. What are the different types of cells in vessel A?

The different types of cells in xylem are:

Tracheids

Vessels

Xylem fibres

Xylem parenchyma

c. Name the vessel B.

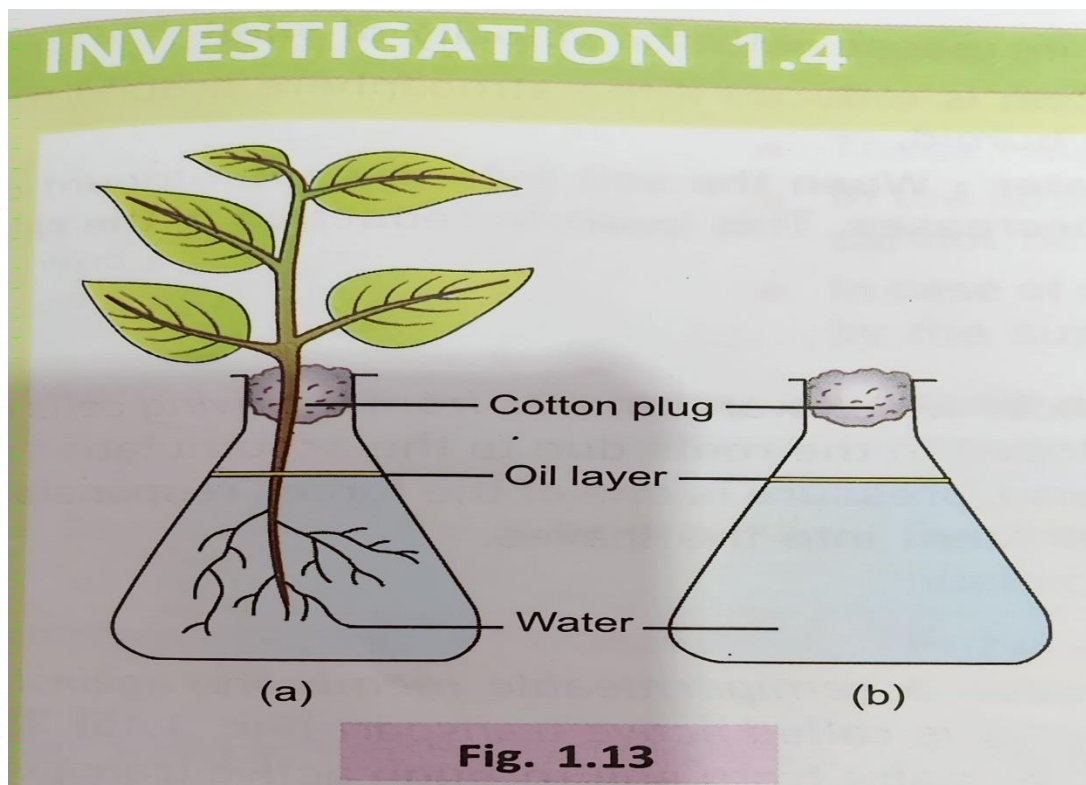
Vessel B is Phloem.

d. Which cell type in vessel A is living?

Xylem parenchyma is the living cell type in xylem.

e. Which cell type in vessel B is dead?

Phloem fibres are dead cells in phloem.



Refer to the diagram and answer the following questions.

Pg-17, Investigation 1.4, Fig-1.13

Identify the process demonstrated in the diagram.

A- The process demonstrated is transpiration.

What is the purpose of the oil layer in the flask?

A- The purpose of the oil layer is to prevent the evaporation of water from the flask.

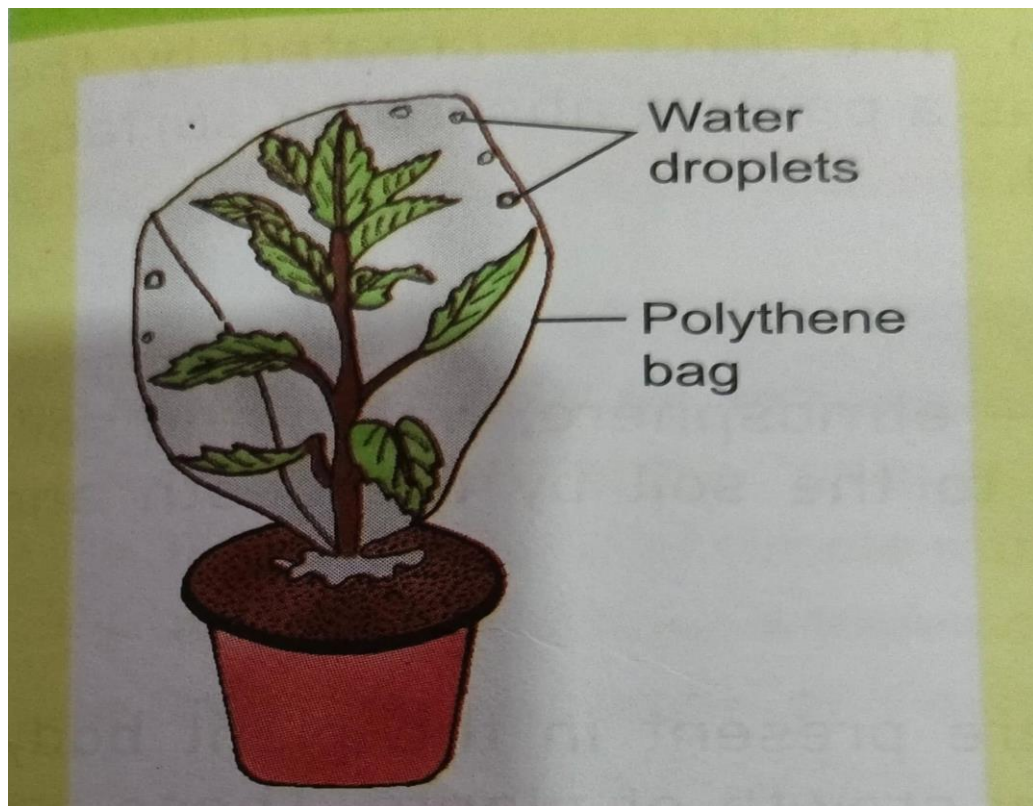
Why is a cotton plug used at the mouth of the flask?

A- The cotton plug prevents loss of water due to evaporation and also supports the plant to keep it steady.

Which flask shows a decrease in water level after 24 hours? Why?

A– Flask (a) shows a decrease in water level after 24 hours because the water is lost in the form of water vapour due to transpiration through leaves.

Study the diagram given below and answer the following questions.



The set up shown above was set up in sunlight for about an hour. It was observed that drops of water appeared on the inside of the polyethylene bag.

- (a) Name the process which is being demonstrated.
- (b) Why was the pot and its soil left uncovered by the polythene bag ?
- (c) Why was the pot left in the sunlight?
- (d) Suppose the pot in this experiment was placed inside a dark room instead of placing it in sunlight for some time. What difference will be noticed?

(a).The process demonstrated is transpiration.

(b) . We left the pot and the soil uncovered to ensure that the water droplets found inside the polythene bag has come from the aerial parts of the plant due to transpiration followed by condensation but not by evaporation of water from the surface of soil.

(c). The pot was left in the sunlight as it increases the rate of transpiration by opening the stomata widely.

(d). The stomata remains closed in the absence of sunlight. That's why very few or no water droplets would appear inside the polythene bag. OR (Transpiration would not occur as the stomata remained closed in the absence of light. So no droplets of water would be inside the polythene bag.

Write the function of the following

1. vessels – Main conducting element of xylem.
2. xylem parenchyma – It helps in the storage of starch and other materials.
3. Xylem fibres – They provide mechanical support to plants.
4. Phloem parenchyma - It helps in the storage of organic matter.
5. Phloem fibres – They provide mechanical support to plant.
6. Sieve plate – It acts as a perforated partition between connected cells in the Phloem tissue, allowing the continuous flow of food materials.
7. Companion cells - They help the sieve tubes in the conduction of food materials.

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