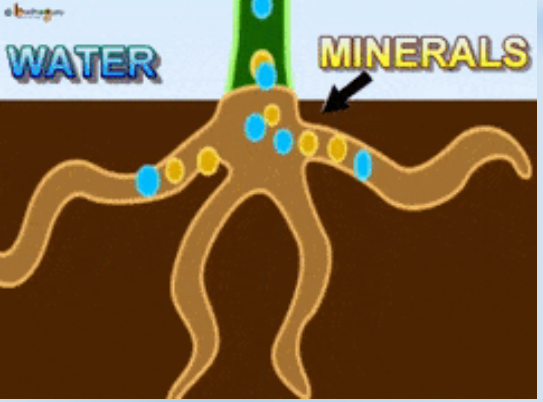


Biology Grade 7

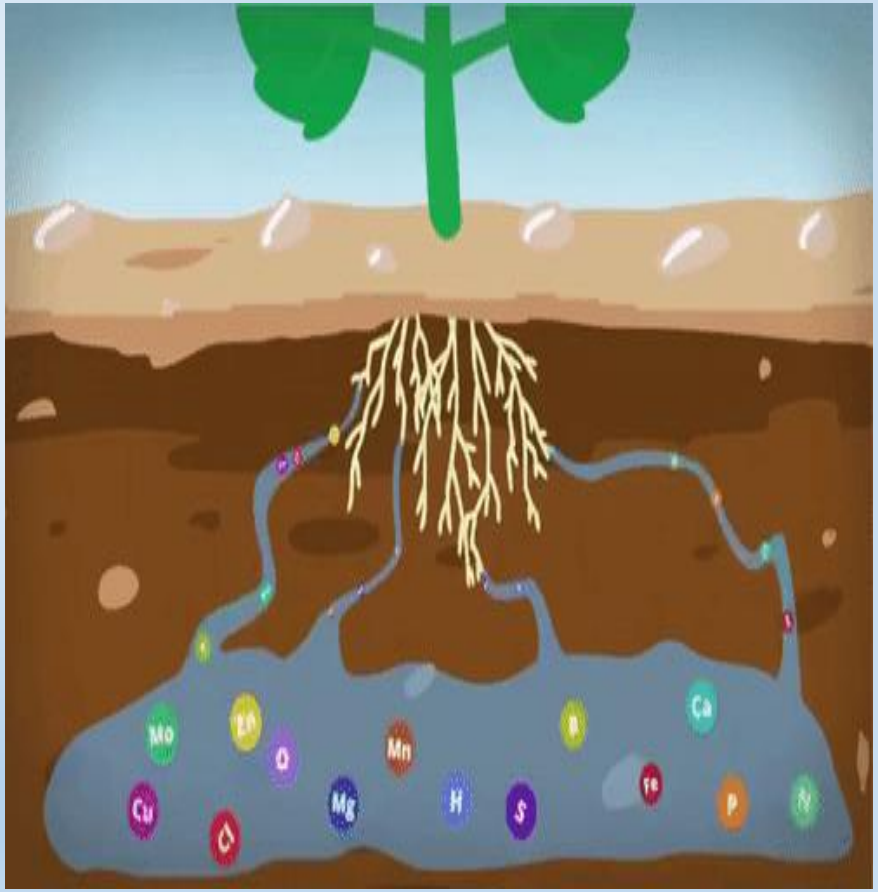
CHAPTER 2: NUTRITIVE NEEDS OF CHLOROPHYLLIC PLANTS

Activity 2: Absorption And Translocation of Water And Mineral salts

INSTRUCTOR: SUHAIB AUDI

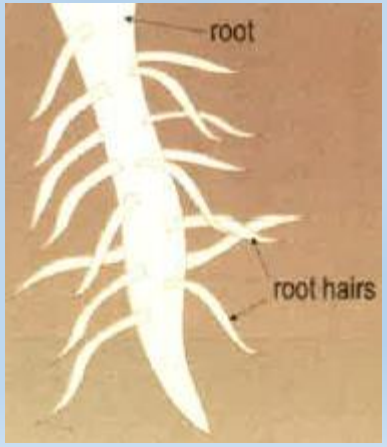
Activity 2: Absorption and translocation of water and mineral salts

- Green plants absorb water from the soil and mineral salts from the soil or water.
- Where and how is absorption carried out?
- How are these elements translocated inside the plant?

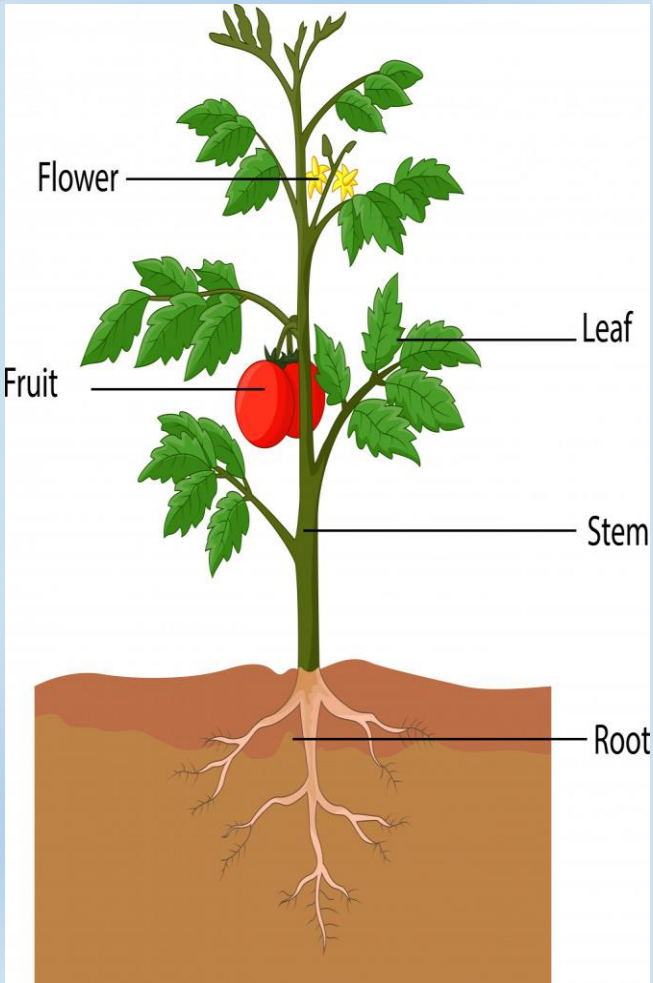


❖ Roots: Organ of Absorption

- In order to produce its food through photosynthesis, the **chlorophyllic plant** uses its **root hairs** to absorb **water** and **mineral salts** from the soil.
- It also uses its leaves to absorb **CO_2** from the air.
- Moreover, the **chlorophyllic plant** absorbs **light energy** though the chlorophyll found in the leaves.
  - **A root observed by a magnifier reveals the existence of numerous hairs.**
  - Through them the plant absorbs water and mineral salts (crude sap) from the soil, water or nutritive solution.



- Crude sap: Solution of water and mineral salts.
- Absorption: Passage of crude sap to the plant. It is done by the root hairs.



❖ An experiment to verify the role of root hairs:

1. Pose the problem at the origin of this experiment.

What is the role of the root hair?

2. Formulate the tested hypothesis

Hypothesis: Root hairs are responsible for the absorption of water and mineral salts.

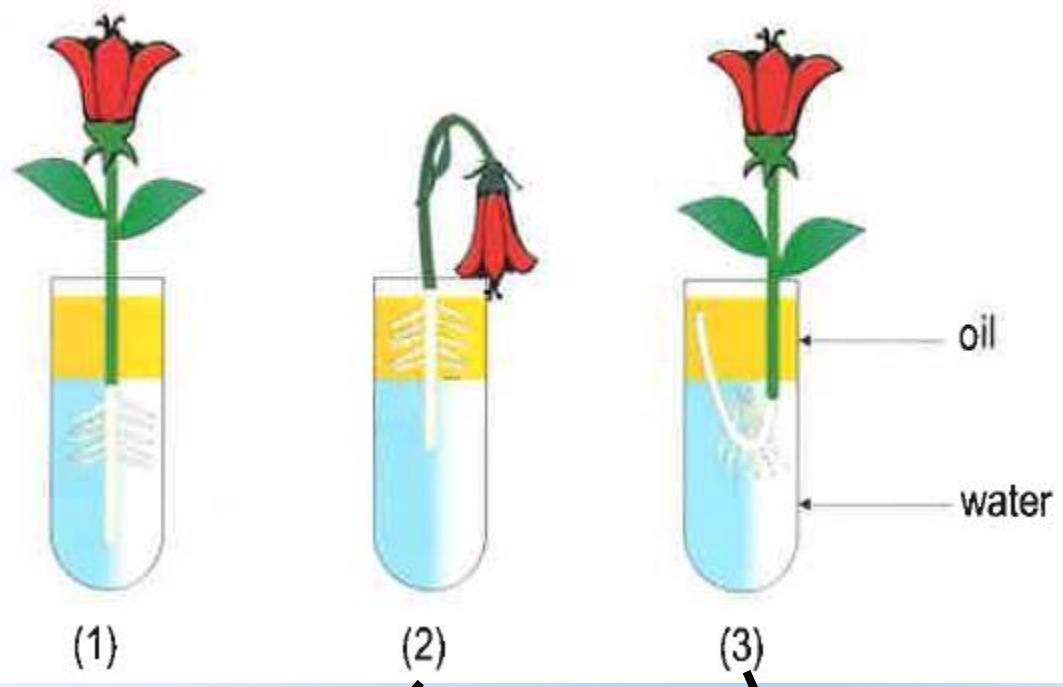
3. Indicate the role of tube 1.

It is a control of tube.

A control tube is used to compare experimental results and determine the effect of the tested variable factor.

4. Indicate the variable factor.

The variable factor is the location of the root hairs; in both tubes 1 and 3 root hairs are immersed in water while in tube 2 the root hairs are immersed in oil.



The root of the plant is immersed in tap water (containing minerals) but its root hairs are immersed in oil.

The root of the plant is immersed in oil but its root hairs are immersed in tap water (containing minerals).

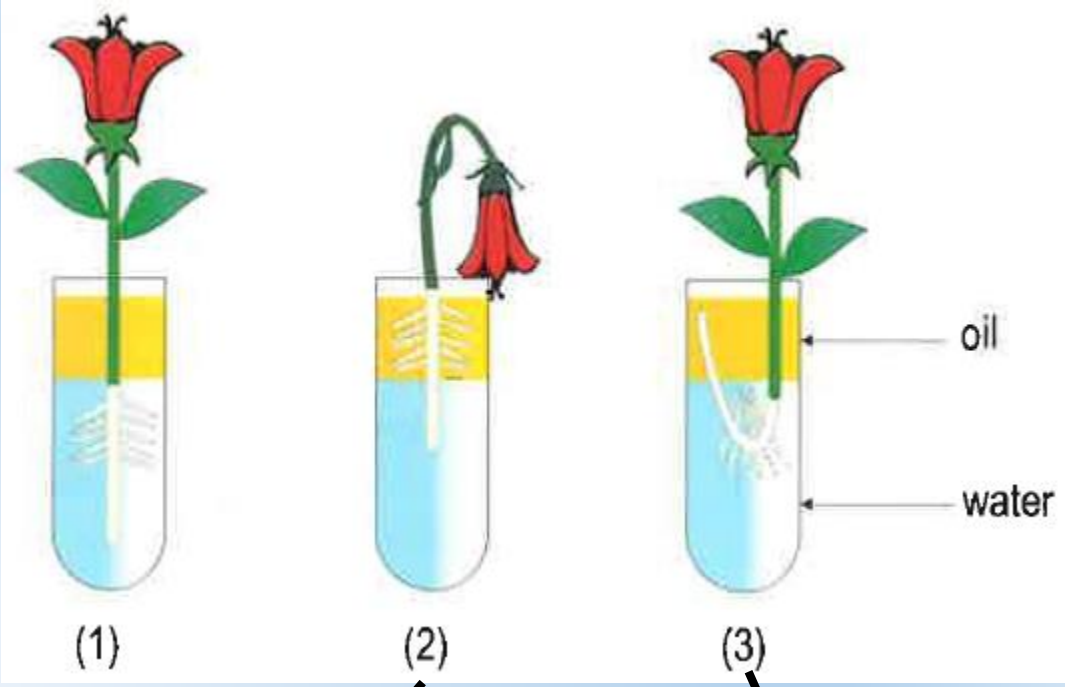
5. Interpret [Analyze + significance (what does this mean?)] the results of the experiment.

In both tubes 1 and 3 where the root hairs are immersed in water the flowers survive while, in tube 2 where the root hairs are immersed in oil the flower dies.

This means that root hairs absorb water while root doesn't absorb water.

6. What can you conclude

Therefore, root hairs are the structure of the green plant responsible for the absorption of water and mineral salts.

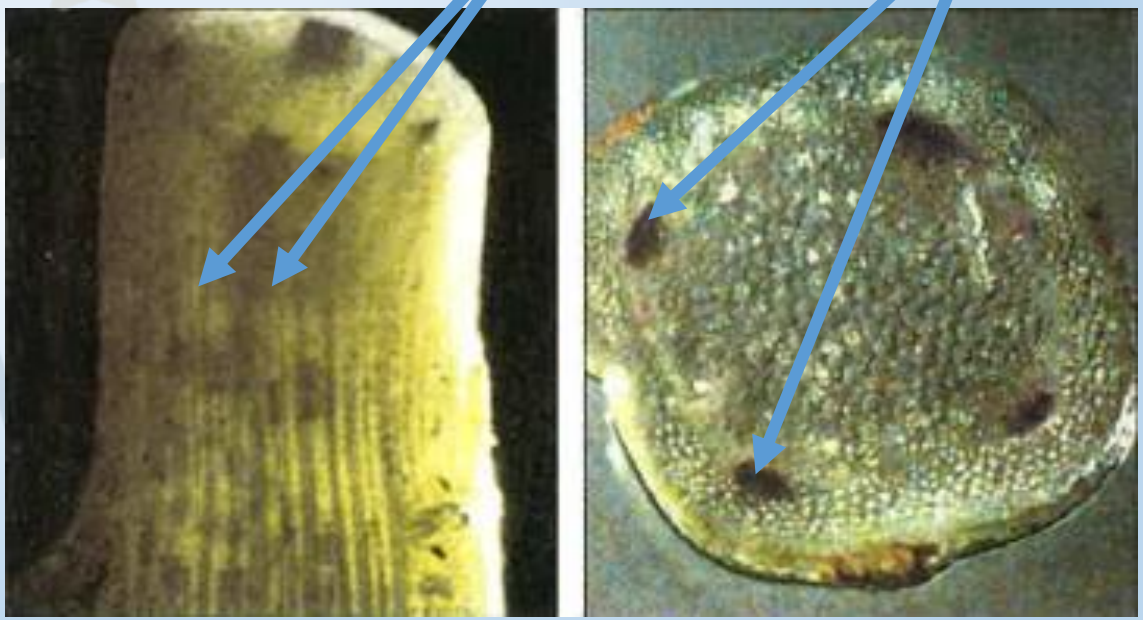


The root of the plant is immersed in tap water (containing minerals) but its root hairs are immersed in oil.

The root of the plant is immersed in oil but its root hairs are immersed in tap water (containing minerals).

❖ **In order to verify that crude sap is translocated inside the plant through conducting vessels we performed the following experiment:**

- Dip two carnation flowers in non-toxic blue ink.
- Make a transverse section in the stem of one and a longitudinal section in the stem of the other.
- Observe the petals and the conducting vessels.



In the transverse and longitudinal sections of the carnation stem, the ink appears concentrated in very fine tubes: the conducting vessels.

1. Pose the problem at the origin of this experiment.

What is the direction of the translocation of the crude sup in a green plant?

2. Formulate the test and hypothesis.

Hypothesis: Crude sap is translocated in an ascending (upward) direction in a green plant.

3. Indicates the importance Erlenmeyer flask 1.

It is a control Erlenmeyer flask.

4. Compare the aspects of the petal in flask 1 to that in flask 2.

The color of the petals of flower 1 is white while the petals of flower 2 is blue.

5. Indicate the pathway followed by the crude sap inside a green plant.

Root hairs → Roots → Stem → Leaves

6. draw out the direction of water and mineral salts in the flowers.

In an ascending (upward direction).

7. Define conducting vessels

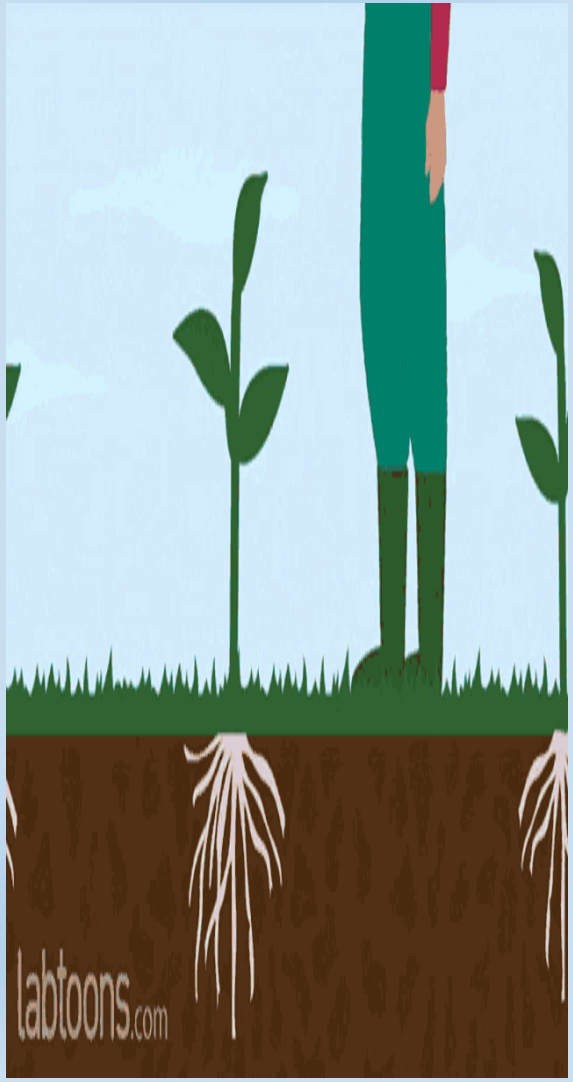
Conducting vessels are fine tubes that conduct water and mineral salts (Crude sap) up ward through the plant (from root hairs to root then stem then to leaves).

8. indicate the place of conducting vessels

Conducting vessels are in the stem.

9. Name the conducting vessels that allow the circulation of the crude sap.

Xylem



Summary

❖ Translocation of Crude Sap

Crude sap (water + mineral salts) is absorbed by **root hairs** and transported **unidirectionally** (in one direction) in an **ascending direction** from the **roots up to the leaves** through the **xylem vessels.**