Sadiq Public School

Do the right, fear no man

Subject: Biology **Class: C3** **Day: Saturday, 16th November 2024**
Lesson

This lesson will help you to revise your concepts regarding transport in plants.

A: Inquiry:

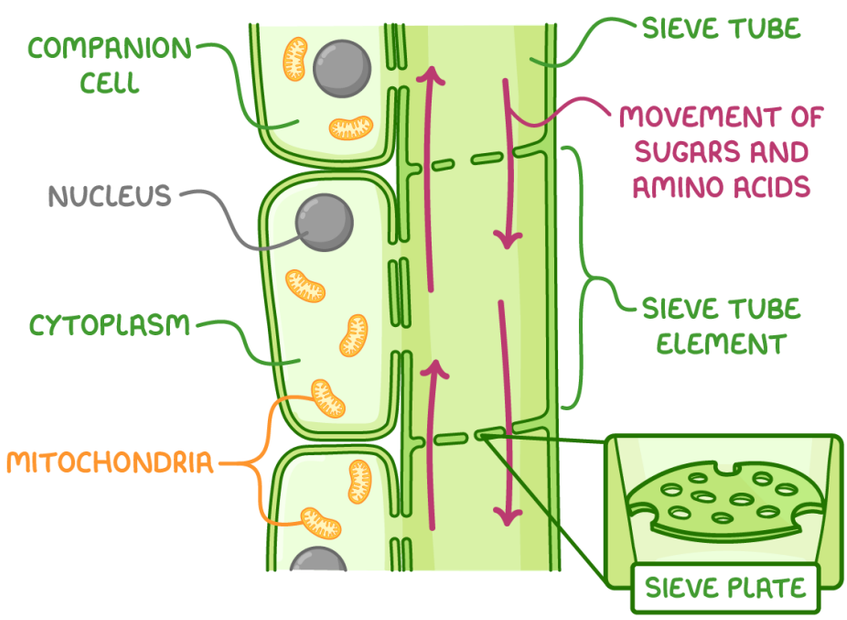
B: Information

Introduction:

Transport in plants

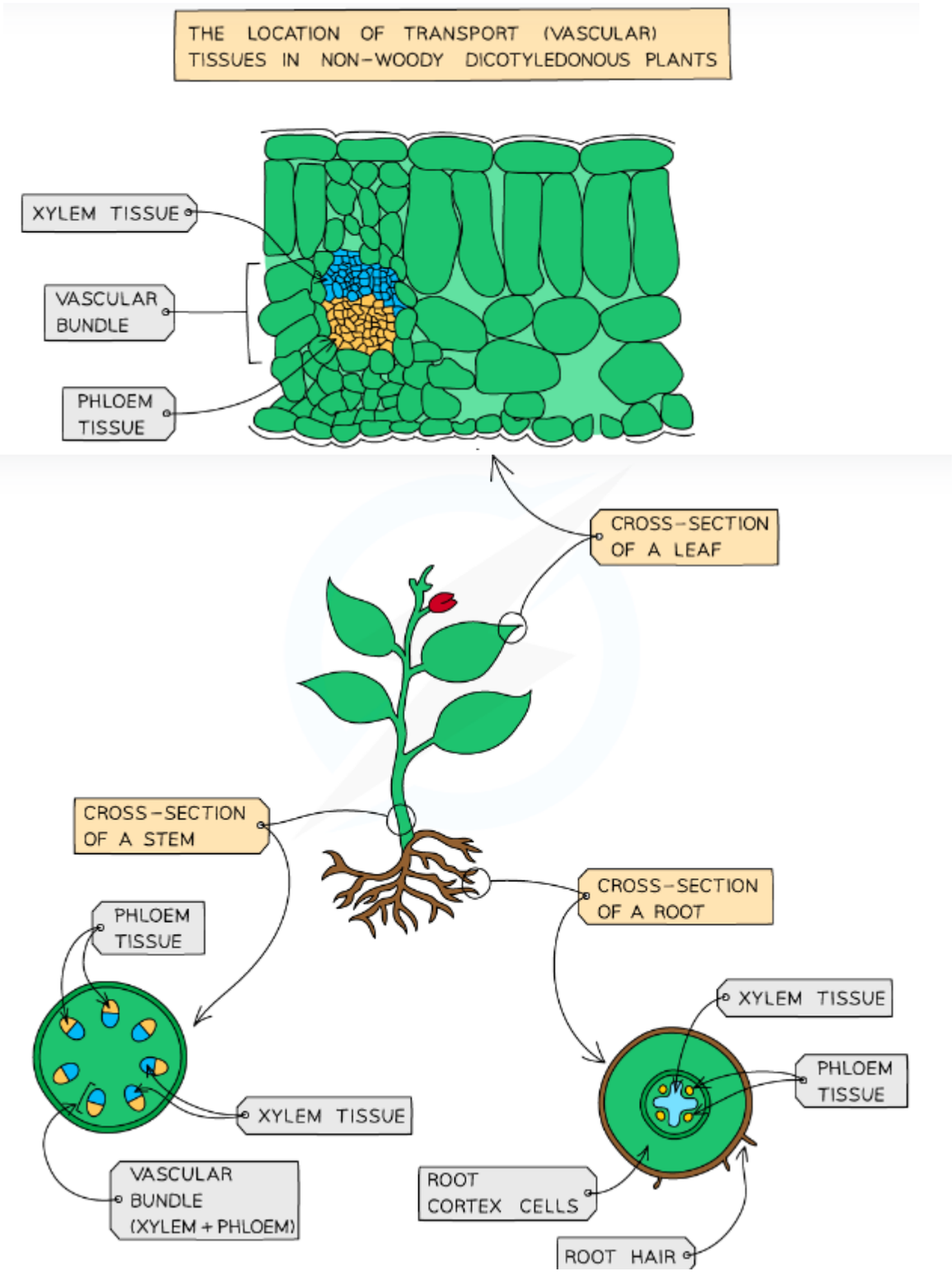
What is the function of the xylem and phloem

- Plants contain two types of transport vessel:
  - **Xylem vessels** – transport water and minerals from the roots to the stem and leaves.
  - **Phloem vessels** – transport food materials (mainly sucrose and amino acids) made by the plant from photosynthesising leaves to non-photosynthesising regions in the roots and stem.
- These vessels are arranged throughout the root, stem and leaves in groups called **vascular bundles.**



Translocation

Translocation is the movement of the prepared food material i.e. sucrose and amino acids, in phloem from the source to the sink. Sources are regions of production while the sink refers to the regions of storage. Glucose is formed into the sources, usually the leaf. This glucose changes into sucrose, amino acids, and fatty acids. Sucrose and amino acids travel further to the ink. When they reach the sink, sucrose sometimes changes back to glucose, and amino acids change into protein. Sucrose and amino acids move into the sieve cells. The sieve cells have to respire. Respiration can never occur with sucrose so it has to change back to glucose. Sucrose from phloem is broken down by enzymes.



Transpiration

It is the evaporation of water at the surfaces of the mesophyll cells resulting in the loss of water vapour from the leaves through the stomata.

Water is constantly being taken from the top of the xylem vessels to supply the cells in the leaves. This induces the effective pressure at the top of the xylem vessel, so the water flows up. This flow is

known as the transpiration stream. The root hair cells provide a large surface area through which water can be absorbed. This increases the quantity of water that moves into the plant.
The hollow xylem vessels provide an easy pathway for water to flow all the way from the roots to the top parts of the plants. The air spaces inside the leaf increase the surface area for evaporation, thus drawing more water out of the xylem. Lastly, the open stomata allow water vapour to easily diffuse out of the leaf. This reduces the water inside the leaf encouraging more water to evaporate from the surface of mesophyll cells.
A force drags water up from root hair cell to the leaf. This force is known as the transpiration pull. The lower epidermis has guard cells. Water comes out from the air spaces. This decreases the water potential in the air spaces, causing it to flow to the mesophyll cells. Root xylem is continuous with stem xylem which is continuous with leaf xylem. Thus, water moves in a form of a stream with the help of transpiration pull.

Factors Affecting the Rate of Transpiration

●Air currents: When the air is still, the area surrounding the leaf becomes saturated with water vapour thus no loss of water vapour occurs, whereas moving air speeds up the rate of transpiration.

●Temperature: Transpiration occurs more rapidly when the surrounding air temperature is higher. When the sun shines on the leaves, they absorb the heat causing them to release water vapour.

●Humidity: Humid air means that it contains a lot of water vapour. Thus, when the air is humid, the transpiration rate will be slow as compared to dry air.

●Light Intensity: During daylight, the stomata in the leaf are open. This gives way for the water vapour to diffuse out from the leaf into the atmosphere. At night time, the stomata remain closed, and transpiration is greatly reduced.

Wilting

The rate of evaporation is faster than the rate of absorption. If plants have no access to water for a long period, then the cells in plants lose water and fail to support the plant. As a result, the roots may not be able to take up enough to replace it. Thus, the plant wilts.

C: Synthesis/absorbing the information:

1. Write your own summary-notes in your notes book based on the information you read in the chapter 7 of your text book.

D: Practising activity:

1. Revise your concepts.
2. Solve the Exam-styled questions given at the end of both units on your Cambridge endorsed text books.