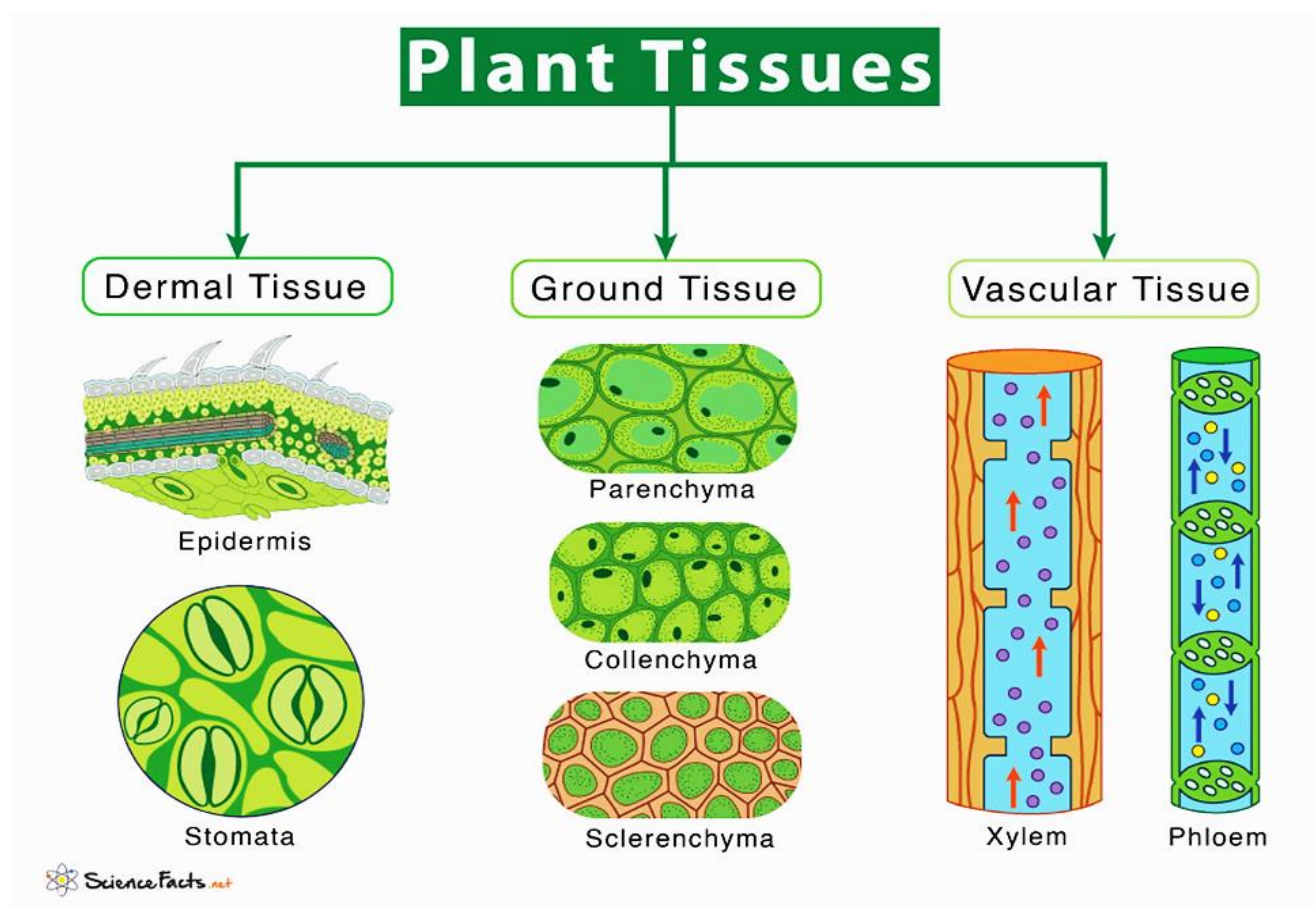




2. Complex Permanent Tissue

- ❖ **Complex Permanent Tissue:** is a tissue with several types of cells but all of them function together as a single unit. It is of two types : xylem and phloem.

The xylem and phloem are vascular bundles that work as the conductive or “plumbing” system of the plant.

1. Xylem

It is the vascular tissue transporting water and minerals from roots to the shoots of the plant, also the xylem supports the plant.

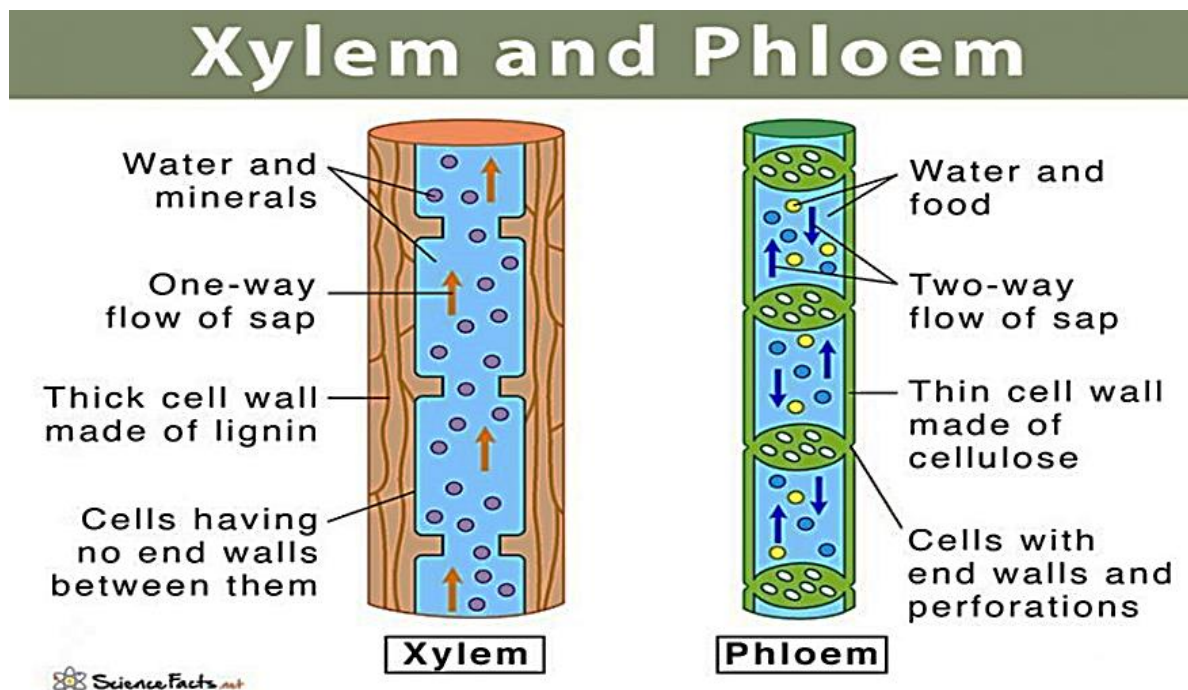
2. Phloem

It is the living, permanent tissue transporting carbohydrates from the leaf to the rest of the plant. Phloem also have filler tissues & carries various hormones and chemicals necessary for the growth and defence of the plant .

Unlike the xylem, which transports water and minerals in one direction (from the root to the leaves), the phloem conducts (sugars) in multiple directions.

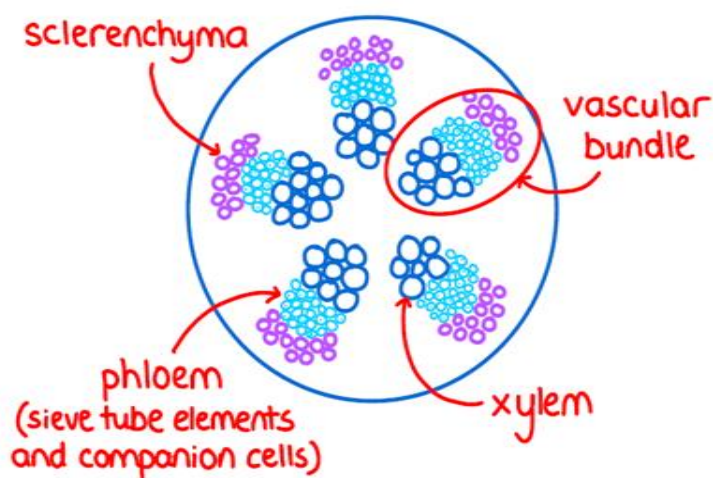
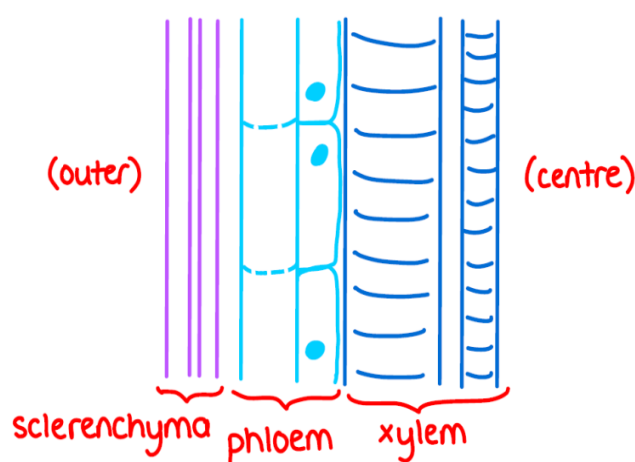
Note //

Photosynthesis in plant converts water, minerals , carbon dioxide , by solar energy into glucose, fructose, sucrose and starch, with oxygen as a byproduct. Chlorophyll within chloroplasts drives this process.



What is the difference between xylem & phloem

Feature	Xylem	Phloem
Function	Transporting Water and dissolved minerals from the roots to shoots of the plant. have the Lignin: providing structural .	Transporting Food (sucrose) and nutrients from leaves to different parts of the plant. Stores food.
Cell State	Dead at maturity	Living at maturity
Direction of Flow	Unidirectional (Roots $\Rightarrow$ Top)	multiple directions (Leaves $\Rightarrow$ All parts)
Cell Walls	Thick, lignified walls (Hard)	Thin wall (Soft)
Speed	Fast (due to transpiration)	Slow (active transport)



Dermal Tissues

Dermal tissue covers the plant and can be found on the outer layer of roots, stems and leaves.

Its main functions are :

Transpiration.

Gas exchange.

protection against physical injury and defence against pathogens.

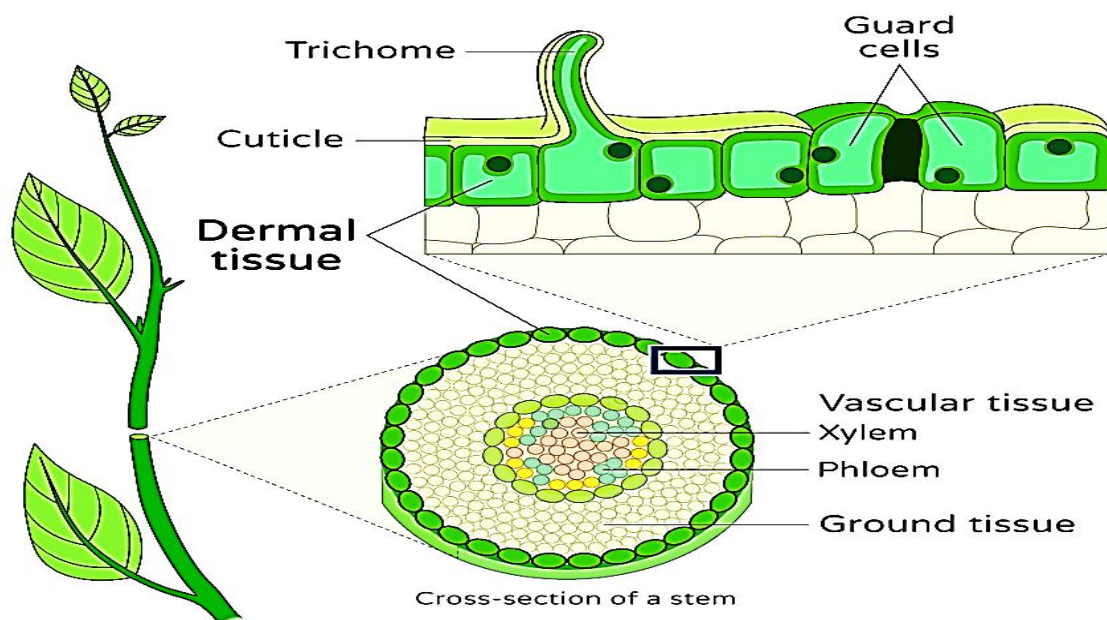
Secretion.

preventing water loss.

Dermal Tissue

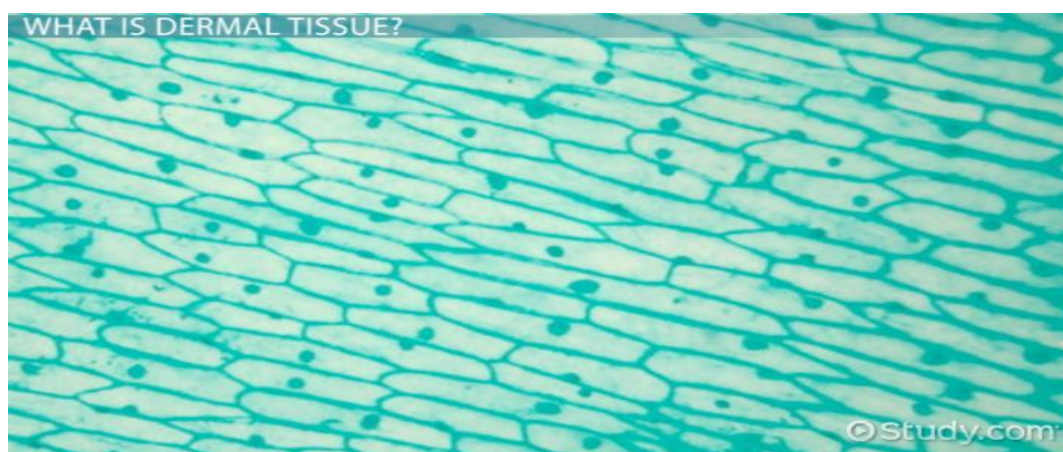
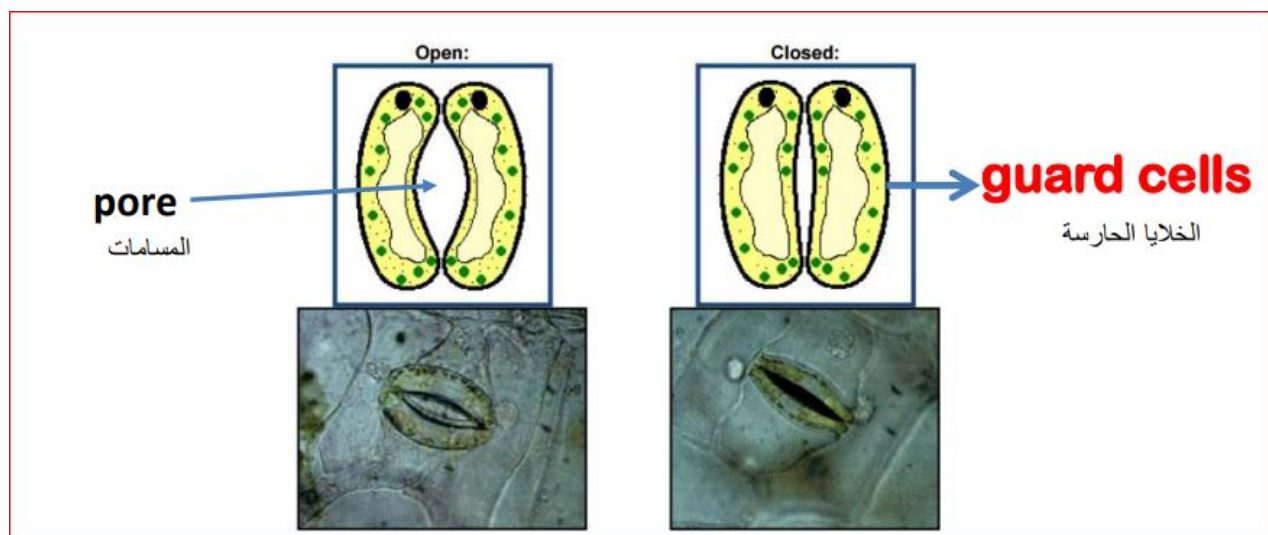
In Plant Stems

ScienceFacts.net



What does the epidermis contain ?

- Stomata and pairs of guard cells (kidney shape) that regulate the opening and closing of pores, They necessary to gas exchange, (Greek stoma = mouth) & Transpiration.
- Trichomes (Leaf Hairs) to defense & Water and salts enter the plant through absorption into the root hairs.
- Cutin and wax ,This layer produces a waxy material prevents water loss (transpiration), protects against pathogens, and provides structural protection.



Note /

Periderm (Cork) : Periderm is the protective tissue (bark) that replaces the epidermis in woody stems and roots.

