

1. Plant Anatomy & Histology

Permanent Tissues:

- **Parenchyma:** Living, thin cellulose walls, performs photosynthesis, storage, secretion.
- **Collenchyma:** Living, pectin corner thickenings, structural support to young stems.
- **Sclerenchyma:** Dead, lignified walls. Fiber (long) & Sclereids (isodiametric).

Complex Tissues:

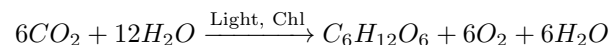
- **Xylem:** Tracheids, Vessels (angiosperms), Xylem Fibers, Xylem Parenchyma (living). Conducts H_2O .
- **Phloem:** Sieve Tubes, Companion Cells, Phloem Parenchyma, Phloem Fibers. Translocates organic solutes.

Dicot vs Monocot Root/Stem:

Feature	Dicot Stem	Monocot Stem
Vascular Bundles	Ring, Conjoint, Open	Scattered, Closed
Pith	Well-developed	Absent/Reduced
Hypodermis	Collenchymatous	Sclerenchymatous

2. Plant Physiology: Photosynthesis

Overall Reaction:



Light Reaction (Thylakoids):

- **PS II (P_{680}):** Photolysis of water ($2H_2O \rightarrow 4H^+ + 4e^- + O_2$).
- **PS I (P_{700}):** Generates *NADPH*.
- **Z-Scheme:** Non-cyclic photophosphorylation produces *ATP* + *NADPH*.

Dark Reaction (Stroma):

- **C_3 Cycle (Calvin):** Primary acceptor: RuBP (5C). Enzyme: RuBisCO. Produces 1 Glucose per $6CO_2$ (18*ATP* + 12*NADPH* used).