

Plant Anatomy Tissues

Meristematic Tissues: Regions of active cell division.

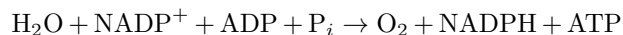
- **Apical Meristems:** Primary growth, increases plant length (tips of roots/shoots).
- **Lateral Meristems:** Secondary growth, increases girth (vascular cambium, cork cambium).
- **Intercalary Meristems:** Located at nodes/leaf bases (e.g., grasses).

Permanent Tissues: Non-dividing, specialized cells.

- **Simple:** Parenchyma (storage/photosynthesis), Collenchyma (flexible mechanical support), Sclerenchyma (rigid support, dead at maturity).
- **Complex:** Xylem (water/mineral transport; tracheids, vessels, fibers, parenchyma) and Phloem (organic solute transport; sieve tubes, companion cells, fibers, parenchyma).

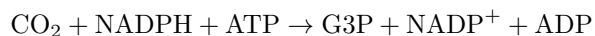
Photosynthesis Respiration

Light Reactions (Thylakoid Membrane):



Photolysis of water occurs via Photosystem II (PSII). Electrons flow through an electron transport chain to PSI.

Calvin Cycle / Dark Reactions (Stroma):



Includes Carbon Fixation (catalyzed by RuBisCO), Reduction, and Regeneration of RuBP.

Cellular Respiration Phases:

1. **Glycolysis:** Cytoplasm; Glucose $\rightarrow$ Pyruvate + 2 ATP + 2 NADH.
2. **Krebs Cycle:** Mitochondrial Matrix; Acetyl-CoA breakdown yielding CO_2 , NADH, FADH_2 , and GTP.

3. **Oxidative Phosphorylation:** Inner Mitochondrial Membrane; Chemiosmosis via ATP synthase yields $\approx 32\text{-}34$ ATP.

Plant Hormones

Auxin (IAA)	Cell elongation, apical dominance, root initiation.
Gibberellins	Stem elongation, seed germination, bolting.
Cytokinins	Cell division, delay senescence, lateral bud growth.
Ethylene	Fruit ripening, abscission, triple response.
Abscisic Acid	Stress hormone, stomatal closure, seed dormancy.

Reproduction Genetics

Alternation of Generations: Life cycle alternates between a multicellular diploid sporophyte ($2n$) and a multicellular haploid gametophyte (n).

Angiosperm Fertilization (Double Fertilization):

- **Syngamy:** Sperm (n) + Egg (n) $\rightarrow$ Zygote ($2n$).
- **Triple Fusion:** Sperm (n) + Two Polar Nuclei ($2n$) $\rightarrow$ Primary Endosperm Nucleus ($3n$).

Floral Formula Components: K = Calyx (sepals), C = Corolla (petals), A = Androecium (stamens), G = Gynoecium (carpels).