

Photosynthesis

Photoautotrophs



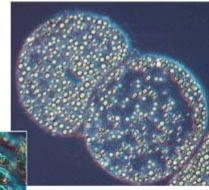
(a) Plants



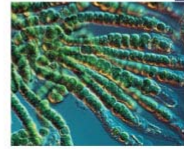
(b) Multicellular algae



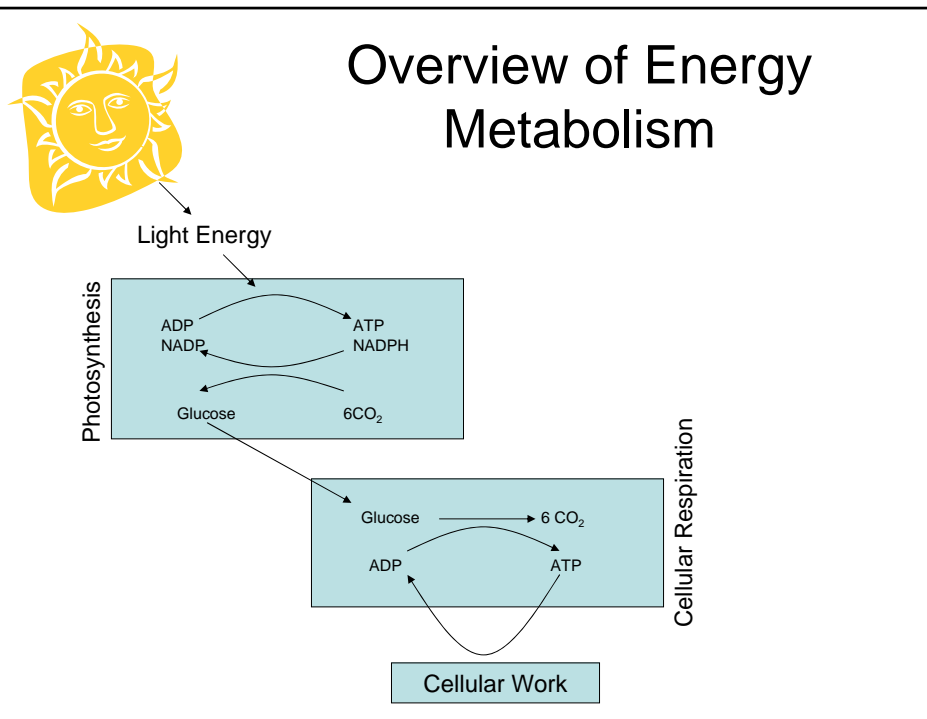
(c) Unicellular protist



(e) Purple sulfur bacteria



(d) Cyanobacteria



Autotrophs – Get Carbon directly from CO_2

Phototrophs – Photosynthesis

Chemotrophs – Chemisynthesis

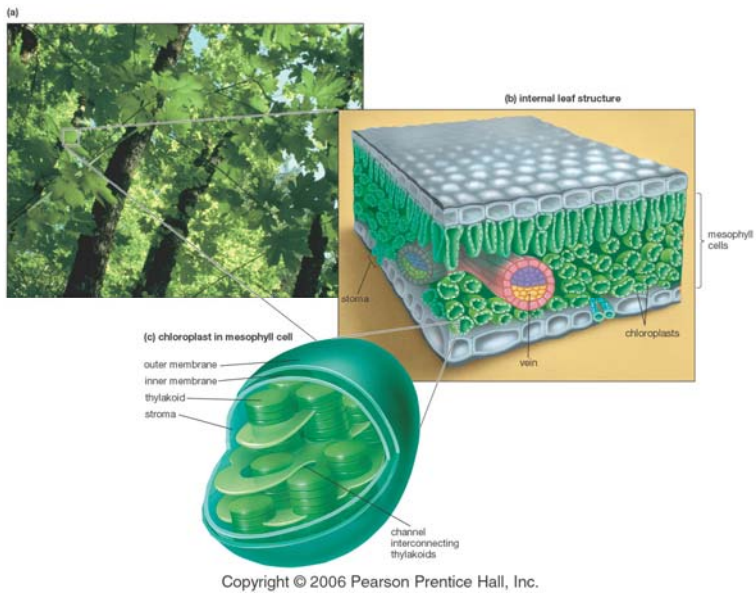
Heterotrophs – get carbon from organic molecules

Eat Autotrophs

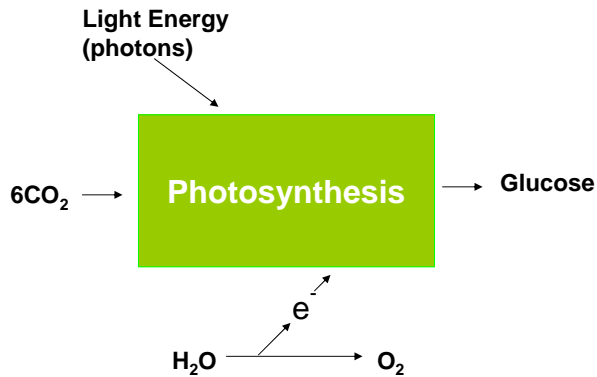


Photosynthesis Outline

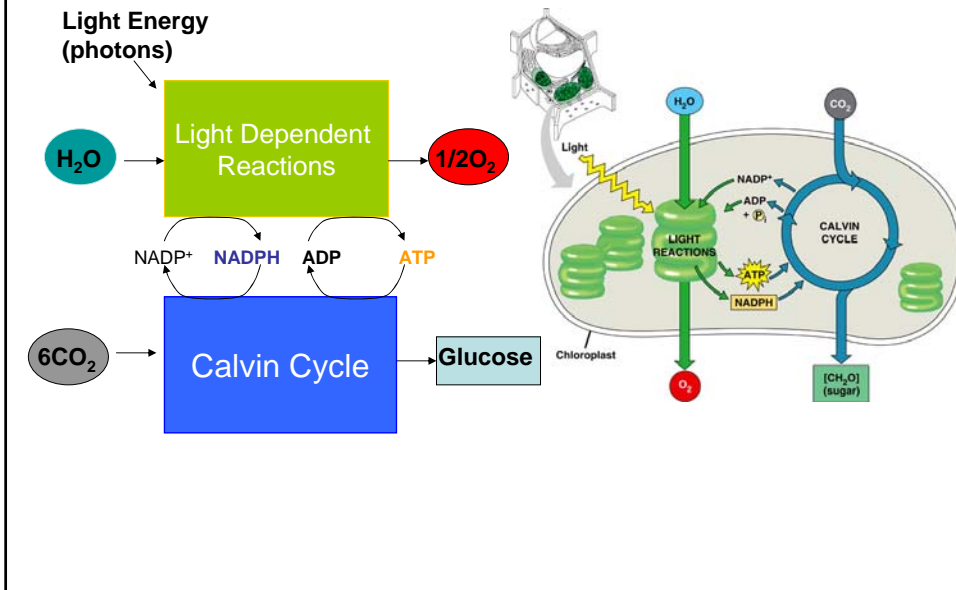
- Overview
- Photo-pigments
- Light Reaction
- Calvin cycle
- Regulation of RUBISCO



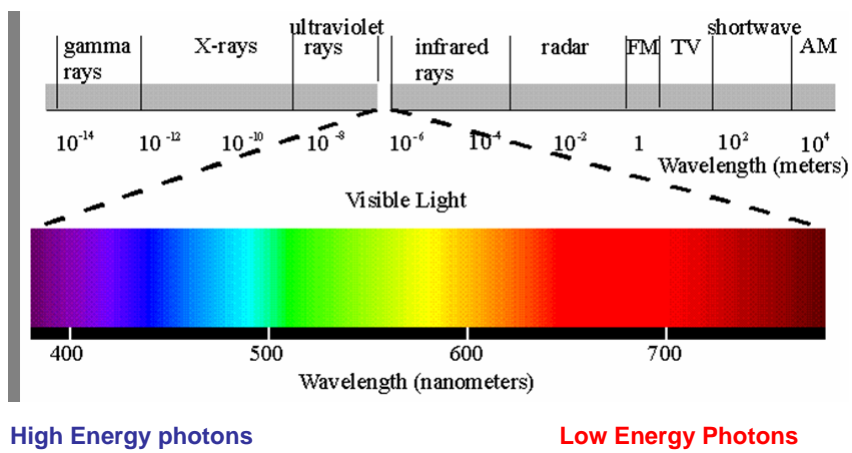
Overview Photosynthesis



2 Parts of Photosynthesis

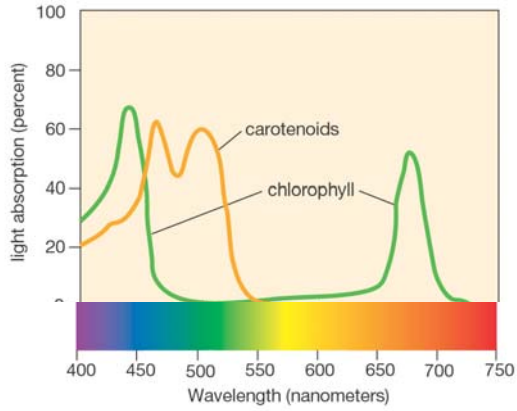


Electromagnetic Spectrum

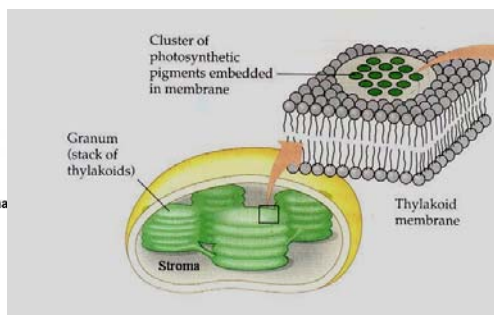
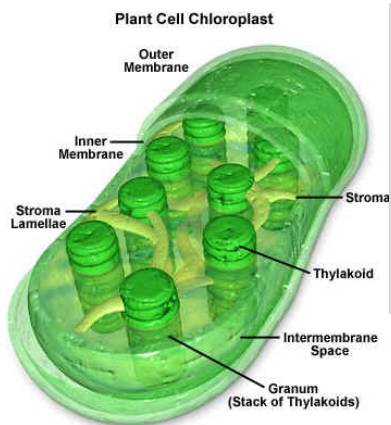


Photosynthetic Pigments

(b) Absorbance of photosynthetic pigments



The Chloroplast



Parts of Light Dependent Reaction

- Capture Light Energy
 - Photosystems
 - Z scheme of electron transport
 - Produces NADPH
 - Concentrates H^+ in thylakoid lumen
- Synthesizing ATP
 - Chemiosmosis
 - Produces ATP

Photosystem Organization

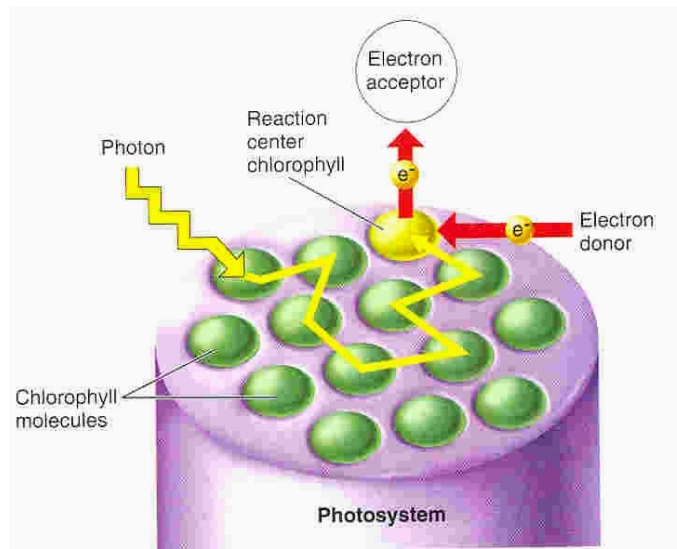
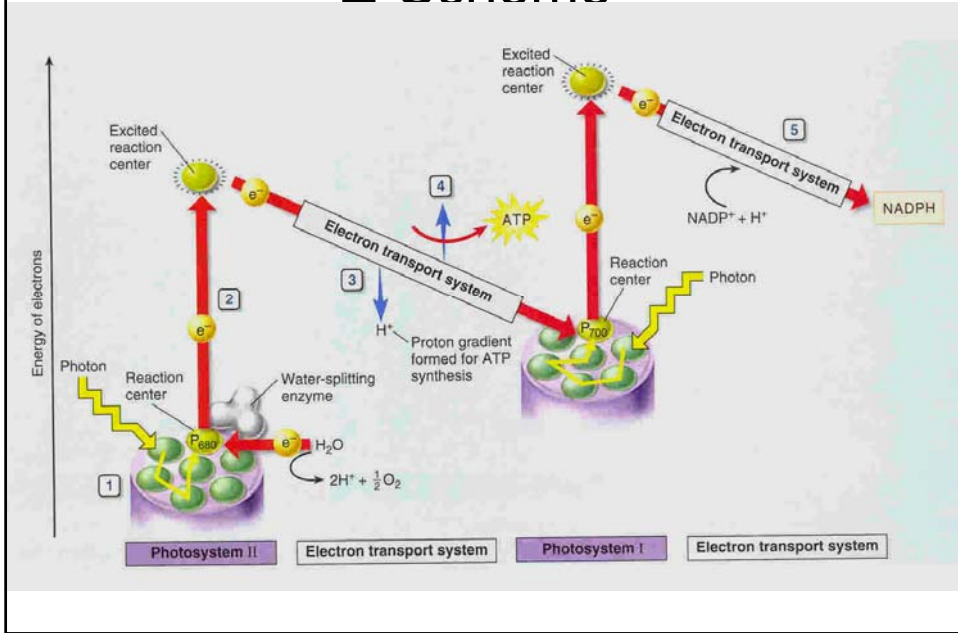
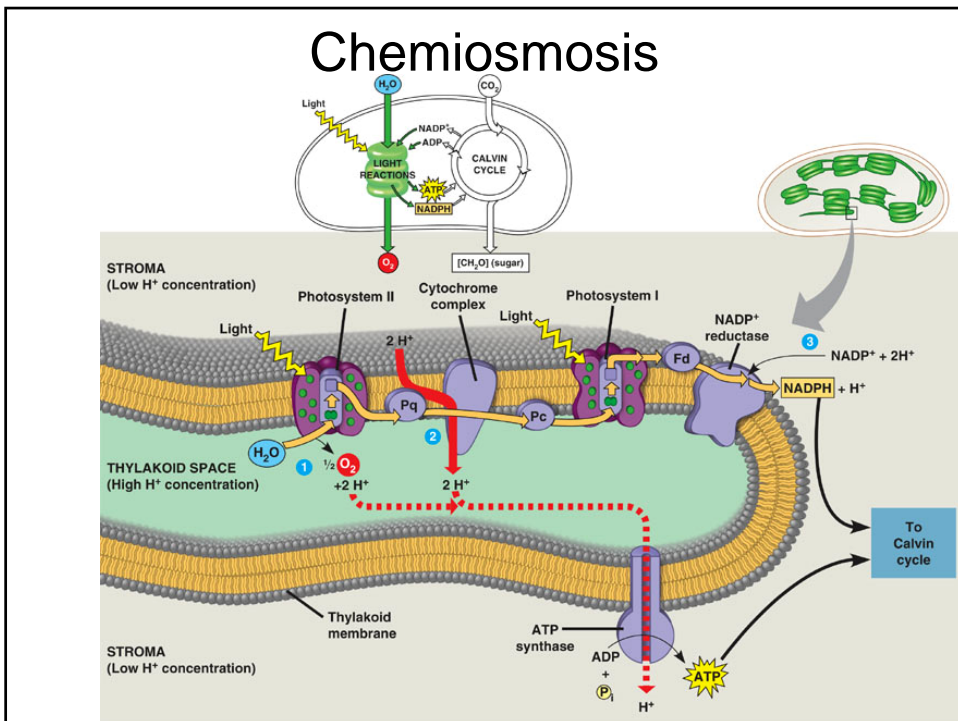


Figure 6.7 How a photosystem works.

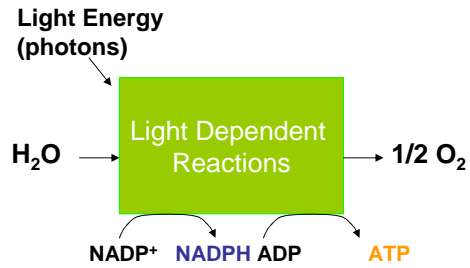
Z-Scheme



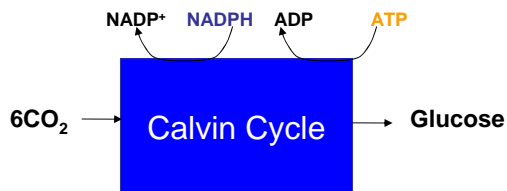
Chemiosmosis



Light Dependent Reactions Overview

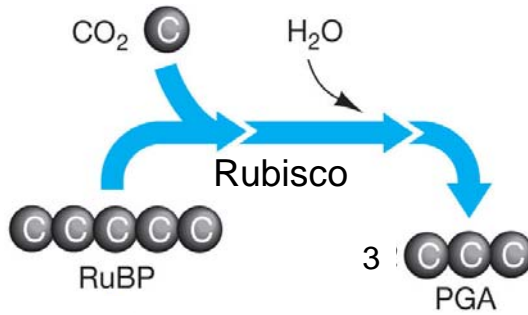


Calvin Cycle Overview



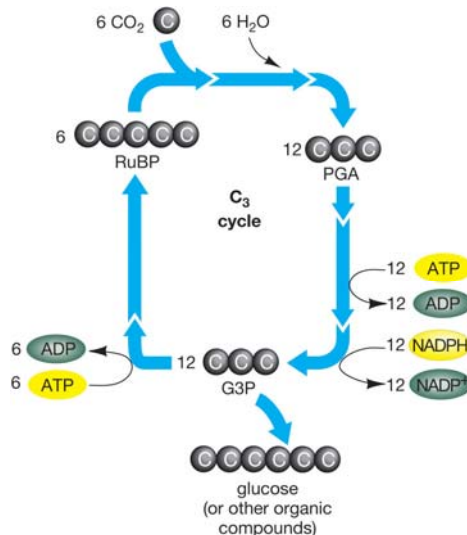
Rubisco

Ribulose-bis-phosphate Carboxylase/Oxygenase



Carbon Fixation

Calvin Cycle



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Regulation of Rubisco

- Rubisco activated by pH8 and above/inhibited pH7and below

Rubisco is active when the light dependent reaction is actively pumping protons into thylakoid lumen.

Rubisco is inactive in the dark after protons move out through ATPase.