PHOTOSYNTHESIS

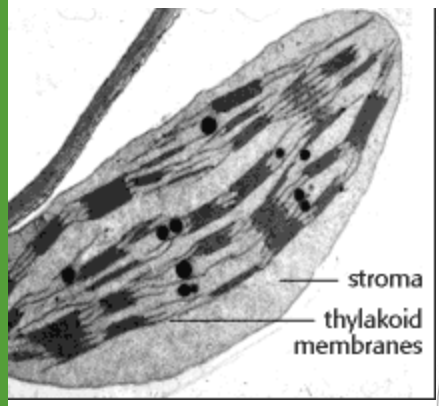
https://www.youtube.com/watch?v=wJDlxp17rY4

https://www.youtube.com/watch?v=sQK3Yr4Sc_k

History of photosynthesis: https://www.youtube.com/watch?v=pdgkuT12e14

Take 3 minutes to share what you know about photosynthesis with your table partner

Photosynthesis **occurs in the chloroplast**



Chloroplasts are highly structured, membrane-rich organelles.

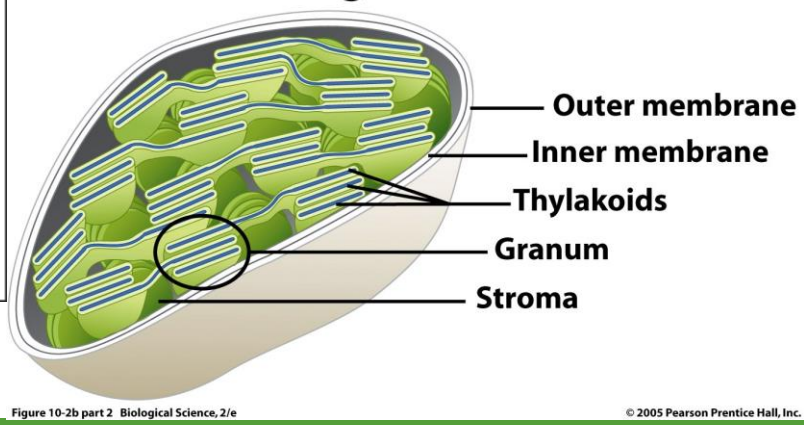
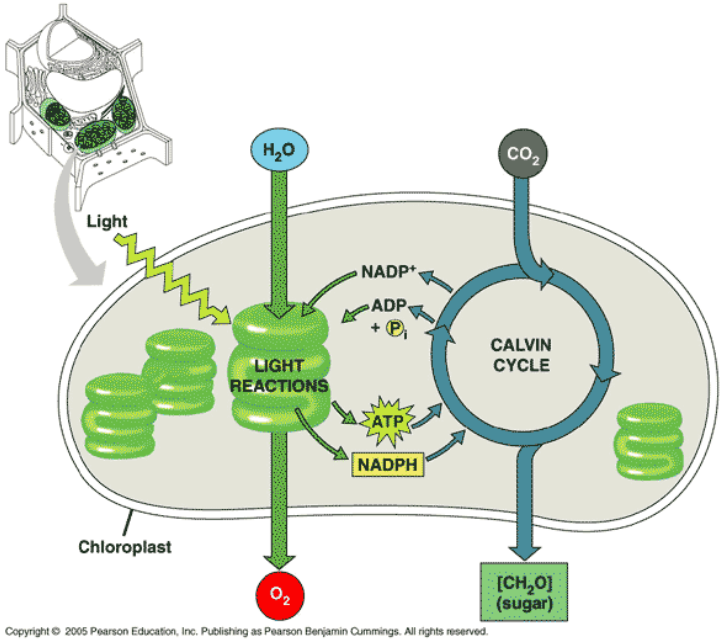


Figure 10-2b part 2 Biological Science, 2/e

2 Step Process

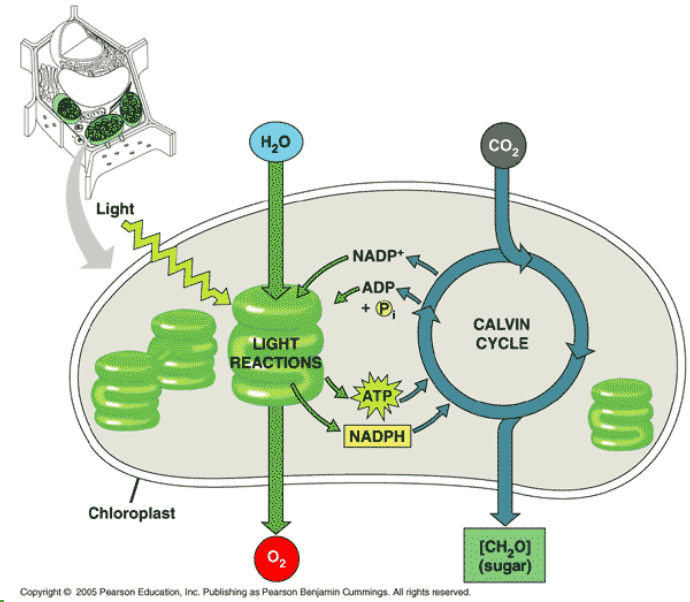
1- "Light" Reaction

2- "Dark" Reaction

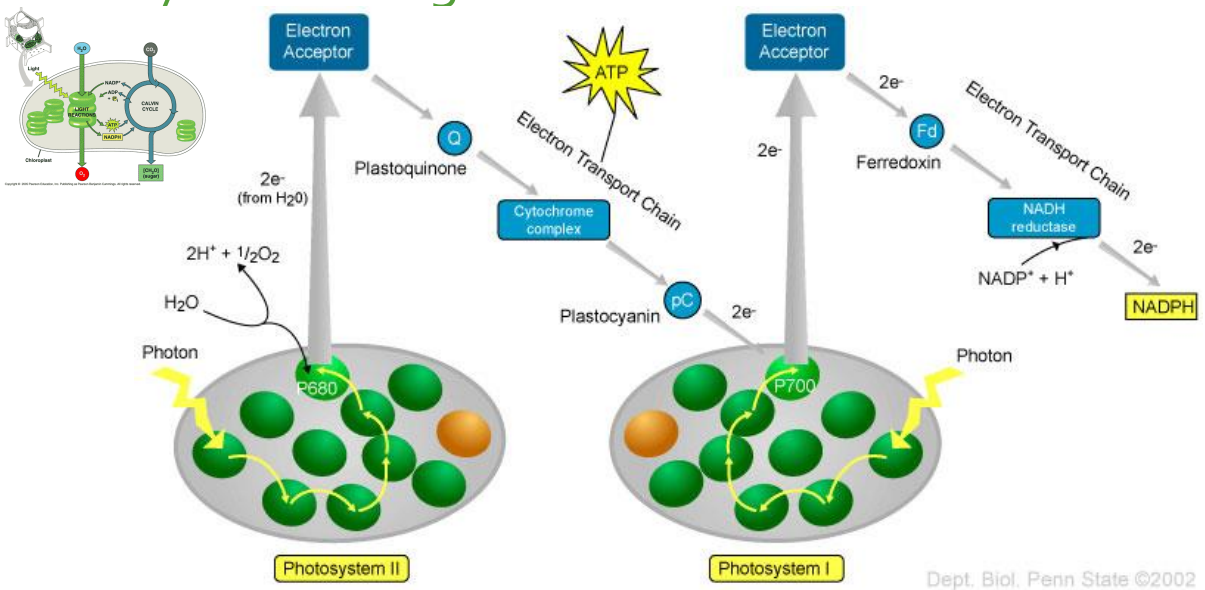


Photosynthesis: Light Reaction

- Needs photons and water
- Creates ATP, NADPH and O2

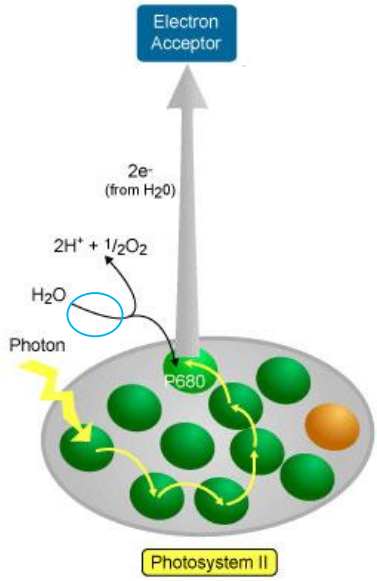


Photosynthesis: Light Reaction



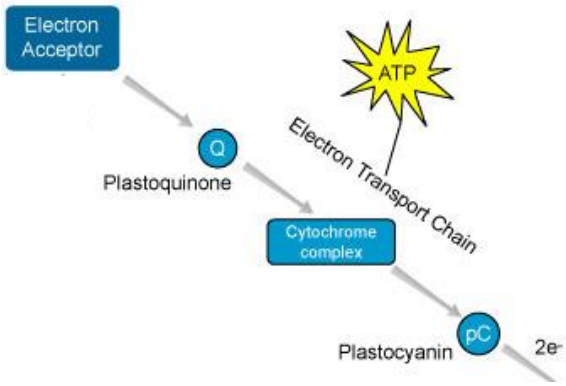
Light reaction: Photosystem II

1. Thylakoid membrane absorbs light energy (photons).
2. The photon is transferred between chlorophyll pigment molecules
3. Photon is absorbed by electron than transferred to the Reaction Center
4. A water molecule is split by the photons, causing the electron to leave the Photosystem



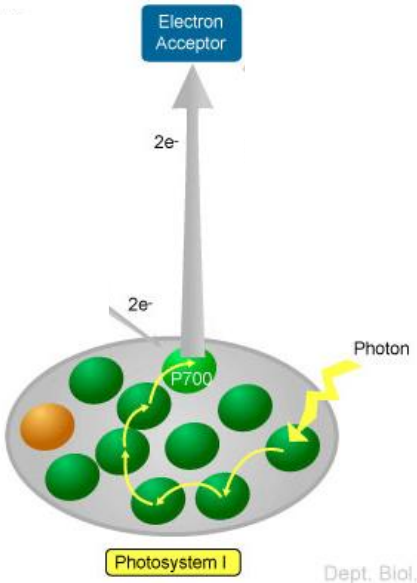
Light reaction: Electron transport chain

1. Pastoquinone (mobile electron carrier) is a protein responsible for stealing the electron.
2. Cytochrome complex uses some of the electron energy to bring hydrogen (proton) into thylakoid.
3. Electron passes onto plastocyanin than PS I.



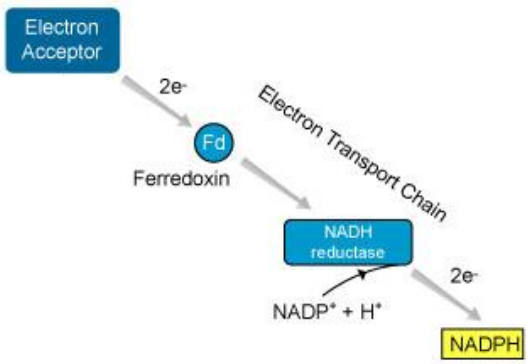
Light reaction: Photosystem I

1. Photosystem I gains another light photon to repeat the process

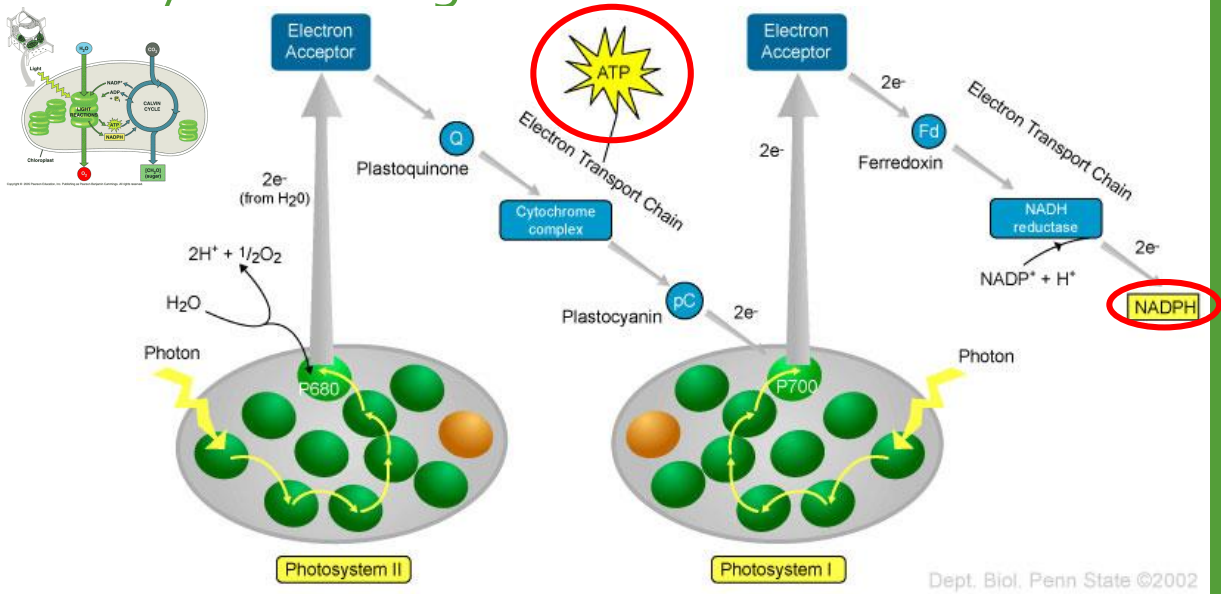


Light reaction: Electron transport chain

1. Close to before process but creates NADPH instead of ATP using spare hydrogen (protons)



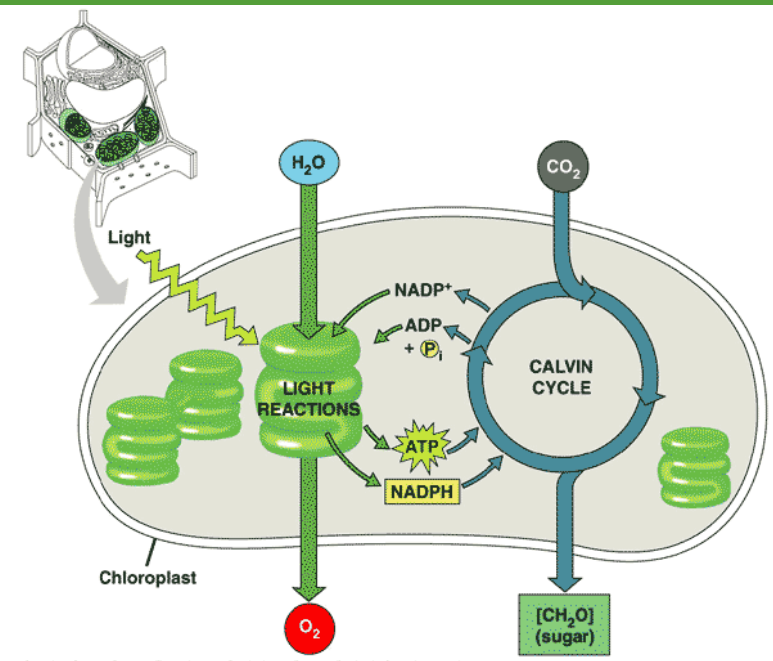
Photosynthesis: Light Reaction



2 Step Process

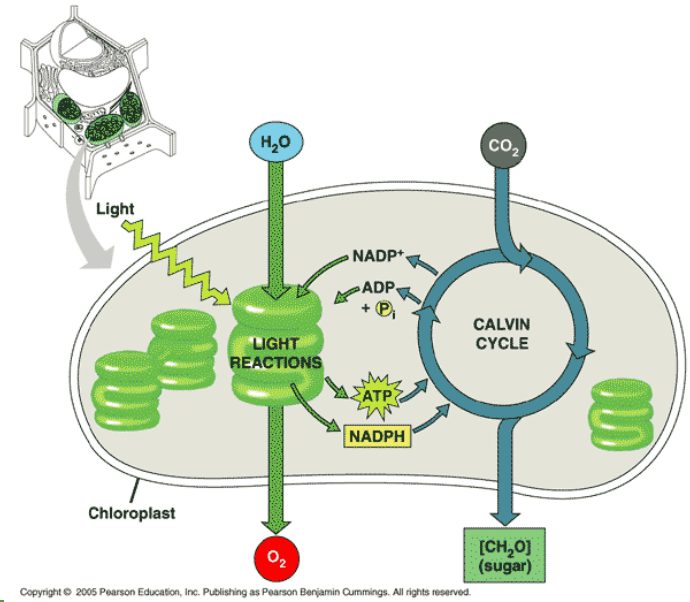
1- Light Reaction

2- Dark Reaction

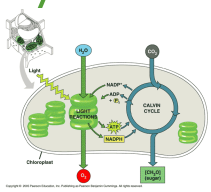


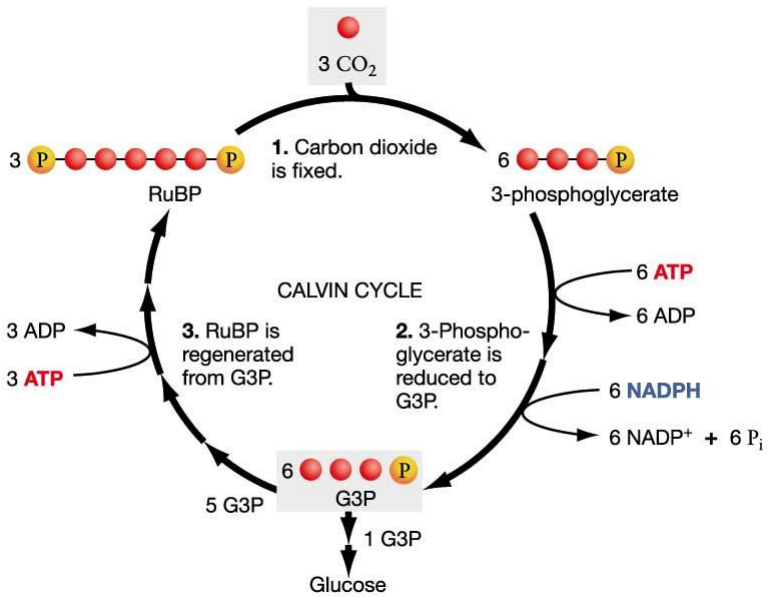
Photosynthesis: Dark Reaction

- Needs ATP, NADPH and CO_2
- Creates sugar, ADP, NADP



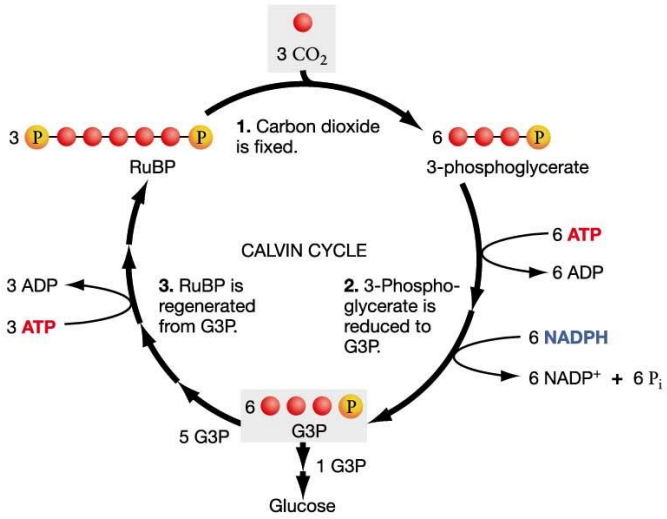
Photosynthesis: Dark Reaction





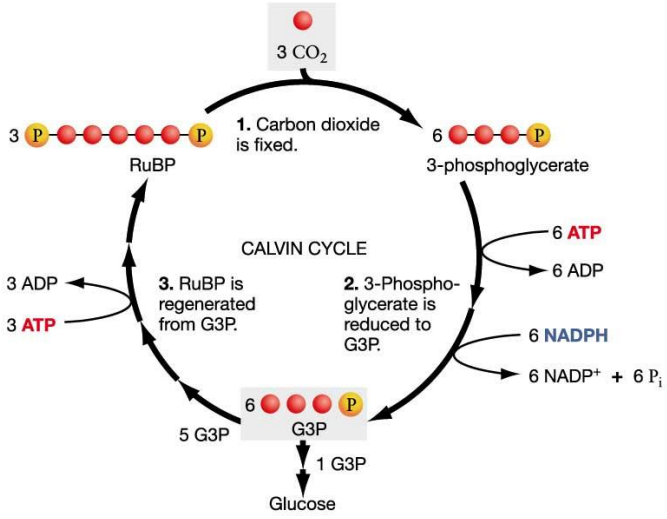
Photosynthesis: Dark Reaction

1. Carbon Fixation:
   - CO_2 combines with another molecule (RuBP) to create a 6-carbon chain
   - The 6-carbon chain breaks immediately into two 3-carbon molecules (3PGA)



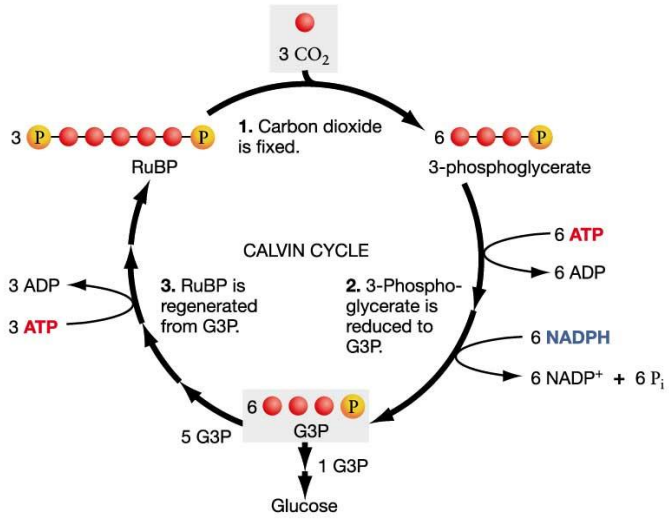
Photosynthesis: Dark Reaction

1. Reduction
   - Energy from 6 ATPs and 6 NADPHs removes the phosphate from 3PGA
     - 3PGA becomes G3P
     - ATP becomes ADP
     - NADPH becomes NADP+

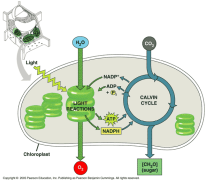


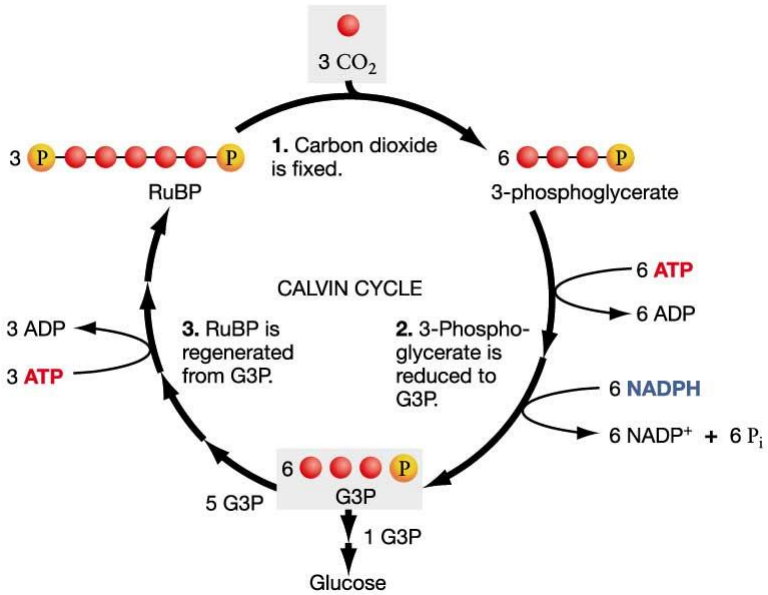
Photosynthesis: Dark Reaction

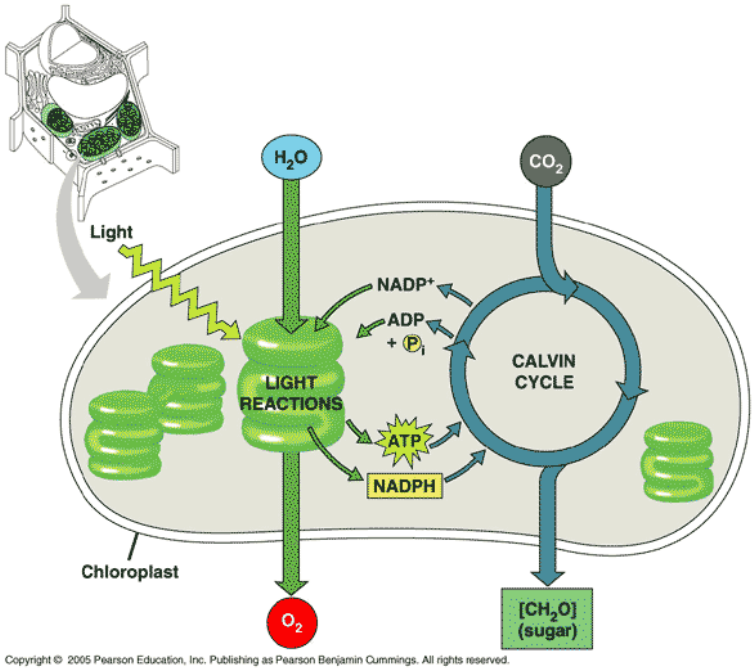
1. Regeneration
   - Some of the G3P is used to make glucose
   - 3 ATPs are used to turn G3Ps into RuBPs



Photosynthesis: Dark Reaction







Photosynthesis Lab