Question 1

- Describe what will happen in the nephron in response to a person drinking too much alcohol. Keep in mind that alcohol is a diuretic.

Too much alcohol?

- The first three segments of the nephron will function as usual, as well as the distal tubule. The alcohol will cause dehydration, so the collecting duct will need ADH to be produced in order to counter the diuretic alcohol. With this aquaporins are inserted in the plasma membrane, letting water pour out, therefore is more permeable to urea.

Question 2

- Describe what will happen in the nephron in response to someone who was given ecstasy and a case of bottled water.

H_2O and ecstasy

- When a person takes ecstasy the person becomes more hydrated because they want to drink more water. If there is more water, there is low blood Na+. The hormone released is aldosterone, which acts on the distal tubule. This activates more Na+ pumps and more Na+ is absorbed. This makes pee less concentrated.

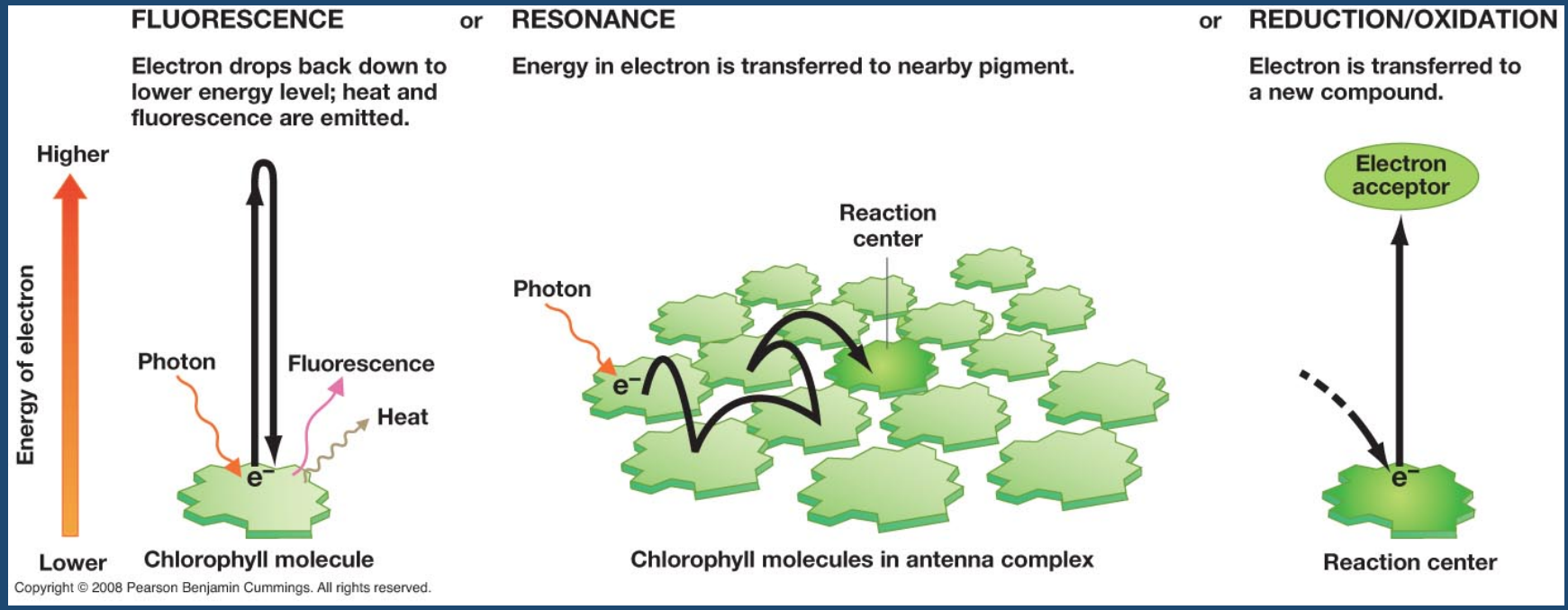
H_2O and ecstasy

- When given ecstasy, a person will begin to consume large amounts of water. This large amount will begin to dilute the blood which causes a decrease of Na+. As a response aldosterone is released which acts on the distal tubule. In response to the hormone more Na+ pumps are activated which allows more Na+ to be reabsorbed…

Back to Photosynthesis!

Photosynthesis Friday!!!!!

Exciting Consequences!



Energy Lost

Energy Transferred

Energy Captured

Fig. 10.11 pg. 206

Photosystem II

Pheophytin captures electron, donates it to intermediates (redox) in an electron transport chain

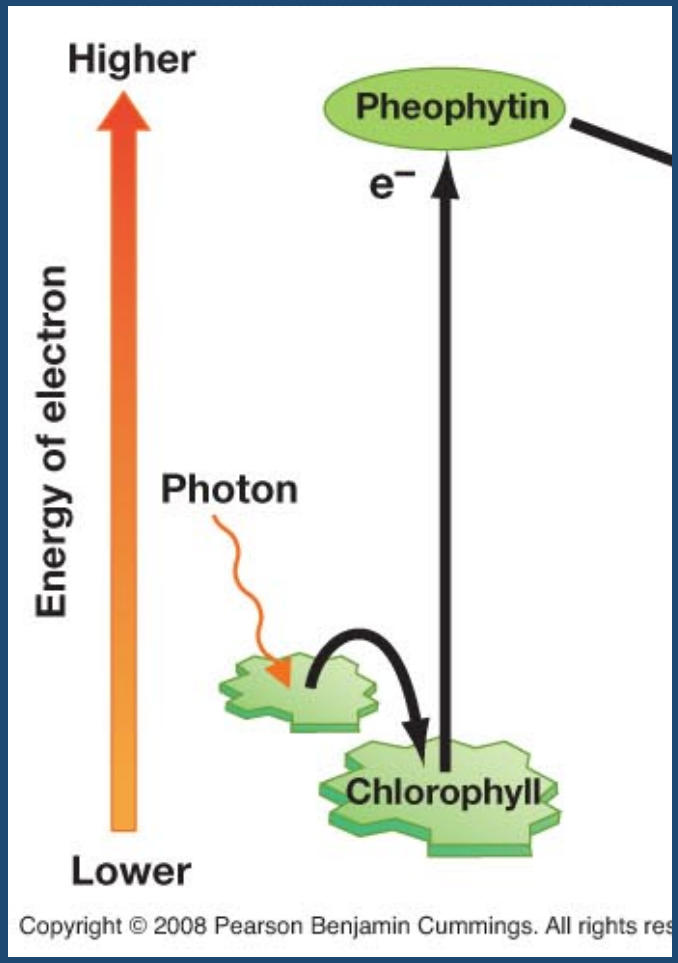
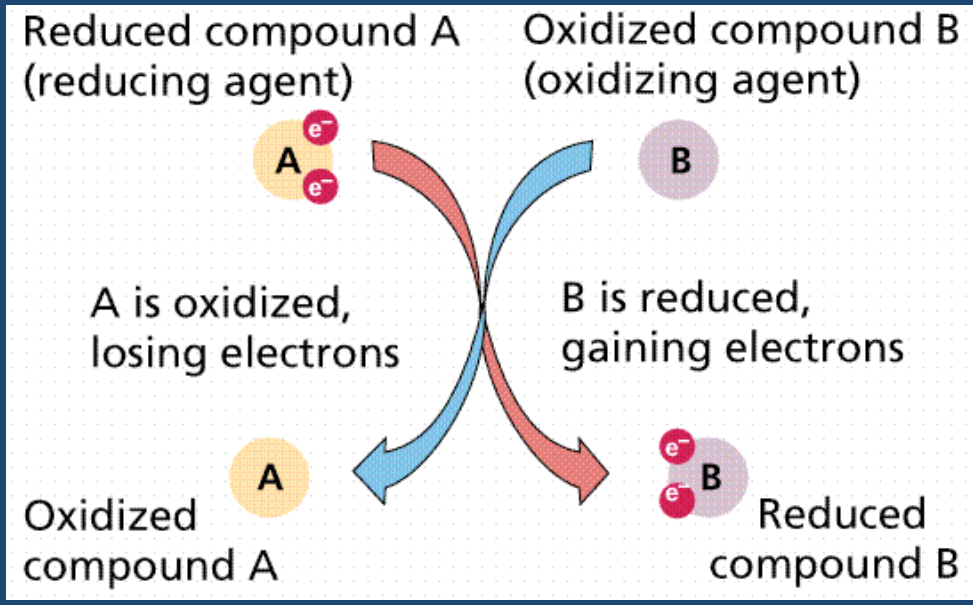


Fig. 10.13 pg. 208

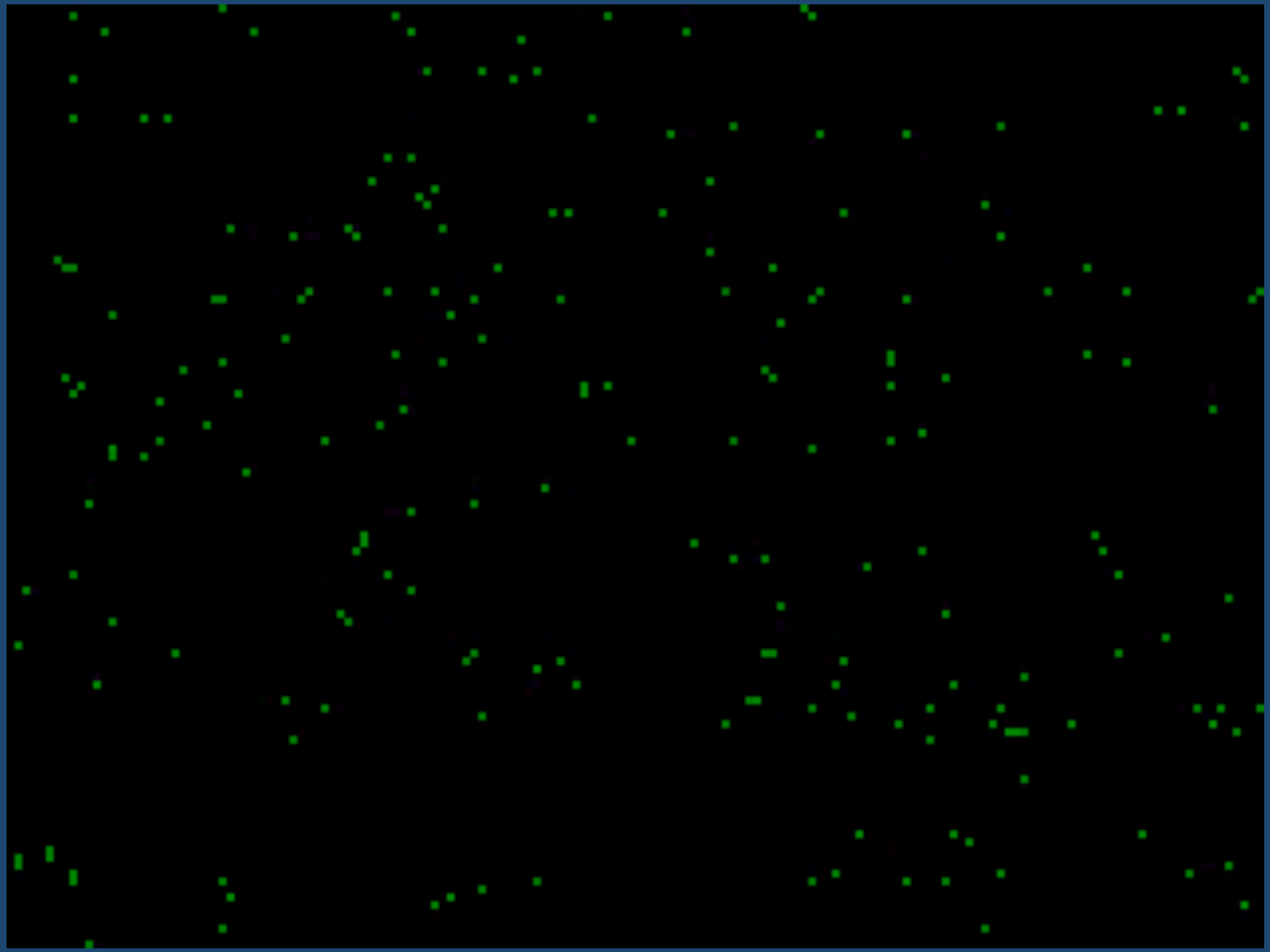
Redox Reactions

- Oxidation - Reduction
- A class of reactions that cause the loss or gain of an electron.
- An electron donor must always be paired with an electron acceptor



NAD +	e- acceptor	Oxidized
NADH	e- donor	Reduced

http://www.emc.maricopa.edu/faculty/farabee/BIOBK/biobookenzym.html



http://www.youtube.com/watch?v=a6RR4kPsnIE

Proton Motive Force!

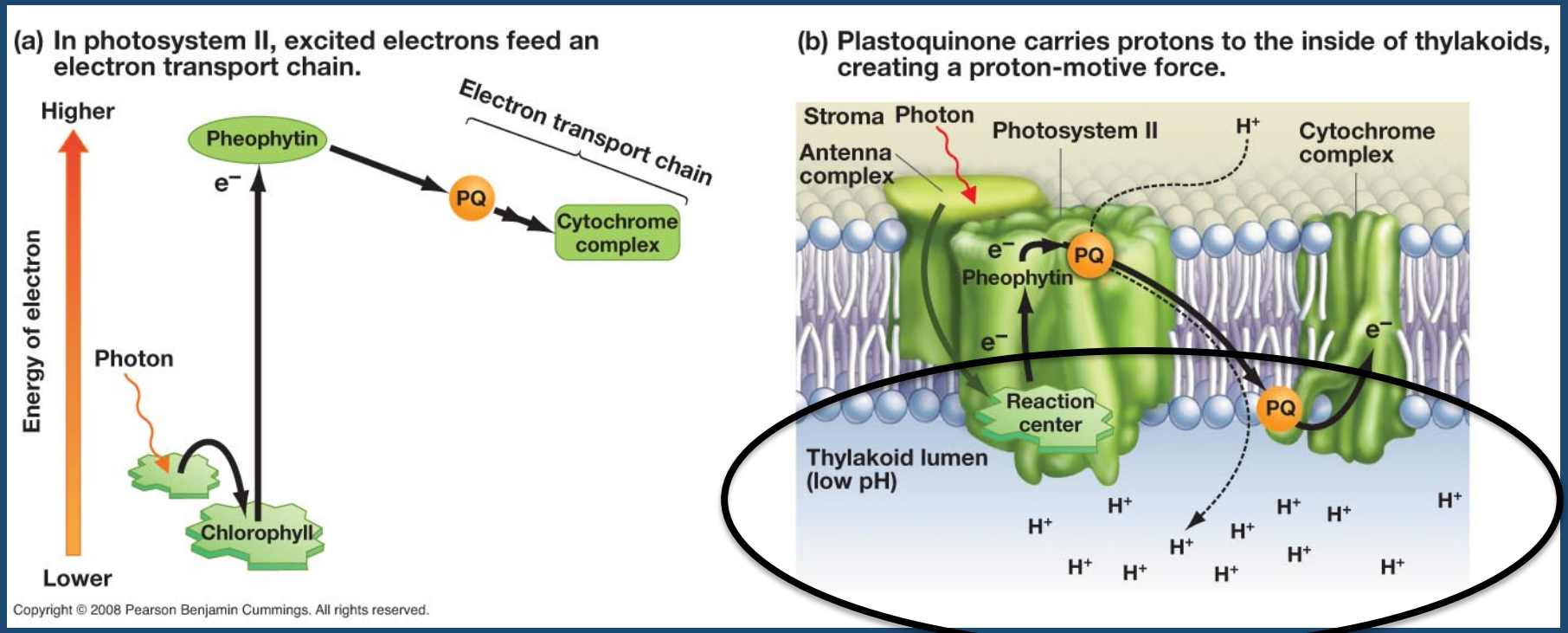
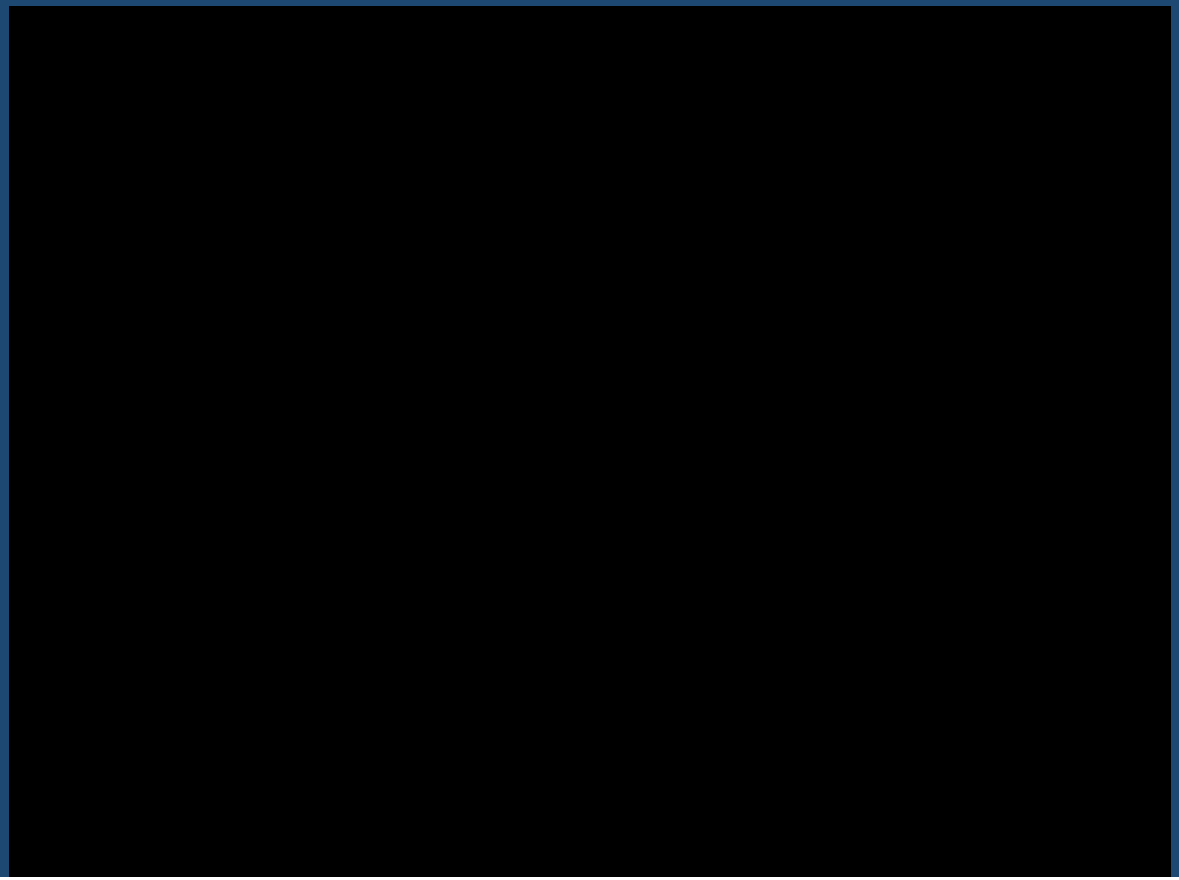


Fig. 10.13 pg 208

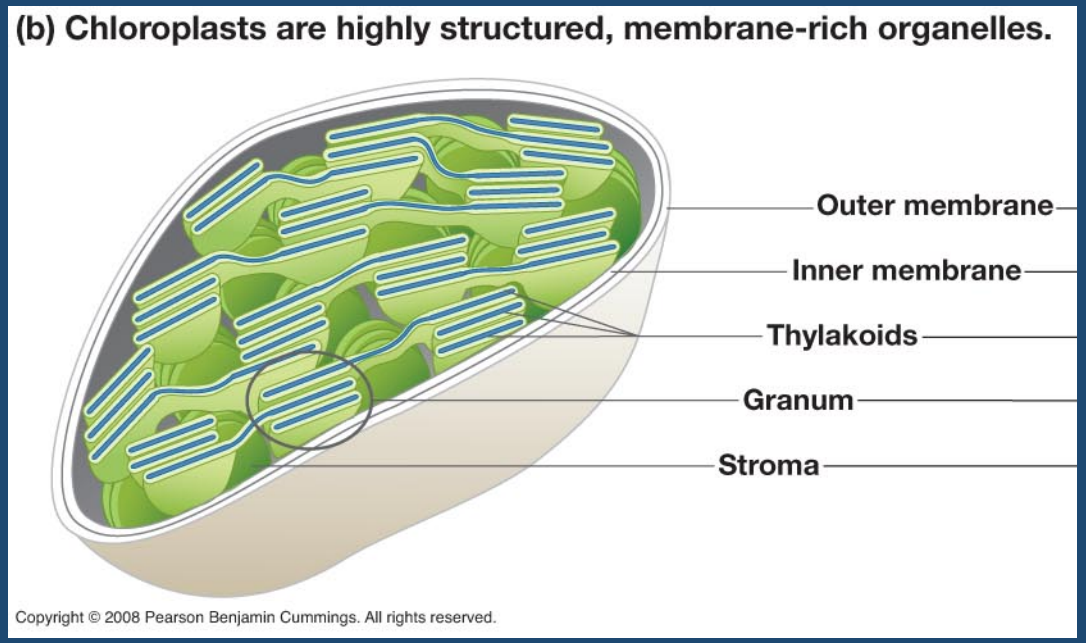
Use the Force

- Just like the ETC in respiration, the ETC in photosystem II proton gradient spins ATP synthase



Where does PS II happen?

If a proton gradient is created on either side of a membrane, the process must be membrane-bound



Wow. Look at all of those membranes!

Fig. 10.2 pg. 200

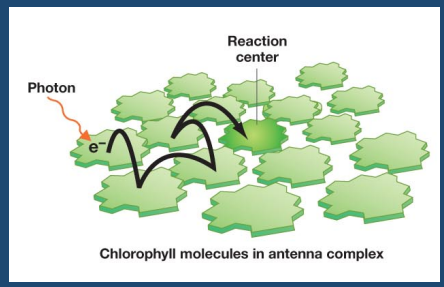
Oxygen overload!

- When Pheophytin donates an electron to the ETC, it must be replaced!
  - This drives a reaction that splits $2H_20 \rightarrow O_2 + 2H_2$
    - Oxygenic Photosynthesis
  - 2 billion years later…
  - Prokaryotic variation: $H_2S \rightarrow S_2$
  - Mini tangent: How to win a Nobel Prize in biochemistry

Photosystem I

Similarities to PS II

- Both rely on the antenna complex of chlorophyll molecules



- Both transport energy via ETC…
  - Iron and sulfur proteins

…until the energy reaches ferredoxin (NADP$^+$ reductase)

where NADP$^+$ is reduced to NADPH

Redox reactions

Photosystem I

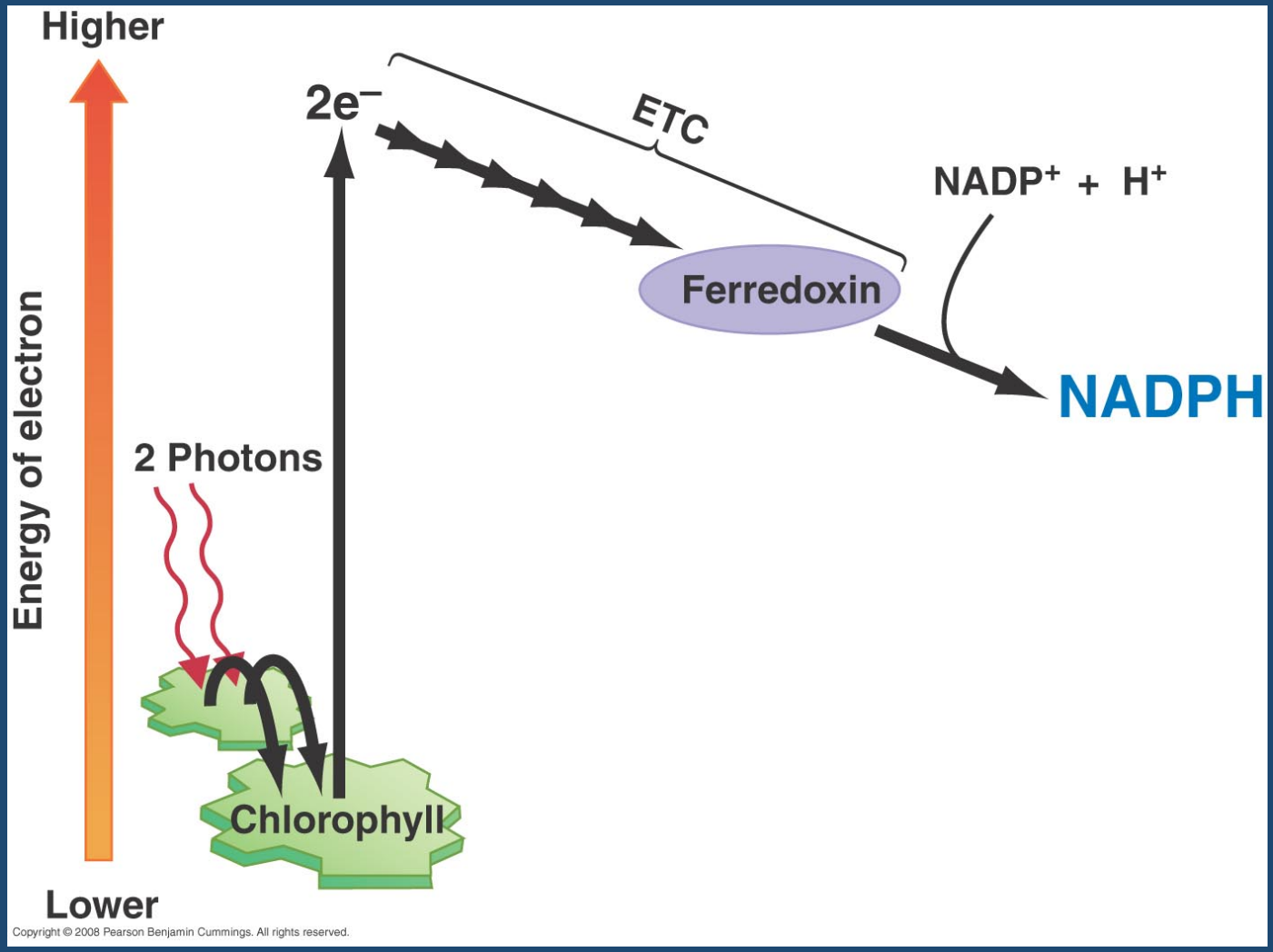


Fig. 10.14 pg 210

Let's Compare…

	Photosystem II	**Photosystem I**
Production		
Wavelength		

They can work alone, but work so much better together

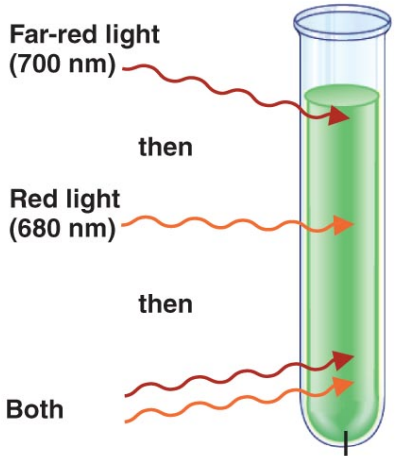
How do they know that??

Do some Science!

What did they measure?

Experiment

Experimental setup:



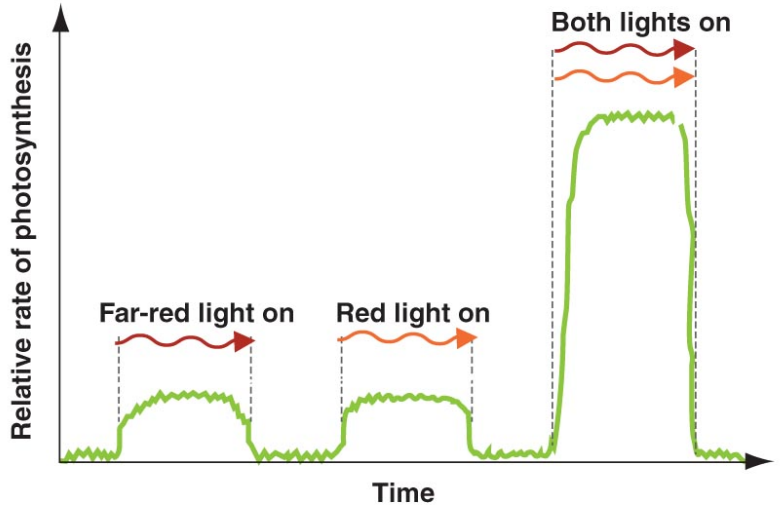
1. Expose algal cells to an intensity of far-red (700 nm) or red (680 nm) light that maximizes rate of photosynthesis at each wavelength. Then expose same algal cells to same intensities of each wavelength at same time.

Prediction: When the wavelengths are combined, the rate of photosynthesis will be double the maximum rate observed for each wavelength independently.

Prediction of null hypothesis: When the wavelengths are combined, the rate of photosynthesis will not be double the maximum rate observed for each wavelength independently.

Experiment

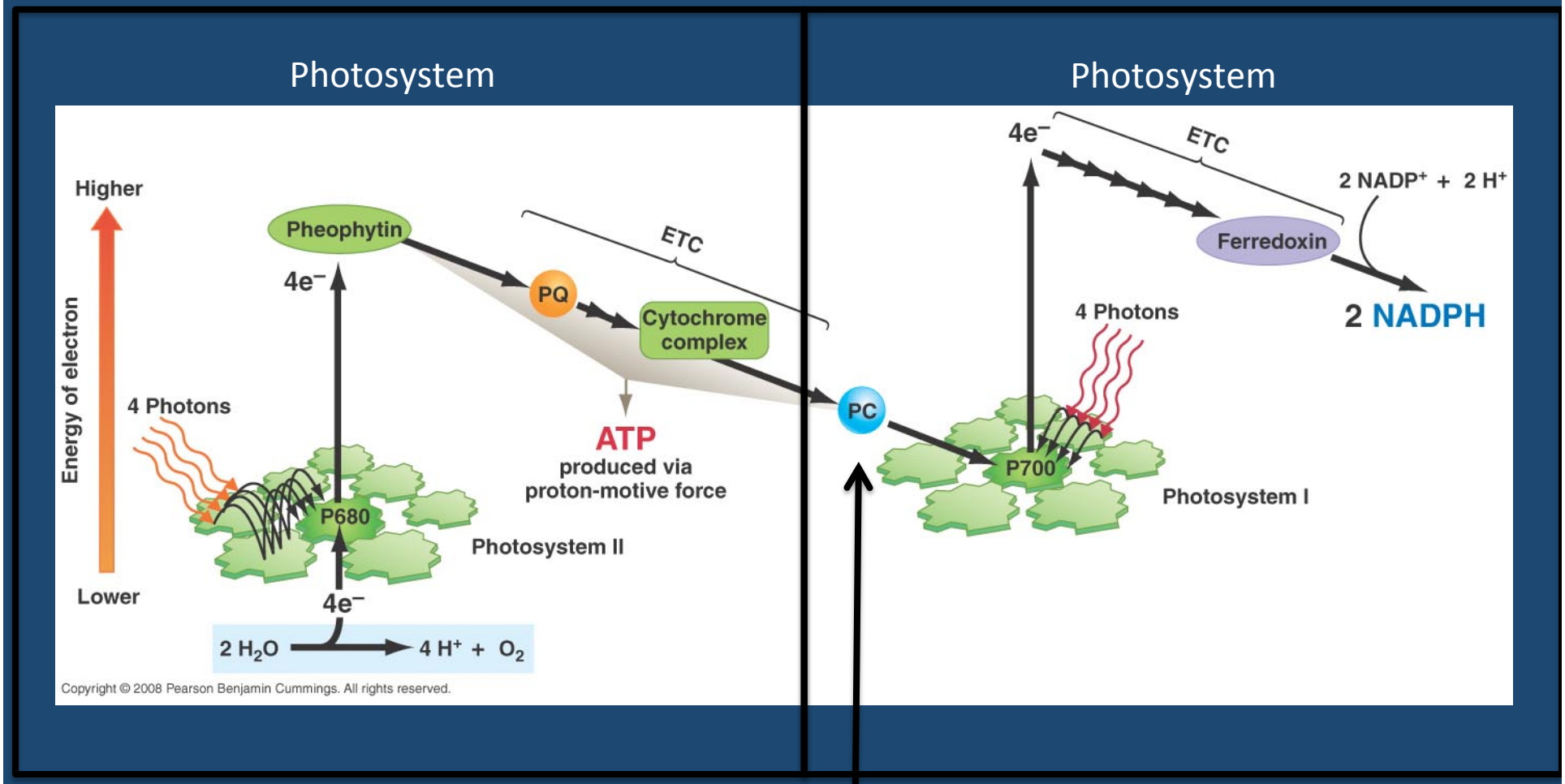
Results:



Conclusion: There is an enhancement effect for red and far-red light. The combination of 700 nm and 680 nm wavelengths more than doubles the rate of photosynthesis.

Fig 10.12 pg. 207

Z-scheme



1,000 times a second

Fig 10.15 pg. 211

Calvin Cycle

All reactions located in the stroma

Light independent

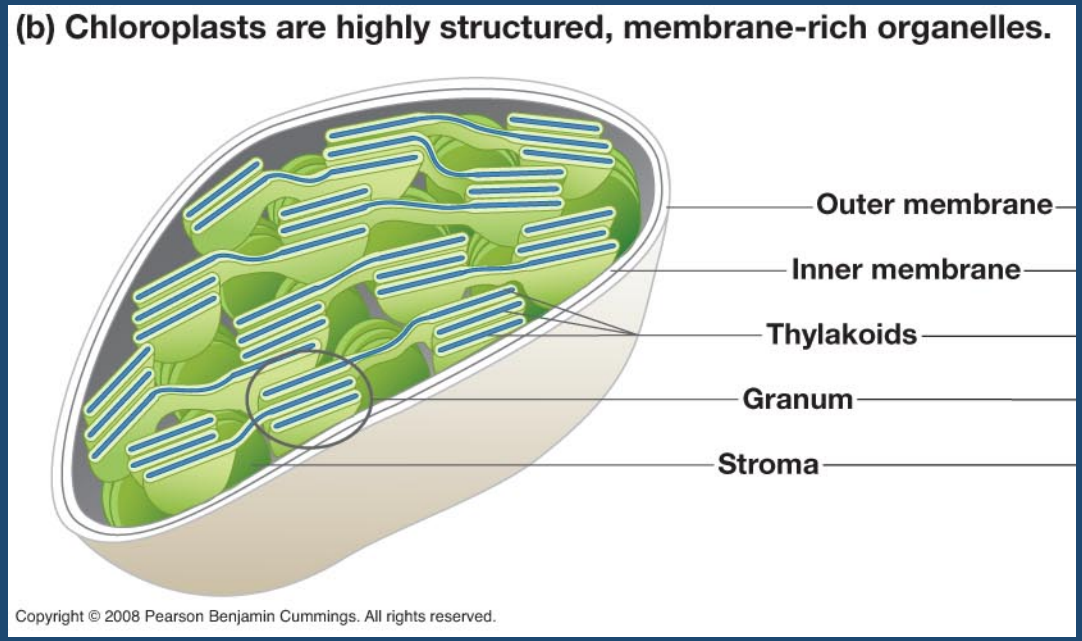


Fig. 10.2 pg. 200