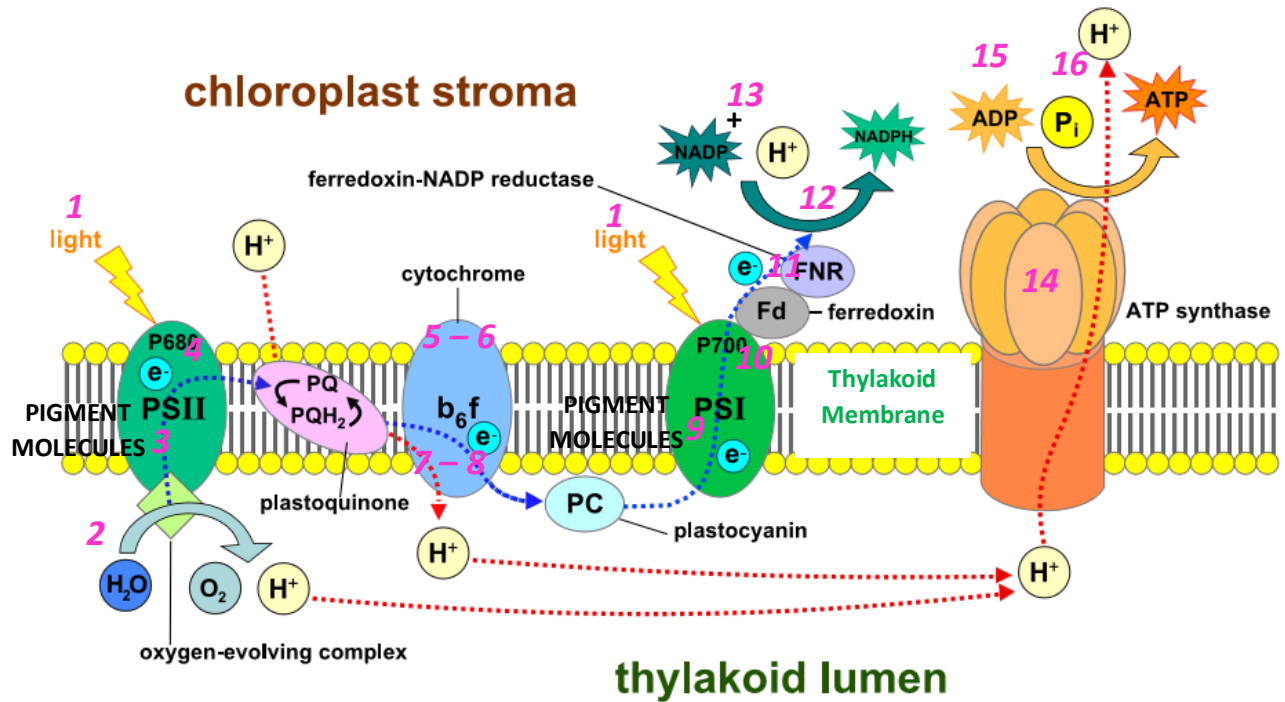


## “Light, Camera & Action” – Non-Cyclic Light Reactions in Photosynthesis – Character List



- 1 The sun - providing photon energy. 1 student who will "activate" both the reaction centers (PSII & PSI)
- 2 Water. 1 student with 2 tennis balls representing 2 electrons
- 3 Chlorophyll a molecules in p680/PSII. 1 student represents both special chlorophyll a molecules in p680. This student starts off with 2 tennis balls representing 2 electrons
- 4 Primary electron acceptor in p680. 1 student
- 5 – 8 Protein complexes that are part of the electron transport chain between PSII & PSI. 4 students in 2 pairs. In each pair, 1 student accepts the 2 tennis balls while the other is "activated" to move a handful of chocolate loonies representing the hydrogen ions from the "stroma" box to the "thylakoid lumen" box.  
NOTE: students 5 – 8 are directed to work in pairs – all other students receive minimal direction. The green painter's tape represents the thylakoid membrane – all students are told that this is a phospholipid barrier but not in which direction the hydrogen ions (chocolate loonies) are to be moved by active transport or facilitated diffusion.
- 9 Chlorophyll a molecules in p700/PSI. 1 student - see comments #3 (p680)
- 10 Primary electron acceptor in p700. 1 student

11 Ferredoxin complex of the electron transport chain between the primary electron acceptor of PSI and NADP<sup>+</sup> reductase. 1 student

12 NADP<sup>+</sup> reductase. 1 student

13 NADP<sup>+</sup>. 1 student who is the final tennis balls acceptor. When the student receives the tennis balls from NADP<sup>+</sup> reductase, the student must switch signs to NADPH

14 ATP synthase. 1 student. This student must move a few chocolate loonies from the "thylakoid lumen space" box to the "stroma" box by facilitated diffusion, then must "catalyze" the synthesis of ATP by touching characters 15 and 16

15 ADP. 1 student

16 P<sub>i</sub>. 1 student. When "catalyzed" through touch by ATP synthase, ADP and P<sub>i</sub> form ATP – they must pair up and switch signs to ATP.

NOTE for 13, 15 and 16: students NADP<sup>+</sup>, ADP and P<sub>i</sub> must be ready on the stroma side of the green painter's tape.

Remaining students are split into 2 more or less equal groups. They are the pigment molecules of the reaction centers that are "activated" to do the "wave" by the sun's photons. The 2 groups must be positioned at each side of the classroom so that the last pigment molecule in the wave from each group can touch the special chlorophyll a molecule student in p680 & in p700, respectively.

NOTE for pigment molecules: students must understand that no electrons are passed between these pigments.