**Photosynthesis**

**Answer Key II**

Label the indicated parts in the following diagram of a chloroplast.

- a. outer membrane
- b. grana
- c. inner membrane
- d. thylakoid
- e. thylakoid space
- f. stroma

**An action spectrum** shows the relative rates of photosynthesis under different wavelengths of light. On the following graph, label the line that represents the absorption spectrum for chlorophyll a and the line for the action spectrum for photosynthesis. Why are these lines different?

![Graph showing absorption and action spectra for photosynthesis]

b/c absorption of other pigments
well chlorophyll a & b
and carotenoids at far red

**Wavelength of light (nm)**

400 500 600 700

Absorption and action spectra for photosynthesis

**Write the general formula for photosynthesis below:**

\[ \text{C}_6\text{H}_{12}\text{O}_6 + \text{H}_2\text{O} + \text{light} \rightarrow 6\text{CO}_2 + 6\text{H}_2\text{O} \]

An experiment with organisms containing chlorophyll a was done using three different lights/wavelengths (485 nm, 580 nm, 660 nm). Predict the relative rate of photosynthesis for the organisms under each wavelength, higher absorbance = high rate of rxn.

**Fill in the blanks in the following overview of photosynthesis in a chloroplast. Indicate the locations of the processes c and h.**

![Diagram of photosynthesis in a chloroplast]

- a. light
- b. \( \text{H}_2\text{O} \)
- c. \( \text{CO}_2 \)
- d. \( \text{O}_2 \)
- e. ATP
- f. NADPH
- g. \( \text{NADP}^+ \)
- h. Calvin Cycle
- i. \( \text{G}_3\text{P} \)

**Word Bank:**
- \( \text{CO}_2 \)
- \( \text{O}_2 \)
- \( \text{H}_2\text{O} \)
- \( \text{glucose} / \text{G}3P \)
- \( \text{ADP} \)
- \( \text{NADPH} \)
- \( \text{ATP} \)
- \( \text{Calvin Cycle} \)
- \( \text{Citric Acid Cycle} \)
- \( \text{Light Reaction} \)

**Where are all of the protons from the ETC2 in the light reactions pumped to for chemiosmosis?**