

**SECTION 6-1 REVIEW****CAPTURING THE ENERGY IN LIGHT**

**VOCABULARY REVIEW** Explain the relationship between the terms in each of the following pairs of terms.

1. granum, stroma \_\_\_\_\_  
\_\_\_\_\_
2. chlorophyll *a*, accessory pigment \_\_\_\_\_  
\_\_\_\_\_
3. chemiosmosis, ATP synthase \_\_\_\_\_  
\_\_\_\_\_

**MULTIPLE CHOICE** Write the correct letter in the blank.

- \_\_\_\_\_ 1. Chlorophyll *a*
- |   |  |
|---|--|
| a. absorbs mostly orange-red and blue-violet light. | c. is an accessory pigment.                                |
| b. absorbs mostly green light.                      | d. is responsible for the red color of many autumn leaves. |
- \_\_\_\_\_ 2. The photosystems and electron transport chains are located in the
- |                                |                        |
|--------------------------------|------------------------|
| a. outer chloroplast membrane. | c. thylakoid membrane. |
| b. inner chloroplast membrane. | d. stroma.             |
- \_\_\_\_\_ 3. Both photosystem I and photosystem II
- |  |  |
|--|--|
| a. receive electrons from other photosystems.                  | c. donate protons to each other.           |
| b. donate electrons to a transport chain that generates NADPH. | d. contain chlorophyll <i>a</i> molecules. |
- \_\_\_\_\_ 4. Water participates directly in the light reactions of photosynthesis by
- |  |  |
|--|--|
| a. donating electrons to NADPH.          | c. accepting electrons from the electron transport chains. |
| b. donating electrons to photosystem II. | d. accepting electrons from ADP.                           |
- \_\_\_\_\_ 5. The energy that is used to establish the proton gradient across the thylakoid membrane comes from the
- |                        |   |
|------------------------|---|
| a. synthesis of ATP.   | c. passage of electrons along the electron transport chain of photosystem II. |
| b. synthesis of NADPH. | d. splitting of water.  |

**SHORT ANSWER** Answer the questions in the space provided.

1. Why is photosynthesis referred to as a biochemical pathway? \_\_\_\_\_

\_\_\_\_\_

2. How does the structure of a chloroplast enable it to build up a concentration gradient of protons? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

3. What are the energy-carrying end products of the light harvesting reactions? \_\_\_\_\_

4. Explain the function of accessory pigments. \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

5. **Critical Thinking** Which photosystem—I or II—most likely evolved first? Explain your reasoning.

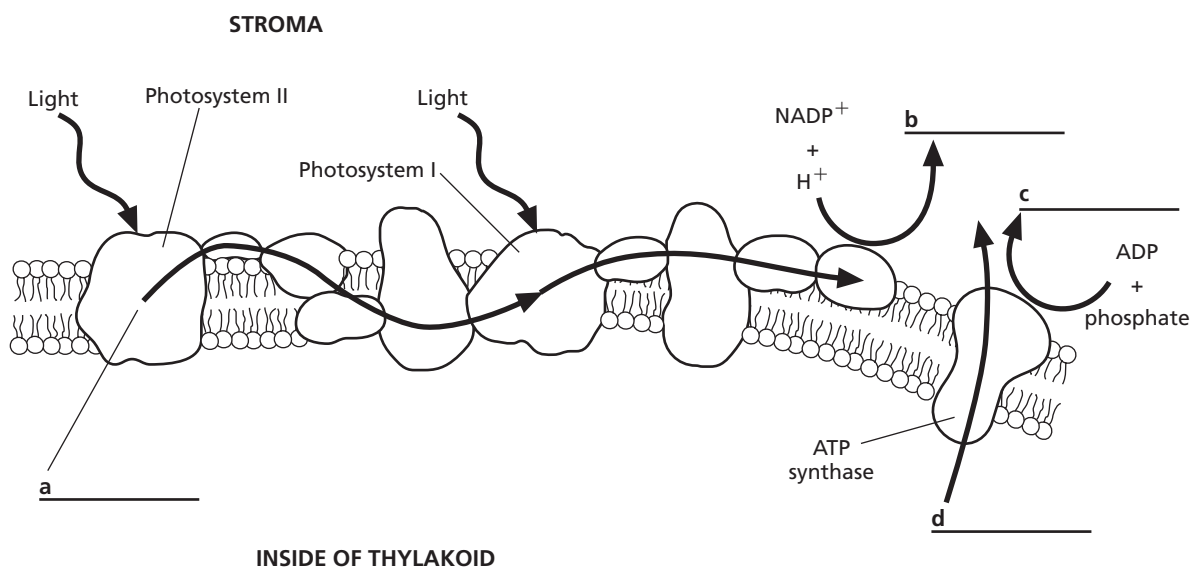
\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**STRUCTURES AND FUNCTIONS** Label the substances represented by the letters *a–d* below.

The diagram below summarizes the light reactions of photosynthesis.



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**SECTION 6-2 REVIEW**

# THE CALVIN CYCLE

**VOCABULARY REVIEW** Define the following terms.

1. Calvin cycle \_\_\_\_\_  
\_\_\_\_\_
2. carbon fixation \_\_\_\_\_  
\_\_\_\_\_
3. stoma \_\_\_\_\_  
\_\_\_\_\_
4. C<sub>4</sub> pathway \_\_\_\_\_  
\_\_\_\_\_
5. CAM \_\_\_\_\_  
\_\_\_\_\_

**MULTIPLE CHOICE** Write the correct letter in the blank.

- \_\_\_\_\_ 1. The Calvin cycle begins when CO<sub>2</sub> combines with a five-carbon carbohydrate called  

a. RuBP.	b. PGA.	c. PGAL.	d. NADPH.
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- \_\_\_\_\_ 2. For every three molecules of CO<sub>2</sub> that enter the Calvin cycle, the cycle produces one molecule of  

a. RuBP.	b. PGA.	c. PGAL.	d. NADPH.
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- \_\_\_\_\_ 3. Organic compounds that can be made from the products of the Calvin cycle include  

a. only carbohydrates.	c. only lipids.
b. only amino acids.	d. carbohydrates, amino acids, and lipids.
- \_\_\_\_\_ 4. C<sub>3</sub> and C<sub>4</sub> plants differ in terms of the number of  

a. steps in the Calvin cycle.	c. carbon atoms in the end product of the Calvin cycle.
b. carbon atoms in the compound that CO <sub>2</sub> is initially incorporated into.	d. ATP molecules used in the Calvin cycle.
- \_\_\_\_\_ 5. As light intensity increases, the rate of photosynthesis  

a. continues to decrease.	c. initially decreases and then levels off.
b. continues to increase.	d. initially increases and then levels off.

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**SHORT ANSWER** Answer the questions in the space provided.

1. How many molecules of ATP and NADPH are used in each turn of the Calvin cycle?

\_\_\_\_\_

2. Using  $(CH_2O)$  as the general formula for a carbohydrate, write the simplest overall equation for photosynthesis. \_\_\_\_\_

3. How do CAM plants differ from both  $C_3$  and  $C_4$  plants? \_\_\_\_\_

\_\_\_\_\_

4. Why does the rate of photosynthesis increase, peak, and then decrease as temperature increases?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

5. **Critical Thinking** Stomata can open and close in response to changes in the  $CO_2$  concentration inside the leaf. Would you expect stomata to open or close if the  $CO_2$  concentration decreased?

Explain. \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**STRUCTURES AND FUNCTIONS** In the blank spaces provided in the diagram, indicate the number of molecules of each substance that are involved in each turn of the cycle.

The diagram below summarizes the Calvin cycle.

