CHAPTER 4 ACTIVE READING WORKSHEETS

PHOTOSYNTHESIS

Section 4-4: The Light Reactions

Read the passage below, which covers topics from your textbook. Answer the questions that follow.

1 Located in the membrane of the thylakoids are a variety of pigments, the most important of which are called chlorophylls.

2 There are several different types of chlorophylls. 3 The two most common types are known as chlorophyll a and chlorophyll b.

4 A slight difference in molecular structure between chlorophyll a and chlorophyll b causes the two molecules to absorb different colors of light. 5 Chlorophyll a absorbs less blue light but more red light than chlorophyll b absorbs. 6 Neither chlorophyll a nor chlorophyll b absorbs much green light. 7 Instead, they allow green light to be reflected or transmitted. 8 That is why leaves and other plant structures that contain large amounts of chlorophyll look green. 9 Only chlorophyll a is directly involved in the light reactions of photosynthesis. 10 Chlorophyll b assists chlorophyll a in capturing light energy; therefore, chlorophyll b is called an accessory pigment.

Read each question and write your answer in the space provided.

SKILL: Identifying Main Ideas

1. Which sentence identifies the main idea of the first paragraph?

2. What supporting details are described by the remaining sentences in the first paragraph?

Read the questions and write your answers in the spaces provided.

SKILL: Recognizing Similarities and Differences

One reading skill is the ability to recognize similarities and differences between two phrases, ideas, or things. This skill is sometimes known as comparing and contrasting. Some clue words that writers use when pointing out similarities or making comparisons are like, as, similarly, similar to, neither, nor, and in the same way. Some clue words that writers use when pointing out differences or making contrasts include however, but, although, on the contrary, still, either, or, and on the other hand.

3. What difference between chlorophyll a and chlorophyll b is noted in Sentence 4?

4. Does Sentence 5 note a similarity or a difference between these molecules?

5. What is the similarity or difference noted in Sentence 5?

6. Does Sentence 6 note a similarity or a difference?

7. What is the similarity or difference noted in Sentence 6?

Read the question and write your answer in the space provided.

SKILL: Recognizing Cause-and-Effect Relationships

In a cause-and-effect relationship, one event, or cause, triggers a second event, or effect, to occur. Determine the cause or effect in the question below.

8. What is the effect of the difference between chlorophyll a and chlorophyll b?

Circle the letter of the phrase that best completes the statement.

9. Because chlorophyll b assists chlorophyll a in capturing light energy, chlorophyll b

a. is a carotenoid.

b. is called an accessory pigment.

c. absorbs more blue light than chlorophyll a.

d. reflects green light.

CHAPTER 4 ACTIVE READING WORKSHEETS

PHOTOSYNTHESIS

Section 4-4: The Calvin Cycle

Read the passage below, which covers topics from your textbook. Answer the questions that follow.

The Calvin cycle has four major steps that occur within the stroma of the chloroplasts.

Step 1. CO2 diffuses into the stroma from the surrounding cytosol. An enzyme combines each CO2 molecule with a five-carbon carbohydrate called RuBP. The product is a six-carbon molecule that splits immediately into a pair of three-carbon molecules known as 3-PGA.

Step 2. Each molecule of 3-PGA is converted into another three-carbon molecule, G3P, in a two-part process. First, each 3-PGA molecule receives a phosphate group from a molecule of ATP. The resulting compound then receives a proton from NADPH and releases a phosphate group, producing G3P. In addition to G3P, these reactions produce ADP, , and phosphate. These three products can be used again in the light reactions to synthesize additional molecules of ATP and NADPH.

Step 3. One molecule of G3P is used to make organic compounds.

Step 4. Most of the G3P is converted back into RuBP in a complicated series of reactions. These reactions require a phosphate group from another molecule of ATP, which is changed into ADP. By regenerating the RuBP that was consumed in Step 1, the reactions of Step 4 allow the Calvin cycle to continue operating.

Read each question and write your answer in the space provided.

SKILL: Identifying Main Ideas

1. Summarize the main events that occur in each step of the Calvin cycle on the lines provided.

a. Step 1

b. Step 2

c. Step 3

d. Step 4

Read the question and write your answer in the space provided.

SKILL: Vocabulary Development

2. The prefix cyto- means “cell.” The suffix -logy means “study.” How does knowledge of these word parts help define cytology?

Circle the letter of the phrase that best completes the sentence.

3. If the RuBP consumed in Step 1 was not regenerated in Step 4 of the Calvin cycle, then

a. CO2 would stop diffusing into the stroma.

b. the cycle would speed up because of an increase in CO2 molecules.

c. the plant cell would lack G3P molecules.

d. the plant cell would stop bonding carbon atoms from CO2 into organic compounds.