

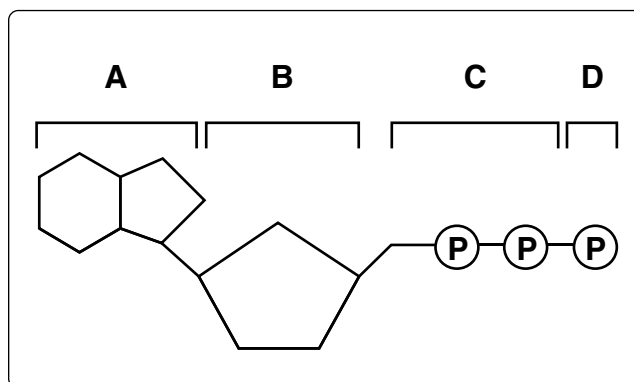
**Chapter 8 Photosynthesis**

**Chapter Test A**

**Multiple Choice**

Write the letter that best answers the question or completes the statement on the line provided.

- \_\_\_\_ 1. Which of the following is an autotroph?
  - a. mushroom
  - b. dog
  - c. monkey
  - d. tree
  
- \_\_\_\_ 2. Which of the following is NOT an example of a heterotroph?
  - a. mushroom
  - b. leopard
  - c. grass
  - d. human
  
- \_\_\_\_ 3. Energy is released from ATP when
  - a. a phosphate group is added.
  - b. adenine bonds to ribose.
  - c. ATP is exposed to sunlight.
  - d. a phosphate group is removed.
  
- \_\_\_\_ 4. Look at Figure 1. All of the following are parts of an ADP molecule EXCEPT
  - a. structure A.
  - b. structure B.
  - c. structure C.
  - d. structure D.
  
- \_\_\_\_ 5. Which structures shown in Figure 1 make up an ATP molecule?
  - a. A and B
  - b. A, B, and C
  - c. A, B, C, and D
  - d. C and D
  
- \_\_\_\_ 6. Which scientists showed that plants need light to grow?
  - a. van Helmont and Calvin
  - b. Priestley and Ingenhousz
  - c. van Helmont and Priestley
  - d. Priestley and Calvin
  
- \_\_\_\_ 7. Which of the following are used in the overall reactions for photosynthesis?
  - a. carbon dioxide
  - b. water
  - c. light
  - d. all of the above



**Figure 1**

- \_\_\_ 8. Most plants appear green because chlorophyll
- does not absorb green light.
  - reflects violet light.
  - absorbs green light.
  - none of the above
- \_\_\_ 9. A granum is a(an)
- stack of chloroplasts.
  - stack of thylakoids.
  - membrane enclosing a thylakoid.
  - photosynthetic pigment molecule.
- \_\_\_ 10. The light-collecting units of a chloroplast are the
- electron carriers.
  - photosystems.
  - stroma.
  - high-energy sugars.
- \_\_\_ 11. What are the products of the light-dependent reactions?
- oxygen gas
  - ATP
  - NADPH
  - all of the above
- \_\_\_ 12. Which step is the beginning of photosynthesis?
- Pigments in photosystem I absorb light.
  - Pigments in photosystem II absorb light.
  - High-energy electrons move through the electron transport chain.
  - ATP synthase allows  $H^+$  ions to pass through the thylakoid membrane.
- \_\_\_ 13. The Calvin cycle takes place in the
- stroma.
  - photosystems.
  - thylakoid membranes.
  - chlorophyll molecules.
- \_\_\_ 14. If carbon dioxide is removed from a plant's environment, what would you expect to happen to its production of high-energy sugars?
- More sugars will be produced.
  - No sugars will be produced.
  - The same number of sugars will be produced but without carbon dioxide.
  - Carbon dioxide does not affect the production of high-energy sugars in plants.
- \_\_\_ 15. If you continue to increase the intensity of light that a plant receives, what happens?
- The rate of photosynthesis increases with light intensity.
  - The rate of photosynthesis decreases with light intensity.
  - The rate of photosynthesis increases and then levels off.
  - The rate of photosynthesis does not change.

### Completion

Complete each statement on the line provided.

- 16. Photosynthesis requires light, water, carbon dioxide, and \_\_\_\_\_ .
- 17. If you separate the pigments found in a typical plant cell's chloroplasts, you will find \_\_\_\_\_ , orange, and red pigments.
- 18. Thylakoids are \_\_\_\_\_ in color because they contain chlorophyll.

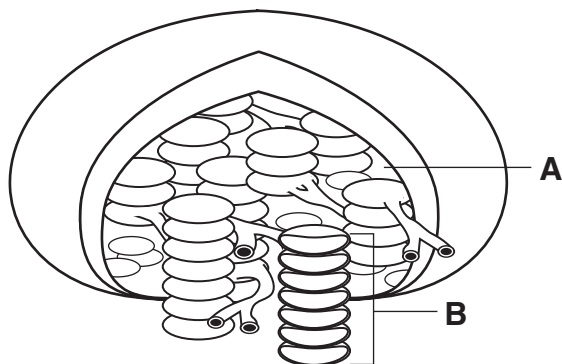


Figure 2

- 19. Photosystems I and II are found in the structure labeled \_\_\_\_\_ in Figure 2.
- 20. In many plants, the rate of photosynthesis \_\_\_\_\_ when the weather becomes very cold.

### Short Answer

In complete sentences, write the answers to the questions on the lines provided.

- 21. How do heterotrophs obtain energy?

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- 22. What is ATP, and when is energy released from it?

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- 23. Write the overall equation for photosynthesis in both symbols and words.

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24. Photosystems I and II are both located in the thylakoid membrane. What advantage does their proximity provide?

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25. What does the Calvin cycle do?

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**Using Science Skills**

Use the diagram and graph below to answer the following questions on the lines provided.

A student prepared two beakers with identical sprigs of a water plant as shown below. She placed one beaker in the shade and the other beaker beside a fluorescent lamp. She then systematically changed the distance of the beaker from the lamp. She counted the bubbles given off by each sprig of the water plant. Shown here is the graph of the data for the beaker she placed in the light.

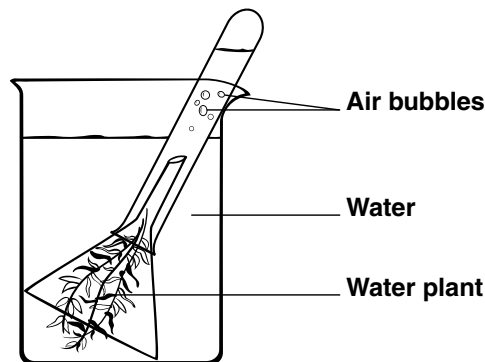
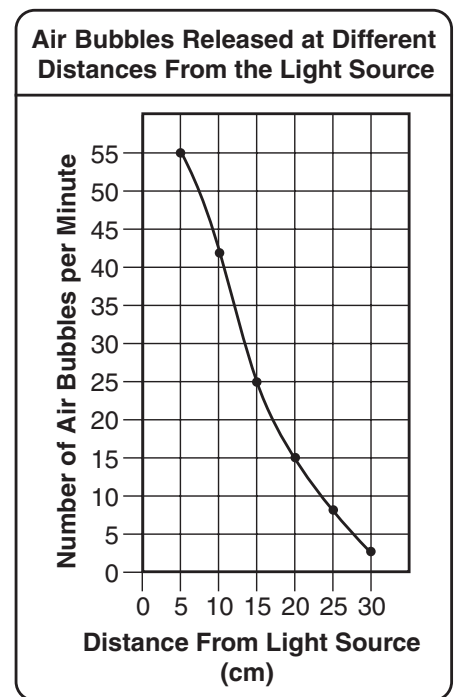


Figure 3



26. **Controlling Variables** Which beaker is the student's control beaker, the one in the shade or the one in the light?

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27. **Applying Concepts** Look at Figure 3. If the student later tested the air bubbles collected in the test tube, what would she find they are made of? How do you know?

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28. **Using Tables and Graphs** Look at the graph in Figure 3. At what distance from the light source was the greatest number of bubbles produced?

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29. **Analyzing Data** Look at the graph in Figure 3. What do the student's data show?

\_\_\_\_\_

\_\_\_\_\_

30. **Predicting** If the lamp was placed closer than 5 centimeters from the water plant, would the plant give off many more bubbles? Why or why not?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

### Essay

*Write the answer to each question in the space provided.*

31. Discuss the relationship between autotrophs and heterotrophs. Do heterotrophs depend on autotrophs for their survival? Explain your answer.

32. Compare the storage capacity of ATP and glucose. How does the cell use each of these molecules to store energy?

33. Describe how pigments obtain energy from light. Use chlorophyll as an example of the process you describe.

34. Identify three factors that affect the rate of photosynthesis, and explain the effect of each.

35. Trace the events that occur in the thylakoid membrane during the light-dependent reactions.