

Bio 10 Chapter 8 Study Test 10-11

Multiple Choice

Identify the choice that best completes the statement or answers the question.

- ___ 1. What are the three parts of an ATP molecule?
- adenine, thylakoid, and a phosphate group
 - stroma, grana, and chlorophyll
 - adenine, ribose, and three phosphate groups
 - NADH, NADPH, and FADH₂
- ___ 2. Which of the following is NOT a part of an ATP molecule?
- adenine
 - ribose
 - chlorophyll
 - phosphate

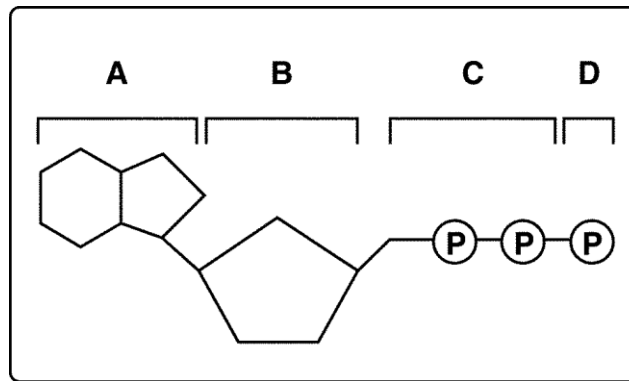


Figure 8-1

- ___ 3. Which structures shown in Figure 8-1 make up an ATP molecule?
- A and B
 - A, B, and C
 - A, B, C, and D
 - C and D
- ___ 4. In Figure 8-1, between which parts of the molecule must the bonds be broken to form an ADP molecule?
- A and B
 - A and C
 - B and C
 - C and D
- ___ 5. Organisms that cannot make their own food and must obtain energy from external sources are called
- autotrophs.
 - heterotrophs.
 - thylakoids.
 - plants.
- ___ 6. Which of the following organisms makes its own food using light energy from the sun?
- mushroom
 - amoeba
 - leopard

- d. oak
- ___ 7. Which of the following organisms is a heterotroph?
 - a. mushroom
 - b. alga
 - c. wheat
 - d. sunflower
- ___ 8. What happens during photosynthesis?
 - a. Heterotrophs consume ATP.
 - b. Heterotrophs produce ATP.
 - c. Autotrophs consume carbohydrates.
 - d. Autotrophs produce carbohydrates.
- ___ 9. Plants gather energy with light-absorbing molecules called
 - a. pigments.
 - b. thylakoids.
 - c. chloroplasts.
 - d. glucose.
- ___ 10. Plants get the energy they need for photosynthesis by absorbing
 - a. high-energy sugars.
 - b. chlorophyll *a*.
 - c. chlorophyll *b*.
 - d. sunlight.
- ___ 11. Where in the chloroplast is chlorophyll found?
 - a. in the ATP
 - b. in the stroma
 - c. in the thylakoid membrane
 - d. in the thylakoid space
- ___ 12. What happens when chlorophyll is struck by sunlight?
 - a. The electrons in the chlorophyll molecule become energized.
 - b. The chlorophyll molecule is broken into two parts.
 - c. A chemical reaction turns chlorophyll into high energy carbohydrates.
 - d. Energy from fat molecules is released.
- ___ 13. What is the role of NADP⁺ in photosynthesis?
 - a. electron carrier
 - b. high-energy sugar
 - c. photosystem
 - d. pigment
- ___ 14. Why are electron carriers needed for transporting electrons from one part of the chloroplast to another?
 - a. High-energy electrons would be destroyed.
 - b. High-energy electrons are highly reactive.
 - c. High-energy electrons are not soluble in cytoplasm.
 - d. High-energy electrons get their energy from electron carriers.
- ___ 15. A student is collecting the gas given off from a plant in bright sunlight at a temperature of 27°C. The gas being collected is probably
 - a. oxygen.
 - b. carbon dioxide.
 - c. ATP.
 - d. glucose.
- ___ 16. Photosynthesis uses sunlight to convert water and carbon dioxide into
 - a. oxygen and carbon.

- b. high-energy sugars and proteins.
 - c. ATP and oxygen.
 - d. oxygen and high-energy sugars.
- ___ 17. In the overall equation for photosynthesis, six molecules of carbon dioxide and six molecules of water result in a molecule of sugar and six molecules of
- a. glucose.
 - b. water.
 - c. oxygen.
 - d. ATP.
- ___ 18. What are the products of the light-dependent reactions?
- a. oxygen gas and glucose
 - b. ATP, NADPH, and oxygen gas
 - c. ATP, carbon dioxide gas, and NADPH
 - d. carbon dioxide gas, oxygen gas, and NADPH
- ___ 19. Which of the following is NOT a step in the light-dependent reactions?
- a. High-energy electrons move through the electron transport chain.
 - b. Pigments in photosystem II absorb light.
 - c. ATP synthase allows H^+ ions to pass through the thylakoid membrane.
 - d. ATP and NADPH are used to produce high-energy sugars.
- ___ 20. Where are photosystems I and II found?
- a. in the stroma
 - b. in the thylakoid membrane
 - c. in the Calvin cycle
 - d. in the cell membrane
- ___ 21. Which of the following activities happens within the stroma?
- a. Photosystem I absorbs light.
 - b. ATP synthase produces ATP.
 - c. The Calvin cycle produces sugars.
 - d. Electrons move through the electron transport chain.
- ___ 22. What is a product of the Calvin cycle?
- a. oxygen gas
 - b. ATP
 - c. high-energy sugars
 - d. carbon dioxide gas
- ___ 23. How does the Calvin cycle differ from the light-dependent reactions?
- a. It takes place in the stroma.
 - b. It takes place in chloroplasts.
 - c. It requires light.
 - d. It requires water.

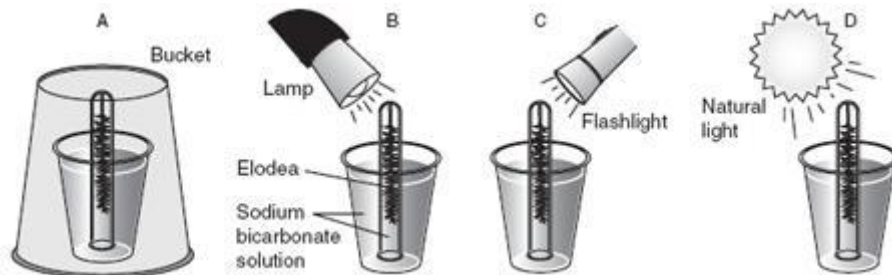


Figure 8-5

- ___ 24. In which experimental setup shown above would you expect the *Elodea* plant inside the test tube to produce the LEAST amount of oxygen?
- a. A
 - b. B
 - c. C
 - d. D

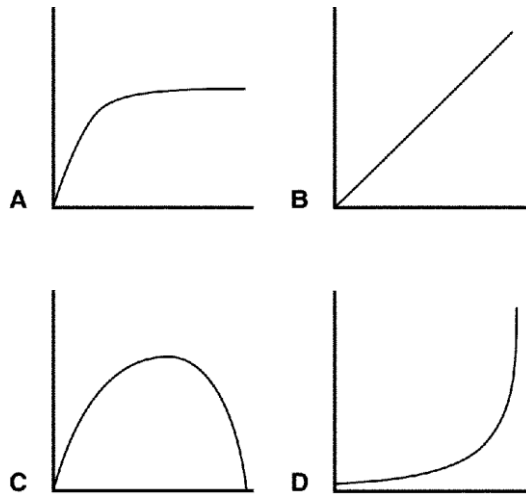


Figure 8-6

- ___ 25. Imagine that y-axis of each graph in Figure 8-6 describes the rate of photosynthesis. Which of the graphs represents the effect of temperature on the rate of photosynthesis?
- a. A
 - b. B
 - c. C
 - d. D

Modified True/False

Indicate whether the statement is true or false. If false, change the identified word or phrase to make the statement true.

- ___ 1. Carbon dioxide is one of the principal chemical compounds that living things use to store energy.

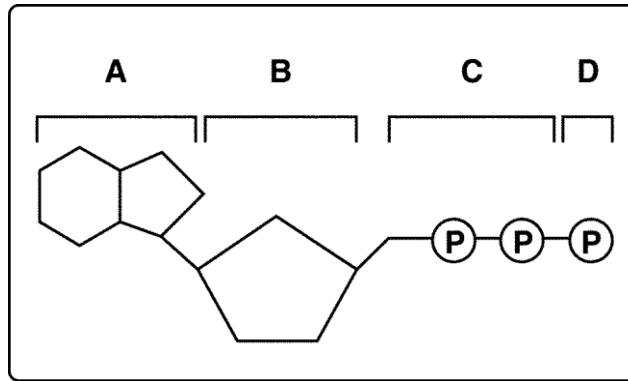


Figure 8-1

- ___ 2. The majority of the cells have only a small quantity of ATP because the ATP functions better like a molecule to store short-term energy. _____
- ___ 3. Ultimately, the energy that a carnivore, such as a wolf, uses comes from sunlight. _____
- ___ 4. Chlorophyll *a* and chlorophyll *b* both absorb light very well in the blue and red regions of the visible light spectrum. _____

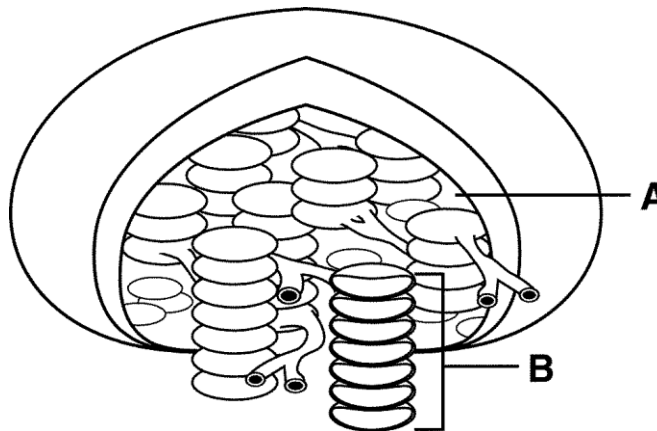


Figure 8-7

- ___ 5. If you were to isolate the organelle shown in Figure 8-7, it would appear green. _____

Completion

Complete each statement.

- Organisms, such as hawks and leopards, that obtain energy from the foods they consume are called _____.
- Photosynthesis requires light, water, carbon dioxide, and light absorbing _____.
- Thylakoids are arranged in stacks known as _____.

- The electron carrier _____ is converted to NADPH during the light-dependent reactions.
- The electrons that chlorophyll loses to the electron transport chain are replenished by _____ molecules.

Short Answer

- How is a molecule of ADP like a rechargeable battery?
- What is ATP, and when is energy released from it?
- Explain the role of electron carriers in photosynthesis and give one example.
- What occurs during the Calvin cycle?
- Describe the relationship between the light-dependent and the light-independent reactions.

Science Skills

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 from the beaker to the lamp. She counted the bubbles given off by the plants in each beaker. Shown here is the graph of the data for the beaker she placed beside the lamp.

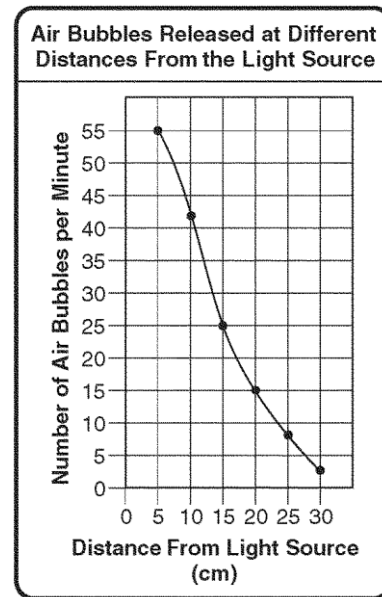
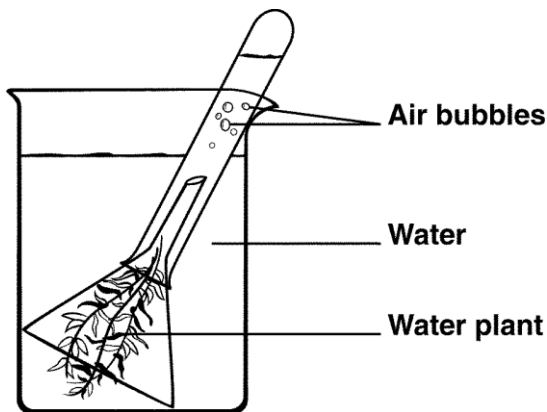


Figure 8–10

- Apply Concepts** Look at Figure 8–10. If the student later tested the bubbles collected in the test tube, what would she find they are made of? How do you know?

A student put together two different experimental setups as shown below.

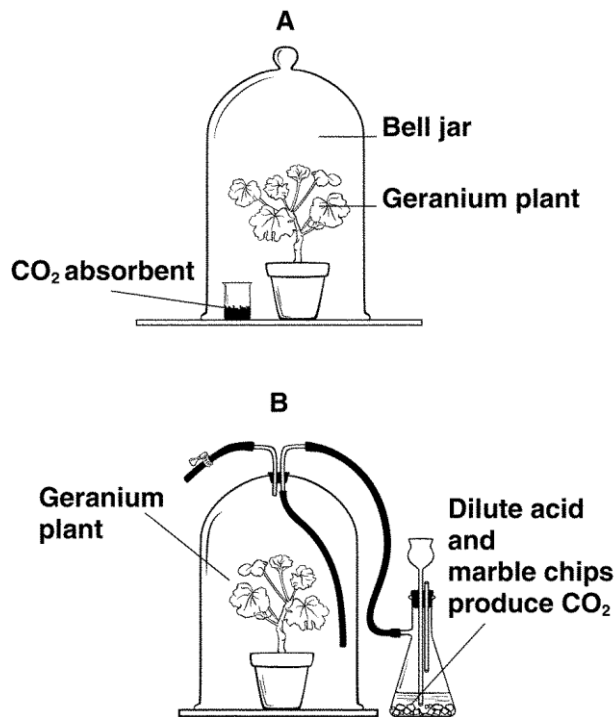


Figure 8-11

2. **Predict** In Figure 8-11, assume that the student placed Plant A in indirect sunlight for two days. How would the rate of photosynthesis of this plant compare with that of a plant grown under normal conditions?
3. **Predict** Review the setups in Figure 8-11. Make a prediction about the effect of carbon dioxide on starch production in plants.

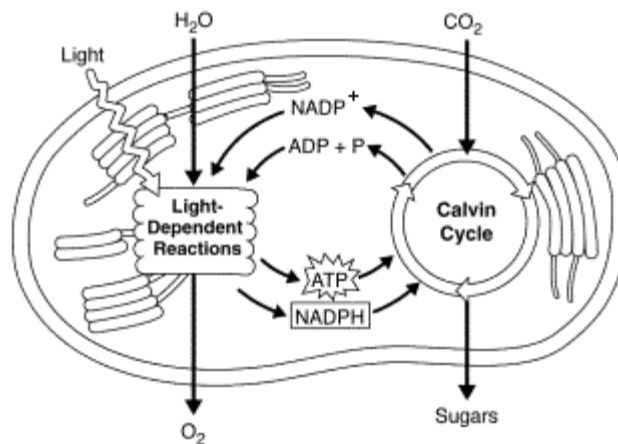


Figure 8-12

4. **Interpret Visuals** What process is shown in Figure 8-12?
5. **Interpret Visuals** In Figure 8-12, what provides the carbon needed to make sugars?

Essay

1. Discuss the relationship between autotrophs and heterotrophs. Do heterotrophs depend on autotrophs for their survival? Explain your answer.
2. Describe how photosynthesis in CAM plants differs from photosynthesis in more typical plants. Why is it unlikely that you would find a CAM plant in an aquatic environment?

Bio 10 Chapter 8 Study Test 10-11 Answer Section

MULTIPLE CHOICE

- | | | |
|------------|--------|--------------------|
| 1. ANS: C | PTS: 1 | BLM: comprehension |
| 2. ANS: C | PTS: 1 | BLM: knowledge |
| 3. ANS: C | PTS: 1 | BLM: application |
| 4. ANS: D | PTS: 1 | BLM: knowledge |
| 5. ANS: B | PTS: 1 | BLM: knowledge |
| 6. ANS: D | PTS: 1 | BLM: application |
| 7. ANS: A | PTS: 1 | BLM: application |
| 8. ANS: D | PTS: 1 | BLM: comprehension |
| 9. ANS: A | PTS: 1 | BLM: knowledge |
| 10. ANS: D | PTS: 1 | BLM: knowledge |
| 11. ANS: C | PTS: 1 | BLM: comprehension |
| 12. ANS: A | PTS: 1 | BLM: comprehension |
| 13. ANS: A | PTS: 1 | BLM: comprehension |
| 14. ANS: B | PTS: 1 | BLM: comprehension |
| 15. ANS: A | PTS: 1 | BLM: application |
| 16. ANS: D | PTS: 1 | BLM: knowledge |
| 17. ANS: C | PTS: 1 | BLM: comprehension |
| 18. ANS: B | PTS: 1 | BLM: knowledge |
| 19. ANS: D | PTS: 1 | BLM: analysis |
| 20. ANS: B | PTS: 1 | BLM: knowledge |
| 21. ANS: C | PTS: 1 | BLM: application |
| 22. ANS: C | PTS: 1 | BLM: knowledge |
| 23. ANS: A | PTS: 1 | BLM: analysis |
| 24. ANS: A | PTS: 1 | BLM: application |
| 25. ANS: C | PTS: 1 | BLM: synthesis |

MODIFIED TRUE/FALSE

- | | | | |
|----------------|----------------|--------|--------------------|
| 1. ANS: F, ATP | | | |
| PTS: 1 | BLM: knowledge | | |
| 2. ANS: T | | PTS: 1 | BLM: comprehension |
| 3. ANS: T | | PTS: 1 | BLM: synthesis |
| 4. ANS: T | | PTS: 1 | BLM: comprehension |
| 5. ANS: T | | PTS: 1 | BLM: synthesis |

COMPLETION

1. ANS:
heterotrophs

consumers

PTS: 1 BLM: knowledge

2. ANS:
pigments
chlorophyll

PTS: 1 BLM: application

3. ANS: grana

PTS: 1 BLM: knowledge

4. ANS: NADP⁺

PTS: 1 BLM: comprehension

5. ANS: water

PTS: 1 BLM: synthesis

SHORT ANSWER

1. ANS:

A cell can store energy by adding phosphate groups to ADP to make ATP. It can then use that energy later by breaking a bond between two phosphate groups to release the stored energy.

PTS: 1 BLM: analysis

2. ANS:

ATP is the chief energy-storing molecule used by organisms. Energy is released when the bonds between phosphate groups are broken, converting ATP into ADP.

PTS: 1 BLM: comprehension

3. ANS:

Electron carriers accept pairs of high-energy electrons and transfer them, along with their energy, to other molecules. NADP⁺ is one example of an electron carrier.

PTS: 1 BLM: comprehension

4. ANS:

The Calvin cycle uses ATP and NADPH from the light-dependent reactions to convert carbon dioxide molecules into high-energy sugars.

PTS: 1 BLM: comprehension

5. ANS:

The light-dependent reactions use energy from the sun to produce ATP and NADPH, and the light-independent reactions (Calvin cycle) use ATP and NADPH from the light-dependent reactions to produce high-energy sugars.

PTS: 1 BLM: synthesis

SCIENCE SKILLS

1. ANS:
The bubbles are probably oxygen gas, which is a product of photosynthesis.

PTS: 1 BLM: application
2. ANS:
Plant A is being grown with a carbon dioxide absorbent. A plant grown in an environment with depleted carbon dioxide would not be able to carry out the Calvin cycle—its rate of photosynthesis would likely be slower than that of a plant grown under normal conditions. Photosynthesis may even stop all together.

PTS: 1 BLM: evaluation
3. ANS:
Plants require carbon dioxide to produce starches. A higher concentration of carbon dioxide surrounding a plant can increase the production of starches. If the area surrounding a plant is depleted of carbon dioxide, a plant may not be able to produce any starches.

PTS: 1 BLM: evaluation
4. ANS:
photosynthesis

PTS: 1 BLM: knowledge
5. ANS:
carbon dioxide

PTS: 1 BLM: knowledge

ESSAY

1. ANS:
Heterotrophs depend on autotrophs to harvest energy from the sun. This energy is then passed on to heterotrophs in the form of food. Without autotrophs, the sun's energy would not be available to heterotrophs and heterotrophs would eventually die out.

PTS: 1 BLM: synthesis
2. ANS:
CAM plants do not take in carbon dioxide through their leaves all the time, as do other plants. Instead, CAM plants take it in only at night, when temperatures are cooler. Their leaves close up during the day so that water is not lost to the warm air. Aquatic plants are not at risk from drying out during the warm day, because they live in water. Therefore, they do not need to close their leaves during the day to prevent water loss.

PTS: 1 BLM: analysis