



8. For what purpose do the characteristics of ATP make it exceptionally useful to all types of cells?

9. What are two ways in which cells use the energy provided by ATP?

- a. Active transport
- b. Protein synthesis
- c. Movement/muscle contractions

### Using Biochemical Energy (pages 202-203)

10. Why is it efficient for cells to keep only a small supply of ATP on hand?

11. Circle the letter of where cells get the energy to regenerate ATP.

- a. ADP
- b. phosphates
- c. foods like glucose
- d. organelles

## Section 8-2 Photosynthesis: An Overview (pages 204-207)

### Introduction (page 204)

12. What occurs in the process of photosynthesis?

### Investigating Photosynthesis (pages 204-206)

13. What did Jan van Helmont conclude from his experiment?

Most of a plant's gain in mass comes from water

14. Circle the letter of the substance produced by the mint plant in Joseph Priestley's experiment.

- a. carbon dioxide
- b. water
- c. air
- d. oxygen

15. What did Jan Ingenhousz show?

### The Photosynthesis Equation (page 206)

16. Write the overall equation for photosynthesis using words.

17. Photosynthesis uses the energy of sunlight to convert water and carbon dioxide into oxygen and high-energy sugars (carbohydrates).

**Light and Pigments (page 207)**

18. What does photosynthesis require in addition to water and carbon dioxide?

19. Plants gather the sun's energy with light-absorbing molecules called \_\_\_\_\_

20. What is the principal pigment of plants? \_\_\_\_\_

21. Circle the letters of the regions of the visible spectrum in which chlorophyll absorbs light very well.

blue-violet region

red region

green region

yellow region

**Section 8-3 The Reactions of Photosynthesis (pages 208-214)**

**Inside a Chloroplast (page 208)**

22. Chloroplasts contain saclike photosynthetic membranes called \_\_\_\_\_

23. What is a granum? \_\_\_\_\_

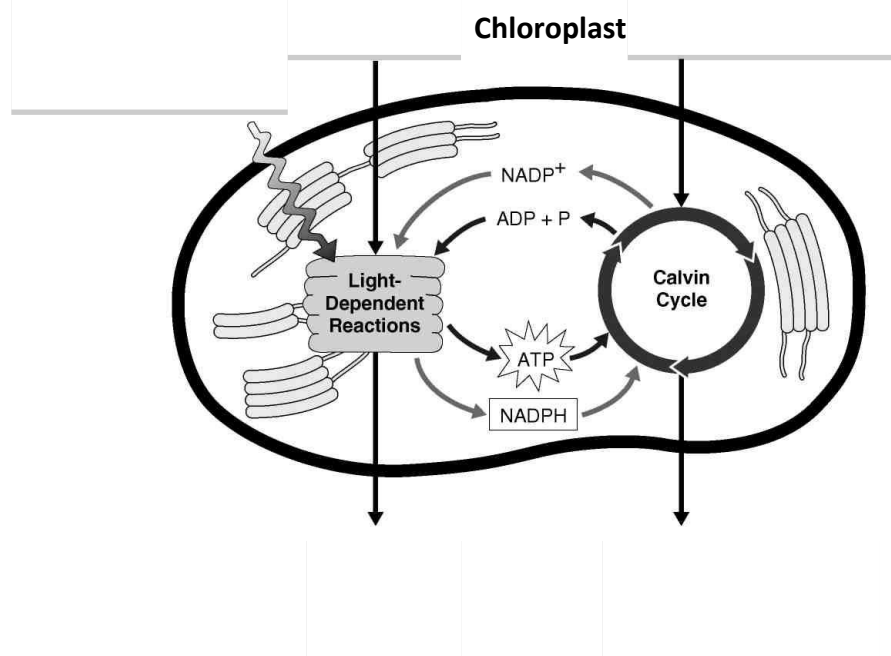
24. The region outside the thylakoid membranes in the chloroplasts is called the \_\_\_\_\_

25. What are the two stages of photosynthesis called?

a. \_\_\_\_\_

b. \_\_\_\_\_

26. Complete the illustration of the overview of photosynthesis by writing the products and the reactants of the process, as well as the energy source that excites the electrons.



### Electron Carriers (page 209)

27. When sunlight excites electrons in chlorophyll, how do the electrons change?

28. What is a carrier molecule?

29. Circle the letter of the carrier molecule involved in photosynthesis.

    H<sub>2</sub>O

    CO<sub>2</sub>

    NADP<sup>+</sup>

    O<sub>2</sub>

30. How does NADP<sup>+</sup> become NADPH?

### Light-Dependent Reactions (pages 210-211)

31. Circle the letter of each sentence that is true about the light-dependent reactions.

    They convert ADP into ATP.

    They convert oxygen into carbon dioxide.

    They produce oxygen gas.

    They convert NADP<sup>+</sup> into NADPH.

32. Where do the light-dependent reactions take place?

33. Circle the letter of each sentence that is true about the light-dependent reactions.

    High-energy electrons move through the electron transport chain from photosystem II to photosystem I.

    Photosynthesis begins when pigments in photosystem I absorb light.

    The difference in charges across the thylakoid membrane provides the energy to make ATP.

    Pigments in photosystem I use energy from light to reenergize electrons.

34. How does ATP synthase produce ATP?

### The Calvin Cycle (pages 212-214)

35. What does the Calvin cycle use to produce high-energy sugars?

36. Why are the reactions of the Calvin cycle also called the light-independent reactions?

**37.** Circle the letter of each statement that is true about the Calvin cycle.

The main products of the Calvin cycle are six carbon dioxide molecules.

Carbon dioxide molecules enter the Calvin cycle from the atmosphere.

Energy from ATP and high-energy electrons from NADPH are used to convert 3-carbon molecules into higher-energy forms.

The Calvin cycle uses six molecules of carbon dioxide to produce a single 6-carbon sugar molecule.

**Factors Affecting Photosynthesis (page 214)**

**38.** What are three factors that affect the rate at which photosynthesis occurs?

a

b

c

**39.** Is the following sentence true or false? Increasing the intensity of light decreases the rate of photosynthesis