1. ______________________ what does photosynthesis require in addition to light, water, and carbon dioxide

2. ______________________ photosystems I and II are found in this structure

3. ______________________ organisms that make their own food

4. ______________________ organisms that cannot make their own food

5. ______________________ the space that surrounds thylakoids

6. ______________________ another name for light-independent reactions

7. ______________________ one product from light-dependent reactions

8. ______________________ a second product from light-dependent reactions

9. ______________________ green pigment found in chloroplasts

10. _______________________ sequence of electron carrier molecules that shuttle electrons through molecules and create energy molecules

Name the three main components that make up ATP

11. _______________________
12. Follow the directions to color the cell parts in each diagram.
USE COLORED PENCILS. NO SUBSTITUTIONS.

Color One Thylakoid purple
Color One Grana Red
Color Stroma Blue
Color the chloroplast membrane Green

13. In what part of photosynthesis do these reactions occur?

14. In what part of photosynthesis do these reactions occur?

15. Why do leaves appear green?
16. ________ 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

17. ________ Which of the following are used in the overall reactions for photosynthesis?
   a. carbon dioxide
   b. water
   c. light
   d. all of the above

18. ________ A granum is
   a. a stack of chloroplasts
   b. stack of thylakoids
   c. membrane enclosing a thylakoid
   d. photosynthetic pigment molecules

19. ________ The light-collecting units of a chloroplast are
   a. electron carriers
   b. photosystems
   c. stroma
   d. high-energy sugars

20. ________ The Calvin cycle takes place in the
   a. stroma
   b. photosystems
   c. thylakoid membranes
   d. chlorophyll molecules

21. ________ If carbon dioxide is removed from a plant’s environment, what would you expect to happen to its production of high-energy sugars?
   a. More sugars will be produced.
   b. No sugars will be produced.
   c. The same number of sugars will be produced but without carbon dioxide.
   d. Carbon dioxide does not affect the production of high-energy sugars in plants.

22. ________ If you continue to increase the intensity of light that a plant receives, what happens?
   a. The rate of photosynthesis increases with light intensity
   b. The rate of photosynthesis decreases with light intensity
   c. The rate of photosynthesis increases and then levels off.
   d. The rate of photosynthesis does not change.

23. ________ Which of the following is NOT a part of an ATP molecule?
   a. adenine
   b. ribose
   c. chlorophyll
   d. phosphate
24. ________ Where are photosystems I and II found?
   a. in the stroma   c. in the Calvin cycle
   b. in the thylakoid membrane   d. all of the answers are correct

25. ________ The Calvin cycle is another name for
   a. light-independent reactions
   b. light-dependent reaction
   c. photosynthesis
   d. all of the above

26. ________ Which of the following affects the rate of photosynthesis?
   a. water
   b. temperature
   c. light intensity
   d. all of the above

27. What is ATP and when is energy released from it?

28. Write the overall equation for photosynthesis in both symbols and words.
29. Compare the storage capacity of ATP and glucose. How does the cell use each of these molecules to store energy?

30. Identify three factors that affect the rate of photosynthesis and explain the effect of each.
Chapter 8 Answer Key

1. Chlorophyll
2. Thylakoid Membrane
3. Autotroph
4. Heterotroph
5. Stroma
6. The Calvin Cycle
7. ATP or NADPH+
8. ATP or NADPH+
9. Chlorophyll
10. Electron transport chain
11. Adenosine base, ribose sugar, and three phosphate groups
12. See book
13. Light-dependent reactions
14. Light-independent reactions (The Calvin Cycle)
15. Leaves absorb red and blue light but reflect green and some yellow. The reflected light hits our eyes, making the leaves appear green.
16. D. a phosphate group is removed
17. D. all of the above
18. B. stack of thylakoids
19. B. photosystems
20. A. Stroma
21. B. No sugars will be produced.
22. C. The rate of photosynthesis increases and then levels off.
23. C. chlorophyll
24. B. in the thylakoid membrane
25. A. light-independent reactions
26. D. all of the above
27. ATP, adenosine triphosphate, is one of the principal compounds that cells use to store and release energy. Energy is released from ATP when the chemical bond between the second and third phosphates is broken and the third phosphate group is released.
28. \[6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2\]
carbon dioxide plus water and light react to produce sugar and oxygen
29. A glucose molecule can store more than 90 times the chemical energy than an ATP molecule. Glucose is used by cells to store large amounts of energy for long periods of time. In contrast, ATP is used to store smaller amounts of energy that will be used in the next few seconds. Cells can regenerate ATP from ADP s needed by using the energy in foods like glucose.
30. Three factors that affect the rate of photosynthesis are light intensity, temperature, and water. The rate of photosynthesis increases with light intensity up to a certain point, then levels off. Photosynthesis slows at extreme temperatures and usually has an optimal temperature for each kind of plant. Lack of water slows down photosynthesis.