Name _____ Class _____ Date _____

Photosynthesis — Chapter Test B

Multiple Choice

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

C 1. What are the three parts of an ATP molecule?
- **a.** adenine, thylakoid, and a phosphate group
- **b.** stroma, grana, and chlorophyll
- **c.** adenine, ribose, and three phosphate groups
- **d.** NADH, NADPH, and $FADH_2$

D 2. 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.

A 3. Organisms, such as plants, that make their own food are called
- **a.** autotrophs.
- **b.** heterotrophs.
- **c.** thylakoids.
- **d.** pigments.

A 4. Which of the following organisms is a heterotroph?
- **a.** mushroom
- **b.** alga
- **c.** wheat
- **d.** sunflower

D 5. Plants get the energy they need for photosynthesis by absorbing
- **a.** high-energy sugars.
- **b.** chlorophyll *a*.
- **c.** chlorophyll *b*.
- **d.** energy from the sun.

C 6. Most plants appear green because chlorophyll
- **a.** absorbs green light.
- **b.** absorbs violet light.
- **c.** does not absorb green light.
- **d.** does not absorb violet light.

A 7. The stroma is the region outside the
- **a.** thylakoids.
- **b.** chloroplasts.
- **c.** plant cells.
- **d.** all of the above

C 8. 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

A 9. What is the function of $NADP^+$ in photosynthesis?
- **a.** electron carrier
- **b.** high-energy sugar
- **c.** photosystem
- **d.** pigment

D 10. 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.

Name _____ Class _____ Date _____

C 11. Where do the light-dependent reactions take place?
- a. in the stroma of the chloroplast
- b. within the mitochondria membranes
- c. within the thylakoid membranes
- d. in the outer membrane of the chloroplasts

B 12. 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

B 13. 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

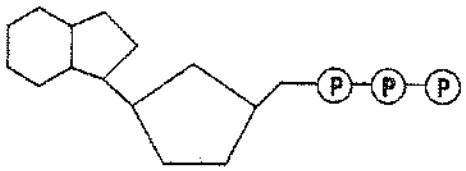
C 14. Which of the following activities happens within the stroma?
- a. Photosystem I absorbs light.
- b. ATP synthase produces ATP.
- c. The Calvin cycle produces sugars.
- d. Electrons move through the electron transport chain.

A 15. The Calvin cycle is another name for the
- a. light-independent reactions.
- b. light-dependent reactions.
- c. photosynthesis reaction.
- d. electron transport chain.

Modified True/False

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

T 16. The substance represented below is called ATP. _____



T 17. Plants gather energy with light-absorbing molecules called pigments.
_____

F 18. During the ~~light-dependent reactions~~, plants use the energy in ATP and NADPH to build high-energy sugars. Calvin cycle

F 19. ATP synthase changes ADP to ATP when ~~light energy~~ passes through it.
H+

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Completion

Complete each statement on the line provided.

20. Organisms, such as hawks and leopards, that obtain energy from the foods they consume are called ~~HETEROTROPHS~~

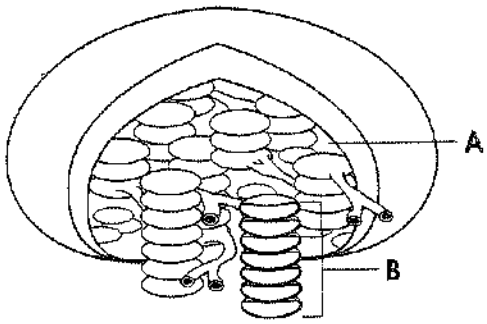

Figure 8–1

21. The area in Figure 8–1 labeled A is called the STROMA.

22. The structure in Figure 8–1 labeled B is called GRANUM.

23. A membrane protein called ATP Synthase allows H^+ ions to pass through the thylakoid membrane and into the stroma.

24. During the Calvin cycle, molecules of CO_2 supply the carbon component of carbohydrates.

Short Answer

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

25. Explain the role of electron carriers in photosynthesis and give one example.

accept electrons & transfer them & their energy to other molecules (NADP+)

26. Describe the relationship between the light-dependent and the light-independent reactions.

LR → use sun to make ATP & NADPH which then power Calvin cycle to use CO_2 to make $C_6H_{12}O_6$

27. What are three factors that affect the rate of photosynthesis?

Temp
Concentration of CO_2 or H_2O
Intensity of light

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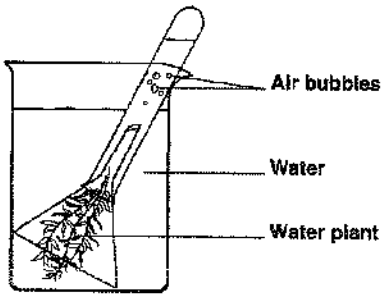
Using Science Skills

Use the diagram 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 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.



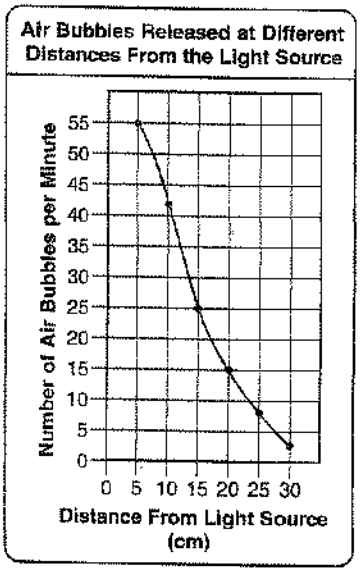


Figure 8–2

28. **Control Variables** In the experiment described in Figure 8–2, which beaker is the student's control?

Beaker in shade

29. **Apply Concepts** Look at Figure 8–2. If the student later tested the bubbles collected in the test tube, what would she find they are made of? How do you know?

O_2 - product of photosynthesis

30. **Interpret Graphs** Look at the graph in Figure 8–2. At what distance from the light source was the greatest number of bubbles produced?

5 cm

31. **Analyze Data** Look at the graph in Figure 8–2. What do the student's data show?

closer to light yields more bubbles

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9 Cellular Respiration and Fermentation

Chapter Test B

Multiple Choice

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

C 1. How do organisms get the energy they need?
- **a.** by burning food molecules and releasing their energy as heat
- **b.** by breathing oxygen into the lungs and combining it with carbon dioxide
- **c.** by breaking down food molecules gradually and capturing their chemical energy
- **d.** by using the sun's energy to break down food molecules and form chemicals

C 2. Which of the following is the correct sequence of events in cellular respiration?
- **a.** glycolysis → fermentation → Krebs cycle
- **b.** Krebs cycle → electron transport → glycolysis
- **c.** glycolysis → Krebs cycle → electron transport
- **d.** Krebs cycle → glycolysis → electron transport

B 3. Which of these is a product of cellular respiration?
- **a.** oxygen
- **b.** water
- **c.** glucose
- **d.** lactic acid

B 4. Which process does NOT release energy from glucose?
- **a.** glycolysis
- **b.** photosynthesis
- **c.** fermentation
- **d.** cellular respiration

D 5. Unlike photosynthesis, cellular respiration occurs in
- **a.** animal cells only.
- **b.** plant cells only.
- **c.** prokaryotic cells only.
- **d.** all eukaryotic cells.

D 6. The starting molecule for glycolysis is
- **a.** ADP.
- **b.** pyruvic acid.
- **c.** citric acid.
- **d.** glucose.

D 7. Which of the following is NOT a product of glycolysis?
- **a.** NADH
- **b.** pyruvic acid
- **c.** ATP
- **d.** glucose

C 8. The Krebs cycle does NOT occur if
- **a.** oxygen is present.
- **b.** oxygen is not present.
- **c.** glycolysis occurs.
- **d.** carbon dioxide is present.

C 9. The Krebs cycle produces
- **a.** oxygen.
- **b.** lactic acid.
- **c.** carbon dioxide.
- **d.** glucose.

A 10. In eukaryotes, electron transport occurs in the
- **a.** inner mitochondrial membrane.
- **b.** nucleus.
- **c.** cell membrane.
- **d.** cytoplasm.

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B 11. High-energy electrons that move down the electron transport chain ultimately provide the energy needed to
a. transport water molecules across the membrane.
b. convert ADP molecules into ATP molecules.
c. convert carbon dioxide into water molecules.
d. break down glucose into pyruvic acid molecules.

D 12. Cellular respiration uses 1 molecule of glucose to produce approximately
a. 2 ATP molecules.
b. 4 ATP molecules.
c. 32 ATP molecules.
d. 36 ATP molecules.

C 13. The air bubbles and spongy texture of bread are due to which process?
a. lactic acid fermentation
b. glycolysis
c. alcoholic fermentation
d. the Krebs cycle

D 14. The conversion of pyruvic acid into lactic acid requires
a. alcohol.
b. oxygen.
c. ATP.
d. NADH.

D 15. All of the following are sources of energy for humans during exercise EXCEPT
a. stored ATP.
b. alcoholic fermentation.
c. lactic acid fermentation.
d. cellular respiration.

Modified True/False

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

F 16. Cellular respiration releases energy by breaking down glucose in the presence of ~~carbon dioxide~~. O2

F 17. The reactants of photosynthesis are the same as the reactants of cellular respiration. products

T 18. The Krebs cycle releases energy in the form of ATP.

T 19. Without the Krebs cycle, the electron transport chain cannot function.

F 20. The first few seconds of intense exercise use up the cell's stores of ~~fat~~. ATP

Completion

Complete each statement on the line provided.

21. The original source of energy for all organisms in an ocean food chain is the Sun.

22. Glycolysis alone nets only 2 molecules of ATP from each glucose molecule.

Name _____ Class _____ Date _____

Short Answer

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

21. Figure 9–1 shows how energy flows among the sun, plants, animals, and fossil fuels. Which arrow represents cellular respiration? Explain your reasoning.

B - flow from animal to plant

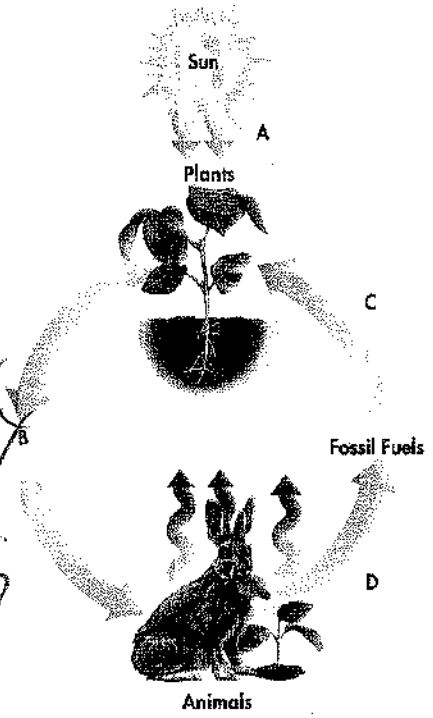

Figure 9–1

22. What roles does oxygen play in photosynthesis and in cellular respiration?

needed to completely break down glucose & efficiently release NRG

23. The electron transport chain uses the energy stored in high-energy electrons to pump H^+ ions across the inner mitochondrial membrane. Why?

Movement of H+ back across membrane through ATP synthase makes ATP from ADP

24. What role does oxygen play in the electron transport chain?

final e- acceptor

Pathway A	Pathway B	Pathway C
Glucose	Glucose	Glucose
↓	↓	↓
Pyruvic acid	Pyruvic acid	Pyruvic acid
↓	↓	↓
	Carbon dioxide	Carbon dioxide
	+	+
Lactic acid	Ethyl alcohol	Water
+	+	+
2 ATP	2 ATP	36 ATP

Figure 9–2

25. Given the inefficiency of two of the pathways shown in Figure 9–2, what advantage could there be to using these pathways to produce energy?

Pathways A & B need no O_2 to produce NRG but not efficiently

Name _____ Class _____ Date _____

Using Science Skills

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

A student poured a solution of bromthymol blue indicator into three test tubes. Then, he placed an aquatic plant in two of the test tubes, as shown. He placed a stopper on each test tube and placed them all in the dark for 24 hours. Bromthymol blue turns from blue to yellow in the presence of CO_2.

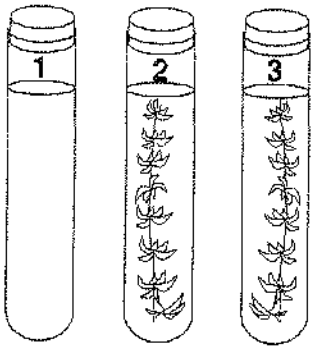

Figure 9–3

26. Apply Concepts Look at Figure 9–3. Which process or processes would you expect the organisms in the test tubes to carry out—cellular respiration, photosynthesis, or both? When would you expect each process to occur?

Exposed to light, plant does both Photo & CR
In dark, only CR

27. Infer What is the purpose of the bromthymol blue in Figure 9–3? How can the student use this indicator to draw conclusions about the processes that the aquatic plants are carrying out? Explain your answer.

It's an indicator for CO_2. Depending on whether the plant is doing Photo or CR it will use or produce CO_2 & Bromothymol Blue will show which is happening

28. Predict Predict what will happen to the test tubes in Figure 9–3 after 24 hours in the dark.

Test tubes 2&3 will turn yellow because plants will use up the CO_2

29. Predict Assume that after 24 hours in the dark, the bromthymol blue in test tubes 2 and 3 in Figure 9–3 had turned yellow. The student then placed test tube 3 in a sunny window. He left test tube 2 in the dark. Predict what color the solution in each test tube will be after the next 24 hours.

#2 → yellow #3 → blue

30. Apply Concepts Explain your prediction in question 29 in terms of cellular respiration and/or photosynthesis.

answers may vary