

BIO112-Chapter 7,8,9 Sample Items

Multiple Choice

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

- ___ 1. Which of the following is NOT a principle of the cell theory?
- Cells are the basic units of life.
 - All living things are made of cells.
 - Very few cells reproduce.
 - All cells are produced by existing cells.
- ___ 2. Looking at a cell under a microscope, you note that it is a prokaryote. How do you know?
- The cell lacks cytoplasm.
 - The cell lacks a cell membrane.
 - The cell lacks a nucleus.
 - The cell lacks genetic material.
- ___ 3. Which of the following is NOT found in the nucleus?
- cytoplasm
 - nucleolus
 - chromatin
 - DNA
- ___ 4. Which structure makes proteins using coded instructions that come from the nucleus?
- Golgi apparatus
 - mitochondrion
 - vacuole
 - ribosome
- ___ 5. Which organelles help provide cells with energy?
- mitochondria and chloroplasts
 - rough endoplasmic reticulum
 - smooth endoplasmic reticulum
 - Golgi apparatus and ribosomes
- ___ 6. You will NOT find a cell wall in which of these kinds of organisms?
- plants
 - animals
 - fungi
 - all of the above
- ___ 7. The cell membrane contains channels and pumps that help move materials from one side to the other. What are these channels and pumps made of?
- carbohydrates
 - lipids
 - bilipids
 - proteins
- ___ 8. Diffusion occurs because
- molecules constantly move and collide with each other.
 - the concentration of a solution is never the same throughout a solution.
 - the concentration of a solution is always the same throughout a solution.
 - molecules never move or collide with each other.
- ___ 9. Which means of particle transport requires input of energy from the cell?
- diffusion
 - osmosis
 - facilitated diffusion
 - active transport
- ___ 10. What are the three parts of an ATP molecule?
- adenine, thylakoids, stroma
 - stroma, grana, chlorophyll
 - adenine, ribose, phosphate groups
 - NADH, NADPH, and FADH₂
- ___ 11. Energy is released from ATP when
- a phosphate group is added.
 - adenine bonds to ribose.
 - ATP is exposed to sunlight.
 - a phosphate group is removed.
- ___ 12. Suppose Priestley repeated his experiment using many kinds of plants besides mint, and that when different plants were placed under the jar the candle remained lighted for different periods of time. What would be a logical conclusion from these experiments?
- Different plants require different amounts of water.
 - Different plants release different amounts of carbon dioxide.

- c. Different plants require different amounts of light.
d. Different plants release different amounts of oxygen.
- ___ 13. 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. c. ATP.
b. carbon dioxide. d. vaporized water.
- ___ 14. In the overall equation for photosynthesis, six molecules of carbon dioxide result in six molecules of
a. glucose. c. oxygen.
b. water. d. ATP.
- ___ 15. Most plants appear green because chlorophyll
a. does not absorb green light. c. absorbs green light.
b. reflects violet light. d. none of the above
- ___ 16. Which of the following is false?
a. A chloroplast contains stroma. c. A granum contains several thylakoids.
b. A stroma contains a thylakoid. d. A thylakoid contains chlorophyll.
- ___ 17. What are the products of the light-dependent reactions?
a. oxygen gas c. NADPH
b. ATP d. all of the above
- ___ 18. 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.
- ___ 19. Which pathway represents the flow of electrons during photosynthesis?
a. H₂O → Photosystem I → Photosystem II
b. O₂ → ADP → Calvin cycle
c. Photosystem I → Calvin cycle → NADPH
d. H₂O → NADPH → Calvin cycle
- ___ 20. What is a product of the Calvin cycle?
a. oxygen gas c. high-energy sugars
b. ATP d. carbon dioxide gas
- ___ 21. How does the Calvin cycle differ from the light-dependent reactions?
a. It takes place in the stroma. c. It requires light.
b. It takes place in chloroplasts. d. It takes place in the thylakoid.
- ___ 22. 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
- ___ 23. Cellular respiration uses one molecule of glucose to produce
a. 2 ATP molecules. c. 36 ATP molecules.
b. 34 ATP molecules. d. 38 ATP molecules.
- ___ 24. Which of these processes takes place in the cytoplasm of a cell?
a. glycolysis c. Krebs cycle
b. electron transport d. all of the above
- ___ 25. Which of the following acts as an electron carrier in cellular respiration?
a. NAD⁺ c. ADP
b. pyruvic acid d. ATP

- ___ 26. The two main types of fermentation are called
 a. alcoholic and aerobic. c. alcoholic and lactic acid.
 b. aerobic and anaerobic. d. lactic acid and anaerobic.
- ___ 27. One cause of muscle soreness is
 a. alcoholic fermentation. c. lactic acid fermentation.
 b. glycolysis. d. the Krebs cycle.
- ___ 28. The conversion of pyruvic acid into lactic acid requires
 a. alcohol. c. ATP.
 b. oxygen. d. NADH.
- ___ 29. The starting molecule for the Krebs cycle is
 a. glucose. c. pyruvic acid.
 b. NADH. d. coenzyme A.
- ___ 30. In eukaryotes, electron transport occurs in the
 a. mitochondria. c. cell membrane.
 b. chloroplasts. d. cytoplasm.
- ___ 31. The energy of the electrons passing along the electron transport chain is used to make
 a. lactic acid. c. alcohol.
 b. citric acid. d. ATP.
- ___ 32. Breathing heavily after running a race is your body's way of
 a. making more citric acid. c. restarting glycolysis.
 b. repaying an oxygen debt. d. recharging the electron transport chain.
- ___ 33. Photosynthesis is to chloroplasts as cellular respiration is to
 a. chloroplasts. c. mitochondria.
 b. cytoplasm. d. nuclei.

Modified True/False

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

- ___ 34. If a cell contains a nucleus, it must be a prokaryote. _____
- ___ 35. The main function of the cell wall is to provide support and protection. _____
- ___ 36. The nuclear envelope regulates which substances enter and leave a cell. _____
- ___ 37. A red blood cell placed in pure water will shrink. _____
- ___ 38. Ultimately, the energy that a carnivore, such as a wolf, uses comes from sunlight.

- ___ 39. ADP is one of the principal chemical compounds that living things use to store energy.

- ___ 40. The Calvin cycle provides cells with compounds that can store energy for more than a few minutes.

- ___ 41. Cellular respiration releases energy by breaking down glucose in the presence of carbon dioxide.

- ___ 42. The products of glycolysis are 2 ATP, 2 NADH, and 2 pyruvic acid molecules. _____
- ___ 43. Without the Krebs cycle, the electron transport chain would produce very few ATPs.

Completion

Complete each statement.

44. Eukaryotes contain specialized structures that perform important cellular functions. These structures are called _____.
45. _____ are photosynthetic membranes inside chloroplasts.
46. Thylakoids are arranged in stacks known as _____.
47. The three main stages of cellular respiration are _____, the Krebs cycle, and _____.
48. Without oxygen, a cell can extract a net gain of only _____ molecules of ATP from each glucose molecule.

Short Answer

49. Suppose a cell were treated with a chemical that inhibits active transport. What would happen?
50. A hypertonic salt solution has a higher concentration of solutes than a blood cell. Explain what happens when a blood cell is placed in a hypertonic salt solution.
51. What happens when a phosphate group is removed from an ATP molecule?
52. A student exposed two plants to only red light and two plants to only green light. Which plants should grow better? Why?
53. Why is the Krebs cycle also known as the citric acid cycle?
54. What is the main function of the electron transport chain?

USING SCIENCE SKILLS

A student put together the experimental setup shown below. The selectively permeable membrane is permeable to both types of solute molecules shown.

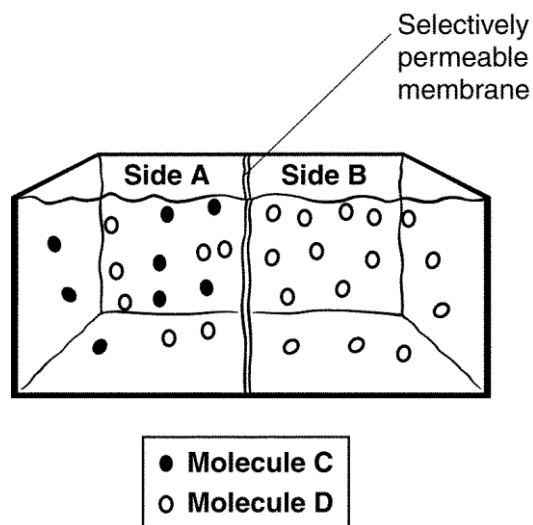


Figure 7-4

55. **Interpreting Graphics** Describe the experimental setup shown in Figure 7-4. Do you expect the distribution of the solutes on each side of the membrane to change over time?
56. **Predicting** Describe the movement of the C molecules on side A of the apparatus shown in Figure 7-4. What will happen to these molecules over time?
57. **Predicting** Once equilibrium is reached in the apparatus shown in Figure 7-4, will the molecules continue to move? Explain your answer.

USING SCIENCE SKILLS

The experimental setup below shows an osmometer. An osmometer is a device used to measure the amount of osmotic pressure exerted by a liquid passing through a semipermeable membrane. The graph shows one lab group's results compared with the results of the rest of the class. Line A represents the results of the single lab group. Line B represents the data of the rest of the class.

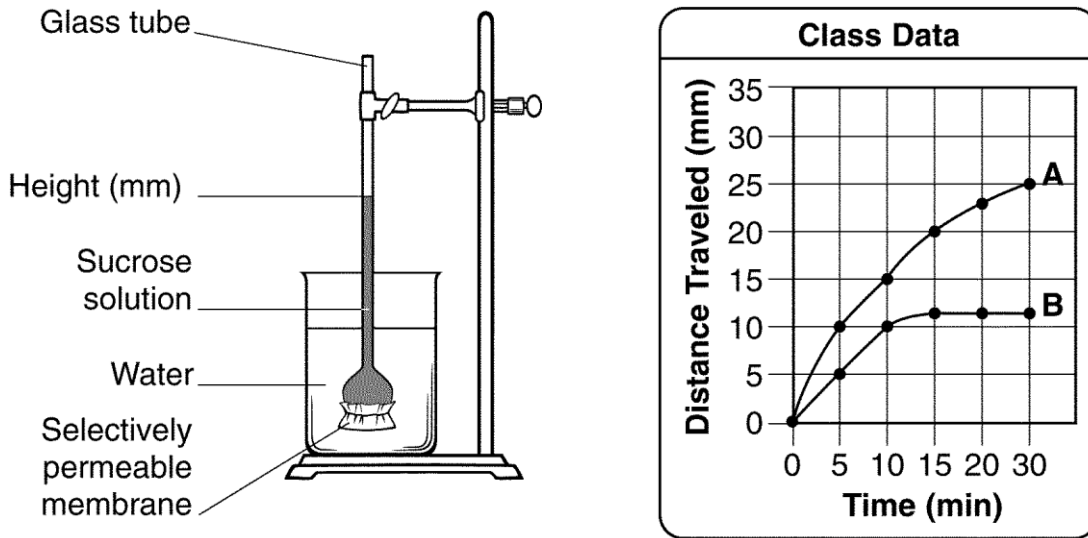


Figure 7-6

58. **Comparing and Contrasting** Look at the graph in Figure 7-6. Compare the lab results of the single lab group with those collected by the rest of the class.
59. **Analyzing Data** Which results in the graph in Figure 7-6 are more likely to be accurate, those represented by line A or by line B? Why?
60. **Evaluating and Revising** What could account for the difference in lines A and B in the graph in Figure 7-6?
61. **Predicting** Look at the graph in Figure 7-6. How would the results differ if a sucrose solution with twice the concentration of the one used to collect the results represented by line A were used?
62. **Calculating** How might you use the graph in Figure 7-6 to calculate the rate of osmosis observed? What units would you use to report the rate?

USING 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 each sprig of the water plant. Shown here is the graph of the data for the beaker she placed in the light.

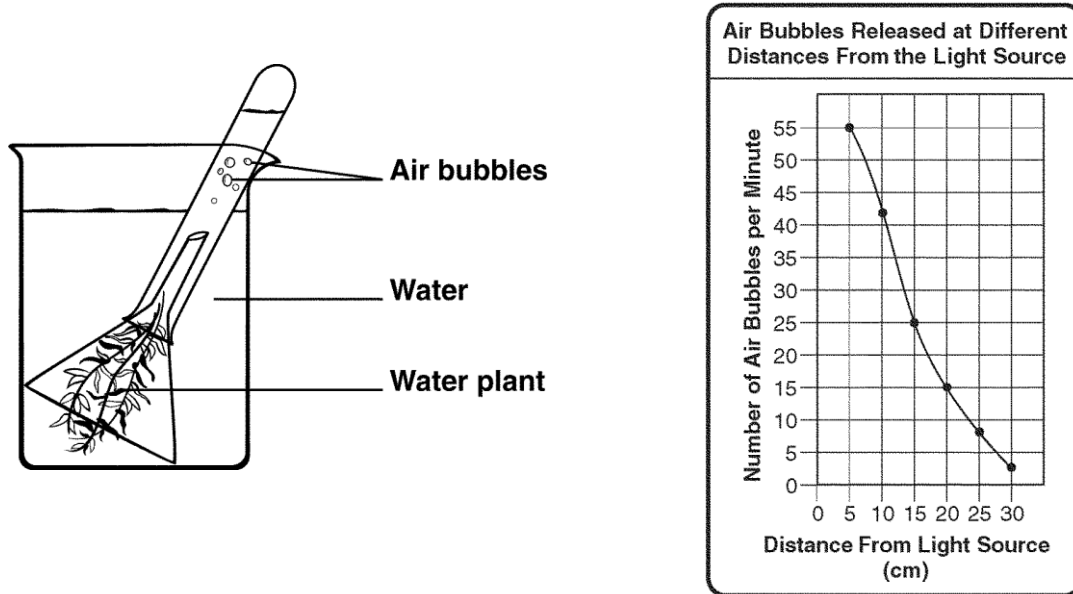


Figure 8-4

63. **Controlling Variables** Which beaker is the student's control?
64. **Applying Concepts** Look at Figure 8-4. If the student later tested the bubbles collected in the test tube, what would she find they are made of? How do you know?
65. **Using Tables and Graphs** Look at the graph in Figure 8-4. At what distance from the light source was the greatest number of bubbles produced?
66. **Analyzing Data** Look at the graph in Figure 8-4. What do the student's data show?
67. **Predicting** If the lamp were placed closer than 5 centimeters from the water plant, would the plant give off many more bubbles? Why or why not?

USING SCIENCE SKILLS

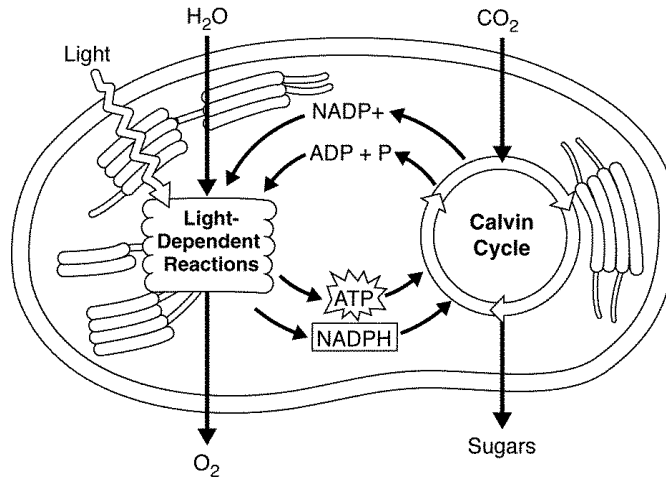


Figure 8-6

68. **Interpreting Graphics** What process is shown in Figure 8-6?
69. **Interpreting Graphics** What structure is shown in Figure 8-6?
70. **Interpreting Graphics** Look at Figure 8-6. What are the products of the light-dependent reactions?

USING SCIENCE SKILLS

A scientist set up a respiration chamber as shown below. She placed a mouse in flask B. Into flasks A, C, and D, she poured distilled water mixed with the acid-base indicator phenolphthalein. In the presence of CO₂, phenolphthalein turns from pink to clear. She allowed the mouse to stay in the chamber for about an hour.

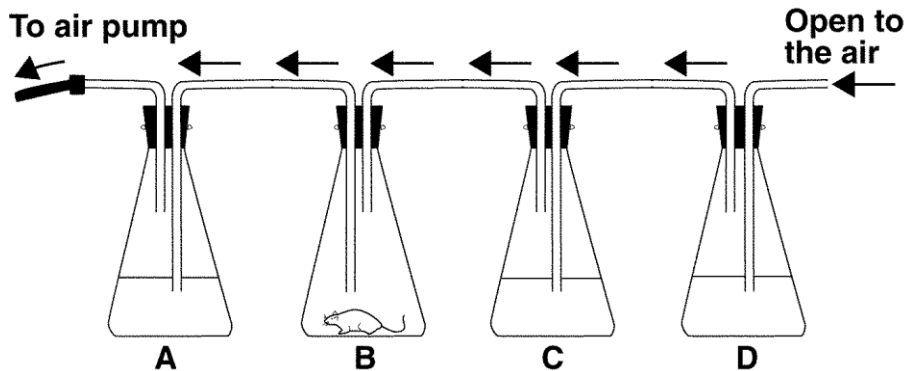


Figure 9-2

71. **Inferring** Write the equation for cellular respiration. Based on this equation and the setup shown in Figure 9-2, what substance(s) would you expect the mouse in flask B to give off?
72. **Interpreting Graphics** What will the mouse require to carry out cellular respiration? Look at the flasks in Figure 9-2. Describe the flow of materials through the flasks. Will the mouse receive fresh air so that it can survive?

73. **Interpreting Graphics** Based on Figure 9–2, how will the scientist be able to detect whether the mouse is carrying out cellular respiration?
74. **Applying Concepts** Assume that the scientist set up an identical respiration chamber, except that in this setup she placed a cricket in flask B instead of a mouse. At the end of one hour, she measured the amount of CO_2 given off by the cricket and the mouse. A small amount of CO_2 had been given off by the mouse, but little to no CO_2 had been given off by the cricket. Was the cricket undergoing cellular respiration? Explain these results.
75. **Predicting** Assume that the scientist set up an identical respiration chamber, except that in this setup she placed a mouse that had been exercising on a hamster wheel. Then, the scientist measured the amount of CO_2 given off by both mice at the end of 15 minutes. Predict which setup produced the most CO_2 . Explain your answer.

USING SCIENCE SKILLS

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 below. 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 .

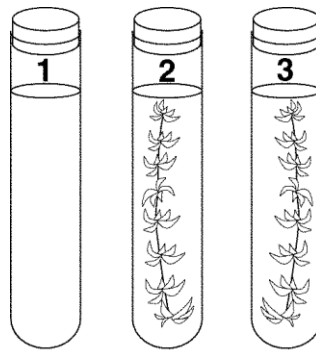


Figure 9–4

76. **Applying Concepts** Look at Figure 9–4. 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?
77. **Inferring** What is the purpose of the bromthymol blue in Figure 9–4? How can the student use this indicator to draw conclusions about the processes that the aquatic plants are carrying out? Explain your answer.
78. **Predicting** Predict what will happen to the test tubes in Figure 9–4 after 24 hours in the dark.
79. **Predicting** Assume that after 24 hours in the dark, the bromthymol blue in test tubes 2 and 3 in Figure 9–4 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.
80. **Applying Concepts** Explain your prediction in question 14 in terms of cellular respiration and/or photosynthesis.
81. Describe the experiments of van Helmont, Priestley, and Ingenhousz. How did the work of these scientists contribute to our current understanding of photosynthesis?