

Study Guide Chapter 3

Multiple Choice

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

- _____ 1. What are the products of photosynthesis?
 - a. carbon dioxide and water
 - b. oxygen and water
 - c. carbon dioxide and sugars
 - d. oxygen and sugars
- _____ 2. What happens during photosynthesis?
 - a. The cell uses oxygen to make food.
 - b. The cell uses the energy in sunlight to make food.
 - c. The cell uses glucose to make oxygen.
 - d. The cell uses the energy in sunlight to make carbon dioxide.
- _____ 3. How does photosynthesis benefit heterotrophs?
 - a. It adds carbon dioxide to the air.
 - b. It creates food that they can eat.
 - c. It eliminates harmful sugars.
 - d. It creates clean water.
- _____ 4. What happens during respiration?
 - a. Oxygen is released into the air.
 - b. Glucose is broken down, releasing energy.
 - c. Carbohydrates are released into the bloodstream.
 - d. Water and carbon dioxide are converted into energy.
- _____ 5. The stage of respiration that releases most of the energy in glucose occurs in the
 - a. nucleus.
 - b. chloroplast.
 - c. cytoplasm.
 - d. mitochondria.
- _____ 6. How are photosynthesis and respiration related?
 - a. They have opposite equations.
 - b. They have the same equation.
 - c. They both produce carbon dioxide.
 - d. They both produce oxygen.
- _____ 7. Together, respiration and photosynthesis keep the levels of carbon dioxide and oxygen in the atmosphere
 - a. fairly constant.
 - b. constantly changing.
 - c. constantly increasing.
 - d. constantly decreasing.
- _____ 8. The energy-releasing process that does not require oxygen is called
 - a. photosynthesis.
 - b. respiration.
 - c. fertilization.
 - d. fermentation.

Name: _____

ID: A

- _____ 9. Under which of the following conditions is lactic-acid fermentation most likely to occur?
- a very fast run
 - a long walk
 - sleeping
 - playing video games
- _____ 10. Mitosis is the stage of the cell cycle during which
- the cell's nucleus divides into two new nuclei.
 - the cell's DNA is replicated.
 - the cell divides into two new cells.
 - the cell's cytoplasm divides.
- _____ 11. What happens during cytokinesis in animal cells?
- A new round of mitosis begins.
 - Two new daughter cells are formed.
 - Each organelle divides into two parts.
 - A cell plate forms in the middle of the cell.
- _____ 12. A DNA molecule is shaped like a
- long, thin rod.
 - spiral staircase.
 - straight ladder.
 - triple helix.
- _____ 13. During DNA replication, adenine (A) always pairs with
- guanine (G).
 - cytosine (C).
 - thymine (T).
 - adenine (A).
- _____ 14. What captures energy from sunlight during photosynthesis?
- solar cells
 - stomata
 - chlorophyll and other pigments
 - carbohydrates
- _____ 15. Each rung of the DNA ladder is made of
- a single nitrogen base.
 - a pair of nitrogen bases.
 - three nitrogen bases.
 - four nitrogen bases.
- _____ 16. During what stage of the cell cycle does replication occur?
- interphase
 - cytokinesis
 - prophase
 - mitosis
- _____ 17. What is copied during replication?
- the cell's organelles
 - chromosomes
 - the cell's DNA
 - two daughter cells

- _____ 18. What are chromatids?
- identical strands of chromosomes
 - identical daughter cells
 - doubled rods of condensed chromatin
 - pigments that absorb the energy in sunlight
- _____ 19. What forms around the chromatids during mitosis?
- two new chromosomes
 - two new nuclei
 - two new cells
 - two new DNA molecules
- _____ 20. The stage of the cell cycle that follows mitosis is called
- interphase.
 - metaphase.
 - cytokinesis.
 - telophase.
- _____ 21. The regular cycle of growth and division that cells undergo is called
- replication.
 - the cell cycle.
 - interphase.
 - mitosis.
- _____ 22. All organic compounds contain the element
- water.
 - oxygen.
 - carbon.
 - nitrogen.
- _____ 23. Why is water important for a cell?
- Water is the main ingredient in DNA.
 - All proteins are made of water.
 - Most chemical reactions in cells require water.
 - Water is an essential organic compound for the body.
- _____ 24. Which term refers to the movement of molecules from an area of higher concentration to an area of lower concentration?
- collision
 - diffusion
 - active transport
 - concentration
- _____ 25. Which term refers to the diffusion of water molecules through a selectively permeable membrane?
- osmosis
 - engulfing
 - active transport
 - passive transport
- _____ 26. Which term refers to the movement of materials through a cell membrane without using the cell's energy?
- concentration
 - collision
 - active transport
 - passive transport

- ____ 27. Enzymes are important because they
- contain water.
 - speed up chemical reactions.
 - contain genetic material.
 - help the cell maintain its shape.
- ____ 28. Sugar molecules can combine with one another to form large molecules called
- proteins.
 - starches.
 - enzymes.
 - lipids.
- ____ 29. When two or more elements combine chemically, they form a(n)
- lipid.
 - atom.
 - element.
 - compound.

Completion

Complete each sentence or statement.

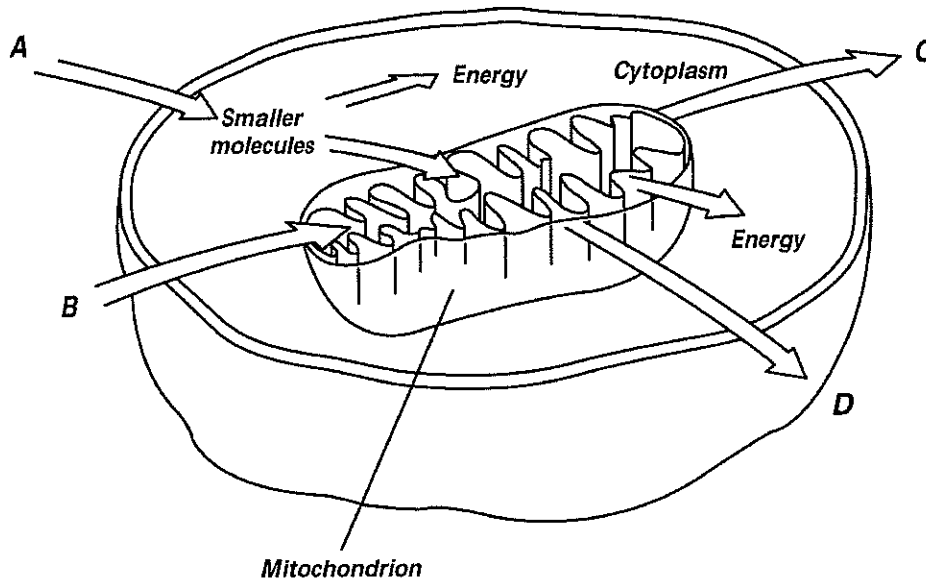
30. Small openings called _____ allow carbon dioxide to enter a leaf.
31. Almost all living things depend on the process of _____ to supply them with the energy they need.
32. During respiration, molecules of _____ are first broken down in the cytoplasm.
33. Energy from glucose is released in the process of _____.
34. The main difference between respiration and fermentation is that respiration uses _____ to obtain energy from food.
35. The products of respiration are energy, carbon dioxide, and _____.
36. A cell's nucleus divides to form two identical nuclei during the stage of the cell cycle known as _____.
37. The final stage of the cell cycle, during which the cytoplasm divides, is called _____.
38. Chloroplasts contain a pigment called _____ that captures the energy in light.
39. During cytokinesis in plant cells, a(n) _____ forms across the middle of the cell.
40. _____ is the process by which a cell makes an exact copy of its DNA.
41. DNA and RNA belong to the group of organic compounds known as _____.
42. Oxygen molecules move across cell membranes through a process called _____.
43. The diffusion of _____ molecules through a selectively permeable membrane is called osmosis.
44. Unlike passive transport, active transport requires the cell to use its own _____.
45. Small molecules called _____ make up proteins.

46. When two or more elements combine chemically, they form a(n) _____.

Short Answer

Use the diagram to answer each question.

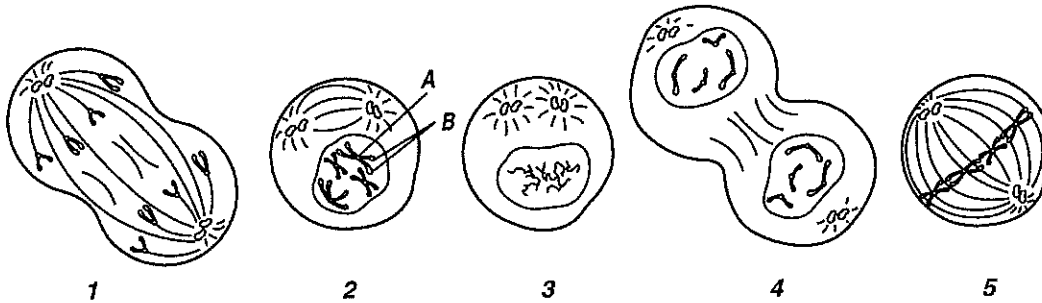
Respiration



47. Identify A and B, which are the raw materials for respiration.
48. Explain where raw materials A and B come from.
49. Identify C and D, which are the products of respiration.
50. Is oxygen required for the stage of respiration that takes place in the cytoplasm? Is oxygen required for the stage of respiration that takes place in mitochondria?
51. Compare the amount of energy released by the stage of respiration that takes place in the cytoplasm with the amount released in the stage of respiration that takes place in the mitochondria.
52. Can you tell whether the cell shown is a plant cell or an animal cell? Explain why or why not.

Use the diagram to answer each question.

The Cell Cycle



53. Identify the stages of the cell cycle represented by drawings 1–5.
54. Which drawings represent parts of mitosis?
55. List drawings 1-5 in their correct order, beginning with the drawing that represents interphase.
56. Identify structure A and describe its function.
57. Identify the structures labeled B. What do these structures contain?
58. Explain what is happening in drawing 4.

Essay

59. Briefly explain what happens in each of the two stages of photosynthesis.
60. Explain the following statement: Photosynthesis and respiration are opposite processes.
61. Animals do not make their own food from energy in sunlight. Explain why they still depend on the sun for energy.
62. Define DNA replication and explain its function.
63. Suppose one side of a piece of DNA contains the following series of nitrogen bases: A-C-G-C-T-T. What is the series of nitrogen bases on the other side of that piece of DNA? Explain how you arrived at your answer.
64. Raising the temperature of a substance causes its molecules to move faster. Explain why raising the temperature of a liquid would speed up diffusion.
65. Describe the two methods of active transport.