

# Repaso de la sección

## Energía de la célula

### USAR TÉRMINOS CLAVE

1. Define el término *fermentación* en tus propias palabras.

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### COMPRENDER LAS IDEAS PRINCIPALES

- \_\_\_\_\_ 2. Se libera  $O_2$  durante
- a. la respiración celular.
  - b. la fotosíntesis.
  - c. la respiración.
  - d. la fermentación.
3. ¿De qué manera se relacionan la fotosíntesis y la respiración celular?

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4. ¿En qué se parecen la respiración y la fermentación? ¿En qué se diferencian?

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### DESTREZAS MATEMÁTICAS

5. Las células de la planta A producen 120 moléculas de glucosa en una hora. Las células de la planta B producen la mitad de la glucosa que produce la planta A. ¿Cuánta glucosa produce por minuto la planta B? Muestra tu trabajo en el espacio en blanco.

**Repaso de la sección (continuación)**

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**RAZONAMIENTO CRÍTICO**

**6. Analizar relaciones** ¿Por qué son importantes las plantas para la supervivencia de todos los demás organismos?

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**7. Aplicar conceptos** Te han asignado la tarea de restaurar la vida en una isla desierta. ¿Qué clases de organismos pondrías en la isla? Si quieres que en la isla haya animales, ¿qué otros organismos debes traer? Explica tu respuesta.

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## Vocabulary and Section Summary

### SECTION: EXCHANGE WITH THE ENVIRONMENT

1. diffusion: the movement of particles from regions of higher density to regions of lower density
2. osmosis: the diffusion of water through a semipermeable membrane
3. passive transport: the movement of substances across a cell membrane without the use of energy by the cell
4. active transport: the movement of substances across the cell membrane that requires the cell to use energy
5. endocytosis: the process by which a cell membrane surrounds a particle and encloses the particle in a vesicle to bring the particle into the cell
6. exocytosis: the process in which a cell releases a particle by enclosing the particle in a vesicle that then moves to the cell surface and fuses with the cell membrane

### SECTION: CELL ENERGY

1. photosynthesis: the process by which plants, algae, and some bacteria use sunlight, carbon dioxide, and water to make food
2. cellular respiration: the process by which cells use oxygen to produce energy from food
3. fermentation: the breakdown of food without the use of oxygen

### SECTION: THE CELL CYCLE

1. cell cycle: the life cycle of a cell
2. chromosome: in a eukaryotic cell, one of the structures in the nucleus that are made up of DNA and protein; in a prokaryotic cell, the main ring of DNA
3. homologous chromosomes: chromosomes that have the same sequence of genes and the same structure
4. mitosis: in eukaryotic cells, a process of cell division that forms two new nuclei, each of which has the same number of chromosomes
5. cytokinesis: the division of the cytoplasm of a cell

## Section Review

### SECTION: EXCHANGE WITH THE ENVIRONMENT

1. Sample answer: Diffusion is when any kind of particles move from a crowded area to a less crowded area. Osmosis is diffusion of water through a semi-permeable membrane.
2. Sample answer: Active transport requires energy, while passive transport does not require energy.
3. Sample answer: Endocytosis is the process that brings things into a cell, and exocytosis takes things out of a cell.
4. B
5. Small particles move through channels in the cell membrane.
6. 5
7. Sample answer: If a cell were unable to transport particles, it could not get the materials that it needs or remove wastes. The cell would most likely die. If many of an organism's cells were damaged in this way, the organism would become sick and might die.
8. Active transport requires energy because the cell must work against the flow of particles.

### SECTION: CELL ENERGY

1. Sample answer: Fermentation is the process by which some organisms get energy from food without using oxygen.
2. B
3. Photosynthesis uses the waste materials of cellular respiration, CO<sub>2</sub> and H<sub>2</sub>O, to generate glucose. Cellular respiration uses the waste material of photosynthesis, O<sub>2</sub>, to break down glucose.
4. Cellular respiration and fermentation both release the energy stored in food. Fermentation does not use oxygen, and cellular respiration does use oxygen.
5. The cells of plant B make an average of 1 glucose molecule per minute.
6. Sample answer: Plants turn energy from the sun into chemical energy. Animals that eat the plants use the stored energy. Plants also produce O<sub>2</sub>.

7. Sample answer: Animals such as birds, insects, and mammals would be good on the island. Plants must be on the island in order to provide a source of food for the animals.

### SECTION: THE CELL CYCLE

1. Sample answer: The cell cycle describes all of the stages a cell goes through in its life. Cytokinesis is the last stage of cell reproduction when a cell's cytoplasm is split between the two new cells.
2. C
3. Chromosomes need to be copied so that the two new cells have the same genetic material as the parent cell.
4. Sample answer: Before mitosis begins, the chromosomes are copied. In phase 1, the nuclear membrane dissolves, and the chromosomes condense. In phase 2, the chromosomes line up along the equator of the cell, and homologous chromosomes pair up. In phase 3, the chromatids move to opposite sides of the cell. In phase 4, a nuclear membrane forms around the chromosomes, and the chromosomes unwind.
5. 8
6. If cytokinesis occurred without mitosis, each cell would only have half of the parent cell's genetic material or less.
7. Mitosis ensures that each new cell receives a copy of each chromosome, and hence, an exact copy of the parent cell's genetic material.
8. The processes of animal and plant cells are different because plant cells have cell walls. Cytokinesis is different in plant cells, but all other stages of mitosis are essentially the same as they are in animal cells.
6. Active transport requires the cell to use energy to move substances. Passive transport does not require the cell to use any energy.
7. Cellular respiration releases stored energy by using oxygen. Fermentation releases stored energy without using oxygen.
8. C
9. A
10. D
11. C
12. Endocytosis and exocytosis are examples of active transport. In both processes the cell must change shape, wrap around a particle, and make other movements that require the cell to use energy.
13. Chloroplasts are needed for photosynthesis. Cellular respiration requires mitochondria.
14. The first stage is cell growth and copying of DNA (duplication.) The second stage is mitosis, which involves separating the duplicated chromosomes. The third stage is cytokinesis (cell division), which results in two separate, identical cells.
15. An answer to this exercise can be found at the end of the Teacher Edition.
16. The plant on the left was given pure water. The plant on the right was given salt water. Osmosis occurred in both plants. In the plant on the left, water moved into the plant because the concentration of water was lower in the plant than in the soil. So, the plant on the left did not wilt. In the plant on the right, the water in the plant moved into the soil, where the concentration of water was lower. The concentration of water in the soil was lower because the water contained salt. As a result, the plant on the right wilted.

### Chapter Review

1. Sample answer: Osmosis is the diffusion of water through a semipermeable membrane.
2. Sample answer: Exocytosis is the process cells use to remove large particles; endocytosis is the process cells use to move large particles into a cell.
3. photosynthesis
4. cellular respiration
5. Cytokinesis is the division of just the cytoplasm. Mitosis is the process in eukaryotic cells in which the nuclear material splits to form two new nuclei.
17. When there is plenty of oxygen, the cells can get energy from cellular respiration. When there is a lack of oxygen, the cell must use fermentation, which doesn't produce as much energy. For fermentation to produce more energy, more food would be required.