

## Chapter 5 Review

1. Explain the term “selectively permeable.” What makes the cell membrane selectively permeable?

“Selectively permeable” means only certain things can pass through. In a cell membrane, proteins act as gatekeepers, allowing some particles to pass through, but not others. The layers of fat particles making up the membrane allow some small particles to diffuse through directly, but prevent larger particles from doing so.

2. What is the rule that governs the direction of the diffusion of particles? Particles diffuse from an area where they are more concentrated to an area where they are less concentrated.

3. How is the concentration gradient of a substance important to diffusion?

Without a concentration gradient, diffusion would not occur. The concentration gradient allows particles to move from an area where they are more concentrated to an area where they are less concentrated.

4. Name two substances that are exchanged across the cell membranes of red blood cells and muscle cells.

Oxygen and carbon dioxide are exchanged across the cell membranes of red blood cells and muscle cells.

5. Name three particles that are small enough to diffuse freely across a cell membrane.

Particles of water, oxygen, and carbon dioxide are all small enough to diffuse freely across the cell membrane.

6. Explain osmosis in your own words. What is the significance of solute concentration to osmosis?

Osmosis is a type of diffusion in which water moves across a membrane. The more solute particles you have on one side of the membrane, the greater the concentration gradient. Water particles will move from the side of the membrane where they are more concentrated (and the solute particles are less concentrated) to the side where they are less concentrated (and the solute particles are more concentrated).

7. What does it mean if a plant cell is turgid?

A turgid plant cell is one that is swollen with water.

8. Give two examples of when a cell might use exocytosis.

A cell might use exocytosis to remove wastes from the cell or to send chemicals out of the cell that are needed elsewhere in the body.

9. Why is phagocytosis often called “cell eating”?

When a living thing takes in nutrients from its environment, we say it is eating. Phagocytosis, which means “cell eating,” is a good name for the type of endocytosis in which the cell takes in large particles from its environment because many cells use the process to take in nutrients.

10. Why is an air freshener a good model for diffusion? Can you think of other good models of diffusion?

Sample answer: An air freshener is a good model of diffusion because the scent particles are initially concentrated around the freshener and gradually move by diffusion through the rest of the room where the scent particles are less concentrated. An open perfume bottle or a drop of food coloring in a glass of water would be other good models for diffusion.

11. Use your knowledge of diffusion to explain

1. Figure 1. You may use diagrams. In the picture some dye has been placed in a beaker of water. The dye moves from areas of high dye concentration to lower dye concentration. Over time, the dye will spread evenly throughout the beaker.



12. Explain the roles of osmosis, the cell wall, and vacuoles in creating turgor pressure.

Water moves by osmosis into a cell because the concentration of water is greater outside the cell than inside the cell. As water enters the cell, the central vacuole fills and the cell swells. As the cell swells, the cell membrane pushes outward (against the cell wall in plants), resulting in turgor pressure.

13. How are osmosis and diffusion different?

Osmosis is a form of diffusion that takes place across a membrane. Osmosis specifically involves the diffusion of water.

How are they the same?

In both processes, particles move down a concentration gradient from an area where they are more concentrated to an area where they are less concentrated.

14. Predict what might happen to an animal cell if it was placed in a beaker of distilled water.

An animal cell has a greater concentration of solutes (and a lower concentration of water particles) than distilled water. If you placed an animal cell into a beaker of distilled water, water particles would move by osmosis from where they are more concentrated in the beaker to where they are less concentrated in the cell. The cell would swell up and might die.

15. Why do plants cells not burst when water diffuses into them?

Water that moves into a plant cell causes the cell to swell, pushing the cell membrane up against the cell wall. The rigid cell wall keeps the cell from bursting.

### What Do You Understand?

16. Golf courses make use of fertilizers to keep the grass green and healthy. Using your knowledge of osmosis, explain how applying too much fertilizer might not help the golf course stay green.

Applying too much fertilizer to the grass will create a concentration gradient between the solution in the soil and the solution inside the plant cells. The concentration of solute outside the plant cells will be greater than that inside and water will leave the plant cells by osmosis. The plant cells will shrink and cause the plants to wilt or even die.

17. Mary came home from school and looked in the fridge for a snack. She loves celery, but it was wilted. She placed the celery into a tall glass filled with water and left it for a while. Why did she do this?

The celery wilted because some of the water inside the cells left the cells by osmosis and evaporated. Mary placed the wilted celery into a glass of water so that water would enter the cells of the celery by osmosis.