Name Date Class

Section 8.1

Cellular Transport

North Carolina Objectives **Objective 2.03** Investigate the cell as a living system including: Maintenance of homeostasis; Movement of materials into and out of cells

Before You Read

This section is about cell transport. You will learn how substances move in and out of cells. Think about the ways you have seen things being moved from place to place. When are things easily transported? When it is more difficult, what types of equipment might be used to help move things along? Write your thoughts on the lines below.

Read to Learn

Osmosis: Diffusion of Water

The plasma membrane of a cell is called a selectively permeable membrane. This means only certain particles, or molecules, are let in and out of a cell.

Water is the only substance the plasma membrane always allows in or out. The movement of water from an area of higher concentration to an area of lower concentration, or diffusion, across the plasma membrane is called **osmosis** (ahs MOH sus). This water flow through the membrane helps create homeostasis. Homeostasis is the regulation of the cell's internal environment.

How does osmosis affect cells?

Most cells undergo osmosis because they are floating in water solutions. When a cell is floating in an isotonic solution, the water moves in and out of the cells at the same rate. In an **isotonic solution,** dissolved substances inside and outside of the cell have the same concentration. Because the amount of water moving in and out of the cells is the same, the cells keep their normal shape.

When a cell is floating in a hypotonic solution, more water enters the cell through osmosis than leaves it. In a **hypotonic solution,** the concentration of dissolved substances is lower outside of the cell than inside. The cell swells because of the extra water that enters. As a result, the cell's internal pressure increases.

In a hypertonic solution, water moves out of the cell during osmosis. When a cell is floating in a **hypertonic solution,** the concentration of dissolved substances outside of the cell is higher

STUDY COACH

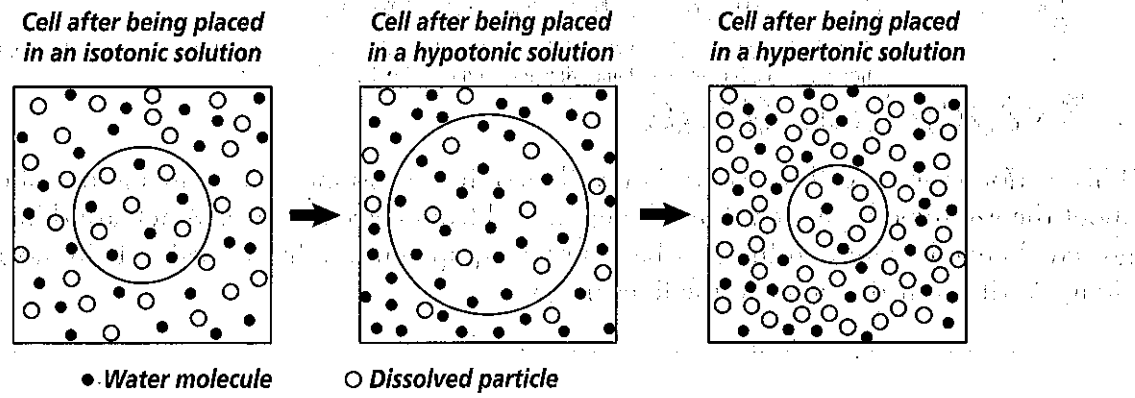
Mark the Text **Read for Understanding** As you read this section, highlight any sentence that you reread. Reread any sentences you highlighted.

Reading Check

1. What is the term for the flow of water across the plasma membrane?

Section 8.1

Cellular Transport, *continued*



than inside of the cell. As water leaves the cell, the cell shrinks, and the pressure inside of the cell decreases.

Reading Check

2. What is the movement called when a cell does not use energy to move particles across the cell's membrane?

_____

_____

_____

Passive Transport

Some molecules, like water, can pass through the plasma membrane by simple diffusion. When the cell uses no energy to move such particles, the movement is called **passive transport.**

Special proteins in the plasma membrane move materials across the membrane. These are called transport proteins. When transport proteins help the passive transport of materials, the process is called **facilitated diffusion.**

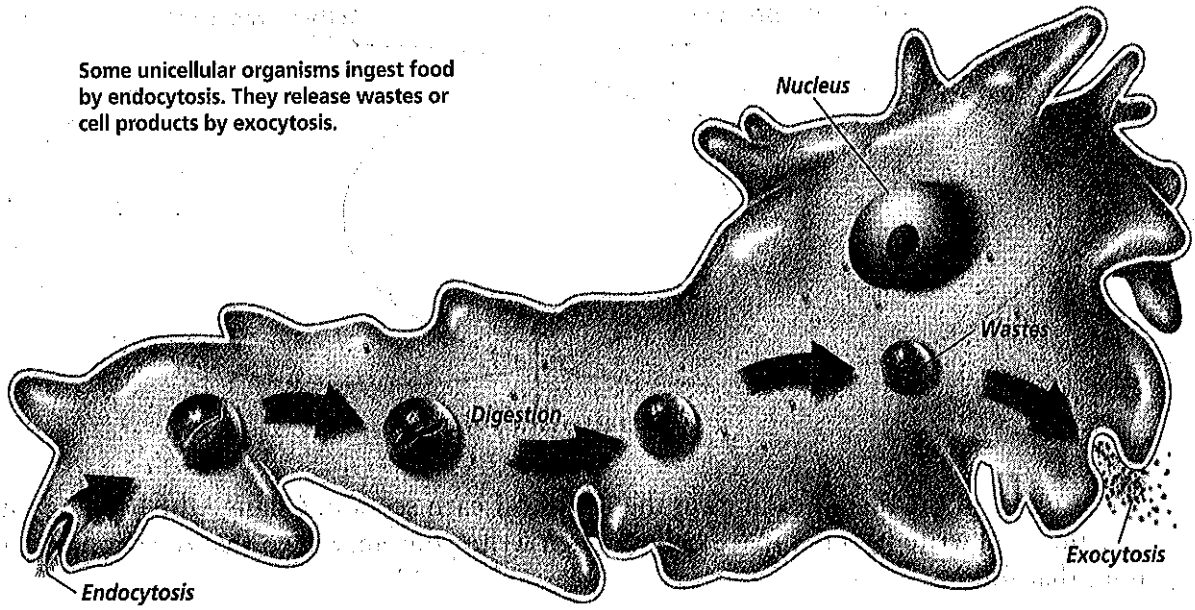
Active Transport

In **active transport,** a transport protein called a carrier protein helps move particles across the membrane against a force. That force is called a concentration gradient. A concentration gradient develops when there are more molecules on one side of a membrane than the other. Because the transport protein has to work hard against the concentration gradient, energy is needed for the carrier protein to move the particles. The transport of substances across cell membranes is what helps cells maintain homeostasis.

Transport of Large Particles

Endocytosis (en doh si TOH sus) is the process in which a cell takes in material from its surroundings and then releases the material inside the cell. During endocytosis, a cell surrounds and takes in material from its environment. This material does not pass directly through the membrane. Instead, it is engulfed and enclosed by a portion of the cell's plasma membrane. It then breaks away and moves to the inside of the cell.

Exocytosis is the reverse process of endocytosis. It is the process of a cell taking material from inside itself and secreting or expelling it from the cell. The material can be wastes or other chemicals. The figure below illustrates endocytosis and exocytosis.



After You Read

Mini Glossary

active transport: energy-needing process by which cells transport materials across the cell membrane against a concentration gradient

endocytosis (en doh si TOH sus): active transport process where a cell engulfs materials with a portion of the cell's plasma membrane and releases the contents within the cell

exocytosis: active transport process by which materials are secreted or expelled from a cell

facilitated diffusion: passive transport of materials across a plasma membrane by transport proteins embedded in the plasma membrane

hypertonic solution: in cells, solution in which the concentration of dissolved substances outside the cell is higher than the concentration inside the cell; causes a cell to shrink as water leaves

hypotonic solution: in cells, solution in which the concentration of dissolved substances is lower in the solution outside the cell than the concentration inside the cell; causes a cell to swell and possibly burst as water enters the cell

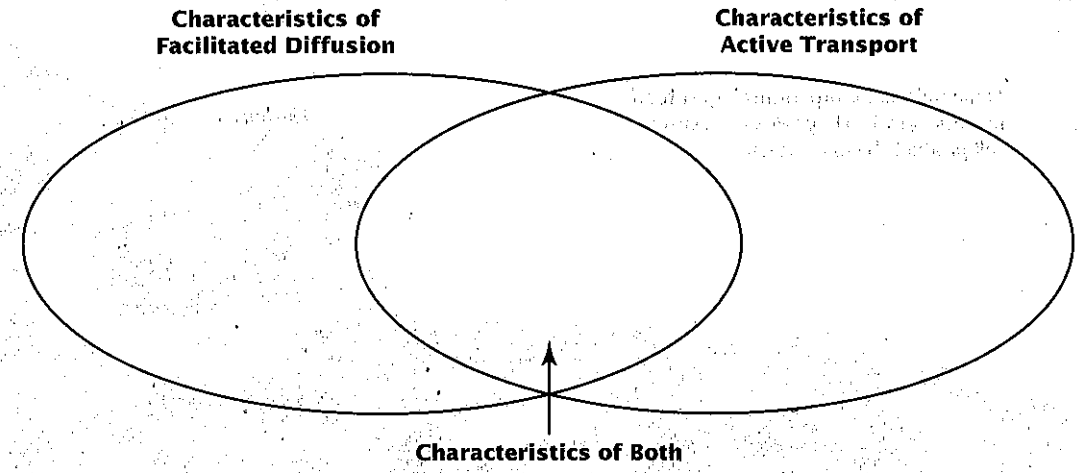
isotonic solution: in cells, solution in which the concentration of dissolved substances in the solution is the same as the concentration of dissolved substances inside a cell

osmosis (ahs MOH sus): diffusion of water across a selectively permeable membrane depending on the concentration of solutes on either side of the membrane

passive transport: movement of particles across cell membranes by diffusion or osmosis; the cell uses no energy to move particles across the membrane

Section 8.1 Cellular Transport, *continued*

1. Highlight two terms in the Mini Glossary on page 81 that identify specific types of active cell transport.
2. Use the Venn diagram to help you review what you have read about cell transport.



3. Choose one of the main headings in the Read to Learn section. Change the heading into a question and write it in the space below. Then write your answer to that question on the lines that follow.

Question:

Answer:

Visit the Glencoe Science Web site at **science.glencoe.com** to find your book and learn more about cellular transport.