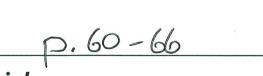
Lesson	Outline
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Moving Cellular Material
A. Passive Transport
1. A cell membrane is, which means that it allows only certain substances to enter or leave a cell.
2. Passive transport is the movement of substances through a cell membrane withou
using the cell's
B. Diffusion
1. Diffusion is the movement of substances from an area of
concentration to an area of
concentration.
2. Usually diffusion continues through a membrane until the
of a substance is the same on both sides of the
membrane.
C. Osmosis—The Diffusion of Water
1. Osmosis is the diffusion of molecules only through a membrane.
2. If the concentration of water in the air surrounding a plant is less than the concentration of water inside the plant's vacuoles, water will diffuse into the
until the concentrations of water are equal.
3. Facilitated diffusion allows molecules to pass through a cell membrane using proteins.
a. Carrier proteins carry through the cell membrane.
b. proteins allow ions to pass through the cell membrane.
D. Active Transport
1. Active transport uses the cell's to move substances through a cell membrane.
2. Active transport moves substances from areas of

concentration to areas of ______ concentration.

Lesson Outline continued

- **3.** A cell uses _______ to take in a substance by surrounding it with the cell membrane.
- **4.** A cell's vesicles release their contents outside the cell during ______.
- **E.** Cell Size and Transport
 - **1.** For a cell to survive, its surface area must be large compared to its
 - **2.** As a cell ______, its volume increases faster than its surface area.

Content Vocabulary

LESSON 3

Moving Cellular Material

Directions: Write the correct term in the boxes to the right of each definition. Then use the letters in the numbered boxes to spell a seventh term.

active transport

diffusion

endocytosis

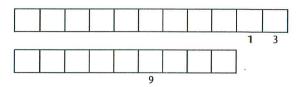
exocytosis

facilitated diffusion

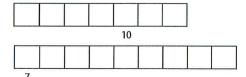
osmosis

passive transport

1. occurs with the help of transport proteins



2. movement through a cell's membrane without using the cell's energy



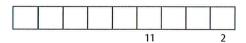
3. movement through a cell's membrane that requires energy



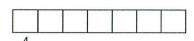
4. when a vesicle releases its contents outside of a cell



5. movement of substances from higher to lower concentration



6. diffusion of water molecules



7. is the process during which a cell takes in a substance by surrounding it with the cell membrane.

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Math Skills 🧲

LESSON 3

Use Ratios

The area of a rectangle is the length times the width, or $A = l \times w$. The surface area of a rectangular solid is the sum of the areas of the six surfaces. The volume of this solid is the product of the length, width, and height, or $V = l \times w \times h$. The ratio of surface area to volume compares the amount of surface area on a three-dimensional solid to the volume of the solid. This ratio may be expressed as A/V or A:V.

A rectangular solid measures **10** cm wide, **5** cm long, and **2** cm tall. What is the ratio of surface area to volume?

Step 1 Calculate the surface area. Add the areas of the six surfaces.

$$(10 + 5) + (10 \times 5) + (5 \times 2) + (5 \times 2) + (2 \times 10) + (2 \times 10) = 160 \text{ cm}^2$$

Step 2 Calculate the volume.

$$10 \times 5 \times 2 = 100 \text{ cm}^3$$

Step 3 Write the ratio. Divide by the greatest common factor to simplify.

$$A:V = 160:100$$

$$160 \div 20 = 8$$
 and $100 \div 20 = 5$

$$A/V = 8:5$$

Practice

- **1.** A rectangular solid has a surface area of 22 cm² and a volume of 6 cm³. What is the surface-area-to-volume ratio?
- **3.** A rectangular solid measures 5 cm long by 3 cm wide by 1 cm high. What is the surface-area-to-volume ratio?

- **2.** A rectangular solid has a surface area of 52 cm² and a volume of 24 cm³. What is the surface-area-to-volume ratio?
- **4.** A rectangular solid measures 8 cm long by 2 cm wide by 2 cm high. What is the surface-area-to-volume ratio?

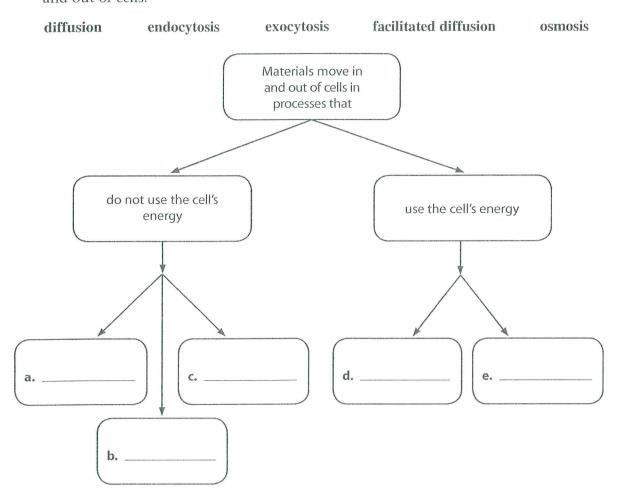
School to Home

LESSON 3

Moving Cellular Material

Directions: *Use your textbook to respond to each statement.*

1. Use the terms below to fill in the concept map about the movement of materials into and out of cells.



Key Concepts Builder



LESSON 3

Moving Cellular Material

Key Concept How do materials enter and leave cells?

Directions: On each line, write the term from the word bank that correctly completes each sentence. Each term is used only once.

1. the movement of substances from an area of higher concentration to an area of lower concentration 2. transport proteins that carry large molecules, such as sugar molecules, through a cell membrane **3.** the state a substance is in when the concentration of the substance is the same on both sides of a cell membrane **4.** when a cell takes in a substance by surrounding it with the cell membrane **5.** the diffusion of water molecules only 6. when molecules pass through a cell membrane using special proteins 7. transport proteins that form pores through a cell membrane **8.** the movement of substances through a cell

membrane by using the cell's energy

9. proteins that assist with the transport of molecules through a cell membrane

10. when a cell's vesicles release their contents

___ 11. what a cell membrane is because it allows only certain substances to enter or leave a cell

12. the movement of substances through a cell membrane without using the cell's energy

outside the cell

- **A.** semipermeable
- **B.** passive transport
- C. diffusion
- D. equilibrium
- E. osmosis
- F. facilitated diffusion
- **G.** transport proteins
- H. carrier proteins
- **I.** channel proteins
- J. active transport
- **K.** endocytosis
- L. exocytosis