

Name: _____ BIK: _____

B2 Booklet

Features, Properties, and
Functions of Cells

Cells

Textbook pages 22-39

Before You Read

How might the cells of a plant be like the cells of an animal? How might they be different? Write your ideas in the space below.

Mark the Text

Identify Definitions

Highlight the definition of each word that appears in bold type.

What is the cell theory?

The cell theory states three important facts about cells.

1. The cell is the basic unit of all life.
2. All living things are made up of one or more cells.
3. All cells come from other living cells.

How are prokaryotic cells different from eukaryotic cells?

There are two main types of cells. Eukaryotic cells are cells with organelles that have a membrane around them. You will find out more about organelles below. Plant cells and animal cells are eukaryotic cells.

Prokaryotic cells are cells that do *not* have organelles with membranes around them. **Bacteria** are prokaryotic cells that live just about everywhere on Earth. Some bacteria cause diseases. ●

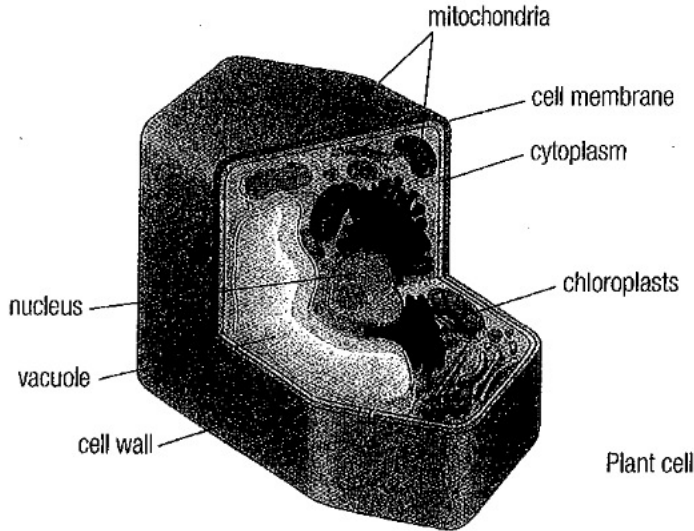
It is easy to confuse bacteria with another type of tiny thing that causes disease: viruses. **Viruses** are non-living things that are able to reproduce. Viruses are not cells. Viruses must be present inside the cell of a living thing in order to reproduce.

What is inside a cell?

All cells have **organelles** that carry out specific tasks that help the cell to survive. Most of the organelles in animal cells are also found in plant cells. However, animal cells do not have a cell wall or chloroplasts.

Reading Check

1. How is a prokaryotic cell different from a eukaryotic cell?

Typical Cell Structures

cell membrane: This structure is like a skin that surrounds the whole cell. The cell membrane keeps the inside of the cell separate from what is outside it. The cell membrane also controls what enters and leaves the cell.

nucleus: The nucleus of the cell controls all the cell's activities.

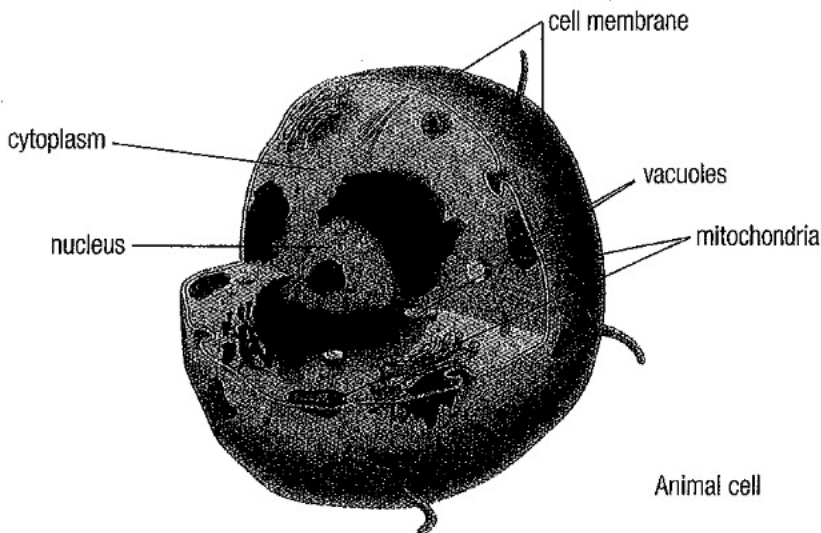
cytoplasm: This clear, jelly-like fluid holds the organelles of the cell in place.

mitochondria: These bean-shaped structures are the energy producers.

vacuoles: Vacuoles store materials such as wastes for a short time. Plant cells usually have one large vacuole. Animal cells have many small vacuoles.

cell wall: The cell wall surrounds the cell membrane of plant cells. The cell wall gives the plant cell protection and supports its box-like shape.

chloroplasts: These green-coloured structures in plant cells trap the Sun's light energy and change it to chemical energy for use by the cell.



Reading Check

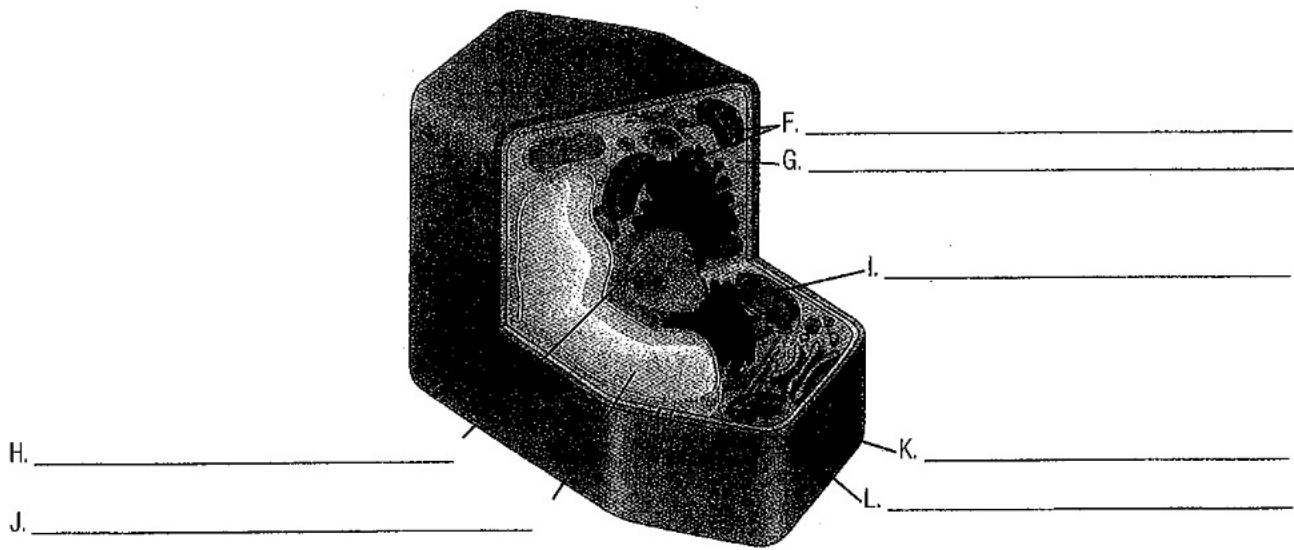
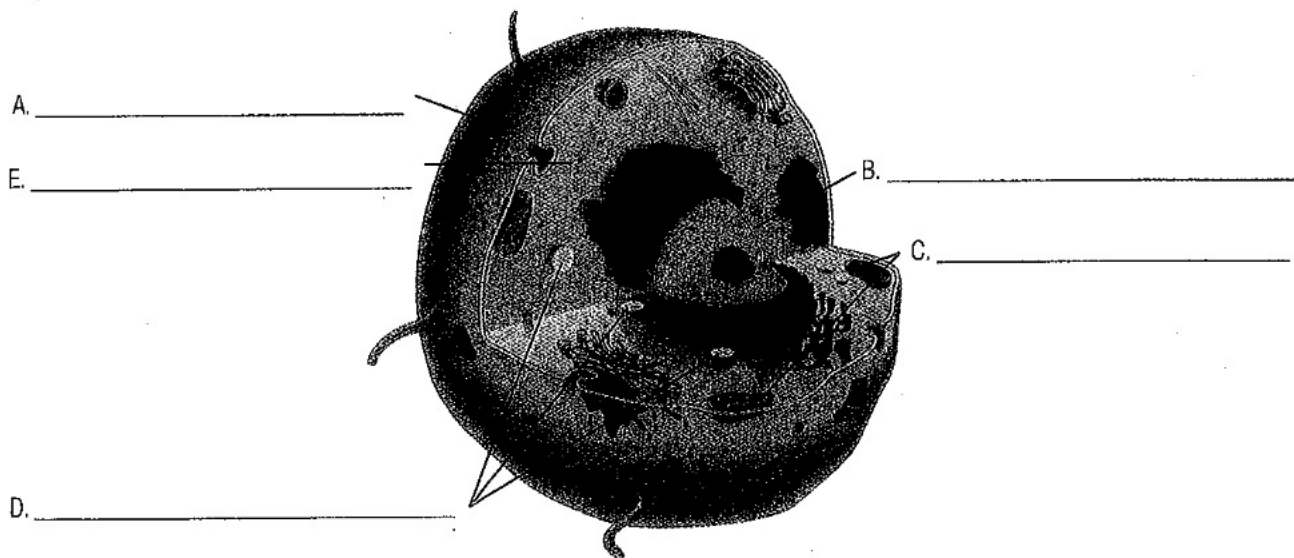
2. Name two organelles that are found in plant cells but not in animal cells.

Use with textbook page 27.

Parts of cells

Vocabulary	
cell membrane	vacuole
nucleus	vacuoles
cell wall	cytoplasm
chloroplast	mitochondria

Use the terms in the box to label the parts of an animal cell and a plant cell. Terms may be used more than once.



Use with textbook pages 24-29.

Inside a cell

Vocabulary

bacteria	living thing
cell theory	mitochondria
cell membrane	organelle
cell wall	prokaryotic
chloroplasts	nucleus
cytoplasm	vacuoles
eukaryotic	viruses

Use the terms in the vocabulary box to fill in the blanks. Each term may be used only once. You will not need to use all the terms.

1. A(n) _____ is a cell structure in which functions are carried out to ensure the cell's survival.
2. Each cell is surrounded by a _____ that separates the interior of the cell from its surroundings.
3. Within the cell is a jelly-like substance called _____.
4. The _____ is the organelle that controls all the activities within the cell.
5. The _____ are the energy producers in the cell.
6. _____ are temporary storage compartments that sometimes store waste.
7. The _____ is a tough, rigid structure that surrounds the cell membrane and protects the cell.
8. The _____ trap the energy from the Sun and change it into chemical energy.
9. Plant and animal cells are examples of _____ cells.
10. _____ cells are cells that do not have organelles with membranes around them.
11. _____ are examples of prokaryotic cells that can cause disease.
12. _____ are examples of non-living things that are able to reproduce.

Use with textbook pages 32-34.

True or false?

Read the statements given below. If the statement is true, write "T" on the line in front of the statement. If it is false, write "F" and rewrite the statement to make it true.

1. _____ The cell is the basic unit of life.

2. _____ All organisms are composed of only one cell.

3. _____ Animal cells use chloroplasts to trap the Sun's energy.

4. _____ Prokaryotic cells are cells that are surrounded by a cell wall.

5. _____ Eukaryotic cells are cells that are surrounded by a cell membrane.

6. _____ Some bacteria cause diseases.

7. _____ Viruses are non-living things.

8. _____ Bacteria are an example of eukaryotic cells.

Use with textbook pages 22–39.

Cells

Circle the letter of the best answer.

- Cell membranes are found in
 - plant cells only
 - animal cells only
 - neither plant or animal cells
 - both plant and animal cells
- Which comparison between plant and animal cells is correct?

	Plants	Animals
A.	no chloroplasts	chloroplasts
B.	no mitochondria	mitochondria
C.	nucleus	no nucleus
D.	cell wall	no cell wall

- Which of the following describes the cell theory?

I.	The cell is the basic unit of life.
II.	All organisms are composed of one or more cells.
III.	Two or more cells are necessary to produce new cells.
IV.	All cells come from other living cells.

- I, II, and III only
- I, II, and IV only
- I, III, and IV only
- II, III, and IV only

- Which of the following statements is true?
 - A eukaryotic cell has organelles surrounded by membranes.
 - A prokaryotic cell has organelles surrounded by membranes.
 - All eukaryotic cells are surrounded by a cell wall.
 - All prokaryotic cells are surrounded by a cell wall.
- Bacteria are examples of
 - organelles
 - viruses
 - prokaryotic cells
 - eukaryotic cells
- Plant cells are examples of
 - organelles
 - bacteria
 - prokaryotic cells
 - eukaryotic cells

Match each Term on the left with the best Descriptor on the right. Each Descriptor may be used only once.

Term	Descriptor
7. _____ cell membrane	A. produces energy
8. _____ nucleus	B. controls all the cell's activities
9. _____ cytoplasm	C. protects and supports plant cells
10. _____ mitochondria	D. traps light energy
11. _____ vacuoles	E. stores materials such as wastes
12. _____ cell wall	F. controls what enters and leaves a cell
13. _____ chloroplasts	G. organelles without a membrane around them
	H. holds the organelles in place

Diffusion, Osmosis, and the Cell Membrane

Textbook pages 40–49

Before You Read

In this section you will learn about two ways in which some substances can move into a cell and out of a cell through its membrane. On the lines below, list two things that you think should be able to move into a cell. Then list two things that should not be able to move into a cell. Think of things a cell might need and things that might harm a cell.

Create a Quiz

After you have read this section, create a five-question quiz based on what you have learned. After you have written the questions, be sure to answer them.

Reading Check

1. In what two ways does diffusion help cells?


What is the cell membrane like?

The cell membrane is a **selectively permeable membrane**. This means that it has many small openings that let some substances pass through it but not others. You can picture the membrane like a window screen in your home that lets air pass through it but keeps insects out. Substances that are smaller than the openings in a cell membrane can move into the cell from outside it. Substances that are larger than the openings cannot move into the cell.

How does diffusion move substances through the cell membrane?

One way that substances can move through the cell membrane is by **diffusion**. Diffusion happens when particles move from a place where there are more of them into a place where there are fewer of them.

Concentration is the amount of a substance in a certain place. A place that has a higher concentration of particles in it has more particles than a place that has a lower concentration.

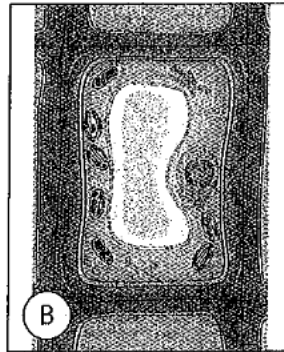
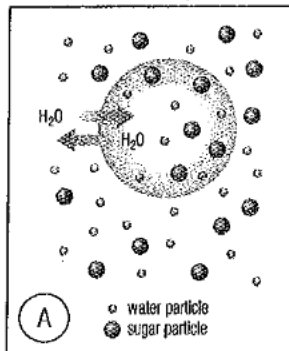
Diffusion moves substances that a cell needs from outside the cell to inside the cell. This is how the oxygen that most cells need moves into a cell. Diffusion also moves wastes from inside the cell to outside the cell. This is how carbon dioxide, a waste gas in some cells, moves out of a cell. 

How does osmosis move substances through the cell membrane?

Osmosis is a special kind of diffusion that involves water. Osmosis is the diffusion of water through a selectively permeable membrane. Osmosis happens when water particles move from a place where their concentration is higher to a place where their concentration is lower.

Osmosis is important to cells. Cells contain water and need it to survive. Cells also live in water or in watery surroundings. What will happen if the concentration of water inside a cell is higher than outside a cell? Water will move out of the cell by osmosis. What will happen if the concentration of water inside a cell is lower than outside a cell? Water will move into the cell by osmosis. ☉

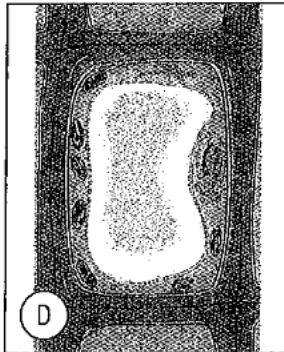
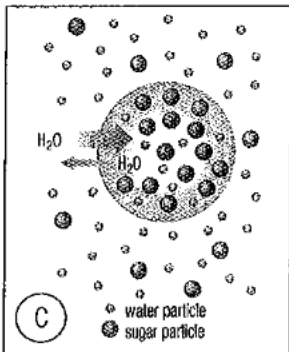
In A, the rate at which water particles move into the cell is the same as the rate at which they move out of the cell. A plant cell, shown in B, is normal and healthy.



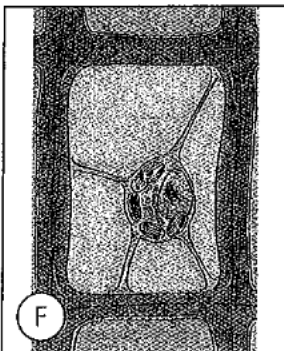
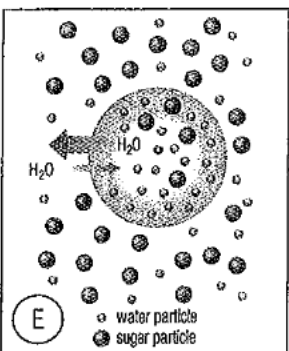
☑ Reading Check

2. If the concentration of water outside a cell is higher than it is inside a cell, in which direction will water move?

In C, the concentration of water particles outside of the cell is higher than inside the cell. Water particles move into the cell by osmosis. A plant cell, shown in D, is swollen with extra water.



In E, the concentration of water particles outside of the cell is lower than inside the cell. Water particles move out of the cell by osmosis. A plant cell, shown in F, loses water. If you could see the whole plant, it would be wilted.



Use with textbook pages 40–45.

Crossing the cell membrane

Vocabulary

diffusion
concentration
osmosis
a selectively permeable membrane

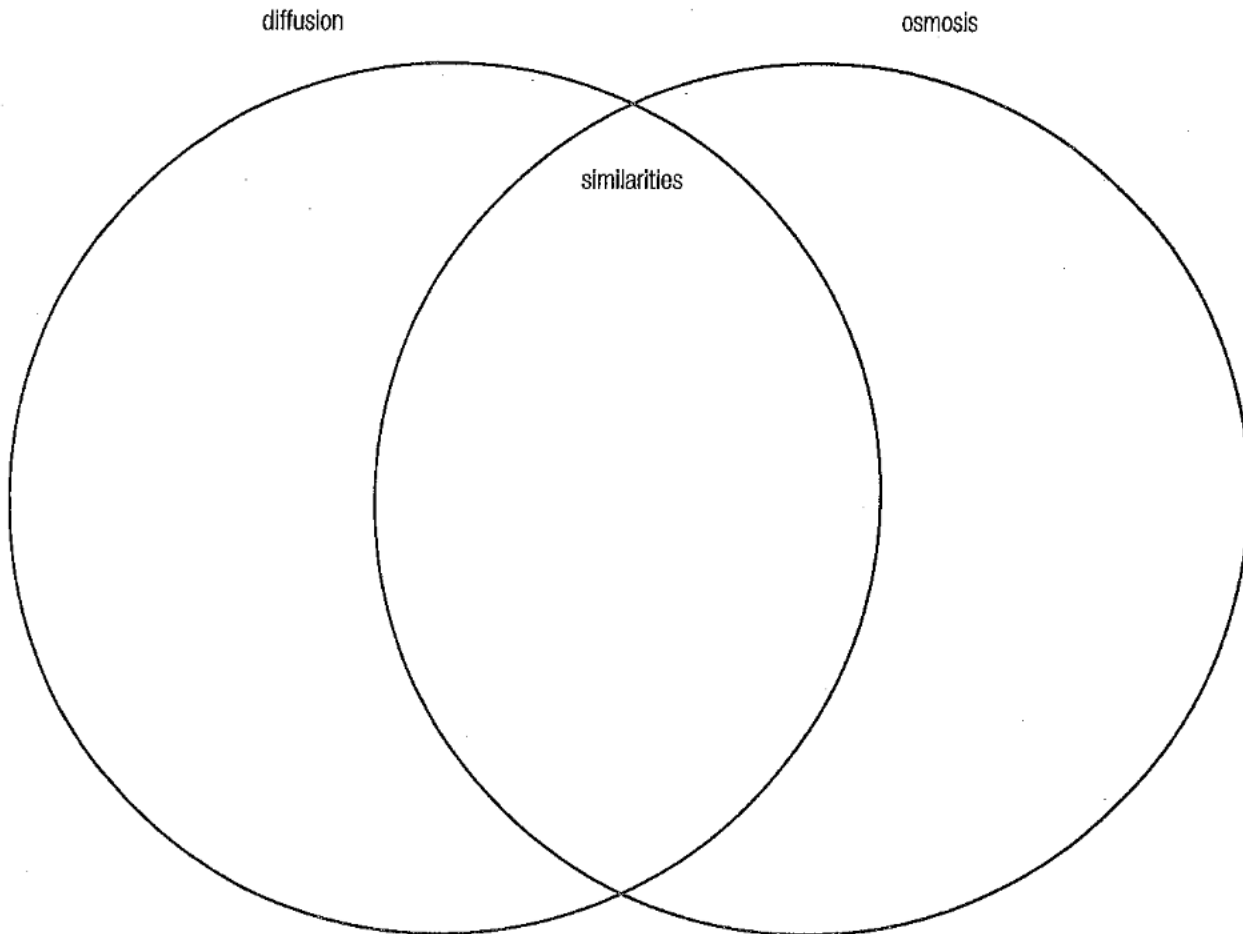
Use the terms in the vocabulary box to fill in the blanks. Each term may be used as often as necessary.

1. _____ refers to the amount of a substance in a given space.
2. _____ is the movement of particles from an area of higher concentration to an area of lower concentration.
3. _____ allows some materials to pass through it but keeps other materials out.
4. _____ is the diffusion of water molecules through a selectively permeable membrane.
5. _____ moves wastes from inside a cell to outside a cell.
6. _____ can be compared to a window screen.
7. _____ happens when water particles move from a place where their concentration is higher to a place where their concentration is lower.
8. _____ is the process by which oxygen is moved into a cell.
9. _____ is the process by which carbon dioxide is moved out of a cell.

Use with textbook pages 40–44.

Osmosis and diffusion

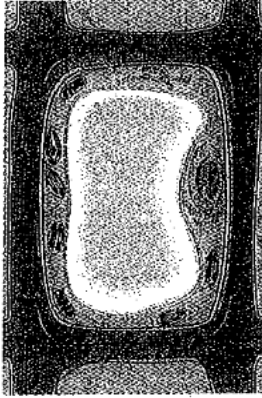
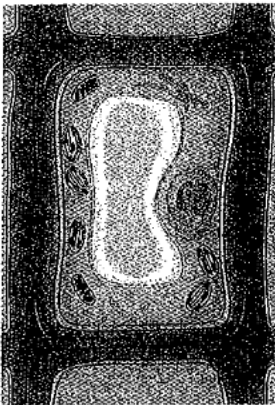
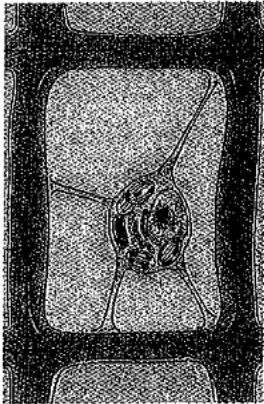
Compare and contrast diffusion and osmosis using this Venn diagram. On the left side list how diffusion is different from osmosis. On the right side list how osmosis is different from diffusion. In the middle section list how they are similar to each other.



Use textbook pages 43–45.

Examples of osmosis

To predict the direction of water flow through a cell membrane, you have to compare the concentration of particles on both sides of the membrane. Examine the diagrams below. Explain why the plant cell looks different in each illustration.

Diagram	Explanation
<p>A.</p> 	
<p>B.</p> 	
<p>C.</p> 	

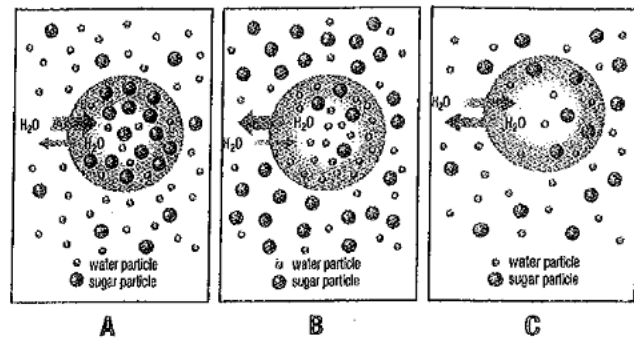
Use with textbook pages 40–45.

Diffusion, osmosis, and the cell membrane

Circle the letter of the best answer.

- Diffusion is
 - the movement of particles from an area of low concentration to an area of high concentration
 - the movement of particles to the inside of a cell only
 - the movement of particles from an area of high concentration to an area of low concentration
 - when the particles do not move through the cell membrane at all
- Osmosis is
 - the movement of water from an area of low concentration to an area of high concentration
 - the movement of water to the inside of a cell only
 - the movement of water from an area of high concentration to an area of low concentration
 - when the water does not move through the cell membrane at all
- A selectively permeable membrane
 - keeps substances out of the cell
 - keeps substances in the cell
 - has many small openings
 - allows only water to pass through it

Use the following diagram to answer questions 4 and 5.



- In which diagram(s) does water move into and out of the cell at the same rate?
 - A
 - B
 - C
 - both A and B
- In which diagram(s) will the cell begin to swell?
 - A
 - B
 - C
 - both A and C

Match each Term on the left with the best Descriptor on the right. Each Descriptor may be used only once.

Term	Descriptor
6. _____ concentration	A. moves oxygen into cells
7. _____ diffusion	B. moves water into and out of cells
8. _____ osmosis	C. allows some substances through
9. _____ selectively permeable membrane	D. surrounds the cell with water
	E. amount of a substance in a certain place

