

# 3-2: Diffusion & Solutions

## Worksheet

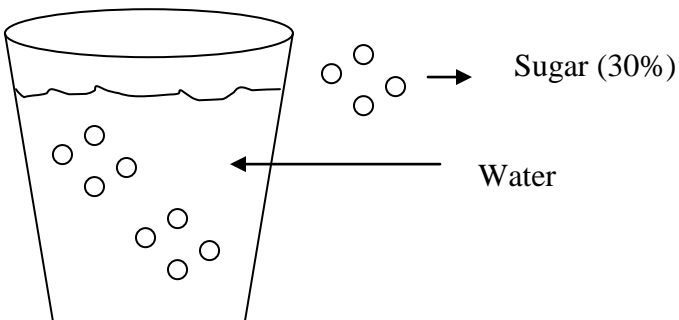
Name: \_\_\_\_\_  
Period: \_\_\_\_ Date \_\_\_\_\_

### Definitions

**Solute:** a substance that is dissolved in a fluid. Example, sugar is a solute that is dissolved in water.

**Solvent:** is the fluid that a solute is dissolved into. Example, sugar is the solute that is dissolved in water (solvent).

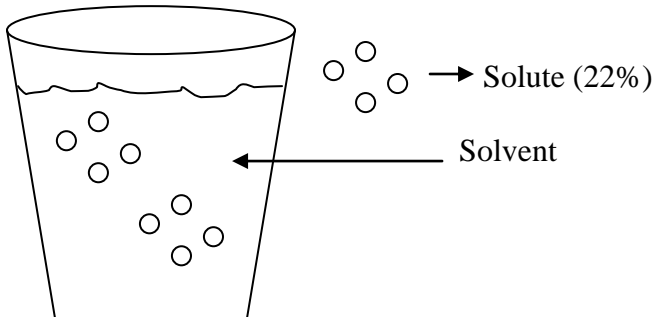
**Solution:** the outcome of the solute (sugar) being dissolved in a solvent (water). Example, sugar dissolved in water would make a solution of "sugar-water".



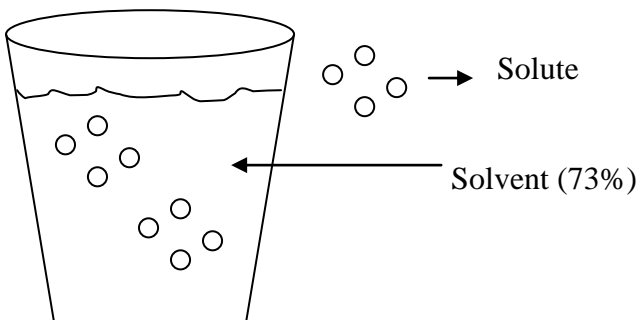
Answer the following questions using diagram to the left.

1. Name the solute. \_\_\_\_\_
2. Name the solvent. \_\_\_\_\_
3. Name the solution. \_\_\_\_\_
4. Solute % concentration = \_\_\_\_\_
5. Solvent % concentration = \_\_\_\_\_

Hint: 100% - 30% solute = solvent %



1. Solvent % = \_\_\_\_\_
2. Solute % = \_\_\_\_\_
3. Solution % = \_\_\_\_\_



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2. Solute % = \_\_\_\_\_
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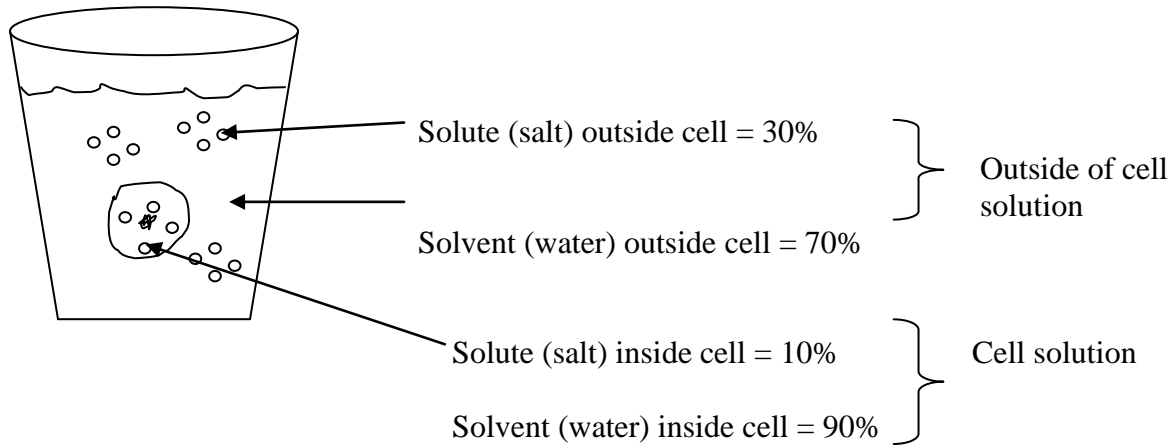
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**Diffusion:** movement of molecules (particles) from an area of high concentration to another area of lower concentration. (spreading out evenly = equilibrium)

**Osmosis:** diffusion of water through a cell membrane from an area of high (water) concentration to an area of low (water) concentration.

## Osmosis



**Answer the following questions about the diagram above.**

1. Where is the highest water concentration?
2. Where is the lowest water concentration?
3. Where is the lowest salt concentration?
4. Where is the highest salt concentration?
5. Which direction would the water move because of osmosis?

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The previous diagram shows that the water (solvent) inside the cell is higher than the solvent (water) outside the cell. This means the solution (refer to definition) outside the cell has less water than inside the cell – when this occurs the solution outside the cell is called **hypertonic**.

**Hypertonic** means the solution outside the cell has **less water** (solvent) and **more salt** (solute) than inside the cell.

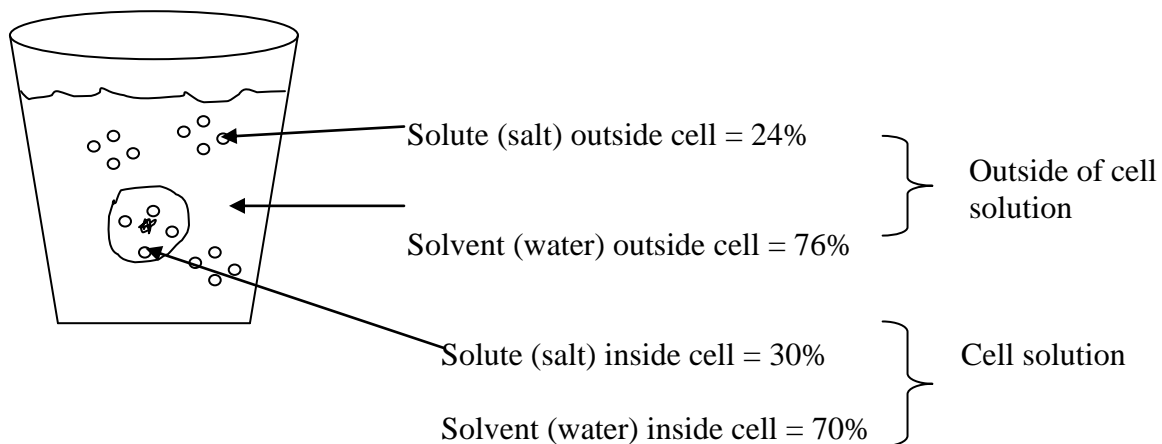
**Hypotonic** means the solution outside the cell has **more water** (solvent) and **less salt** (solute) than inside the cell.

#### Answer the following questions.

1. A cell has 75% water (solvent) and 25% salt (solute). The solution outside the cell (Solution A) has 50% water (solvent) and 50% salt (solute). Is the solution outside the cell *hypertonic* or *hypotonic*?
2. A solution has 75% salt therefore it has \_\_\_\_\_% water. The cell has 75% water and therefore \_\_\_\_\_% salt. What is the solution outside the cell? Hypertonic or hypotonic.
3. A cell has 70% water and the solution it is put into has 30% salt. What is the solute concentration of the cell? \_\_\_\_\_% What is the water concentration of the solution the cell is put into? \_\_\_\_\_%

When the salt and water concentration inside a cell is the same as the solution outside the cell – the outside solution is called an **Isotonic solution**. Water will diffuse in and out of the cell but the % concentration will always be equal between inside and outside of the cell.

#### Solve the following. Refer to the diagram.



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1. What type of solution is outside the cell?
2. Osmosis states that the water will move across a membrane according the rules of diffusion. Which direction will water move in the example above?

From inside the cell outward to the outside solution

OR

From the outside solution inwards into the cell.

3. What would happen to the cell in both situations A and B described in question #2?

The cell would shrink / swell in situation A.

The cell would shrink / swell in situation B.