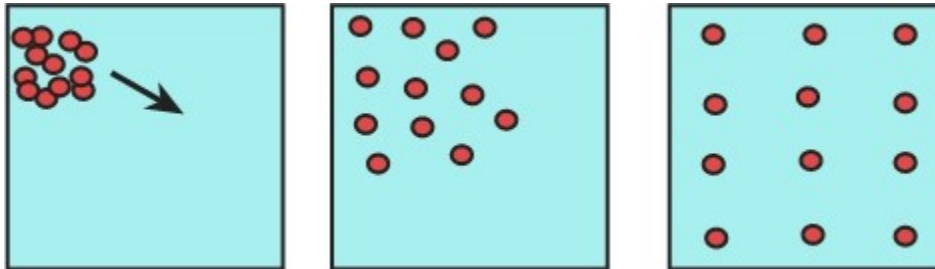


# Diffusion & Osmosis Overview

## Diffusion

the process by which molecules spread from areas of high concentration, to areas of low concentration. When the molecules are even throughout a space - it is called **EQUILIBRIUM**



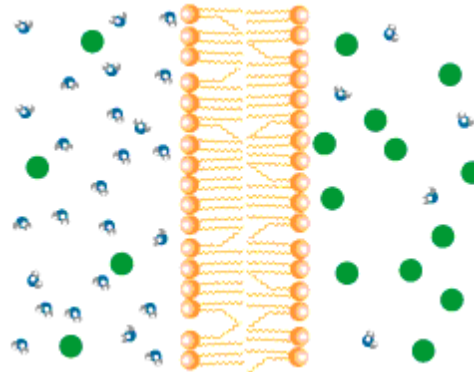
**Concentration gradient** - a difference between concentrations in a space.

Molecules will always move down the concentration gradient, toward areas of lesser concentration. Think of food coloring that spreads out in a glass of water, or air freshener sprayed in a room.

## Osmosis

Watch this animation of water molecules moving across a selectively permeable membrane. Water molecules are the small blue shapes, and the solute is the green.

The solute is more concentrated on the right side to start with, which causes molecules to move across the membrane toward the left until equilibrium is reached.



**Selectively Permeable** - membranes that allow some things through, the cell membrane is selectively permeable, water and oxygen move freely across the cell's membrane, by diffusion

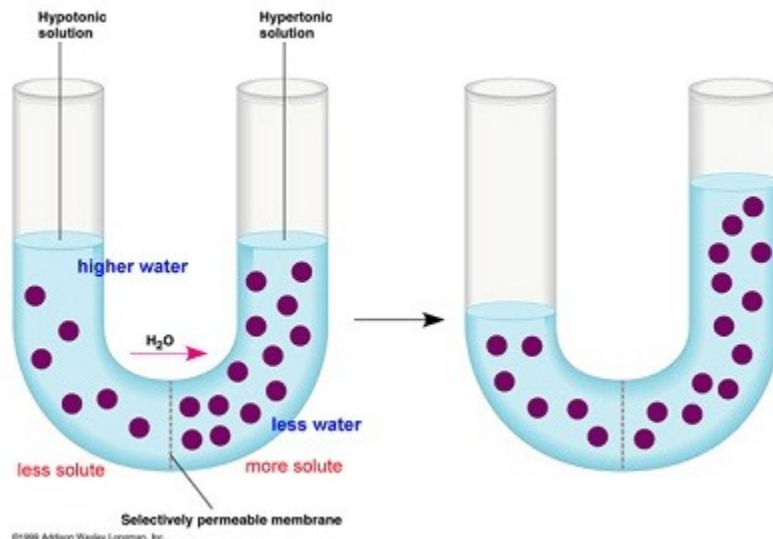
**Osmosis** - the diffusion of water (across a membrane)

Water will move in the direction where there is a high concentration of solute (and hence a lower concentration of water).

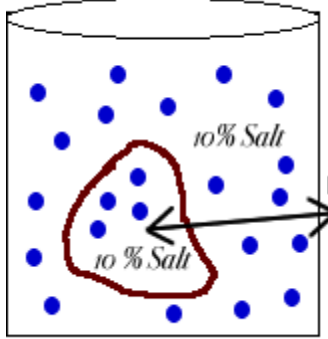
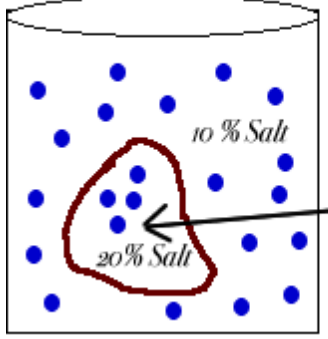
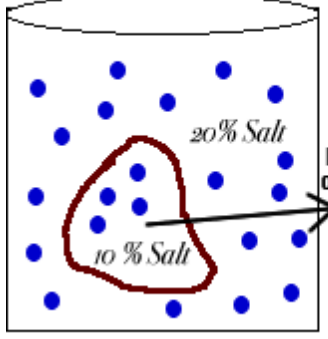
## **SALT SUCKS**

A simple rule to remember is:

Salt is a solute, when it is concentrated inside or outside the cell, it will draw the water in its direction. This is also why you get thirsty after eating something salty.



## Type of Solutions

<p><b>Solution is <u>I</u>so<sup>T</sup>onic</b></p>  <p>● Water Molecules</p>	<p>If the concentration of solute (salt) is equal on both sides, the water will move back in forth but it won't have any result on the overall amount of water on either side.</p> <p>"<b>ISO</b>" means the same</p>
<p><b>Solution is <u>H</u>ypo<sup>T</sup>onic</b></p>  <p>● Water Molecules</p>	<p>The word "<b>HYPO</b>" means less, in this case there are less solute (salt) molecules outside the cell, since salt sucks, water will move into the cell. The cell will gain water and grow larger. In plant cells, the central vacuoles will fill and the plant becomes stiff and rigid, the cell wall keeps the plant from bursting</p> <p>In animal cells, the cell may be in danger of bursting, organelles called <b>CONTRACTILE VACUOLES</b> will pump water out of the cell to prevent this.</p>
<p><b>Solution is <u>H</u>yper<sup>T</sup>onic</b></p>  <p>● Water Molecules</p>	<p>The word "<b>HYPER</b>" means more, in this case there are more solute (salt) molecules outside the cell, which causes the water to be sucked in that direction.</p> <p>In plant cells, the central vacuole loses water and the cells shrink, causing wilting.</p> <p>In animal cells, the cells also shrink.</p> <p>In both cases, the cell may die.</p> <p>This is why it is dangerous to drink sea water - its a myth that drinking sea water will cause you to go insane, but people marooned at sea will speed up dehydration (and death) by drinking sea water.</p> <p>This is also why "salting fields" was a common tactic during war, it would kill the crops in the field, thus causing food shortages.</p>

Diffusion and Osmosis are both types of **PASSIVE TRANSPORT** - that is, no energy is required for the molecules to move into or out of the cell.

Sometimes, large molecules cannot cross the plasma membrane, and are "helped" across by **carrier proteins** - this process is called **facilitated diffusion**.

### Words You Should Know:

- Diffusion
- Osmosis
- Gradient
- Equilibrium
- Selectively Permeable
- Passive Transport
- Active Transport

- Isotonic
- Hypertonic
- Hypotonic
- Contractile Vacuole
- Carrier Protein
- Facilitated Diffusion