Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Class \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_

Living Environment: Diffusion, Osmosis, and Movement Across a Membrane – Part One

**Diffusion**

* Diffusion is - the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Diffusion**

* When an area of high concentration of molecules exists near an area of low

concentration of these molecules, there is said to be a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

* The diffusion of these molecules down the concentration gradient \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

******

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (exergonic or passive)

**Diffusion**

* Net diffusion stops when concentration on both sides equal (if crossing a membrane) or when there is a uniform distribution of particles.
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is reached.
* Molecules continue to move, but \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ occurs (hence the phase "net diffusion" above).
* Diffusion of one compound is independent to diffusion of other compounds.

**Diffusion**

* A good example of diffusion is food coloring.
*  If you place a drop of red food coloring in a beaker of water eventually the entire beaker of water will have a red tint.

**Diffusion**

* Other everyday examples of diffusion are:
1. Sugar will diffuse through tea until the entire cup of tea is sweet. (We stir the tea to speed up the diffusion.)
2. The odor of food cooking diffuses throughout the kitchen. If you open the

kitchen door it will spread into the next room.

**Diffusion**

* Examples of diffusion in science are:
1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. Oxygen diffusing out of the stomata and lenticels of leaves.

**Factors Affecting Diffusion Across a Plasma Membrane**

* Diffusion directly through lipid bilayer:
* The greater the lipid solubility of the diffusing particle, the more permeable the membrane will be.
* All else being equal,\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ across lipid bilayer.

**Osmosis, the Passive Transport of Water**

* Osmosis is - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, hence the term “passive transport.”



**Osmosis**

* Plasma membrane permeable to water but not to solute.
* Solute = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Solvent = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in which particles may be dissolved.

**Osmosis**

* Water moves \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

* In other words, if there is a low concentration of solute, then there is a high concentration of water molecules.

**Osmosis**

* If there is a high concentration of solute, then there is a low concentration of water.
* Just as with the diffusion of other molecules, water will move from an area of high

 concentration of water molecules to an area of low concentration of water molecules,

 “\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.”

**How Will Water Move Across Semi-Permeable Membrane?**

* Solution A has 100 molecules of glucose per ml.
* Solution B has 100 molecules of fructose per ml.
* How will the water molecules move?
* **How Will Water Move Across Semi-Permeable Membrane?**
* There will be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_since the concentration of solute in each solution is equal.

* **How Will Water Move Across Semi-Permeable Membrane?**
* Solution A has 100 molecules of glucose per ml.
* Solution B has 75 molecules of fructose per ml.
* How will the water molecules move?
* **How Will Water Move Across Semi-Permeable Membrane?**
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Solution Types Relative to Cell**

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: Solute concentration higher outside the cell than inside the cell.



* Hyper = more (think hyperactive); Tonic = dissolved particles
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

* Cell shrinks

**Solution Types Relative to Cell**

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: Solute concentration lower outside the cell than inside the cell.
* Hypo = less, under (think hypodermic, hypothermia); Tonic = dissolved particles



* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Cell expands (and may burst)

**Solution Types Relative to Cell**

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: Solute concentration equal to that of cell.
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

