## DIFFUSION and OSMOSIS- "Old" AP BIO Lab 1

In this experiment you will measure diffusion of small molecules through dialysis tubing, an example of a selectively permeable membrane. Small solute molecules and water molecules can move freely through a selectively permeable membrane, but larger molecules will pass through more slowly, or perhaps not at all. The movement of solute through a selectively permeable membrane is called dialysis. The size of the minute pores in the dialysis tubing determines which substances can pass through the membrane.

## PROCEDURE:

1. Tie off one end of a piece of dialysis tubing provided and fill with 15% glucose and 1% starch solution. Test the solution with a glucose test strip. Tie end of bag leaving sufficient space for expansion. Complete the table below.

2. Fill cup two-thirds full with distilled water. Add 5 droppers of Lugol's iodine (IKI). Test the iodine/water with a glucose test strip. Record the color on the table below.

3. Rinse dialysis bag well and obtain a mass for the bag and record on the table below.

4. The experiment starts when the dialysis bag is immersed in the cup water.

5. Allow your setup to stand for approximately 30 min or until you see a distinct color change

in the bag or the beaker. Record any color changes below.

6. Test the liquid in the cup and the bag for the presence of glucose. Record the results below.

		Solution Color		Glucose Present?		Mass of Bag	
	Initial contents	Initial	Final	Initial	Final	Initial	Final
Bag	15% glucose 1% starch						
Сир	H2O iodine					Х	Х

DRAW a diagram to MODEL how the molecules moved during this experiment. Use BLUE dots for GLUCOSE. Use RED dots for IODINE. Use GREEN dots for STARCH.



AT START OF EXPERIMENT



AT END OF EXPERIMENT

Molecules will always move by diffusion DOWN their concentration gradient FROM an area of HIGHER concentration TO an area of LOWER concentration and cross a selectively permeable dialysis tubing membrane until they reach equilibrium, as long as the solute molecules are small enough to fit through the pores in the tubing. If there is a concentration gradient across the membrane and the solute is unable to pass through the pores, water molecules will move by osmosis due to differences in water potential ( $\Psi$ ).

## PRACTICE A SHORT ANSWER FRQ:

**EXPLAIN** what happened to each of the molecules and WHY? Include: diffusion, osmosis, concentration gradient, osmosis, water potential in your description.

GLUCOSE:	 	 	
IODINE:			
STARCH: :	 	 	
WATER:	 	 	

What happened to the water potential of the water when glucose and starch were added to make the solutions used in the dialysis bag?

**EXPLAIN** why the dialysis tubing used in this activity could be called a "selectively permeable" membrane.

Use what you know about the structure of carbohydrates to **EXPLAIN** why glucose was able to pass through the dialysis tubing but starch was not.

**PREDICT** what would happen if this experiment started with glucose and IKI solution in the bag and only starch and water in the cup outside. What results would you see? How would you tell if the molecules moved?