

## Diffusion Lab Worksheet – Table, Materials, and Procedures

**Purpose:** to investigate diffusion through a membrane using dialysis tubing as a model of the plasma membrane of animal cells.

**Data**

**Table 1: Fill in the table by observing what happened with your indicator tests**

Solution in Tubing	After Soaking for 10 minutes		
	Presence of Starch in <u>BEAKER</u> (color change with Lugol's Iodine solution?)	Presence of Glucose in <u>BEAKER</u> (color change with glucose test strip?)	Presence of Starch in <u>DIALYSIS TUBING</u> (color change with Lugol's Iodine solution?)
Starch-glucose solution			
Starch-glucose solution with amylase			

**Table 2: Mass Change – record the mass before and after soaking. Then subtract to find the difference in mass.**

	Mass of Dialysis Tubing (grams)
<b>Before soaking</b>	
<b>After soaking</b>	
<b>Difference in Mass (subtract)</b>	

**Materials:**

- |                            |                    |                |
|----------------------------|--------------------|----------------|
| 150 ml beaker              | Starch solution    | Lugol's Iodine |
| 1 Piece of Dialysis tubing | Glucose solution   | Pipettes       |
| 2 Plastic clips            | Glucose Test Strip | Balance        |

**Procedures for Starch-Glucose Solution:**

- 1) Collect the materials you need for your lab set up.
- 2) Tightly seal one end of the dialysis tubing with one plastic clip. Be sure that you can see some of the plastic sticking out of the clip when it is closed. The end must be clipped tightly so that no liquid placed in the tubing will come out.
- 3) Next, pour **starch-glucose** solution into the open end of the tube until it is 2/3 full.
- 4) Now clip the open end tightly with the second plastic clip. Again make sure that some plastic can be seen sticking out of the plastic clip. This clip must also be tightly placed so that no liquid will come out.
- 5) Using a paper towel, pat the dialysis tubing dry. Record the mass of your tube BEFORE soaking tube in the solution.
- 6) Place the dialysis tube in a 600 ml beaker.
- 7) Add just enough water to the beaker to cover the entire tube.
- 8) Using a stopwatch or timer, let the tube soak for 15 minutes.
- 9) After 15 minutes, remove the tube from the beaker of water and pat dry with the paper towel. Record the mass of the tube AFTER it soaked in the solution.
- 10) **Check for glucose.** Using the glucose test strip, dip it into the beaker. The test strip will change color if glucose is present. Compare your strip to the bottle. Record your results in your data table.
- 11) **Check for starch.** Place 1 drop of Lugol's Iodine into your beaker. The water in the beaker will turn blue-black (gray) if starch is present. If not, the water will stay clear. Record your results in your data table.
- 12) **Clean up.** Empty your tubing and beaker containing Lugol's Iodine into the sink with the water running slightly. Wash your beaker and place in dish rack to dry. Discard the dialysis tubing in the trash bin.
- 13) **Teacher Demo:** Place the dialysis tubing into the beaker with the iodine. Let soak for a few minutes. Observe what happens to the liquid in the dialysis tubing and record results in your data table.

**Teacher Demo: Starch-Glucose Solution with Amylase:**

- 1) Watch demonstration or demonstration video in class to infer what would happen if amylase was added to your starch-glucose solution inside of the dialysis tubing.
- 2) Think about the size of the molecules and what amylase does to come up with your answer. Record your inference in the data table above and check with your group members to compare your answers.

## Diffusion through a Membrane Post Lab Questions

### Post Lab Questions

- 1) Did the **glucose** molecules diffuse through the dialysis tubing filled with **starch-glucose solution**? How do you know this is true? Why did this occur? (Hint: make a claim, give evidence, and reasoning)
  
- 2) Did the **starch** molecules diffuse through the dialysis tubing filled with **starch-glucose solution**? How do you know this is true? Why did this occur? (Hint: make a claim, give evidence, and reasoning)
  
- 3) Did osmosis occur through the dialysis tubing filled with **starch-glucose solution**? How do you know this is true (mass change)? Why did this occur? (Hint: make a claim, give evidence, and reasoning)
  
- 4) Think about the results for the dialysis tube that contained **starch-glucose solution with amylase (Teacher demo/video)**. What would happen to the starch in the dialysis tubing? How do you know? How could you test it?
  
- 5) Explain. (Hint: make a claim, give evidence, and reasoning for the following)
  - What would happen if the concentration of the glucose in the starch-glucose solution was higher or lower?
  
  
  
  
  
  
  
  
  
  
  - What would happen if the concentration of the starch in the starch-glucose solution was higher or lower?
  
- 6) Explain how the dialysis tubing was selectively permeable.
  
- 7) Put the following in order from smallest to largest using what you observed from this lab experiment.  
- **starch, Lugol's Iodine (iodine potassium iodide), glucose, Dialysis membrane pores, water**
  
- 8) Explain what would happen if we put water in the dialysis tubing and placed it in a beaker of starch-glucose solution.
  
  
  
  
  
  
  
  
  
  
- 9) What are some experimental flaws or sources of error in the experiment and how it was set up? How did these flaws affect the data? How could these flaws be corrected if we did this experiment again?