



Name _____ Period _____ Date _____

Part 1—Diffusion Through a Membrane

9. Based on your knowledge of diffusion, predict what will happen to the substances inside and outside of the “cell.” Record your prediction here.

Table Two — Chemical Test Results

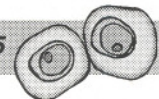
Indicator Solution Used	Material Tested		
	Distilled Water	Starch	Glucose
Blue-colored Glucose Indicator Solution			
Amber-colored Starch Indicator Solution			

What test would you need to perform to prove that it is the *combination* of glucose and the Glucose Indicator Solution that changes color when heated and not just the glucose or the Glucose Indicator Solution alone? Support your answer with an explanation.

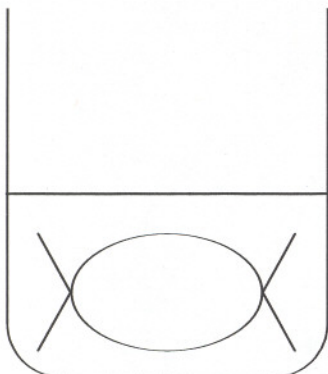
Model Cell Observations

- Carefully examine the “cell” and beaker you put aside earlier.
- Record any changes, including color changes, you observe in the “cell” and in the beaker.

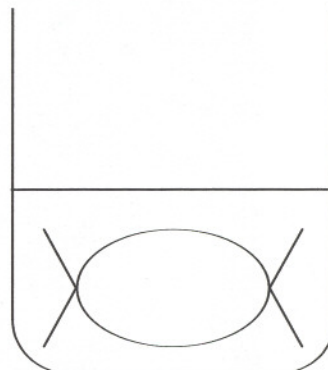
- Use a pipette to transfer 10 drops of the solution in the beaker (outside the “cell”) to a clean test tube. Test it with Glucose Indicator Solution. Did a color change occur? _____ Is this test result positive or negative? _____



- Label the contents and note the colors present in both the beaker and the cell of the “Final State” diagram below.



Initial State



Final State

Questions:

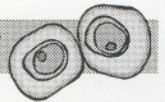
1. What is the best explanation for the color change that occurred inside the “cell?”

2. Did any starch diffuse out of the “cell?” _____ Explain how you can tell.

3. Did any glucose diffuse out of the “cell?” _____ Explain how you can tell.

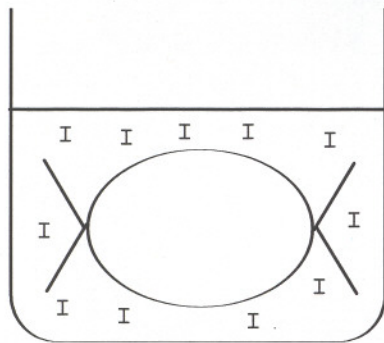
4. Which substance(s) diffused through the membrane?

5. Which substance(s) did not diffuse through the membrane?

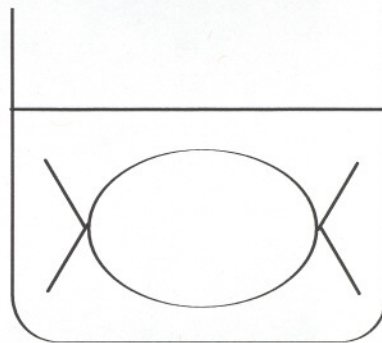


6. Explain why some substances were able to pass through the membrane while others were not able to.

7. In the "Initial State" diagram below, Starch Indicator Solution is indicated with the letter "I" because it contains iodine. Using the letters "S" for starch and "G" for glucose, indicate the areas where each of these molecules are located in both diagrams. Be sure you indicate the location of iodine molecules in the "Final State" diagram too.



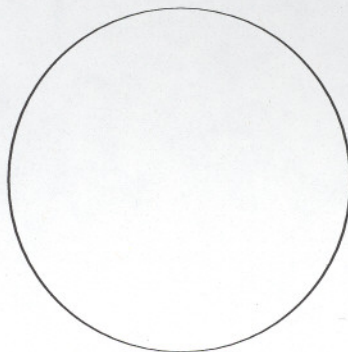
Initial State



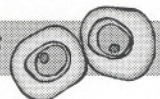
Final State

Part 2—Diffusion of Water Across a Membrane (Osmosis)

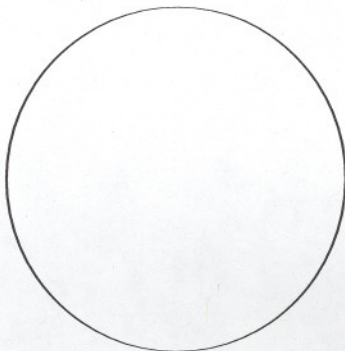
6. Based on your observations, draw and color a typical red onion cell mounted in water. Label the cell wall, cell membrane, and cytoplasm.



8. Observe the cells for several minutes. You should see a change in the cells from your previous observation. If not, add more salt solution. Describe the changes you observed in the red onion cells.



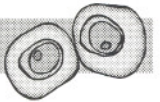
10. Based on your observations, draw and color a typical red onion cell mounted in salt solution. Label the cell wall, cell membrane, and cytoplasm.



11. Describe what happens to the water content of the red onion cells when they are placed in a salt solution.

13. Observe the cells for several minutes. Describe the changes that occurred in the red onion cells.

15. Based on your observations, draw and color a typical red onion cell mounted in distilled water. Label the cell wall, cell membrane, and cytoplasm.



Analysis Questions

1. During Part 1 of this laboratory activity, one group of students followed the directions incorrectly. They poured the Starch Indicator Solution into the “cell” and filled the beaker with starch and glucose solution. State how their results would differ from those obtained by students in their class who followed the directions correctly.

2. Some state roads are salted heavily in the winter, creating an environmental problem. Based on observations you made in this laboratory activity, explain how organisms could be harmed by high levels of salt from roadways.

3. When a person in the hospital is given fluid intravenously (an I.V.), the fluid is typically a saline (salt) solution with about the same water concentration as human body tissues. Explain how the use of distilled water in place of this saline solution would be expected to upset the patient's homeostasis. Your answer should refer to the process of diffusion.

4. Many fresh-water one-celled organisms have structures called *contractile vacuoles*. These structures collect and pump out excess water that accumulates in the cell. Name the process that causes water to flow into these organisms. _____ Explain why contractile vacuoles would be of little value to one-celled organisms living in the ocean (salt water).

5. Popcorn sold at most movie theaters is very salty, causing people to become thirsty and buy soft drinks. Describe in scientific terms why the salty popcorn causes this thirst. You should mention changes in specific body cells in your answer.

6. In many animals, glucose, rather than starch, is transported by the blood through the body to all the cells. Starches in many foods are digested to yield glucose. Based on what you learned in this laboratory activity, explain why the digestion of starch to glucose is necessary.
