Investigating Osmosis Using Cellular Models

• Objectives:
  • Model cellular osmosis
  • Reinforce chemical reactions

• Activities:
  • Prepare “cell” model using dialysis tubing
  • Add starch and sugar solution to the “cell”
  • Use chemical reactions to test for presence of sugar and starch

• Outcomes:
  • Students were able to distinguish the difference between diffusion and osmosis
  • Students were able to explain why the starch stayed in the “cell” and the sugar was detected outside of the “cell”

In Elizabeth Bockman’s 8th grade science class the students were examining osmosis by making a model “cell” using dialysis tubing. The “cell” was filled with 10 mL of starch solution and 10 mL of a sugar solution. The students then placed their “cells” into a solution of iodine. After waiting 10 minutes the students observed the results and tested the iodine solution for the presence of sugar. As was indicated by the blue color starch was present in the “cell” and nowhere else. The sugar test strips revealed that the sugar had diffused outside of the cell into the surrounding media. These results then allowed the students to analyze the concept of diffusion and osmosis. As can be seen in the last photo on the bottom the cell has grown in terms of the amount of liquid inside the cell, through osmosis, while the ability of the sugar to diffuse across the membrane was possible due to the size restriction of the dialysis tubing. The starch was too large to pass through the membrane therefore the blue color is contained to the inside of the “cell”. This experiment was an excellent activity to not only allow the students to investigate osmosis and diffusion but to also allow the students to learn about dialysis and the functionality of dialysis tubing.