Models of Movement

Summary

Students will perform two experiments using "bags" made of dialysis tubing. One demonstrates diffusion, the other osmosis.

Main Core Tie

Science - Biology

Standard 2 Objective 3

Time Frame

1 class periods of 70 minutes each

Group Size

Small Groups

Materials

- student sheet
  (attached)
  2 beakers
  starch solution (mix corn starch with water until no more will dissolve)
  saturated sugar solution (color it with food coloring to make it easier to see)
  dialysis tubing (3/4 to 1 inch works well)
  small rubber bands
  iodine solution (IKI-iodine potassium iodide)

Background for Teachers

Description:

Students will perform two experiments using "bags" made of dialysis tubing. One measures the movement of iodine across the membrane into a bag filled with starch solution, where it turns black. This is an example of diffusion, water is not involved. The other experiment measures the movement of water (therefore, osmosis) into a bag of sugar.

Student Prior Knowledge

Students should be aware of the definitions for osmosis and diffusion. They should also understand that living membranes are able to let particles of a certain size through and can actively transport molecules that they need either inside or out. The package the dialysis membrane comes in should say what size particle can pass through it. Dialysis membranes, being non-living are unable to actively transport molecules against the osmotic pressure.

Instructional Procedures

Read the introduction with students. If you know the particle size of your dialysis membrane you could share that with them.
In a beaker, demonstrate the effect of iodine solution on some of the starch solutions.
Go over the procedures with students. Show them where materials are located.
Allow time for data collection and have students post their results on the board by amount of mass the bags changed. Use + and -- symbols to show gain or loss of mass.

Summarize with the class the results. It is very easy for the bags to leak. If a group of students have data that doesn't agree with the rest of the class, they probably had a leaker.

Assessment Plan

Scoring Guide:

1. Students collect and record data4
2. Students correctly answer analysis questions..4

Answers:

1. *What color does iodine turn in starch? Black or blue-black*
2. *Did the iodine or starch move through the membrane in bag #1? Iodine*
3. *What evidence do you have to prove that? The contents of the bag turn black and there is no black in the solution.*
4. *Is iodine moving through a membrane osmosis or diffusion? diffusion Why? Water is not involved.*
5. *Did the water or sugar move through the membrane in bag #2? water*
6. *What is your evidence? The bag weighed more at the end*
7. *Is the movement of water osmosis or diffusion? Osmosis Why? That is the definition of osmosis.*
8. *What do you assume about the size of sugar and starch molecules? They are too large to pass through the membrane.*

3. Conclusion is thoughtfully and completely written.4

Bibliography

Lesson Design by Jordan School District Teachers and Staff.

Authors

Utah LessonPlans