Diffusion and Osmosis Kit

Purpose of kit:

This kit will help students understand the movement of water across a membrane from a hypotonic side of a semipermeable membrane to a hypertonic side. Students will set up simple demonstrations using plastic bags and sugar water and measure the movement of water by monitoring the change in mass of the "dialysis tube".

This lesson is best used when teaching about osmosis or diffusion in a living system. For example, it can be used during a plants unit to show how water moves into and around a plant or during units on human body systems (circulatory, respiratory).

Contents:

- Plastic bags
- String
- Pipettes
- Electronic balances
- Student instructions
- Copy of student worksheet
- Key to student worksheet

Preparation:

1. Additional materials needed:
    a. Document camera
    b. Strong sugar water solution
    c. Small bucket or other container to hold fresh water
2. Lab can be expanded with a microscope part of the lesson. To do this, you will need:
    a. Microscopes
    b. Slides
    c. Cover slips
    d. Red onion

Lesson:

1. Give students context for the investigation. Molecules move across membranes, whether it's gases crossing the alveoli of the lungs, water moving through the nephrons of the kidneys, or water moving into and through a plant.
2. Tell students that this investigation will help us determine which way water moves across a membrane.
3. Introduce students to the lab supplies. This will vary depending on what part of the investigation you are using.
    a. If you are using the plastic bags for dialysis tubing, it is important that they tie the strings as tightly as they can to avoid leaks
    b. If you are doing red onion, demonstrate peeling a very thin layer of the red part of the onion. This should be just one cell thick.
4. Best results for the dialysis tubing are achieved if the tubes are left to sit for about 40 minutes. Because of this, it's a good idea for students to set up their dialysis tubing first, then do the microscope portion of the lesson. If you are not using microscopes, then you can do another activity (such as lecture about osmosis or diffusion) while waiting for results.
5. At the end of the lesson, assess students on their understanding using the questions on the worksheet.
6. It is always a good idea to follow up an investigation with an entry into their summary chart (an example from the plants unit here).

Back pocket questions:

- What do you think will happen?
- Why do you think you are seeing that?
- Can you think of where else we might see this sort of thing happen?