Exploring Diffusion

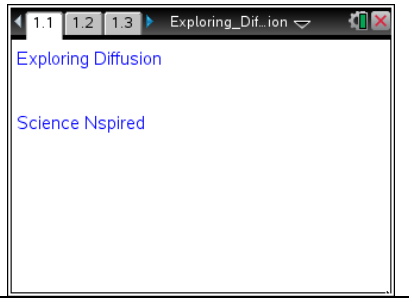
Student Activity

Name _____

Class _____

Open the TI-Nspire document *Exploring_Diffusion.tns.*

This lesson involves using a dynamic model of diffusion through a selectively permeable membrane.



About Diffusion and Osmosis

Diffusion occurs when particles of a higher concentration of a substance move to an area of lower concentration; often across the cell membrane. Diffusion is a form of **passive** transport because no cellular energy is required for it to occur. **Active** transport occurs when ATP energy *is* required to move a substance from one area to another.

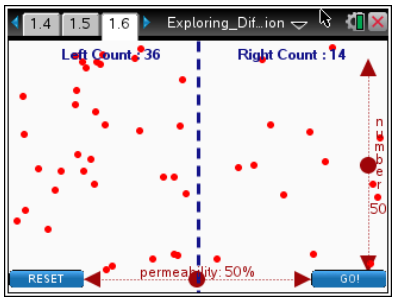
Osmosis is the particular case of diffusion where the substance that moves through the membrane is water.

When free movement through the membrane is possible, then that membrane is said to be **permeable**. If some things can pass through and some can't, the membrane is **selectively permeable**. All living cells are contained within a selectively permeable membrane, which allows movement in and out of certain molecules.

Understanding the processes of diffusion and osmosis is important if we are to understand how living things function.

Move to page 1.6.

1. On page 1.6, use the sliders (or arrow keys) to change the number of molecules, and the permeability of the membrane.
2. Observe the effects of these changes, and answer the questions on pages 1.7-1.11.



Tech Tip: Select “GO!” and “STOP” to start and stop the simulation. Select “RESET” to reset the simulation to the initial state.

Move to pages 1.7 through 1.11.

3. Set the permeability slider to 0%. Set the number of particles to 50. Look to the RIGHT side of the membrane. We might expect to see_____ particles.
    - 0
    - less than 25
    - more than 25
    - around 50
4. Set the permeability slider to 50%. Set the number of particles to 50. Look to the RIGHT side of the membrane. We might expect to see_____ particles.
    - 0
    - less than 25
    - more than 25
    - around 50
5. Set the permeability slider to 100%. Set the number of particles to 50. Look to the RIGHT side of the membrane. We might expect to see_____ particles.
    - 0
    - less than 25
    - more than 25
    - around 50
6. Set the number of particles to 20. To observe around 5 particles on the RIGHT side of the membrane, what would the permeability need to be?
    - 0%
    - 25%
    - 50%
    - 100%

7. In each example, you have been directed to observe the number of particles on the RIGHT side of the membrane. Explain the relationship between the concentration of particles and the direction of movement.