Biology I
Lab: Diffusion

Purpose
To observe the process of diffusion across a selective membrane utilizing two indicators: phenolphthalein and iodine. Phenolphthalein is a pH indicator that turns red in basic solutions. Iodine is a starch indicator, which changes from light brown to dark blue in the presence of starch.

Materials

dialysis tubing	phenolphthalein
string	iodine
600 ml beaker	starch solution
two 400 ml beakers	1M NaOH
10 ml graduated cylinder	

Procedure
1. Obtain two pieces of water-soaked dialysis tubing. Tubing can be found in the 400-mL beaker filled with water.
2. Seal one end of each bag by folding over 1-2 cm of the end and tying it tightly with a piece of string. The ends of the tube must be sealed tightly to prevent leaks.
3. Roll the untied end of each tube between your thumb and finger to open it and form a bag.
4. Fill one bag with 10 ml of water and add three drops of phenolphthalein. Seal the open end of the bag by folding the end and tying it securely.
5. Fill the other bag with 10 ml of a starch suspension. Seal the open end of the bag by folding the end and tying it securely.
6. Gently rinse the outside of each bag in tap water.
7. Fill a beaker with 200 ml of tap water and add 10 drops of 1M sodium hydroxide (NaOH). Submerge the dialysis bag containing phenolphthalein in the beaker.
8. Fill a beaker with 200 ml of tap water and add 20-40 drops of iodine. Submerge the dialysis bag containing starch in the beaker.
9. Observe the color changes of the bags' contents and the surrounding solutions.

Hypothesis
In reading the purpose and procedure, form a hypothesis on the outcome of this experiment. Explain your thoughts.

Data and Analysis
1. Explain the process of diffusion. Is it an example of passive or active transport?

2. Describe the color changes in the two bags and their surrounding solutions.

3. For which molecules and ions does your experiment give evidence for passage through the semi-permeable membrane: phenolphthalein? Iodine? Starch? NaOH?

4. What characteristics distinguish those molecules and ions passing through the membrane from those that do not pass through the membrane?

5. Diffusion can occur across the plasma membrane. List several substances that have the ability to diffuse across the membrane.