**Cell Membrane Permeability Lab**

The cell membrane determines what diffuses into a cell. This characteristic of a cell membrane is called permeability. Many cells are semi permeable, which means that not all substances can pass through the cell membrane.

In this investigation, you will model a cell membrane, and determine if the membrane is permeable to certain substances.

1. Where is the cell membrane of an animal cell located? Where is located in a plant cell?

2. What types of materials do you think might be able to pass through the cell membrane?

3. Where do you find cells?
**Materials**
- Plastic lunch bag
- 2- 100mL graduated cylinders
- Starch solution (share)
- 1- 200mL beaker
- Iodine solution (share)
- 3 test tubes
- Test tube rack

**Procedure**

1. Write your name on a piece of tape and attach to your beaker. Then label your three test tubes, again using tape, as follows- **Iodine Before**, **Iodine After**, and **Starch**.

2. Measure 40mL of iodine solution into a graduated cylinder. Caution iodine will stain. The iodine will represent the environment outside your model of the cell (plastic bag with starch).

3. Fill the test tube labeled **Iodine Before** one-fourth full with iodine solution, and set it in the beaker, then pour the remainder of the iodine solution from the graduated cylinder into the beaker. Record the color of the iodine solutions in the test tube and beaker in Data Table 1.

4. Measure 40mL of starch solution into another graduated cylinder. Fill the test tube labeled **Starch** one-fourth full with starch solution, and set it in the beaker, then pour the remainder of the starch solution from the graduated cylinder into the bag, and seal the bag.

5. Record the mass of the bag with the starch, in Data Table 2, using the electronic scale. Record the color of the Starch solution from the test tube and bag in Data Table 1, and then place the sealed bag and test tube with starch inside the beaker that contains the iodine solution. The bag represents the cell membrane.

6. Let the beaker and its contents stand overnight.

7. The next class period, remove the plastic bag and the test tubes from the beaker. Record the colors of the solutions in the **plastic bag** and the **test tube** labeled **Starch** in data table 1.

8. Pour iodine solution from the beaker into the test tube labeled **Iodine After** until the test tube has the same amount of solution as the test tube labeled **Iodine Before**.

9. Hold and observe the 2 test tubes side by side, then look down through their openings. Record the colors of the solutions in the last line of data table 1.

10. After drying off the outside of the plastic bag measure the mass of the plastic bag and its contents using the electronic scales and record the mass in data table 2 “mass of bag and contents after” column.

11. **Thoroughly clean and dry** all glassware and work station.
Title: Group member’s names

Objectives:
  a. 
  b. 

Problem: Which particles will pass through (permeate) a plastic bag (membrane)? (Starch? Iodine?)

Hypothesis: If Starch and Iodine solutions are placed on opposite sides of a Semi-permeable membrane, then the ________ will diffuse through the membrane, but the ________ will not. Then the ________ will diffuse through the membrane, but the ________ will not. Then both the ______ and the ________ will diffuse through the membrane. (choose one of the above)

Results:

Data Table #1

<table>
<thead>
<tr>
<th></th>
<th>Color Before (today)</th>
<th>Color After (Tomorrow)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starch in bag</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Starch in test tube</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iodine in test tube</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iodine in beaker</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Data Table #2

<table>
<thead>
<tr>
<th>Mass of Bag with Starch Before (today)</th>
<th>Mass of Bag with Starch After(tomorrow)</th>
</tr>
</thead>
<tbody>
<tr>
<td>________________grams</td>
<td>________________grams</td>
</tr>
</tbody>
</table>
Analyze and Conclude

1. What part of the cell does the plastic bag represent?

2. Explain the reason why the test tube containing the starch solution was placed in the beaker?

3. When starch mixes with iodine what color does the mixture turn? What happened to the contents of the plastic bag at the end of day 2?

4. Which direction did the starch move? Back up your answer with your observations.

5. Which direction did the iodine move? Again back up your answer with your observations.

6. Based on your results, was the model cell membrane permeable or impermeable to iodine? How about the starch?

7. Why is the color of the iodine before different compared to the color of the iodine after?

8. Did the mass of the bag with its contents after decrease or increase? Give a possible explanation for this observations.

10. The cell membrane contains little holes or openings called pores. Pore size may determine why some chemicals can or cannot pass through a cell membrane. In your model, how might the size of the membrane pores compare to the size of the iodine molecules? Explain.

11. In your model, how might the size of the membrane pores compare to the size of the starch molecules? Explain.

12. Large things need to get into the cell but can’t fit through the pores. How then do these larger molecules get into the cell?