**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period: \_\_\_\_\_\_ Team # \_\_\_\_\_\_\_**

**LAB: Diffusion & Osmosis**

**Introduction**: Semi-permeable membranes are substances which allow some things to pass through them, but not others. In this lab, we will use a small plastic bag to demonstrate semi-permeable membranes that allow certain molecules to pas through, but not others.

**Materials**:

10-20 cm dialysis tubing iodine solution ~10 mL concentrated soluble starch solution

metric balance 250 mL beaker water

Graduated syringe

**Methods**:

DAY 1

1. Retrieve a pre-cut piece of dialysis tubing. Rub the tubing between your thumb and forefinger to open it.

2. Twist one end and use a piece of string to TIGHTLY tie off one end.

3. Bring your dialysis tubing to the starch solution station. Use the dropper there to fill the tubing about 3/4 of the way to the top.

4. Return to your table and TIGHTLY tie off the second end of the tubing. Try to remove any air bubbles by gently squeezing the tubing before tying it off.

5. Rinse your tubing at the sink, and gently pat it dry.

6. RECORD THE INITIAL MASS OF THE FULL SACK after using a triple-beam balance to measure it.

7. Place the sack in the bottom of your plastic beaker, and fill the beaker with enough water to completely cover the tubing sack by about 1/2 an inch.

8. Bring the beaker with the sack back to your lab table, and add 8 drops of the brown iodine solution

9. Record the starting time and date of the experiment in the data table.

DAY 2

1. Observe your dialysis sack. Record visual observations in the data section below. IF YOU SEE A DARK BLUE / BLACK COLOR, RECORD WHERE YOU SEE IT.

2. Remove the sack from the beaker and gently pat it dry. Use a triple-beam balance to measure the mass and record it and the experiment end time / date in the data table.

3. Complete analysis questions.

**Hypotheses:** 1. The water will move ( into / out of ) the bag because of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(identify the process).

2. The iodine ( will / will not ) cross the semi-permeable membrane into the sack, by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

3. The starch ( will / will not ) cross the semi-permeable membrane out of the sack, because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Predictions:** 1. If water moves the way we hypothesize, the mass of the bag will \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

2 & 3. If the iodine and starch move the way we hypothesize, we will see a blue color (inside the bag / outside the bag / both inside and outside the bag).

**Data**:

|  |  |  |  |
| --- | --- | --- | --- |
| **Initial Mass (g)** | **Final Mass (g)** | **Start Time / date** | **End Time / date** |
|  |  |  |  |

 *Visual Observations:*

**Results**:

|  |  |  |
| --- | --- | --- |
| **Change in mass (final -initial)** | **Elapsed Time (hours)** | **Rate of Osmosis (Change in mass / time)** |
| g |  |  |

**Conclusion Questions**:

1. In what direction did **water**, **iodine**, and **starch** move across the membrane, if at all? Explain how your data supports these three conclusions.

|  |  |  |  |
| --- | --- | --- | --- |
| Substance | Direction it moved  | Name of process | How you know |
| Water |  |  |  |
| Iodine |  |  |  |
| Starch |  |  |  |

2. How much water entered the simulated cell, if any?

3. Were the results what you expected to find? Why or why not?

4. Based on what you’ve observed, predict what you believe would happen to the starch, water, and iodine if the cell was placed into a solution of **pure water** *after* our experiment ended. Explain the basis for your predictions, and the observations you could make to test them.

|  |  |  |
| --- | --- | --- |
| Substance | Direction it would move | Why you hypothesize this |
| Water |  |  |
| Iodine |  |  |
| Starch |  |  |