**Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

I CAN explain how materials move in and out of a cell.

**Period \_\_\_Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Diffusion Lab**

**Question:** How does a plastic bag affect the movement of molecules?

**Background Info:**

* The plasma membrane of cells is selectively permeable. It allows only certain materials to move in and out of the cell at any given time. One way materials can move across the plasma membrane is by ***diffusion***. ***Diffusion*** is the movement of materials from areas of **higher** concentration—crowded areas-- to areas of **lower** concentration—less crowded areas.
* Iodine indicates the presence of starch. Specifically, iodine turns corn starch purple.
* A plastic bag is called semi-permeable which means it has many microscopic openings that allow small amounts of air or water to enter and leave. Larger things cannot pass through these openings.
* Osmosis is a special type of diffusion. Osmosis is the movement of water molecules through a membrane from a crowded area (high concentration) to a less crowded area (low concentration).

**Hypothesis**:

 If a plastic baggie of cornstarch is placed into a beaker of an iodine solution, then the

 corn starch will \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Materials:**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Procedure:**

**Warning: Iodine will stain skin and clothing!**

1. Place ONE LARGE teaspoon of cornstarch in a plastic bag and add 50 mL of water.

2. Carefully tie the bag closed—try **NOT** to trap air in the baggie—and use your hands to mix the cornstarch and water by **gently** squeezing the bag.

3. Fill a beaker with 125 mL of water and add one pipette (up to bulb-about 15 drops) of iodine.

**BE CAREFUL – PLACE THE PIPETTE IN THE DIXIE CUP WITH A PAPER TOWEL!!!!**

4. Gently—slowly—place the bag into the beaker so that the cornstarch solution is submerged in the iodine solution.

5. Wait at least fifteen minutes. While you are waiting, answer the questions and fill in the “Starting Color” column in the data table below.

6. Observe the changes that take place. Fill in the “Color after 15 Minutes” column in the data table and answer the post-lab questions.

**Questions:**

1. Molecules tend to move from areas of \_\_\_\_\_\_\_\_\_concentrations to areas of \_\_\_\_\_\_concentration.

2. Which has a higher concentration of cornstarch: the baggie or the beaker? \_\_\_\_\_\_\_\_\_\_\_\_\_

3. Which has a higher concentration of iodine: the baggie or the beaker? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. If the baggie is permeable (allows materials in and/or out of the cell membrane) to

cornstarch, which way will the cornstarch move

 ---into the baggie or out of the baggie?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. If the baggie is permeable (allows materials in and/or out of the cell membrane) to iodine, which way will the iodine move

 ---into the baggie or out of the baggie?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6. If the baggie is permeable (allows materials in and/or out of the cell membrane) to iodine, what **color** would you expect the liquid in the baggie to turn? \_\_\_\_\_\_\_\_\_\_\_\_

What about the liquid in the beaker? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

7. If the baggie is permeable to starch (allowing only the starch out), what color would you expect the liquid in the baggie to turn?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What about the liquid in the beaker?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Data Table**

|  |  |  |
| --- | --- | --- |
|  | **Starting Color** | **Color after 15 Minutes** |
| **Solution in Beaker** |  |  |
| **Solution in Bag** |  |  |

**Post-Lab Questions—Draw Conclusion and Analysis**

1. Based on your observations, which substance moved: the iodine or the cornstarch?

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. How did you determine this?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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3. The plastic baggie was permeable (let which substance in or out) to which substance?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. Define “selectively permeable.” (see background information)

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5. Is the plastic baggie selectively permeable?\_\_\_\_\_\_\_\_

6. How did you determine this?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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7. Sketch the beaker and baggie in the space below.

 Use arrows to illustrate how diffusion occurred in this lab.

 Be sure to label the parts of your diagram.

8. What would happen if you did an experiment in which the iodine solution was in the plastic baggie and the cornstarch solution was in the beaker?

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