Biology 1 Name:

***Diffusion & Osmosis Lab***  Date:

Hour:

**Introduction (Background Information & Problem)**

\**Be sure to NOTE: This is an explanation of the material covered and a general overview of the experiment.*

Diffusion if the movement of particles down their concentration gradient. This means, assuming random and free motion, molecules will move from areas where the concentration is high to areas of lower concentration. The diffusion of water molecules across a membrane is called osmosis. Usually, water (the solvent) contains dissolved particles (the solute). The relative concentrations of water and the solute determine if a solution is hypertonic or hypotonic. When a selectively permeable membrane is involved, some solute molecules will be “blocked” from moving. ***This experiment will test a membrane to determine if it is selectively permeable.***

Monosaccharide and polysaccharides will be placed in a membrane and tests will be used to determine if the molecules are able to pass through it. Benedict’s solution changes color in the presence of monosaccharide molecules. It will be used to indicate the presence of these molecules. An Iodine solution changes color in the presence of polysaccharide molecules. This will be the other indicator used as it will indicate the presence of polysaccharides.

**Materials**

\**Be sure to NOTE: This is simply a list of everything needed for the experiment.*

* dialysis tubing
* dental floss
* 250 ml glass beaker
* water
* polysaccharide (starch) solution
* monosaccharide (sugar) solution
* Benedict’s solution
* Iodine solution
* graduated cylinder
* food coloring
* plastic reaction wells
* pipette
* test tubes

**Hypothesis**

\**Be sure to include:*

* *A statement that is actually a PREDICTION about what will happen in the EXPERIMENT.*
* *If/Then statement (doesn’t have to actually use “if” and “then”)*

**Reason for Hypothesis**

\**Be sure to include:*

* *If you believe the experiment will prove or disprove the hypothesis.*
* *A reason WHY you believe the hypothesis will be proved or disproved.*
* *It’s basically just a statement explaining why you wrote the hypothesis you wrote.*

**Day One Procedure A**

\**Be sure to NOTE: This is a step-by-step, simple, concise yet detailed outline of how the experiment is performed.*

1. Fill a 250ml glass beaker with about 200ml of tap water. Set aside for later.
2. Obtain and open a 10cm strip of dialysis tubing
3. Close one end of the tubing by folding over about 1cm of tubing, twisting it and tying it with a piece of dental floss. Set this aside.
4. Measure out 4ml of polysaccharide solution and pour it into the open end of the dialysis tubing.
5. Measure out 4ml of monosaccharide solution and pour it into the open end of the dialysis tubing.
6. Put one drop of food coloring (any color) into the open end of the dialysis tubing.
7. Close the open end of the dialysis tubing by folding over the excess, twisting and tying with dental floss.
8. Record the mass of your dialysis tubing construction.
9. Place the dialysis tubing (sealed) into the beaker of water you set aside in step one.
10. Label the beaker with group member names and class hour. Set on side lab counter.

**Day One Procedure B**

\**Be sure to NOTE: This is a step-by-step, simple, concise yet detailed outline of how the experiment is performed.*

1. Fill a 250ml glass beaker with about 200ml of tap water.
2. Place one drop of food coloring (any color) into the beaker of water and set aside for later.
3. Obtain and open a 10cm strip of dialysis tubing
4. Close one end of the tubing by folding over about 1cm of tubing, twisting it and tying it with a piece of dental floss. Set this aside.
5. Measure out 4ml of polysaccharide solution and pour it into the open end of the dialysis tubing.
6. Measure out 4ml of monosaccharide solution and pour it into the open end of the dialysis tubing.
7. Close the open end of the dialysis tubing by folding over the excess, twisting and tying with dental floss.
8. Record the mass of your dialysis tubing construction.
9. Place the dialysis tubing (sealed) into the beaker of water you set aside in step one.
10. Label the beaker with group member names and class hour. Set on side lab counter.

**Day Two Procedure**

1. Record the location of the food coloring.
2. Remove the dialysis tubing from the beaker of water. Rinse the tubing with water. Measure and record the mass.
3. Carefully (without spilling) cut the dialysis tubing open at one end
4. Using a pipette, remove some solution from the tubing.
5. Drop five drops of the solution from the tubing into an empty reaction well.
6. Drop two to three drops of iodine into the reaction well containing solution from the tubing.
7. Record the color (change or not) in the data table.
8. Clean and rinse the pipette to prevent contamination.
9. Using the pipette, remove some solution from the beaker.
10. Drop five drops of the solution from the beaker into an empty reaction well.
11. Drop two to three drops of iodine into the reaction well containing solution from the beaker.
12. Record the color (change or not) in the data table.
13. Clean and rinse the pipette to prevent contamination.
14. Using a pipette, remove some solution from the tubing.
15. Drop seven drops of the solution from the tubing into a test tube.
16. Drop four drops of Benedict’s solution into the test tube containing solution from the tubing.
17. Place the test tube in a hot water bath for three minutes.
18. Remove the test tube from the water bath using the test tube holders. Be careful! The test tube will be hot!
19. Record the color (change or not) in the data table.
20. Clean and rinse the pipette to prevent contamination.
21. Using the pipette, remove some solution from the beaker.
22. Drop seven drops of the solution from the beaker into a test tube.
23. Drop four drops of Benedict’s solution into the test tube containing solution from the beaker.
24. Place the test tube in a hot water bath for three minutes.
25. Remove the test tube from the water bath using the test tube holders. Be careful! The test tube will be hot!
26. Clean and rinse all materials and return them to your teacher.

**Data**

\**Be sure to NOTE: This data table was created before the experiment was performed. Oh yeah, that makes sense! If a biology student knows what they are doing ahead of time, then they should know what they need to record while they are doing the experiment. A pre-made, empty table also ensures that you don’t forget to record anything during the experiment.*

Labeled Sketch of the Set-up:

Test Results:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Before (Day 1) - Mass: \_\_\_\_\_\_\_\_\_\_ g | | | | After (Day 2) - Mass: \_\_\_\_\_\_\_\_\_\_ g | | | |
| Beaker | | Tubing | | Beaker | | Tubing | |
| Did you put polysaccharide in here? |  | Did you put polysaccharide  in here? |  | Results of Iodine Test |  | Results of Iodine Test |  |
| Did you put monosaccharide in here? |  | Did you put monosaccharide  in here? |  | Results of Benedict’s Test |  | Results of Benedict’s Test |  |
| Did you put food coloring in here? |  | Did you put food coloring  in here? |  | Is there food coloring here? |  | Is there food coloring here? |  |

**Conclusion**

\**Be sure to include:*

* *General explanation of your findings*
* *Restated hypothesis*
* *Was the hypothesis proved or disproved?*
* *WHY? Support your statements with actual data.*
* *Possible errors. This isn’t just what you did wrong, but is what to watch out for (like contamination) and what could be done to make the experiment and data sounder (like more trials).*
* *General explanation of what happened*