Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period: \_\_\_\_\_\_\_\_ Due Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Osmosis and Diffusion Across an Egg Membrane**

Objective: In this investigation, you will use a hen’s egg to determine what happens during osmosis and diffusion across membranes.

Materials: 1 egg in the shell, marker, distilled water, clear sugar syrup (Karo), vinegar, cup, tongs, electronic balance, lots of paper towels, pencil, beaker, plastic wrap

**Procedure**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Day 1** | |  | | | | | |
| **Results of Osmosis** | | | | | | | |
| Solution | | Egg Original  Mass | Egg Final  Mass | Liquid in cup  Original (ml) | Liquid in Cup Final (ml) | Notes/Appearance | |
| Vinegar | |  |  |  |  |  | |
| Water | |  |  |  |  |  | |
| Syrup | |  |  |  |  |  | |

1. Place a paper towel on the balance; zero and mass the egg and record in the data table.
2. Label the vinegar cup.
3. Place the egg in the cup.
4. Measure 100 ml of vinegar in beaker and pour the vinegar over the egg.
5. Cover the cup and leave the cup at your station until next class.
6. Review osmosis, isotonic, hypertonic, and hypotonic.
7. Complete the following below:

|  |  |
| --- | --- |
| Hypothesis:   Experimental Group:  Control Group:  Independent variable:  Dependent variable: | Draw with arrows to indicate the direction vinegar will flow and explain why. Explanation:  http://images.clipartpanda.com/egg-clip-art-egg-clip-art-1.jpg |

|  |  |
| --- | --- |
| **Day 2** |  |

1. Place a paper towel on the balance and zero the balance.
2. Use tongs or your fingers to carefully, gently, gingerly pull the egg out of the vinegar. Let the excess vinegar drip from the egg.
3. Place the egg on the balance and record the mass in the data table.
4. Pour the liquid (vinegar) into the beaker and record the volume.
5. On the back of the last page, write a summary of the data using only the numbers. Example: The original mass of the egg was \_\_. The final mass after being in the vinegar for hours was . The change in mass was \_\_. The vinegar level changed from \_\_ to \_\_.
6. On the back of the last page, write an analysis of what happened to the egg. Use data above to support your summary and use the terms ***hypotonic***, ***hypertonic***, and ***isotonic***.

1. Cross off or scrub off the word “vinegar” on the cup and label “distilled water.” Thoroughly rinse the cup.
2. Write the final mass after vinegar in the next section of the table.
3. Rinse the cup out thoroughly.
4. Place the egg in the cup - gently.
5. Measure 100 ml of distilled water in the beaker and pour over the egg. Leave the egg.
6. Complete the following.

|  |  |
| --- | --- |
| Hypothesis:   Experimental Group:  Control Group:  Independent variable:  Dependent variable: | Draw with arrows to indicate the direction water will flow and explain why. Explanation:  http://images.clipartpanda.com/egg-clip-art-egg-clip-art-1.jpg |

|  |  |
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| **Day 3** |  |

1. Place a paper towel on the balance and zero the balance.
2. Use tongs or your fingers to carefully, gently, gingerly pull the egg out of the distilled water. Let the excess water drip from the egg.
3. Place the egg on the balance and record the mass in the data table.
4. Pour the liquid (water) into the beaker and record the volume.
5. On the back of the last page, write an analysis of what happened to the egg. Use data above to support your summary, and use the terms ***isotonic***, ***hypotonic***, and ***hypertonic***.
6. Rinse the cup out and place the egg carefully into the cup.
7. Measure 100 ml of Karo syrup or dextrose solution in the beaker and pour into the cup. Scrape the sides with the spoon provided.
8. Clean up the beaker - wipe any writing off the beaker, rinse with soap and water and dry. Place beside the sink to dry.
9. Complete the following:

|  |  |
| --- | --- |
| Hypothesis:   Experimental Group:  Control Group:  Independent variable:  Dependent variable: | Draw with arrows to indicate the direction sugar will flow and explain why. Explanation:  http://images.clipartpanda.com/egg-clip-art-egg-clip-art-1.jpg |

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| --- | --- |
| **Day 4** |  |

1. Remove the container and carefully pull out the egg near a source of water.
2. Carefully rinse off the excess syrup under the slow-running water and pat the egg dry with a paper towel.
3. Place a paper towel on the balance and zero.
4. Mass the egg and record in the data table.
5. Record the ml of syrup/sugar water.
6. Clean up your station - Rinse all containers; wipe the counters. Clean the balances. Throw away cups.
7. On the back of the last page, write an analysis of what happened to the egg after soaking in the sugar water. Use the terms/phrases: ***solute***, ***hypotonic***, ***hypertonic***, ***isotonic***, and ***osmosis***.

**Final Questions**

1. What happened to the size of the egg after remaining in the vinegar? Was the vinegar hypertonic or hypotonic? Explain.
2. Where did the vinegar liquid move - into or out of the egg? How do you know? What data supports this conclusion?
3. What happened to the size of the egg in distilled water? Was the distilled water hyper, hypo, or isotonic?
4. What happened to the size of the egg in syrup/sugar water? Was the solution hyper, hypo, or isotonic?
5. Roads are sometimes salted to melt ice. How would this influence the plant cells (use your terms)?
6. Diabetics have difficult time getting glucose into their cells. Would this condition create a hypotonic, hypertonic, or isotonic condition for the cells? Which way would liquid move from the cell?