

Name: _____

Section: _____



Osmosis Lab



Introduction: Homeostasis is the process of maintaining a constant internal environment despite changing external conditions. In order for a living organism to be at homeostasis, substances such as food and water must be able to move into or out of the cell. This lab exercise will investigate the process of osmosis, which is the diffusion of water into and out of cells.

Purpose: To see how a potato/carrot reacts when placed into various osmotic environments

Hypothesis: _____

Materials: Salt water, tap water, distilled water, potatoes/carrots, triple beam balance, containers for water, paper towels, forceps, calculators

Procedures:

(Day #1)

1. Label three containers: salt water, distilled water, and tap water.
2. Put the appropriate kind of water in each container. Fill the container approximately halfway.
3. Make observations about the physical appearance of the potato/carrot and record them in the data table.
4. Measure the mass of one piece of potato/carrot. Record this in the data table and place the potato/carrot into the salt water solution. **Clean the balance after each use.**
5. Repeat Step #4, and place this piece of potato/carrot into the distilled water.
6. Repeat Step #4, and place this piece of potato/carrot into the tap water.
7. Make predictions about what will happen to the mass of each potato/carrot overnight. Record on your paper.

(Day #2)

8. Remove the potato/carrot from the salt solution. Do not stab or poke the potato/carrot with forceps when removing it. Using a paper towel, pat the potato/carrot dry. Measure the mass, and record in the data table. Record any other observations about the potato/carrot (color, texture, etc.).
9. Repeat step #8 with each of the other potatoes/carrots.
10. Clean up your lab table. Put potatoes/carrots and paper towels in the trash, and pour all liquids down the sink.
11. Work the calculations, and answer the questions about the lab.

Predictions:

Carrot in salt water	Carrot in distilled water	Carrot in tap water

Observations/Data:

<i>Qualitative</i>	Carrot in salt water	Carrot in distilled water	Carrot in tap water
Before			
After			

<i>Quantitative</i>	Carrot in salt water	Carrot in distilled water	Carrot in tap water
Day 1 mass			
Day 2 mass			
Difference (between day 1 & 2 masses)			
% change			

Calculations: Using the following equation, calculate the percent change in mass of the potatoes/carrots for each type of solution. Please be sure to tell me whether the % change was due to an increase or decrease in size. You may simply use a up (↑) or down (↓) arrow.

$$\frac{\text{Difference}}{\text{Beginning Mass}} \times 100 = \text{ ______ \%change}$$

Show your calculations below

Questions for thought:

1. In potatoes/carrots, what cell part stores water?
2. What do you think caused the changes in mass for your potatoes/carrots?
3. Which potato/carrot had the largest percent decrease in mass? Why do you think this happened?
4. Which potato/carrot had the largest percent increase in mass? Why do you think this happened?
5. What physical observations did you make about your potato/carrot in salt solution? What do you think caused these physical changes?
6. What physical observations did you make about your potato/carrot in distilled water? What do you think caused these physical changes?
7. Which of these solutions is "hypertonic?" How do you know?
8. Which of these solutions is "hypotonic?" How do you know?
9. Think about what happens to a plant when you don't water it. What happens to its leaves? Why does this happen (Hint: think of what is found in the vacuole of a healthy plant cell), and what can you do to stop the plant from dying?
10. A plant cell has a cell wall around its cell membrane. The cell wall is not "stretchy," so the plant cell won't break open. How does this help the plant to remain upright, and not fall over? (Hint: think about what's in the vacuole, and how it can help in this situation.)