

Unit 1 Handout _____

Lesson 5: Osmosis in Carrots

Purpose: To observe how osmosis affects plants.

Research/Background:

Osmosis is the diffusion of water particles from a higher concentration to a lower concentration. An easy way to observe this is by using plants. Plant shape and firmness can be changed based on how much water is in the plant. You have seen this before when a plant wilts. It wilts because it does not have enough water to keep itself upright. In this lab, we will place carrots in a solution that contains a concentration of water higher or less than the concentration of water in the carrot.

Procedure

1. Label two ribbons with your period number.
2. Tie the ribbon as tightly as you can around the carrot without damaging the carrot.
3. Make observations about the ribbon and the carrot in the table below.
4. Designate one carrot for freshwater and one for salt water.
5. Leave the carrots in their assigned solutions for at least 24 hours.
6. Record observations of the ribbon and the carrot in the table below.

Observations of Carrot Before Solution
<p>Describe how the ribbon is tied around the carrot:</p> <p><i>We will do the next two measurements together as a class.</i></p> <p>Mass of all freshwater carrots: <u>Answers</u> My carrot FW: <u>Answers</u></p> <p>Mass of all saltwater carrots: <u>var-y</u> My carrot SW: <u>var-y</u></p>

Observations of Fresh Water Carrot after 24 Hours	Observations of Saltwater Carrot after 24 Hours
<p>Class Mass: _____ My Mass: _____</p> <p>Describe the carrot.</p> <p style="color: blue;">The carrot seems larger because the ribbon appears tighter.</p>	<p>Class Mass: _____ My Mass: _____</p> <p>Describe the carrot.</p> <p style="color: blue;">The carrot seems smaller because the ribbon is loosely tied around it.</p>

) These should be larger than the starting values!

These should be smaller than the starting values! ←

Analysis**FRESH WATER CARROT DATA ONLY!**

1. Did the mass of the carrots change after 24 hours? How? Yes, it increased.
2. Did the carrot (overall) shrink or grow? It grew
3. Was the carrot placed in a hypertonic or hypotonic solution? Hypotonic
4. Which had a higher concentration of water: the solution or the carrot? Solution
5. Where did the water move from and to? From the solution and to the carrot
6. How did the carrot change after sitting in the fresh water solutions for 24 hours?

*The volume of the carrot increased and the mass increased from ___g to ___g.
Replace the missing values with your own data!*

7. In one or two complete and detailed sentences, describe what happened that caused the fresh water carrot to change. Your answer should include the following words: osmosis, water, mass, concentration, and solution.

The mass and size of the carrot increased due to the osmosis of water into the carrot. This happened because there was a higher concentration of water in the solution and a lower concentration of water in the carrot. The water moved from the solution and into the carrot causing the observed changes.

SALTWATER CARROT DATA ONLY!

8. Did the mass of the carrots change after 24 hours? How? Yes, it decreased.
9. Did the carrot (overall) shrink or grow? It shrank
10. Was the carrot placed in a hypertonic or hypotonic solution? Hypertonic
11. Which had a higher concentration of water: the solution or the carrot? Carrot
12. Where did the water move from and to? From the carrot and into the solution
13. How did the carrot change after sitting in the salt water solutions for 24 hours?

*The volume of the carrot decreased and the mass decreased from ___g to ___g.
Replace the missing values with your own data!*

14. In one or two complete and detailed sentences, describe what happened that caused the salt water carrot to change. Your answer should include the following words: osmosis, water, mass, concentration, and solution.

The carrot's mass and volume decreased because water left the carrot due to osmosis. The carrot had a higher concentration of water than the solution. Therefore the water left the carrot and went into the solution causing the observed changes.