Name ___________________________________ Date ___________________ Period ____

PRENTICE HALL - Virtual Osmosis Lab Activity

1. Log on to: **www.phschool.com/science/biology_place/labbench/**
2. ------> go to " Lab 1: Diffusion & Osmosis "
3. ------>Read the information on each page to answer the questions below. Click Next to get to the next page.

Introduction

4. In this lab activity:

a) You will study ____

Diffusion

5. Define Diffusion:____
6. Define Concentration Gradient—look at the first sentence:

____

Osmosis

7. Define Osmosis:____

Closer Look: Osmosis

8. The solute concentration in the beaker is__________ than that in the bag, and thus the water concentration is ___________in the beaker than in the bag. This causes water to move from the________ (left) into the ____________(right).
9. Run the simulation. Write down 2 Fun Facts about what you observed:

*
*

Movement of Molecules in Solution

10. There are often several different types of molecules in a solution. What is the motion of each type of molecule?

11. When a molecule moves down its own concentration gradient, what region does it move?

Closer Look: Concentration Gradient

12. What do you notice about the size of the starch molecules?

13. Which molecule is small enough to move across the membrane in both directions?

14. When iodine combines with starch, what color compound is formed?

15. Run the simulation. Write down 2 Fun Facts about what you observed:

    *
    *

Movement of Molecules in Cells

16. Like dialysis bags, cell membranes are____.
17. Run the simulation. Write down 2 Fun Facts about what you observed:

*
*

Types of Solutions Based on Solute Concentration

18. The terms _______tonic, _________tonic, and ______tonic are used to compare solutions relative to their solute concentrations.
19. In the illustration, the solution in the bag contains less solute than the solution in the beaker. The solution in the bag is hypotonic. What does hypotonic mean?

20. The solution in the beaker is hypertonic. What does hypertonic mean?

21. Which solution will water move into?

22. Will there be a net movement of water between two isotonic solutions?

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GLENCOE Diffusion Virtual Lab

http://www.glencoe.com/sites/common_assets/science/virtual_labs/LS03/LS03.html

Background information:

A **cell membrane** permits some materials to pass through while keeping other materials out. Such a membrane is called "**selectively permeable**." Under normal conditions, water constantly passes in and out of this membrane. This diffusion of water through a selectively permeable membrane is called **osmosis**. Like other substances, water **diffuses** from an area of higher concentration to an area of lower concentration. When the movement of water molecules in and out of a cell reaches the same rate, a state of **equilibrium** is reached.

If the concentration of water molecules is greater outside a cell, then the solution is **hypotonic** to the cell. Water will move into the cell by osmosis. The pressure against the inside of the cell membrane will steadily increase. If the pressure becomes great enough, the cell membrane will burst.

A solution is **isotonic** to the inside of the cell when there is the same concentration of water molecules on the inside and outside of the cell membrane. To maintain equilibrium, water molecules move into and out of the cell at the same rate.

Suppose a living cell is placed in a solution that has a higher salt concentration than the cell has. Such a solution is **hypertonic** to the cell, because there are more salt ions and fewer water molecules per unit volume outside the cell than inside. Water will move from the area of higher water concentration (inside the cell) to the area of lower water concentration (outside the cell). The selectively permeable membrane does not allow salt ions to pass into the cell. The cell shrinks as the cell loses water.

Objectives:

- Describe the process of osmosis
- Observe the movement of water through cell membranes during the process of osmosis
- Compare and contrast three osmotic states: *hypotonic, isotonic*, and *hypertonic*

Procedure: **Red Blood Cell**

1. Select the red blood cell at the top of the screen and drag it into the hypotonic beaker.
2. Observe the process of osmosis. Determine whether water (represented as blue arrows) moves into, stays in equilibrium, or moves out of the cell. Observe what happens to the shape and size of the cell.
3. Record your observations in the Data Table.
4. Click "reset" at the bottom. Now drag the red blood cell to the isotonic beaker. Observe the process of osmosis again and record your observations in the Data Table.
5. Click "reset" at the bottom. Now drag the red blood cell to the hypertonic beaker. Observe the process of osmosis again and record your observations in the Data Table.

Elodea Cell

1. Select the elodea cell at the top of the screen and drag it into the hypotonic beaker.
2. Observe the process of osmosis. Determine whether water (represented as blue arrows) moves into, stays in equilibrium, or moves out of the cell. Observe what happens to the shape and size of the cell.
3. Record your observations in the Data Table.
4. Click "reset" at the bottom. Now drag the elodea cell to the isotonic beaker. Observe the process of osmosis again and record your observations in the Data Table.
5. Click "reset" at the bottom. Now drag the elodea cell to the hypertonic beaker. Observe the process of osmosis again and record your observations in the Data Table.

Paramecium Cell

1. Select the paramecium cell at the top of the screen and drag it into the hypotonic beaker.
2. Observe the process of osmosis. Determine whether water (represented as blue arrows) moves into, stays in equilibrium, or moves out of the cell. Observe what happens to the shape and size of the cell.
3. Record your observations in the Data Table.
4. Click "reset" at the bottom. Now drag the paramecium cell to the isotonic beaker. Observe the process of osmosis again and record your observations in the Data Table.
5. Click "reset" at the bottom. Now drag the paramecium cell to the hypertonic beaker. Observe the process of osmosis again and record your observations in the Data Table.

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GLENCOE Diffusion Virtual Lab

Data Table: fill in the data table below

Molecules Name	Red Blood Cell: Net Water Movement In or Out?	Red Blood Cell: Appearance of Cell	Elodea: Net Water Movement In or Out?	Elodea: Appearance of Cell	Paramecium: Net Water Movement In or Out?	Paramecium: Appearance of Cell
Hypotonic Solution						
Isotonic Solution						
Hypertonic Solution						

Analysis:

Answer the following questions completely

1. Did water move into or out of the cell while it was surrounded by a **hypo**tonic solution?
2. Did water move into or out of the cell while it was surrounded by a **hyper**tonic solution?
3. Did water move into or out of the cell while it was surrounded by an **iso**tonic solution?
4. **Compare and contrast** what happens to an animal, a plant, and a paramecium cell in a hypotonic, hypertonic, and isotonic solution.
5. Could elodea or paramecium from a freshwater lake be expected to survive if transplanted into the ocean? Explain.
6. If you grill a steak, would it be better to put salt on it before or after you cooked it? Explain in terms of osmosis.
7. Why does salad become soggy and wilted when the dressing has been on it for a while? Explain in terms of osmosis.
8. An effective way to kill weeds is to pour salt water on the ground around the plants. Explain why the weeds die, using the principles discovered in the virtual lab.