Name_____ Hour_____

Lab
Partners_____

Why water your bean plant?

Lab Overview:
In this lab, you will use potatoes to figure out how much sugar is in different containers of colored water. You will then rank the colored water solutions from the least amount of sugar to the most amount of sugar using the data that you collect. You will apply this information to explain why and how water enters or leaves the roots of plants.

Question: At the cellular level, why and how does water move into a plant root?

Knowledge Probe:
Review the terms **solute, solvent** and **solution** from chemistry and write their meanings here.
Solute:_____

_____

_____

Solvent:_____

_____

_____

Solution:_____

_____

_____

Watch the two short videos on diffusion and osmosis.

Questions to consider before doing the lab~~~
1.   How does osmosis differ from diffusion?

_____

_____

_____

2. Particles always move from _____ concentration to _____ concentration.

3. Make a list of possible errors that could possibly happen. Next to each one, explain how this error could be minimized or eliminated.

_____

_____

_____

_____

_____

_____

4.   Make a picture model of what you think will happen to the potato that you put in the pure water.

5. Make a picture model of what you think will happen to the potato that you put in the water that has the most sugar in it.

Procedure on Day 1:
1.   Get 6 clear cups and fill 5 cups with 100 ml of a different colored solution and one with 100 ml of distilled (pure) water.
2.   Get 12 slices of potato from your teacher along with a plastic knife. Two potato slices will go into each cup.
3.   Weigh 2 potato slices all together and record their mass in the data table under the color beaker you will be placing them into. Then cut each slice into 4 equal parts.
4.   Place the 8 potato bits into their chosen colored cup.
5.   Repeat steps 2 and 3 for each of the 5 colored solutions and the distilled water.
7. Place all of your cups on a tray and identify it in a way that you can find it tomorrow.

Complete the handout on diffusion and osmosis.

Procedure on Day 2:
1.   Make certain you have a roll of paper towels at your lab station.
2.   Find your colored potato solutions and bring them to your lab table.
3.   Remove the potatoes bits from each container and and CAREFULLY blot off the extra water.
4.   Weigh the potatoes from each color separately and enter the data into the table.
5.   Dump the solutions down the drain and then wash and dry the cups.

Change in Potato Mass in Various Colored Solutions

Solution Color	Beginning Mass in grams	Final Mass in grams	Change in Mass in grams	Percent Change in Mass	Class Average
Yellow					
Red					
Green					
Blue					
Orange					
Clear					

Calculations:
1. Figure out the difference in mass for each bag by subtracting the final mass from the beginning mass.
2. Calculate the percent change in mass for each bag by using this equation:

$$\text{Percent change in mass} = \frac{\text{Final Mass} - \text{Beginning Mass}}{\text{Beginning Mass}} \times 100$$

3. Place your data on the class averages chart to be shared with the class.

4. What is the independent variable in this experiment? _____

5. What is the dependent variable in this experiment? _____

6. What was the control in this experiment? _____

7. Why is the control necessary? _____

_____

_____

Data Analysis

Create a way to graph your data and the classroom data showing the percent change in mass of the potatoes compared to the color of the water. Put both data sets on the same graph and use a different color for each one. Make a key for understanding. Fill in the Rank Box below with your findings.

Ranking of Colored Solutions from Least to Greatest Sugar Concentration

Lowest Concentration of Sugar   Highest Concentration of Sugar

_____ _____ _____ _____ _____ _____

Explanation:

How does the change in mass of the potato help you understand how water enters or leaves the root of your bean plant? Draw, label and explain a model at the **cellular level** to completely answer this question.