Qualitative And Quantitative Plasmolysis Lab
Do Not Write on this Lab - Return it at the End of the Class Period.

Background: Read this section before you start.
Water passes through cell membranes from areas of high water concentration to areas of lower water concentration. This movement of water is called osmosis. If a cell is placed in an environment in which the concentration of water is less than that inside the cell, water will flow from the cytoplasm through the membrane into the environment. The cytoplasm of the cell shrinks. In an animal cell, the entire cell shrivels. In a plant cell, the cytoplasm shrinks away from the cell wall. This water removal is called plasmolysis.

One can observe the effects of water loss by observing the shrinking of a cell's cytoplasm with a microscope. This observation is a qualitative measurement. In measuring the amount of water loss in grams, a scientist makes a quantitative measurement.

The purpose of this investigation is to observe the qualitative effects of plasmolysis in Elodea cells and to quantitatively measure the rate of plasmolysis in potato slices.

Materials (per student)

Part B	Part A
Elodea sprigs	White potatoes—2
Microscope	Beakers 4
Glass slide	Balance
Cover slip	Paper towel
Water	Glass marking pencils or labels
Dropper	Distilled water—50 ml
Distilled water	5% sodium chloride solution—50 ml
Paper towel	10% sodium chloride solution—50 ml
5% sodium chloride solution—5 ml	15% sodium chloride solution—50 ml

Procedure Part A - Quantitative Plasmolysis

1. Make a Copy of the Potato Mass Table on your lab report. See below.
2. Get four beakers A, B, C, and D.
3. Get a length of white potato.
4. Cut the long slices into approximately 1cm cubes. You will need 12 cubes total.
5. Determine the mass of three of your potato cubes. Use Weigh Boats and Tare the balance. Record the mass of the 3 potato cubes in the data table for Beaker A. Put the three cubes of potatoes into Beaker A.
6. Repeat step 5 for each of the three other beakers.
7. To beaker A, add 50 ml (or just enough to cover the cubes) of distilled water; to beaker B, add 50 ml of 5% sodium chloride solution; to beaker C, add 50 ml of 10% sodium chloride solution; and to beaker D, add 50 ml of 15% sodium chloride solution.
8. After 15 minutes, remove the potato cubes from the beakers. Gently blot them dry with a paper towel and determine the mass of each set of three cubes. Record the masses in the data table.
9. In rows 3 and 4 of the data table, indicate the amount of increase or decrease in mass for each set of cubes.
10. Calculate and record the percent change by using the formula:
    Amount of increase or decrease / Mass before X 100 = % change
11. Do not discard the solutions in the four beakers. Leave the beakers on your lab bench.

Data Table: Change in Mass of Potato Cubes.

	Beaker A	Beaker B	Beaker C	Beaker D
Mass Before				
Mass After				
Amount of Increase				
Amount of Decrease				
Percent Change				

Procedure Part B. Qualitative Plasmolysis

1. Make a wet mount of an Elodea leaf. Locate epidermal cells on low power and then on high power of your microscope.
2. Find some nice cells on the edge of the Elodea leaf. While you look through the eyepiece have your partner **place** two drops of 5% sodium chloride solution along one edge of the coverslip near the cells you are observing. Have your partner draw the salt solution across the slide by placing a small piece of a paper towel on the opposite side of the coverslip while you are watching the cells. Observe the effects of the solution on the cells.
3. **Sketch** several of the cells that have been bathed in the 5% sodium chloride solution. Made sure your partner sees what has happened to the cells. Label the plasma membrane in your sketches.
4. Switch places with your partner. While they are looking through the Microscope at the cells your should **replace** the sodium chloride solution with **distilled water** in the same manner that the sodium chloride was added.
5. Clean any salt water that may be on your microscope stage and other parts.

Analysis: Answer on your Lab Report.

1. What happened to the cytoplasm of the leaf cells when salt solution was added to the Elodea wet mount? Why?
2. When the salt solution was replaced by distilled water in the Elodea wet mount, did the cells recover? Why or why not?
3. Which potato cubes gained the most mass after 15 minutes of immersion? Which potato cubes lost the most mass?
4. Explain why the mass changes that you observed happened for each of the groups of potato cubes.
5. What might have been the result with the potato slices if the immersion time were lengthened?
6. What would happen to your cells if you were to drink salt water? Explain.