Mr. Galloway Life-Sci-LAB-plants-elodea
NAME: _____ **DATE:** _____

Experiment: Elodea (Anacharis) Plant Cells

[Homeostasis, Osmosis, Photosynthesis]

Experimental Method:

Observe	**- Examine the Elodea (freshwater) plants, especially the leaves**
Question	**- What might happen if a pond's solute concentration changes?**
Gather	**- Research data on post-hurricane sea water contamination of ponds**
Hypothesize	**- If salt water from the Gulf mixes with inland ponds, then the fresh water plants' cells will undergo plasmolysis.**
Test	**- Leaves tested in aquarium, saline, and distilled water. (*You will perform this experiment in the lab today.*)**
Analyze	**- (*This is for you complete at the end of this lab.*)**
Conclude	**- (*This also is for you to complete.*)**

Background Information (Spiritual Application Review)

SPIRITUAL ANALOGY & APPLICATION - Elodea's common name is "Anacharis" which come from the Greek language and means:
"increased GRACE or GIFT (CHARIS)".
- Our Creator God designed (gave us as a gift) plants for many reasons:
* to eat and enjoy as His natural candy (fruit),
* to make clothing,
* to make homes out of wood,
** and especially to continually provide life-giving OXYGEN to his nephesh (thinking/feeling) creatures.
- Similarly, God has given us His Holy Spirit (the Greek word for spirit is pneuma, which also means air or wind or breath).
* His Holy SPIRIT is the life-giving source for new birth spiritually when a person is "born-again".
* So, without the new, SPIRITUAL, second BIRTH, no person can have eternal life (John 3)
- The choice is yours to trust and submit to (or to reject) the pure work that God did for you through Jesus.
* Jesus lived a sinless human life to earn your human right to go to heaven (the new creation).
* Jesus died (allowed sinful men to kill him) to pay the consequences we deserve for our sin.
* Jesus then rose from death as He promised to prove who He truly is and to offer His Spirit to us.
**** None of our SELF-infected "good" works are of any value to earn or buy His pure eternal life.

Elodea (*Elodea Canadensis*) is a common plant that grows in fresh water ponds, lakes, and is often used in freshwater aquariums. Remember that plant cells contain both a cell membrane and a cell wall. They also often contain a large water vacuole.

Homeostasis involves the maintenance of a stable set of conditions inside an organism's cell(s).

Osmosis has important implications for organisms and their cells. Because cells contain mostly water, the water concentration of the environment in which they reside is very important. If cells are exposed to water concentrations that are different from their internal environment, they may loose or gain water. The exaggerated picture at the right shows three beakers with isotonic, hypertonic, & hypotonic solutions.

Photosynthesis in water plants provides food for the plant and much of the oxygen needed by the bacteria and animals in the pond or aquarium where they live. If changes in the salt (or many other solutes in the solution) concentrations in the water hindered the plants' ability to perform photosynthesis, then the interdependent system of life in that habitat would be affected as well.

SOLUTION = a mixture in which the minor component (the **SOLUTE** like dissolved salt) is uniformly distributed within the major component (the **SOLVENT** like water).
The following terms refer to solutions inside and outside of a cell. Remember that the cell membrane around the cell is the gateway between the two solutions (one inside the cell and the other outside the cell.
ISOTONIC = a solution outside of a cell membrane that has an equal (same) amount of solute (like salt or sugar) as the solution inside the cell.
HYPERTONIC = a solution outside of a cell membrane that has **MORE solute** (like salt or sugar) than the solution inside the cell. In this solution, water will flow out of the cell, to the outside of the cell. So the cell will shrink.
* This shrinking process is call **PLASMOLYSIS**.
HYPOTONIC = a solution outside of a cell membrane that has **LESS solute** (like salt or sugar) than the solution inside the cell. In this solution, water will flow **INTO** the cell, **FROM** the outside of the cell. So the cell will **SWELL**.
* This **SWELLING** process is call **CYTOLYSIS**. If it continues in an animal cell with no wall, it will explode the cell.

MATERIALS: Elodia Plant (Anacharis – a water plant commonly used in aquariums)
microscope, slide, cover slip, distilled water, salt, Q-tips, paper towels, metric beaker, gram scale

METHODS / PROCEDURES:

A. Elodea in AQUARIUM Water

1. Prepare a wet mount of an Elodea leaf with aquarium water. To do this, use a soaked "Q-Tip" to place a drop of aquarium water towards one end of the slide. Using forceps remove a small leaf from the tip of an Elodea plant and lay it flat in the drop of water. Cover with a cover slip.

2. Observe the leaf at 40X and record your observations.

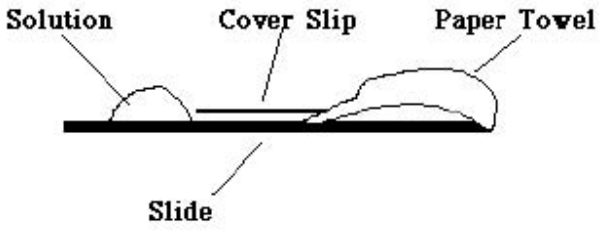
3. Increase the magnification to 100X, observe and record your observations.

B. Elodea in 10% SALT Solution
1. Remove the slide from the stage of the microscope.

2. Soak a "Q-Tip" in 10% salt solution & put 2 drops on the slide at the left edge of the cover slip. To make a 10% sea salt solution, mix 10 grams of NaCl with100 ml of distilled water.

3. Tear off a small piece of paper towel and place the torn edge on the slide at the right edge of the cover slip. The piece of towel should begin to soak up water, drawing the salt solution under the cover slip as it does so. (See the figure below)

4. Return the slide to the microscope stage and observe the cells at 40X and 100X. Record your observations.



C. Flushing Out the Salt Solution with DISTILLED Water
1. Remove the slide from the stage of the microscope.

2. Place 3-5 drops of distilled water on the slide at the cover slip.

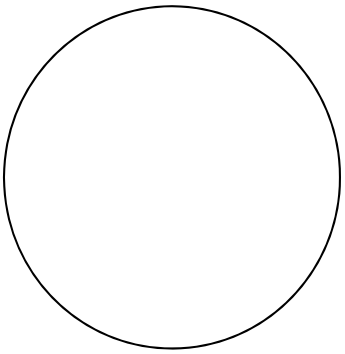
3. Draw the water through with a piece of paper towel.

4. Observe the cells at 40x and 100x. Record your observations.
Remove the slide from the microscope stage, clean it and the cover slip, then put them away carefully. The cover slip is very sharp.

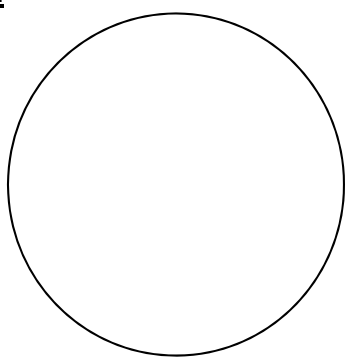
Observations

- Prepare sketches of your observed Elodea cells under each set of conditions (aquarium water, 10% salt solution, and distilled water).
- Label the magnification under which the plant cells are being observed (40x or 100x).
- Label the sketches to note the cell structures that you can identify.
- Be sure to note any changes in the color, size, and shape of the cells.

A. Elodea in AQUARIUM Aqueous Solution



Low Power (_____ x)



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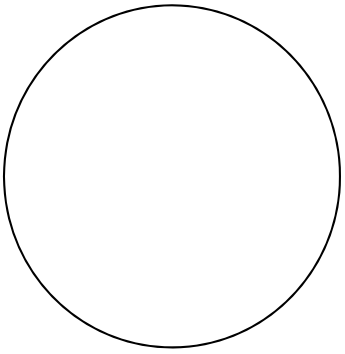
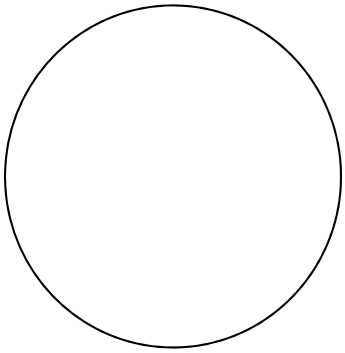
B. Elodea in 10% SALT Solution

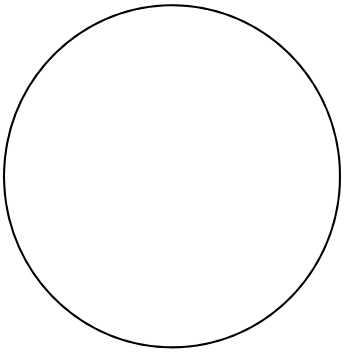


Low Power (_____ x)

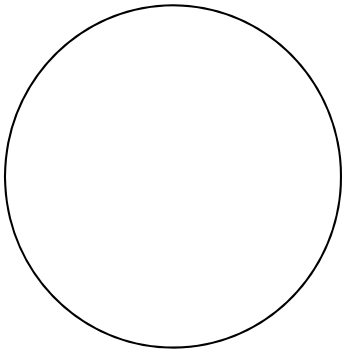


High Power (_____ x)

C. C. Elodea in Distilled Water (0% Salt Solution)



Low Power (_____ x)



High Power (_____ x)

YOUR Conclusions

1. What was the shape of your Elodea cells in **Aquarium** water?

2. What happened to your cells as the ***salt*** water flowed under the cover slip?

3. What happened to the cells when the salt water was flushed out with ***distilled*** water?
   ** Why do you think this happen?

4. Why do you think the cell ***walls*** did not change shape very much?

5. Which of the **solutions** were
a. Isotonic -
b. Hypotonic -
c. Hypertonic -

6. Did any of the solutions cause cells to undergo cytolysis or plasmolysis? Explain why or why not.

7. Think of some way that this lab could be improved or made more interesting: