LESSON PLAN
Integrated Lesson #1 for Dr. Ortiz

Teacher: Leah Hudak

Subject: BIO

TAKS/TEKS: IPC obj 4:9A(10,11), IPC obj4:7A(10, 11), IPC obj49B (11), IPC obj4:9D (10,11), BIO obj1:1A(10,11), BIO obj1:2B(10,11), BIO obj2:4B10,11)

FRIDAY

TOPIC(S): 6.2 Water and Diffusion
ENDURING UNDERSTANDINGS: Students will relate water's unique features to polarity and identify how and why the processes of diffusion and osmosis occur and why they are important to cells. This lesson has a lot of underlying math concepts involved such as the addition, subtraction, multiplication and division in figuring out the number of protons, neutrons, and electrons in a molecule of water. The fact that the negative electrons are not shared equally in the covalent bonds tests is the kids also know how to add or subtract negative numbers. Also, in order to figure out the directions of osmosis and diffusion, students must calculate concentrations. They will also be putting data into charts, looking at the difference in mass, and calculating the average mass loss or gain.
ACTIVITIES/SKILLS: Students will take notes on osmosis and diffusion. They will answer questions in their notes though out to help transition to the new and difficult materials. They will actively participate in 2 hands on minilabs/demos. Lastly, they will complete a worksheet to check for understanding.
RESOURCES: text material, worksheets created by teacher, visuals prepared by teacher, minilabs prepared by teacher
ASSESSMENT: worksheet created by teacher
INDEPENDENT PRACTICE: X
NOTES and PROCEDURES: X

6.2 Water and Diffusion

REVIEW

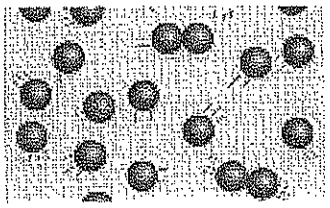
- Water is one of the most important compounds!
- What is a compound?
- How is it bonded?
- Strong or weak bond?
- What is polarity?
- Why is water polar?

NOTES

- When molecules are polar or charged, they are attracted to (the opposite or the same) charge?
- Below we will draw water and show its polar property and bonds
- EX: water + water = _____

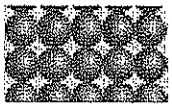
- Molecules move differently when they are in the different states of matter. In our notes we will draw the 3 states of matter and describe each state's molecules.

Gas-fast moving and high energy



Liquid-slow moving and low energy

Solid-no movement and no energy



Motion?

Energy?

Shape?

Example?

- Diffusion-

- Dye experiment-(what happens?)

- All liquids act differently with other liquids depending on what they are made of.
-
- What is density? What type of liquids are dense?

- What happens when a dense thick liquid was poured into a less dense water solution?

- What happens when a low density water solution was poured into a low density water solution?

- Would a pitcher of kool-aid containing 1 packet of mix be denser than a pitcher with 3 mixes? Why?

- The earth and even your body are mostly made of water (or liquids containing water).
- When things diffuse in and out of your body, they do it using NO energy. Molecules that are diffusible go into and come out of cells freely. Other molecules required energy for the transport in and out of cells.

- What is osmosis?

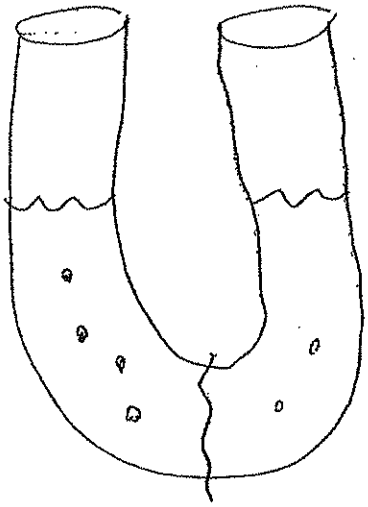
- 3 cell situations

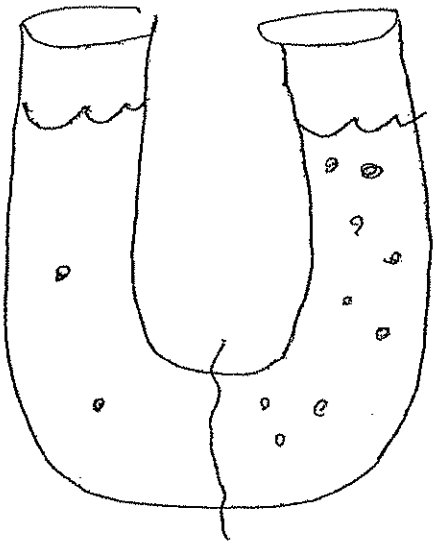
- Isotonic- Hypertonic- Hypotonic-

Potato Experiment-(what happened?)

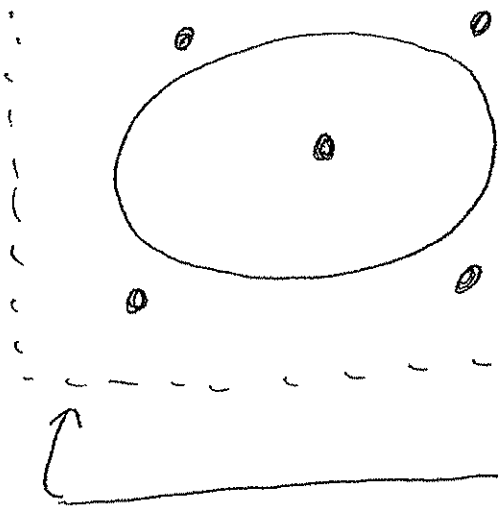
Name _____ Date _____

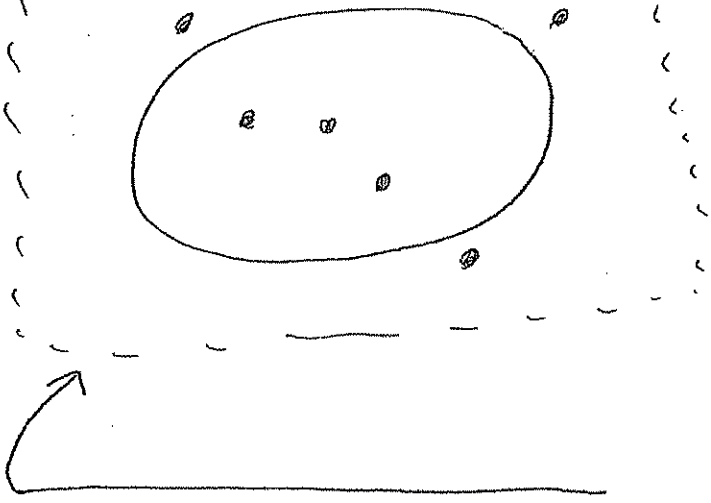
According to osmosis, where will water move (Draw an arrow). Label which side is high concentration and low concentration.

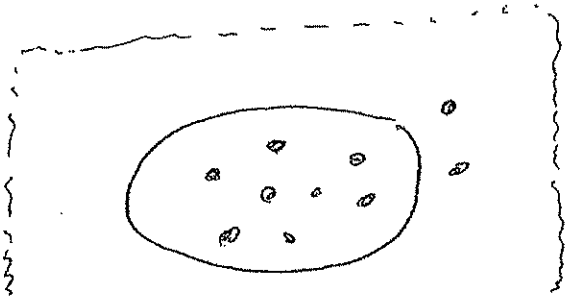
① 

② 

Below, Draw arrows where osmosis occurs and label each hypo, hyper or isotonic.

③ 

④ 



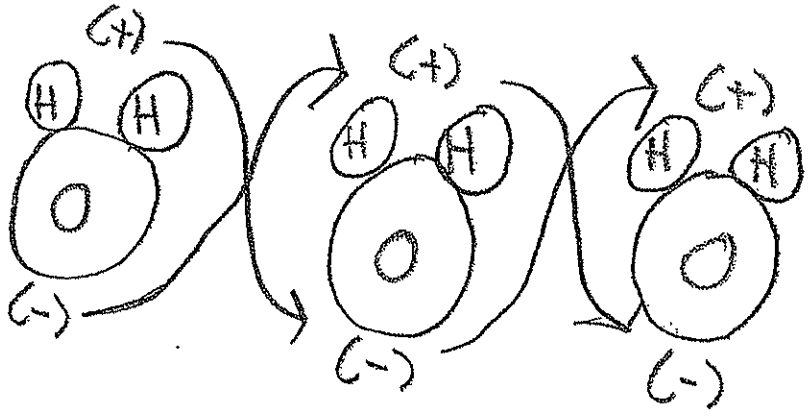
6.2 Water and Diffusion

REVIEW

- Water is one of the most important compounds!
- What is a compound? 2 or more atoms of an element bonded.
- How is it bonded? Covalent
- Strong or weak bond? Super Strong
- What is polarity? There's a (+) & (-) side
- Why is water polar? (+) toward Hydrogen (-) toward oxygen

NOTES

- When molecules are polar or charged, they are attracted to (the opposite or the same) charge? yes
- Below we will draw water and show its polar property and bonds
- EX: water + water = Cohesion



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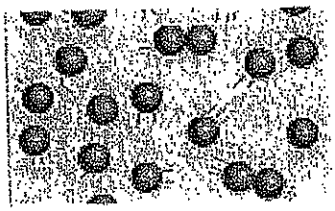
Gas-fast moving and high energy

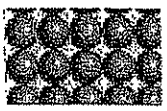


Motion? Fast
Energy? Kinetic
Shape? Not one
Example? Oxygen

Liquid-slow moving and low energy

depends - fast
Kinetic
of its container
Water

Solid-no movement and no energy



Vibrating
potential
defined
Ice

Name: _____ Date: _____

Osmosis & Diffusion in an Egg

Objective:

In this investigation, you will use a fresh hen's egg to determine what happens during osmosis & diffusion across membranes.

Materials: (per lab group)

1-2 fresh hen eggs in their shells, masking tape & marker, distilled water, clear sugar syrup, vinegar, container, tongs, balance, paper towels, paper, pencil

Procedure:

Day 1

1. Label the jar with your lab group & the word "vinegar".
2. Mass the egg with the balance & record in the data table.
3. Carefully place the raw egg into the container & cover the egg with vinegar.
4. Loosely re-cap the container & allow the jar to sit for 24 to 48 hours until the outer calcium shell is removed.

Day 2

1. Open the container & pour off the vinegar.
2. Use tongs to carefully remove the egg to a paper towel & pat it dry.
3. Record the size & appearance of your egg in your data table.
4. Mass the egg on a balance & record it in the data table.
5. Clean and re-label the container with your lab group & the word "_____".

Name: _____ Date: _____

6. Carefully place the egg into the container & cover the egg with _____.
7. Loosely re-cap the jar & allow it to sit for 24 hours.

Day 3

1. Open the container & discard the _____.
2. Use tongs to carefully remove the egg to a paper towel & pat it dry.
3. Record the size & appearance of your egg in your data table.
4. Mass the egg on a balance & record.
5. Clean and re-label the container with your lab group & the word _____.
6. Carefully place the egg into the container & cover the egg with _____.
7. Loosely re-cap the container & allow it to sit for 24 hours.

Day 4

1. Open the container & pour off the _____.
2. Use tongs to very carefully remove the egg & rinse off the excess syrup under slow running water.
3. Pat the egg dry on a paper towel.
4. Record the size & appearance of your egg in your data table.
5. Mass the egg on a balance & record.
6. Clean up your work area & put away all lab equipment.

Name: _____ Date: _____

Data:

RESULTS OF DIFFUSION			
	Original Mass	Final Mass	Appearance of Egg
VINEGAR			
WATER			
SYRUP			

Questions & Conclusion:

1. Vinegar is made of acetic acid & water. Explain how it was able to remove the calcium shell.

2. (a) What happened to the size of the egg after remaining in vinegar?

(b) Was there more or less liquid left in the jar?

(c) Did water move into or out of the egg? Why?

3. (a) What happened to the size of the egg after remaining in distilled water?

(b) Was there more or less liquid left in the jar?

(c) Did water move into or out of the egg? Why?

Name: _____ Date: _____

4. (a) What happened to the size of the egg after remaining in syrup?

(b) Was there more or less liquid left in the jar?

(c) Did water move into or out of the egg? Why?

5. Was the egg larger after remaining in water or vinegar? Why?

6. Why are fresh vegetables sprinkled with water at markets?

7. Roads are sometimes salted to melt ice. What does this salting do to the plants along roadsides & why?