**Thursday-Membrane Transport Jigsaw Lab**

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Rm 2-221 and 2-223

~32 students

Mayo High School, 9th Grade Honors Biology

**Lesson Date and Time:** January 10, 2013

 Hours 1, 2, 5, 8

**Class length:** 50 minutes

**Materials:** Cell Biology Packet #2

8 White boards

Dry erase markers

8 copies of each procedure

8 Trays

 **Egg materials:**

 8 Eggs dissolved in vinegar/class

 Beakers (to hold egg in solution)

 Diluted corn syrup

 10% Salt solution

 Water

 Vinegar

 Balance with weigh boats

 **Food coloring materials:**

 Red, blue, and green food coloring

 3 150 ml beakers

 Hot water

 Cold water

 2 150 ml beakers

 **Plant cells** **materials:**

Live cells (elodea)

 Slides

 4 Microscopes

 10% Salt solution

**Dialysis tubing materials:**

 Pre-cut pieces of dialysis tubing

 8-100 mL graduated cylinders

 4% Corn Starch solution

 Iodine

 Beakers

 Balance with weigh boats

**Benchmark:**

9.4.1.2.5 Compare and contrast passive transport (including osmosis and facilitated transport) with active transport, such as endocytosis and exocytosis.

**Today’s Vocabulary:**

Selective permeability

Passive transport

Diffusion

Osmosis

Isotonic

Hypotonic

Hypertonic

Dynamic equilibrium

Solute

Solvent

**Objectives:**

Students will be able to explain the processes of diffusion and osmosis.

Students will be able to identify a solution as **hypotonic**, **isotonic**, or **hypertonic** and describe the direction that osmosis would occur (into the cell or out of the cell).

**Announcements/Reminders: 2 minutes**

QUEST Monday- on the plasma membrane and the info we are learning today and tomorrow

**Anticipatory Set: 5 minutes**

Last week we talked about the plasma membrane and how it determines what may move through it. Today we are going to be looking at exactly *how* that happens.

Show YouTube video on diffusion

<https://www.youtube.com/watch?v=cD3dOlcxVmE>

Make sure students understand:

*All* molecules are *always* moving.

Ask: What makes them move faster? (higher temperatures)

Ask: Why do the molecules spread out/mix?

Molecules bump into each other, which changes their direction and causes them to mix up (diffusion)

The ultimate cause of diffusion is the *random motion of molecules*

**Input: 5 minutes**

Tell students:

 Today, I am going to divide you into 4 groups. Each group is going to do a different experiment that helps us observe osmosis or diffusion. Tomorrow, you will present to the class in order to teach us about your experiment, what you learned, and the information in your section of the notesheet on page 3 of your packet.

Haves students turn to page 3

Tell students what group they are in:

 Front right 4 tables-Egg Osmosis Experiment

 Back right 4 tables-Food Coloring Diffusion Experiment

 Front left 4 tables-Plant Cells Osmosis Experiment

 Back left 4 tables-Dialysis Tubing Experiment

You will need to find a partner within your group.

Have them star their section of the notesheet on page 3.

Tell students to record their data and notes from today on this page.

Tell students:

When everyone in your group is finished with the procedure, you need to get with your group and plan how your group presentation for tomorrow. You will present using a white board. Please include pictures or diagrams. You may also perform a skit, sing a song, etc. Feel free to be creative. Please ask me if you have questions.

**Modeling: 8 minutes**

Briefly describe the procedure for each of the experiments. (See “lab procedures –jigsaw” document)

Make sure to show how to use a balance with weigh boat (this is expensive!).

**Guided practice and monitoring: 20 minutes**

Students should complete their experiment in pairs. They may work at the experiment’s station or go back to their desk if it is too crowded.

Circulate to help students and ask question to help them focus on diffusion or osmosis. Refer students to the written directions at each station when they have questions about a procedure.

Question to ask during the experiments:

 What is your hypothesis?

What do you think is happening?

 What is causing that?

 What does it tell us?

Students should then meet with their group of 8 to plan their presentation for tomorrow using a white board.

Circulate to redirect off-task behavior, answer questions, and provide feedback when necessary.

**Check for understanding:** 25 minutes

Make sure that everyone is cleaned up and ask students to return to their desks.

Ask students: How do you feel about the concepts on your group’s section of the notesheet? Thumbs up if you totally get it. Thumbs down if you have no idea what it means.

Tell students: I will give you about 10 minutes to finish preparing your presentation.

Ask if students have any questions about what they need to present tomorrow?

**Closure: 4 minutes**

Ask the egg and food coloring groups to explain their prediction for tomorrow and their reasoning for it.

There is no homework tonight!

**Independent Practice: 1 minute**

Tell students: There are some examples of diffusion and osmosis in your own life. One of them is smell. Think about what smell has to do with osmosis or diffusion. We will discuss this tomorrow.

Tomorrow, your group is responsible for teaching the class about your experiment and the information in your section of the note sheet on page 3.