Osmosis and Diffusion, Egg Lab Setup

December 3, 2014

Welcome! 12/3/14

OBJECTIVE: Students will: 1. Define and compare osmosis, diffusion and types of solutions using a POGIL; and 2. Set up osmosis lab

Catalyst: *Use your POGIL from yesterday, copy the complete sentences below and fill in the blanks.*

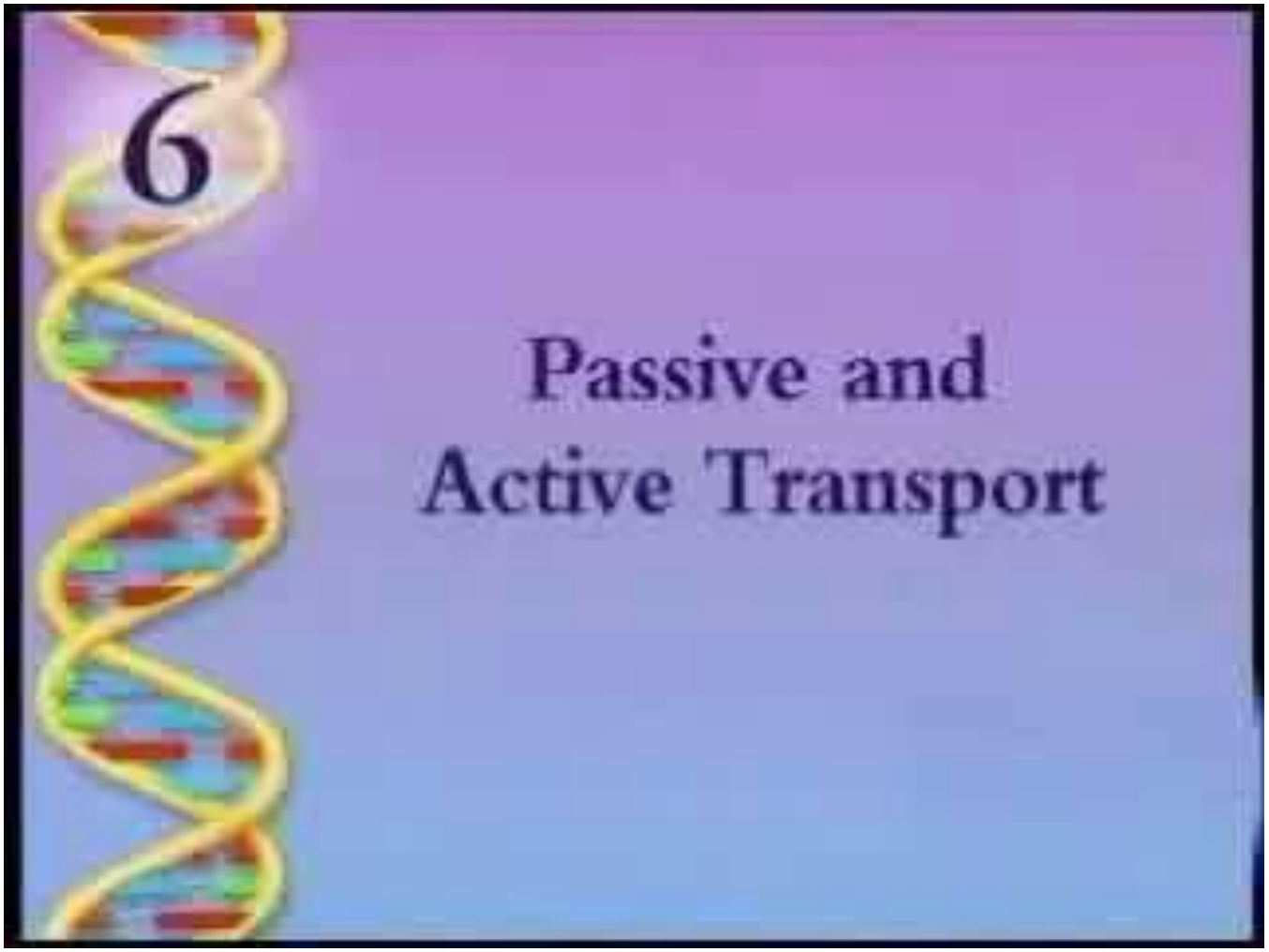
1. In simple diffusion, molecules move from _____ concentration to ____ concentration.
2. In active transport, the process requires _____ because the molecules are moving from _____ concentration to _____ concentration.

Homework: HW 3.2 DUE Friday, 12/5/14

Agenda

- Catalyst
- Active and Passive Transport Video
- Transport in Cells POGIL
- Set up Egg-citing Egg-speriment
- Exit Slip

Active & Passive Transport Video



POGIL

ISN Page 109

- Let's check some of the answers: 7, 16, 33

	Active Transport	Passive Transport	
		Diffusion	Facilitated Diffusion
Requires energy input by the cell			
Molecules move along (down) a concentration gradient			
Moves molecules against (up) a concentration gradient			
Always involves channel (membrane-spanning) proteins			
Molecules pass between phospholipids			
Moves ions like Na+ and K+			
Moves large molecules			
Moves small nonpolar and polar molecules			

Osmosis and Diffusion

- Cell membranes separate the inside of the cell from the outside environment. They control what enters and exits the cell—maintaining **homeostasis**.

Transport

- How can molecules move across a membrane? What are the two types of transport?

Active and Passive Transport

- Molecules can move across the membrane via active transport (with energy), or passive transport (without energy).
- Small molecules like water (H20), and carbon dioxide (CO2), and oxygen (O2) travel across the membrane easily via passive transport.

Selectively Permeable

- Membranes are selectively permeable—meaning not everything can come in.

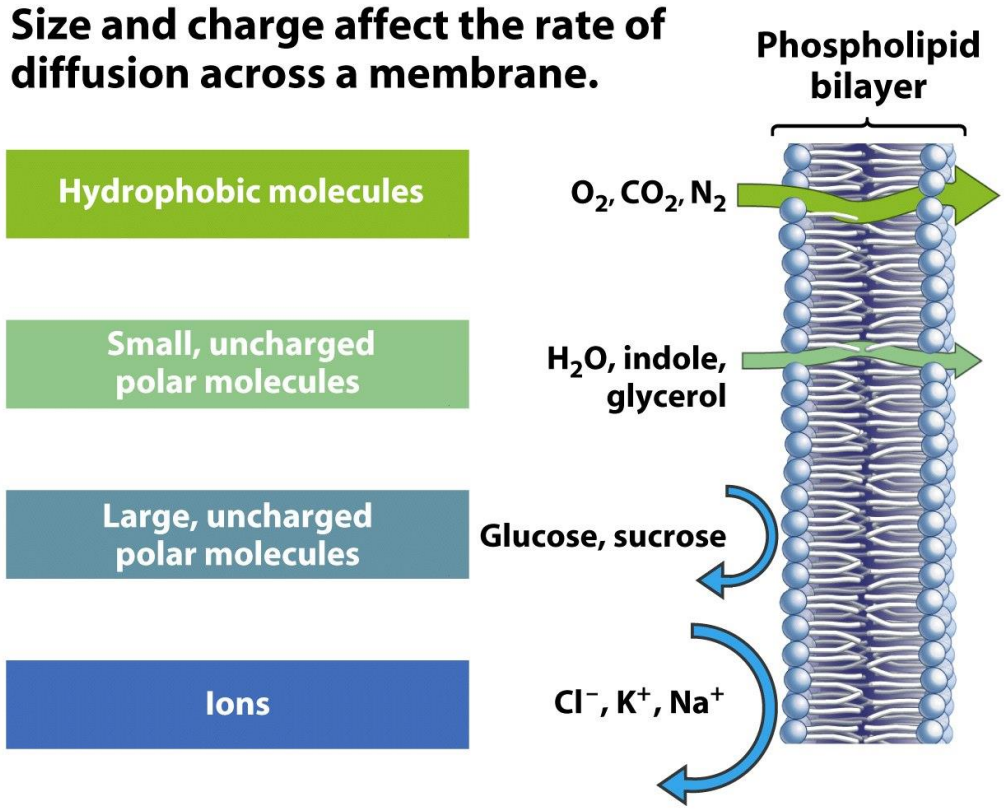


Figure 6-9b Biological Science, 2/e

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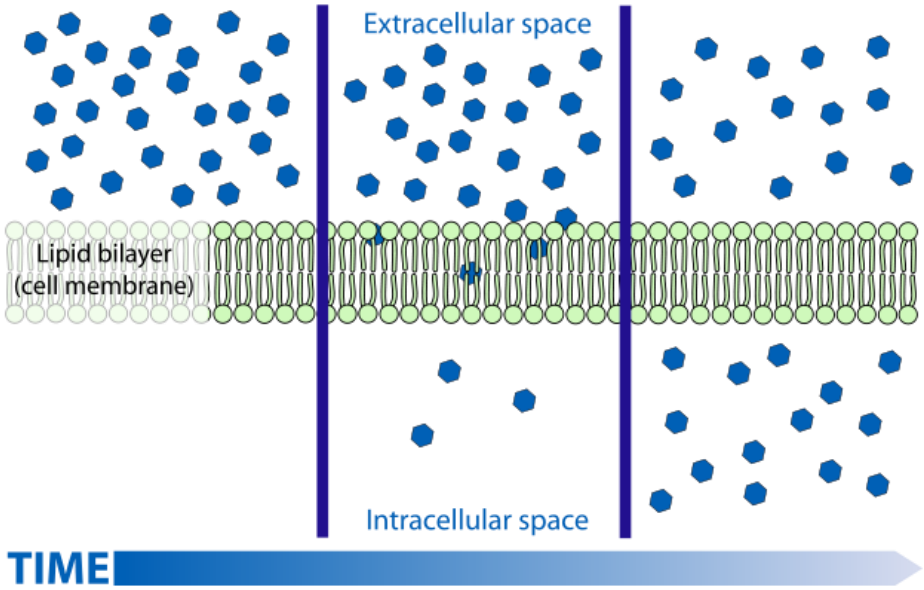
Equilibrium

- ***Molecules ALWAYS move from <u>HIGH</u> concentration to <u>LOW</u> concentration, until the system is at <u>equilibrium</u>.***

- What does "equilibrium" mean?

This is called a CONCENTRATION GRADIENT.

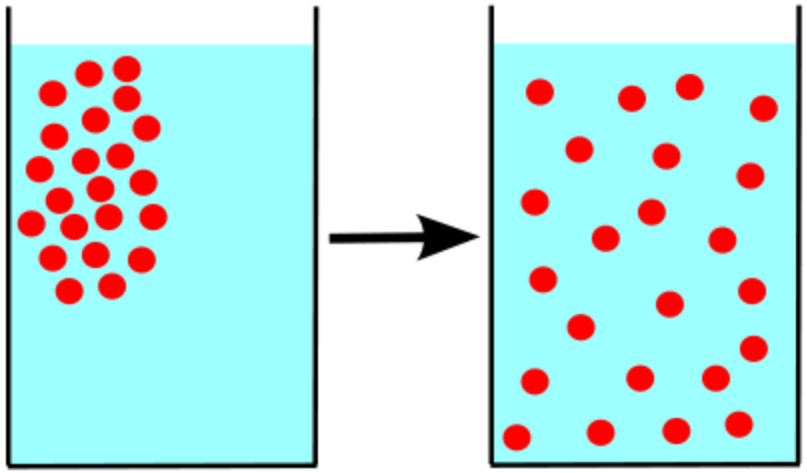


Passive Transport

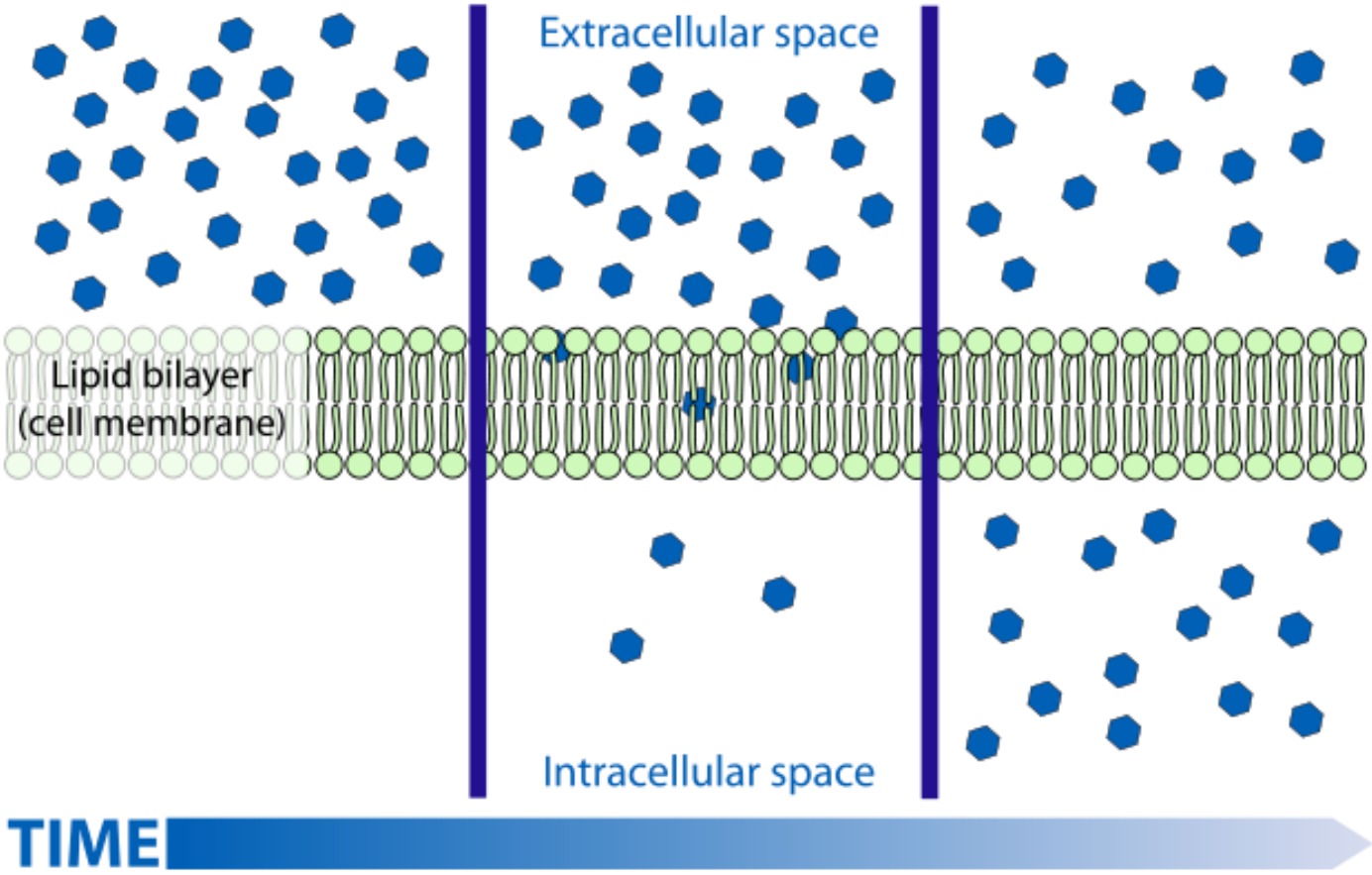
- Two examples of passive transport:
  - Diffusion
  - Osmosis

Diffusion

- Diffusion: movement of particles, molecules across a membrane or in space.
- Molecules spread from an area of HIGH concentration to an area of LOW concentration until equilibrium.



Diffusion Across a Membrane

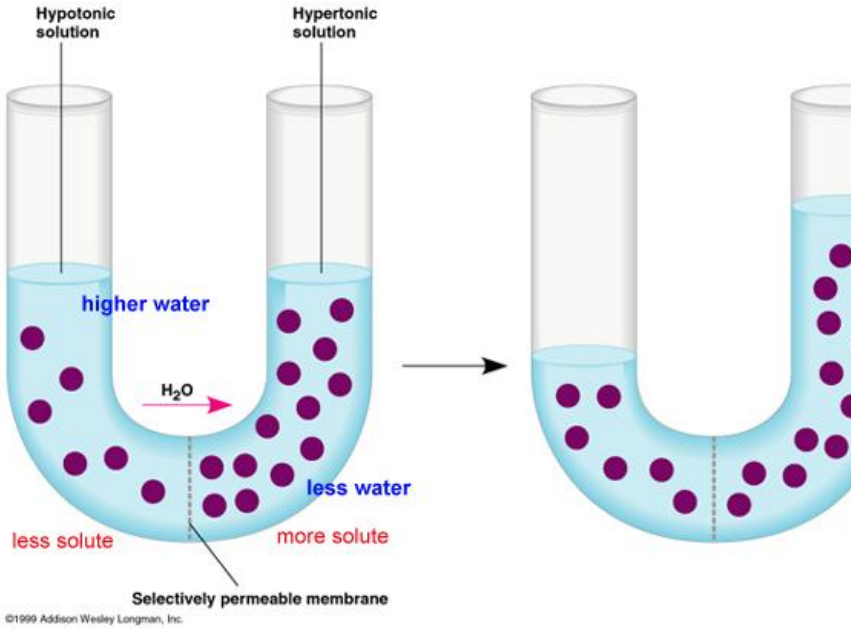


Osmosis

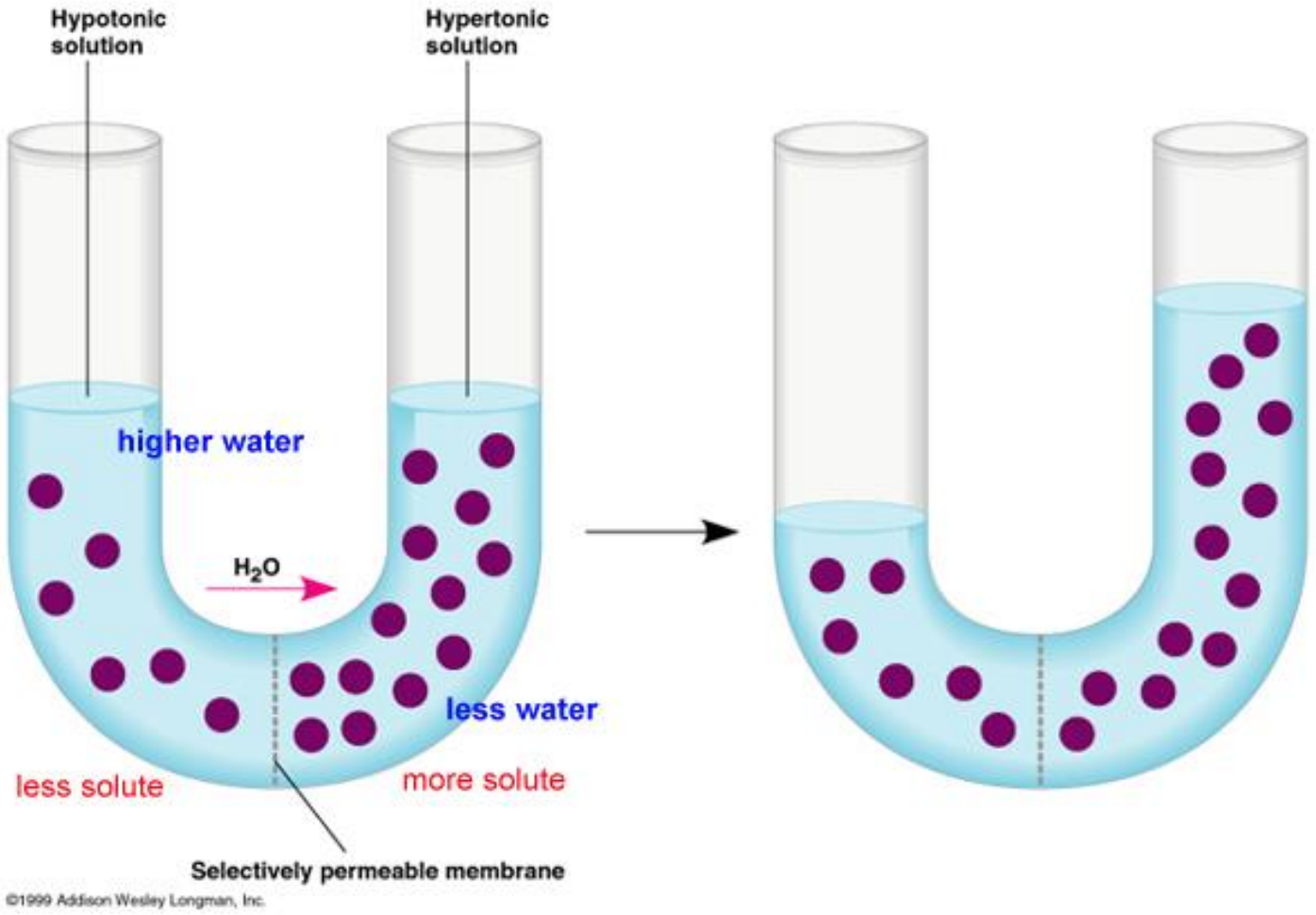
- Osmosis: movement of WATER across a membrane
- Specific type of diffusion where WATER is the particle/molecule
- Move from a higher concentration of WATER (lower concentration of solute) to a lower concentration of WATER.

Osmosis

- Remember: "SALT SUCKS"
  - Salt is a solute. When it is concentrated inside or outside the cell, it will draw water <u>toward</u> itself.
  - **Why do you get thirsty after eating something salty?**



Example of Osmosis



Transport in Cells POGIL

- Use your SAME roles from yesterday to complete the POGIL. This should go FASTER than yesterday!
- You should get through question # 18 in **25 minutes**.

Review

- What is diffusion?
- What is osmosis?

Egg-citing Egg-speriment

You will use **pages 113-119** for this lab report!

Attach the RUBRIC to page 119

Egg-citing Egg-speriment

- An egg is a single cell, and surrounded by a membrane. We can use an egg to show substances moving across the membrane.
- How does the external environment affect an egg without a shell?

Research

1. What is the purpose of the cell membrane?
2. Does the cell membrane let just anything in and out? What easily passes through the membrane?
3. What is “osmosis”?

Vocabulary to Know

- Solute
- Molecules
- Solution
- Osmosis
- Concentration
- Membrane
- Diffusion
- Semi-permeable
- Homeostasis

IV and DV

- We will test the effects of placing the egg in:
  - Corn sugar (high concentration of sugar)
  - Distilled water
  - Air (no solution)

  Independent Variable?

  What should we measure for the **Dependent Variable** to see if the egg changes?

  Purpose: Does _____ affect _____?

Make 3 Hypotheses!

- Make a prediction for what will happen in:
  - Corn sugar (high concentration of sugar)
  - Distilled water
  - Air (no solution)
- **Hypothesis:** If I place the egg in _____, then I predict _____ .
  - *Which direction will the water move? Inside the cell or outside the cell?*

Day 1 Procedure (Page 114)

1. Carefully take your egg out of the vinegar, and dry it using paper towels.
2. Measure the mass of the dry egg by carefully placing the egg in a coffee filter and gently placing it on the balance.
3. Measure the circumference of the egg by wrapping the string gently around the middle of the egg. Hold your finger on the spot where the end of the string meets the rest of the string. Measure the distance with a ruler (use centimeters!) Record the measurement.
4. Record 3 observations about the egg. (What does it look like? How does it feel?)
5. Add 150 mL of corn syrup solution to an empty beaker. Record observations about the corn syrup. (What does it look like? How does it feel?)
6. Slowly place the egg in the solution. Cover the beaker with plastic wrap.
7. Place your beaker on the window sill in the designated spot.

Data Table (Page 115)

	Mass (g)	Circumference (cm)	Calculated Change	Observations
Day 1: Original Egg in Vinegar				1. 2. 3.
Day 2: Egg removed from Corn Syrup				1. 2. 3.
Day 3: Egg removed from Water				1. 2. 3.

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Record Measurements and Observations

- Observations—what we KNOW, based on our 5 senses. NOT INFERENCES.
- Don't forget to label your units!

Exit Slip

1. How does water move across a membrane? From _____ to _____ .
2. Look at the diagram. Will the water move in OR out of the cell?