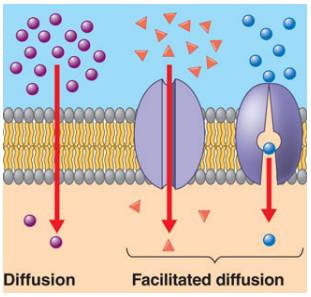
LAB: PASSIVE & ACTIVE TRANSPORT

The cell membrane is **semi-permeable**. This means some materials are allowed through and some are not. The size, shape, and charge of the molecules determines whether they can pass or not.

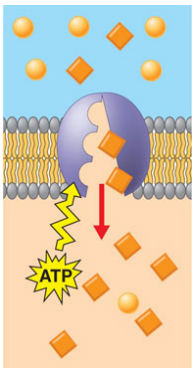


Passive Transport

- The movement of materials through a membrane **without energy**
- **Diffusion**: the movement of materials from high concentration to low concentration
- **Osmosis**: the diffusion of water through a membrane

Active Transport

- The process of **using energy** to move materials through a membrane
- Some materials, like sugar or salt, are too big to flow through the membrane
- Instead, the cell needs energy to move the molecule through a protein.
    - What type of energy? **ATP!**
- Cells in our kidneys filter & remove salt from your blood through active transport.



Endocytosis

- Occurs when a large bit of material is **captured** with a pocket in the membrane
- The pocket breaks off & forms a package that moves into the cell
- Requires energy
- Essential nutrients, like iron, are absorbed into cells this way

1.	2.	3.

Exocytosis

- Occurs when a large bit of material needs to be **removed** from a cell
- A package of the materials travels through the cell to the membrane, joins it, and is expelled
- Requires energy
- Cells use this to flush out **waste** such as hormones

1.	2.	3.

Part 1: Plastic Bag Membrane

Materials: plastic bags, rubber bands, 2 beakers, cornstarch, iodine, water, 50 ml graduated cylinder, teaspoon

Procedures

1. Label two clean glass 200ml beakers 1 & 2.
2. Pour approximately 100 mL of water into each beaker.
3. Add 1 teaspoon of cornstarch into **beaker 1**. Stir until mostly or fully mixed.
4. Add 10 drops of iodine into **beaker 2**. *(careful, iodine will stain clothes)*
5. Use the graduated cylinder to pour 30 mL of water into a plastic bag. Add 10 drops of iodine to the bag. Rubber band to seal the bag. Gently place the bag into **beaker 1**. Record/draw the initial color below.
6. Use the graduated cylinder to pour 30 mL of water into the other plastic bag. Add 1 tsp of cornstarch to the bag and mix well. Rubber band to seal the bag. Gently place the bag into **beaker 2**. Record observations.
7. Let the bags sit for 10-15 minutes. (Move on to part two while you wait).
8. After 15 minutes, record your observations below.
9. Let the bags sit for 24-48 hours & record observations again.

Observations

	1. Iodine Bag in Cornstarch Water	2. Cornstarch Bag in Iodine Water
Initial Observations		
After 15 Minutes		
After 24-48 hours		

Part 2: Egg Shell Membrane

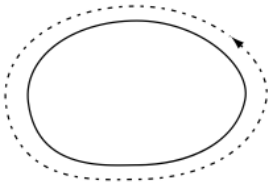
Materials: raw egg, 400 ml beaker, balance, tape measure, vinegar, corn syrup, salt

Hypotheses: What will happen to an egg after soaking for 24 hours in…

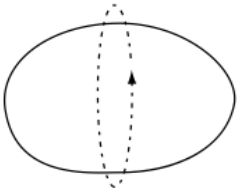
1. Vinegar? _____
2. Corn Syrup? _____
3. Tap water? _____

Day 1: Monday

1. Obtain and find the mass of a raw egg. Record in the table below.
2. Use a tape measure to measure the egg's long & short circumference as shown. Record.
3. Carefully place the egg in a 400ml beaker labeled with your group number.
4. Add vinegar to the beaker until the egg is fully covered. Record your initial observations.
5. Cover **with** saran wrap and leave overnight.



Long circumference



Short circumference

Day 2: Tuesday

6. *Very carefully* take the egg out of the vinegar and place it on the balance. Record the mass.
7. Use a tape measure to measure the egg's circumference. Record.
8. What else happened to the egg? Record any other 'after' observations.
9. Clean the beaker with soap and water, then gently place the egg back in the beaker.
10. Add **corn syrup** to the beaker until the egg is fully covered. Record initial observations.
11. Cover with saran wrap and leave overnight.

Day 3: Wednesday

12. Repeat steps 6-9.
13. Add **distilled water** to the beaker until the egg is fully covered. Record initial observations
14. Cover with saran wrap and leave overnight.

Day 4: Thursday

15. Repeat steps 6-8. Clean the beaker and throw away the egg.

	Mass (g)	Long Circumference (cm)	Short Circumference (cm)	Other Observations
Plain Egg				INITIAL:
Soaked in **Vinegar**				INITIAL: AFTER:
Soaked in **Corn Syrup**				INITIAL: AFTER:
Soaked in **Distilled Water**				INITIAL: AFTER:

Conclusion – *Answer thoughtfully & thoroughly, attach extra paper if necessary, use data to support your answers.*

Part One: Plastic Bag Membrane

1. What does this activity have to do with cell membranes? _____

   _____

2. What did you observe? _____

   _____

   How can we explain this? _____

   _____

   _____

3. Which particles – starch or iodine – were *able* to cross the model cell membrane? _____

   How do you know? _____

   _____

4. Which particles – starch or iodine – were *unable* to cross the model cell membrane? _____

   How do you know? _____

   _____

Part Two: Egg Shell Membrane

5. What does this activity have to do with cell membranes? _____

   _____

6. What happened to the egg after soaking in **vinegar** for 24 hours? _____

   _____

   How can we explain this in terms of membranes? _____

   _____

   _____

7. What happened to the egg after soaking in **corn syrup** for 24 hours? _____

   _____

   How can we explain this in terms of membranes? _____

   _____

   _____

8. What happened to the egg after soaking in **distilled water** for 24 hours? _____

   _____

   How can we explain this in terms of membranes? _____

   _____

   _____

9. What other substances might be cool to soak an egg in? _____

   _____