

Cellular Transport Worksheet

Name _____

Section A: Cell Membrane Structure

1. Label the cell membrane diagram. You'll need to draw lines to some of the structures. ****Draw cholesterol molecules in the membrane.****

channel proteins

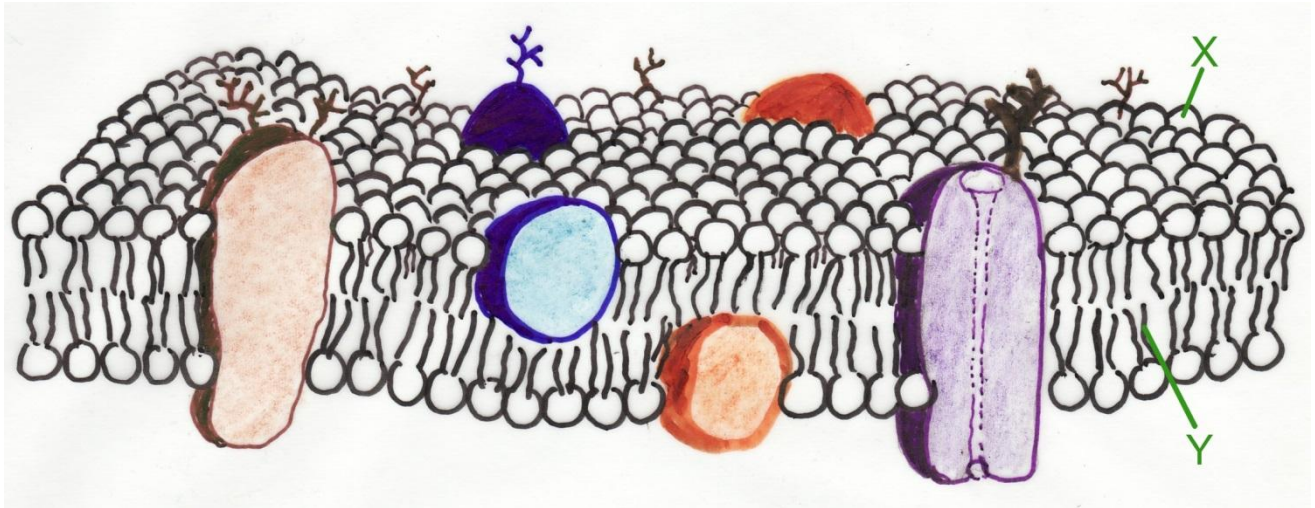
phosphate hydrophilic head

carbohydrate chain

integral proteins

fatty acid hydrophobic tail

peripheral proteins



2. The cell membrane of the red blood cell will allow water, carbon dioxide, oxygen and glucose to pass through. Because other substances are blocked from entering, this membrane is called _____.

3. How many layers are found in the cell membrane? _____

4. What are the molecules that make up the majority of the membrane? _____

5. What do you call the phenomenon when you have a different concentration of materials on the inside and the outside of the cell? _____

6. Explain the concentration of molecules when a cell reaches dynamic equilibrium. _____

7. The ___ portion of the cell membrane functions as a barrier while the ___ portion determines specific functions, including pumps, receptors, adhesion, etc.

a. carbohydrate, nucleic acid

c. lipid, protein

b. lipid, carbohydrate

d. nucleic acid, lipid

8. What is the function of peripheral proteins? _____

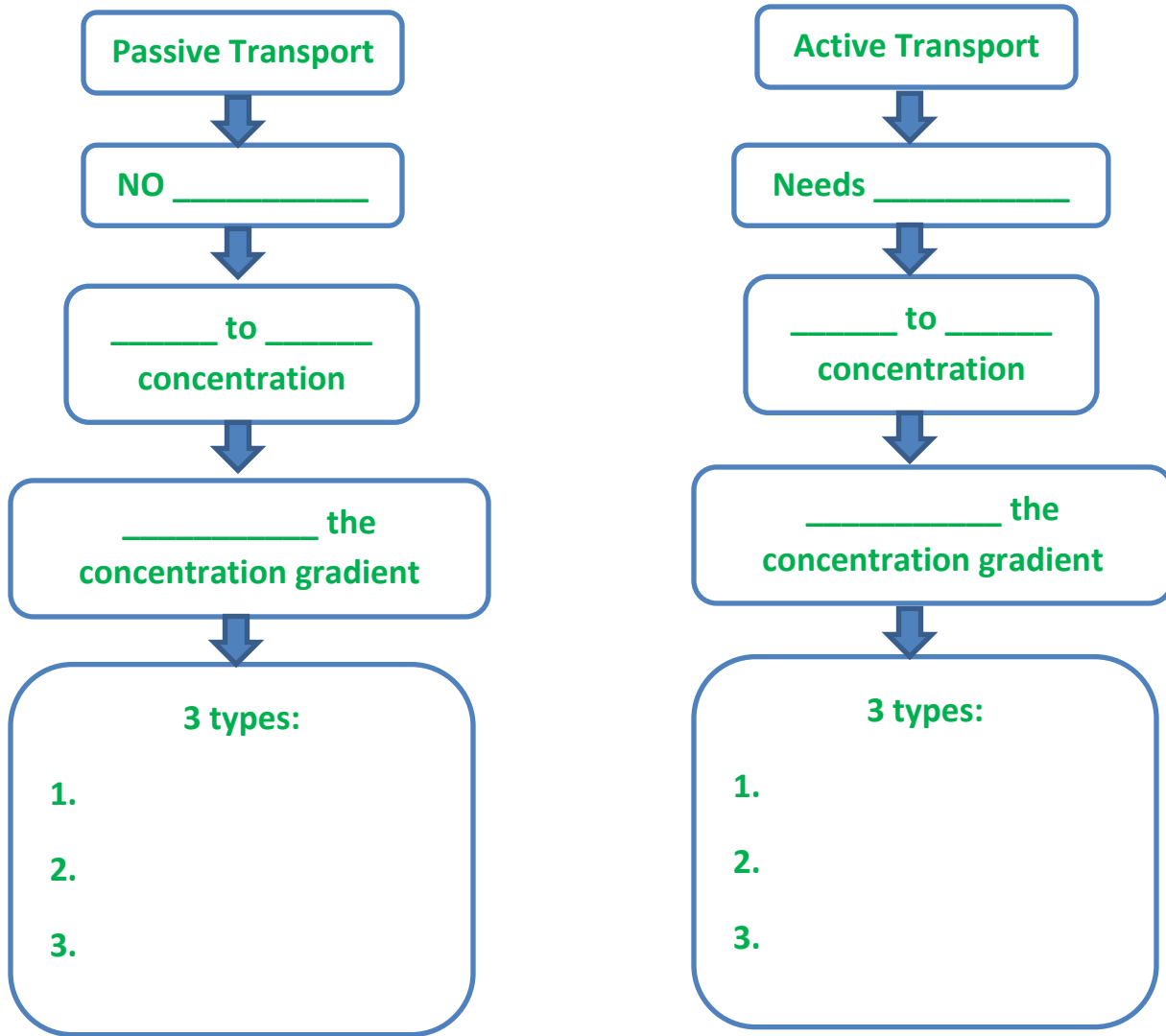
9. What is the function of integral proteins? _____

10. What factors can influence the rate of transport? _____

11. What is homeostasis? _____

****Need help answering these questions. Try this link...On the "Websites-Cells" page, click on "Cell Membrane".****

Section B: Graphic Organizer -- Fill in the missing information.

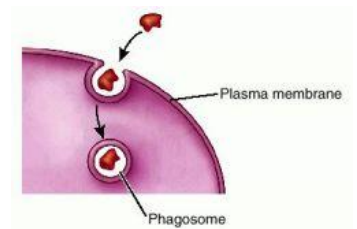


Section C: Active and Passive Transport

1. Which of the following is true about passive transport?
 - a. It does not allow materials to diffuse.
 - b. It requires energy to create a higher concentration of materials outside the cell.
 - c. It requires energy to create a higher concentration of materials inside the cell.
 - d. It allows particles to pass without the use of cellular energy (ATP).
2. The sodium-potassium pump is a good example of ions being moved out of a cell against a concentration gradient. The concentration of sodium ions is greater on the outside of the cell. What method is used by the cell to rid itself of more sodium?

a. osmosis	c. facilitated diffusion
b. diffusion	d. active transport
3. Where are carrier proteins located? _____
4. Which type of transport is occurring in the diagram?

5. In what type of passive transport do protein channels assist molecules across the membrane? _____



6. Between an area of high concentration and one of low concentration there is a _____.
7. How does the steepness of the concentration gradient influence the rate of transport? _____
8. The movement of water across a membrane from an area of high concentration to an area of low concentration is _____.

Section D: Osmosis and Diffusion LAB

In this lab you will observe the diffusion of a substance across selectively permeable (or semipermeable) membrane. The dialysis tubing is selectively permeable like a cell membrane allowing smaller molecules to pass through easily. Iodine is an indicator for starch and will turn from reddish brown to dark black in the presence of starch.

Procedure:

1. Tie one end of the dialysis tubing in a knot.
2. Add one scoop of cornstarch and water in the dialysis bag. Do NOT fill the bag full.
3. Tie a knot in the other end of the dialysis tubing. Leave some air in the tubing. Wash the tubing off to remove cornstarch from the outside of the bag.
4. In a cup, add water to fill the cup $\frac{1}{2}$ full. Place 5 drops of iodine into the water filled cup.
5. Place the tubing in the cup of water. Let it sit for ten minutes and answer the questions below while you wait.

Pre-lab questions -

1. What is in the tubing? _____ What color is it? _____
2. What is in the cup? _____ What color is it? _____
3. What do you predict will happen to the iodine and cornstarch molecules? (Hypothesis) _____
4. How is the tubing similar to a cell membrane? _____

Post-lab questions -

1. What is in the tubing? _____ What color is it? _____
2. What is in the cup? _____ What color is it? _____
3. Which molecule(s) diffused across the membrane? _____
4. Explain the movement of the molecule(s). _____
5. Is this active or passive transport? _____ How did you know? _____

Section E: Concept Check --- Identify if the examples are of OSMOSIS or DIFFUSION.

1. The student sitting next to you just came from gym class and forgot to shower. _____
2. After sitting in the bathtub for hours, your fingers start to look like prunes. _____
3. One way to rid slugs from your garden is to sprinkle salt on them, so it loses water and shrivels up. _____
4. The girl sitting two rows ahead of you put on too much perfume this morning. _____
5. Anthony sprays water on the veggies in the produce section to "plump them up". _____

On the "Website-Cells" page, click on "Osmosis", "Diffusion" and "Active Transport" links. Complete the tutorials.

Section F: EGG DEMO

Day 1 - Get two eggs out of the vinegar bath. Find the mass of each. Place one egg in corn syrup and one egg in distilled water.

- Predict what you think will happen to the egg soaking in corn syrup overnight. _____
- Predict what you think will happen to the egg soaking in distilled water overnight. _____

Day 2 - Mass each egg.

EGGS	Day 1 - Mass	Day 2 - Mass	Appearance of egg on Day 2
Egg 1 - in corn syrup			
Egg 2 - in distilled water			

Post-lab Questions:

1. Corn syrup egg - Why did the mass change? _____
 _____ What type of solution is the corn syrup? _____
2. Distilled water egg - Why did the mass change? _____
 _____ What type of solution is the distilled water? _____
3. What would happen if we placed the egg in an isotonic solution? _____
4. What type of transport is illustrated in this demo? _____ Does this transport require energy? _____

Section G: Tonics

STATEMENT	ISOTONIC solution	HYPERTONIC solution	HYPOTONIC solution
1. The concentration of the solute in the solution is lower than the concentration inside the cell.			
2. When a cell is placed in this solution, water will enter the cell.			
3. Type of solution that animal cells prefer.			
4. A plant cell with good turgor pressure. Preferred solution.			
5. When this solution is injected into the body, no cell disruption occurs because no net osmosis occurs.			
6. The concentration of the solute in the solution is higher than the concentration inside the cell.			
7. The concentration of the solute in the solution is the same as in the cell.			
8. Plant cells go limp when put in this solution.			
9. When a cell is placed in this solution, water will leave the cell.			

Section I: Can water kill you? *The New York Times* article, "When excess water can kill a runner" by John O'Neil
 Runners who get dehydrated face obvious dangers, but drinking too much water during a race can also be deadly. Doctors investigated seven cases in which runners who collapsed after a marathon were found to have a shortage of salt in the blood. One of the runners died. Fears of dehydration have led to a mistaken belief that the safe thing to do in a marathon "is to drink as much as you can, as often as you can". During a race, so much blood is diverted to the muscles that the intestines are unable to absorb the water a runner drinks. Once the race ends the water floods into the blood stream and disrupts the body's salt balance. This can cause the brain to swell, which in turn sets off a mechanism that releases water into the lungs. The treatment for the condition is simple: add more salt to the bloodstream. But the fluid in the lungs and the circumstances of the collapse often lead emergency room doctors to suspect heart trouble and to order treatments that make things worse.
 Explain in terms of tonicity what is occurring in his body. _____

Section J: Tonicity LAB - Each lab table is a lab group (6 students).

1. In each lab group, obtain 6 strips of dialysis tubing and tie a knot in one end of each bag.
2. Pour approximately 25 mL of the solutions into 6 separate bags.
3. Remove most of the air from the bag, but leave a little space. Tie the baggie.
4. Rinse the outside of the bag and dry. Record the mass of each bag.
5. Label 6 cups and fill half full of distilled water. Place the dialysis tubing in the appropriate cup.
6. Let the tubing sit overnight. Remove the tubing, dry and mass each.

Contents of bag	Initial Mass	Final Mass	Mass Difference (initial mass -final mass)	% Change in Mass (mass difference/initial mass)
Distilled Water				
.2 M sucrose				
.4 M sucrose				
.6 M sucrose				
.8 M sucrose				
1.0 M sucrose				

Post-lab questions:

1. Explain the relationship between the change in mass and molarity of sucrose within the dialysis bag.
2. Predict what would happen to the mass of each bag in this experiment if all the bags were placed in .4 M sucrose solution instead of distilled water. Explain your response.

**** Practice Quizzes****

- <http://www.sciencegeek.net/Biology/review/U1Membranes.htm>
- http://edhsgreensea.net/Biology/taters/cell_membrane_vocab_mc.htm
- http://edhsgreensea.net/Biology/taters/cell_membrane_mc.htm