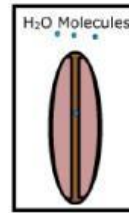
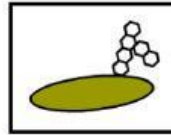
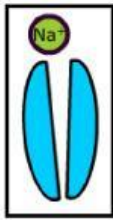


Part 1 - Construction of a Cell Membrane

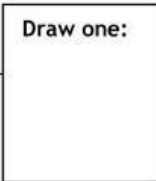
http://www.wisc-online.com/objects/index_tj.asp?objID=apl1101

Click through to page 5:

1. Identify the following proteins that make up the cell membrane.



2. Most of the cell membrane is made up of _____



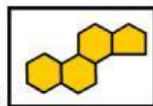
The "tails" are _____ and therefore face inward and away from water.
The "heads" are _____ and face toward the watery surfaces.

3. What is the purpose of fibrous proteins?

4. Globular protein pores (called aquaporins) allow _____ to pass through, while other integral proteins selectively transport _____.

5. What are glycoproteins?

Why are they said to be peripheral?



6. What is this molecule? _____ In what type of cells is it found?
What is the function of this molecule?

7. Construct a Cell Membrane by answering questions one through ten in the computer based activity.

Part 2 - Membranes & Transport

http://www.wiley.com/legacy/college/boyer/0470003790/animations/membrane_transport/membrane_transport.htm

1. Read the "Overview" of a cell membrane. Click on "Continue" to observe the animation. Draw a cell membrane and label all the parts as you step through the animation.

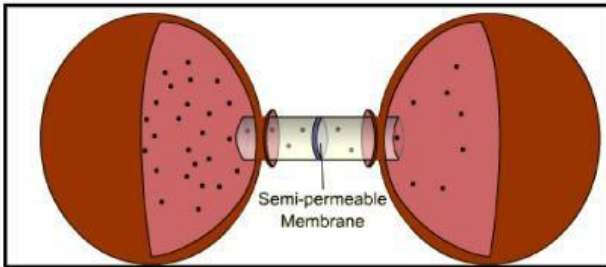


What are the two general characteristics of a molecule that will prevent it from passing through the membrane?

2. Click “Continue” again to observe “Osmosis and Diffusion”.

The net movement of molecules occurs from regions of _____ to _____ concentration.

Osmosis



What is the “aim” of osmosis?

Explain why the balloon on the left would get larger?

3. Click on “Passive Transport”.

NOTE: Osmosis and diffusion are forms of passive transport. This animation describes another special case of passive transport called facilitated diffusion.

Facilitated diffusion requires _____ called transporters to facilitate the passage of molecules across membranes.

What are the two general types of transporters? How are they different?

What type of molecule do you think **glucose permease** is?

Sketch how glucose molecules can pass through a cell membrane.

1.	2.	3.
----	----	----

4. Continue on “Active Transport”:

- a. In contrast to passive transporters, active transporters can move molecules from _____ to _____ concentration.
- b. What form of chemical energy is consumed for active transport to take place? _____
- c. What ion is moved into the cell? _____
- d. What ion is moved out of the cell? _____
- e. How many sodium ions are move out of the cell during each cycle? _____
- f. How many potassium ions are moved into the cell during each cycle? _____
- g. Does the cell become more positively charged or does the surrounding solution become more positively charged? Explain!
- h. Where in animals is this “sodium-potassium pump” commonly found? _____

Part 3 - Solutions

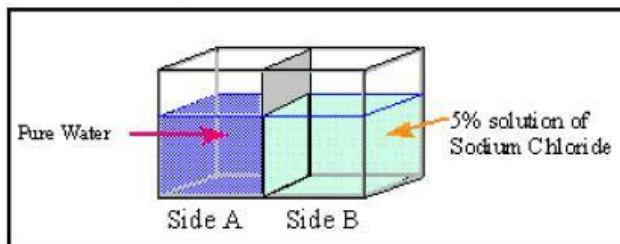
http://www.chem4kids.com/files/matter_solution.html

1. What is a solution?
2. Explain the difference between the solute and solvent.

Part 4 - Diffusion and Osmosis

http://www.mun.ca/biology/Osmosis_Diffusion/tutor2.html

1. Read the overview and define all the terms (click on a word to get to the glossary):
 - Diffusion -
 - Osmosis -
 - Passive Transport -
 - Thermal (Brownian) Motion -
 - Concentration -
 - Concentration Gradient -
2. Scroll to example #1 and read it. Briefly describe how and why perfume spreads through a classroom.
3. Scroll to example #2 and read it.
 - What is the solute?
 - What is the solvent?
 - What happens to the NaCl molecules?
 - What is the end result?
4. Scroll to example #3 and read it.



Which way will the solutes move?

Which way will water move?

Why do the molecules move in opposite directions?

5. Scroll to example #4 and read it.
 - Define the terms hypotonic -
 - &
 - hypertonic -

The direction of *solute* diffusion is from _____ to _____

The direction of *water* diffusion is from _____ to _____

Part 5 - Passive Transport

<http://www.wisc-online.com/Objects/ViewObject.aspx?ID=AP1903>

1. Molecules move randomly using _____.
2. Net diffusion moves molecules _____ the concentration gradient from areas of _____
_____ to _____ until
_____ is reached.
3. Describe the different results of raising or lowering the temperature. (Click on both at the same time.)

Part 6 - Membrane Transport

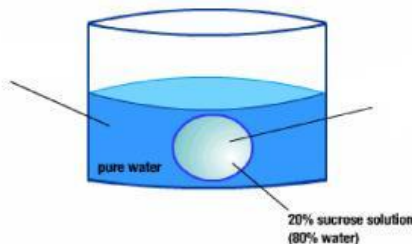
<http://www.northland.cc.mn.us/biology/Biology1111/animations/transport1.html>

****The animations on this page do not have a pause button. However, you can manually pause the animation by right clicking on it and selecting/deselecting "play".**

1. Click on passive transport from the main menu.
2. What are the three types of passive transport?
 - a.
 - b.
 - c.
3. Watch the tour of the cell membrane as a review. Then click next to continue on to simple diffusion. Review the process of diffusion. What are the determinants of diffusion?
 - a.
 - b.
 - c.
4. Click next to continue on to facilitated diffusion. After watching the animation, compare and contrast simple **diffusion** with **facilitated diffusion**.

How are they the **same**?

How are they **different**?
5. Click next to continue on to osmosis. **Osmosis** refers to the diffusion of what molecule? _____
6. Define the following terms used to compare two solutions and label them on the diagram:



hypertonic -

hypotonic -

In which solution is *water* more concentrated?

[hypertonic OR hypotonic]

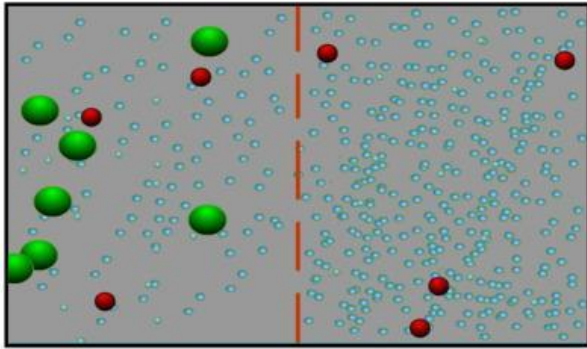
Therefore, if osmosis were to occur which way would water move [into the cell OR out of the cell]

The process continues until _____ is reached. At this point the solutions are said to be isotonic.

Part 7 - Osmosis & Diffusion

http://zoology.okstate.edu/zoo_lrc/biol1114/tutorials/Flash/Osmosis_Animation.htm

Observe the animation for a few minutes.



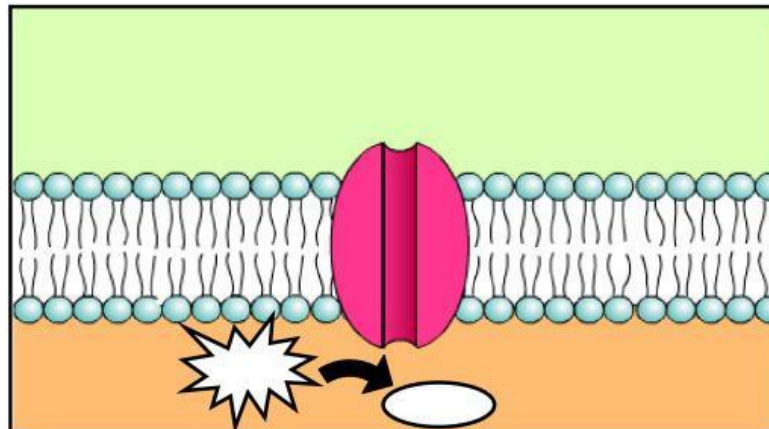
1. What do the blue molecules represent?
2. What are the green and red molecules?
3. Which side is hypotonic? [left OR right]
4. In which direction will water move? [left OR right]
5. Towards which side are the red molecules moving? [left OR right] Why?
6. Are the green molecules crossing the membrane? Why OR Why not?

Part 8 - Active Transport

Return to the animation at:

<http://www.northland.cc.mn.us/biology/Biology1111/animations/transport1.html>

1. This time click on **active transport** & define the process:
active transport -
2. Why is active transport necessary?
3. Cells must expend ATP (energy) to transport materials _____ their concentration gradient (i.e. from _____ to _____ concentration).
4. Click to view ion pumps and view the animation a few times. Use the image below to diagram the process. Show the concentration gradient and the movement of the ions, as well as the energy conversion.



5. Next, click on **endocytosis** & define the process.
endocytosis -

6. List the 3 types of endocytosis.

- a. _____ (_____)
- b. _____ (_____)
- c. _____ - _____

7. Watch the animations of phagocytosis and then pinocytosis.

Phagocytosis and Pinocytosis



Describe what is happening.

How are they different?

Receptor-mediated



Describe what is happening.

Part 9 - Phagocytosis

<http://academic.brooklyn.cuny.edu/biology/bio4fv/page/phago.htm>

This site has some additional information about the process of phagocytosis as well as some video of the actual process in occurring with a cell.

What organelle do you think digests the incoming particle? _____

Part 10 - Overview

http://www.teachersdomain.org/asset/tdc02_int_membraneweb/

Click on each type of molecule and observe how it moves through a membrane. *Identify* the type of transport taking place for each of the following molecules and *describe* how you can tell.

Molecule	Type of transport	How can you tell?
oxygen & carbon dioxide		
glucose		
potassium		
sodium		
ion		
enzyme		

What is the difference between endocytosis and exocytosis?