In & Out of the Cell: Web Quest Name:

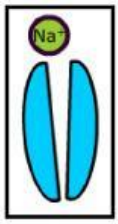
Period:

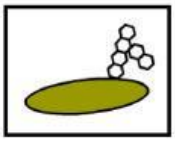
Part 1 - Construction of a Cell Membrane

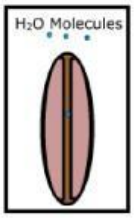
http://www.wisc-online.com/objects/index_tj.asp?objID=ap1101

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 _____

Draw one:

The "tails" are _____ and therefore face inward and away from water.

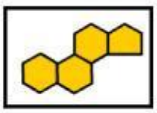
The "heads" are _____ and face toward the watery surfaces.

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.

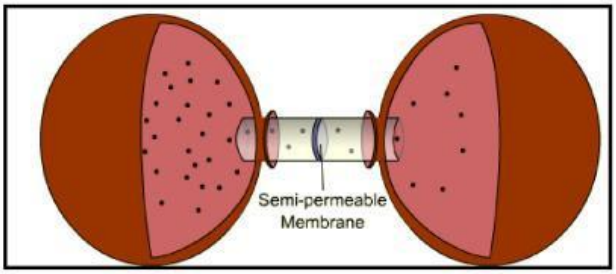
LIVEWORKSHEETS

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 perme***ase*** 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? _____

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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 -

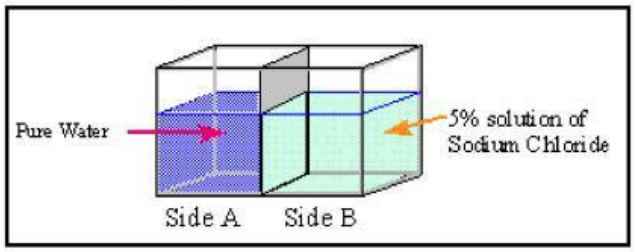
2. Scroll to example #1 and read it. Briefly describe how and why perfume spreads through a classroom.

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 _____

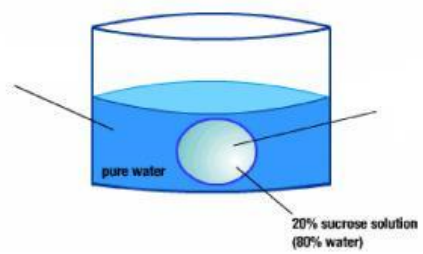
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Part 5 - Passive Transport
http://www.wisc-online.com/Objects/ViewObject.aspx?ID=AP1903

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 <u>three types of passive transport</u>?
   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 <u>determinants of diffusion</u>?
   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:



<u>hypertonic</u> -

<u>hypotonic</u> -

In which solution is *water* more concentrated?
[hypertonic **OR** hypotonic **]**

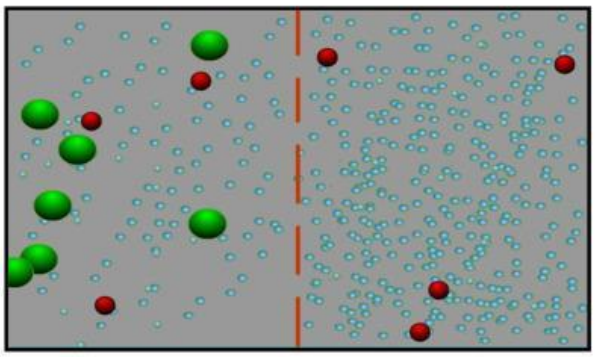
Therefore, if osmosis were to occur which way would water move **[** into the cell **OR** out of the cell **]**

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

LIVEWORKSHEETS

Part 7 - Osmosis & Diffusion
http://zoology.okstate.edu/zoo_lrc/biol1114/tutorials/Flash/Osmosis_Animation.htm

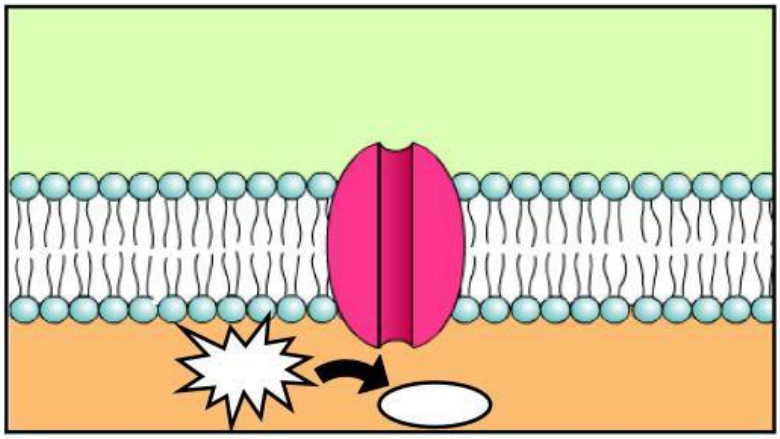
Observe the animation for a few minutes.



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. _____-_____

LIVEWORKSHEETS

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?

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