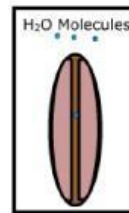
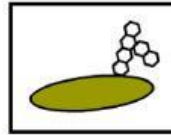
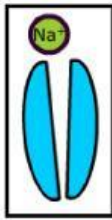


**Part 1 - Construction of a Cell Membrane**

[http://www.wisc-online.com/objects/index\\_tj.asp?objID=apl1101](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 \_\_\_\_\_

Draw one:

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

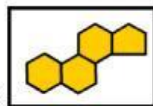
The "heads" are \_\_\_\_\_ and face toward the watery surfaces.

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](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.

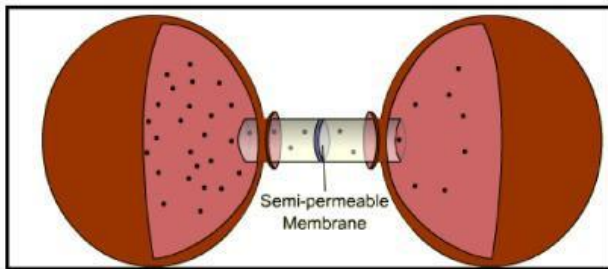


What are the two general characteristics of a molecule that will prevent it from passing through the membrane?

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":

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

### Part 3 - Solutions

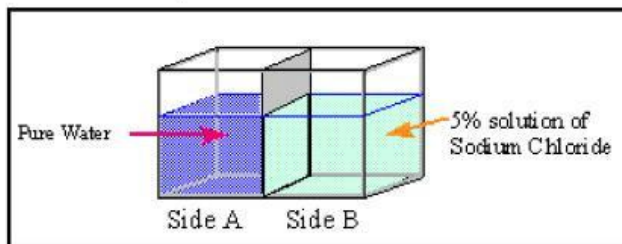
[http://www.chem4kids.com/files/matter\\_solution.html](http://www.chem4kids.com/files/matter_solution.html)

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](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

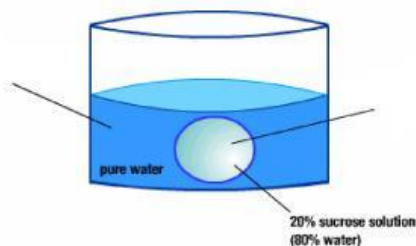
<http://www.northland.cc.mn.us/biology/Biology1111/animations/transport1.html>

**\*\*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 ]

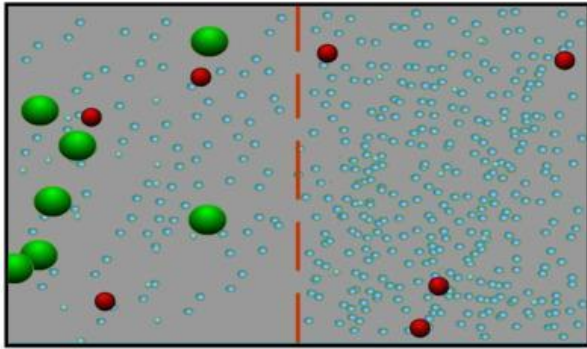
The process continues until \_\_\_\_\_ is reached. At this point the solutions are said to be isotonic.



## Part 7 - Osmosis & Diffusion

[http://zoology.okstate.edu/zoo\\_lrc/biol1114/tutorials/Flash/Osmosis\\_Animation.htm](http://zoology.okstate.edu/zoo_lrc/biol1114/tutorials/Flash/Osmosis_Animation.htm)

Observe the animation for a few minutes.



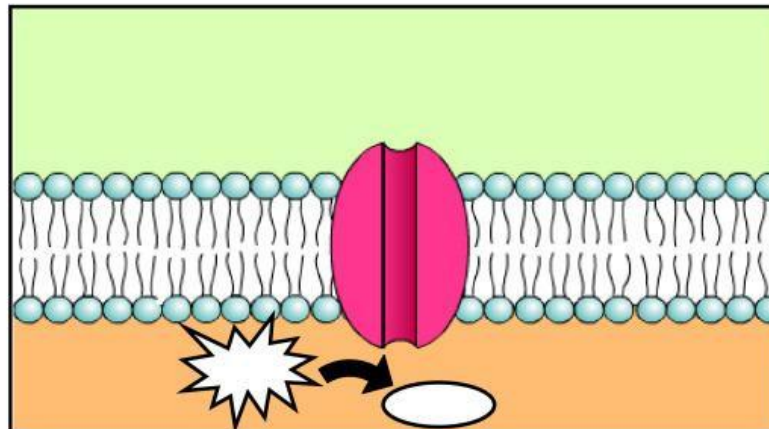
1. What do the blue molecules represent?
2. What are the green and red molecules?
3. Which side is hypotonic? [ left OR right ]
4. In which direction will water move? [ left OR right ]
5. Towards which side are the red molecules moving? [ left OR right ] Why?
6. Are the green molecules crossing the membrane? 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/](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?