

## Days 19-21

### Cell Transport Web Activity

Click on each of the links in the following sections, and answer the questions. This will serve as part of your notes for this section.

After you are finished, complete the Cell Transport Assignment Check over this assignment.

#### A. Hypotonic, Isotonic, Hypertonic by June B. Steinberg

As you read through the material and play the animations, answer the following questions.

1. Define the concentration of water **is the amount of water per unit of volume.**
2. Since water flows in the direction of its concentration gradient, that means that water will flow from **\_ the right side of the membrane to the left side\_**, diffusion then is the movement of molecules from areas high concentration to areas of lower concentration.
3. What is a solution?
4. Suppose you have a cup of coffee with sugar in it. **\_\_\_Water\_\_\_** is the solvent and **\_\_\_coffee\_\_\_** and **\_\_\_sugar\_\_\_** are the solutes.
5. What are the 6 factors that can influence the rate of diffusion? **Temperature, The state of the solvent, The size of the molecules, The steepness of the diffusion gradient, Permeability, Membrane structure**
6. How does temperature affect the rate of diffusion? **The more heat molecules have, the faster they move and the faster they will diffuse.**
7. What is the order in terms of the speed of diffusion for solids, liquids and gasses? **Diffusion occurs much faster in gases than in liquids and much faster in liquids than in solids.**
8. The larger the molecule, the **\_\_\_\_\_slower\_\_\_\_\_** it will diffuse.
9. The greater the steepness of the gradient causes **it to dissolve faster.**
10. Define osmosis. **Osmosis is a special case of diffusion. It is simply the diffusion of water through a selectively permeable membrane. This means that water moves through a selectively permeable membrane in the direction of its concentration gradient.**
11. **or osmosis to occur:**
  - a. **A selectively permeable membrane between two water solutions, or between a water solution and pure water.**
  - b. **The concentration of solute in the two solutions must be unequal; i.e. there must be more solute on one side of the membrane than on the other side.**
  - c. **The membrane must be impermeable to the solute, but permeable to water.**
12. What do the blue dots represent? **Wherever there are blue dots there is no water.**
13. On what side of the tubes is the concentration of solute greater? **The concentration of water, the amount of water per unit of volume, will be greater on the right, where there are no dots.**

14. Water will move towards the side of the membrane where there is **more solution**. This happens because where there is solute, there is **solute, there is less water**.

15. There is no mechanism for the active transport of water as there is for many other substances such as **calcium, sodium and glucose**.

16. There are 3 possible relationships that cells can encounter when placed in a water solution:

a. The concentration of solute can be equal to the concentration of solute in the cells. The cell is in an **isotonic solution**. (**iso = same as normal**).

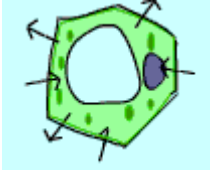
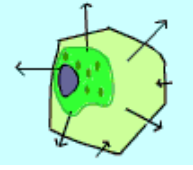

b. The concentration of solute can be greater than the concentration of solute in the cells. The cell is in an **hypertonic solution**. (**hyper = more than normal**).

c. The concentration of solute can be less than the concentration of solute in the cells. The cell is in an **hypotonic solution**. (**hypo = less than normal**).

Now push the buttons on the animations below (on the web page) and describe what is happening in each beaker by completing the following chart. You can replay this as you need to describe what is occurring.

Beaker Number	Tonicity (Hypertonic, Isotonic, or Hypotonic)	Explain what happened to the cell and why it happened
1	Isotonic	Use your own words
2	Hypotonic	Use your own words
3	Hypertonic	Use your own words

Draw the situations that occur in solutions of differing concentrations in a **PLANT CELL** in the chart below and describe what is happening and why.

Isotonic Solution	Hypertonic Solution	Hypotonic Solution
		
Plant cell in isotonic solution (Water entering cell equals water leaving cell.)	Plant cell in hypertonic solution (More water leaves the cell than enters it.)	Plant cell in hypotonic solution (More water enters cell than leaves it.)

17. What is plasmolysis? In a hypertonic solution, the plasma membrane of the cell will pull away from the cell wall as the cell shrinks.

18. Why doesn't the plant cell burst, like an animal cell? Because of the rigid cell wall.

## B. Cell Membrane

19. What is the main function of the cell membrane? **To maintain homeostasis.**
20. How does the cell membrane maintain homeostasis for the cell? **To regulate the movement of substances into and out of the cell.**
21. What is another name for the cell membrane? **Plasma Membrane**
22. Describe the structure of the cell membrane? **The Plasma membrane is the outer boundary of the cell. It consists of a lipid bilayer as well as proteins, such as ion such as channels and aquaporins.**
23. What is the function of the ion channel? **Is a protein that acts as a pore to ions (atoms with with either a negative or a positive charge).**
24. What is the function of the protein pump? **The protein pump uses energy released within the cell to force substances through the plasma membrane.**

### C. Diffusion

25. What is the definition of diffusion? **Dissolved substances have to pass through the cell membrane to get into or out of a cell.**
26. What are two examples of diffusion in the human body?

location	particles move	from	to
gut	digested food products	gut cavity	blood in capillary of villus
lungs	oxygen	alveolar air space	blood circulating around the lungs

### D. Osmosis

27. What two things are required for osmosis to occur?
- **two solutions with different concentrations**
  - **a partially permeable membrane to separate them**
28. What does “partially permeable membrane” mean?
- Partially permeable membrane means they let some substances pass through them, but not others.**

### E. Facilitated Diffusion

29. Is ATP required for facilitated diffusion? **No**
30. What is required in order for facilitated diffusion to occur? **A Carrier Protein is required.**

### F. Active Transport

31. Define active transport. Active transport is the The process by which dissolved molecules move across a cell membrane from a lower to a higher concentration.

32. What is the job of carrier proteins? Carrier proteins pick up specific molecules and take them through the cell membrane against the concentration gradient.

33. Describe an example of active transport in the human body? Active transport takes place during the digestion of food in the small intestine.

### **G. Diffusion and Osmosis**

Watch the simulation.

34. Summarize what you saw in 4-5 sentences. This will be in your own words

### **H. Endocytosis**

35. Find and describe the three types of Endocytosis below:

A. Phagocytosis

B. Pinocytosis

C. Receptor-mediated endocytosis