

1. Use arrows to indicate the direction of diffusion in each case:  $\circ$  is a molecule that can pass through the cell membrane.



2. For each of the situations below use an arrow to indicate the net movement **of sugar** into or out of the cell. (Assume that the sugar molecules can pass through the cell membrane in each case.)



- 6. Does a cell expend energy when molecules diffuse in or out of the cell?
- 7. Below is a diagram of a red blood cell surrounded by intravenous (IV) fluid.



- a. How many water molecules are in the red blood cell?
- b. How many water molecules are in the IV fluid?
- c. The membrane is permeable to water only. What direction (if any) will the water move?
- d. Is the IV fluid hypertonic, hypotonic, or isotonic to the red blood cell?
- 8. Draw an arrow to show which way the water would move by osmosis. Fill in any missing percentages.

Identify the type of solution: hypotonic, hypertonic, and isotonic.





- 9. The U-shaped tube above is separated by a selectively permeable membrane. Solute A is allowed to pass from one side to the other but Solute B cannot. For Solute A to reach equilibrium what would have to happen?
- 10. Draw a picture of a red blood cell that is HYPERTONIC, HYPOTONIC, and ISOTONIC.