

**Setting the stage for Lab #1 – Diffusion – Osmosis – Water Potential  
and the tangle of terminology.**

1. Define diffusion

2. Give a molecular level explanation as to why the diffusion of ethanol is faster in air than in water.

3. What is a permeable membrane?

How would it be different than a semi-permeable membrane?

4. Is osmosis a type of diffusion? \_\_\_\_\_ If it is, then in what two fundamental ways is it different?

1)

2)

Now define osmosis:

Now refer to lab #1 and define dialysis:

How is dialysis different from osmosis?

5. Plant, bacterial and fungal cells can develop an internal pressure that is higher than the environmental pressure. This can never occur in an animal cell. Why ?

The quantitative measure of this internal hydrostatic pressure is called pressure potential ( $\Psi_p$ ). If the pressure potential inside a cell was rising, the free energy of water within that cell would be (rising) (falling).

6. Water potential ( $\Psi$ ) is a measure of the free energy of water within a cell. The free energy of water within a cell is a product of both the solute potential and the pressure potential within a cell. Add these together and you have the water potential.

7. Think .....hyper means more.....so a hypertonic solution would have (more) (less) solute.

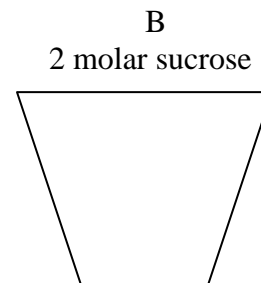
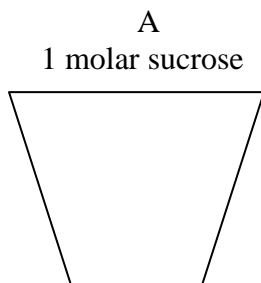
Think.....hypo means less.....so a hypotonic solution would have (more) (less) solute.

A hypertonic solution is a solution in which a cell would \_\_\_\_\_ water.

A hypotonic solution is a solution in which a cell would \_\_\_\_\_ water.

An isotonic solution is a solution in which cells have no net gain or loss of water.

8. Now put it all together .....Use words such as **high, low, less, more, equal**



\_\_\_\_\_ free energy of water

\_\_\_\_\_ hypertonic than B

\_\_\_\_\_ hypotonic than B

\_\_\_\_\_ solute potential

\_\_\_\_\_ water potential

\_\_\_\_\_ pressure potentials

\_\_\_\_\_ free energy of water

\_\_\_\_\_ hypertonic than A

\_\_\_\_\_ hypotonic than A

\_\_\_\_\_ solute potential

\_\_\_\_\_ water potential

\_\_\_\_\_ pressure potentials

Now use the words up or down to answer the following.....

If temperature goes up, water potential goes \_\_\_\_\_.

If hydrostatic pressure goes up, water potential goes \_\_\_\_\_.

If molar concentration goes up, water potential goes \_\_\_\_\_.

As water potential goes up, free energy of water goes \_\_\_\_\_.

9. Circle the description with the greater free energy of water.

Water at 50° C and 10 psi

or

Water at 100° C and 10 psi

Why?

Water at 50° C and 10 psi

or

Water at 50° C and 40 psi

Why?