Name: Key Period: _____ Date: _____

# Water Potential Practice

$\Psi = \Psi_p + \Psi_s$

$\Psi_s = -iCRT$

1. In an open environment, both internally and externally, what is the ONLY really important variable in the water potential formula? Why?

- The solute concentration, C.
- Everything else is the same on either side of the membrane, and will cancel out mathematically.

2. An animal cell has a .7 molar KCl concentration inside of the cytosol and is placed in a .75 molar solution of KCl. If the temperature is 26° C what is the water potential inside the cell?

$i = 2$ (KCl is a salt, Potassium Chloride)

$C_{int} = .7$ mol $\quad T = 299$ K

$C_{ext} = .75$ mol

$\Psi_{int} = \Psi_p^{\,0} + \Psi_s = -iCRT = -(2)(.7\text{ mol})(.0831)(299)$

$\Psi_{int} = -34.79$ bar

3. A bacterial cell has an internal solute concentration of .86 Mol and a pressure potential of 2.0 bar. If the environment is at 20° C with a concentration of .95 Mol, which way will $H_2O$ move? (solute name intentionally not given)

$\Psi_{int} = \Psi_p + \Psi_s = 2\text{ bar} + -(1)(.86)(.0831)(293) = -18.94$ bar

$\Psi_{ext} = \Psi_p + \Psi_s = 0 - (1)(.95)(.0831)(293) = -23.13$ bar

Water will move out of the bacteria.

[* if the i is not given assume 1.]

4. What is it dangerous to drink a lot of 100% pure water?

There will be more solutes in your digestive track cells, so they will swell with water, potentially bursting

5. Solute: NaCl, $C_{(ext)} = 2$ Mol, $C_{(int)} = .09$ Mol, T = 31° C. Which way will the water move?

$\Psi_{int} = -(2)(.09)(.0831)(304) = -4.55$ bar

$\Psi_{ext} = -(2)(2)(.0831)(304) = -101.05$ bar

water will move out