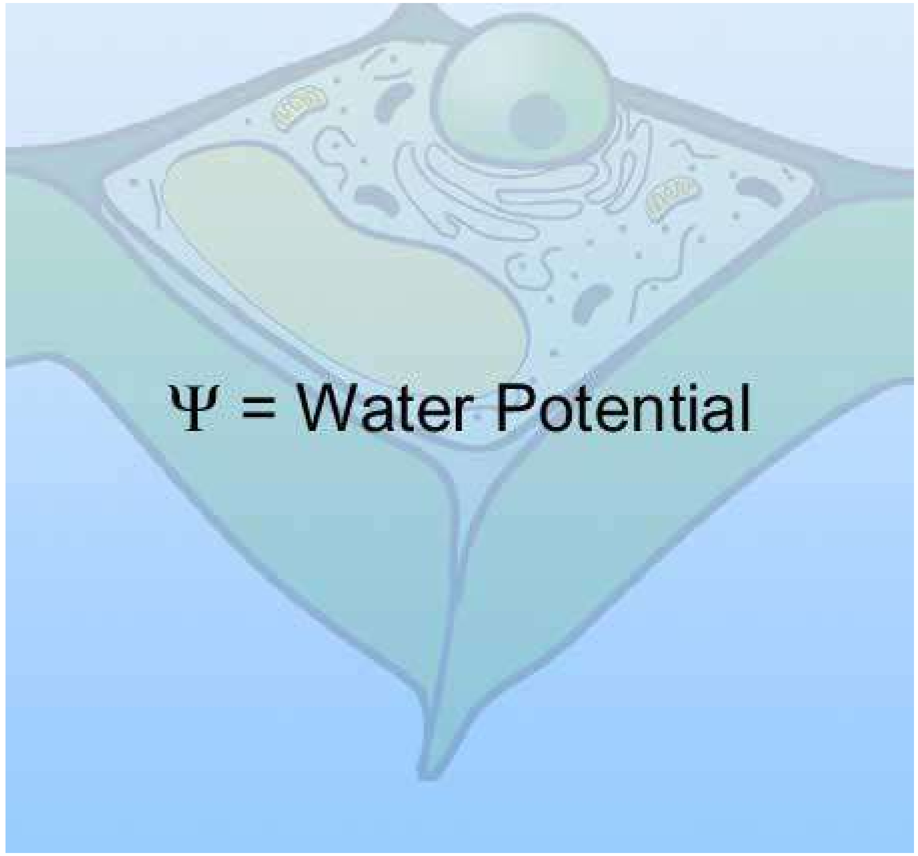
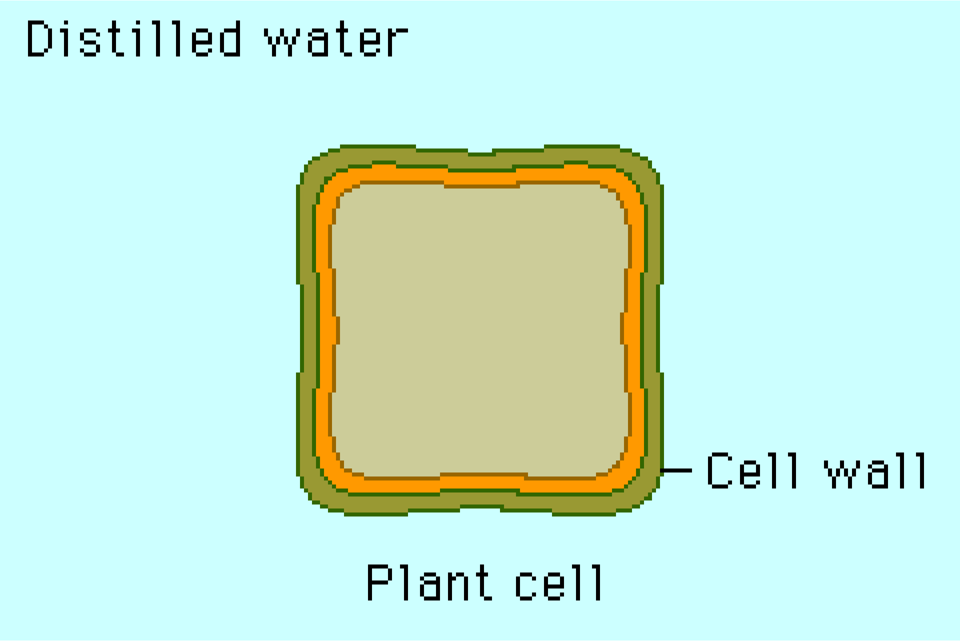


Water moves from a region of HIGHER WATER POTENTIAL to a region of LOWER WATER POTENTIAL

http://www.neosci.com/demos/10-1041_cell%20processes/Presentation%20Images/tutorials/3.01.jpg

Ψ = pressure potential (Ψ_p) + solute potential (Ψ_s)

Pressure potential ψ_p
= amount of pressure on the container surrounding the solution



Water is less likely to move into container if ψ_p is high

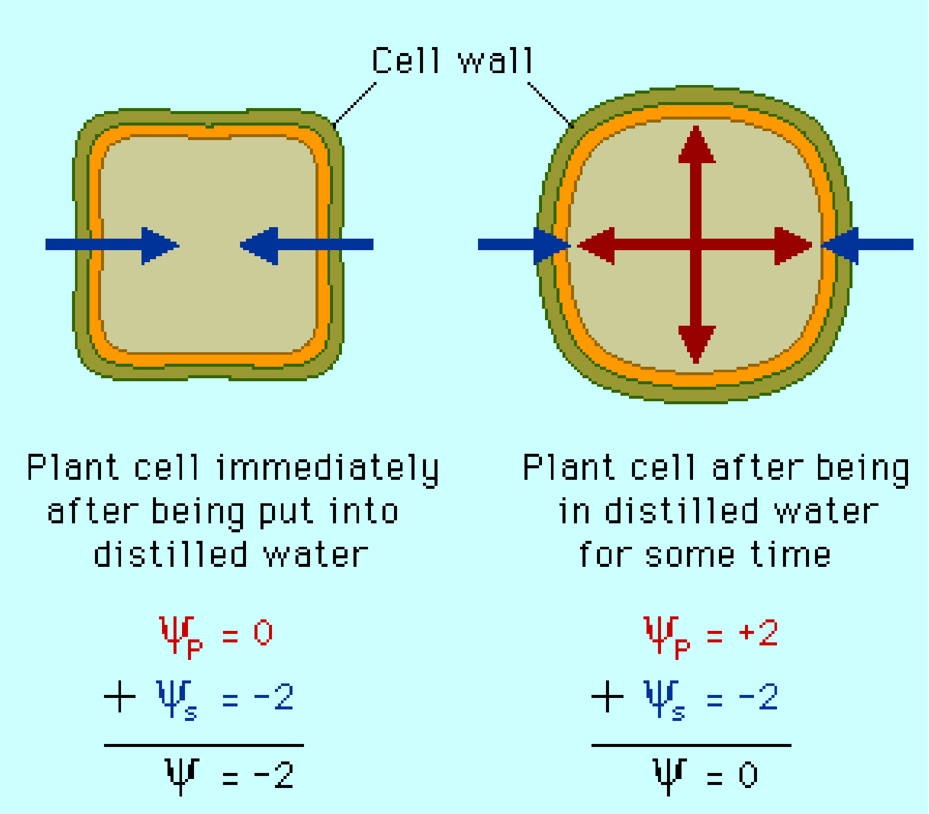
Increasing pressure potential Ψ_p increases Ψ

http://www.phschool.com/science/biology_place/labbench/lab1/watpot.html

Ψ = pressure potential (Ψ_p) + solute potential (Ψ_s)

PLANTS
Water moving into plant cell puts pressure on cell wall.

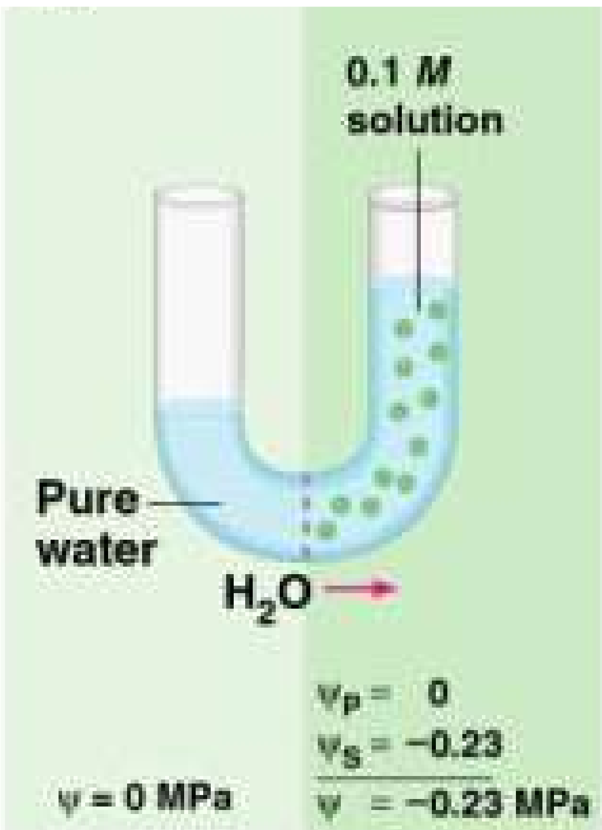
INCREASES
PRESSURE POTENTIAL
which INCREASES
WATER POTENTIAL



http://www.phschool.com/science/biology_place/labbench/lab1/watpot.html

Ψ = pressure potential (Ψ_p) + solute potential (Ψ_s)

Adding solute lowers SOLUTE POTENTIAL (ALSO CALLED OSMOTIC POTENTIAL)



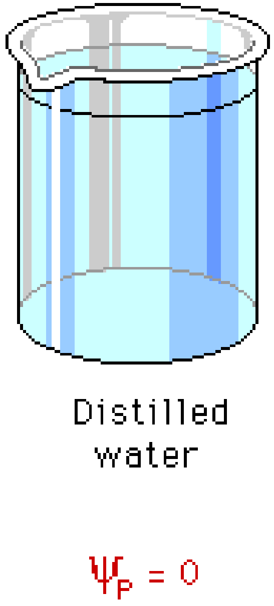
Makes it more ________________

Overall WATER POTENTIAL decreases too

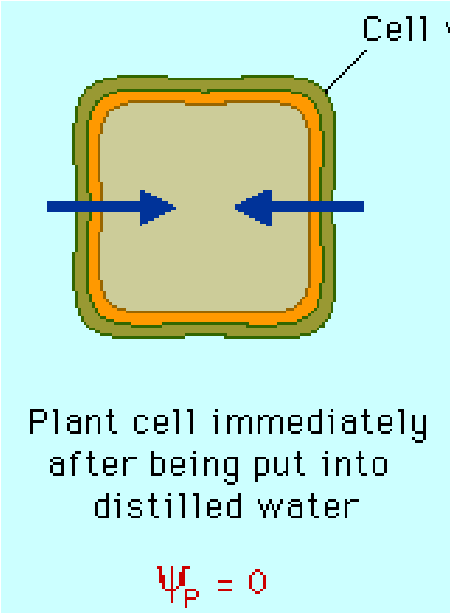
Water = more likely to flow toward areas with low water potential

animation

SOLUTE SUCKS!

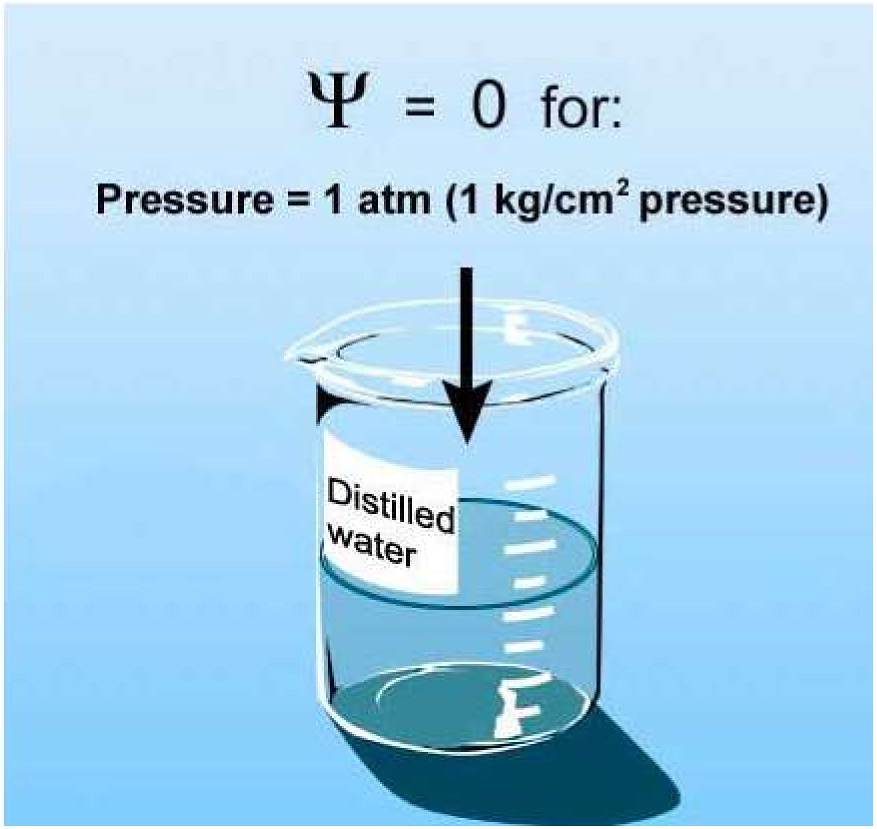


In open system (like beaker)
pressure potential $\Psi_p = 0$



In closed system
(like plant cell with rigid cell wall)
pressure potential Ψ_p **can be a positive or negative number, or zero.**

SI UNITS



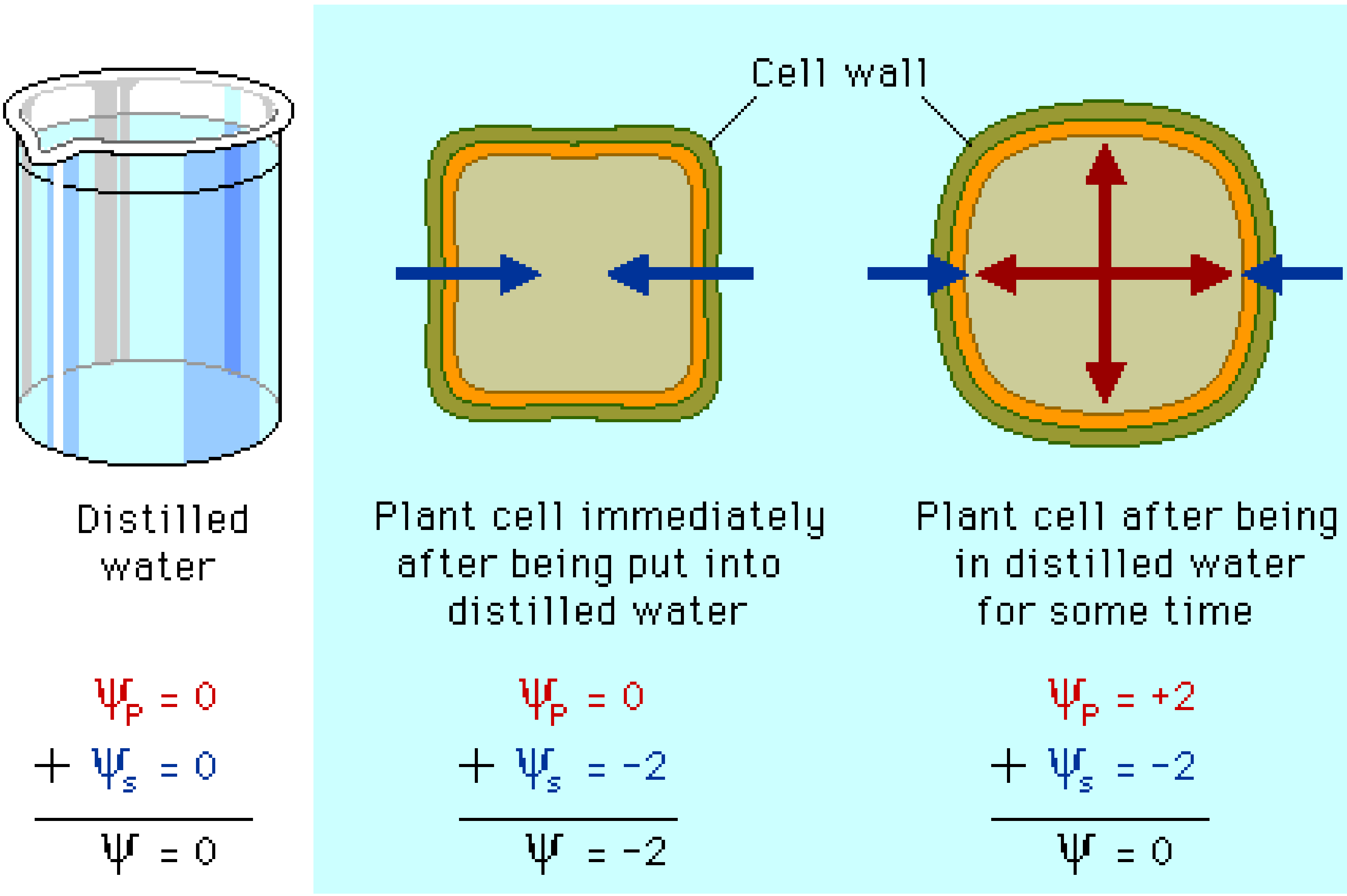
1 Bar = 1 Atm

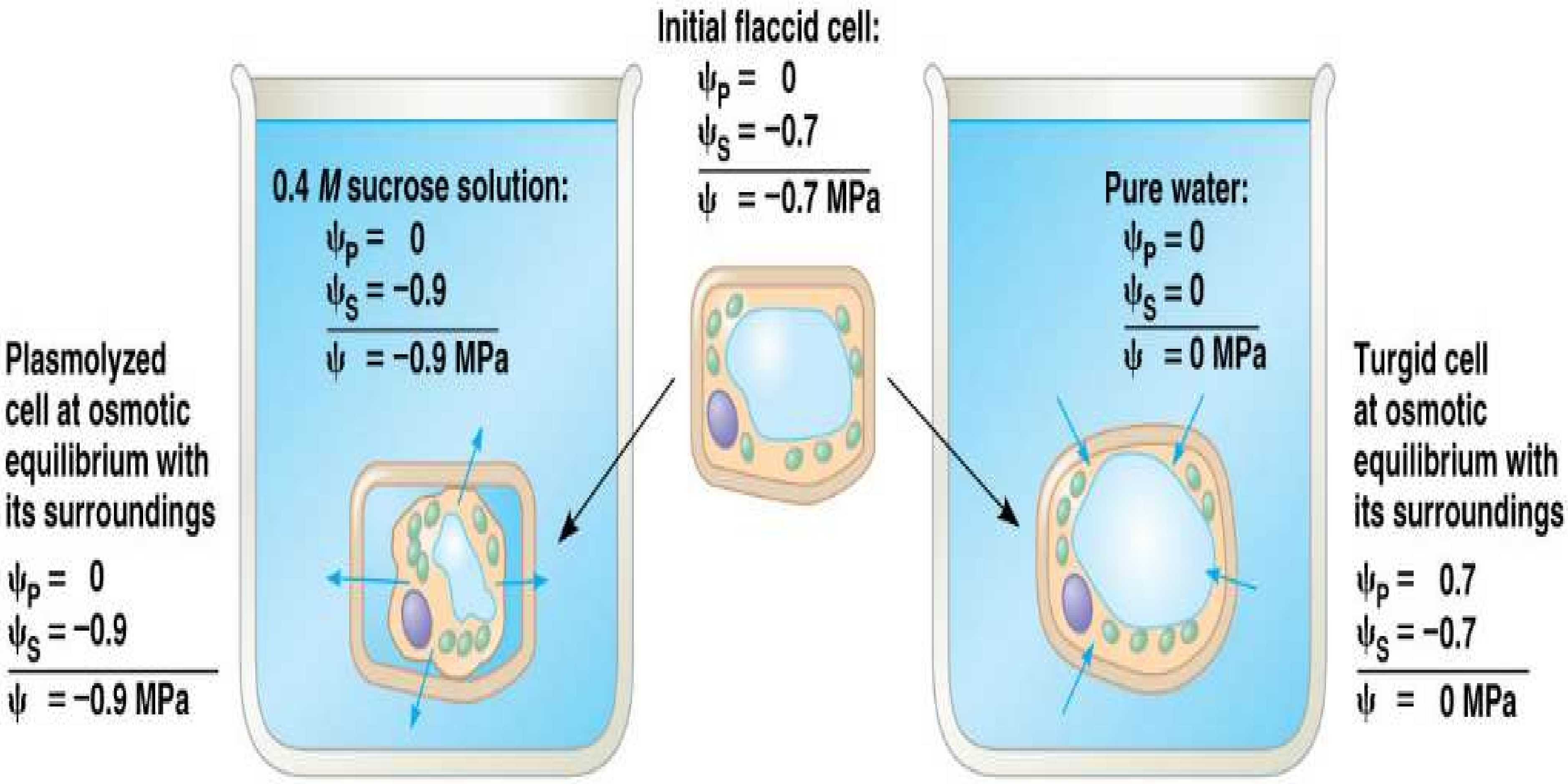
1 Bar = 0.1 Megapascals (Mpa)

Ψ of pure distilled water at 1 atmosphere pressure

= 0 bars

http://www.neosci.com/demos/10-1041_cell%20processes/Presentation_4.html

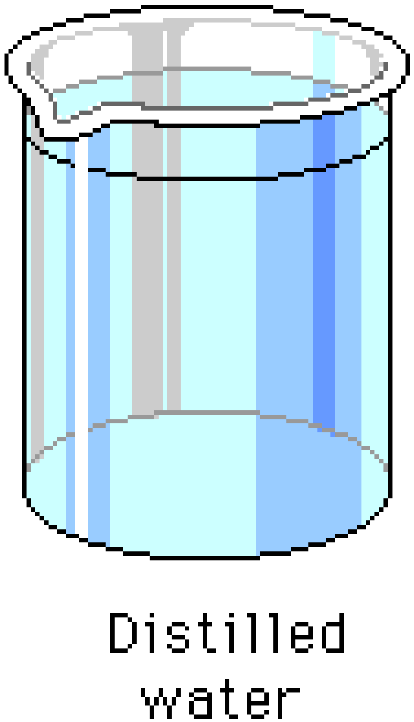

Cell wall
Distilled water
Plant cell immediately after being put into distilled water
Plant cell after being in distilled water for some time
$\Psi_P = 0$
$+ \Psi_s = 0$
$\Psi = 0$
$\Psi_P = 0$
$+ \Psi_s = -2$
$\Psi = -2$
$\Psi_P = +2$
$+ \Psi_s = -2$
$\Psi = 0$



(a) Initial conditions: cellular ψ > environmental ψ

(b) Initial conditions: cellular ψ < environmental ψ

Ψ = pressure potential (Ψ_p) + solute potential (Ψ_s)

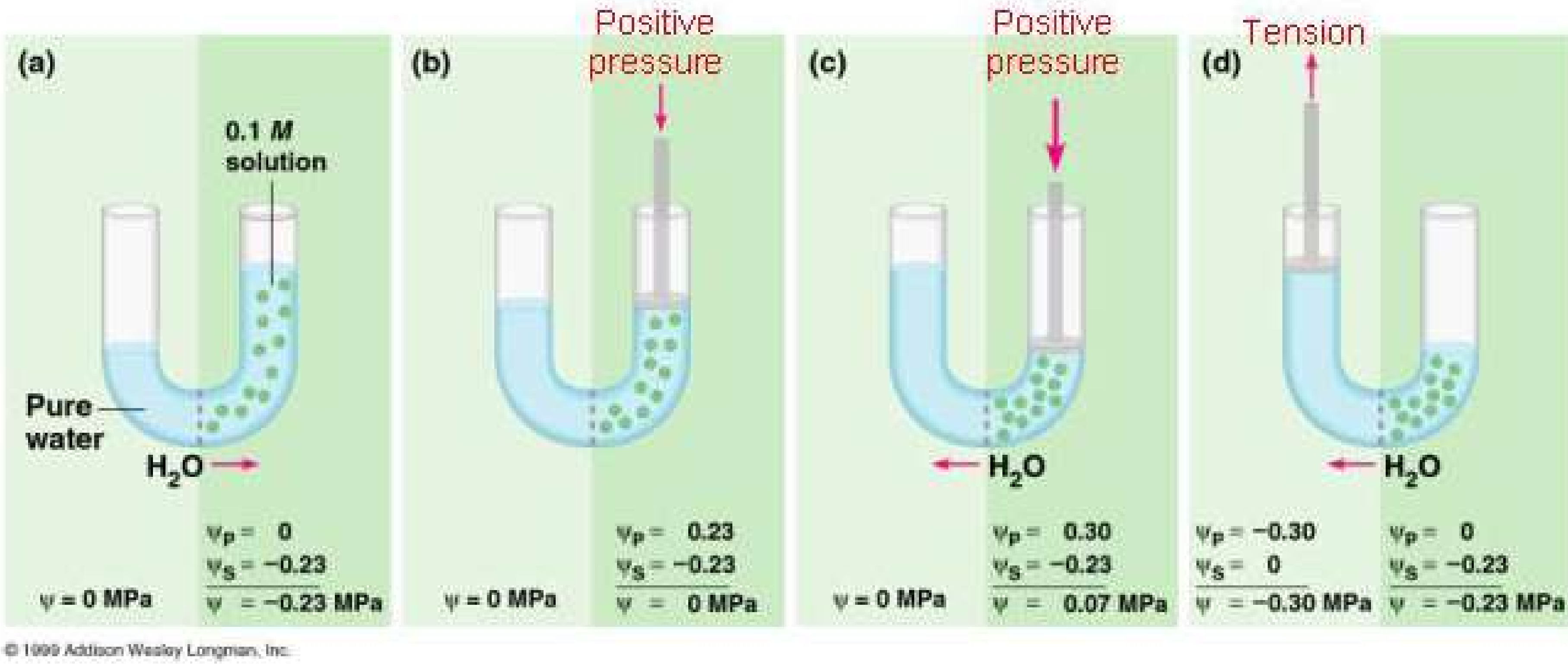


PURE WATER in an OPEN CONTAINER

Water Potential Ψ = ___________

$$\begin{array}{rl} & \Psi_P = 0 \\ + & \Psi_s = 0 \\ \hline & \Psi = 0 \end{array}$$

Water Flows from Regions of High Water Potential to Regions of Low Water Potential



Changes in water potential (Ψ_w) can be brought about by changes in pressure potential (Ψ_p) or changes in solute potential (Ψ_s).

http://www.cetbiology.com/biology-photographs/waterpotential.jpg

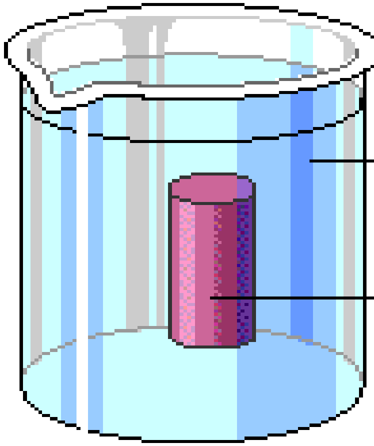
Solute potential (Ψ_s) = –iCRT

i =	The number of particles the molecule will make in water; for NaCl this would be 2; for sucrose or glucose, this number is 1
C =	Molar concentration (from your experimental data)
R =	Pressure constant = 0.0831 liter bar/mole K
T =	Temperature in degrees Kelvin = 273 + °C of solution

The molar concentration of a sugar solution in an open beaker has been determined to be 0.3M. Calculate the solute potential at 27 degrees. Round your answer to the nearest hundredth.

Now that you know the Ψ_s you can calculate the water potential Ψ of this beaker of liquid.

http://www.phschool.com/science/biology_place/labbench/lab1/quiz.html

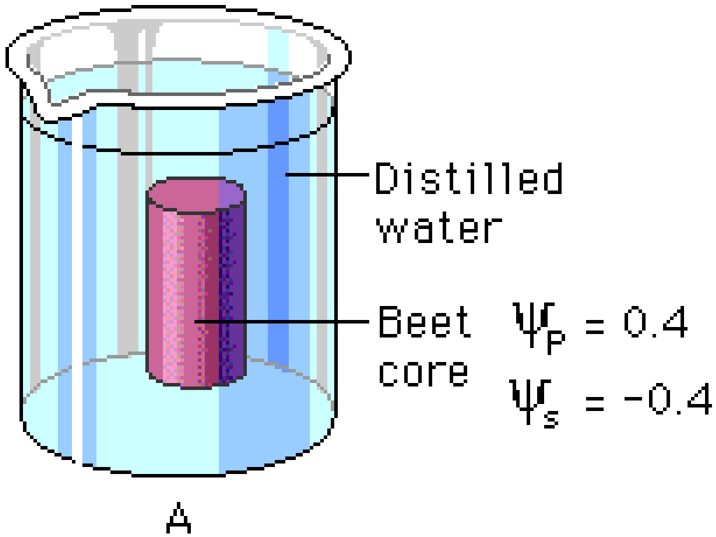


What is the water potential of the distilled water?

What is the water potential of the beet core?

Which way will water move?

5. Which of the following statements is true for the diagrams?



- a. The beet core in beaker A is at equilibrium with the surrounding water.
- b. The beet core in beaker B will lose water to the surrounding environment.
- c. The beet core in beaker B would be more turgid than the beet core in beaker A.
- d. The beet core in beaker A is likely to gain so much water that its cells will rupture.
- e. The cells in beet core B are likely to undergo plasmolysis.

http://www.phschool.com/science/biology_place/labbench/lab1/quiz.html