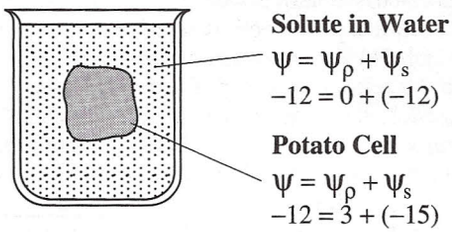
If you were to add solute to the water outside the potato cells, the water potential of the solution surrounding the cells would decrease. It is possible to add just enough solute to the water so that the water potential outside the cell is the same as the water potential inside the cell. In this case, there will be no net movement of water. This does not mean, however, that the solute concentrations inside and outside the cell are equal, because water potential inside the cell results from the combination of both pressure potential and solute potential (Figure 1.3).

Figure 1.3



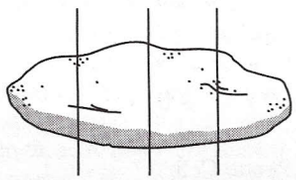
If enough solute is added to the water outside the cells, water will leave the cells, moving from an area of higher water potential to an area of lower water potential. The loss of water from the cells will cause the cells to lose turgor. A continued loss of water will eventually cause the cell membrane to shrink away from the cell wall (plasmolysis).

Procedure

Work in groups. You will be assigned one or more of the beaker contents listed in Table 1.4. For each of these, do the following:

1. Pour 100 mL of the assigned solution into a labeled 250-mL beaker. Slice a potato into discs that are approximately 3 cm thick (see Figure 1.4).

Figure 1.4



2. Use a cork borer (approximately 5 mm in inner diameter) to cut four potato cylinders. Do not include any skin on the cylinders. You need four potato cylinders for *each* beaker.
3. Keep your potato cylinders in a covered beaker until it is your turn to use the balance.
4. Determine the mass of the four cylinders together and record the mass in Table 1.4. Put the four cylinders into the beaker of sucrose solution.
5. Cover the beaker with plastic wrap to prevent evaporation.
6. Let it stand overnight.
7. Remove the cores from the beakers, blot them gently on a paper towel, and determine their total mass.
8. Record the final mass in Table 1.4 and record class data in Table 1.5. Calculate the percentage change as you did in Exercise 1B. Do this for both your individual results and the class average.
9. Graph both your individual data and the class average for the percentage change in mass in Table 1.4.

Table 1.4: Potato Core—Individual Data

Contents in Beaker	Initial Mass	Final Mass	Mass Difference	Percent Change in Mass	Class Average Percent Change in Mass
a) 0.0 *M* Distilled Water					
b) 0.2 *M* Sucrose					
c) 0.4 *M* Sucrose					
d) 0.6 *M* Sucrose					
e) 0.8 *M* Sucrose					
f) 1.0 *M* Sucrose					

Table 1.5: Potato Core Results—Class Data

Contents in Beaker	Percent Change in Mass of Potato Cores								Total	Class Average
	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8		
0.0 *M* Distilled Water										
0.2 *M* Sucrose										
0.4 *M* Sucrose										
0.6 *M* Sucrose										
0.8 *M* Sucrose										
1.0 *M* Sucrose										