D2.3 Water potential (HL)

What the Cell · DP Biology · worksheet · HL statements D2.3.8–11

Name _____ **Date** _____ **Total** _____ / 20

About 20 minutes, or one section at a time. The number of marks shows how many separate points to make.

Section A: Recall

5 marks

1 **Define** water potential. D2.3.8 **[1]**

2 **State** the unit of water potential. D2.3.8 **[1]**

3 **State** the water potential of pure water. D2.3.8 **[1]**

4 **State** the equation linking water potential, solute potential and pressure potential. D2.3.10 **[1]**

5 **State** whether pressure potential is positive or negative in xylem sap under tension. D2.3.10 **[1]**

Section B: Understanding

7 marks

6 **Explain** why dissolving a solute in water lowers its water potential. D2.3.8 **[2]**

7 **Explain** the changes in solute potential and pressure potential when a flaccid plant cell is placed in pure water. D2.3.11 **[3]**

8 **Deduce** whether a cell with a solute potential of −800 kPa and a pressure potential of +200 kPa gains or loses water in a solution of −400 kPa. D2.3.9 **[2]**

Section C: Working with evidence

8 marks

All data in this section are invented for practice. The patterns are realistic.

9 D2.3.11

Potato cylinders were blotted, weighed, left in sucrose solutions for 24 hours, then blotted and reweighed.

Sucrose / mol dm^{-3}	**0**	**0.2**	**0.3**	**0.4**	**0.6**	**0.8**
Mean change in mass / %	+16	+7	+2	−3	−10	−17
Water potential of solution / kPa	0	−540	−820	−1120	−1760	−2460

a **Explain** the change in mass in pure water. **[2]**

b **Estimate** the sucrose concentration at which there would be no change in mass. **[1]**

c **Estimate** the water potential of the potato tissue. Show your reasoning. **[2]**

d **Explain** why percentage change in mass is used instead of change in mass. **[1]**

e **Explain** why the cylinders were blotted before each weighing. **[1]**

f **Suggest** one change to make the estimate more precise. **[1]**

What the Cell. Original questions written for this course.