

Membranes and membrane transport · supported focus

Supported focus · HL

Supported scope

- Supported HL focus. First assessment 2025; current subject brief acquired; full Biology guide not acquired. Remaining guide, assessment and practical requirements retain their recorded holds.
- State model conditions and distinguish fictional data from measurements.

Osmosis · 1.1

Reasoning

A potato cylinder gains mass in one solution and loses mass in another. Its mass change provides evidence about movement of water, rather than movement of potato tissue. Start with a prediction. State the quantities or features you would compare, then decide what evidence could distinguish two explanations.

Osmosis · 2.1

Reasoning

Osmosis is the net movement of water through a partially permeable membrane from a more dilute solution to a more concentrated solution. Dissolved solutes can change the direction of net water movement. osmosis: Net water movement through a partially permeable membrane; control variable : A factor kept constant for a fair comparison.

Osmosis · 3.1

Reasoning

Use percentage change to compare samples with different initial masses. A zero percentage change estimates a solution concentration with no net water movement. This is an estimate from a trend, not proof that water molecules stop moving. Use equal-length cylinders from similar tissue, fixed solution volume, temperature and immersion time. Blot each cylinder in the same way before weighing. Repeat each concentration and plot mean percentage change against concentration.

Osmosis · 4.1

Reasoning

State the known values and their units. Choose the relation because its assumptions fit this case, then rearrange before substitution. Known: initial mass 2.50 g; final mass 2.75 g. Use $\text{percentage change} = (\text{final} - \text{initial}) / \text{initial} \times 100$. $\text{Percentage change} = (2.75 - 2.50) / 2.50 \times 100 = +10\%$. A positive value means net water entry. Interpolate the concentration where the plotted trend crosses zero.

Osmosis · 4.2

Reasoning

A 4.00 g cylinder ends at 3.60 g. Find percentage mass change. Use the same sequence: known quantities → model → relation → substitution → unit and interpretation.

Osmosis · 5.1

Reasoning

Blotting removes surface solution. Weighing a wet cylinder without blotting adds liquid that did not enter the cells. Repeats reduce random variation but do not correct a miscalibrated balance. Return to the original observation. Explain what the result supports, which conditions it assumes, and one way to test a competing explanation.

Osmosis · 5.2

Reasoning

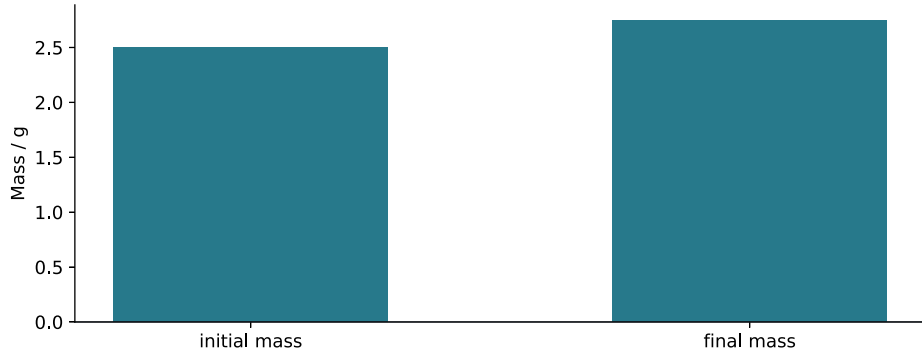
At zero net water movement no water molecules cross the membrane. This claim is false: Blotting removes surface solution. Weighing a wet cylinder without blotting adds liquid that did not enter the cells. Repeats reduce random variation but do not correct a miscalibrated balance.

Osmosis · 5.3

Reasoning

Osmosis and a fair potato experiment: Use percentage change to compare samples with different initial masses. A zero percentage change estimates a solution concentration with no net water movement. This is an estimate from a trend, not proof that water molecules stop moving.

Osmosis · diagram



- Original teaching diagram: Osmosis and a fair potato experiment
- Use the labels and the stated model together.

Osmosis · original transfer

Your turn

Fictional tissue changes are +4% at 0.20 mol/L and -2% at 0.50 mol/L. Estimate the zero-change concentration by local linear interpolation and state its limitation.

Osmosis · transfer reasoning

Method and interpretation

Zero is $\frac{4}{6}$ of the interval: $0.20 + (\frac{4}{6}) \times 0.30 = 0.40$ mol/L. This assumes local linearity and comparable conditions; repeat around the crossing. Zero net mass change does not mean molecules stop moving.

Check yourself

- Explain osmosis using the stated model.
- Explain control variable using the stated model.
- Change one value in the original transfer; explain which assumption still matters.