Active Transport: Worksheet

Cambridge IGCSE Biology 0610 · Syllabus 3.3.1 to 3.3.3 · Pertemuan 11
All concentrations are in arbitrary units

CORE | SUPPLEMENT (Extended)

A Recall: Diffusion and Osmosis — CORE

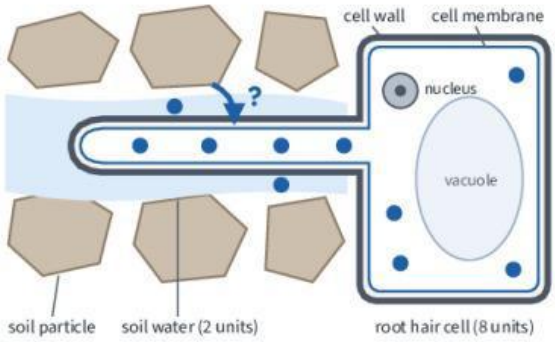
A1 Diffusion is the net movement of particles from _____ concentration to _____ concentration.

A2 Osmosis is the diffusion of _____ through a _____ membrane.

A3 Does the cell supply energy from respiration for diffusion? _____ For osmosis? _____

B The Root Hair Puzzle — CORE

Soil water holds **2 units** of a mineral ion. The root hair cell holds **8 units**. The ions still move **into** the cell. Work through the steps.



Rule: name the particle that moves, then name its gradient.

B1 **Name** the particle that moves: _____

B2 **Compare:** outside _____ units; inside _____ units

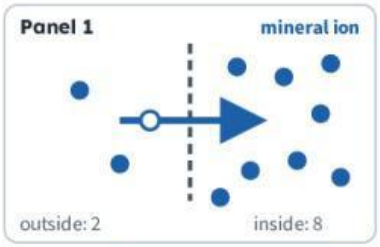
B3 **Decide:** it moved from _____ to _____ concentration, so it moved _____ its gradient.

B4 **Choose:** the process is _____ and the energy comes from _____

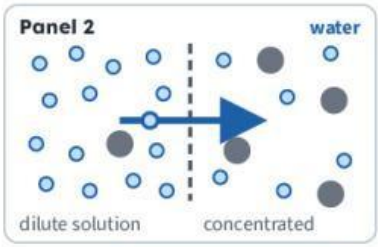
B5 Diffusion would move the ions _____

C Which Process Is It? — CORE

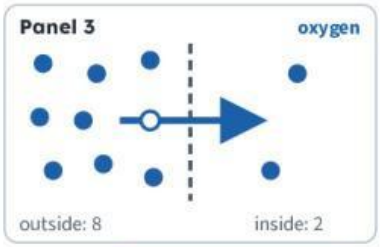
The arrow shows the particle that moves (named top right). Name the process and decide whether the cell must supply energy from respiration. *Options: diffusion / osmosis / active transport; Yes / No*



Process _____
Energy? _____



Process _____
Energy? _____



Process _____
Energy? _____

Key: ● ion or oxygen particle ○ water molecule ● solute molecule ○ on arrow = particle crossing | dashed line = membrane

D Compare the Three Processes — CORE

Feature	Diffusion	Osmosis	Active transport
What moves	Particles, e.g. oxygen		
Direction vs. the gradient	Down the gradient		Against the gradient
Energy from respiration?	No		

LIVEWORKSHEETS

E Problem Bank

CORE

E1 Oxygen is at 20 outside a cell and 5 inside it. Oxygen moves into the cell. Name the process: _____

Is energy from respiration needed? _____ [2]

E2 An ion is at 1 outside a cell and 6 inside it. The ion moves into the cell. Name the process: _____

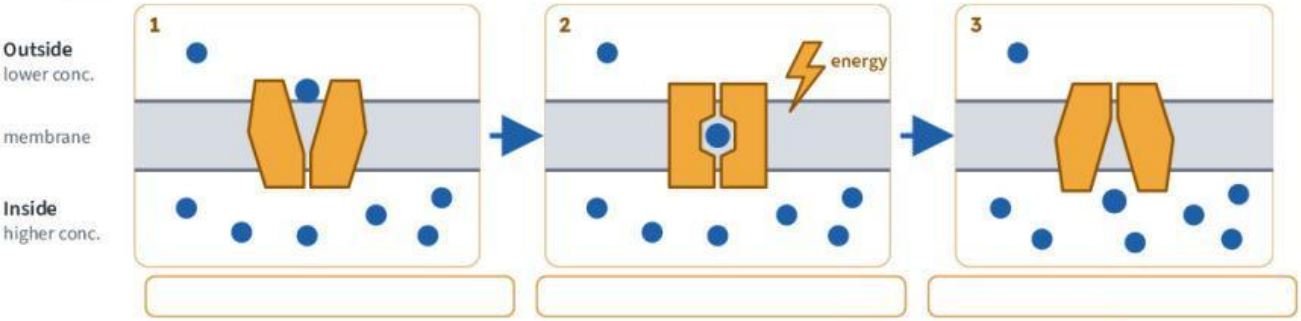
Reason: the ion moves from a _____ concentration (1) to a _____ concentration (6), _____ the gradient. [2]

E3 The energy for active transport comes from _____. Most of it is released in the _____ of the cell. [2]

F How Protein Carriers Work

SUPPLEMENT

The diagram shows one particle being moved across a cell membrane by a protein carrier. Choose the correct caption for each panel. *Options: particle attaches to the carrier / carrier uses energy from respiration and changes shape / particle is released on the higher-concentration side*



_____ | _____ | _____

F1 State what carries particles across the membrane during active transport. _____ [1]

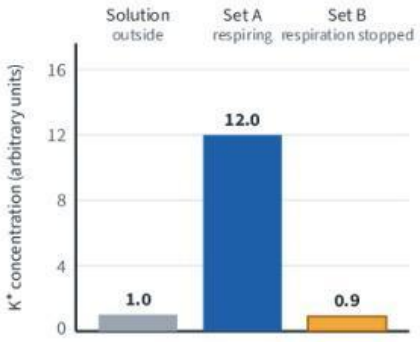
G Why Active Transport Matters: Data Question

SUPPLEMENT

G1 Explain why root hair cells need active transport to take in mineral ions. [3]

_____

A student places two sets of root segments in a solution that holds potassium ions at a concentration of **1.0**. Set A is left as it is. Set B is treated with a chemical that stops respiration. After 24 hours the student measures the potassium ion concentration inside the root cells. (Illustrative data.)



G2 Calculate how many times greater the concentration inside the cells of set A is than the concentration in the solution. Show your working. [1]

_____ = _____ times

G3 Explain why the cells in set A contain a higher concentration of potassium ions than the solution. [2]

_____

G4 Suggest why the cells in set B did not build up a higher concentration than the solution. [2]

_____

LIVEWORKSHEETS