

3 Active transport and plant cells – Part 2

Name: _____ Class: _____ Date: _____

Vocabulary

Write each word three times.

English	Write it 3 times (English)		
Active transport	_____	_____	_____
energy	_____	_____	_____
respiration	_____	_____	_____
carrier protein	_____	_____	_____
root hairs	_____	_____	_____
turgid	_____	_____	_____
flaccid	_____	_____	_____
plasmolysis	_____	_____	_____

Recall

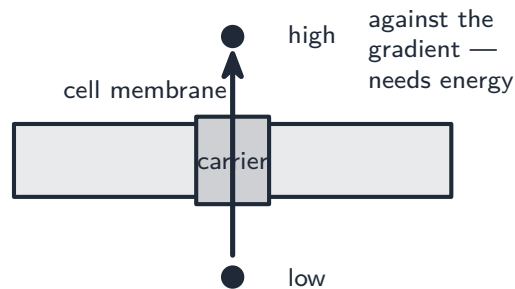
Diffusion and osmosis move particles **down** a gradient and need no energy. But cells sometimes need to move substances the other way.

New ideas

Read these first, then do the Practice.

■ 1 Active transport

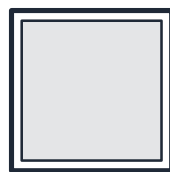
Active transport moves particles through the cell membrane from a **lower** to a **higher** concentration – **against** the gradient. Because it is “uphill”, it needs **energy** from **respiration**, and a **carrier protein**.



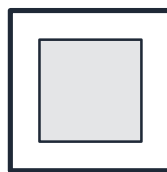
For example, **root hairs** take up mineral ions from the soil this way.

■ 2 Osmosis and plant cells

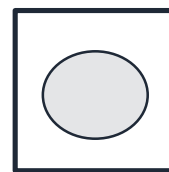
Water entering or leaving a plant cell changes how firm it is:



turgid
(firm)



flaccid
(soft)



plasmolysed

- in water, cells take in water and become **turgid** (firm) – this supports the plant;
- in a concentrated solution, cells lose water and become **flaccid** (soft);
- if much more water leaves, the membrane pulls away from the wall – **plasmolysis**.

■ 3 Comparing the three

Process	Direction	Needs energy?
diffusion	high → low	no
osmosis	water, dilute → concentrated	no
active transport	low → high (against)	yes

Watch out: **active transport** moves particles *against* the gradient (low → high) and **needs energy** from respiration – diffusion and osmosis are passive and need

none. A cell in pure water becomes **turgid** (firm), not flaccid.

Practice

Try these in order.

3.6 How is active transport different from diffusion? [2]

3.7 Where does the energy for active transport come from? [1]

3.8 Give one example of active transport in a plant. [1]

3.9 A plant cell is put in pure water. Will it become turgid or flaccid? [1]

3.10 Which of the three processes moves **water only**? [1]

3.11 Challenge. Root cells take in mineral ions even when the soil has a *lower* ion concentration than the cells. Name the process they use, and explain why it needs energy. [3]