Higher Tier — Separate Science

Full Higher Separate content. ★ = Higher Tier. ◆ = Separate Science only.

Q1. Define diffusion and state whether energy is required.

[2 marks]

Q2. A red blood cell is placed in distilled water. Predict and explain what happens.

[3 marks]

Q3. Explain why active transport is needed in root hair cells to absorb mineral ions.

[3 marks]

★ HIGHER TIER

Q4. ★ Explain why large multicellular organisms need specialised transport systems.

[2 marks]

Total: 10 marks

on and Osmosis (1.7–1.9)

Q1 (2 marks)

Define diffusion and state whether energy is required.

- Net movement from high to low concentration (down concentration gradient) [1]
- Passive — no energy required [1]

Q2 (3 marks)

A red blood cell is placed in distilled water. Predict and explain what happens.

- Water moves into cell by osmosis [1]
- Distilled water has higher water potential than inside cell [1]
- Cell swells and bursts (lyses) — no cell wall to resist pressure [1]

Q3 (3 marks)

Explain why active transport is needed in root hair cells to absorb mineral ions.

- Mineral ion concentration often LOWER in soil than in root cells [1]
- Diffusion would move ions OUT of root [1]
- Active transport uses ATP and carrier proteins to move ions against the gradient [1]

Q4 (2 marks) [★ HT]

★ Explain why large multicellular organisms need specialised transport systems.

- SA:V ratio decreases with increasing size — diffusion too slow for internal cells [1]
- Transport systems deliver O■, glucose and remove CO■ quickly to all cells [1]