*This is the **Higher Combined** version — includes Higher Tier content. Some Separate-only details are omitted.*

Substances move across cell membranes by diffusion, osmosis or active transport, depending on the direction and type of substance.

Required Practical: Investigating osmosis in plant tissue (potato cylinders in different concentrations).

- Diffusion: passive, any substance, from HIGH to LOW concentration
- Osmosis: passive, water only, from high to low WATER POTENTIAL through partially permeable membrane
- Active transport: against concentration gradient, requires ATP and carrier proteins
- Turgid plant cell: water absorbed → vacuole swells → firm. Plasmolysed: water lost → limp
- Root hair cells: minerals absorbed by active transport; water by osmosis

Key Terms

Diffusion	Passive movement from high to low concentration — no energy needed
Osmosis	Diffusion of water through partially permeable membrane from high to low water potential
Active transport	Movement against concentration gradient — requires ATP

■ **Exam Tip:** Osmosis = WATER ONLY. Always specify: partially permeable membrane. From HIGH water potential (dilute) to LOW water potential (concentrated).