B2: Scaling Up

OCR Gateway · GCSE Biology · Revision Notes

Specification reference: B2a–B2b

Note: Sections marked ★ HIGHER TIER ONLY are for Higher tier students only. Foundation tier students should focus on the unmarked sections.

B2a The Circulatory System

Multicellular organisms need transport systems because diffusion alone is too slow over long distances.

- The heart is a double pump: right side pumps blood to lungs; left side pumps oxygenated blood to body.
- **Arteries** — thick walls, carry blood away from heart at high pressure.
- **Veins** — thinner walls, have valves, carry blood to heart at low pressure.
- **Capillaries** — one cell thick; exchange of O2, CO2, glucose and waste with tissues.
- **Red blood cells** — no nucleus; carry oxygen using haemoglobin.
- **White blood cells** — fight infection (phagocytes and lymphocytes).
- **Plasma** — liquid; transports hormones, CO2, urea and digested food.
- **Platelets** — help blood clot.

Key Terms

Double circulation: Two separate loops: one to lungs, one to body

Coronary arteries: Supply blood to the heart muscle itself

Exam Tip: The LEFT side of the heart pumps oxygenated blood. It has thicker walls because it pumps blood all the way around the body.

B2b Transport Systems in Plants

Plants have two transport tissues: xylem (water and minerals) and phloem (sugars).

- **Xylem** — carries water and dissolved minerals from roots to leaves (transpiration stream). Dead cells with no cytoplasm; lignified cell walls.
- **Phloem** — transports dissolved sugars (sucrose) from leaves to all parts of the plant (translocation). Living cells.
- **Transpiration** — loss of water vapour from leaves through stomata. Pulls water up the xylem.
- Rate of transpiration increases with: higher temperature, lower humidity, higher wind speed, more light (stomata open wider).

Required Practical 3: Investigating factors affecting the rate of water uptake by a plant (using a potometer).

Osmosis in plant roots: water enters root hair cells by osmosis (soil water potential is higher than inside root cells). Mineral ions are absorbed by active transport.