

B4: Community-Level Systems

OCR Gateway · GCSE Biology · Revision Notes
Specification reference: B4a–B4c

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

B4a Ecosystems and Habitats

An ecosystem is a community of organisms and the non-living environment. Populations are affected by biotic and abiotic factors.

- **Biotic factors:** predation, competition, disease, food availability.
- **Abiotic factors:** temperature, light, pH, water availability, minerals.
- Predator-prey cycles: as prey increases, predators increase; predators then reduce prey numbers, causing predator numbers to fall.

Key Terms

Ecosystem: A community of organisms plus their non-living environment

Biodiversity: The variety of different species in an ecosystem

B4b Feeding Relationships

Food chains and webs show the flow of energy through an ecosystem.

- Producers (plants/algae) convert light energy into chemical energy.
- Energy is transferred along the food chain when organisms eat one another.
- Energy is lost at each step through respiration, heat and excretion.
- Pyramids of biomass show mass of living material at each trophic level.

Exam Tip: Only about 10% of energy is transferred from one trophic level to the next. The rest is lost as heat, waste and in respiration.

B4c Cycling Materials

Matter cycles through ecosystems and is never lost — it is recycled.

Carbon Cycle: CO₂ fixed by photosynthesis → used by plants → eaten by animals → returned by respiration, decomposition, combustion.

Water Cycle: evaporation and transpiration → condensation into clouds → precipitation → rivers and groundwater → sea.

Nitrogen Cycle: nitrogen in air → fixed by nitrogen-fixing bacteria → absorbed by plants → eaten by animals → returned as ammonia by decomposers → converted by nitrifying bacteria to nitrates → denitrifying bacteria return N₂ to air.

- Decomposers (bacteria and fungi) break down dead matter and return minerals to soil.
- Human activities disrupt cycles: burning fossil fuels increases CO₂; deforestation removes carbon sinks.