

Topic 7: Ecology

AQA GCSE Biology 8461 · spec 4.7 · sheets 7.1–7.4

Ecology in one view

- The Sun's energy flows through ecosystems; carbon and water cycle round.
- Communities compete and depend on each other; adaptations fit species to conditions.
- Human activity threatens biodiversity — and biology-only trophic levels explain dinner.

Communities and competition

- Levels — individual, population, community, ecosystem.
- Plants compete — light, space, water, mineral ions.
- Animals compete — food, mates, territory.

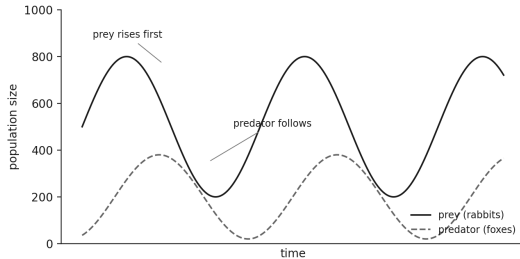
Abiotic and biotic factors

- Abiotic — light, temperature, moisture, soil pH, wind, CO₂, oxygen.
- Biotic — food, new predators, pathogens, outcompeting species.
- Interdependence — removing one species affects the whole community.

Adaptations and extremophiles

- Structural — shape; behavioural — actions; functional — internal processes.
- Extremophiles live at extreme temperature, pressure or salt.
- Deep-sea vent bacteria are the named example.

Food chains and predator-prey cycles

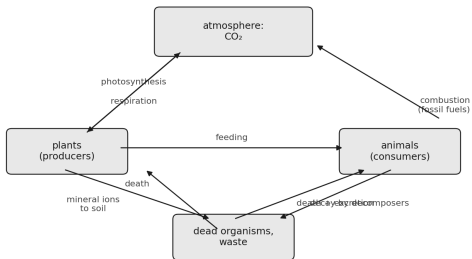


- Producer, primary, secondary, tertiary consumers.
- Prey rise first, predator follows, both oscillate.
- Photosynthetic organisms are Earth's biomass producers.

RP9 sampling

- Quadrats for abundance, transects for distribution.
- Mean, mode and median of the counts.
- Scales chosen before the graph is drawn.

Carbon and water cycles



- Photosynthesis takes in CO₂; respiration and decay return it.
- Decomposers return mineral ions to the soil.
- Water — continuous evaporation and precipitation.

Decay and biogas

- Biology only — temperature, water, oxygen set the decay rate.
- Compost — optimum conditions for rapid decay.
- Anaerobic decay makes methane — biogas generators.

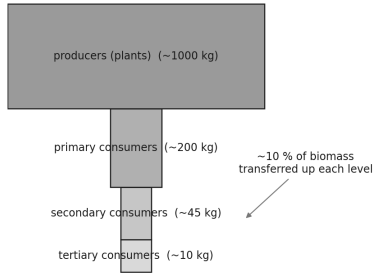
Biodiversity under threat

- Biodiversity — the variety of species — stabilises ecosystems.
- Threats — waste and pollution, land use, deforestation, global warming.
- Peat bogs — habitat lost and CO₂ released, twice the damage.

Maintaining biodiversity

- Breeding programmes and rare-habitat regeneration.
- Field margins and hedgerows back in single-crop land.
- Less deforestation and CO₂; recycling over landfill.

Trophic levels and the 10 percent rule



- Levels — producers, primary, secondary, tertiary; apex predators; decomposers.
- Only about 10 percent of biomass passes up each level.
- Lost — faeces, respiration, urine; producers store ~1 percent of sunlight.

Food security and farming

- Threats — birth rate, diets, pests, environment, input costs, conflict.
- Farming — limit movement, control temperature, high-protein feed.
- Fisheries — net size and quotas keep breeding stocks.

Biotechnology at the table

- Fusarium on glucose syrup, aerobic — mycoprotein.
- GM bacteria — insulin; GM crops — golden rice.
- Biotechnology answers the growing population's demand.

Check yourself

- Checklist before you call this topic done.
- Competition lists, factor lists, three adaptations, extremophiles.
- Cycles drawn, RP9 statistics, the 10 percent calculation, six threats to food security.