

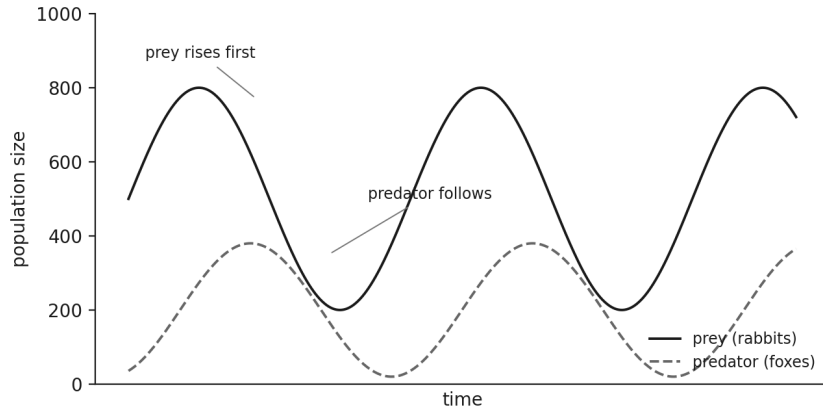
Exercise walk-through

7.2

Organisation of an ecosystem and material cycles (4.7.2, RP9/RP10)

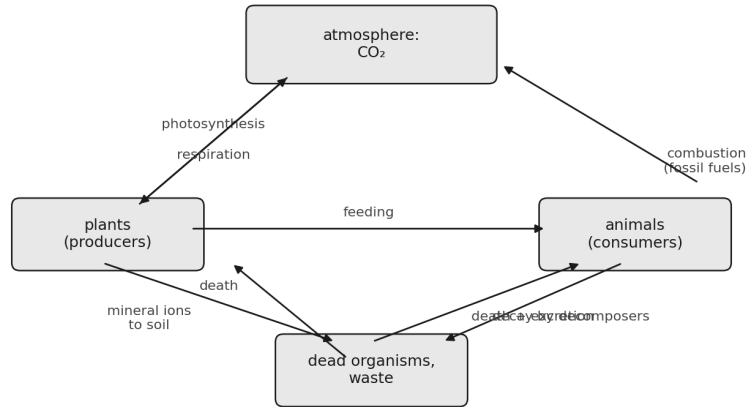
AQA · GCSE · Biology

Food chains and predator-prey cycles



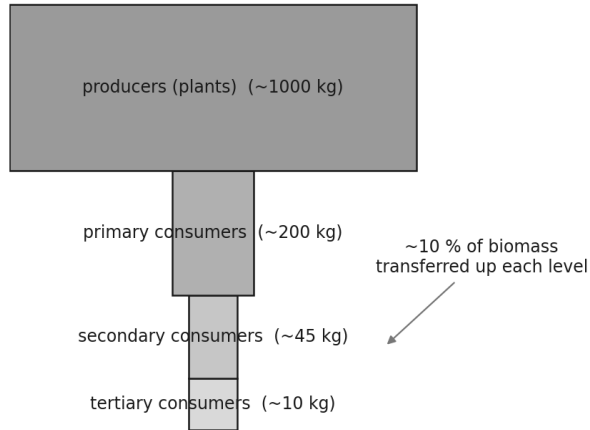
- Producer, primary, secondary, tertiary consumers.
- Prey rise first, predator follows, both oscillate.
- Photosynthetic organisms are Earth's biomass producers.

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.

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.

Exercises 2.1·2.3

2.1 Name the organism at the start of every food chain and what it produces. [2]

2.2 In RP9, five quadrats give counts 4, 6, 6, 8, 11. Give the mean, mode and median. [3]

2.3 (*HT*) Name the gas produced by anaerobic decay and one use. [2]

Exercises 2.1·2.3

2.1 Name the organism at the start of every food chain and what it produces. [2]

2.1 A producer (green plant/alga); it makes glucose by photosynthesis.

2.2 In RP9, five quadrats give counts 4, 6, 6, 8, 11. Give the mean, mode and median. [3]

2.2 Mean = 7; mode = 6; median = 6.

2.3 (*HT*) Name the gas produced by anaerobic decay and one use. [2]

2.3 Methane; fuel – burned in biogas generators for heating/electricity.

Exercises 3.1·3.2

3.1 Explain, in sequence, why predator and prey populations cycle out of phase. [4]

3.2 Describe how a student would investigate the effect of light intensity on the distribution of a plant species using a transect. [5]

Exercises 3.1·3.2

3.1 Explain, in sequence, why predator and prey populations cycle out of phase. [4]

3.1 Prey abundant → predators find food easily, so more survive and reproduce, and predator numbers rise; more prey are eaten, so prey numbers fall; food is now scarce, so predator numbers fall; with fewer predators, prey recover – so the cycles continue out of phase.

3.2 Describe how a student would investigate the effect of light intensity on the distribution of a plant species using a transect. [5]

3.2 Lay a tape/transect line from shade (e.g. under a tree) into open light; place a quadrat at regular intervals, e.g. every 2 m, along it; count the plants (or estimate % cover) in each quadrat; measure the light intensity at each point with a light meter; repeat and take means, then relate abundance to light intensity.

Exercise 3.3

3.3 (*HT*) A gardener wants rapid decay of vegetable waste into compost. Explain three conditions he should provide. [4]

Exercise 3.3

3.3 (*HT*) A gardener wants rapid decay of vegetable waste into compost. Explain three conditions he should provide. [4]

3.3 Oxygen – turning the heap aerates it so aerobic decomposers respire and multiply quickly; water – moist (not waterlogged) conditions keep decomposers active; warmth – a higher temperature towards the enzyme optimum speeds their respiration and growth; accept shredding to increase surface area (any three, 1 mark each plus one for a linked explanation).