*This is the **Higher Separate** version — includes all Higher Tier content (marked ★) and all Separate Science content.*

Food chains and webs show the flow of energy through an ecosystem. Energy is lost at each step, limiting the length of food chains.

- Producer: organism that makes its own food by photosynthesis (plants, algae). Always the start of a food chain.
- Consumer: organism that gets energy by eating other organisms. Primary (herbivore), secondary, tertiary consumers.
- Arrow in food chain: shows direction of energy transfer (from food TO consumer). E.g. grass → rabbit → fox.
- Apex predator: top of the food chain — not eaten by any other organism.
- Only ~10% of energy transfers to the next trophic level. Rest is lost through: respiration (heat), movement, undigested waste.
- This limits food chain length to typically 4-5 organisms — too little energy remains for more levels.
- Trophic levels: level 1 = producers; level 2 = primary consumers; level 3 = secondary consumers, etc.
- ★ **HT** Pyramid of biomass: represents dry mass of organisms at each trophic level. Always widest at the base. Never inverted.
- ★ **HT** Biomass efficiency: efficiency (%) = (biomass of next level ÷ biomass of previous level) × 100. Typically ~10%.

Key Terms

Producer	Organism making food by photosynthesis — base of all food chains
Consumer	Organism that eats other organisms to get energy
Trophic level	A feeding level in a food chain — producers are level 1
Pyramid of biomass	Diagram showing dry mass of organisms at each trophic level — always widest at base
Biomass	The total dry mass of living material at a trophic level

■ **Exam Tip:** ~10% energy transfer is a key fact. Always give the REASON why energy is lost: respiration (heat), movement, undigested waste. Pyramids of BIOMASS are always pyramid-shaped — pyramids of numbers can be inverted (e.g. one tree with many insects).