Chapter 16: Organising an ecosystem

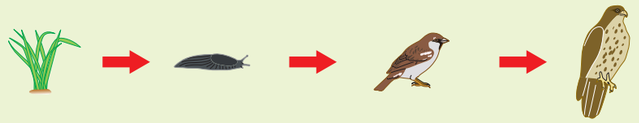
Knowledge organiser

Levels of organisation

Feeding relationships within a community can be represented by **food chains**.

Photosynthetic organisms that synthesise molecules are the producers of all **biomass** for life on Earth, and so are the first step in all food chains.

A range of experimental methods using transects and quadrats are used by ecologists to determine the distributions and abundances of different species in an ecosystem.



all food chains begin with a **producer**, for example, a green plant or alga producing glucose through photosynthesis

slugs are **primary consumers** – they are **herbivores** that eat producers

sparrows are **secondary consumers** – they are **carnivores** that eat primary consumers

hawks are **tertiary consumers** – they are carnivores that eat secondary consumers

Consumers that kill and eat other animals are predators, and those that are eaten are **prey**.

Apex **predators** are carnivores with no predators.

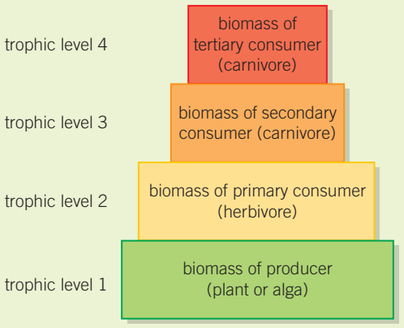
Organisms usually have more complex feeding relationships, with more than one predator or more than one food source. These can be shown in a **food web**.

Pyramids of biomass

The **trophic level** of an organism is the number of steps it is from the start of its food chain.

Pyramids of biomass represent the relative amount of biomass at each trophic level of a food chain.

Biomass is the amount of living or recently dead biological matter in an area. Biomass is transferred from each trophic level to the level above it in the food chain.



Producers transfer about 1% of the incident light energy used for photosynthesis to produce biomass.

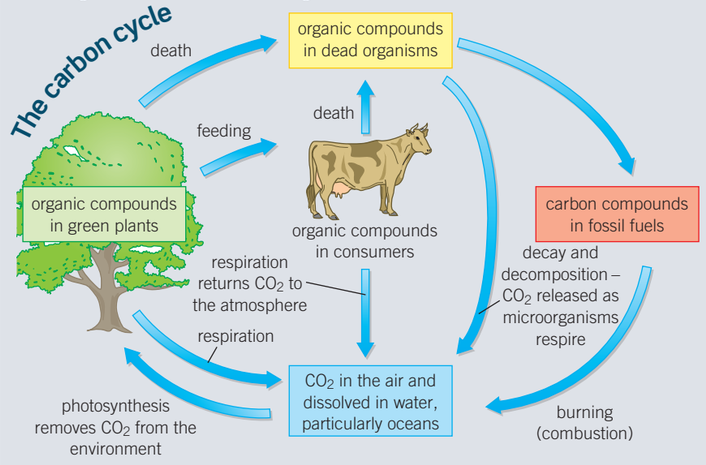
Approximately 10% of the biomass from each trophic level is transferred to the level above it.

This loss of biomass moving up the food chain is due to several factors:

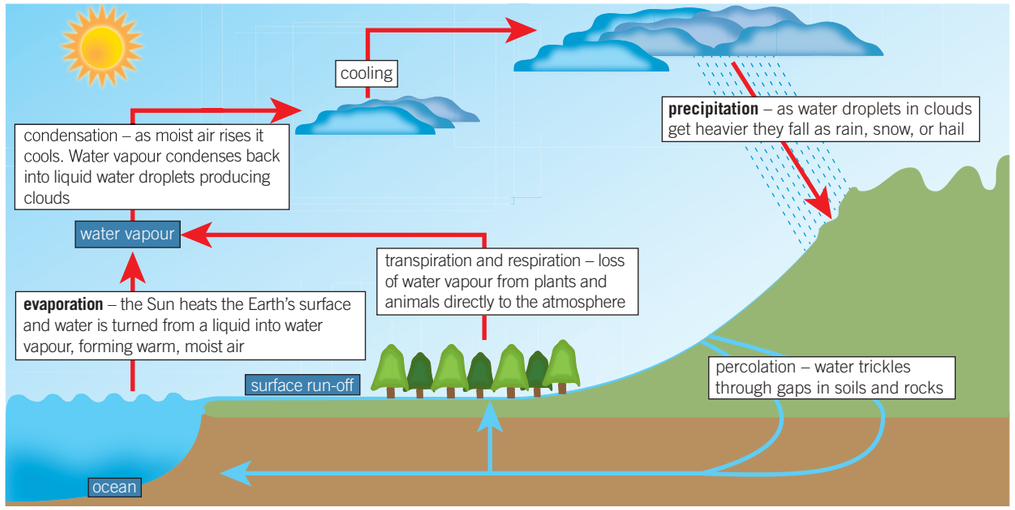
- use in life processes, such as respiration
- not all of the matter eaten is digested, some is egested as waste products
- some absorbed material is lost as waste
- energy is used in movement and to keep animals warm.

How materials are cycled

All materials in the living world are recycled, which provides the building materials for future organisms.



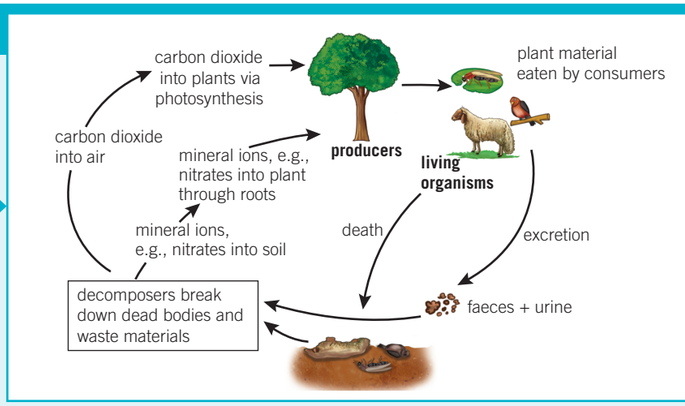
The water cycle



Decomposition

Decomposers, such as bacteria and fungi, break down dead plant and animal matter by secreting enzymes into the environment. The small soluble food molecules produced then diffuse into the decomposer.

These materials are cycled through an ecosystem by decomposers returning carbon to the atmosphere as carbon dioxide and mineral ions to the soil.



Key terms

Make sure you can write a definition for these key terms.

biomass *carbon cycle* *carnivore* *consumer* *decomposer* *evaporation* *fertiliser* *food chain* *food web* *herbivore* *precipitation* *predator* *prey* *producer* *trophic level* *water cycle*

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Retrieval questions

Learn the answers to the questions below then cover the answers column with a piece of paper and write as many as you can. Check and repeat.

	B16 questions	Answers
1	What is a producer?	organism that makes its own food, usually by photosynthesis
2	What is a food chain?	representation of the feeding relationships within a community
3	What is a consumer?	organism that eats other organisms for food
4	What is a herbivore?	organism that only eats producers (plants/algae)
5	What is a predator?	organism that kills and eats other organisms
6	What is a prey organism?	organism that is killed and eaten by another organism
7	What is an apex predator?	carnivore with no predators
8	What proportion of biomass is transferred from each trophic level to the one above?	approximately 10%
9	Why is biomass lost between trophic levels?	• some ingested material is egested • some material is lost as waste (carbon dioxide and water in respiration, water and urea in urine) • used in life processes, such as respiration • energy is used in movement and to keep animals warm
10	What is the carbon cycle?	process that returns carbon from organisms to the atmosphere as carbon dioxide, which can then be used by plants
11	What is the water cycle?	process that provides fresh water for plants and animals on land before draining into seas and rivers

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