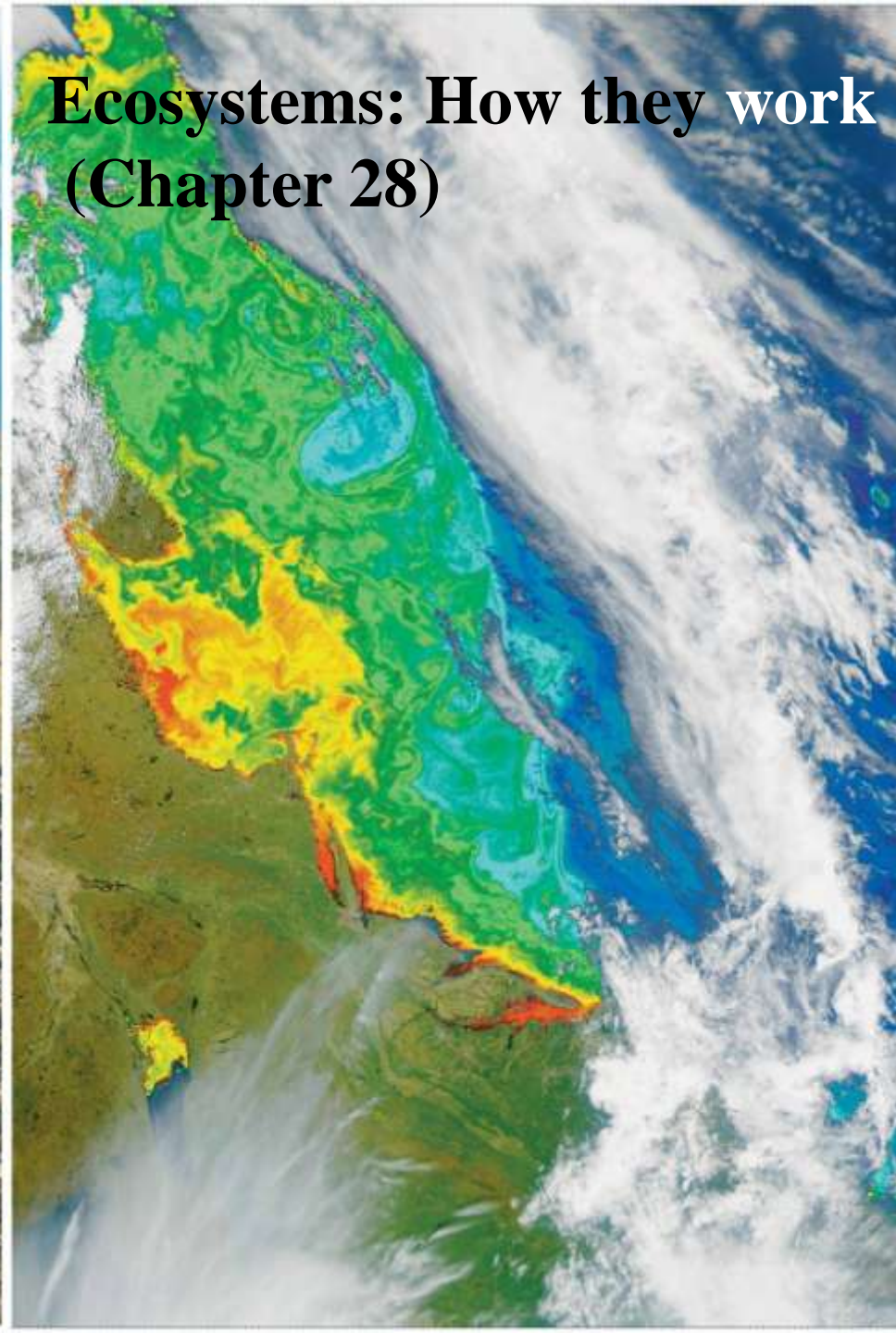


Ecosystems: What they are (Chapter 28)



Ecosystems: How they work (Chapter 28)



Ecosystems:

- Interactions among organisms with their environment
Niche – is the specific role an organism plays in its environment

Pyramid of energy –

- Energy is not recycled
- Energy transfer between trophic levels is not 100% efficient

Energy transfer between trophic levels is not 100% efficient

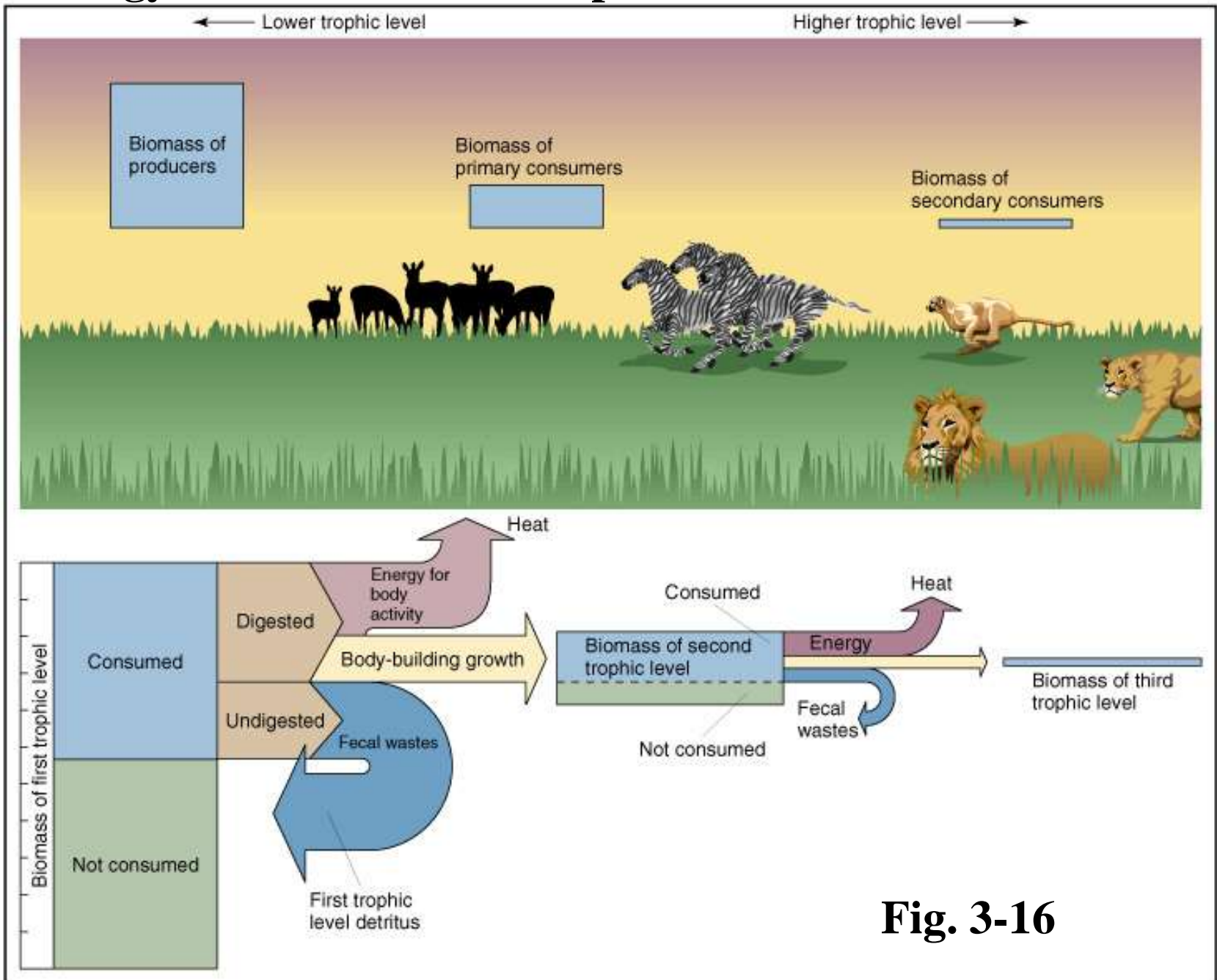


Fig. 3-16

Pyramids and biomass

- Because of energy loss there are more herbivores and then

A food pyramid

- has different levels and it is a pyramid because of energy loss
 - Producer
 - First order consumer (herbivores)
 - Second order consumer (Carnivores, Omnivores)
 - Third order consumer (carnivores, omnivores)
 - first order consumer
 - second order consumer
 - third order consumer
 - Symbiotic feeding relationships... Symbiosis ('living together')
 - Mutualism (+, +)
 - Parasitism (+, -)
 - Commensalism (+, 0)



Fig. 2-11. Trophic categories.

Autotrophs

Make their own organic matter from inorganic nutrients and an environmental energy source

Heterotrophs

Must feed on organic matter for energy

Producers

Photosynthetic green plants: use chlorophyll to absorb light energy

Photosynthetic bacteria: use purple pigment to absorb light energy

Chemosynthetic bacteria: use high-energy inorganic chemicals such as hydrogen sulfide

Consumers

Primary consumers/herbivores: animals that feed exclusively on plants

Omnivores: animals that feed on both plants and animals

Secondary consumers/carnivores: animals that feed on primary consumers

Higher orders of consumers/carnivores: animals that feed on other carnivores

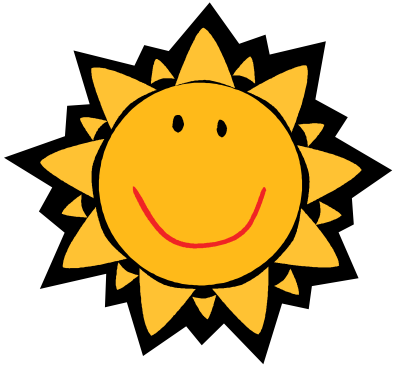
Parasites: plants or animals that become associated with another plant or animal and feed on it over an extended period of time

Detritus feeders and decomposers: organisms that feed on dead organic material

Decomposers: fungi and bacteria that cause rotting

Primary detritus feeders: organisms that feed directly on detritus

Secondary and higher orders of detritus feeders: feed on primary detritus feeders



Producers

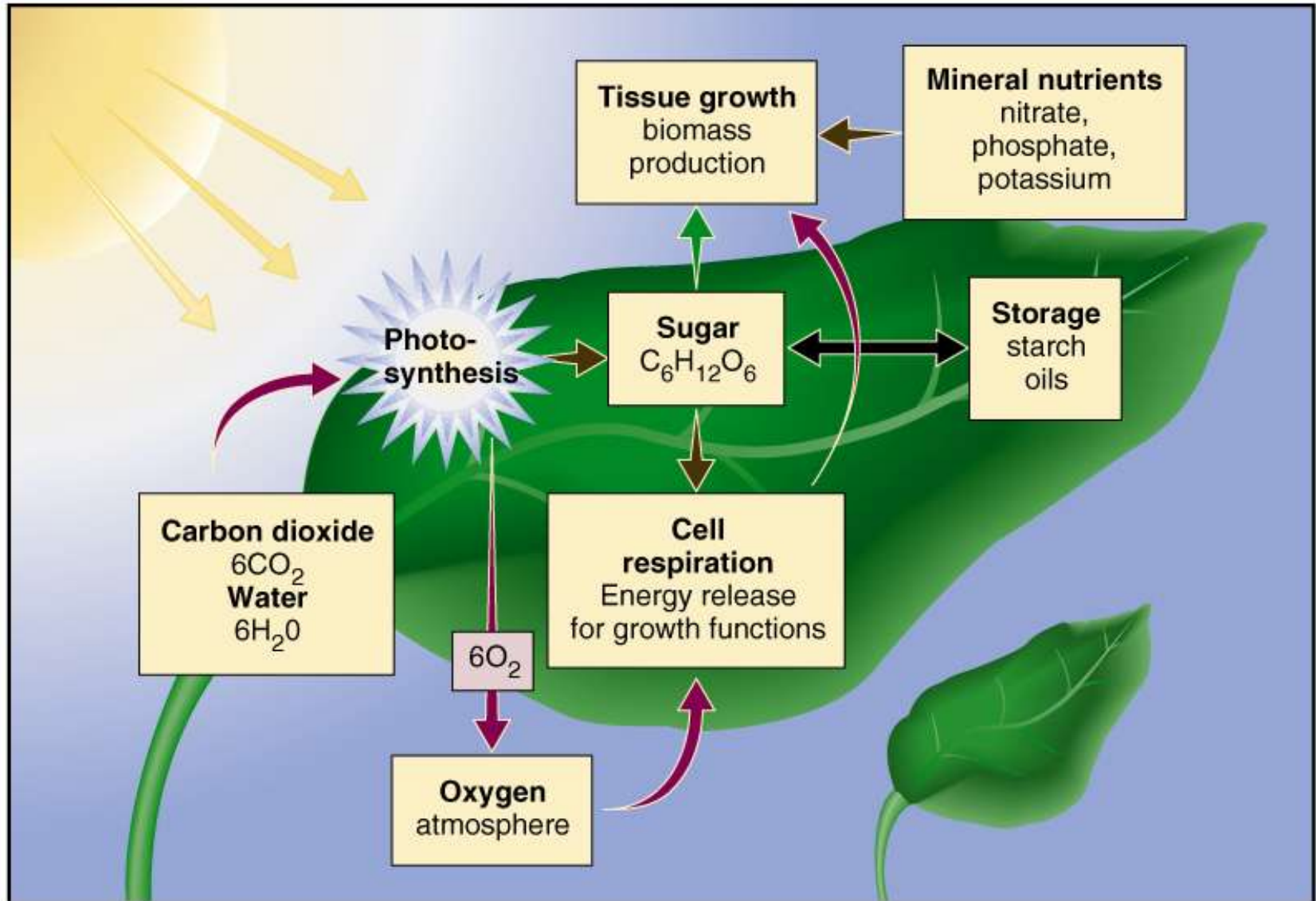
Herbivores



Decomposers

Producers as chemical factories.

Energy changes in organisms and ecosystems



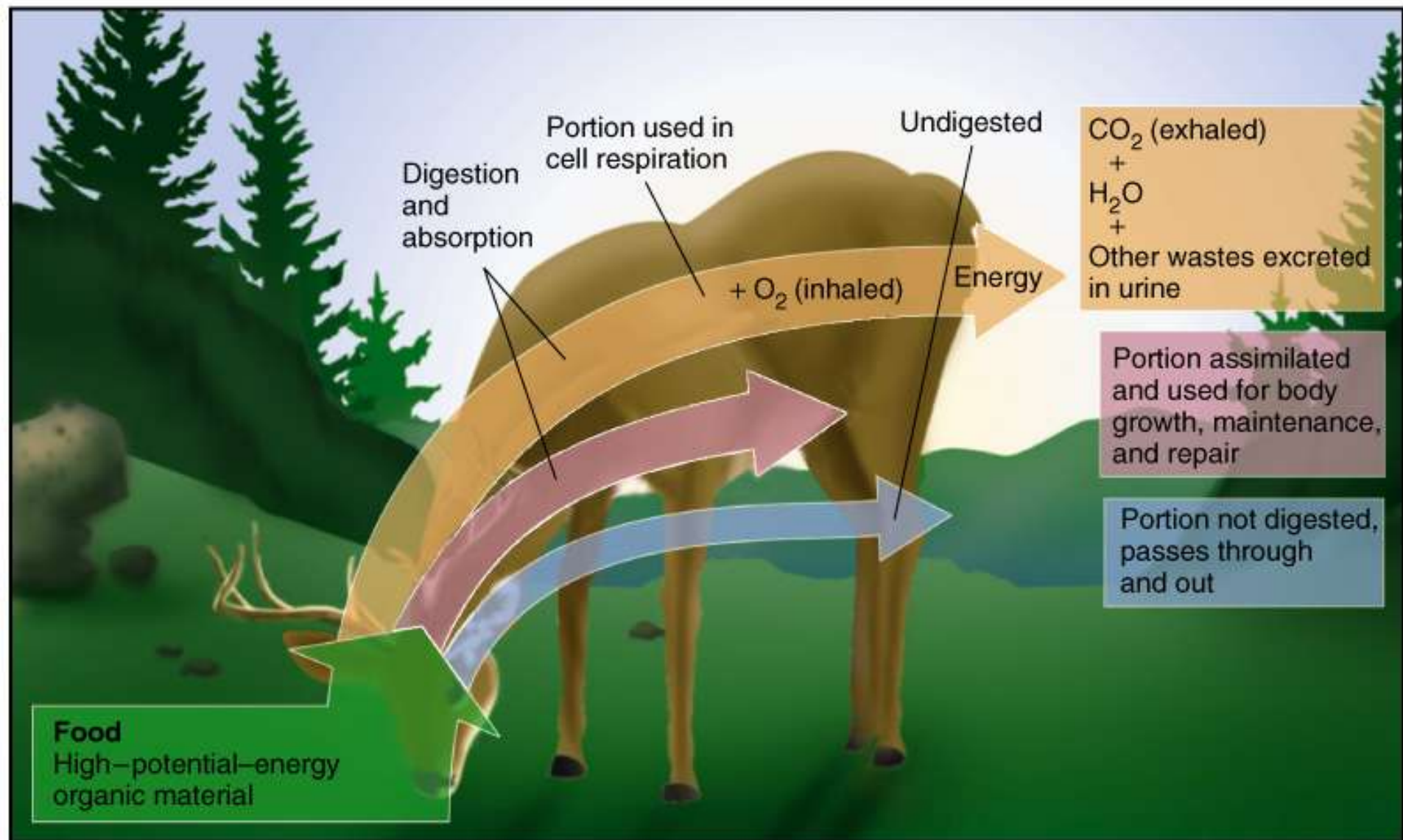


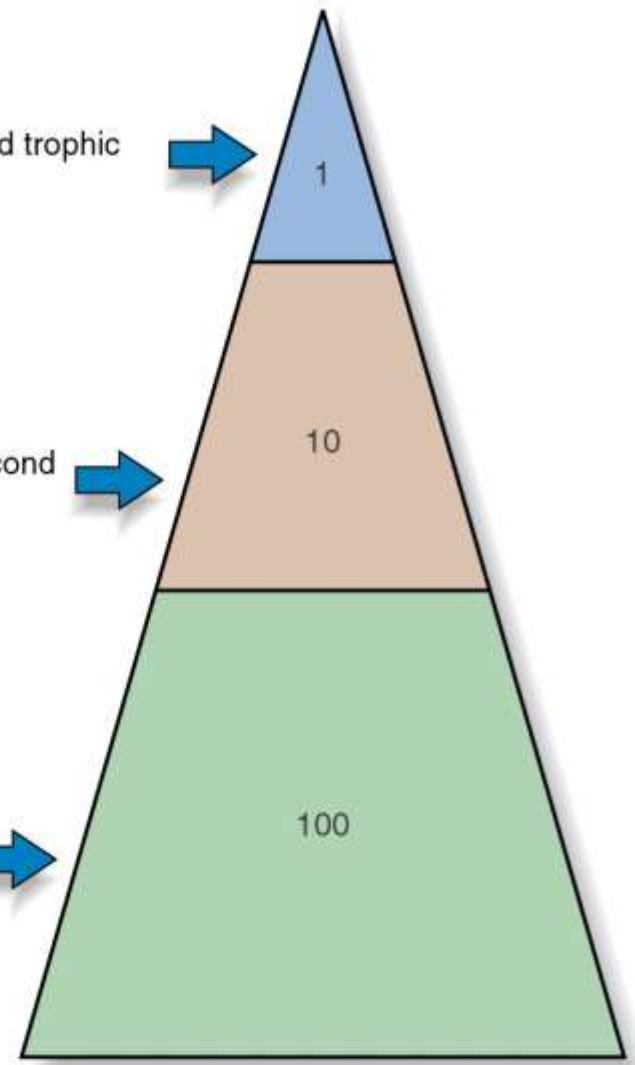
Fig. 3-13. Only a small portion of food ingested by a consumer is assimilated into body growth, maintenance and repair.



→ Total combined mass of all carnivores = Biomass of third trophic level →

→ Total combined mass of all herbivores = Biomass of second trophic level →

→ Total combined mass of all producers = Biomass of first trophic level →



Segments of pyramid show relative biomass at each trophic level

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Fig. 2-13. Biomass pyramid. A graphic representation of the biomass (the combined mass of all organisms) at successive trophic levels has the form of a pyramid.

Food chain

- is the transfer of mater and energy through an ecosystem

Food Chains vs. Food Webs

- Chain shows what feeds on what a web shows all of the possible feeding relationships
- Food Web - Energy Flow and Matter Cycling in Ecosystems...
- Cycles in the ecosystem
- The passage of energy and living matter
- Matter is recycled

Trophic structure of ecosystems

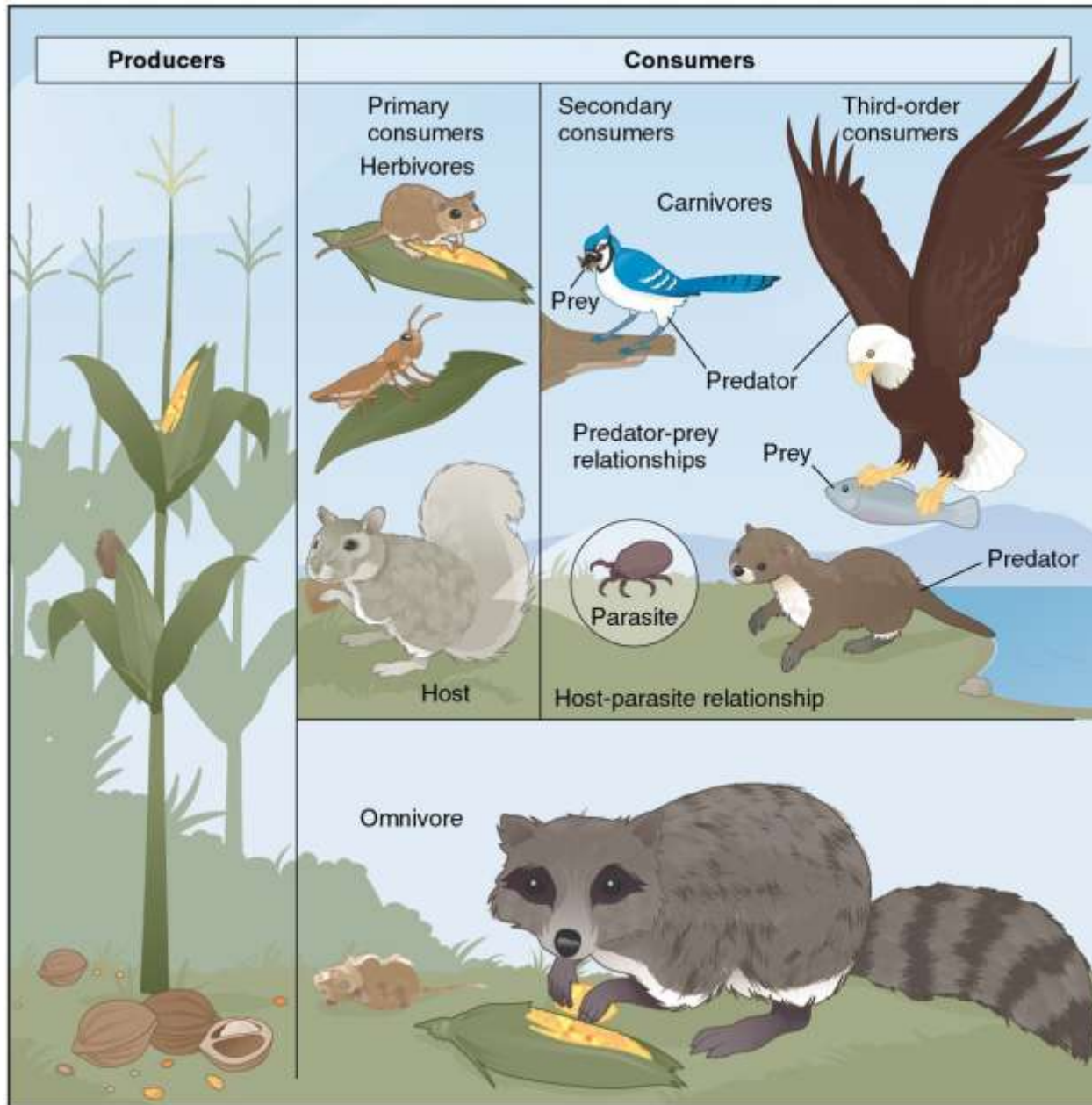


Fig 2-9

Terrestrial food web

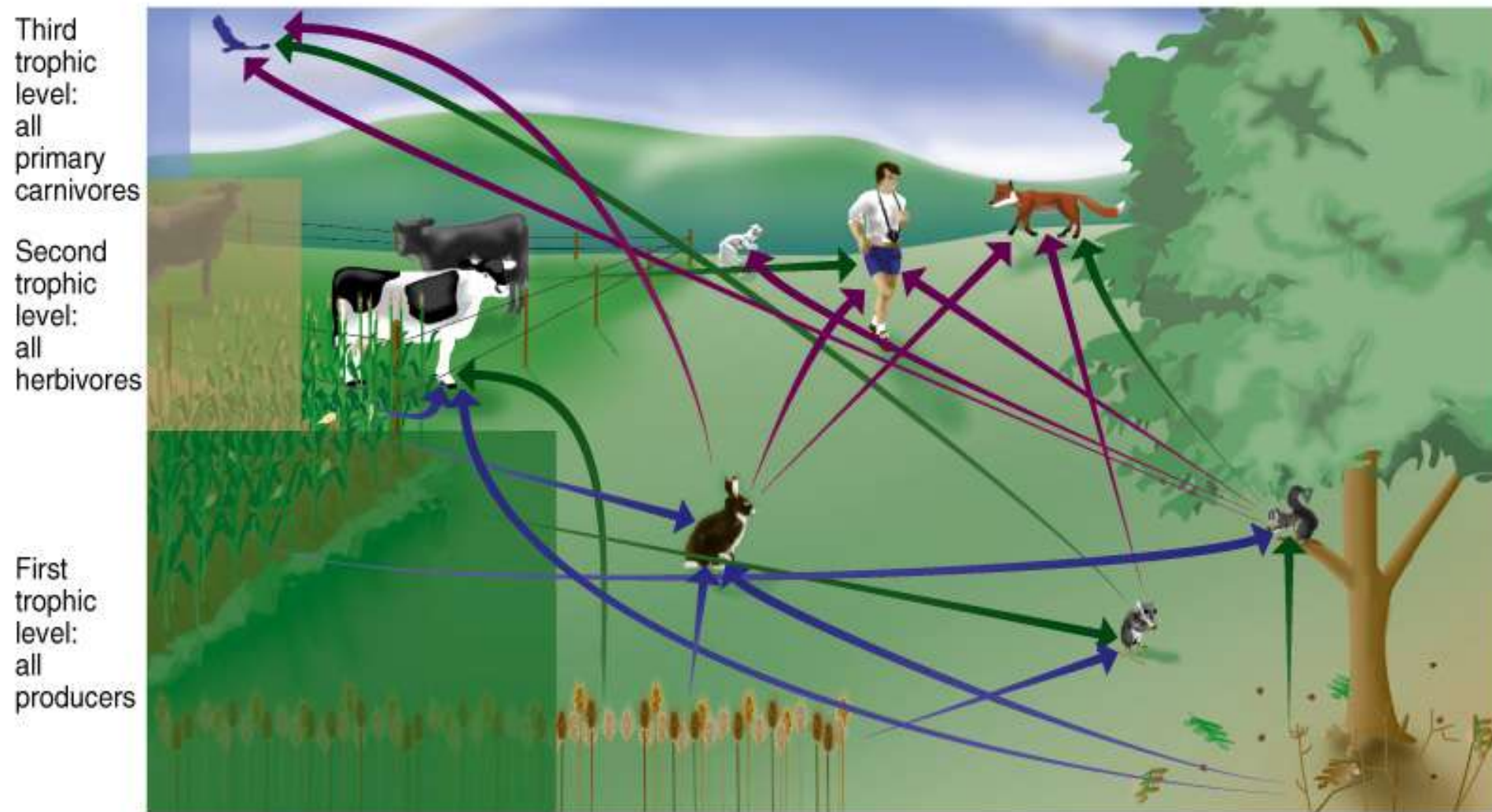
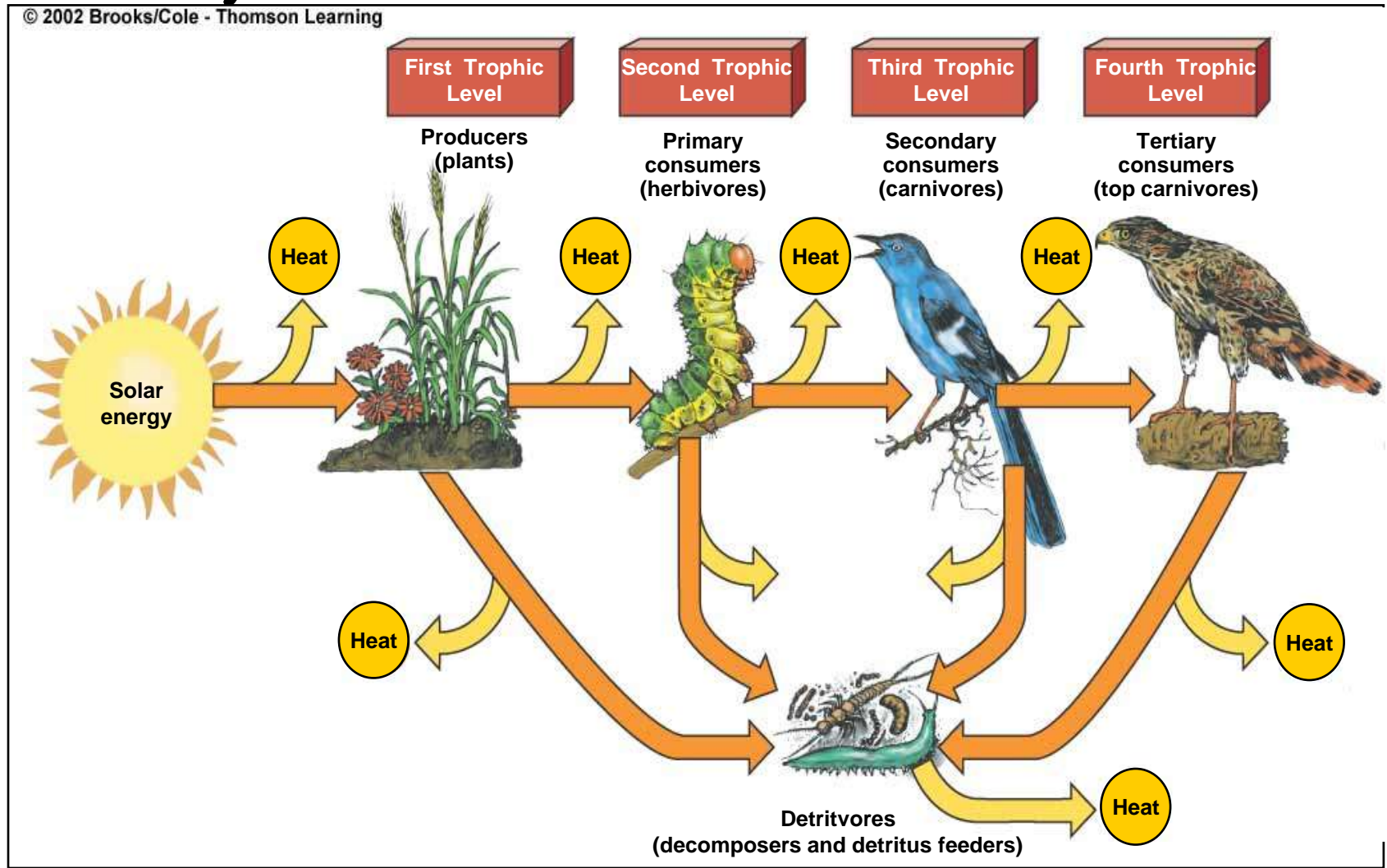


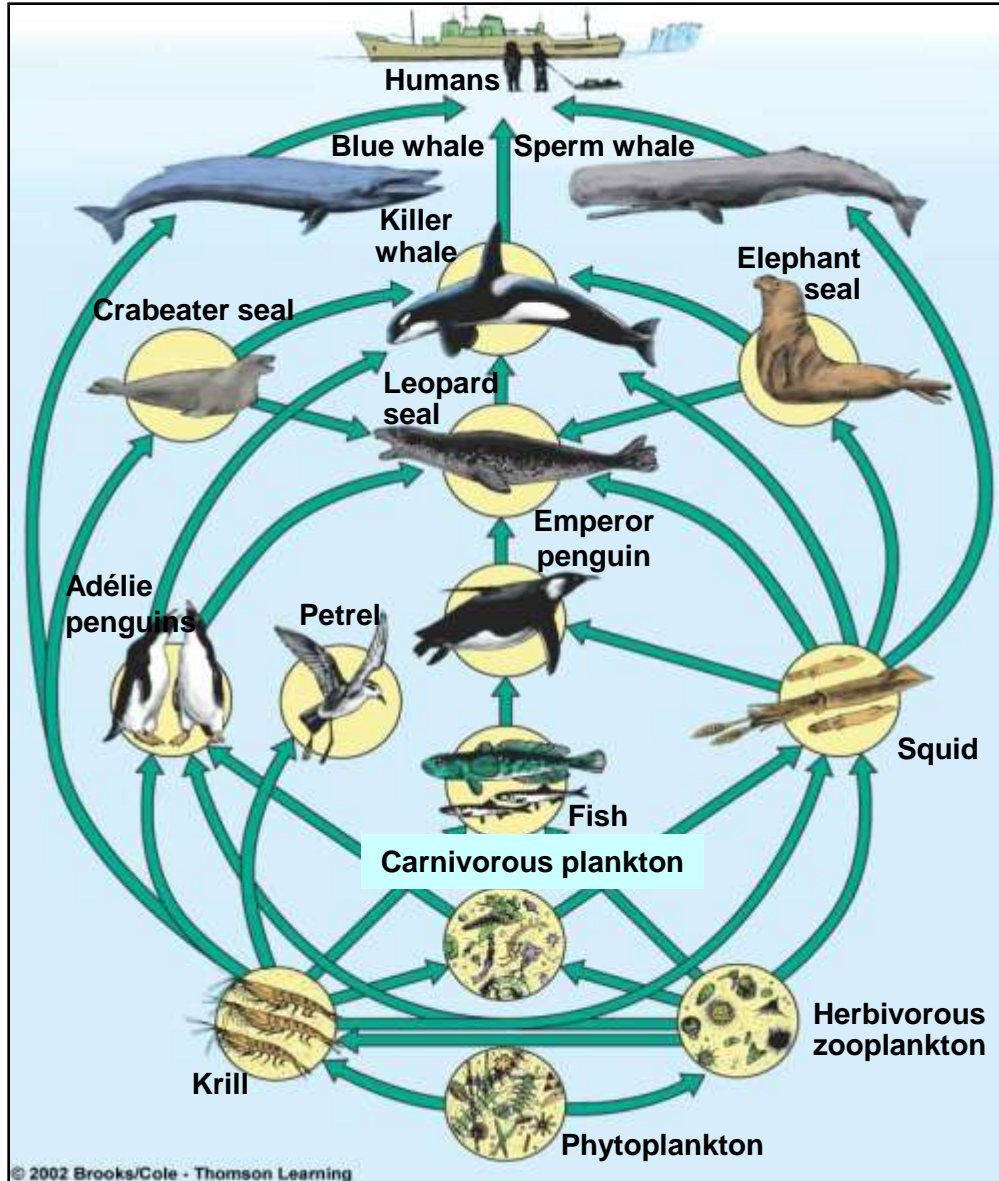
Fig 2-12a

Energy Flow and Matter Cycling in Ecosystems...

- There is little if no matter waste in natural ecosystems!



Generalized Food Web of the Antarctic



Note:
Arrows
Go in direction
Of energy
flow...

Fig. 4.18, p. 77

Food web in the offshore Beaufort Sea in spring

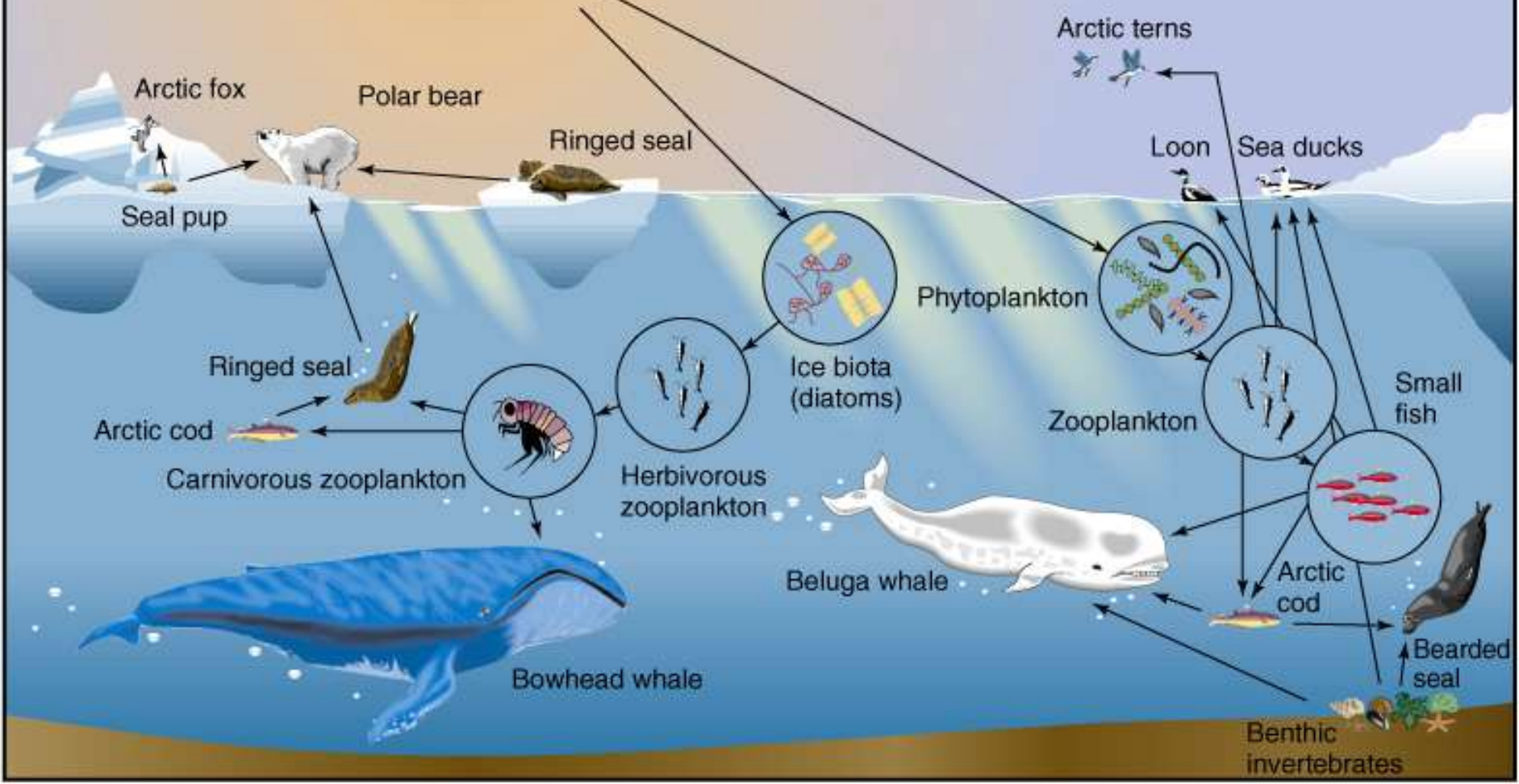


Fig 2-12b

Major Ecosystem Components

- Abiotic is non living
- Biotic is living

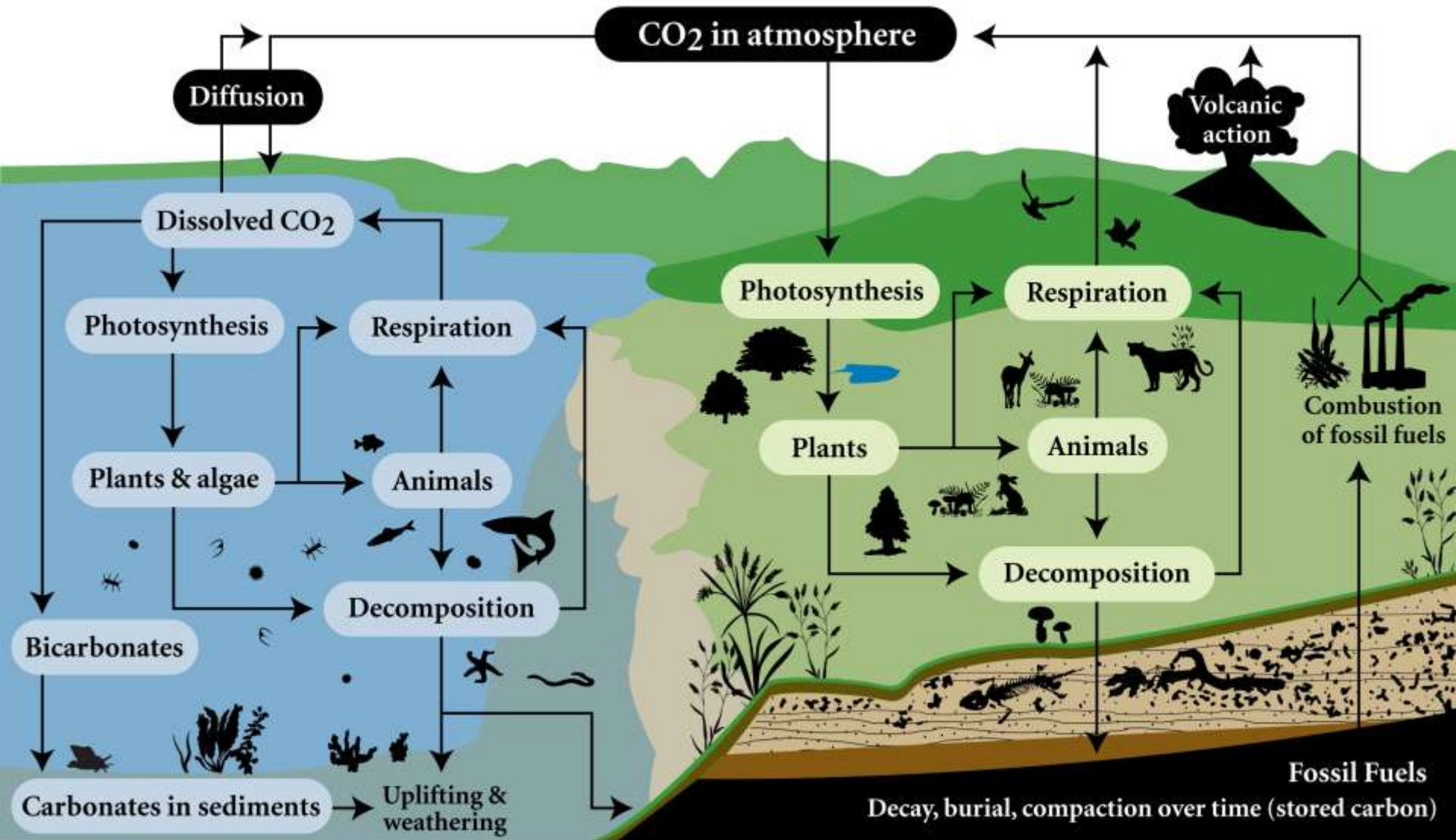
Abiotic

- Abiotic factors that influence life in the biosphere
 - determine the biosphere's structure and dynamics (fluctuations)
 - Water, air, temperature, soil, light levels, precipitation, salinity
 - Sets tolerance limits for populations and communities
 - Abiotic Components unusually move in cycles.

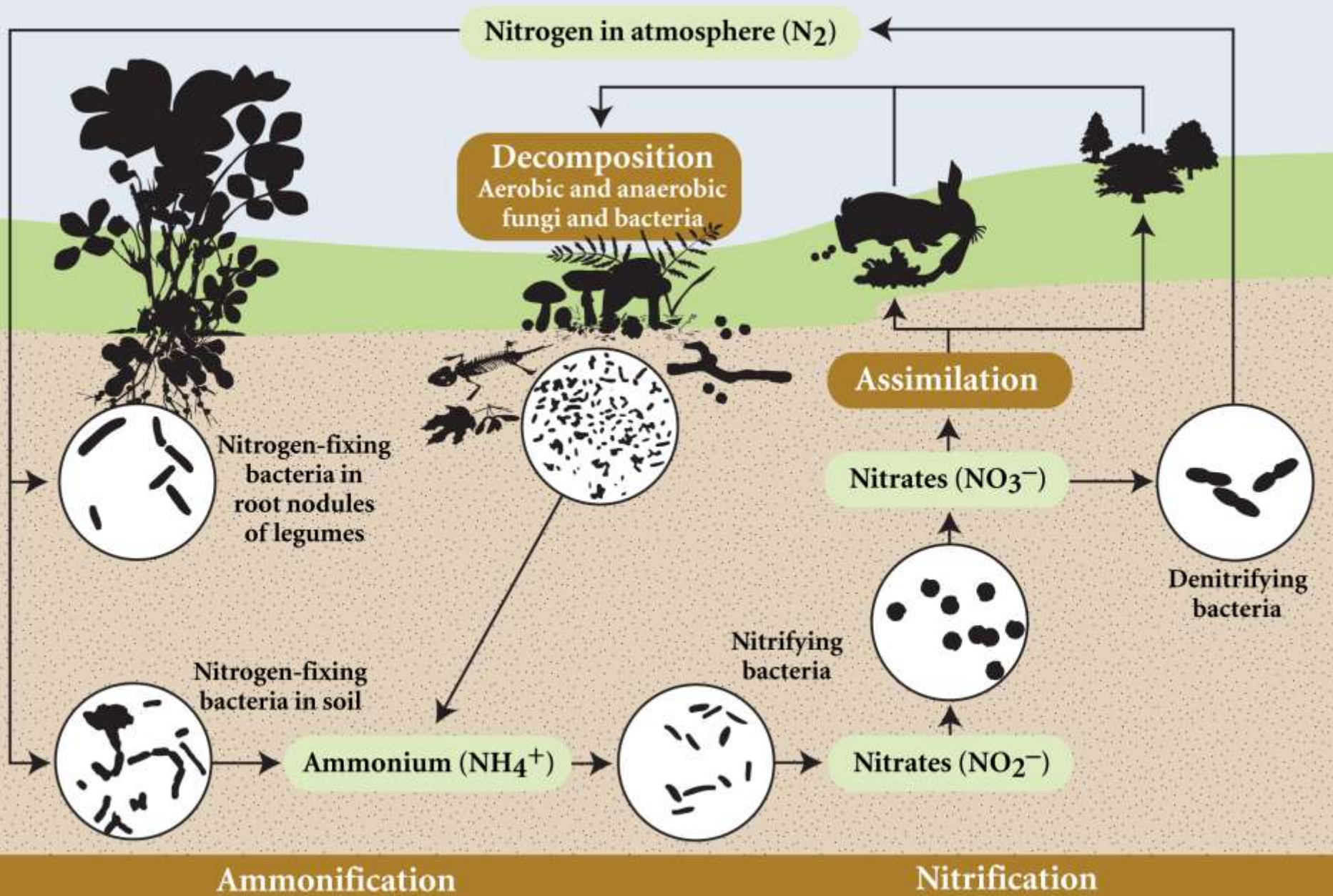
There is little if no matter waste in natural ecosystems!

- Carbon Cycle
- Nitrogen Cycle
- Water Cycle

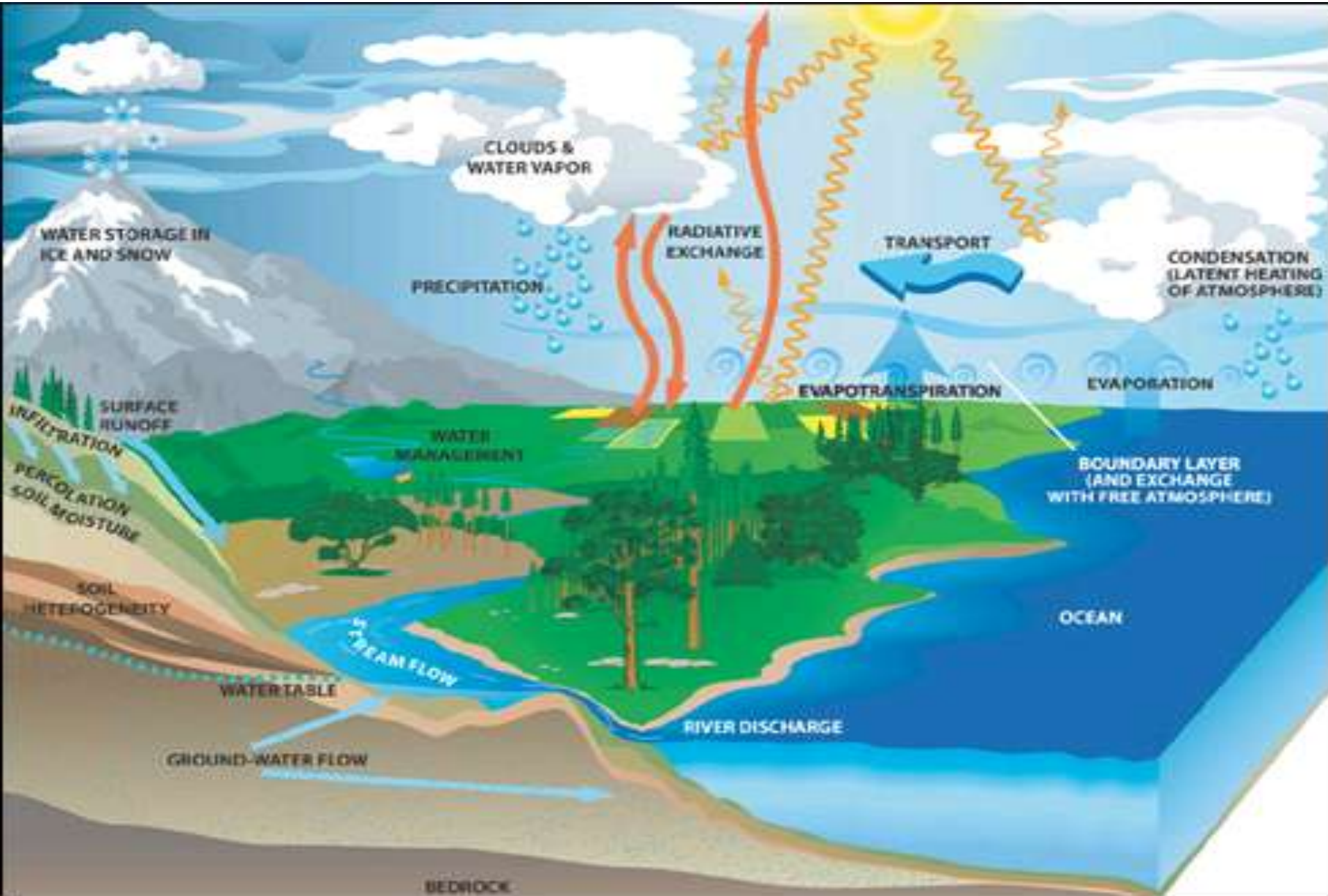
Carbon Cycle



Nitrogen Cycle



Water Cycle



Biotic Components

- Producers, consumers, decomposers
- Plants, animals, bacteria/fungi
- Biotic interactions with biotic components include
 - predation
 - competition
 - over crowding
 - symbiosis
 - Mutualism
 - Parasitism (disease)
 - commensalism

Physical and chemical factors, and disturbance

- Solar energy, water, temperature, wind,
- For example, soils include inorganic material, organic material in various stages of decomposition, water, air, and living organisms.
- All of which can be affected by disturbance.
- Such variables play an important role in determining the distribution of organisms

Latitude Climates

- Are due to the uneven heating of Earth's surface as it orbits the sun
 - Influences
 - many abiotic and biotic factors
 - distribution of biological communities

The tilt of the Earth's axis

- Causes the changes of the seasons in the northern and southern hemispheres
The uneven heating of the Earth
- Also sets up patterns of precipitation and prevailing winds

Local Climates

- Sea breezes
- land breezes
- mountain breezes

Ocean currents

- Influence coastal climate
- Affect rainfall
- Affect temperatures