

Ecology

Bio Sphere

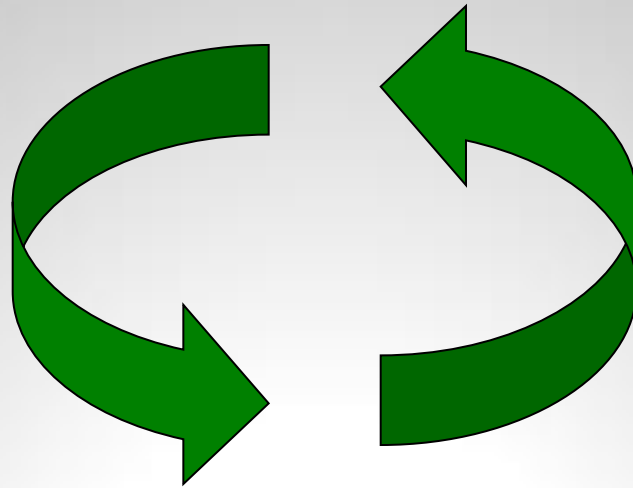
Feeding Relationships

with a whole lot of other creatures...



Ecology

- Putting it all together...
 - study of interactions between creatures & their environment, because...



***Everything is connected
to everything else***

Ecology: the study of interactions that take place between organisms and their environment



Biosphere



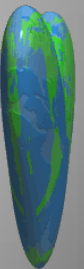
- the portion of Earth that supports living things.
- Living things are affected by both the physical or nonliving environment and by other living things.

Abiotic and Biotic factors

- **Abiotic factors** ~ The nonliving parts of an organism's environment
- Examples: air currents, temperature, moisture, light, and soil.



- **biotic factors** ~ All the living organisms that inhabit an environment
- All organisms depend on others directly or indirectly for food, shelter, reproduction or protection



ECOLOGY studies the interdependence between living organisms and their living and non-living environments.



Organisms may relate to one another in many different ways.

predator/prey



producer/consumer

decomposer



SYMBIOSIS: an interspecies relationship involving frequent close contact.



host



parasite

The effect of symbiosis may be positive, neutral, or negative.



MUTUALISM

both organisms benefit

Ant Security Guards



A Shrimp and his friend

COMMENSALISM

one organism benefits
the other is unaffected



[The tiny fish cleaner](#)



Or one organism may cause scavenge, decompose, or cause disease in another.



Whatever their relationships, the components of living systems, from a single cell to an ecosystem, interact to maintain balance.



ATOMS
MOLECULES
ORGANELLES
CELLS
TISSUES
ORGANS
SYSTEMS
ORGANISMS
POPULATIONS
COMMUNITIES
ECOSYSTEMS
BIOMES
BIOSPHERE



An **ORGANISM** is an individual living thing.

A **POPULATION** consists of all the interacting members of a species in a local area.



How do the members of a population interact with one another?

A **COMMUNITY** includes all of the different populations that live and interact in the same area.



How do the members of a community interact with one another?

An ECOSYSTEM consists of the non-living environment and all its interacting species.



A diverse ecosystem is more stable than an ecosystem that lacks diversity.



Diversity increases the chances that some organisms will be able to withstand disruptions to the environment.

ENERGY FLOWS THROUGH ECOSYSTEMS.



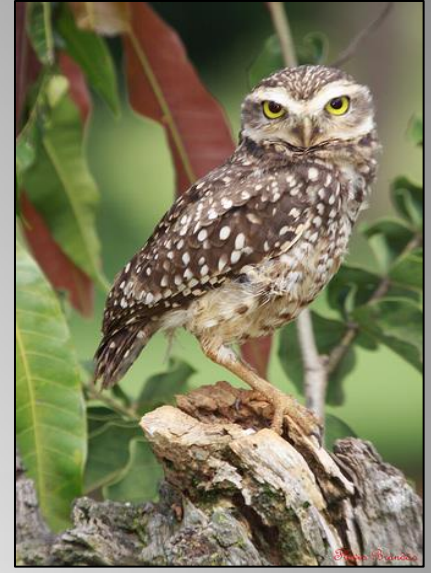
The SUN is the primary energy source for most ecosystems.

REMEMBER THIS??

AUTOTROPHS use the sun's energy to make food by the process of photosynthesis.

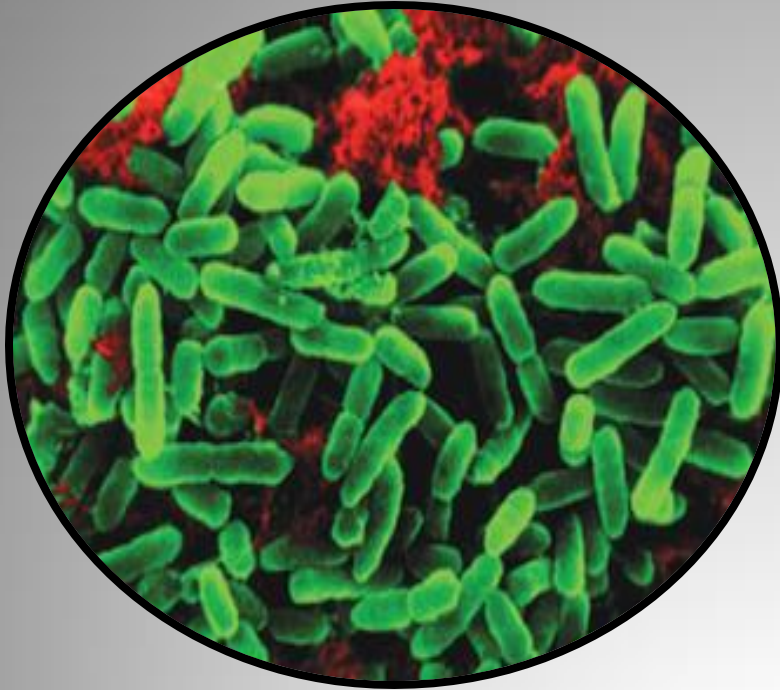


The sun's energy flows through producers to herbivores to carnivores in a FOOD CHAIN.

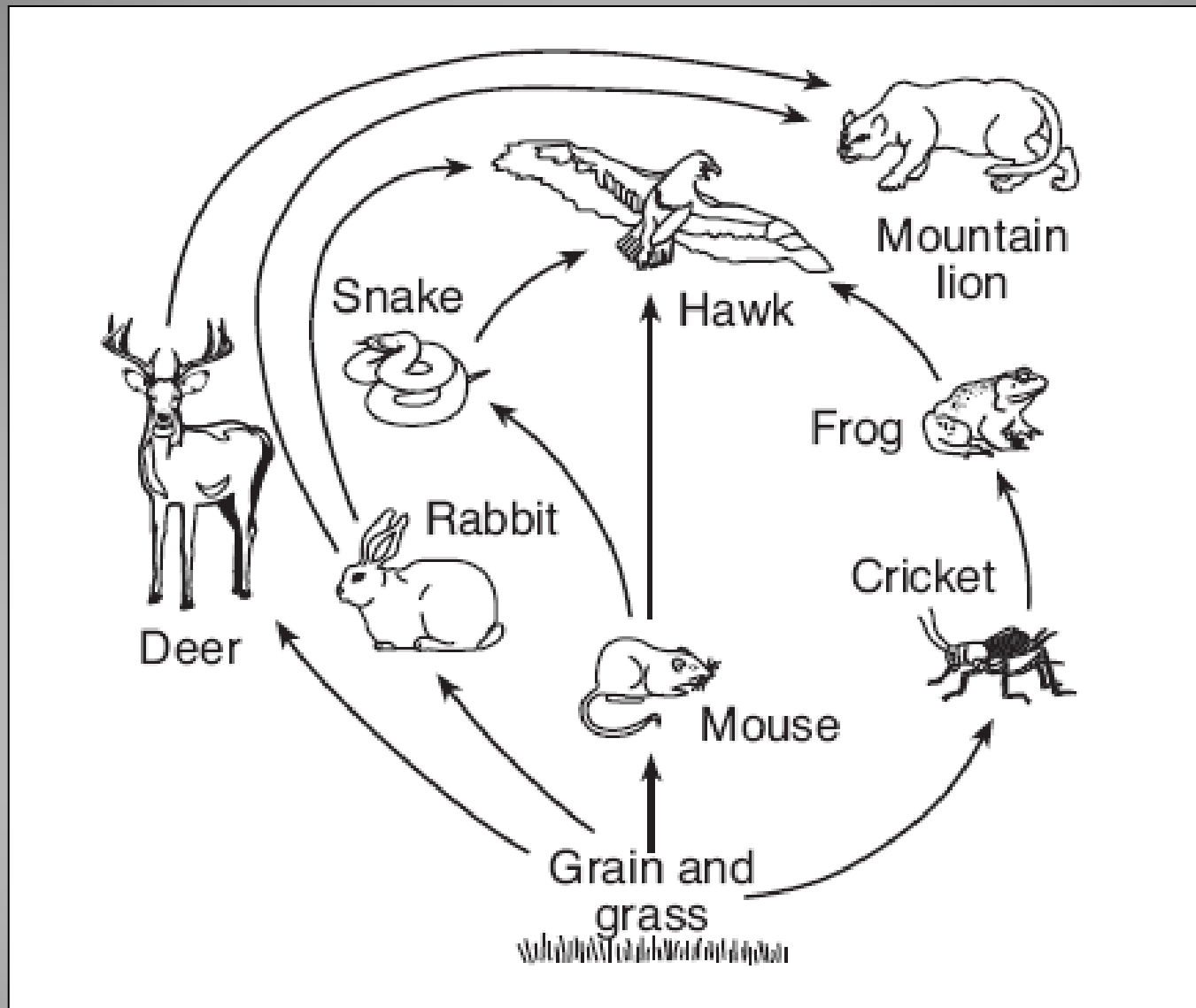


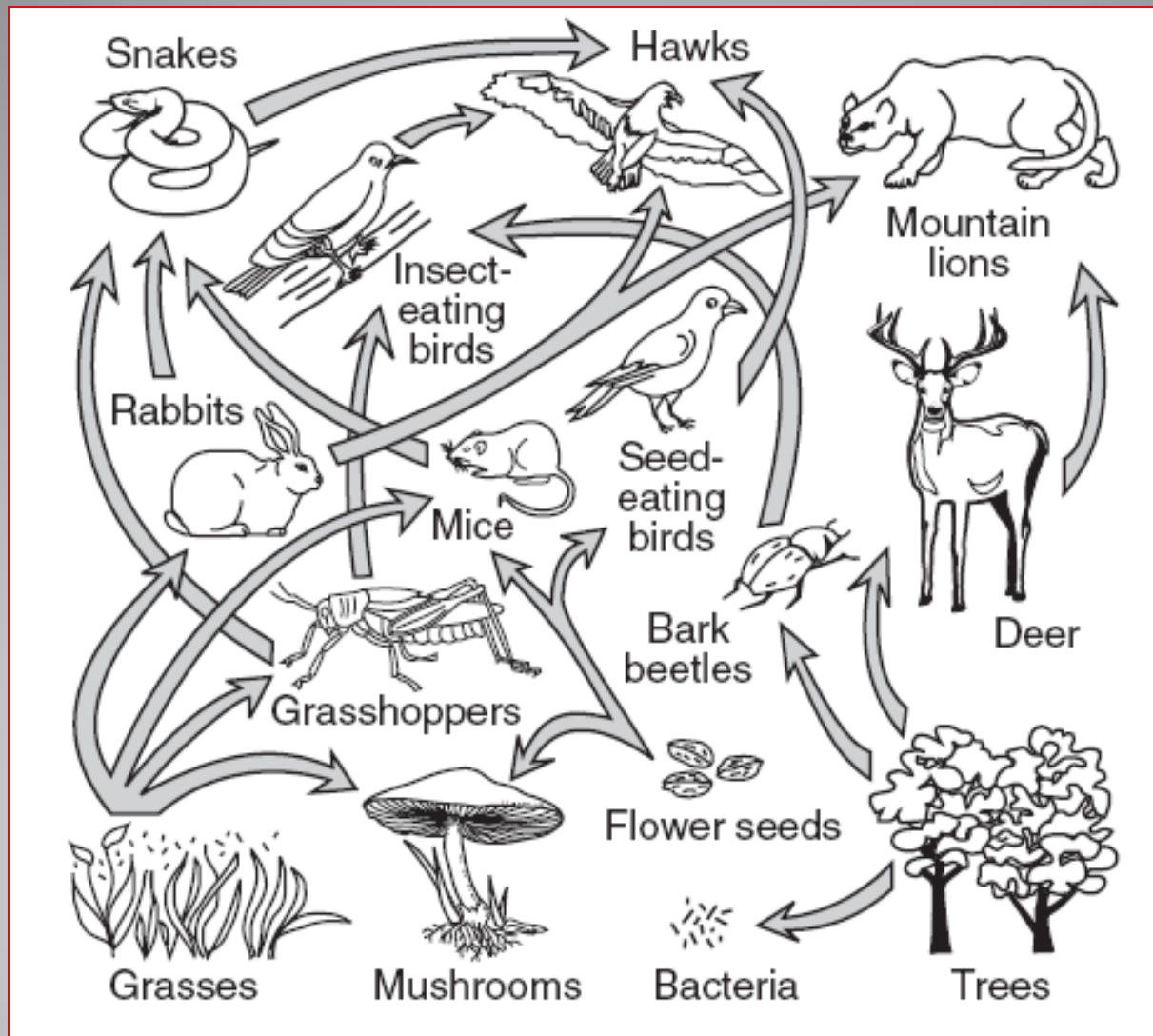
Grass → Cricket → Frog → Owl

BACTERIA and FUNGI decompose the remains of organisms and their wastes at every level of the food chain.

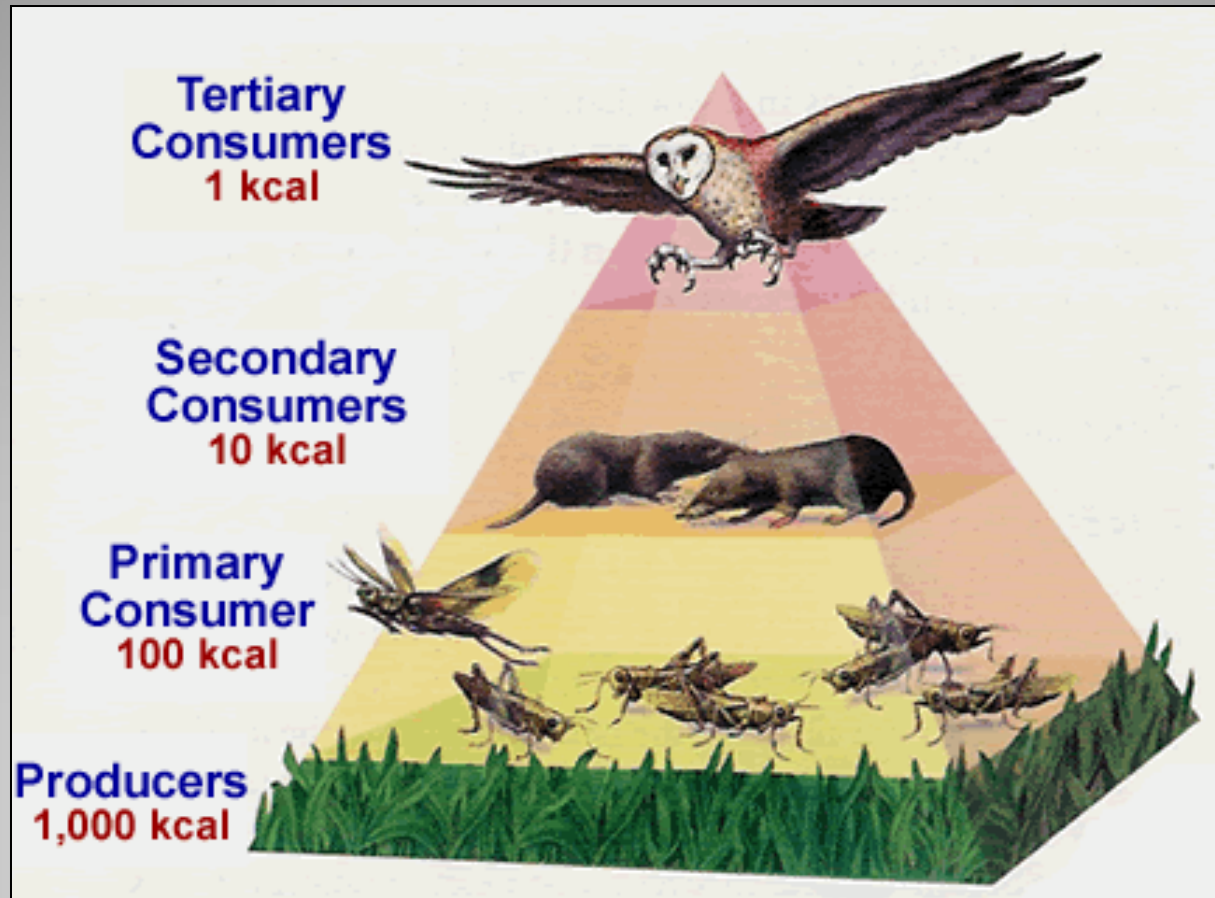


FOOD WEBS identify the complex relationships among many producers, consumers, and decomposers in an ecosystem.

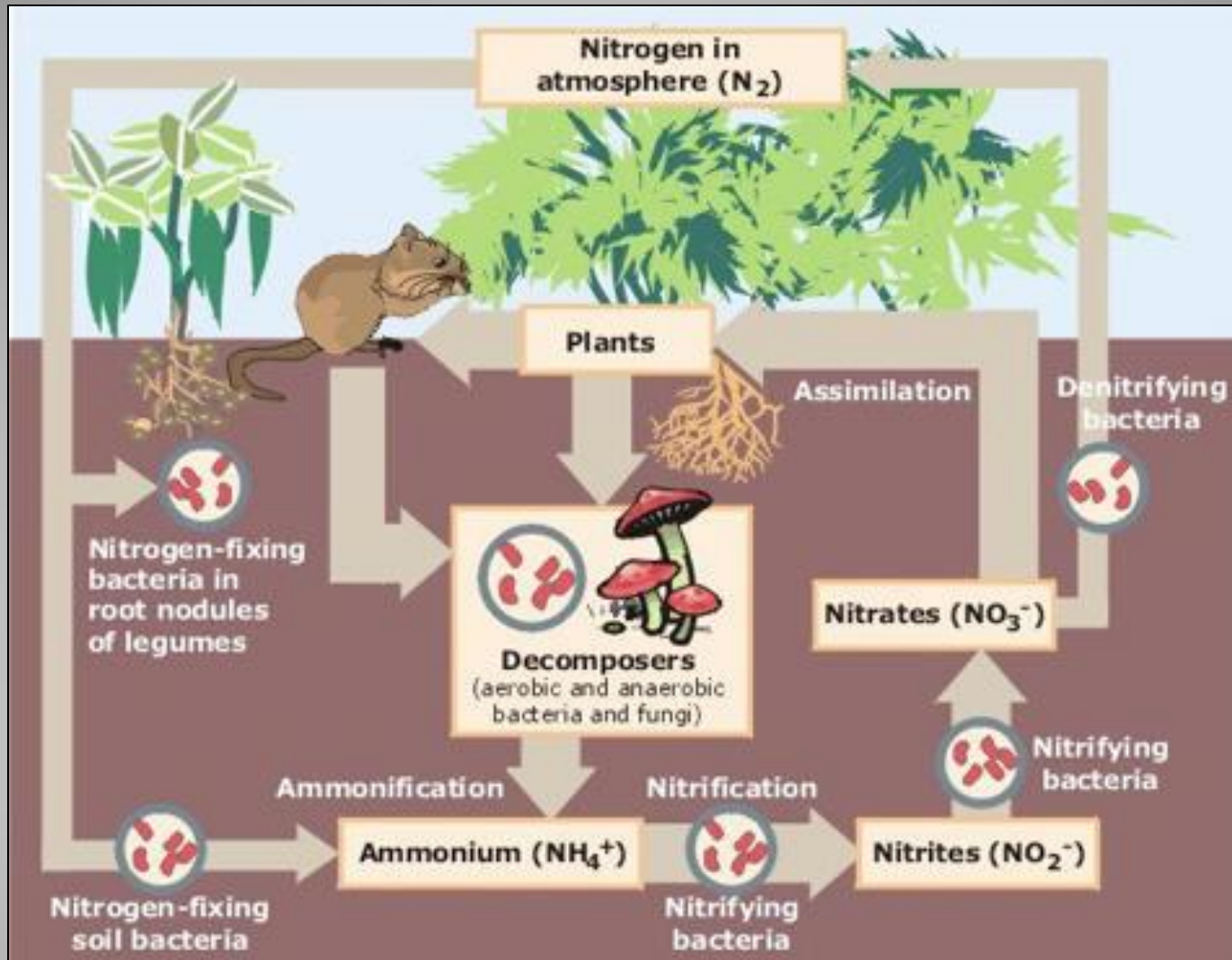




At each link in a food web, some energy is stored, but most of an organisms energy is USED for its own processes.



Unlike energy (which flows through an ecosystem) the materials that organisms are made of are **RECYCLED** by the decomposers.



The world contains a wide diversity of physical conditions, which creates a variety of habitats for wildlife.



Competition can occur between members of different species for an ecological role or NICHE.

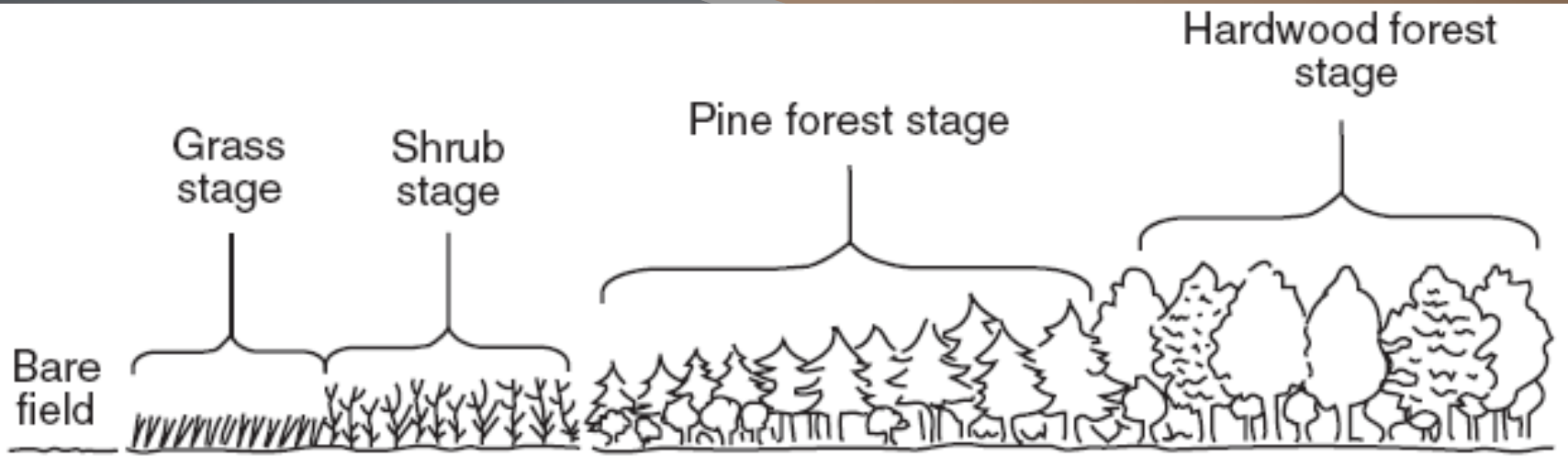


What factors define an organism's role in the environment?

Competition can also occur within species.



Why do members of the same species compete with one another?



pioneer organisms

climax community

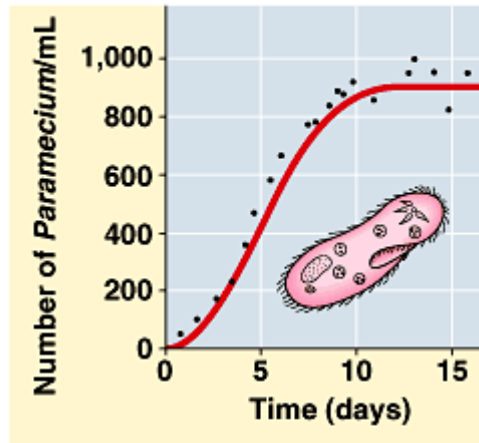


New York State's
DECIDUOUS FOREST

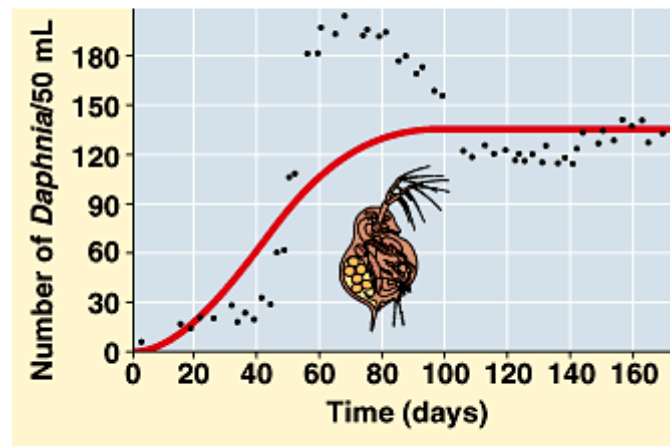
The number of organisms any habitat can support is limited by the available resources.



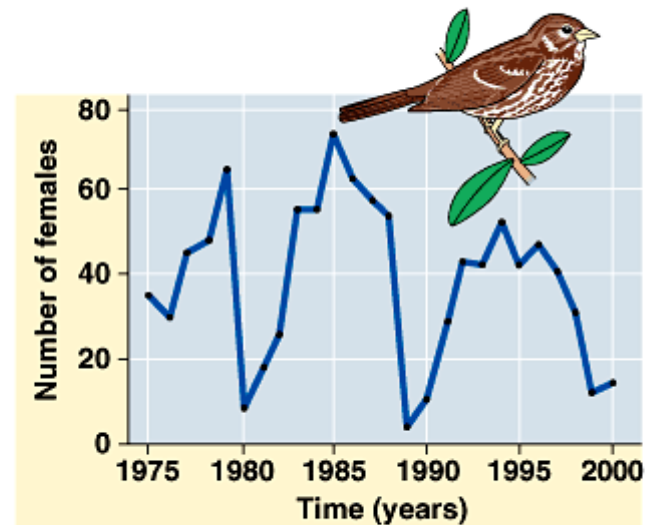
Population size is limited by environmental factors including available space, amount of food, number of predators.



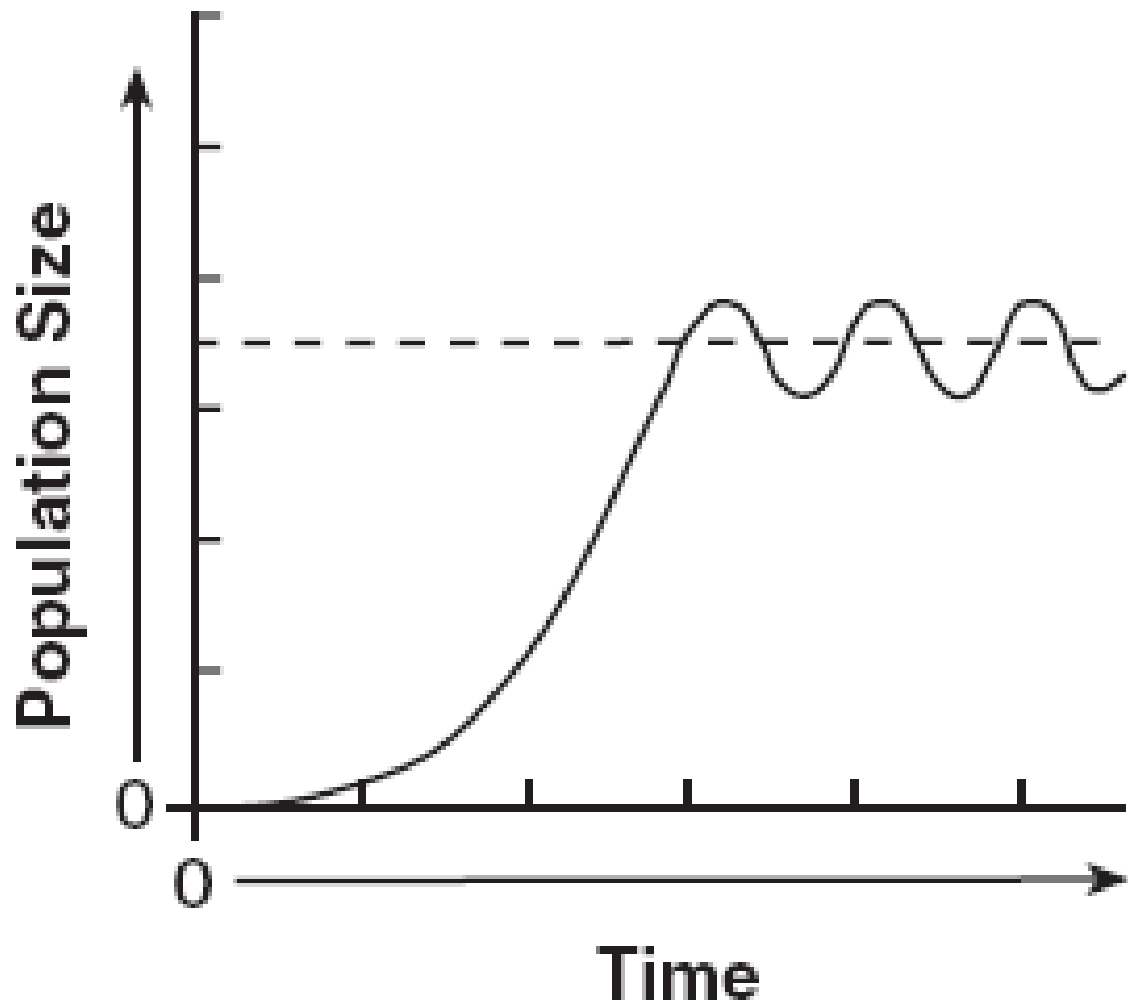
(a) A *Paramecium* population in the lab



(b) A *Daphnia* population in the lab

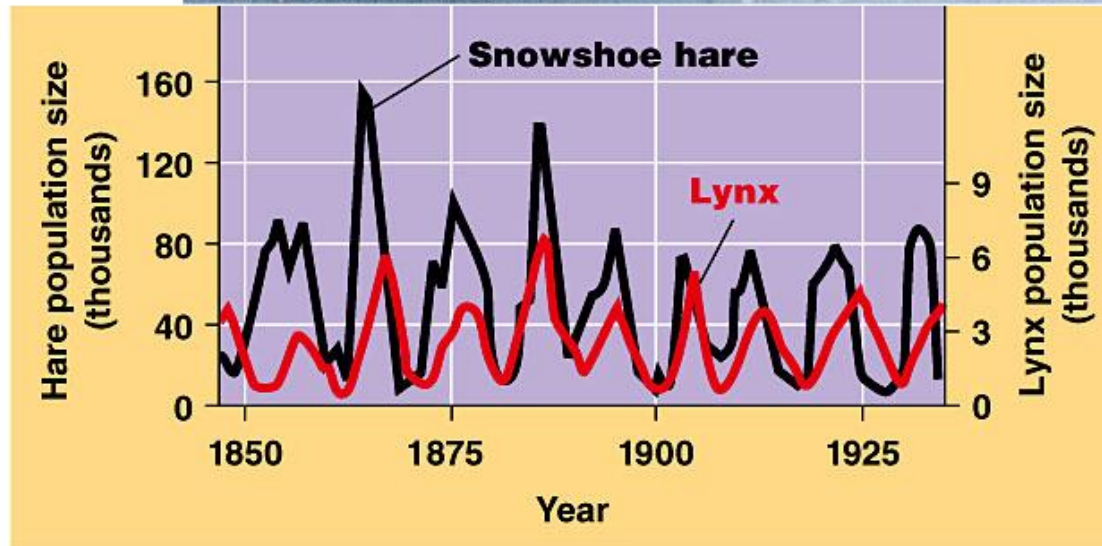


(c) A song sparrow population in its natural habitat



CARRYING CAPACITY

Every population is linked with others.

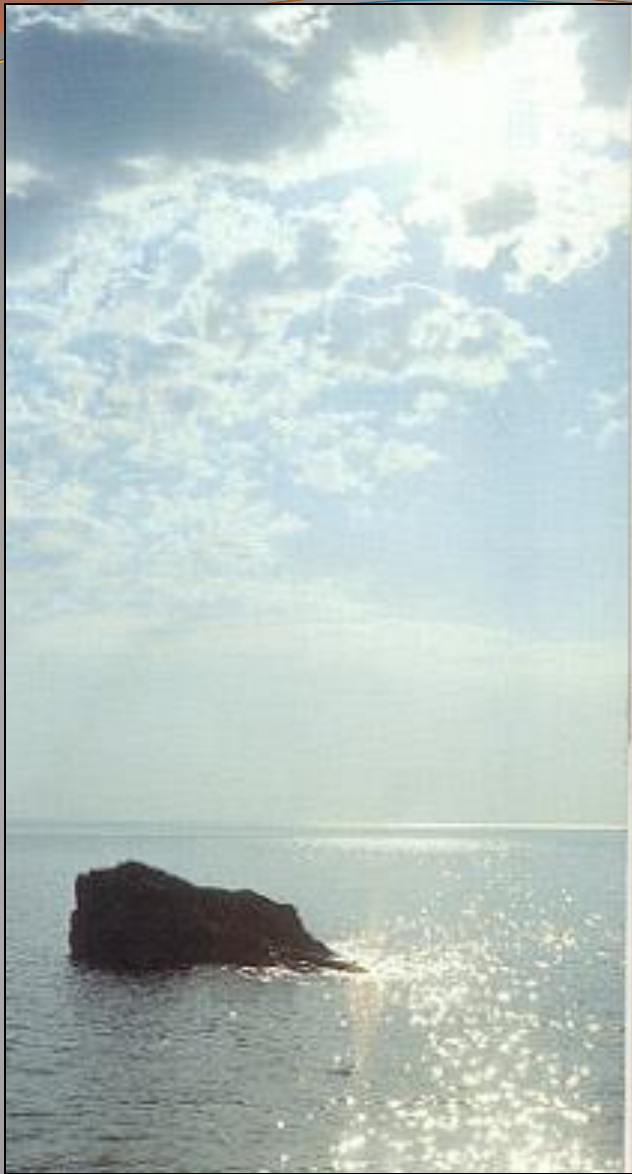


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This graph is typical of the cyclic changes in population sizes of a predator and its prey.

The largest biome on earth is the **MARINE BIOME**.

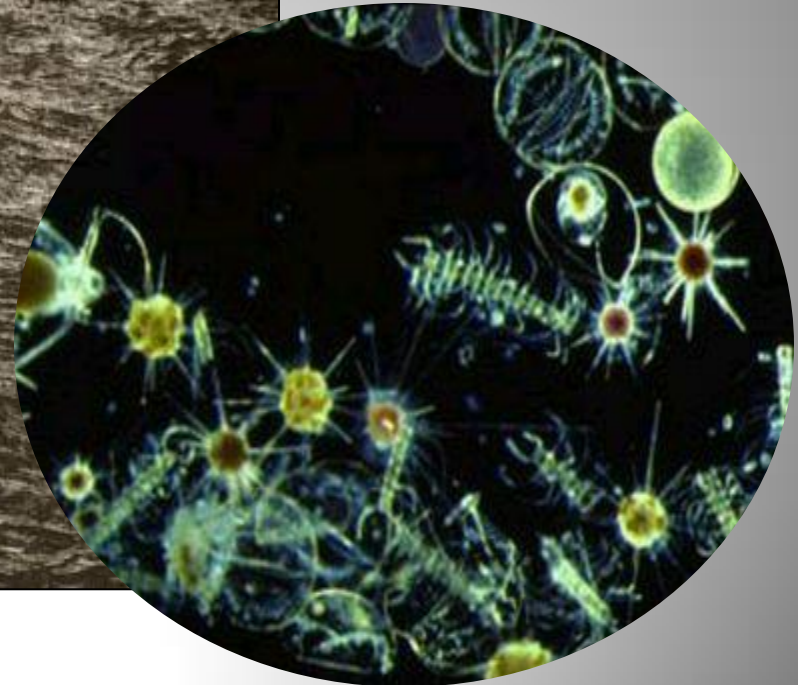




Because water captures and retains heat, the ocean has the most stable temperature of any biome on earth.

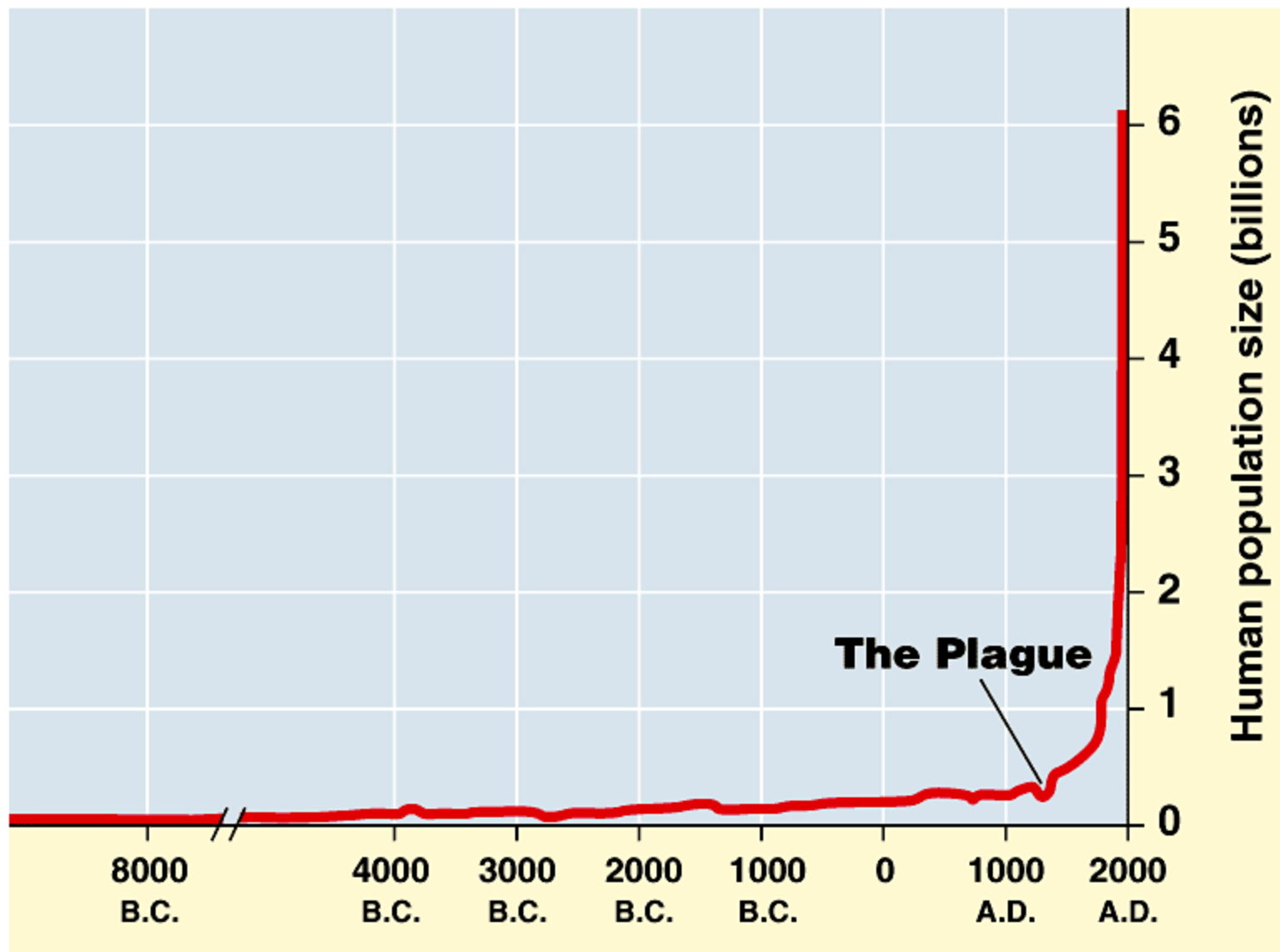


The greatest amount of photosynthesis on earth takes place in microscopic autotrophs that live at the surface of the oceans.



The oceans provide a habitat to a rich diversity of life.





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Carnivore



Carnivore



Carnivore



Herbivore



Plant

Quaternary consumers

Tertiary consumers

Secondary consumers

Primary consumers

Primary producers



Carnivore



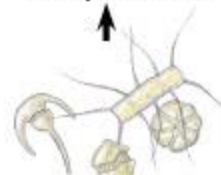
Carnivore



Carnivore



Zooplankton



Phytoplankton

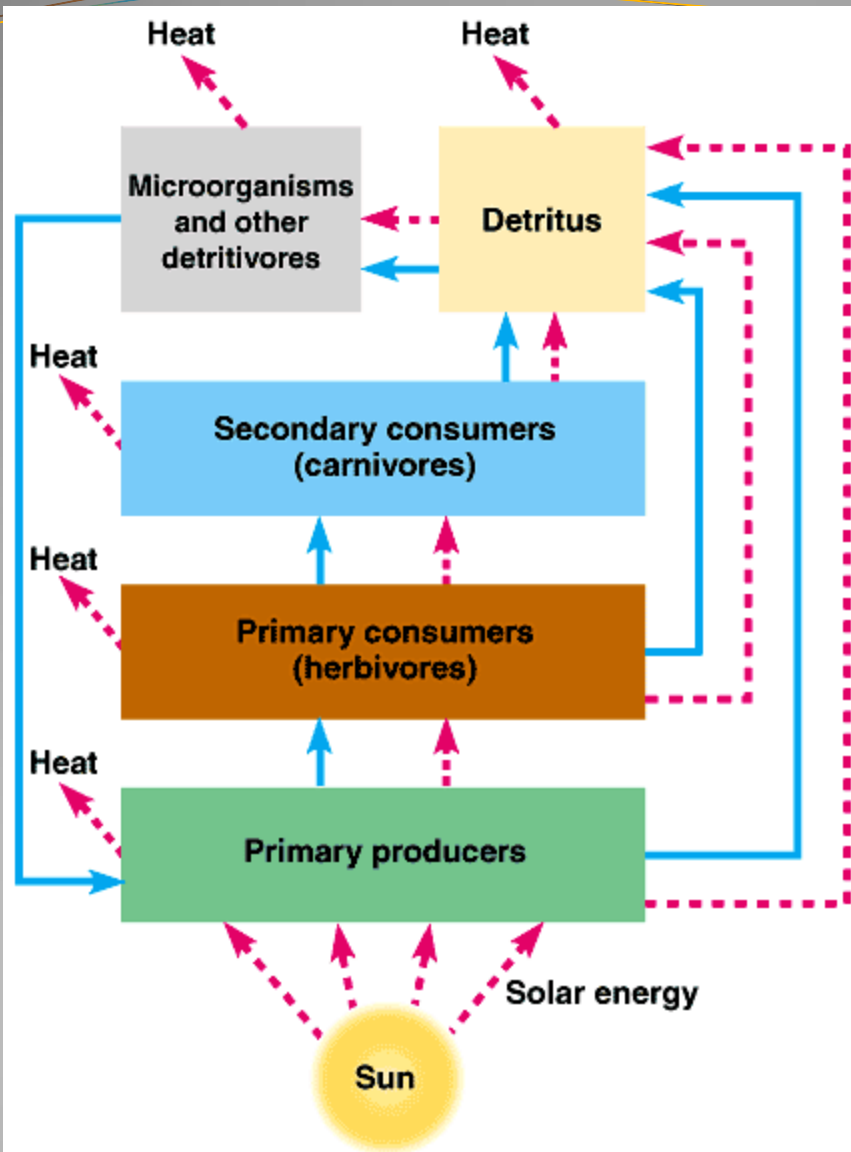
A terrestrial food chain

A marine food chain

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**Plant material
eaten by caterpillar**

200 J

100 J

Feces

67 J

**Cellular
respiration**

33 J

Growth

Tertiary consumers



10 J

Secondary consumers



100 J

Primary consumers



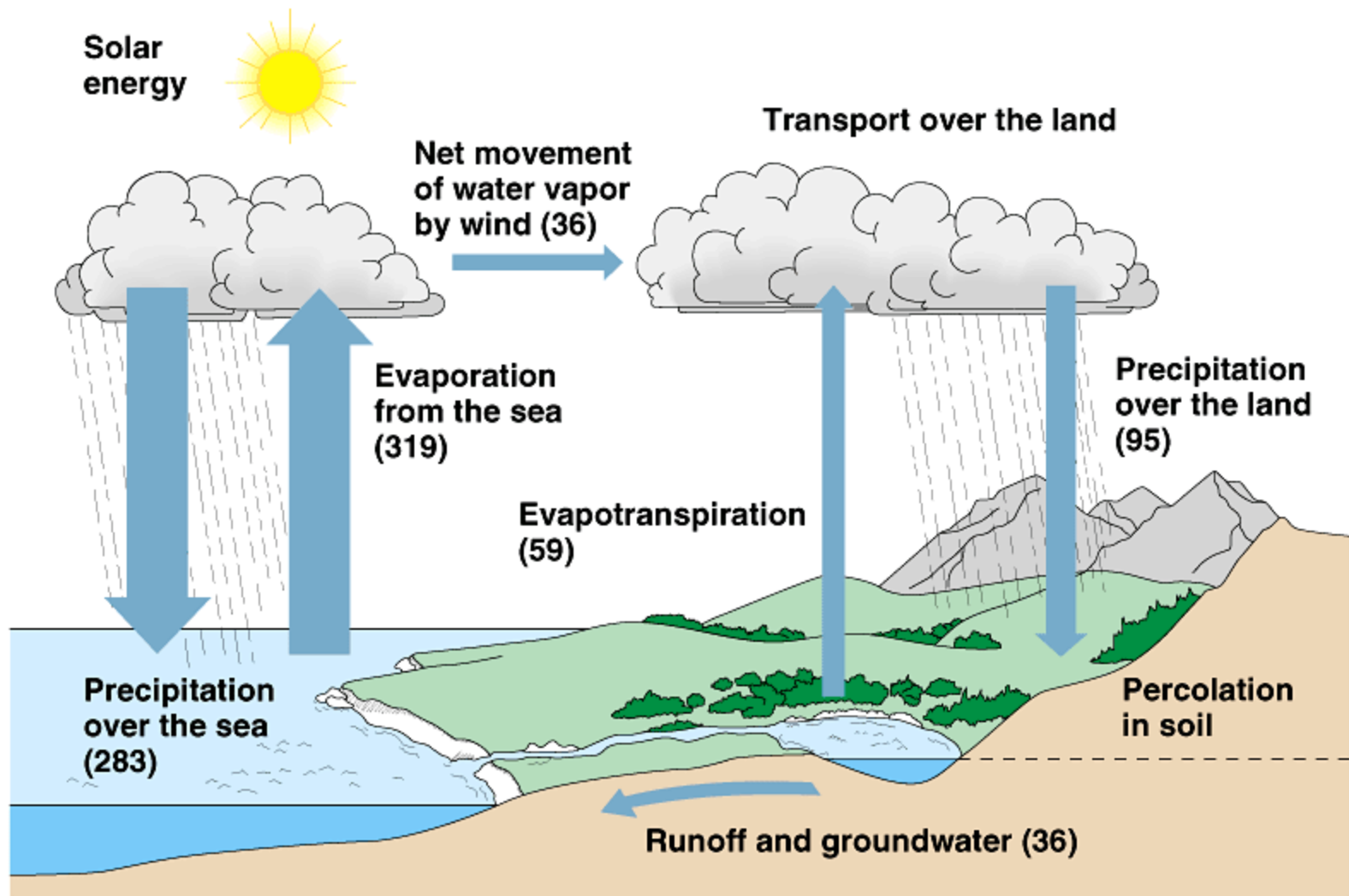
1,000 J

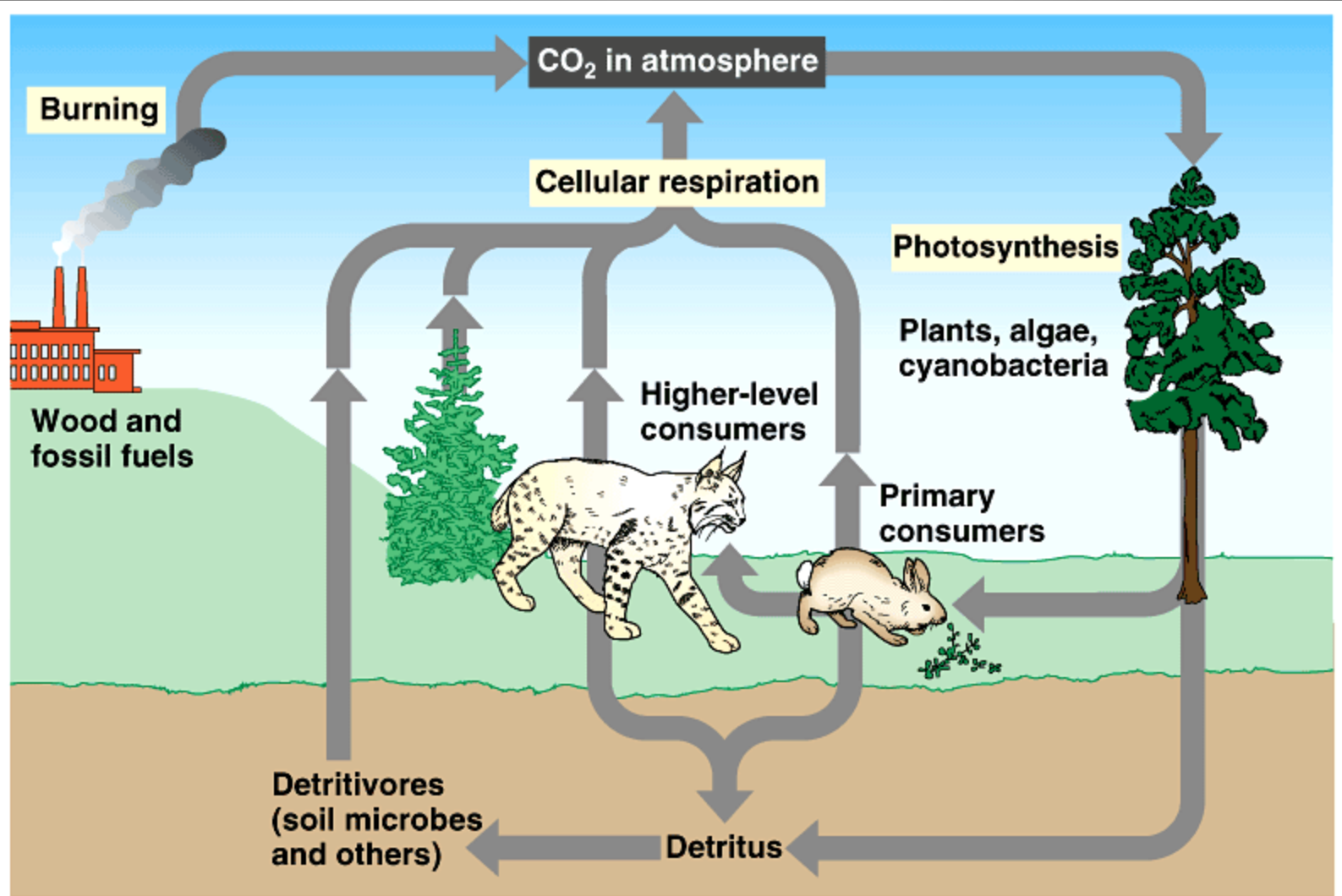
Primary producers

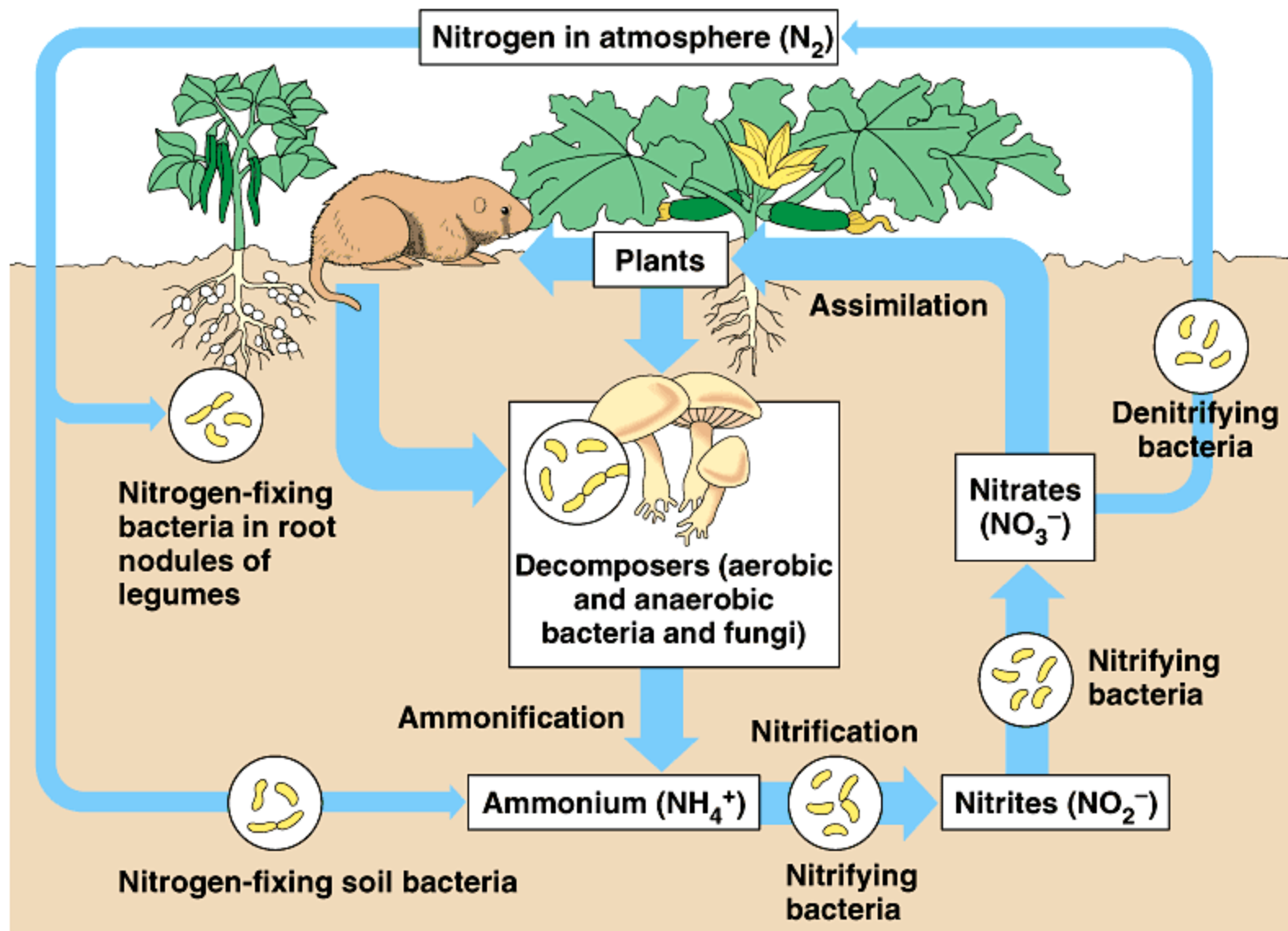


10,000 J

1,000,000 J of sunlight







**DDT concentration:
increase of
10 million times**

