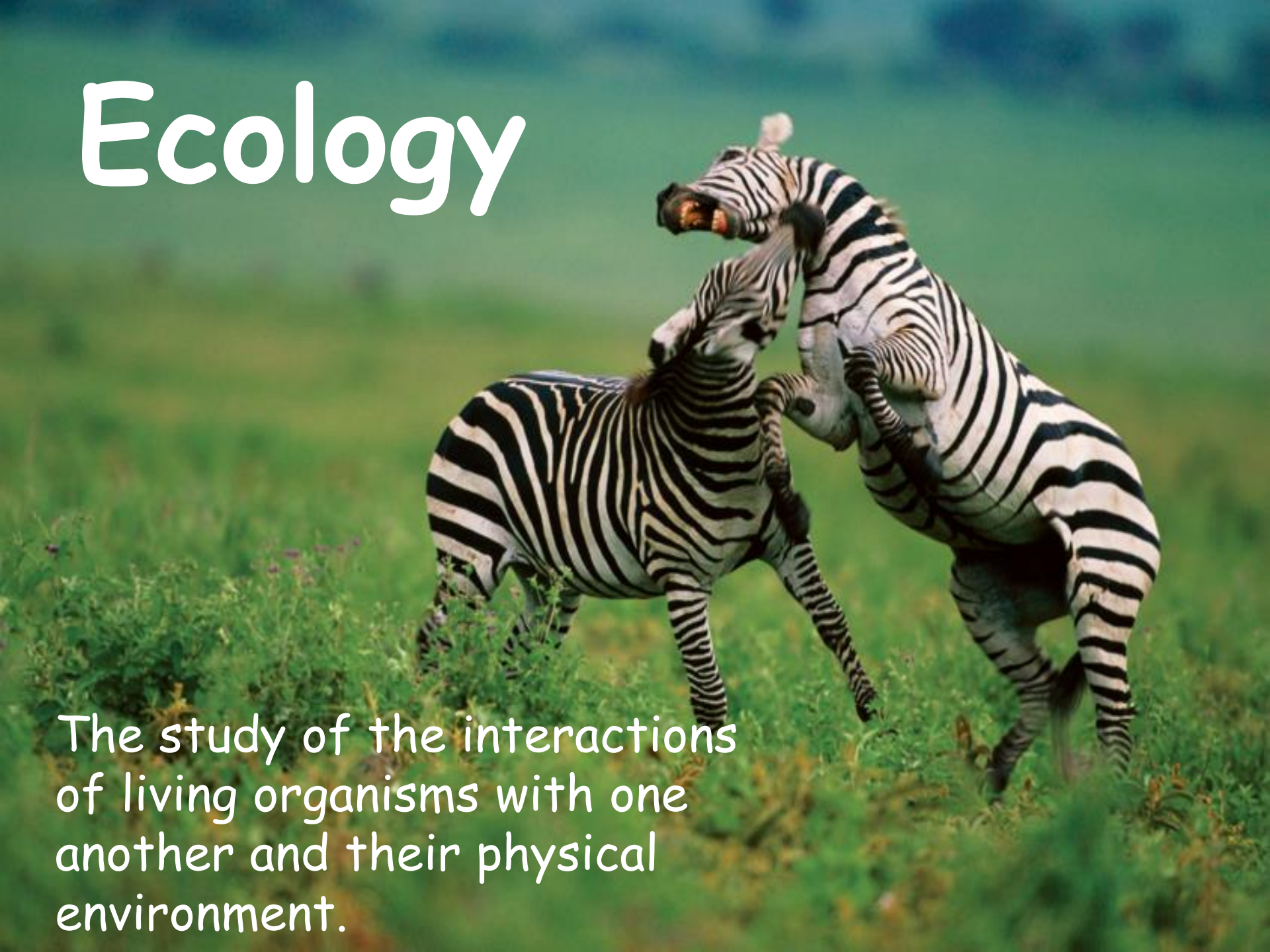
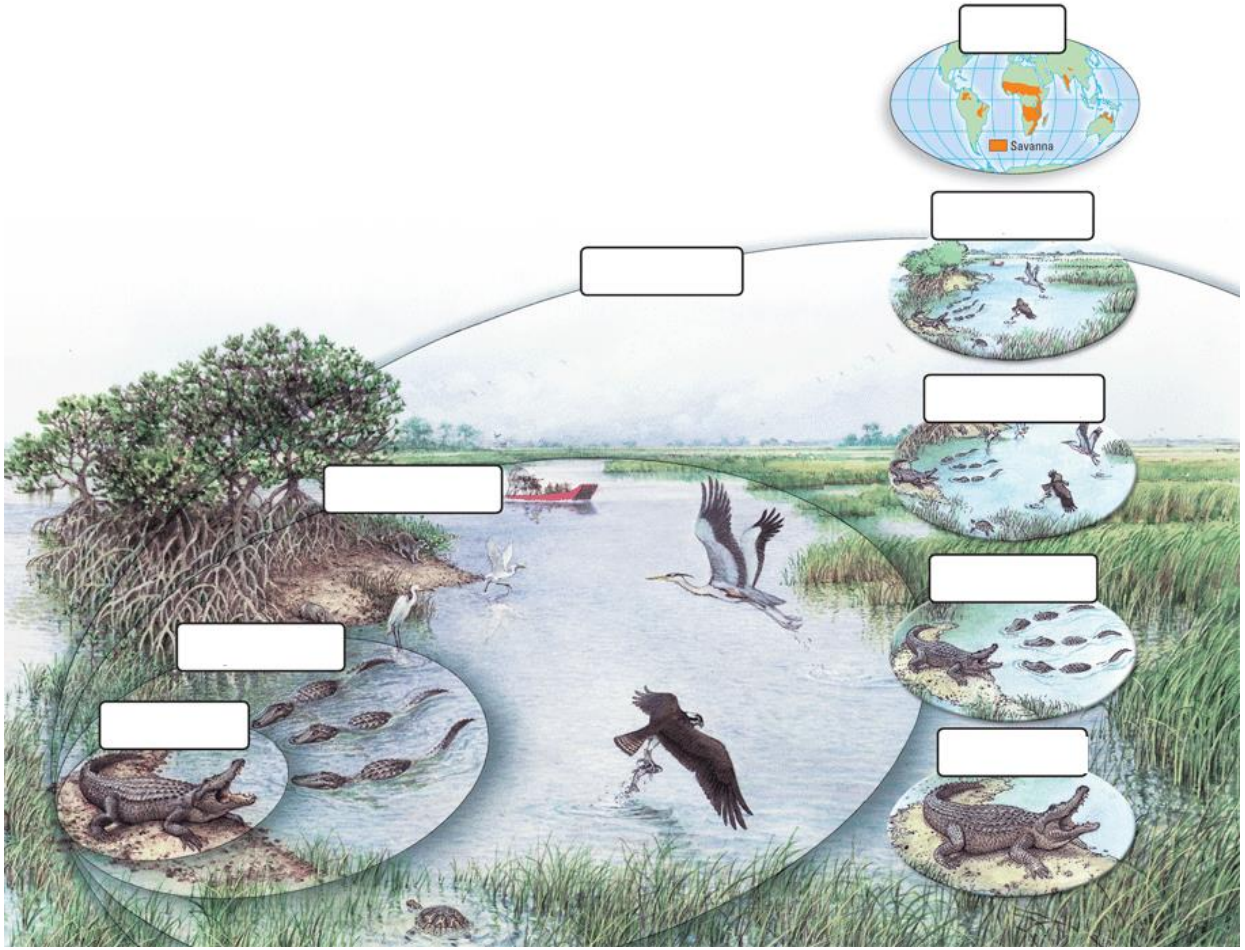
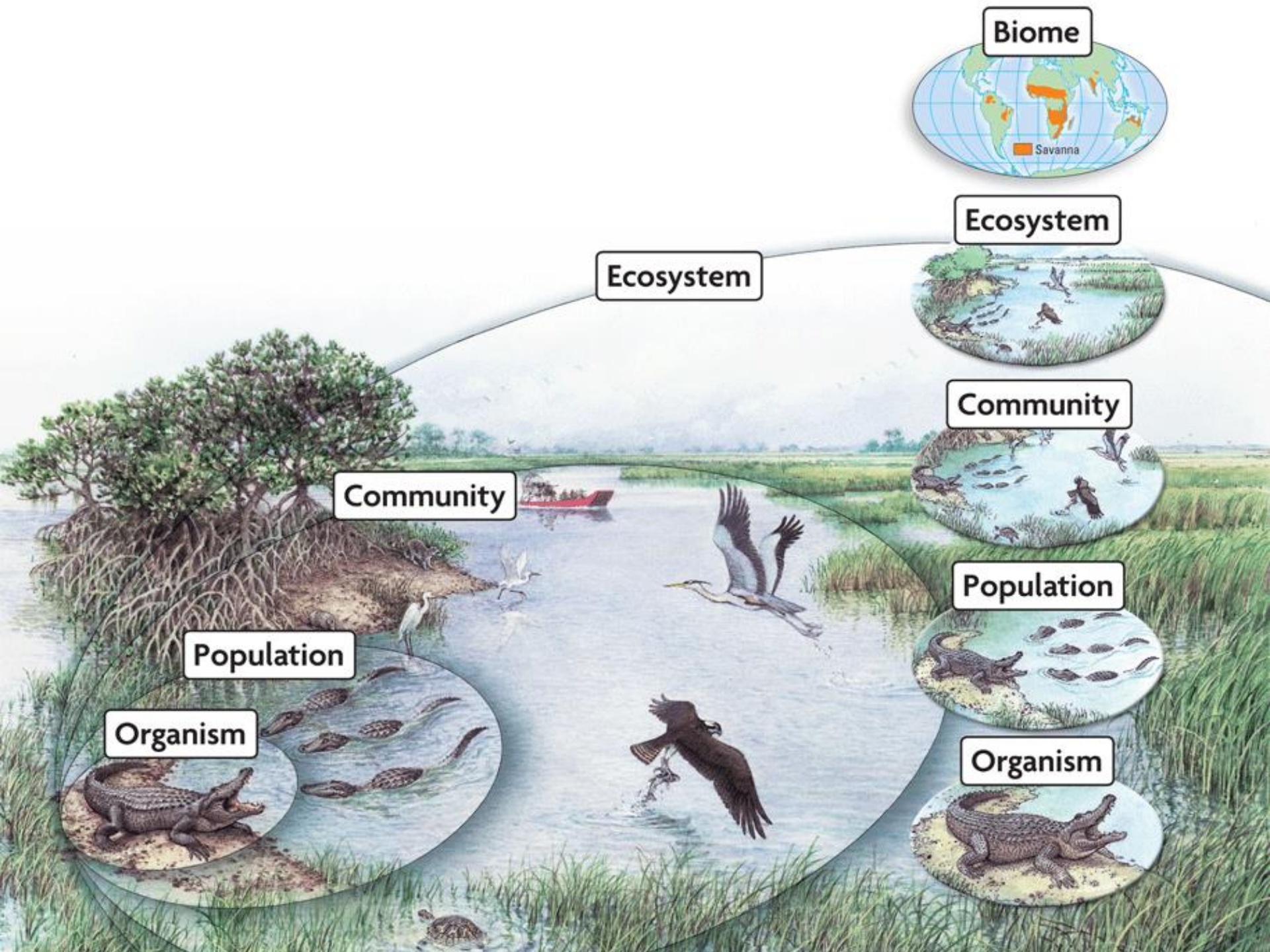
Ecology



The study of the interactions of living organisms with one another and their physical environment.

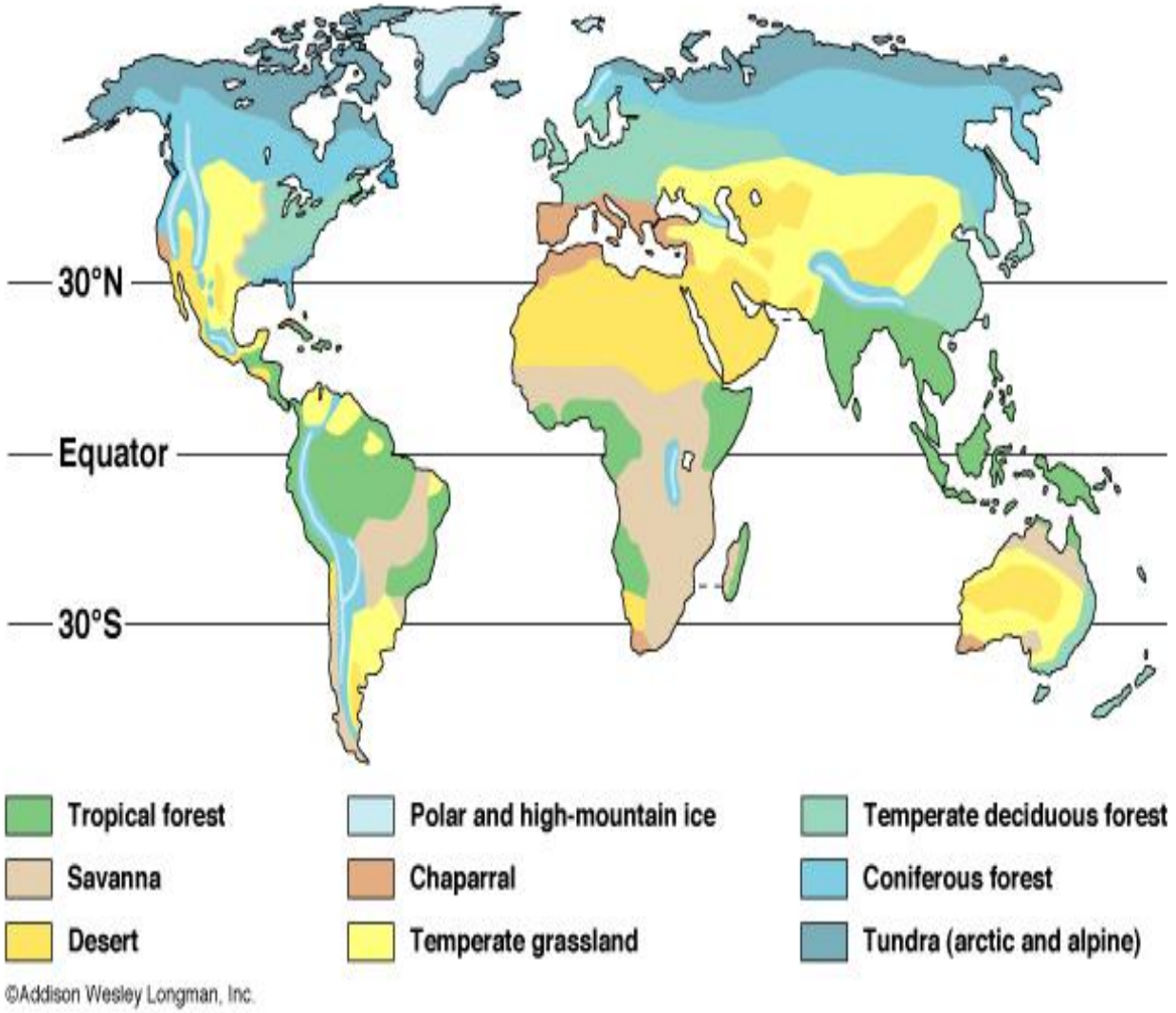
Levels of Organization



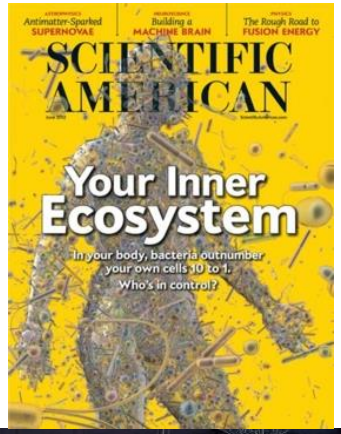

Biome
Savanna
Ecosystem
Ecosystem
Community
Community
Population
Population
Organism
Organism

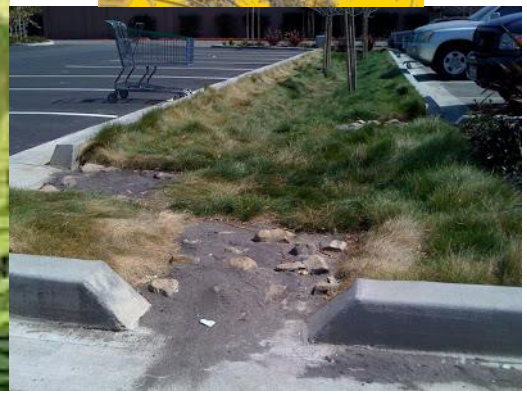
Biome:

Made up of smaller ecosystems characterized by a specific climate and certain types of plant and animal communities.



Ecosystem: A biological community of living organisms and their physical environment





Ecosystem: A specific location in the biome

Made up of both:

- A **Community** **(the living part).**

and

- **Habitat**

(the non-living part)

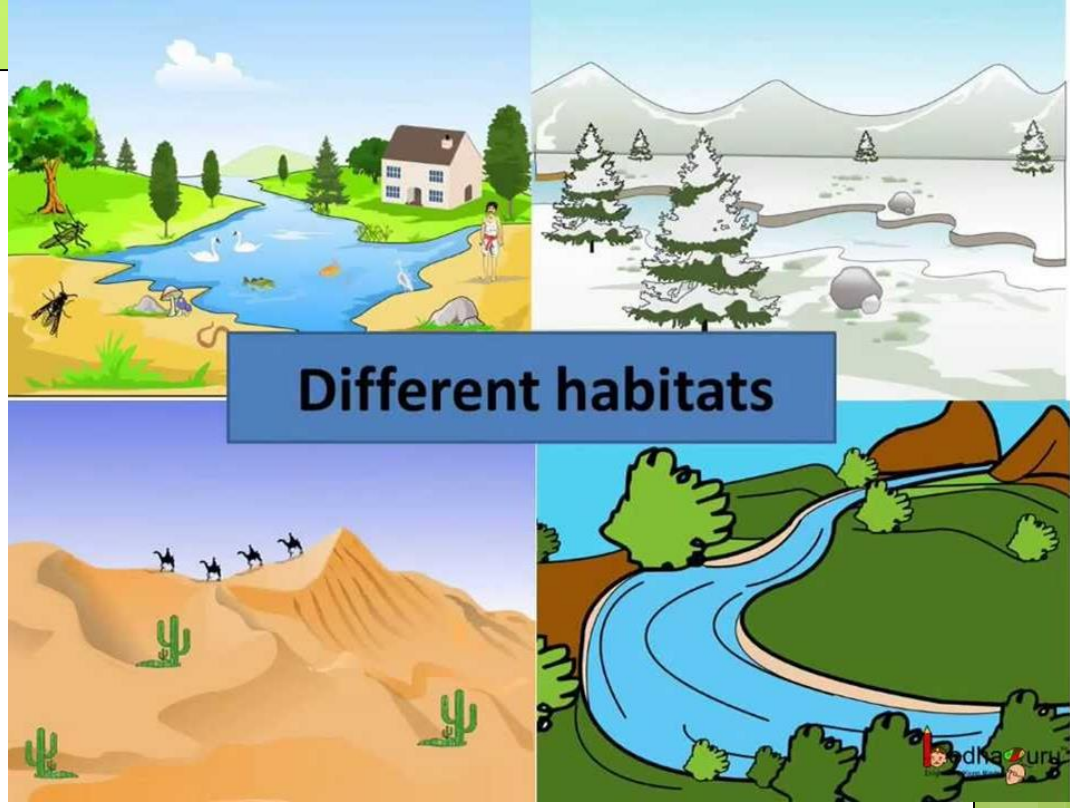
The place where a particular population lives.

Community:

All the living organisms that coexist in a certain area.

Habitat:

The place where a particular population lives.



Habitat deals with things that are not alive, such as weather and climate. Or aquatic vs. not aquatic.

POPULATION:

- All the members of one species that live in one place at one time.

Organism

- A living thing

COMMUNITY Interactions

Bee pollinating flower

Mistletoe growing into a mangrove tree

Bat about to eat frog

Whale with barnacles on skin

- Community Interactions
  - Predation : + / -
  - Parasitism: +/ -
  - Commensalism: + / 0
  - Mutualism: + / +

Abiotic vs. Biotic

- Biotic-All the LIVING or ONCE LIVING components of an ecosystem. Also includes the product of living things.

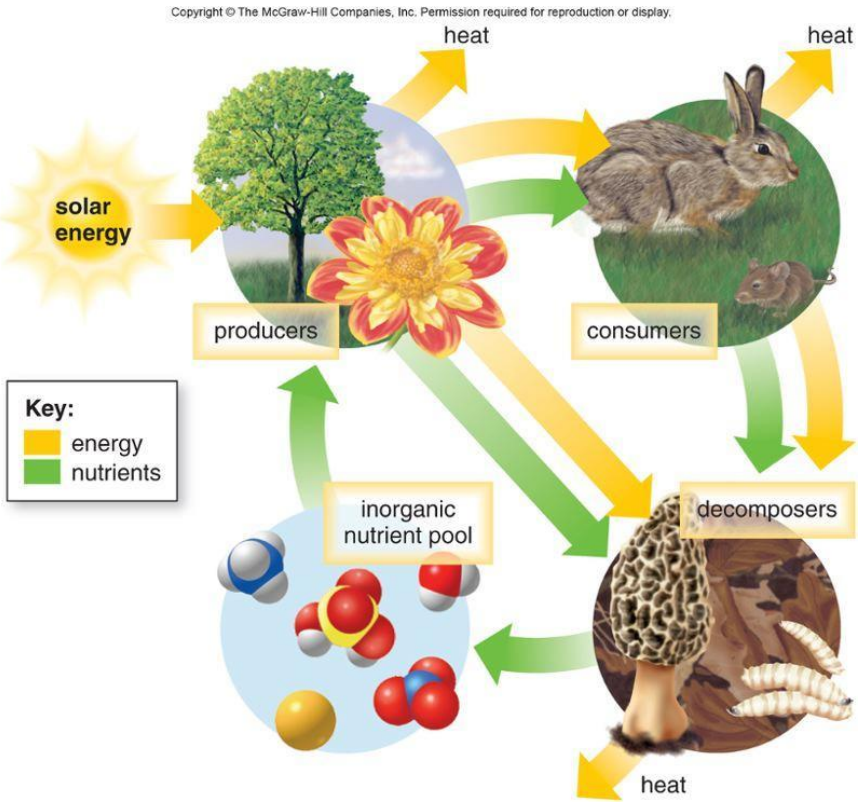
- Abiotic factors-All the non-living components of an ecosystem

Abiotic vs. Biotic

- Water--A
- Temperature--A
- Soil--B
- Owl--B
- Bacteria--B
- Precipitation--A
- Dead leaf--B
- Light--A
- Humidity--A
- Tree--B
- Feces--B
- Fingernail--B
- Bacteria --B
- Fur --B

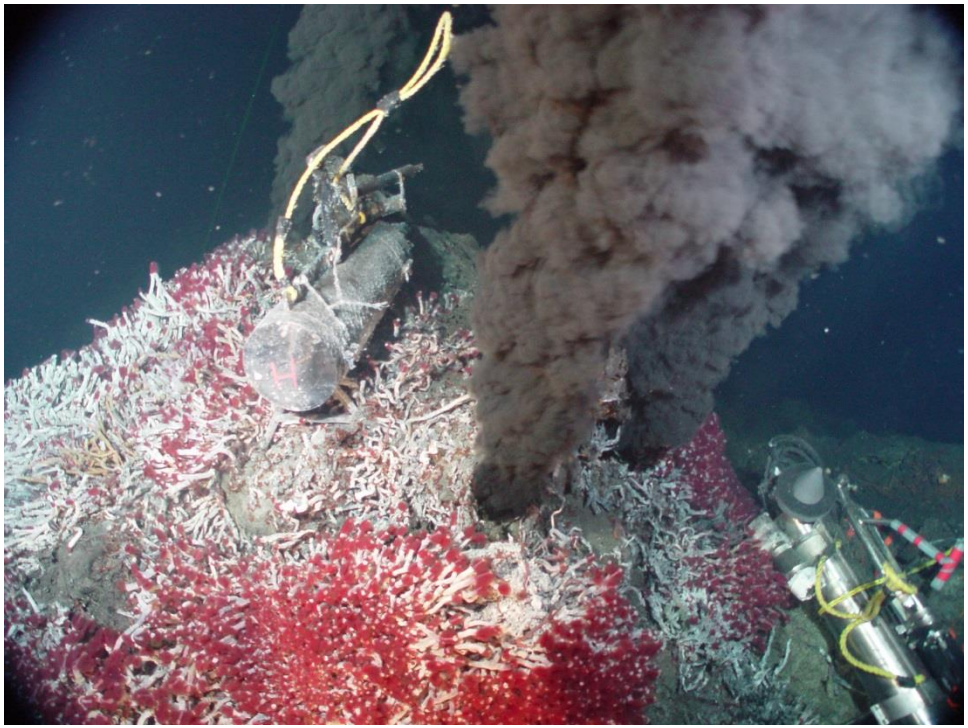
The Flow of Energy in an Ecosystem

- All ENERGY flows into ecosystem from the SUN



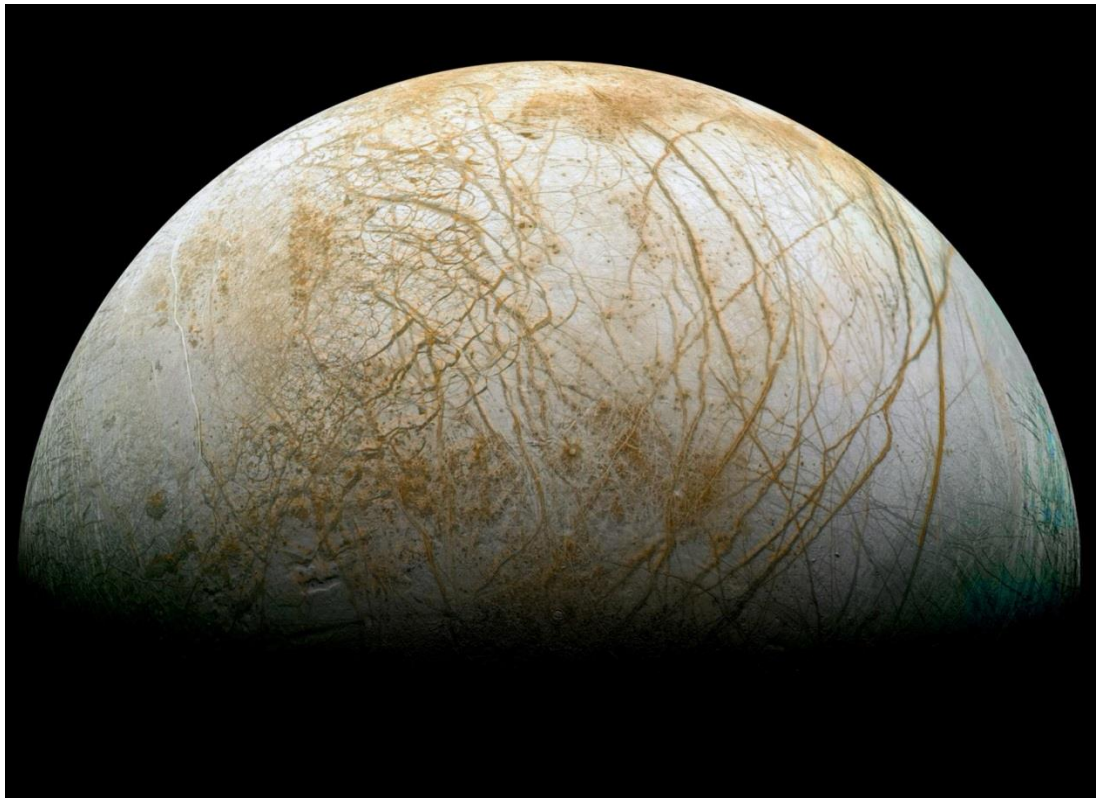
The Flow of Energy in an Ecosystem

- (Except for thermal vents in the ocean!)



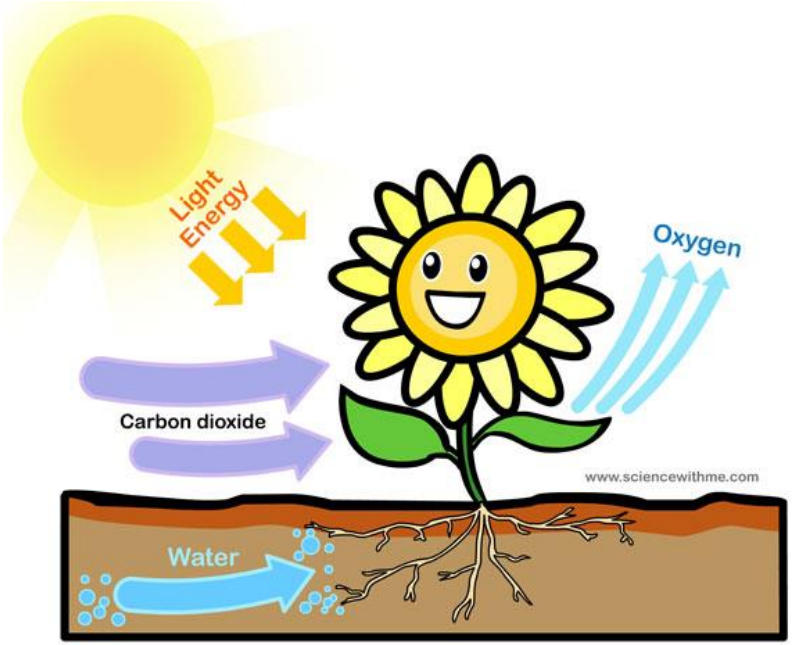
The Flow of Energy in an Ecosystem

- (Or possibly on some moons like Europa)



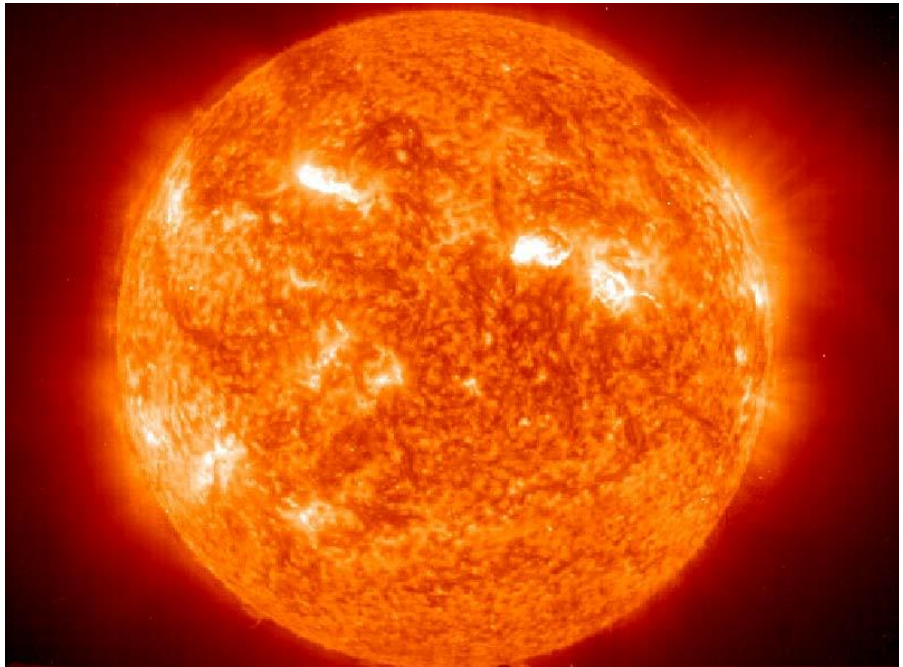
The Flow of Energy in an Ecosystem

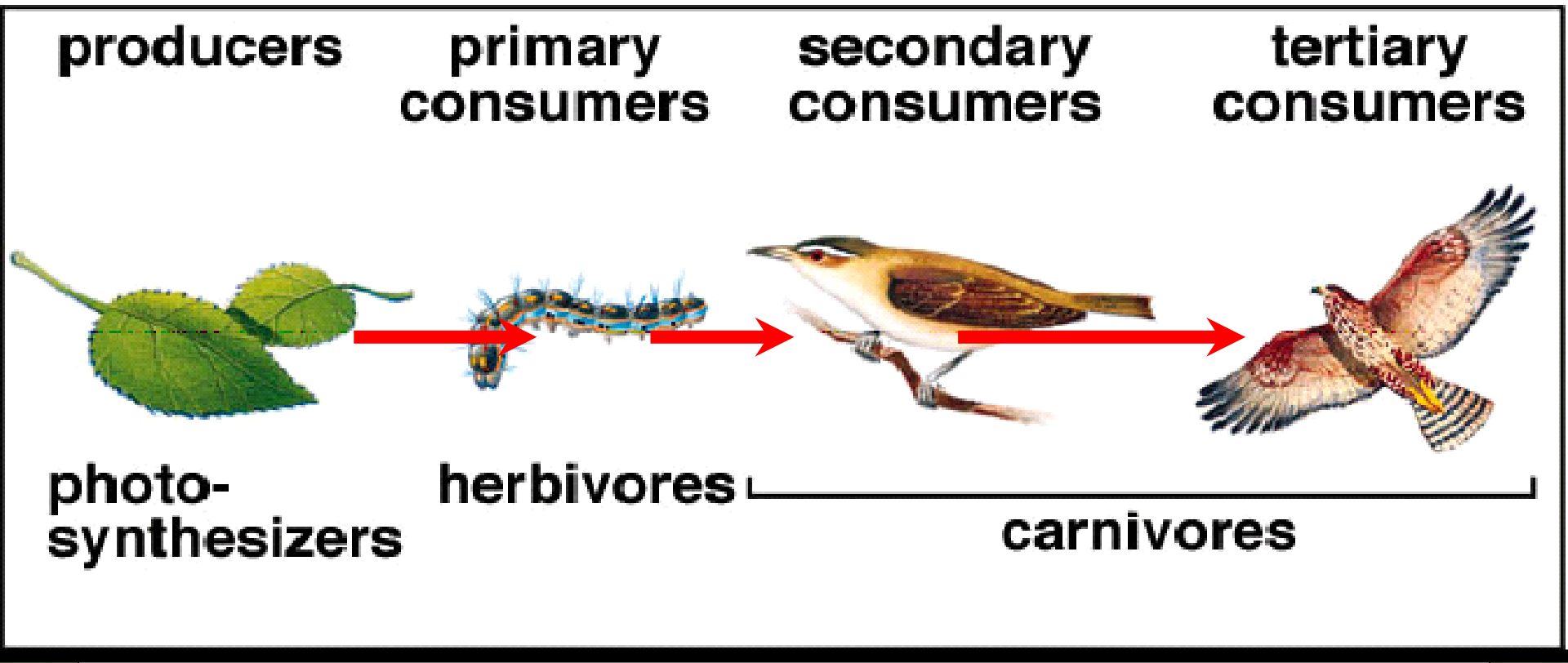
Photosynthesis makes it possible to capture light energy from sun and transform it into chemical energy of organic molecules (food).



The Flow of Energy in an Ecosystem

- All organisms are chemical **machines** driven by energy captured in photosynthesis.





Food Chain

Describes both feeding relationships between organisms and one possible path energy can travel in an ecosystem.

FOOD WEB:

- shows the interactions between a wide variety of organisms in the environment
  - creating a complicated,interconnected path of energy flow.
- can be used to study effects of the changing or introduction of a variable in an environment

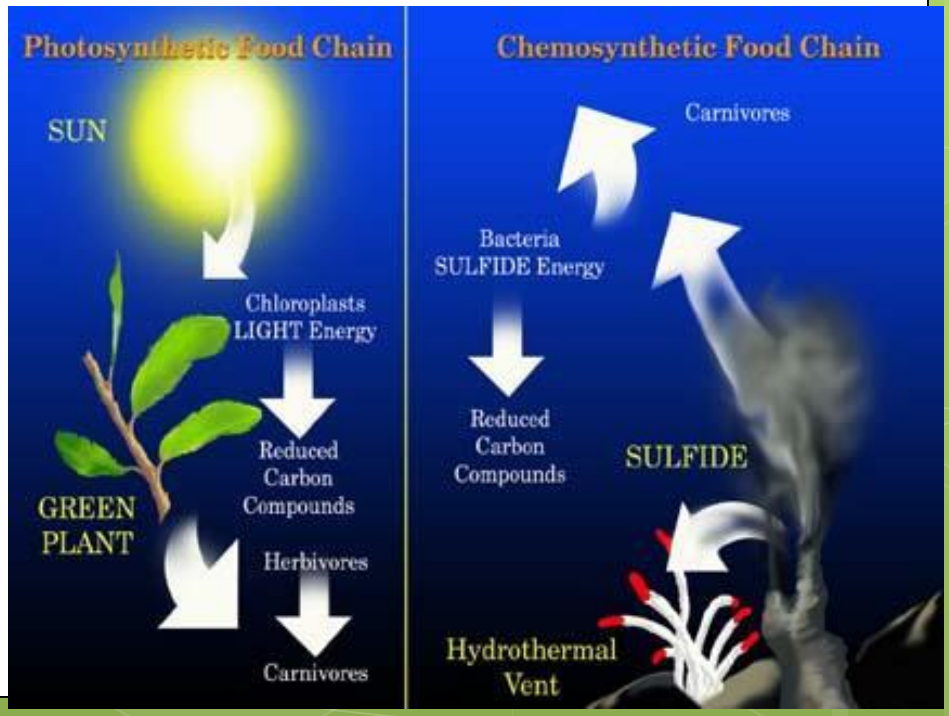
Producer: (AKA: Autotroph)

Auto: Yourself **Troph: Source of energy**

Translates as: Getting energy from a source that is yourself.

Organisms that capture energy from sunlight and use it to make food are known as photosynthesizers.
(e.g. all plants)

Organisms that capture energy from chemicals and use it to make food are known as chemosynthesizers.
(e.g. bacteria in hydrothermal vents)



Consumer: (AKA: Heterotroph)

Hetero: Different **Troph: Source of energy**

Translates as: Getting energy from a source different than themselves.

- obtains energy to build their molecules by eating plants or other organisms
- Different levels of consumers depending on where they eat
  - Primary
  - Secondary
  - Tertiary
  - Quaternary

Primary Consumers
(1st consumer of the food chain)

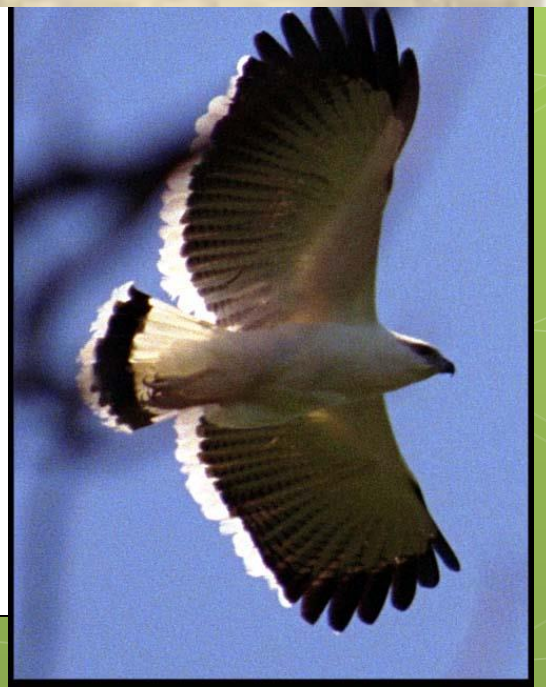
- eats producers
- Also known as herbivores
  - Eg. Cows, horses, caterpillars and ducks

Secondary Consumers
(2nd consumer on the food chain)

- eats herbivores
- Carnivore
  - Eg. Wolf, ferret, and leopard

Tertiary Consumer
(3rd consumer on the food chain)

- eats second order (other carnivores)
- Carnivore
  - Eg. Hawk
    Cougar

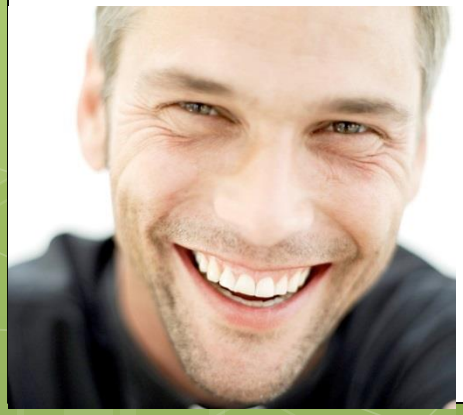


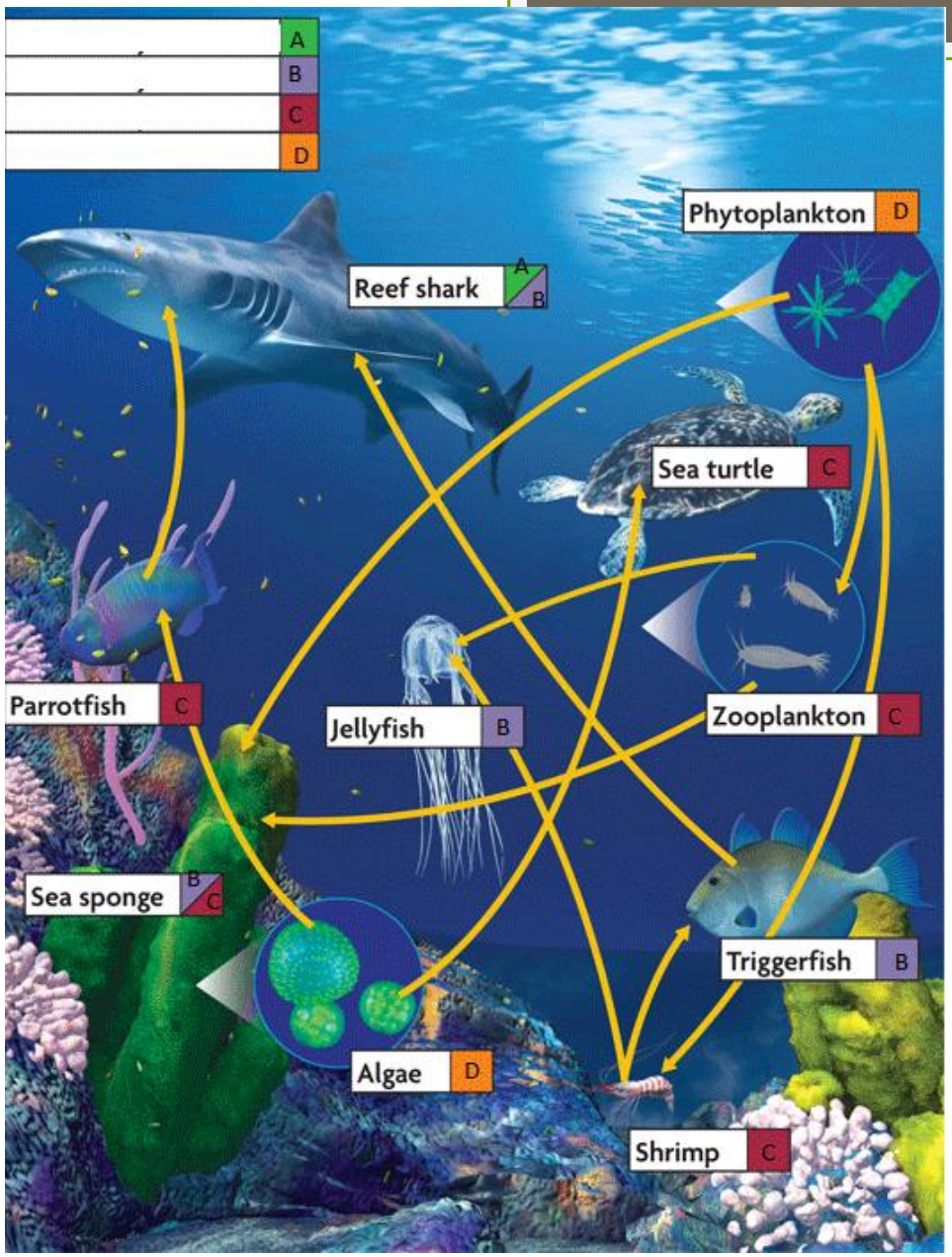
Quaternary
(4th consumer on the food chain)

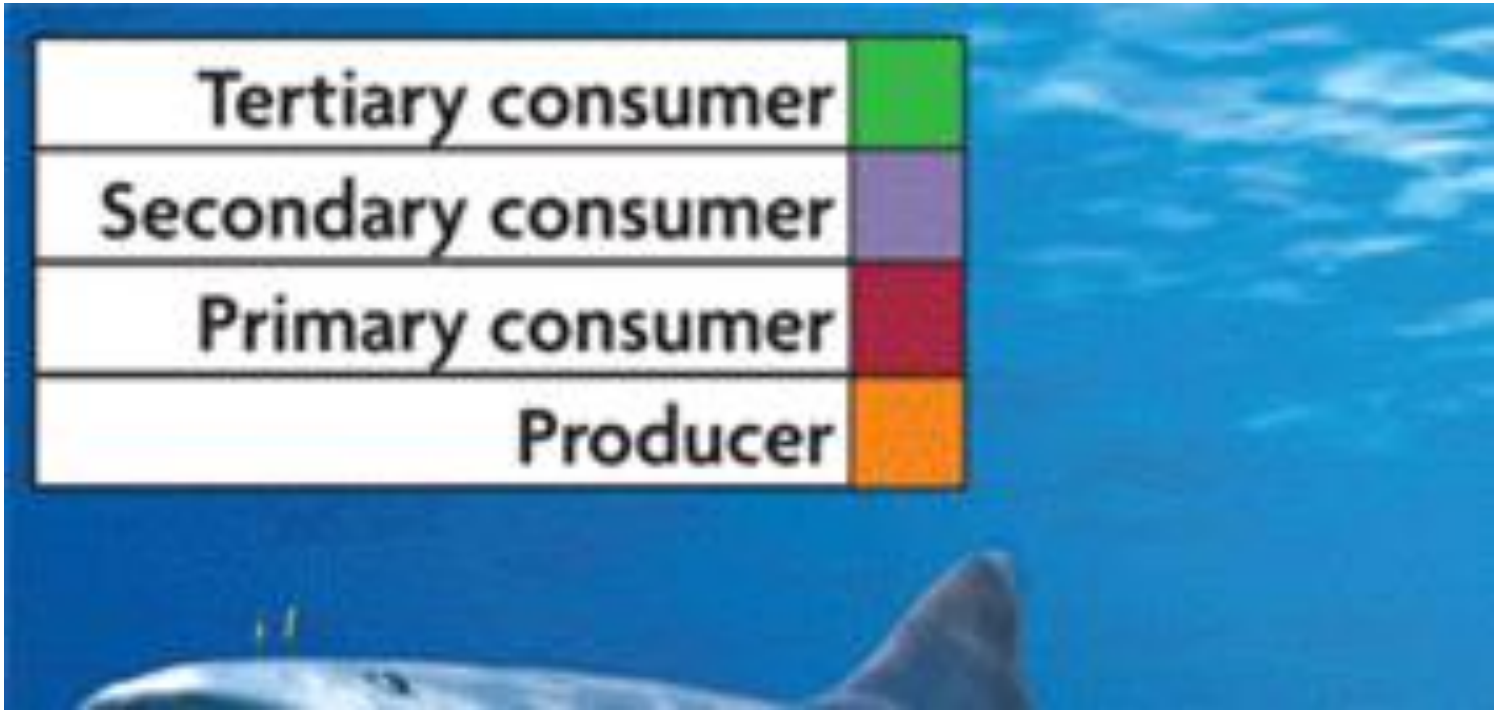
- this is very rare…
  - Not enough energy at the level before to support these higher levels
  - Carnivore
    - Eg. Orca

Omnivores

- obtains the energy to build their molecules by consuming plants or other organisms




A
B
C
D
Phytoplankton D
Reef shark A B
Sea turtle C
Parrotfish C
Jellyfish B
Zooplankton C
Sea sponge B C
Triggerfish B
Algae D
Shrimp C


Tertiary consumer
Secondary consumer
Primary consumer
Producer

Introduced Variables to the food web

- Using the aquatic food web above, explain what would happen if the zooplankton population drastically declined.

- Explain what would happen if the reef shark population drastically increased.

Can an Organism Act at Different Consumer Levels?