ECOLOGY:

The study of how organisms interact with the living and nonliving things that surround them.

Living versus Non- living

ABIOTIC: Non- living factors in the environment.

*examples: air, water, soil

BIOTIC: Living factors in the environment

*examples: plants, animals, decomposers

The Organization of Life

- Species- A group of organisms that only reproduces within itself.

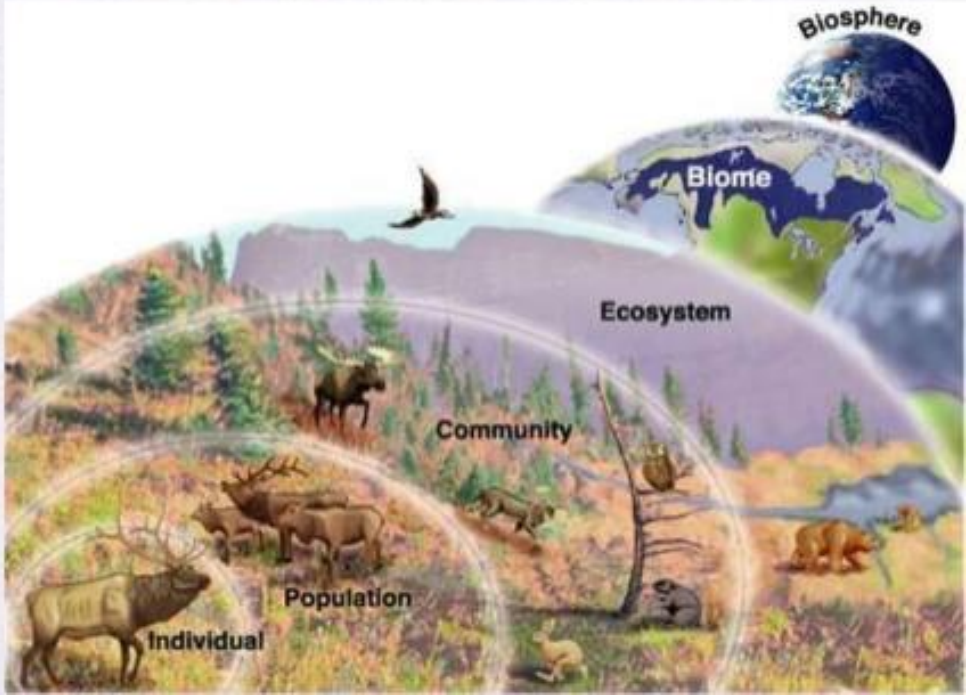
- Population- Members of the same species in the same area.

- Community- All of the species that occupy an area.

- Ecosystem-All of the living and nonliving things that occupy an area.
- Biome- Regions characterized by climate, dominant plants, and animals
- Biosphere- Any region of our planet that supports life.

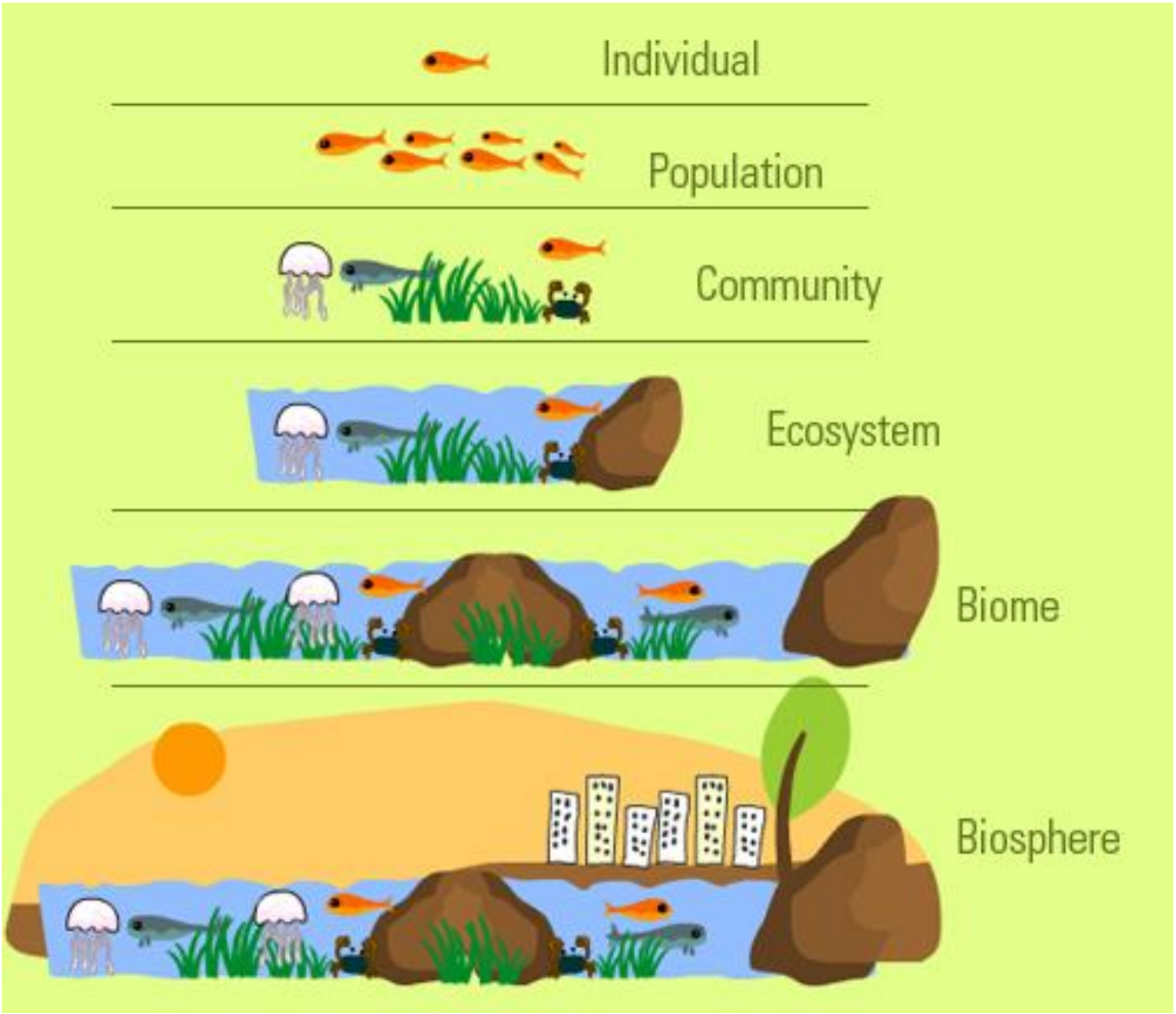
Levels of Organization

- Smallest → Largest
  - Species (Individual)
  - Population
  - Community
  - Ecosystem
  - Biome
  - Biosphere



Examples of Organization

- Species- Dragonflies
- Population- Dragonflies in the AHS pond
- Community- All the species in the AHS pond
- Ecosystem- All of the abiotic and biotic aspects of the AHS pond
- Biome- Temperate Deciduous Forest
- Biosphere- Earth areas that support life.


Individual
Population
Community
Ecosystem
Biome
Biosphere

HABITAT versus NICHE

- HABITAT: The specific environment that an organism calls its 'home.'

  example- A pond is the dragonflies habitat.

- NICHE: The specific ROLE that an organism plays in its environment.
- *example- An owl lives in the forest, is nocturnal and preys upon small mammals.*

Requirements for an Ecosystem

1. There must be a constant flow of energy into the ecosystem
2. There must be a cycle of materials between living and nonliving organisms.

Feeding Relationships in an Ecosystem:

THE PRODUCERS

- Autotrophs- Organisms that can produce their own food through photosynthesis

- Form the base of any food chain or food web

Feeding Relationships in an Ecosystem-
THE HETEROTROPHS

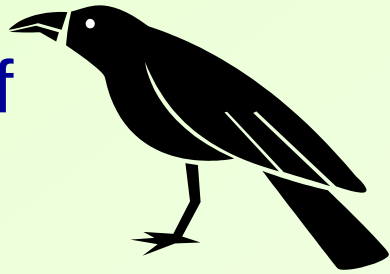
- AKA Consumers
- Organisms that cannot produce their own food and therefore must consume their food
- HERBIVORES- Animals that feed on plants (deer)
- CARNIVORES- Animals that feed on other animals (wolves)

MORE HETEROTROPHS

- OMNIVORES- Animals that feed on both plants and other animals (humans)

- DECOMPOSERS- Organisms that breakdown dead or decaying organic matter and return the nutrients to the soil (ex. Bacteria and Fungus)

- SCAVENGERS- Organisms that feed off of dead organisms (crows)



- In any ecosystem, the growth and survival of organisms depends on the physical conditions and on the resources available to the organism.

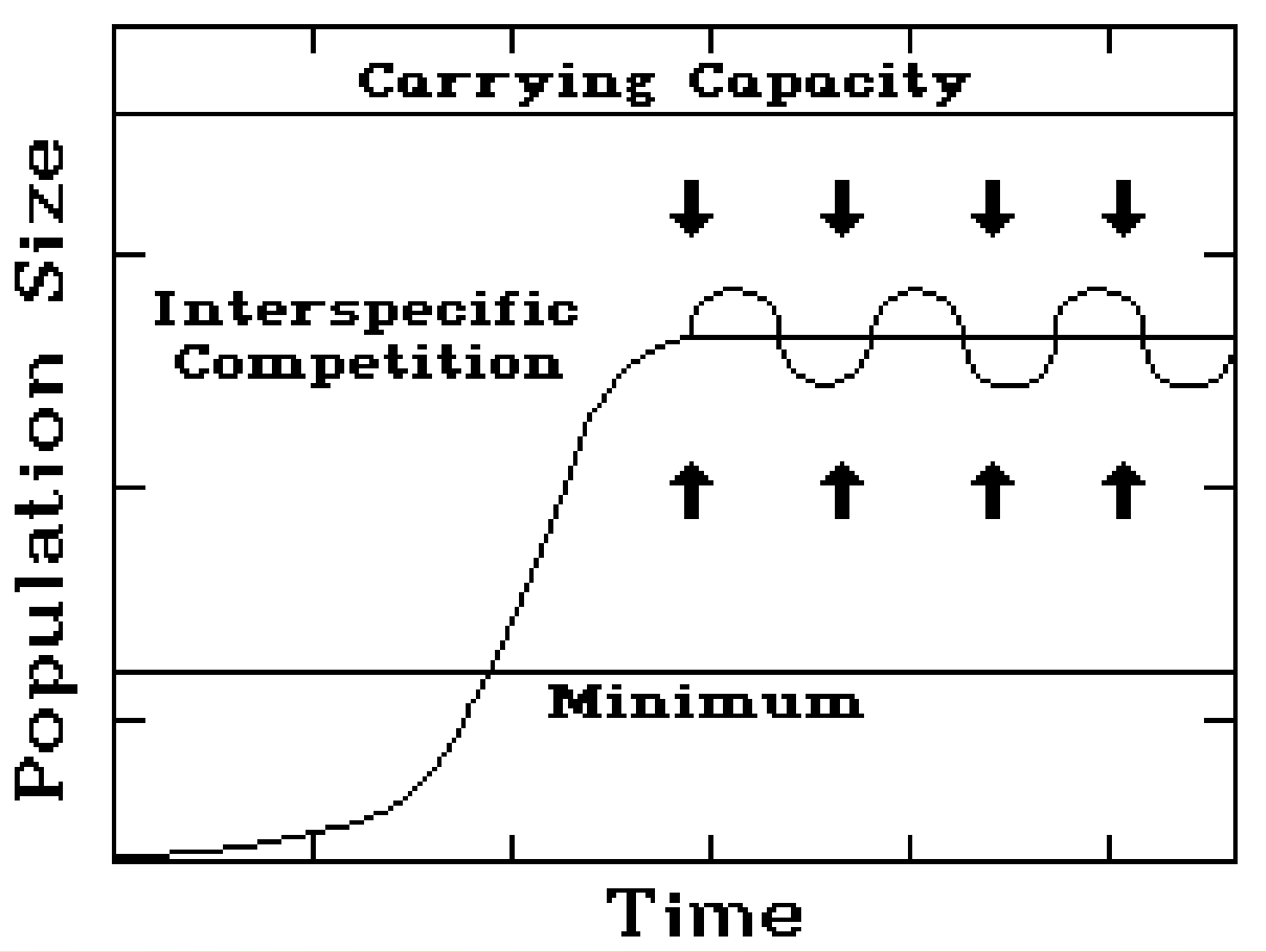
- COMPETITION: The struggle for resources among organisms.

- LIMITING FACTORS: Factors in the environment that limit the size of populations. (amount of food, availability of space, water availability, etc.)

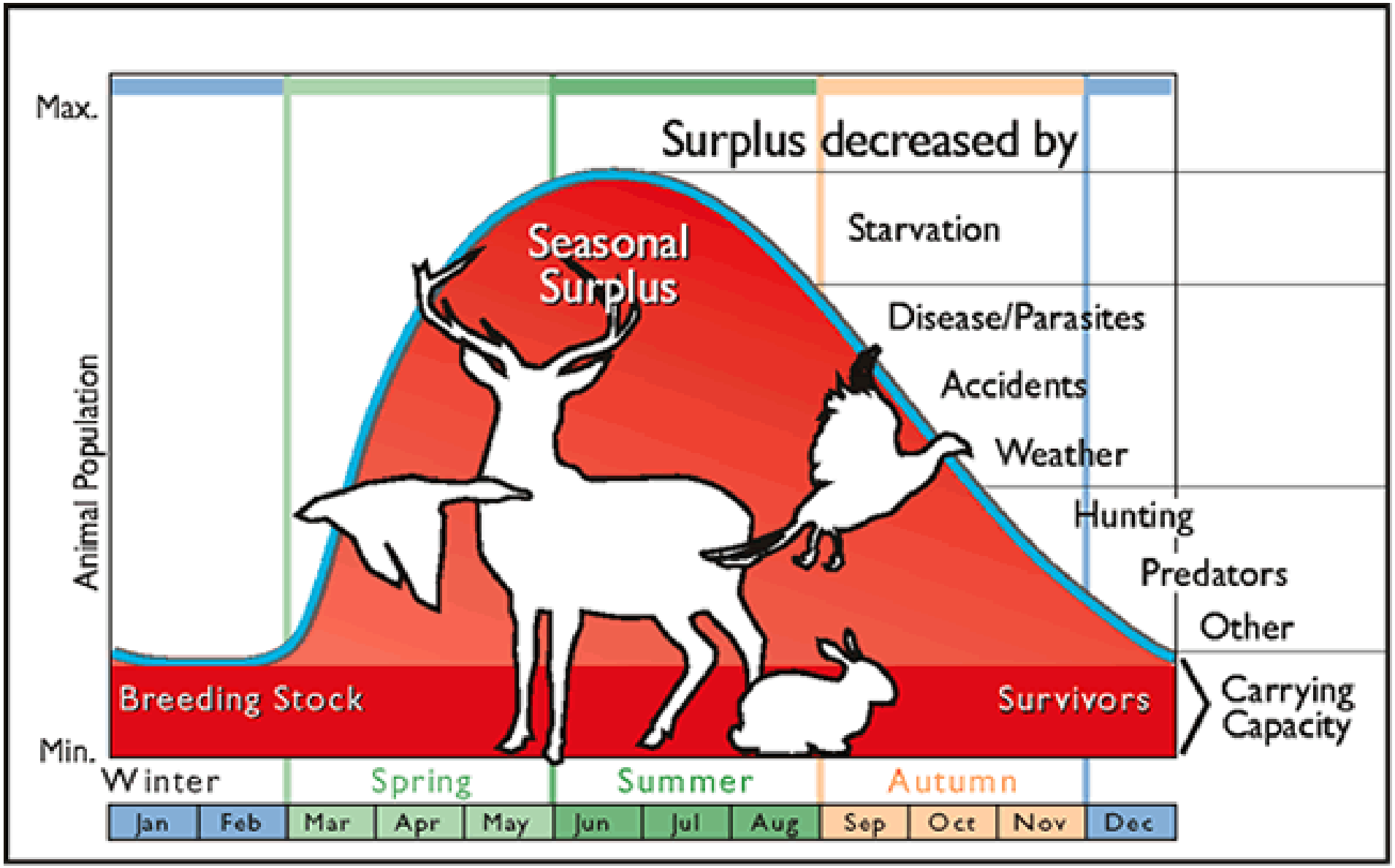
Carrying Capacity

- The amount of organisms that an ecosystem can support.
- The carrying capacity of an area is determined by its limiting factors.
- A population may only continue to grow until it has reached its carrying capacity

Carrying Capacity:



Graph of carrying capacity



Symbiotic Relationships

- Close association between 2 organisms
  - –Parasitism: one organism benefits and the other organism is harmed (+,-)

Deer Tick on Dog

Parasitism

Fly larvae on bird chick

Symbiotic Relationships

–Commensalism- one organism benefits and the other is neither harmed or helped(+,0)

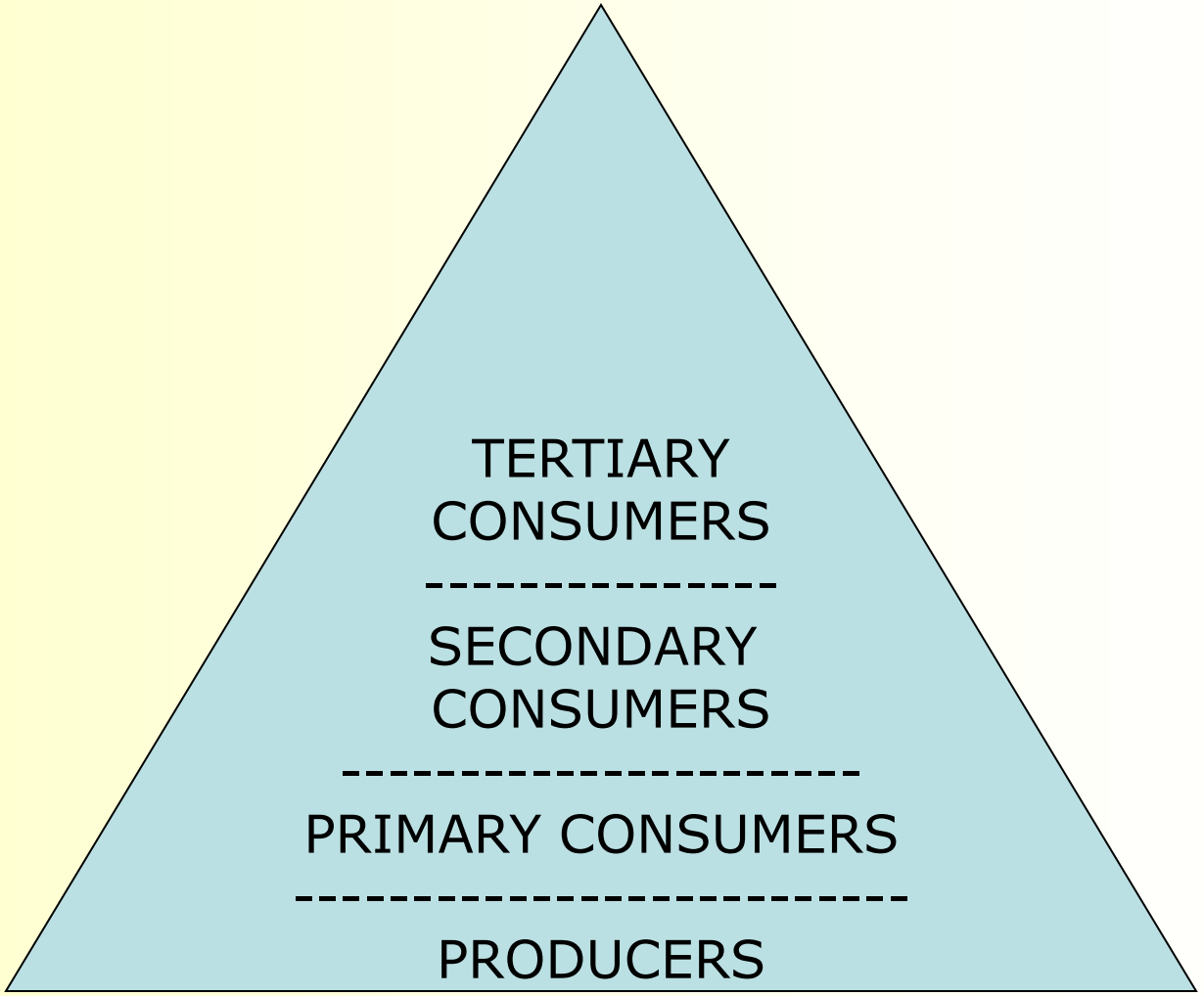
Owl in Tree or
Shark with
Pilot fish

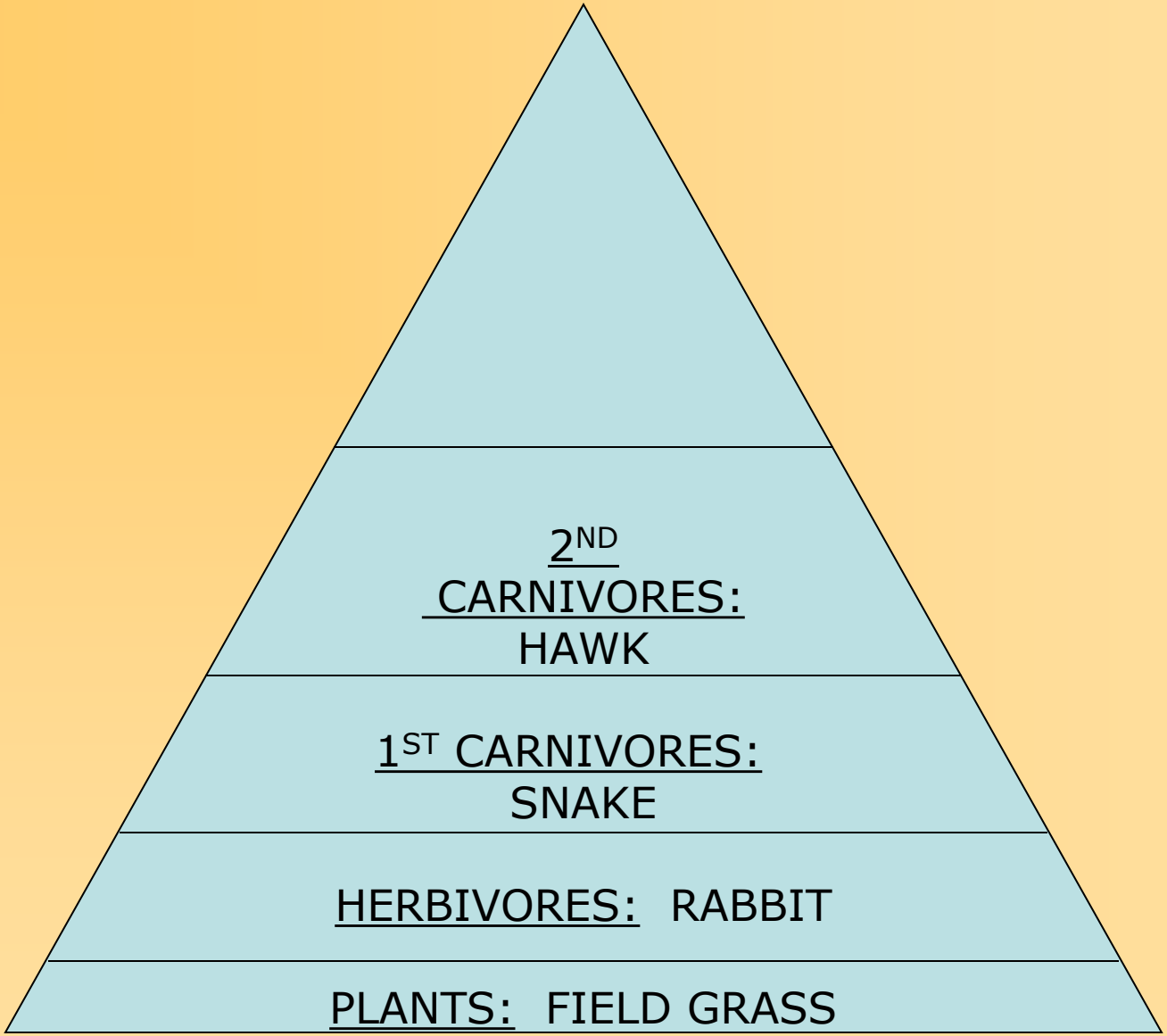
Mutualism

- Mutualism- both organisms benefit (+,+)

Cleaner Shrimp or Clownfish in an anemone

THE PYRAMID OF LIFE




2ND
CARNIVORES:
HAWK
1ST CARNIVORES:
SNAKE
HERBIVORES: RABBIT
PLANTS: FIELD GRASS

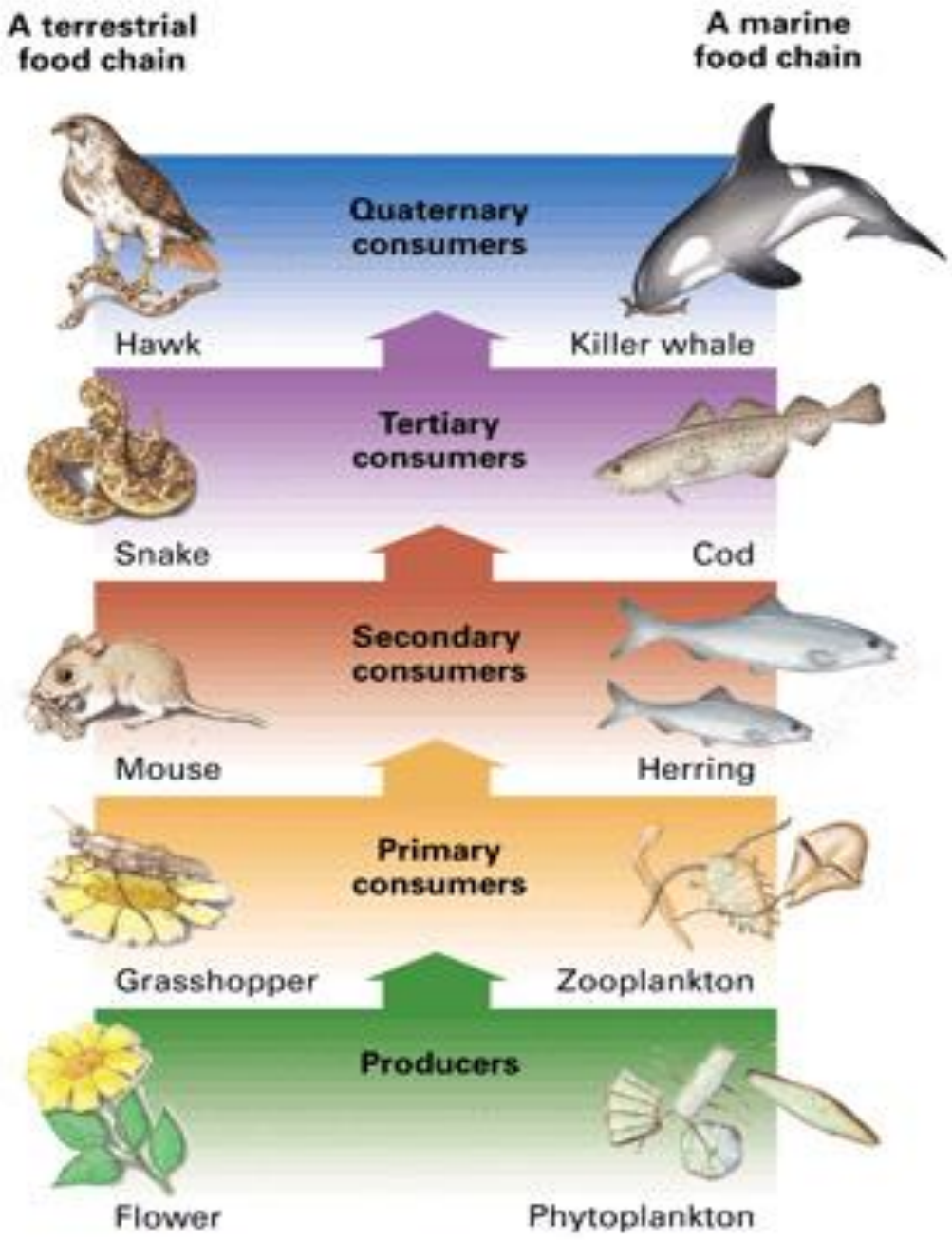
ORGANIZATION OF FEEDING RELATIONSHIPS

Food Chain- The flow of energy through an ecosystem. Only one feeding pathway is illustrated.

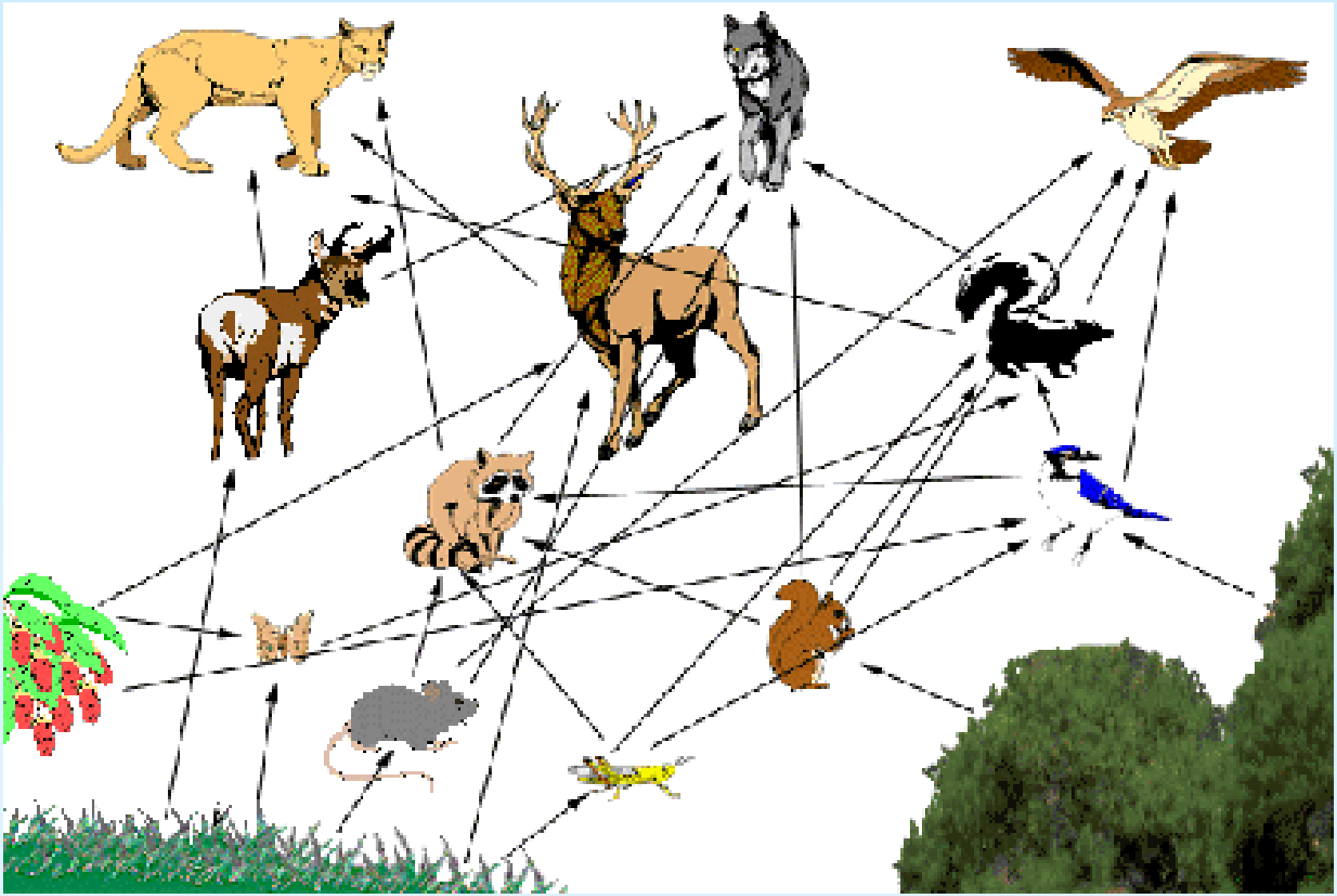
Food Web- Shows all feeding pathways in an ecosystem.

THE ARROW IN BOTH CHAINS AND WEBS ALWAYS POINTS IN THE DIRECTION ENERGY IS FLOWING!!!

A Food Chain: Demonstrates ONE PATHWAY of feeding within an ecosystem.

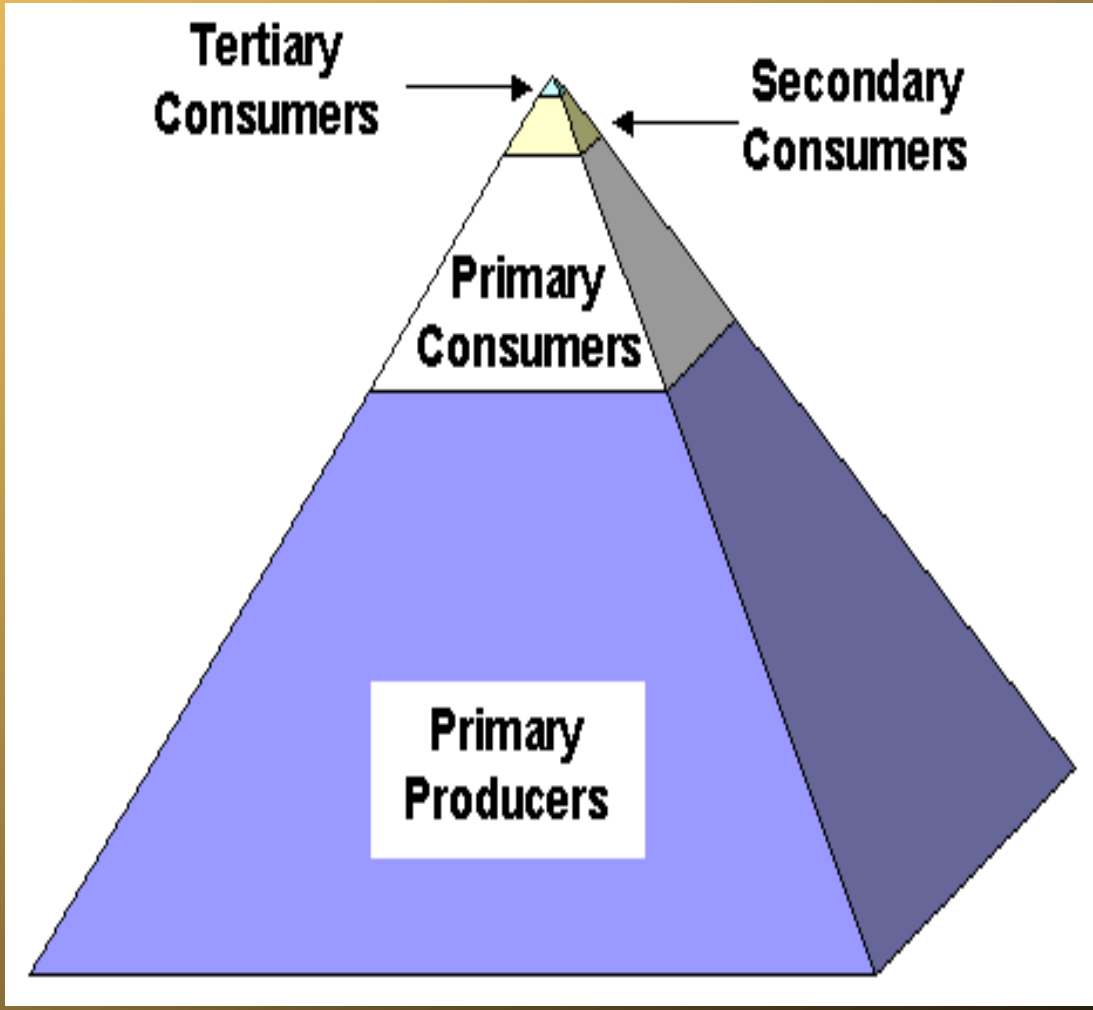


A FOOD WEB: shows all feeding relationships (notice the direction of the arrows)



The Pyramid of Biomass

The amount of energy or biomass decreases at each level of the food chain. As a result, fewer organisms can be supported at each level!!!



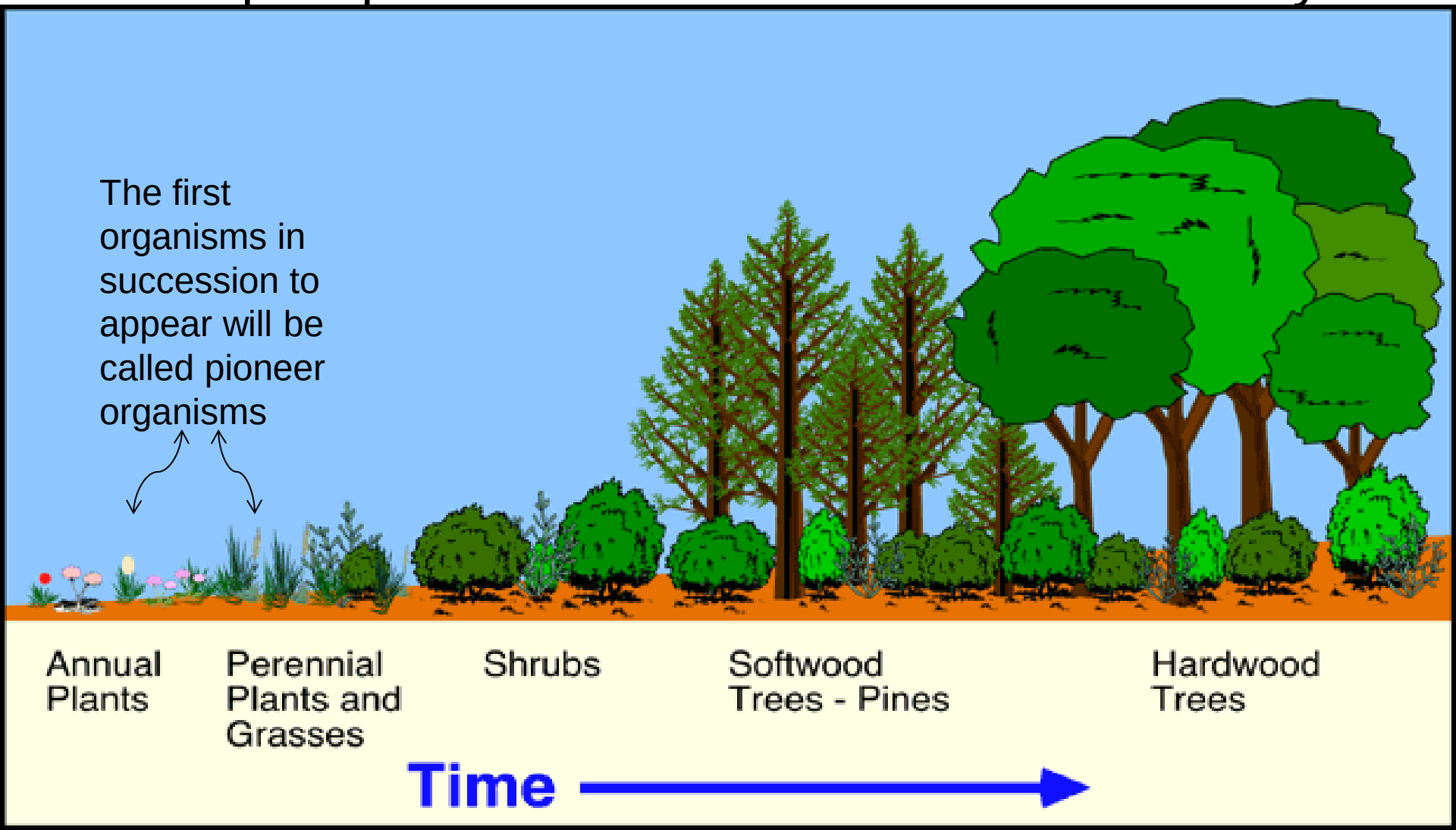
Succession

The aging of an ecosystem… the process by which populations in an ecosystems are gradually replaced by new ecosystems.

Each community in succession makes the environment better for the next community.

EACH GROUP OF ORGANISMS PREPARES THE WAY FOR THE NEXT!

Land Succession: The change in vegetation in an ecosystem as the soil matures and changes. The soil is enriched at each stage, preparing the way for more complex plants. Results in a climax community



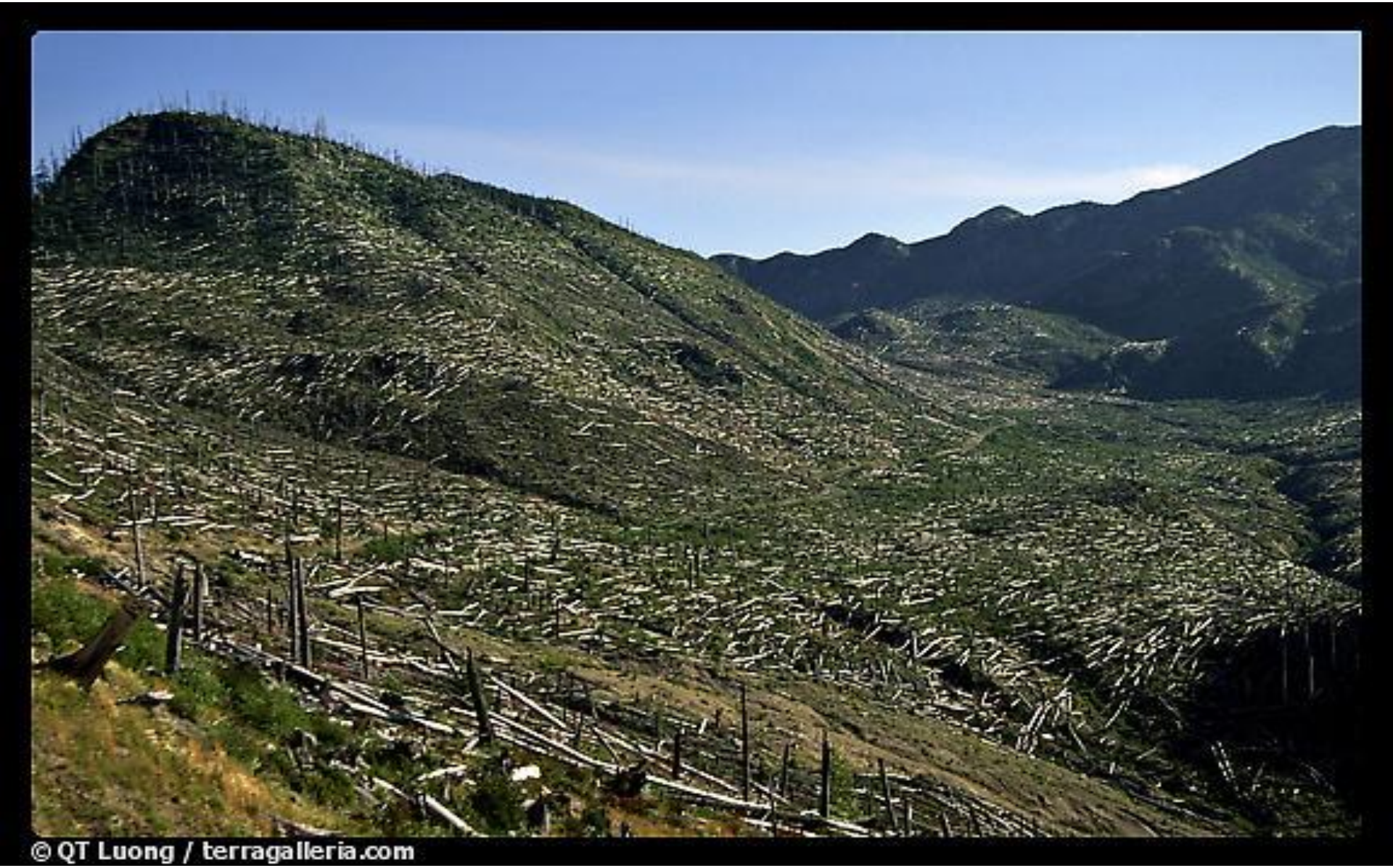
Let’s Start From The Beginning

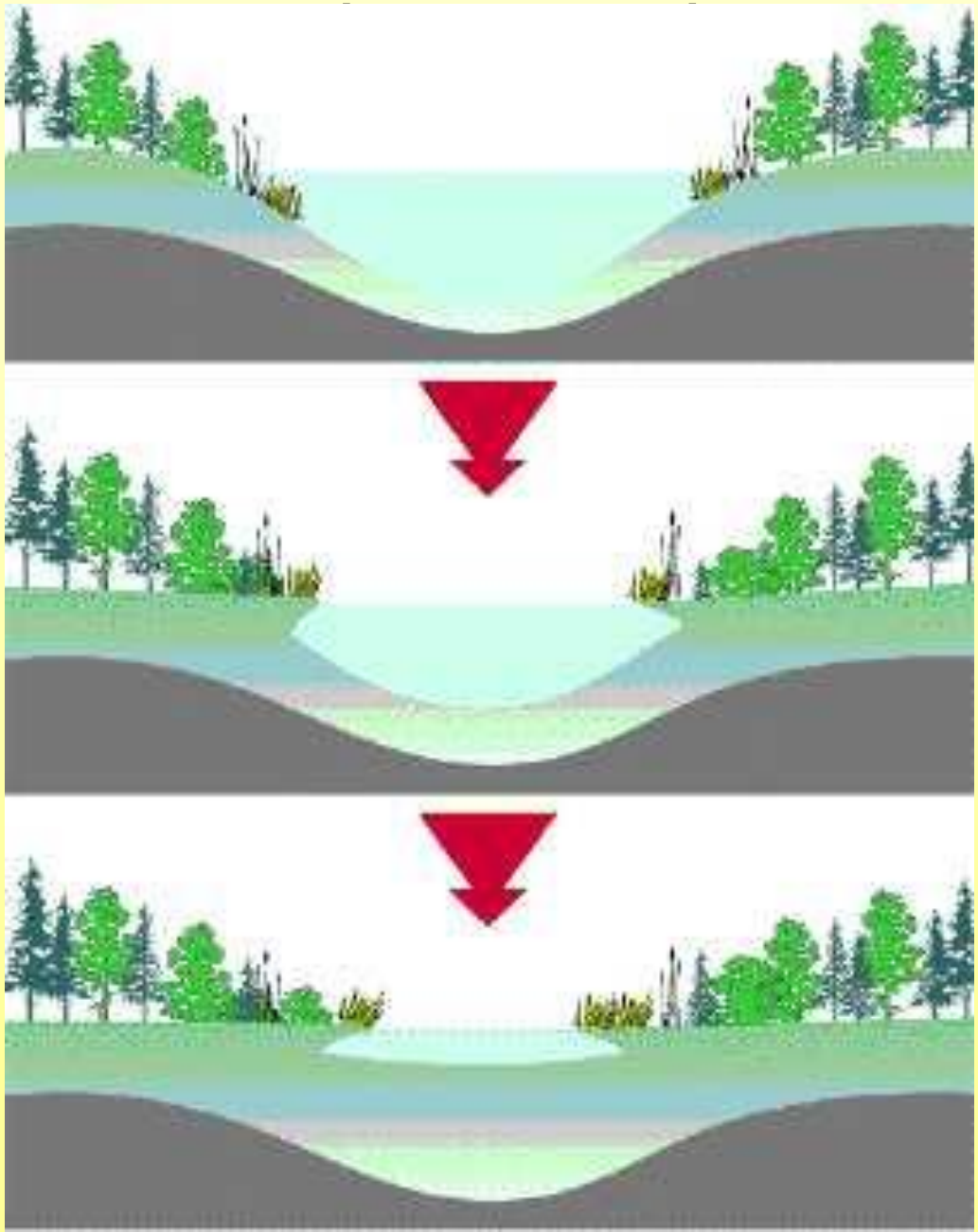
- You need some disturbance to clear the land:

Fire

Mt. St. Helens: May 18, 1980

Mt. St. Helens





Pond Succession

The gradual filling in of a pond over time.

CYCLES IN NATURE

The Water Cycle…

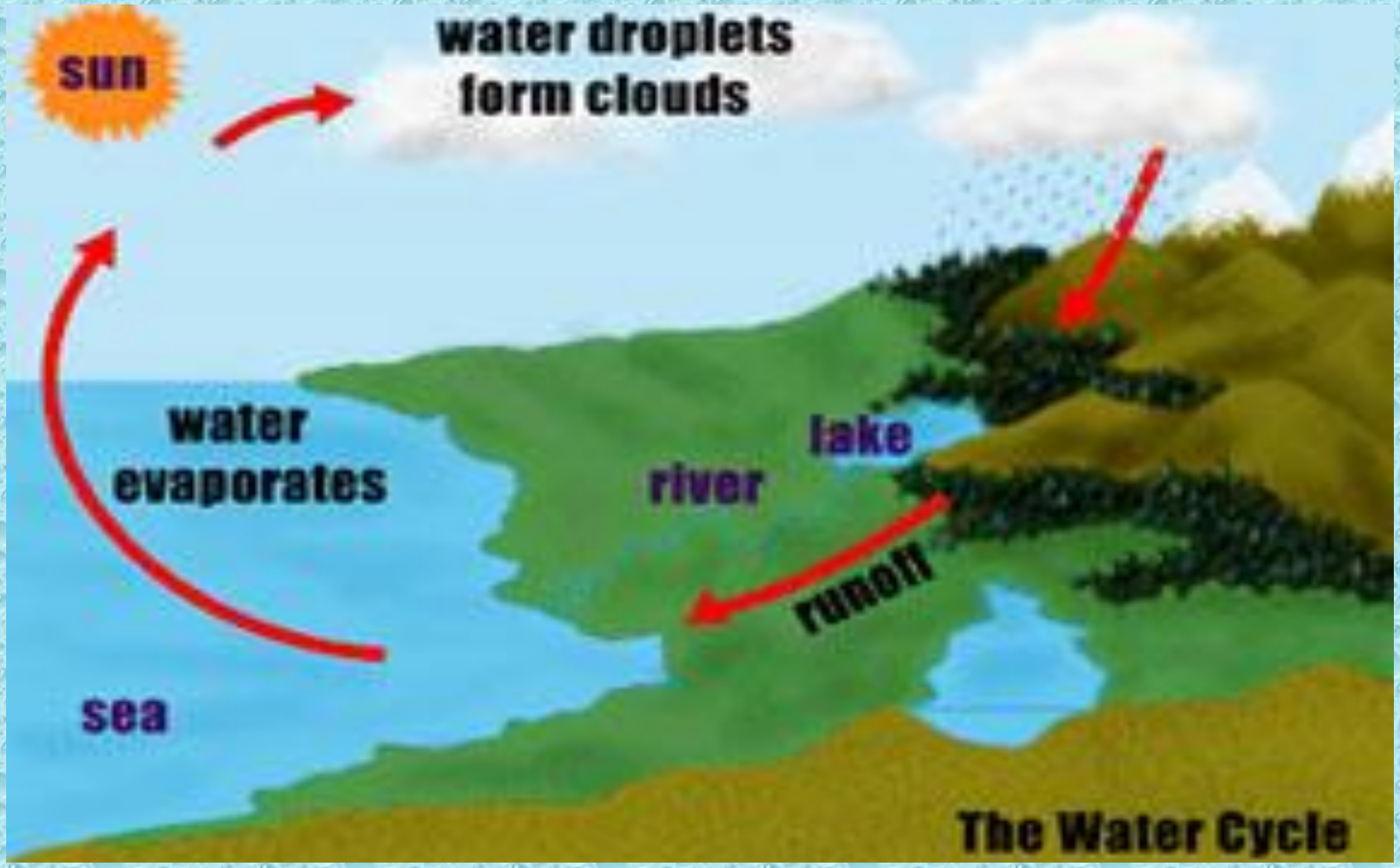
Precipitation- the falling of water back to earth

Infiltration- water penetrates soil and bodies of water

Evaporation- water changes from a liquid to gas

Condensation- water vapor condenses into clouds

The Water Cycle

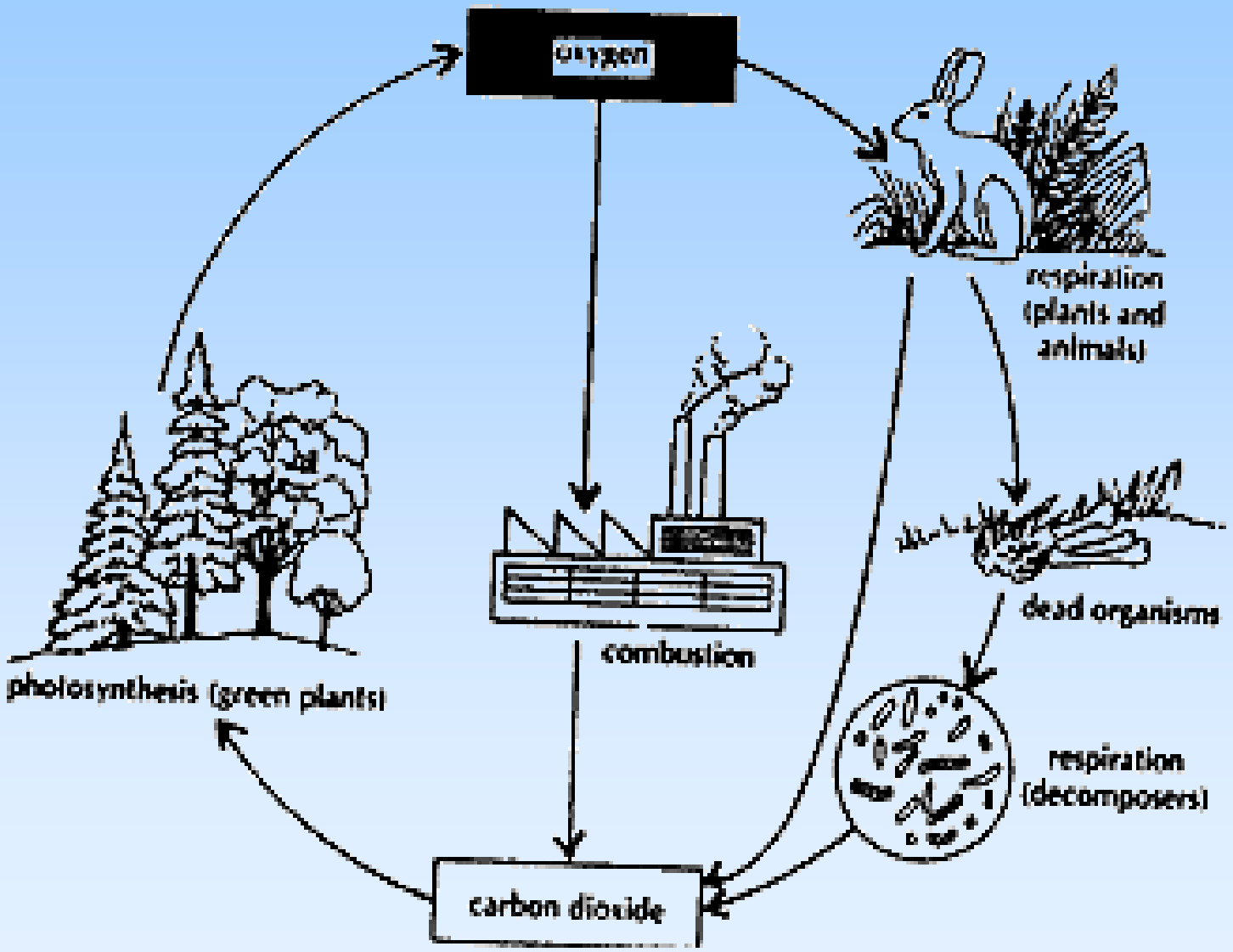


The Carbon-Oxygen Cycle

- Carbon Dioxide is absorbed by plants in photosynthesis. Oxygen is released by plants in photosynthesis.

- Oxygen is absorbed by plants and animals in cellular respiration. Carbon Dioxide is released as a waste product during cellular respiration

The Carbon/ Oxygen Cycle



Nitrogen Cycle

- Nitrogen is necessary to construct protein.
- Nitrogen is not in a usable form in the air.
- Nitrogen fixing bacteria convert atmospheric nitrogen into a usable form for plants.
- Denitrifying bacteria return nitrogen to the atmosphere.
- Decomposing bacteria help in this process…

The Nitrogen Cycle