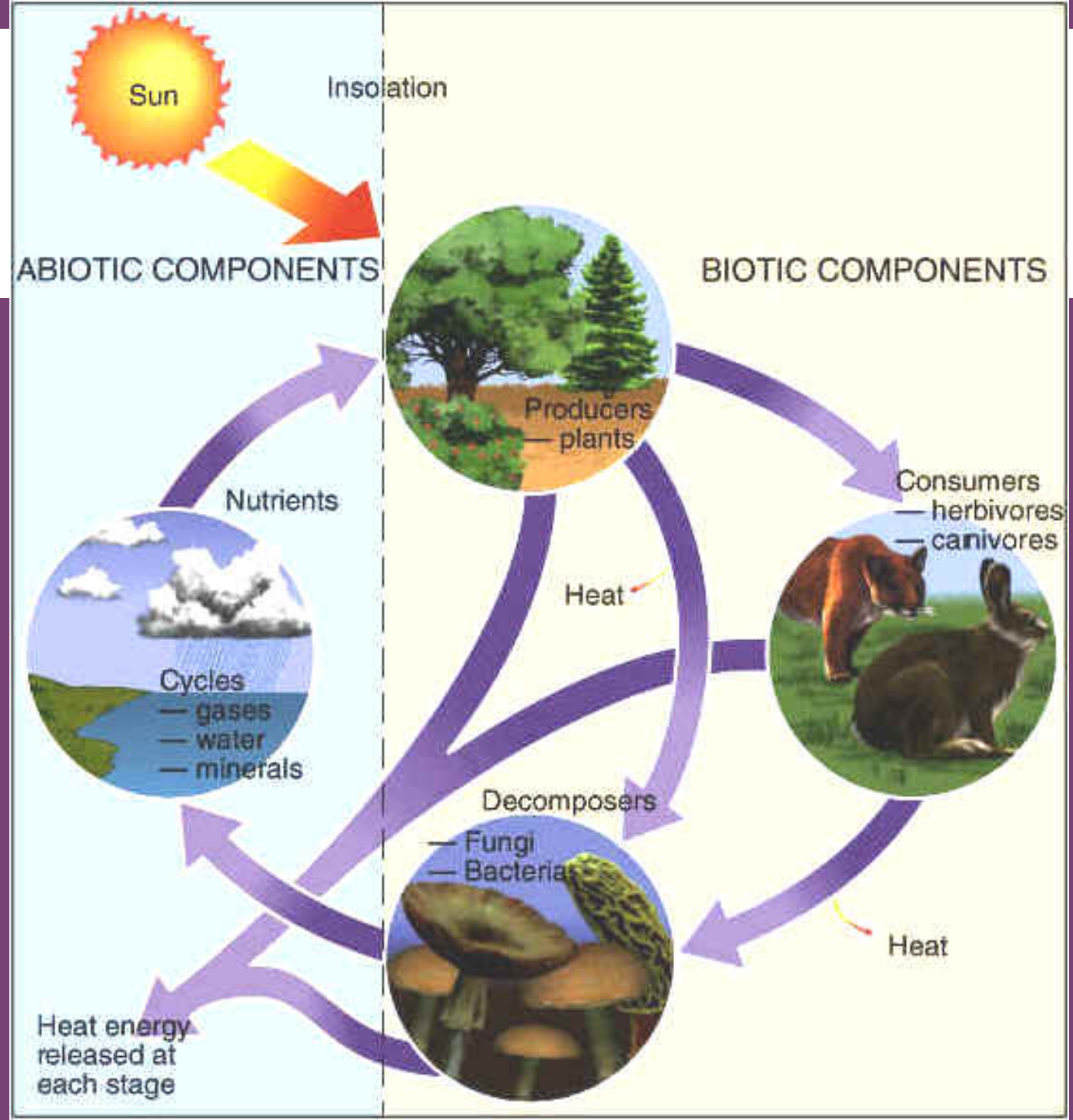


# REPORTING CATEGORY 5

# #31-CHANGES TO ECOSYSTEMS

# ENVIRONMENTAL CHANGE

- **Ecosystem** – physically distinct, self-supporting unit of interacting **biotic** and **abiotic** factors
- When analyzing how an event will change an ecosystem, keep these questions in mind:
  1. Are producers affected?
  2. Did nutrient/mineral levels change?
  3. Are any organisms directly hurt/killed?
  4. Did habitat loss occur?

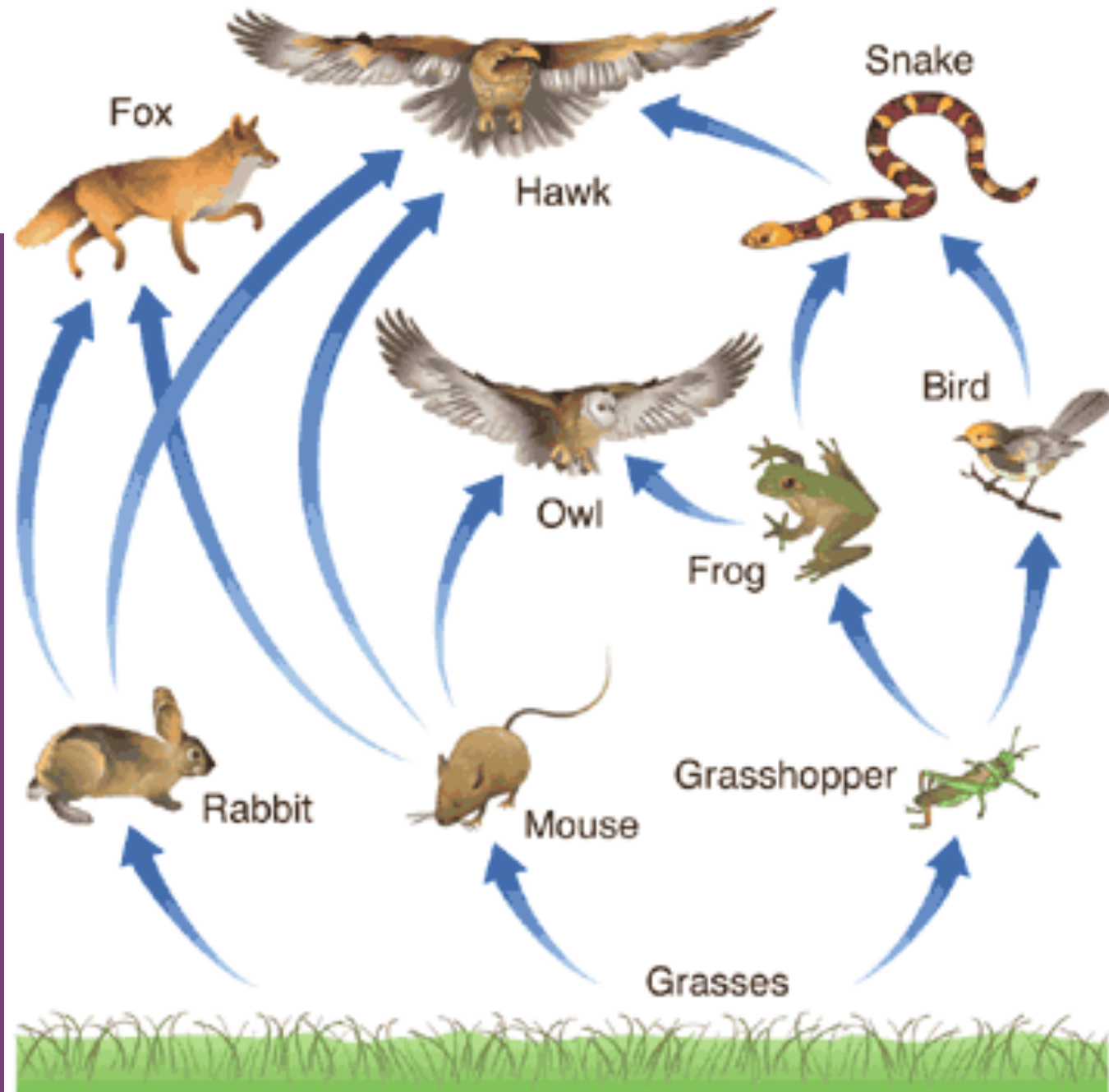


# #14-TROPHIC LEVELS

# FEEDING RELATIONSHIPS

## Food Web

- More realistic path through an ecosystem made of many food chains
- Energy flows through ecosystems from producers to consumers
- Producers (make food) aka **autotrophs**
- Consumers (use food by eating producers or other consumers) aka **heterotrophs**  
*ex: herbivores, carnivores, omnivores, decomposers, scavengers*



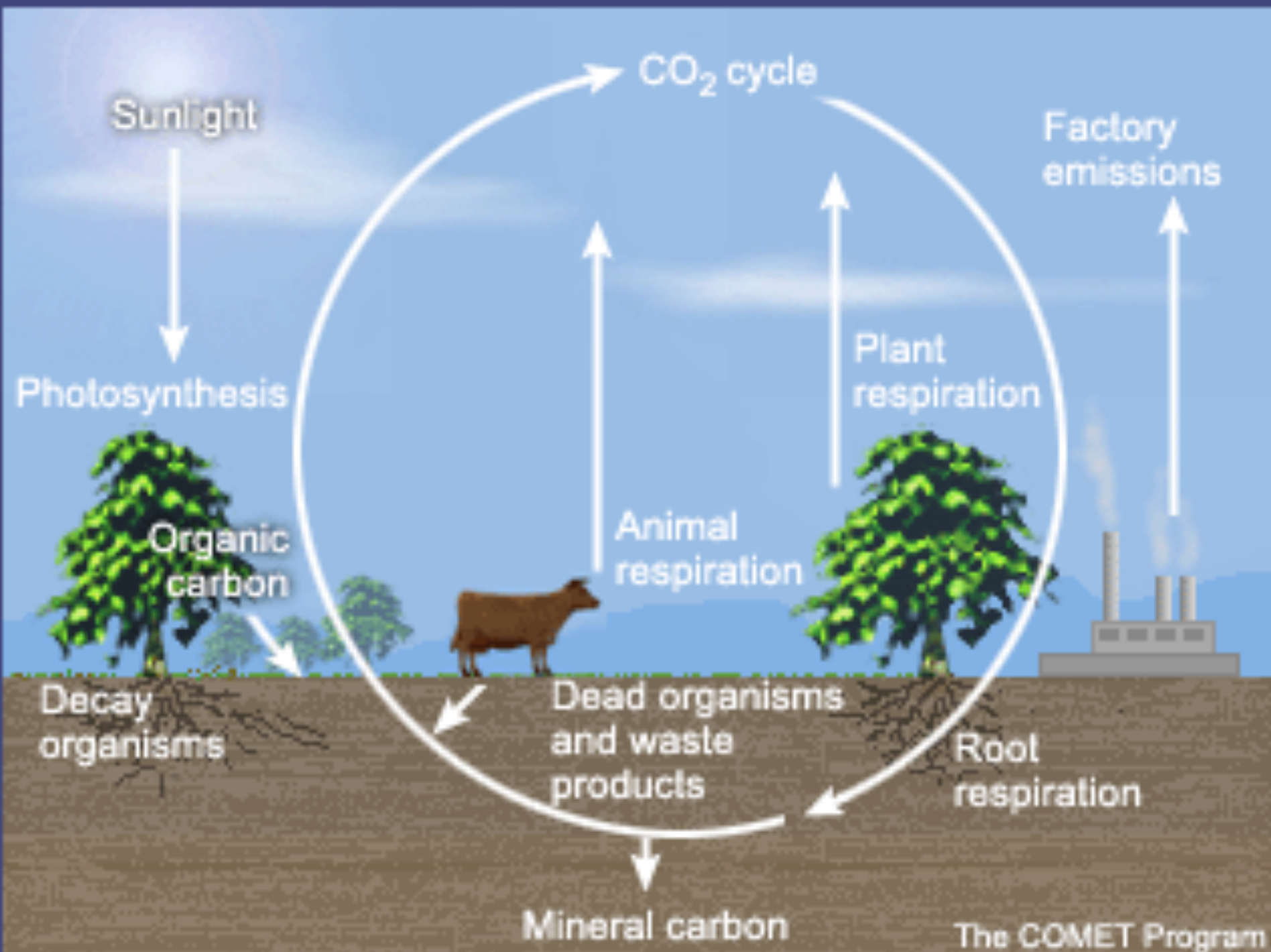
# #42-ECOLOGICAL SUCCESSION

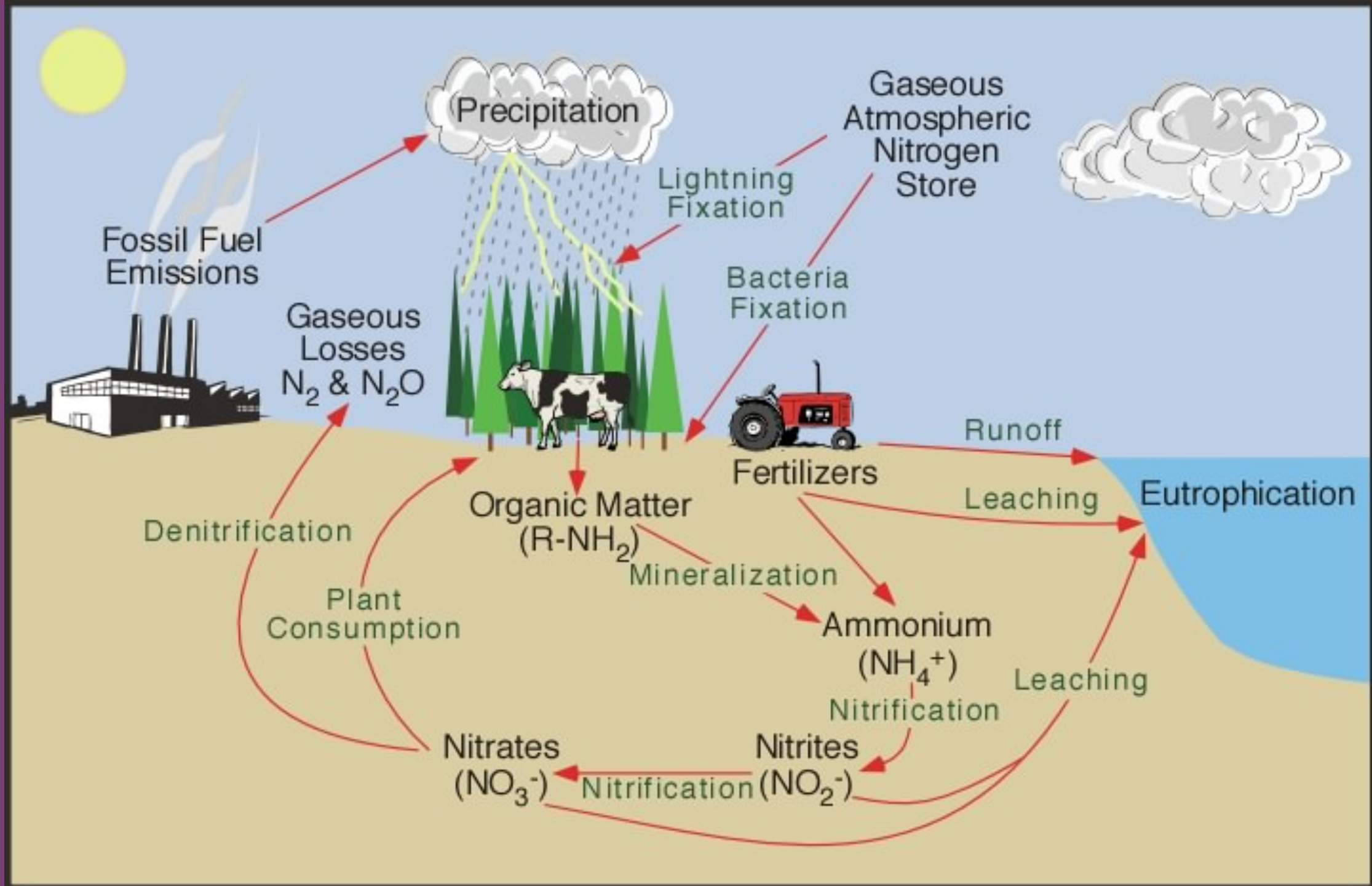


- **Primary succession** is a series of changes that occur in an area where no ecosystem has ever been.
- **Secondary succession** occurs when there are a series of changes after a natural disturbance (hurricane, fire, etc..) It only can occur in a place where an ecosystem has already existed.
- **Pioneer species** are the first species to populate an area.

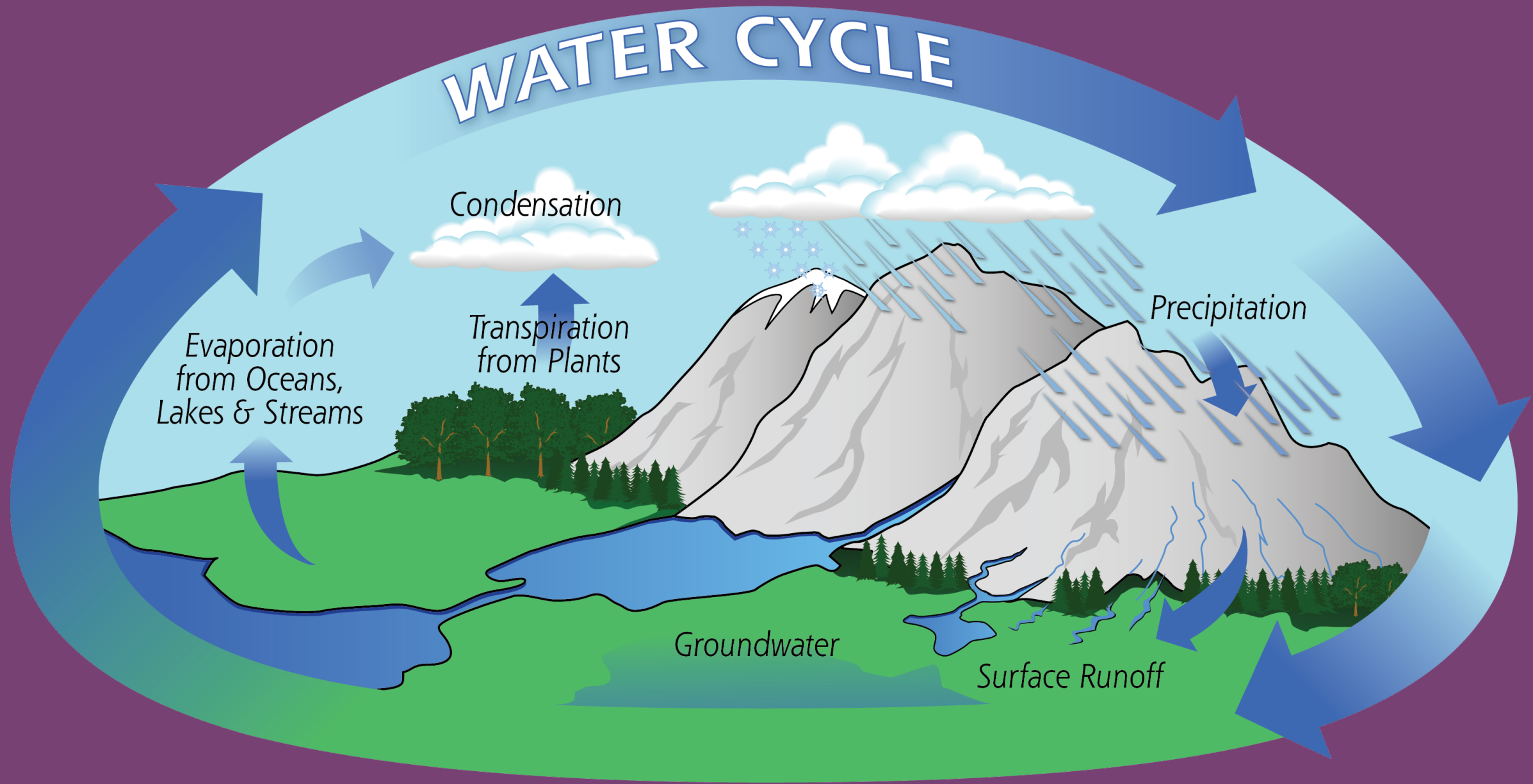
# #27-CYCLES OF MATTER





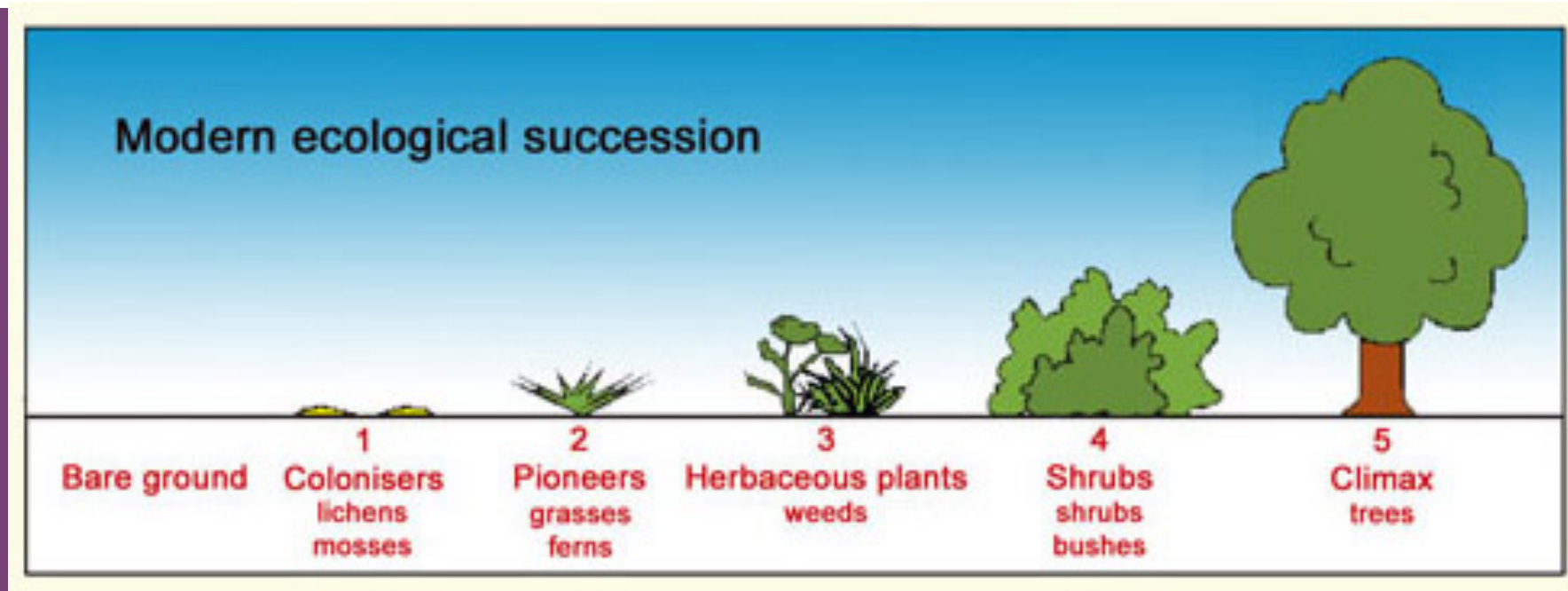


# WATER CYCLE



# #2-ECOLOGICAL SUCCESSION

# GOAL IS A CLIMAX COMMUNITY



Ecosystems develop toward a stable, **climax community**. **Biodiversity** increases and plant and animal life becomes more complex.

# #24-SYMBIOSIS

# PERMANENT RELATIONSHIPS AMONG ORGANISMS

<b>Interaction</b>	<b>Species A</b>	<b>Species B</b>
<b><u>Commensalism</u></b>	Receives benefit	Not affected
<b><u>Mutualism</u></b>	Receives benefit	Receives benefit
<b><u>Parasitism</u></b>	Receives benefit	Harmed

#9-IMPACT ON AN ECOSYSTEM



# ABSENCE OF A SINGLE TROPHIC LEVEL CAN IMPACT ENTIRE ECOSYSTEMS

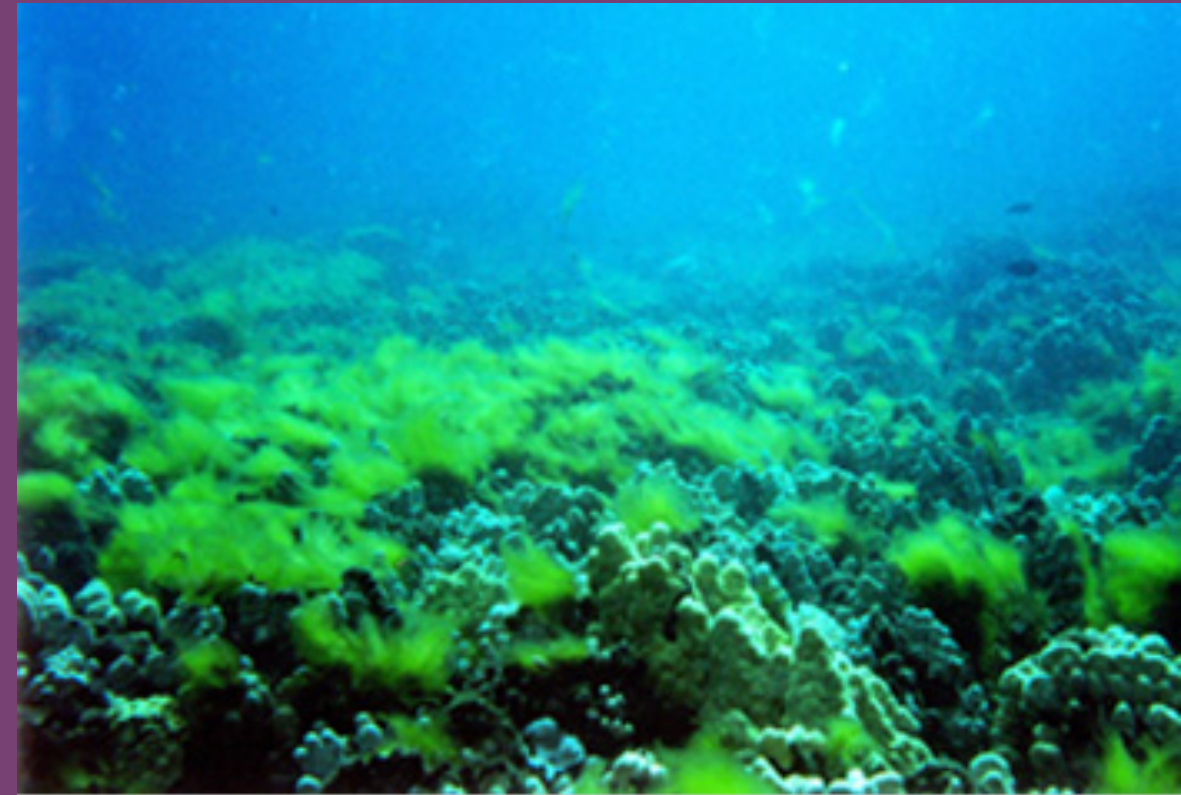
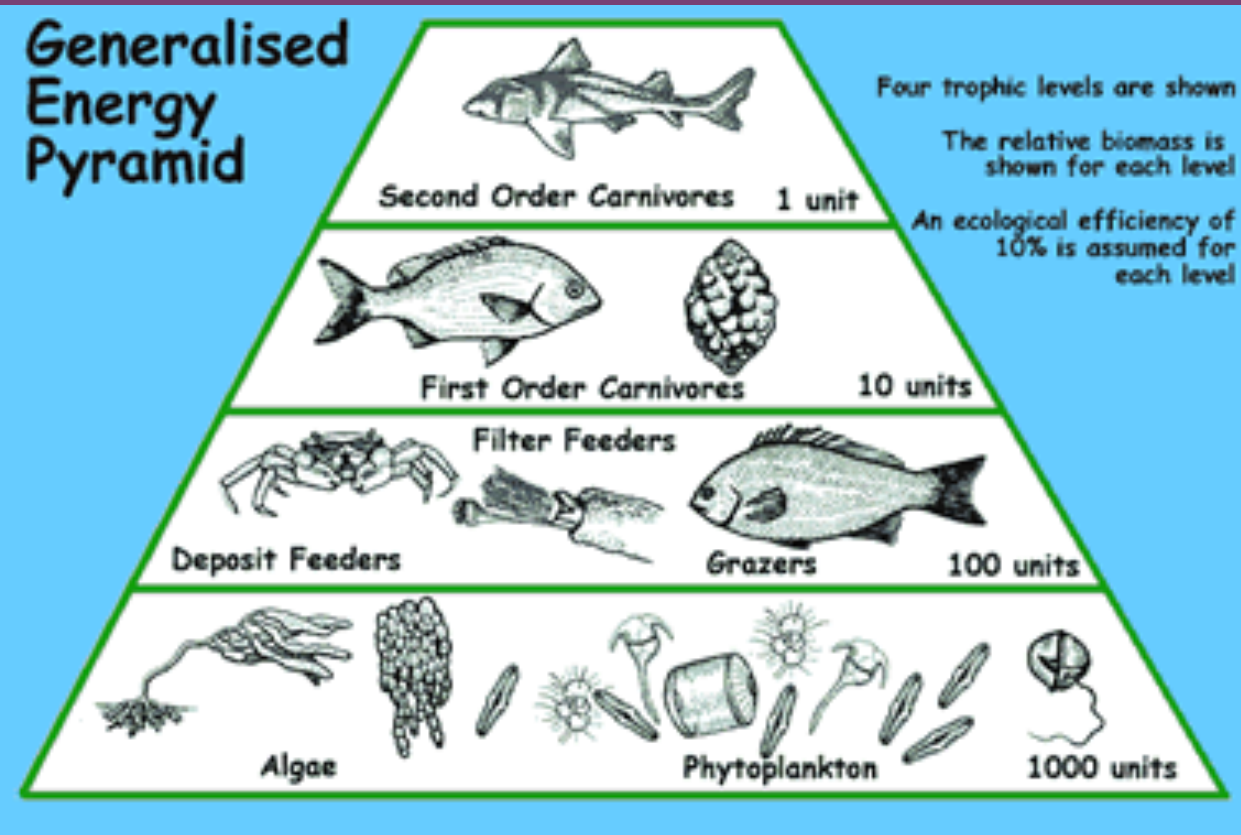


Figure 4: Algal blooms on reefs can be caused by excess input of nitrogen and phosphorus which can fertilize the seaweeds and allow them to grow over live coral.

# #46-ADAPTATIONS



**Adaptation** – any *variation* in an organism that makes it better suited to its environment that usually fulfills a survival requirement

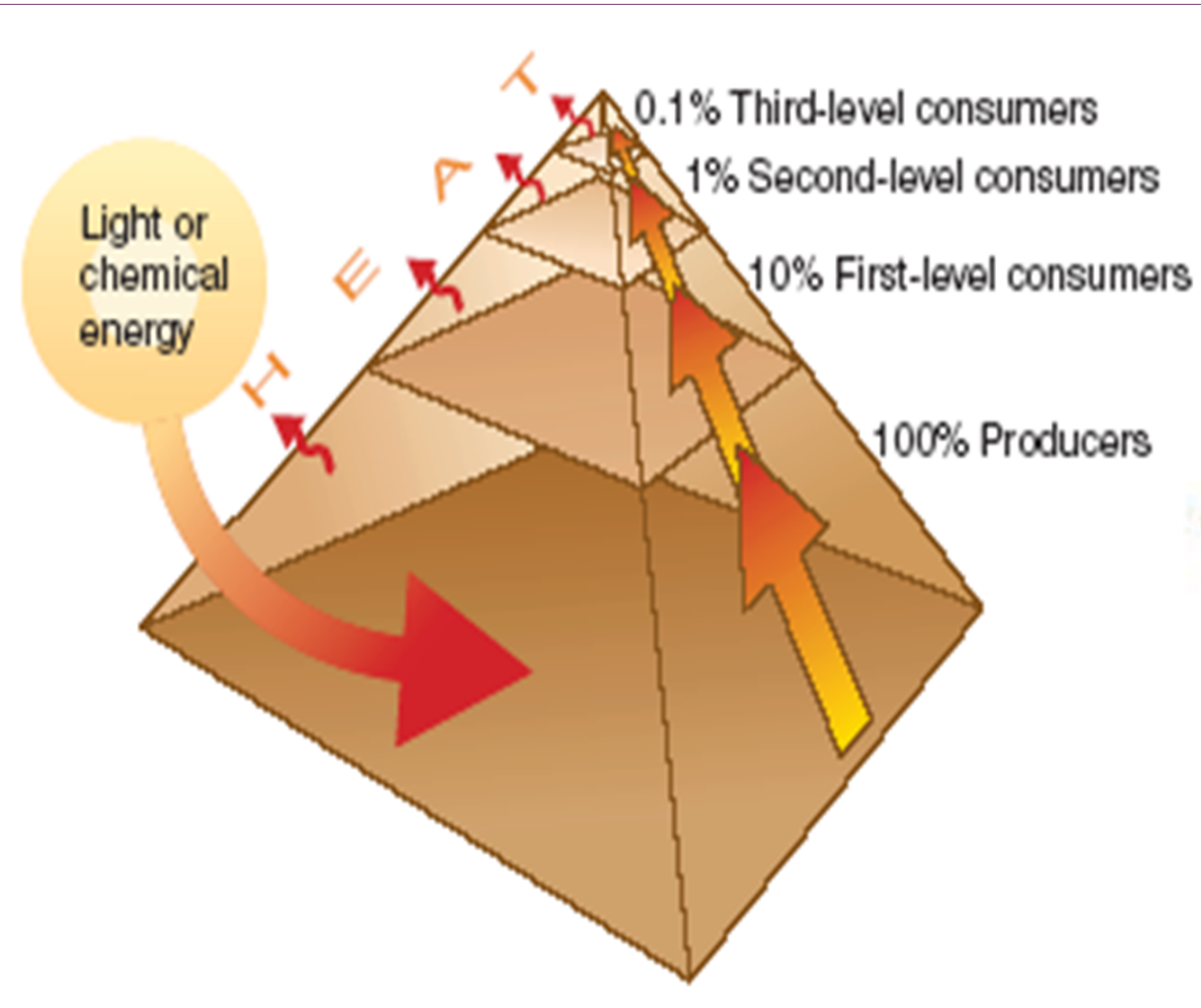
**Different ecosystems require different adaptations**

*Examples:*

- **Tundra:** freezing cold, soil frozen
  - o Plants: short to avoid wind
  - o Animals: migrate to avoid coldest periods
- **Desert:** very little water, can be very hot
  - o Plants: long roots to find water
  - o Animals: large ears to radiate heat

# #37-TROPHIC LEVELS

# ENERGY PYRAMIDS



- Producers** put in 100% of the energy into an ecosystem and form the base of the pyramid
- Pyramid shape shows a decrease in *energy/biomass/numbers* as it goes from one **trophic level** to the next

#50-COMPETITION



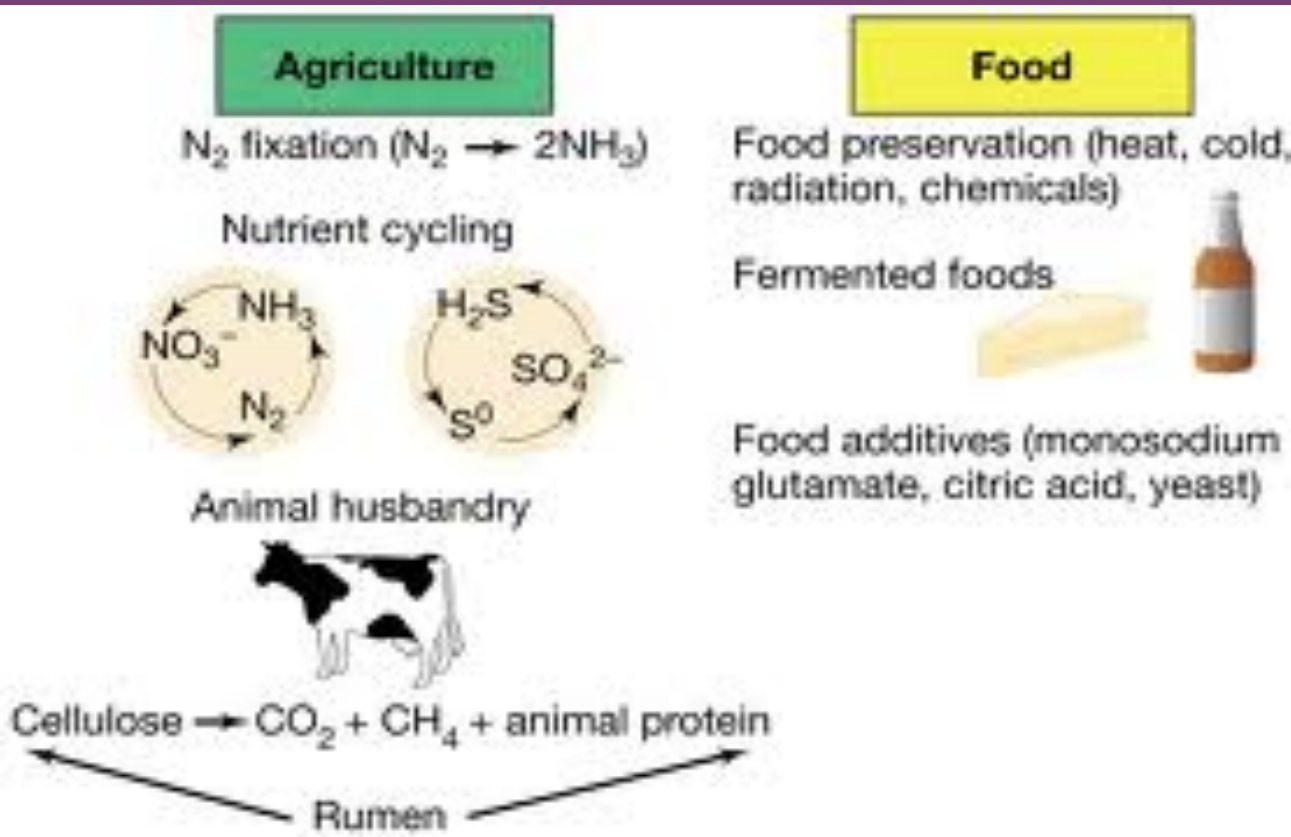
- Competition – relationship in which **both organisms are harmed** from fighting over resources.



# #40-MICROORGANISMS



# LIVING THINGS THAT CANNOT BE SEEN WITH THE NAKED EYE



## Maintain Health of Organisms

- Help **digestion** by breaking down compounds
- Used for vaccines and antibiotics

## Maintain Health of Ecosystems

- Recycle **carbon** for plants to use
- Recycle **nitrogen** for plants to use
- Create **sugars** in marine ecosystems

## Disrupt Health of Organisms

- Cause **disease** like malaria and ringworm

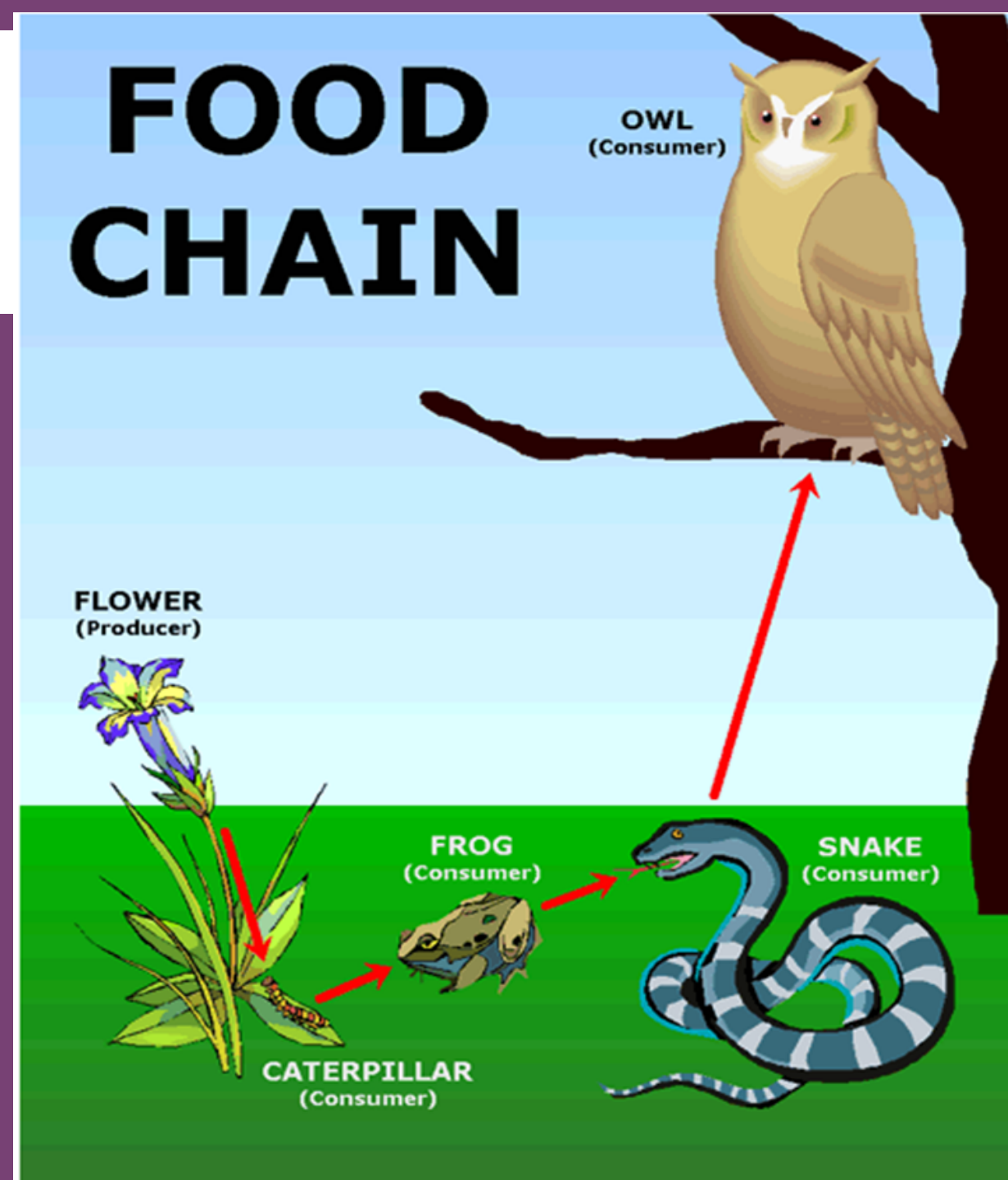
## Disrupt Health of Ecosystems

- When numerous, **toxins** become concentrated

# #12-TROPHIC LEVELS

# 10% RULE

- Energy flows through an ecosystem in one direction from producers to various levels of consumers
- 100% of the energy starts at the producer level
- At each trophic level, 90% of available energy is lost to heat
- Each new trophic level only receives 10% of usable energy from the previous level



# #11-SYMBIOSIS

# COMMON RELATIONSHIPS

- Lichens: **Mutualism** between:
  - Fungus (structure)
  - Algae or cyanobacteria (provides food)
- Mycorrhizae: **Mutualism** between:
  - Fungus (nutrient & water uptake for plant)
  - Plant (carbohydrate for fungus)
- Bacteria Nodules: cyanobacteria and certain other forms of bacteria, especially those that live in the roots of legumes **mutualistically**, conduct *nitrogen fixation* as part of their metabolism

