

Unit 9 & 10 Notes

Land Use & Human Impact

- Land Use:
 - deciding how to use land for **benefit** of the economy and ecosystem
- Human Impact:
 - Based off of land use decisions, this may **impact the biosphere** in a negative or positive way

Land Use: Agriculture Practices



- **Old Methods**
(Traditional)
 - Summer fallows
 - Spraying the fields with water
 - **Pesticide spraying** methods
 - Salinization

- **Newer Methods**
(Sustainable)

- No till Methods
- **Contour** Farming
- Terracing
- Alley Cropping
- Cover Crops
- Integrated Pest Management



Traditional Agriculture

- Pros

- Less time
- Don't have to pay as many workers
- May get **more of one** crop

- Cons

- Typically only grow **one crop** (monoculture)
- Often uses slash and burn
- Deplete soil nutrients** (Need to farm somewhere else after a season or two)
- Possible **pollution** from use of chemical pesticides and fertilizers

Sustainable Agriculture

•Pros

- Natural, continually **replenishing nutrients** in the soil
- Extends the “life of the land”
- Don’t need to **buy chemical pesticides** and fertilizers

•Cons

- Takes **time and attention to crops** to be proactive about problems
- Hard to do on a large scale

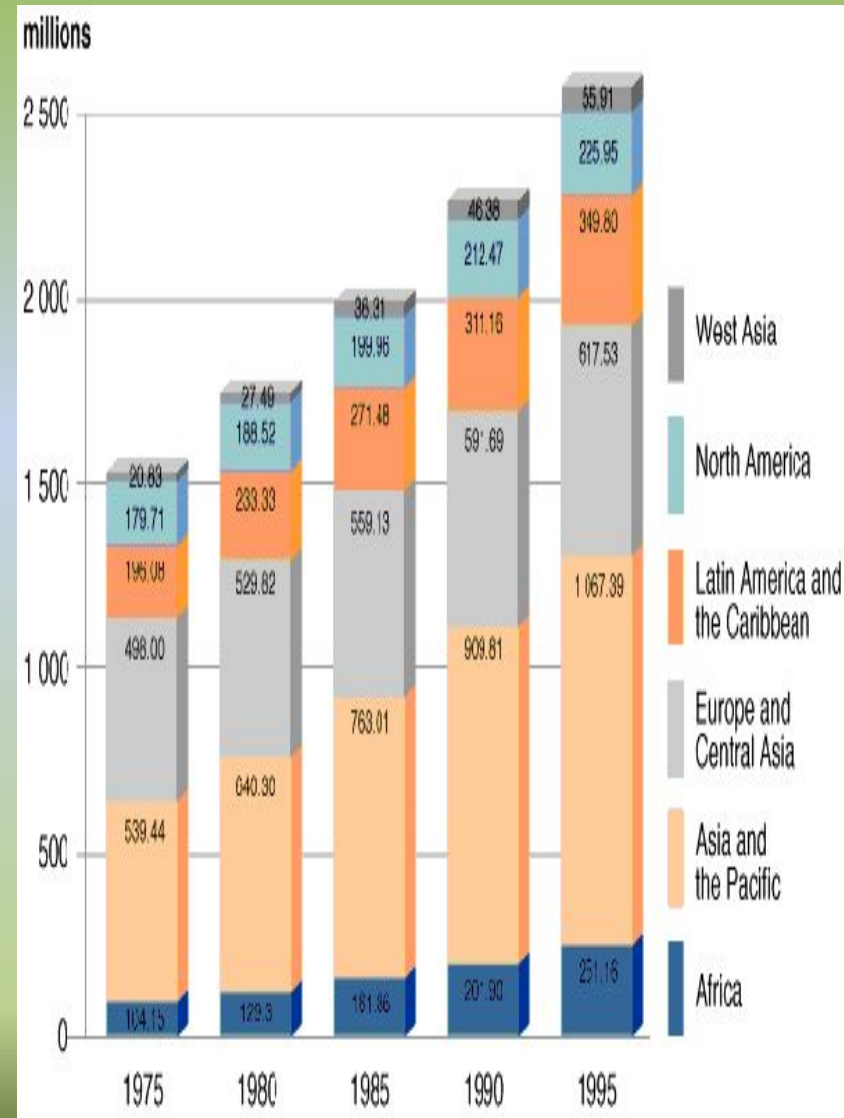
What is Urbanization?

- The movement of people from rural areas to cities
- Depend on resources outside the city

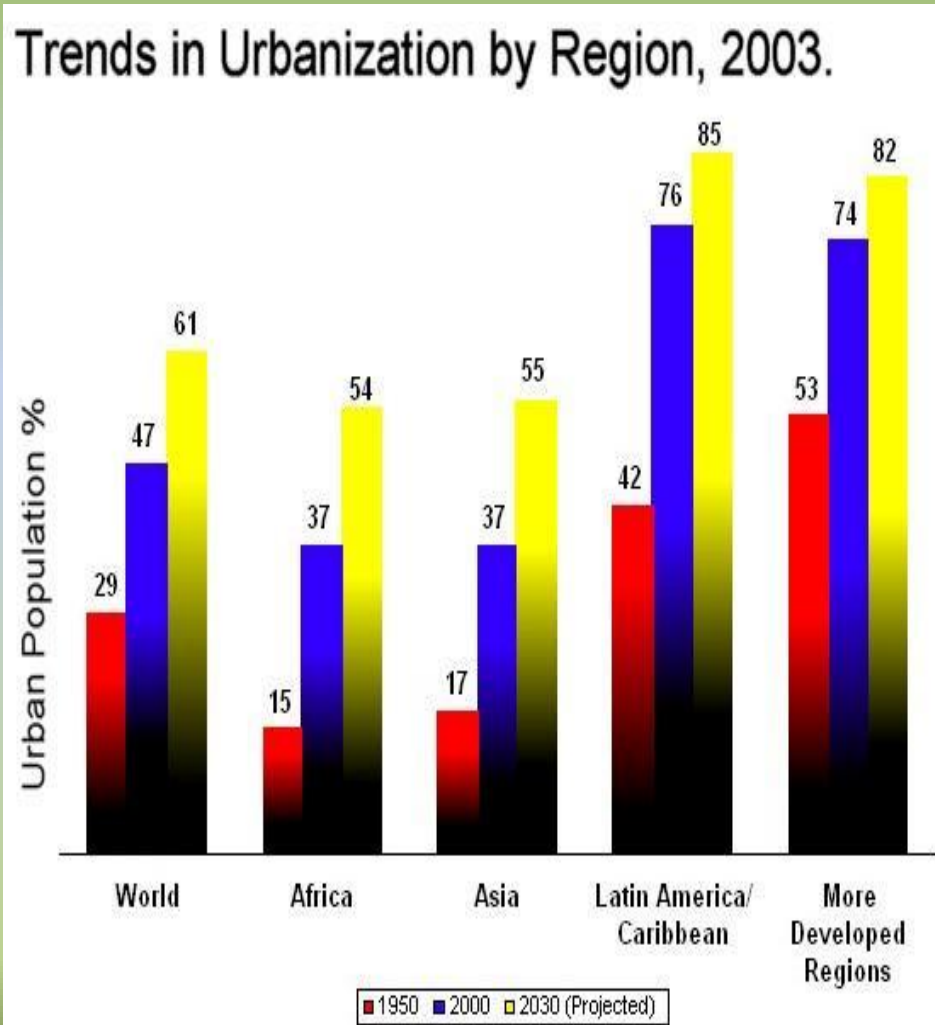


How are cities growing

- Cities have grown from 2% to 45% since 1950
- By 2050, 66% of all people in the world will live in urban areas
- 75% of the U.S. population lives in urban areas occupying 3% of the country's land area



Why are big cities growing?



- Increase in birth rates
- Immigration
 - Poor are moving to larger cities and away from rural areas

Effect of Cities



- Heat Island

- A METROPOLITAN AREA THAT IS SIGNIFICANTLY WARMER THAN THE SURROUNDING RURAL AREAS DUE TO HUMAN ACTIVITIES.
- The enormous amount of heat is in the center of the city
- 3° to 5° C (5°--9°F) **higher** than the surrounding countrysides

Benefits of Urban Development

- Better education system
- Medical services
- Social Service programs



Problems of Urban Development



- Infectious diseases
- Inadequate water system
- Poor sewer systems
- Exposure to pollution

Acid Rain

- ▶ **Effects:**
 - ▶ Chemical Weathering of structures
 - ▶ pH levels of rivers become more acidic
 - ▶ Indicator species are being harmed or disappearing



	pH 6.5	pH 6.0	pH 5.5	pH 5.0	pH 4.5	pH 4.0
TROUT	Survives	Survives	Survives	Survives	Does not survive	Does not survive
BASS	Survives	Survives	Survives	Does not survive	Does not survive	Does not survive
PERCH	Survives	Survives	Survives	Survives	Survives	Does not survive
FROGS	Survives	Survives	Survives	Survives	Survives	Survives
SALAMANDERS	Survives	Survives	Survives	Survives	Does not survive	Does not survive
CLAMS	Survives	Survives	Does not survive	Does not survive	Does not survive	Does not survive
CRAYFISH	Survives	Survives	Survives	Does not survive	Does not survive	Does not survive
SNAILS	Survives	Survives	Does not survive	Does not survive	Does not survive	Does not survive
MAYFLY	Survives	Survives	Survives	Does not survive	Does not survive	Does not survive

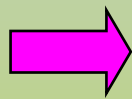
TWO FORMS...

Wet

Refers to acid rain, fog, sleet, cloud vapor and snow.

Dry

Refers to acidic gases and particles.

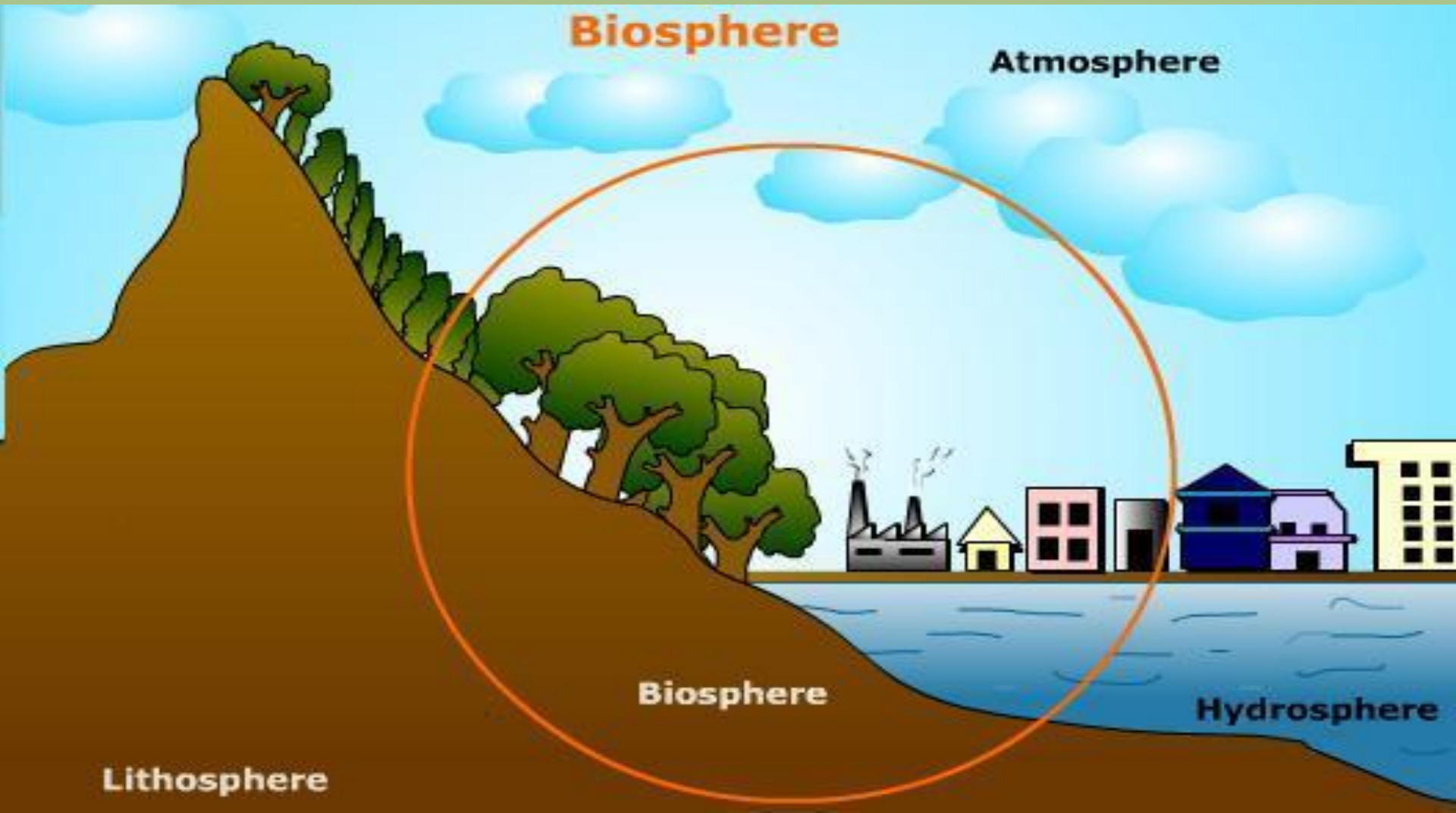


Two main contributors to acid deposition

- ▶ Sulfur Dioxide (SO_2)
- ▶ Nitrogen Oxides (NO_x)
- ▶ In the US, about $\frac{2}{3}$ of all SO_2 and $\frac{1}{4}$ of all NO_x comes from electric power generation that relies on burning fossil fuels like coal

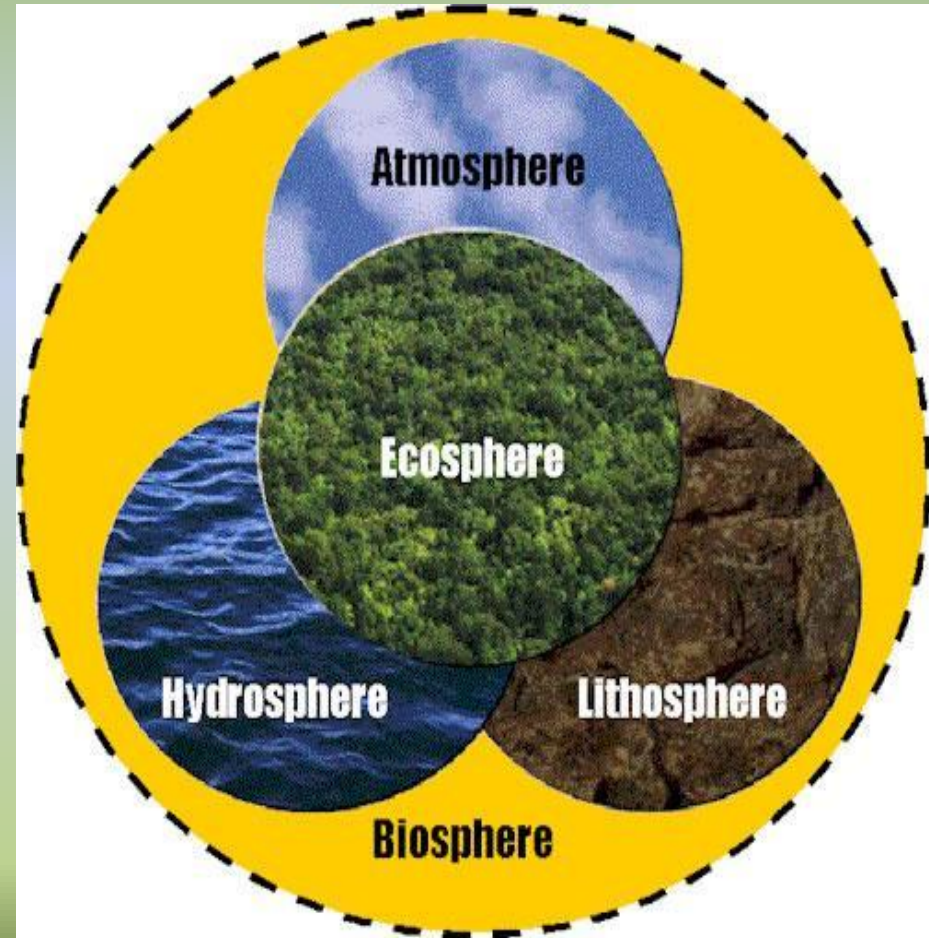


The Biosphere



What is the Biosphere?

- **Combined portions of the planet in which all of life exists, including land, water and atmosphere**



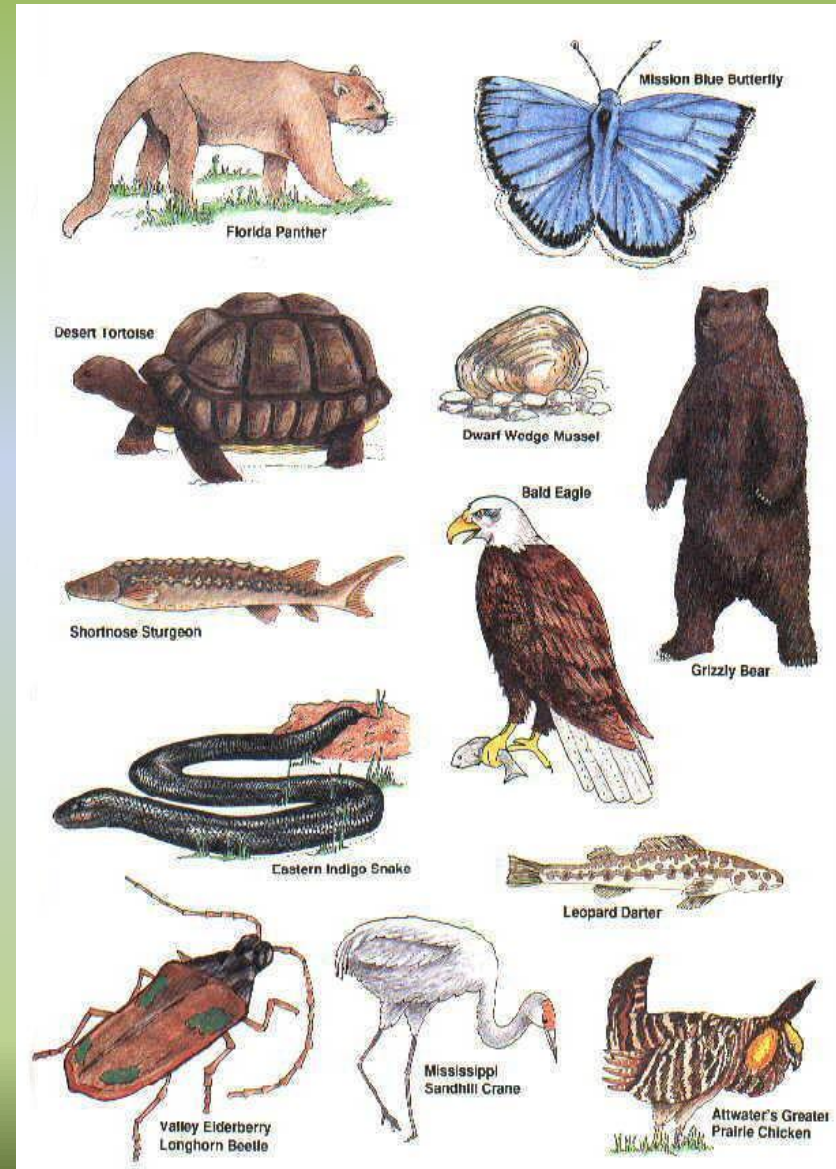
Levels of Organizations

- Species

- Group of organisms so similar to one another that **they can breed and produce fertile offspring**

- Population

- A group of individuals that belong to the **same species** and live in the **same area**





Community

All the different populations that live together in a defined area

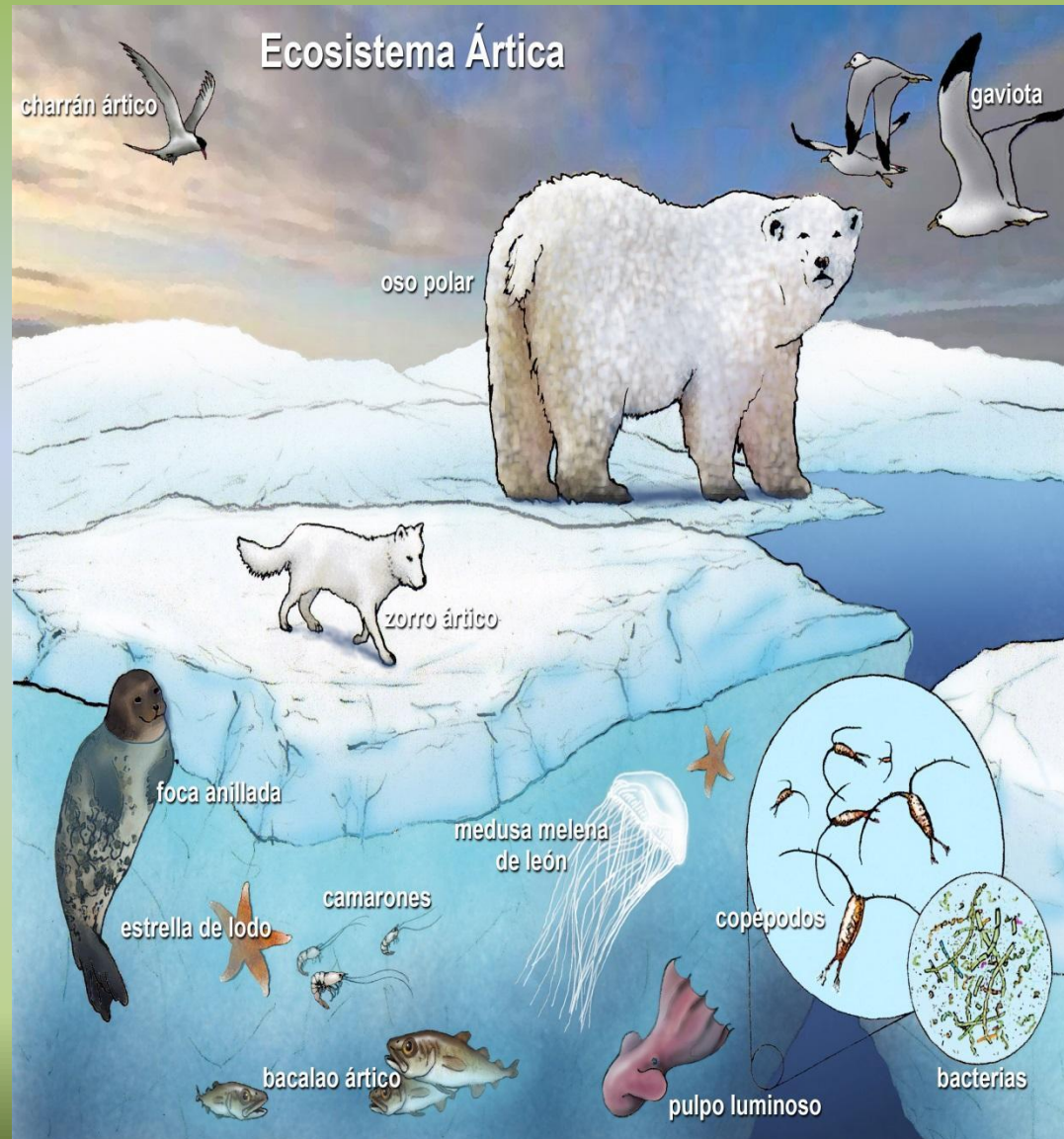


Ecosystem

Collection of all the organisms that live in a particular place, together with their nonliving environment

Ecosystems

- Influenced by a combination of Biological and Physical Factors
- Depend on biotic factors and abiotic factors



Biotic vs. Abiotic

- Biotic Factors

- The biological (LIVING) influences on organisms within an ecosystem
- Ex:



- Abiotic Factors

- Physical or nonliving factors that shape ecosystems
- Ex: **temperature, precipitation, humidity, wind, soil type, and sun light**





Biome

A group of ecosystems that have the same climate and dominant communities

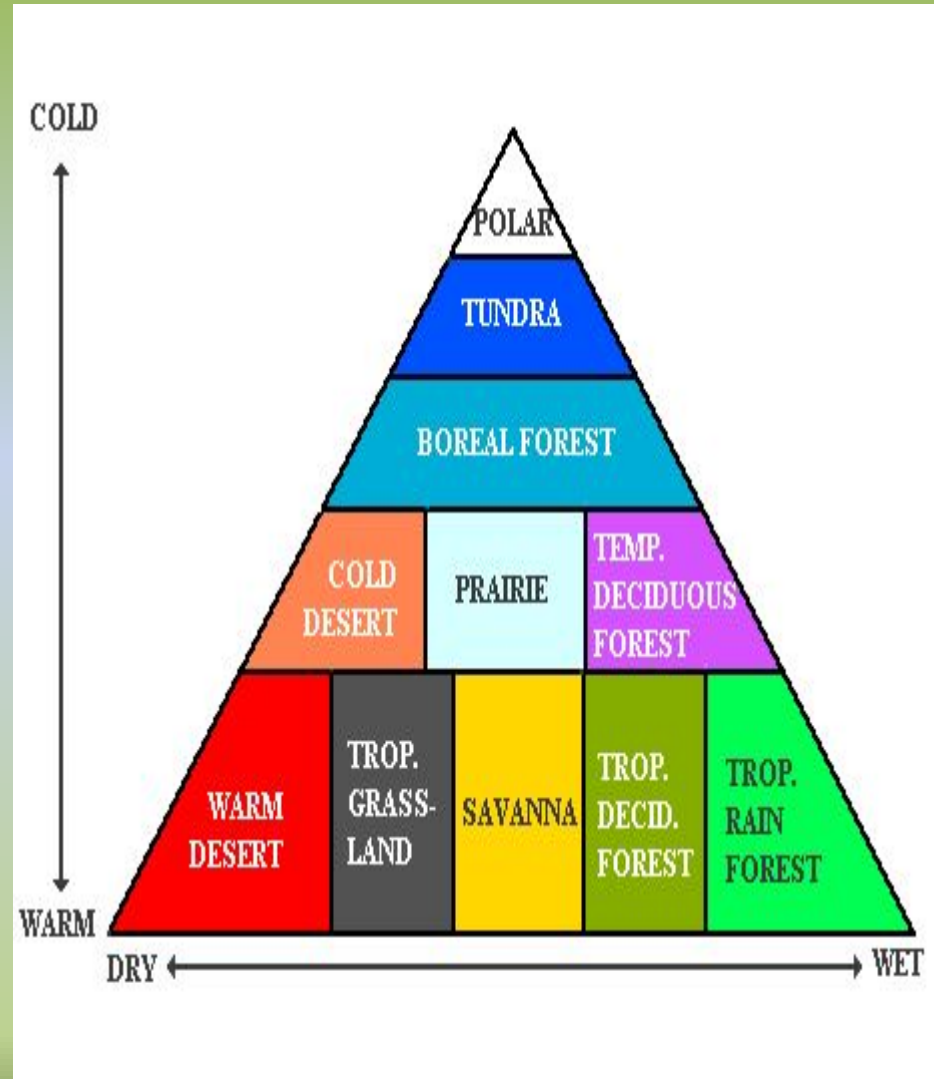
How are Biomes Named?

- According to their plant life
- Plant life determine which organisms live there

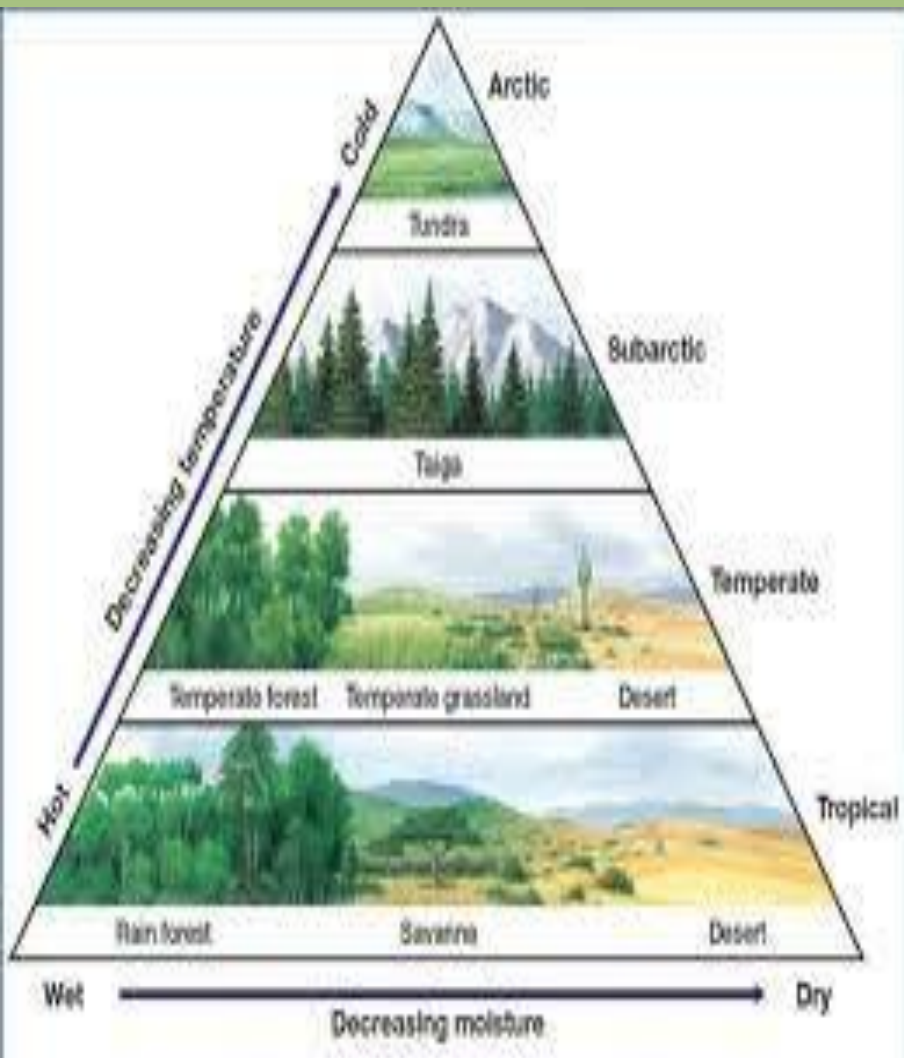


Organisms in Biomes

- Plants & animals have adapted to specific environments
- Threatened by human activities



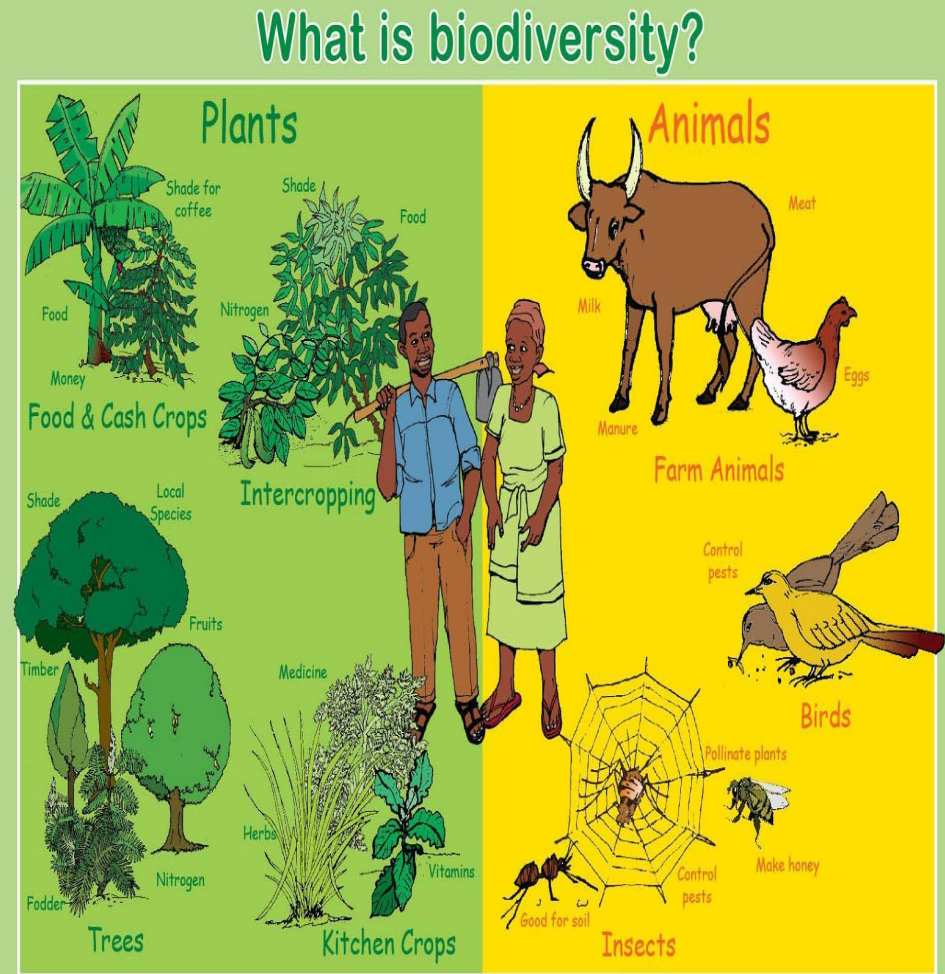
What are the Major Land Biomes?



- Tropical Rain Forest
- Temperate Forest
- Taiga
- Savanna
- Temperate Grassland
- Chaparral
- Desert
- Tundra
- Mountain

What is Biodiversity?

Term used to indicate the number and variety of species on Earth



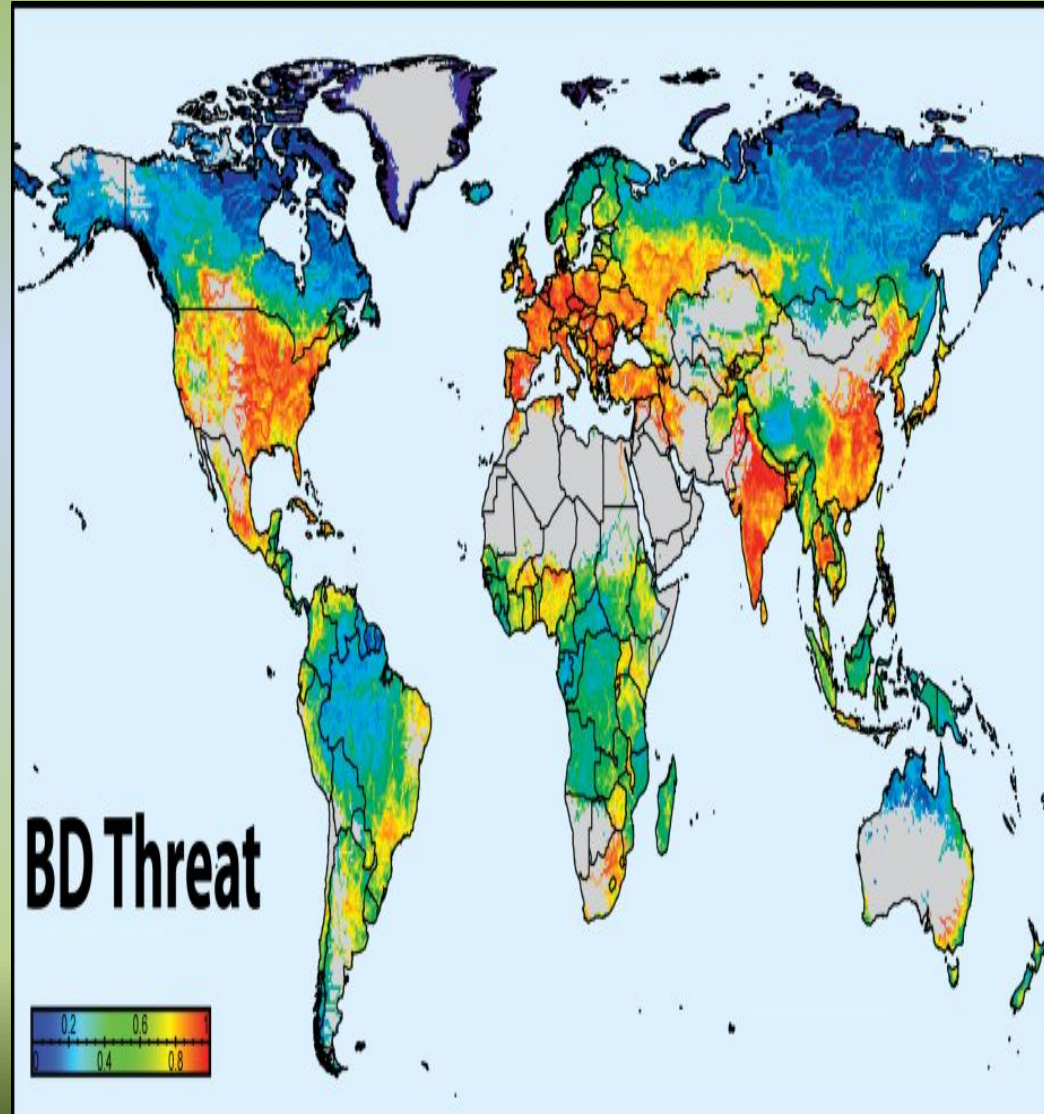
Why is Biodiversity important?



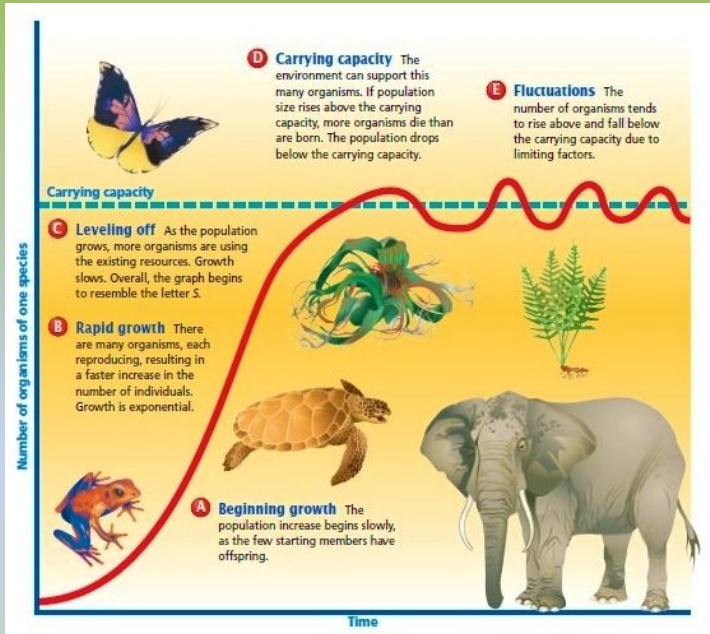
- Provides humans with special needs
- It helps species populations adapt to ecological (environment) changes.

How can humans reduce biodiversity?

- Altering habitats
- Hunting species to extinction
- Introducing toxic compounds into food webs
- Introducing invasive species to new environment



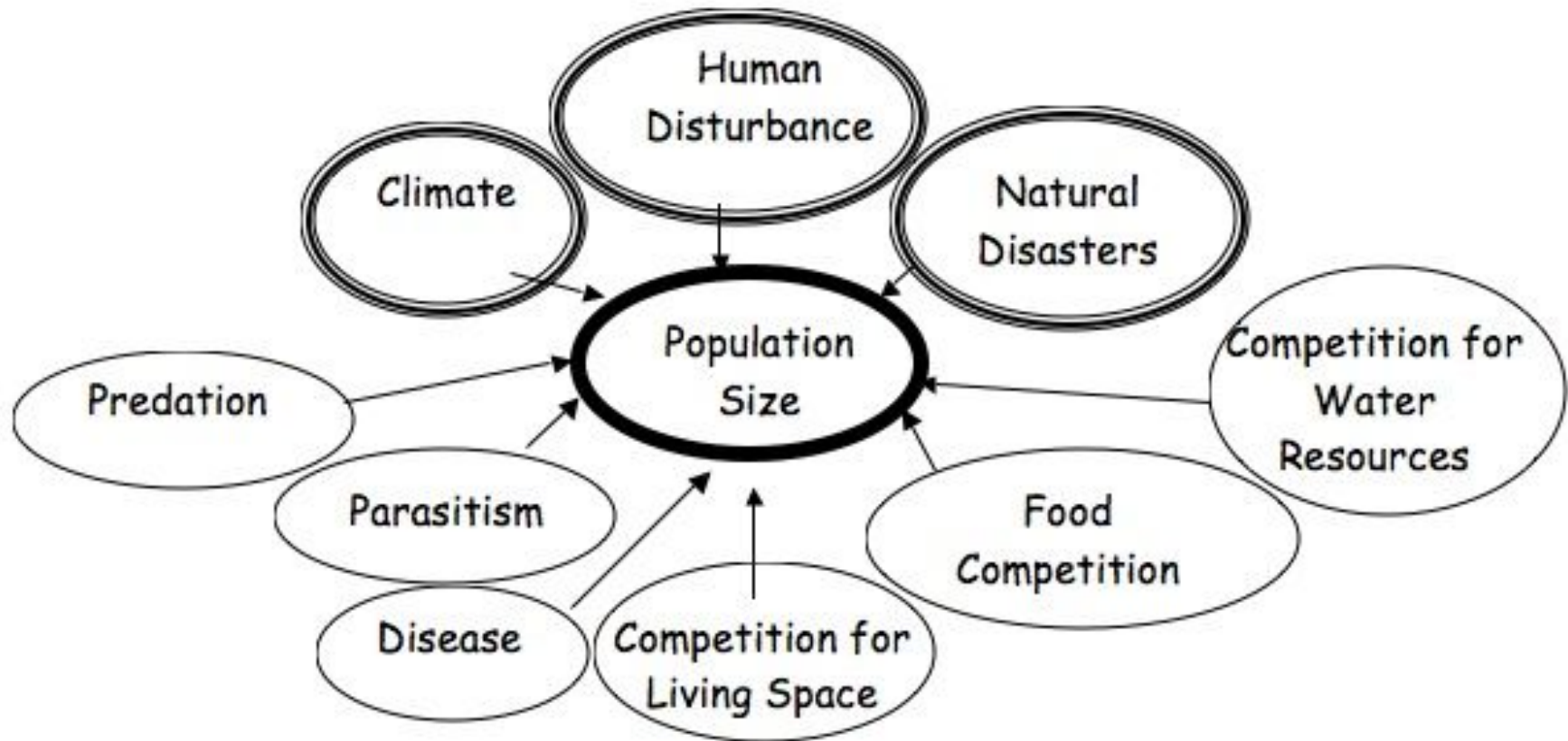
What affects Population?



Limiting factors are resources or other factors in the environment that can lower the population growth rate (lower biodiversity).

1. Competition
2. Disease
3. Abnormal weather patterns
4. Human activities.

Limiting Factors



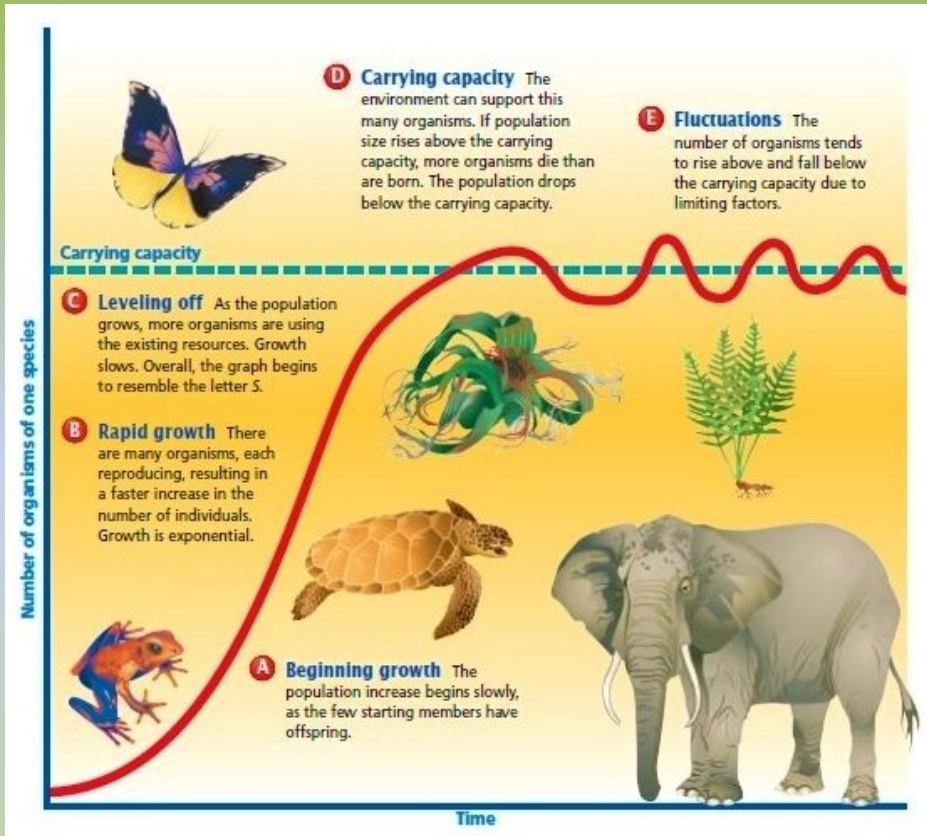
Population Limiting Factors:

Density Independent (the 3 above) *Boom-&-Bust*
Kills what's in its path regardless of population density
vs.

Density Dependent (the 6 below) *S-Shaped Curve*
Kills more easily in dense than in less-dense populations

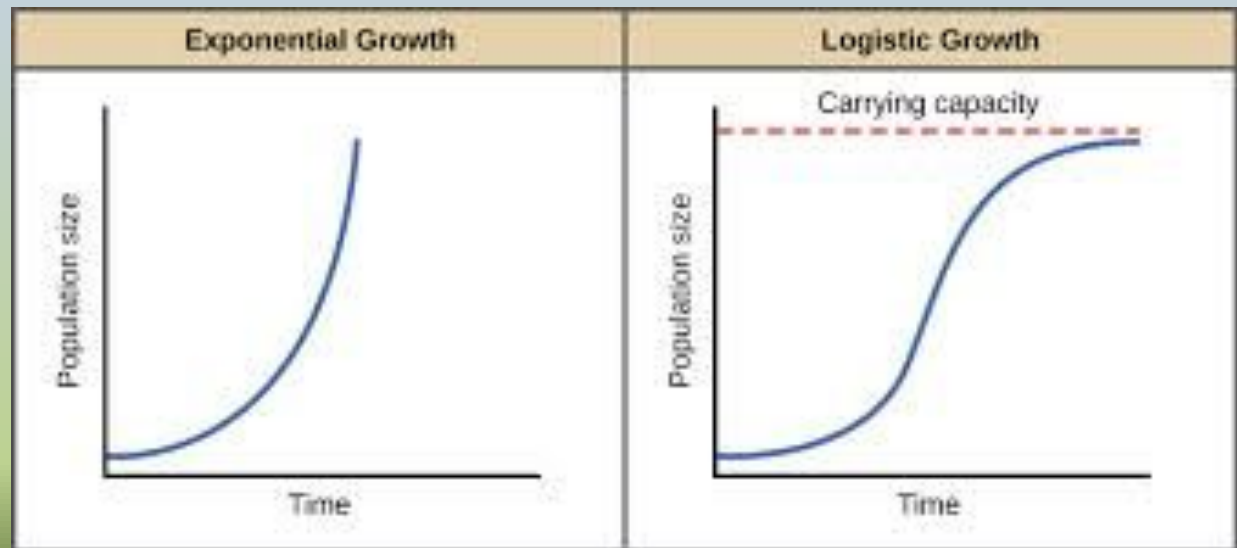
What affects Population?

The carrying capacity (K) is the maximum population size that can be supported in a particular area without destroying the habitat.



Carrying Capacity Factors

1. Limiting factors determine the carrying capacity of a population.
2. When organisms face limiting factors, they show logistic growth.
3. When there are no limiting factors, the population grows exponentially (no stopping).



Nitrogen Cycle and Carbon Cycle

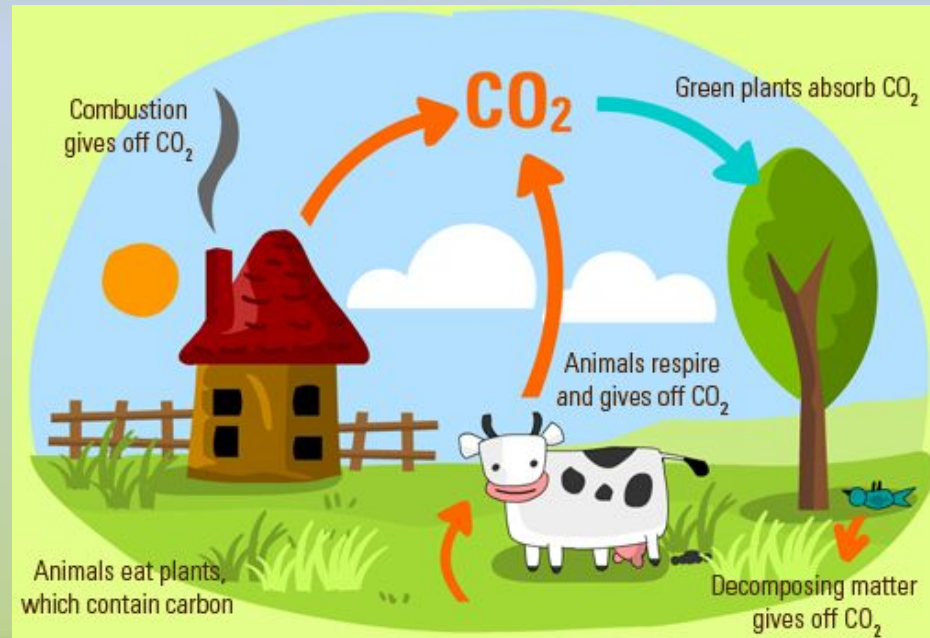
1. While watching the videos write down 4 facts about Nitrogen Cycle and 4 facts about the Carbon Cycle
2. Be prepared to share!

The Carbon Cycle

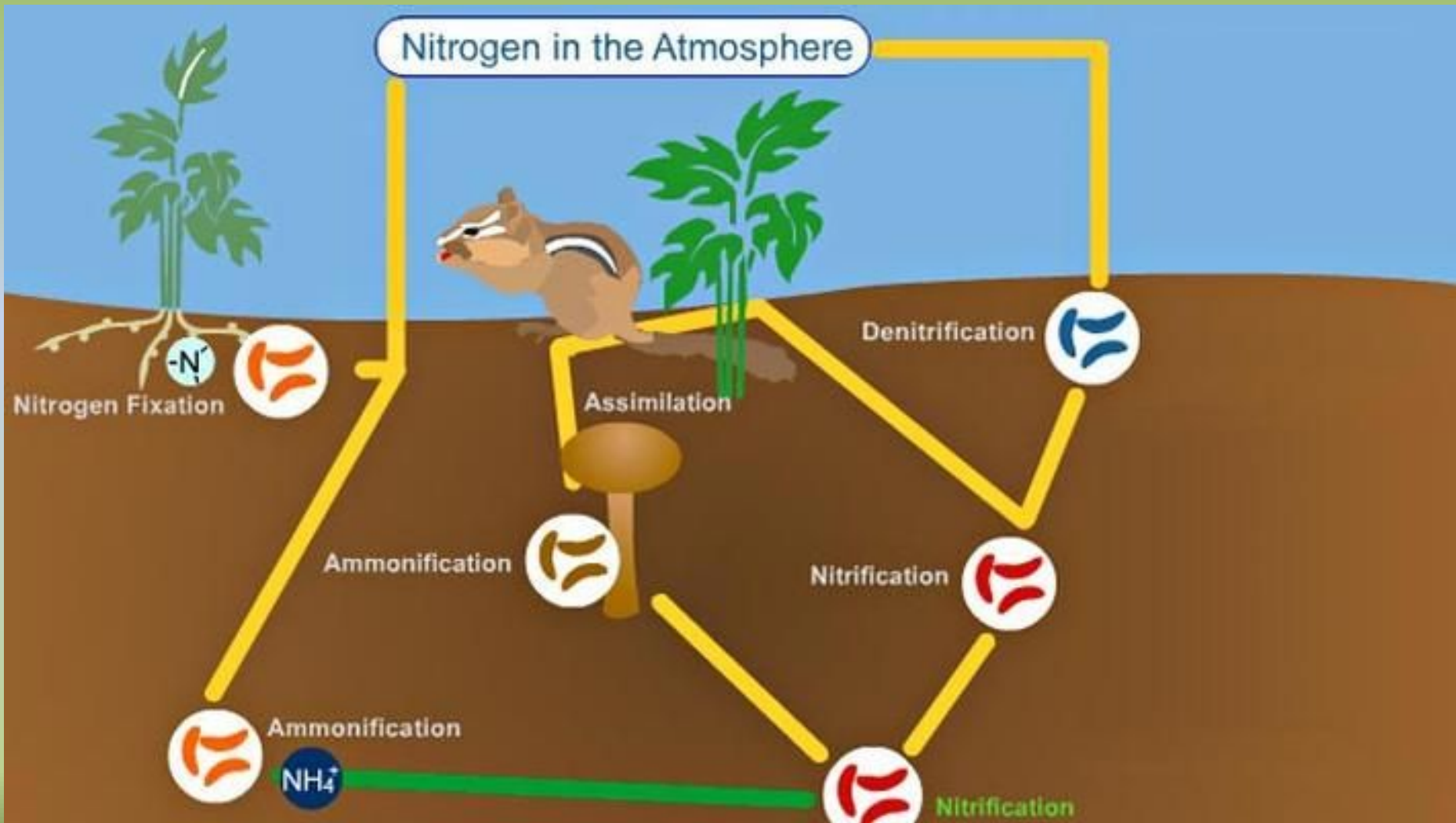
Carbon is constantly cycling between living organisms and the atmosphere through:

- photosynthesis
- cellular respiration
- burning of fossil fuels.

- Global Climate Change occurs when more carbon dioxide, a greenhouse gas, is released into the atmosphere than can be used for photosynthesis.



The Nitrogen Cycle



The Nitrogen Cycle

Ammonification:

conversion of organic nitrogen into ammonia

Nitrification:

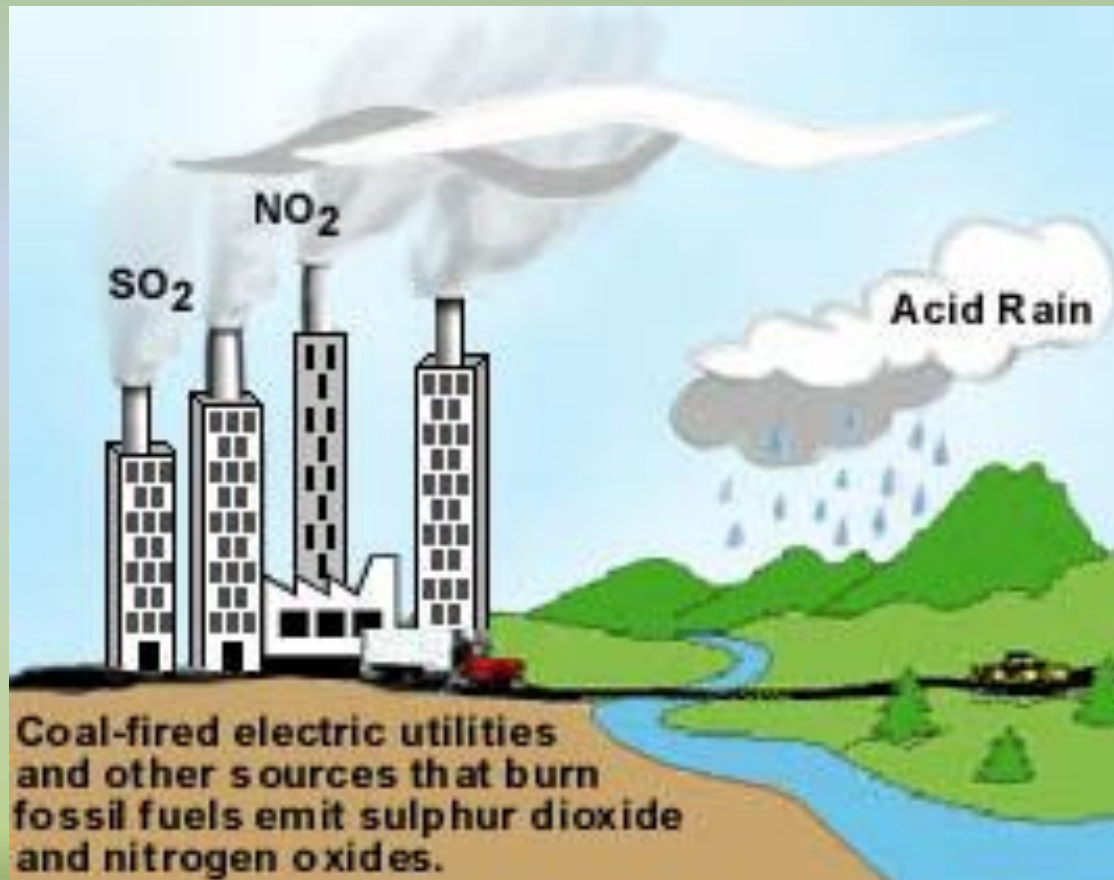
soil and water oxidize ammonia and ammonium ions and form nitrites and nitrates

Nitrogen Fixation:

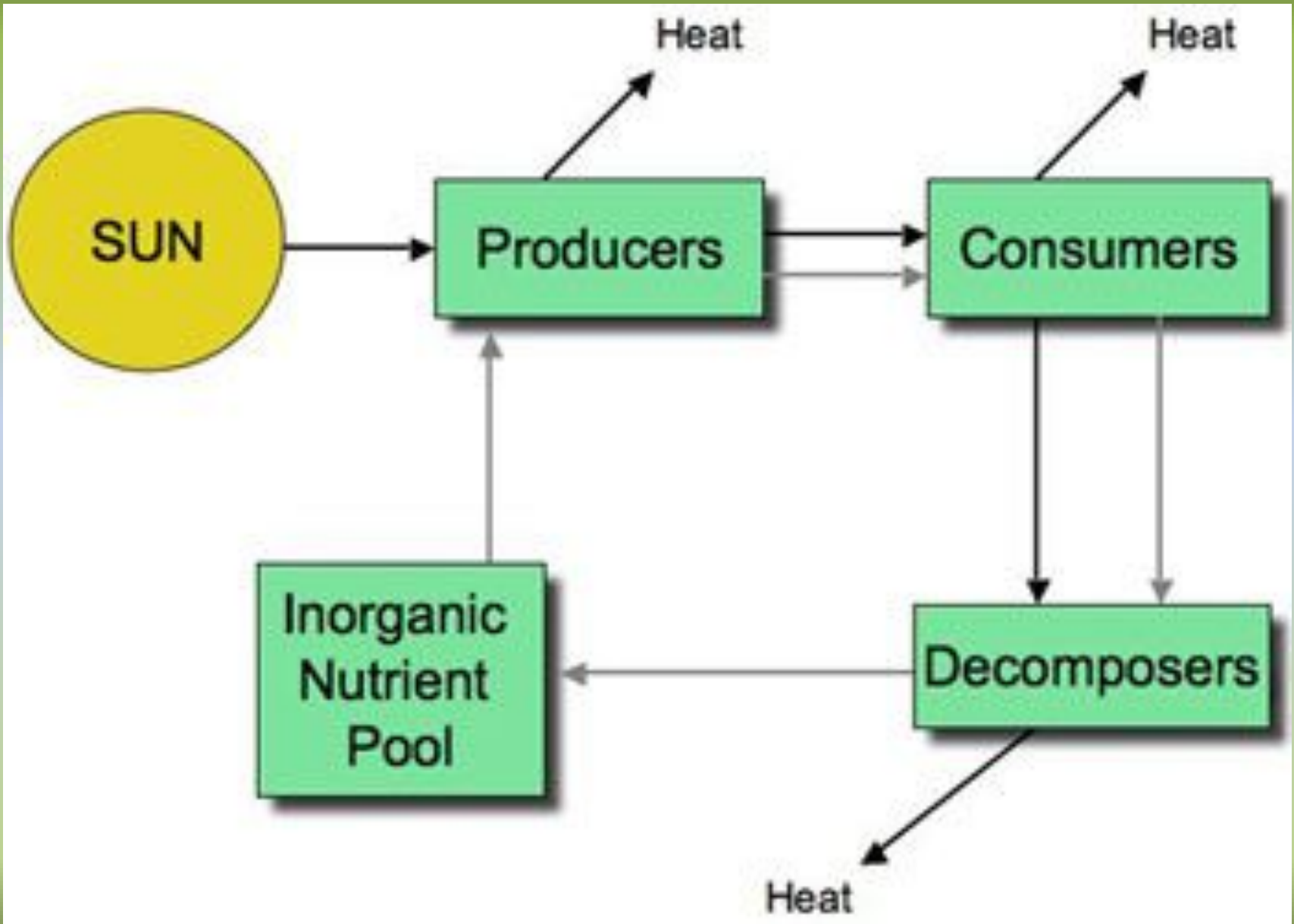
atmospheric nitrogen is converted into organic compounds

The Nitrogen Cycle

- Humans cause acid rain by burning fossil fuels releasing nitrogen gases into the atmosphere.

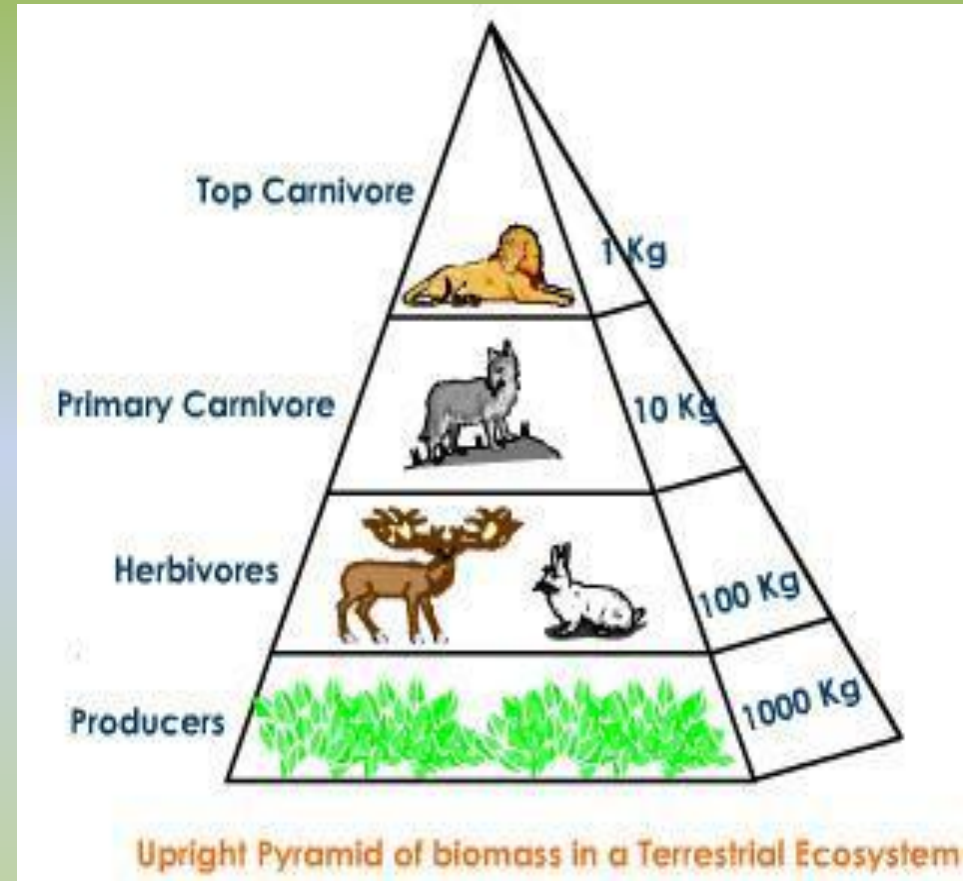


Energy Flow



What is a Trophic Level?

- **Each step** in the transfer of energy through an ecosystem
- Each time energy is transferred, **less of it is available to organisms** at the next trophic level



- **Producer** → **Primary Consumers** → **Secondary Consumers** → **Tertiary Consumers**

What Eats What in an Ecosystem

- **Producers**

- **Makes its own food**
- Plants, trees, algae

- **Consumers**

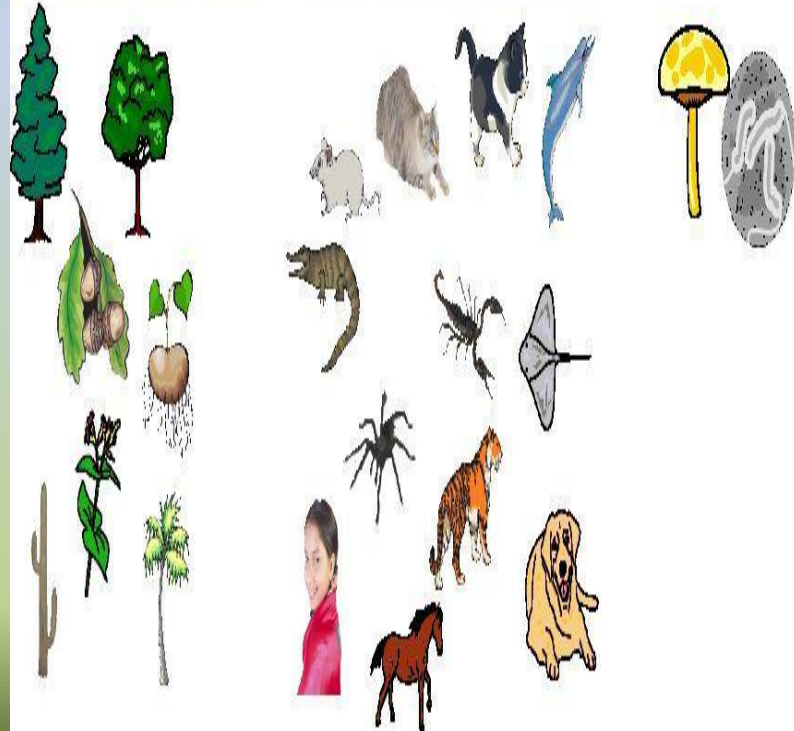
- **Obtains energy by eating other organisms**
- Animals



Producers

Consumers

Decomposers





- **Herbivore**

- Eats only producers
- Cows, sheep, deer, grasshoppers

- **Carnivores**

- Eats only other consumers
- Lions, hawks, spiders

- **Omnivore**

- Eats both producers and consumers
- Bears, pigs, humans

Invasive Species

a nonnative species that overtakes the supplies for native species

Positives

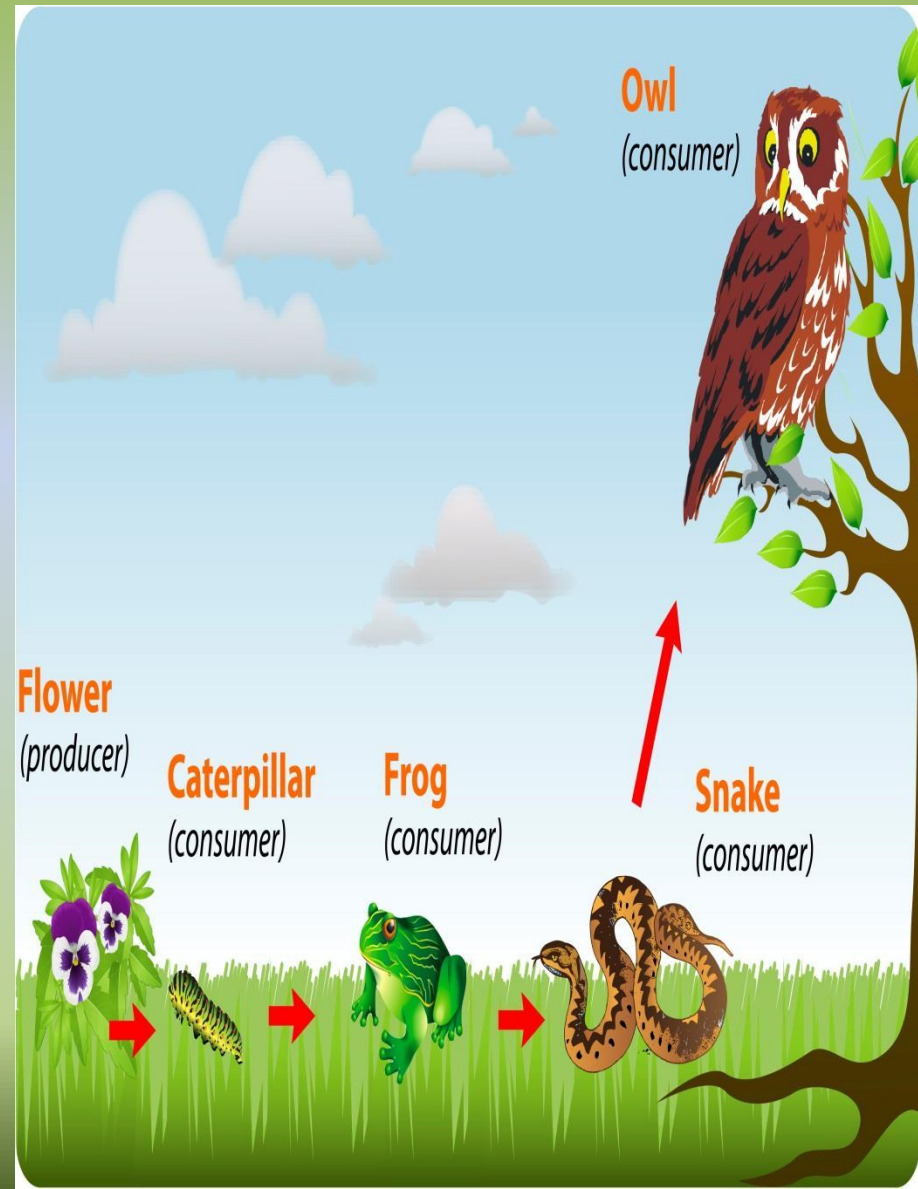
- Increases biodiversity initially (decreases biodiversity over time)

Negatives

- Impacts the food resources
- No natural predators
- Keeps an unbalanced ecosystem

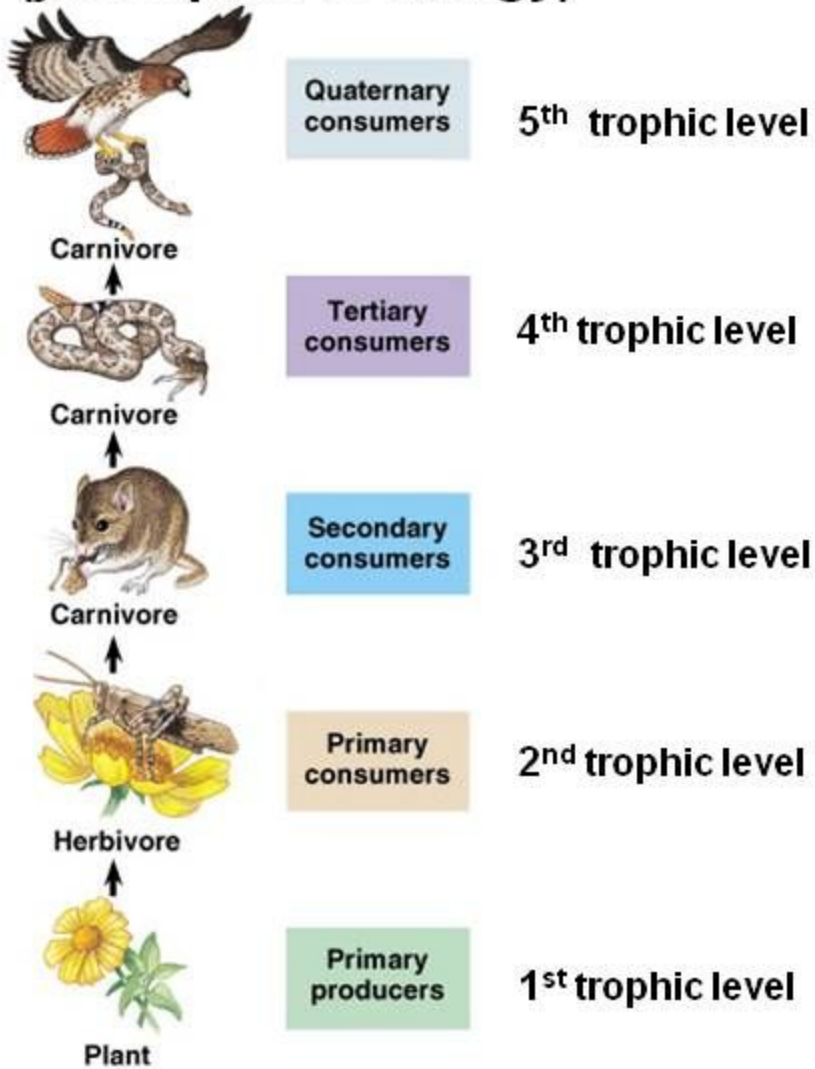
What is a Food Chain

- A sequence in which energy is transferred from one organism to the next as each organism eats another



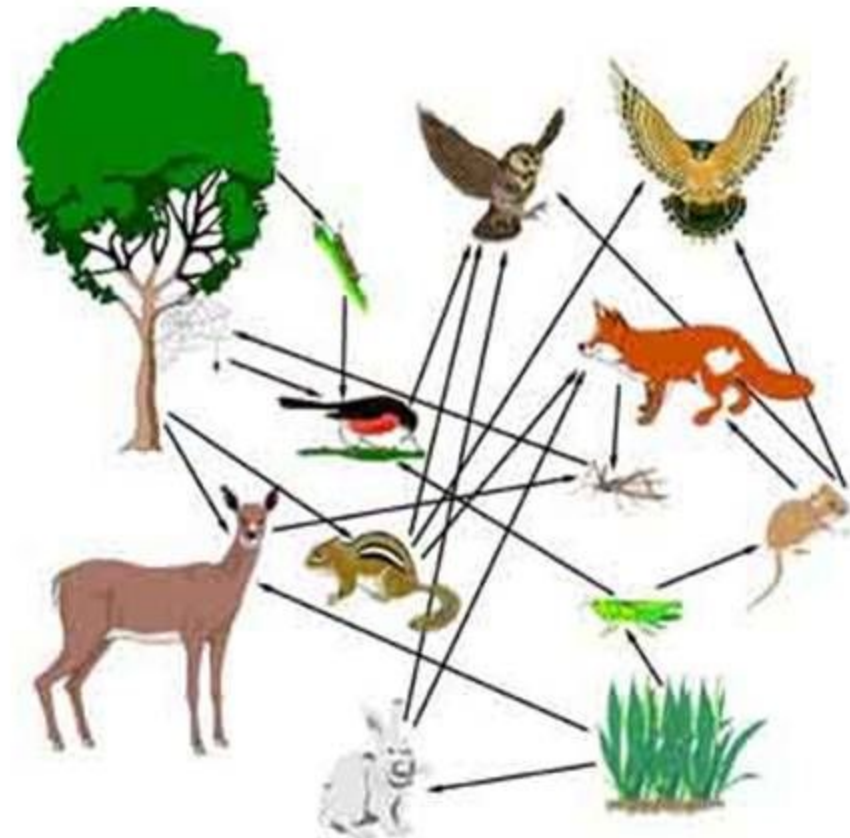
Food Chain

(just 1 path of energy)



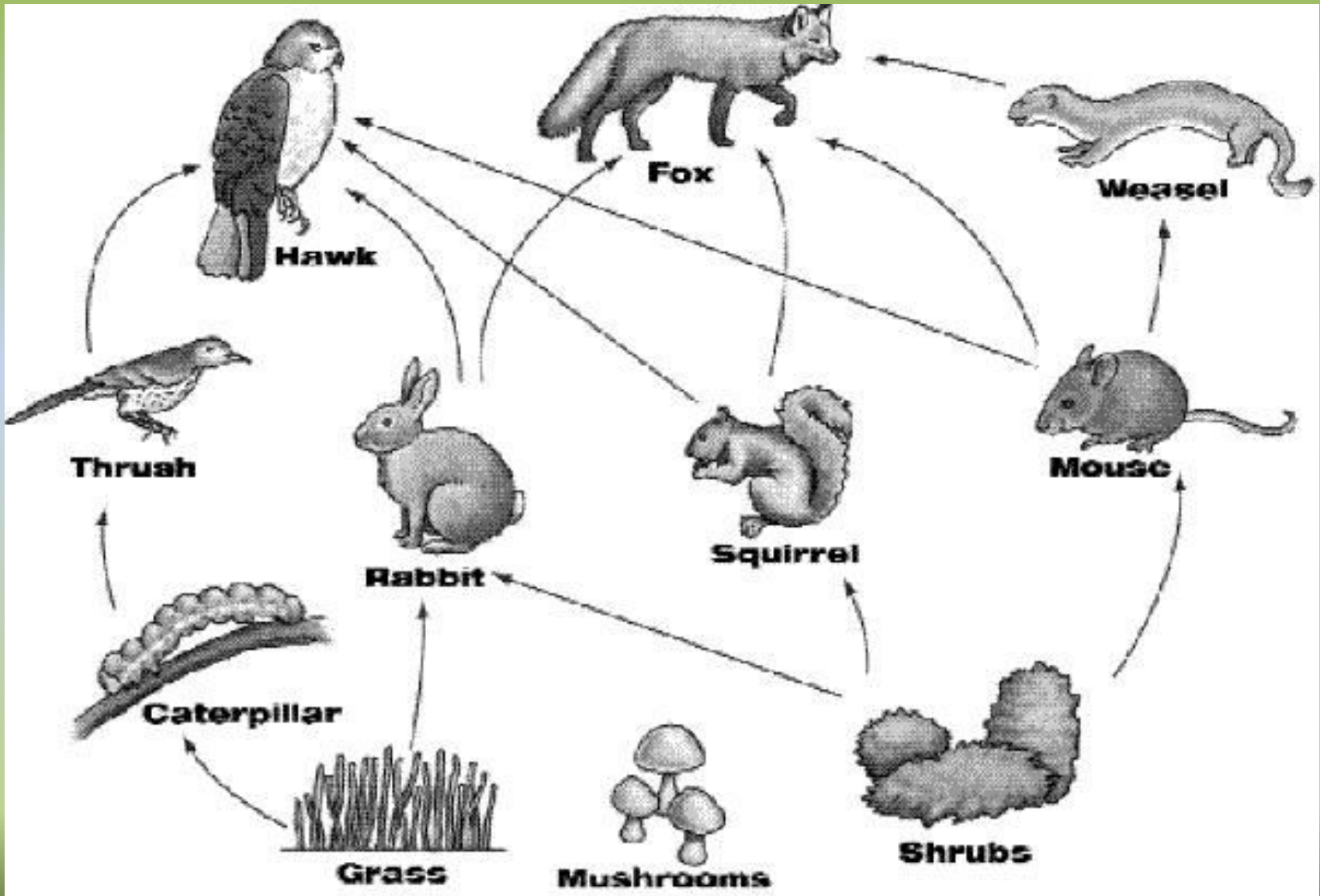
Food Web

(all possible energy paths)



The *arrow* points to the eater and shows the transfer of energy.

What is a Food Web?



What is a Food Web?

- A group of interrelated food chains
- No one path - energy always starts with producers
- Shows feeding relationships in an ecosystem