# Biotic and Abiotic factors affecting the ecosystem

Chapter 4

- Biotic factors – living organisms
- Abiotic – non living organisms

# Nutrient Limitation

- Limiting nutrient – whatever nutrient is the most scarce
- Limits growth of producers
- Producers grow quickly when more of the limiting nutrient is added
- Fertilizers
- Algal bloom – when excess phosphates or nitrogen cause an overgrowth of algae.

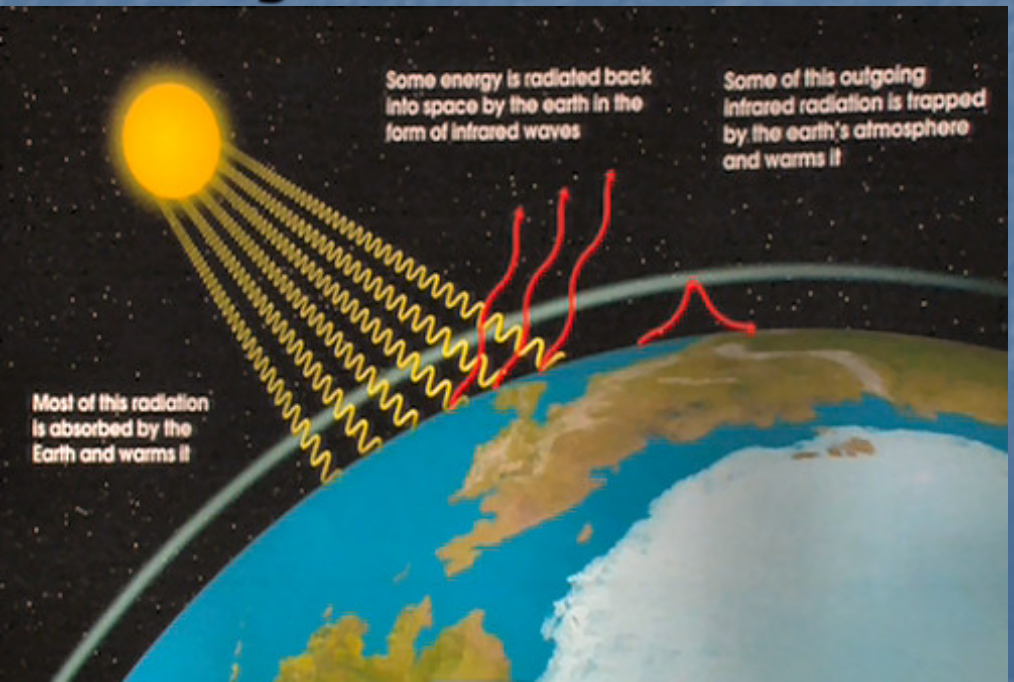

Photographer: Paul Schmidt
Credit: Charlotte Sun Herald

# Climate

- Weather – day to day condition of the atmosphere
- Climate – long term pattern of weather conditions
  - Rainfall patterns
  - Seasonal changes
  - Humidity
  - Average temperature

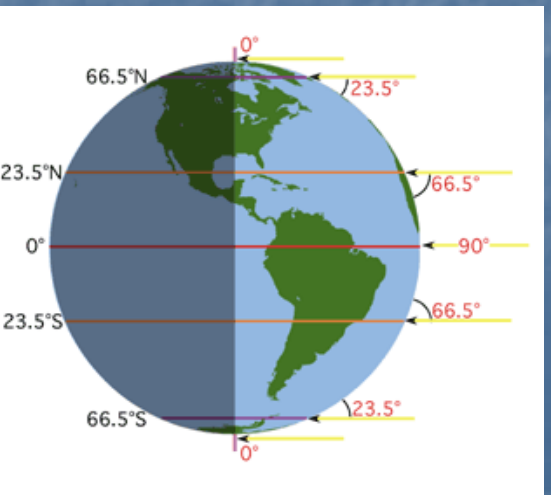
# Greenhouse effect

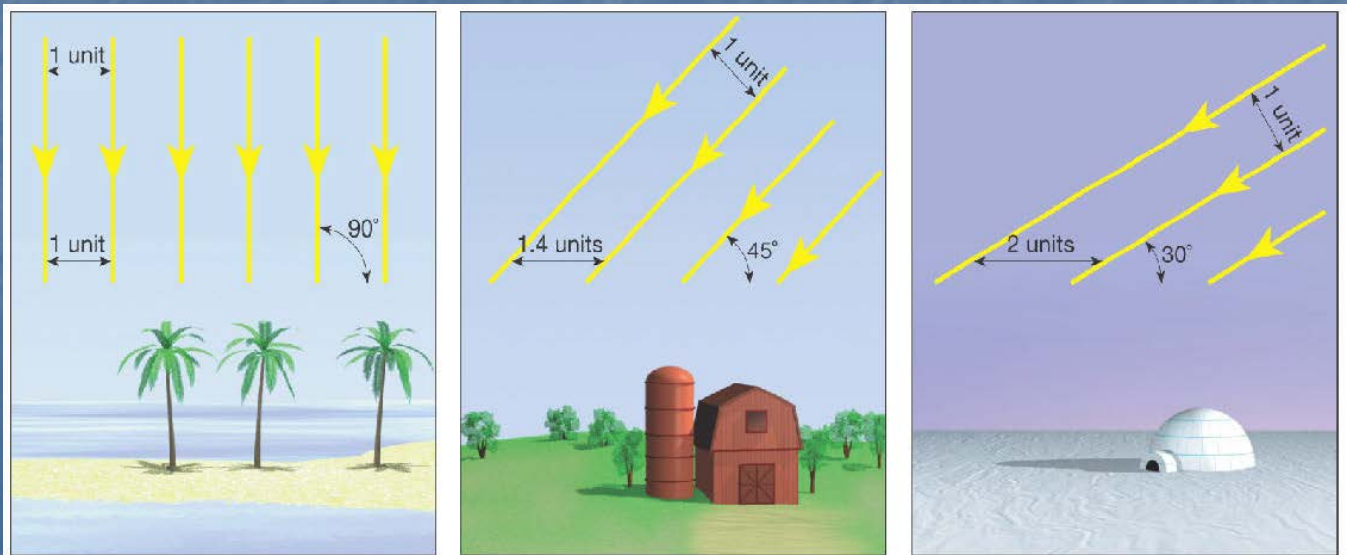
- Carbon dioxide, methane, water vapor trap heat (blanket)
- Increased burning of fossil fuels increases amount of $CO_2$ in the atmosphere
- Global Warming
- Drought, melting ice caps
- rising sea levels




# Effect of latitude on climate

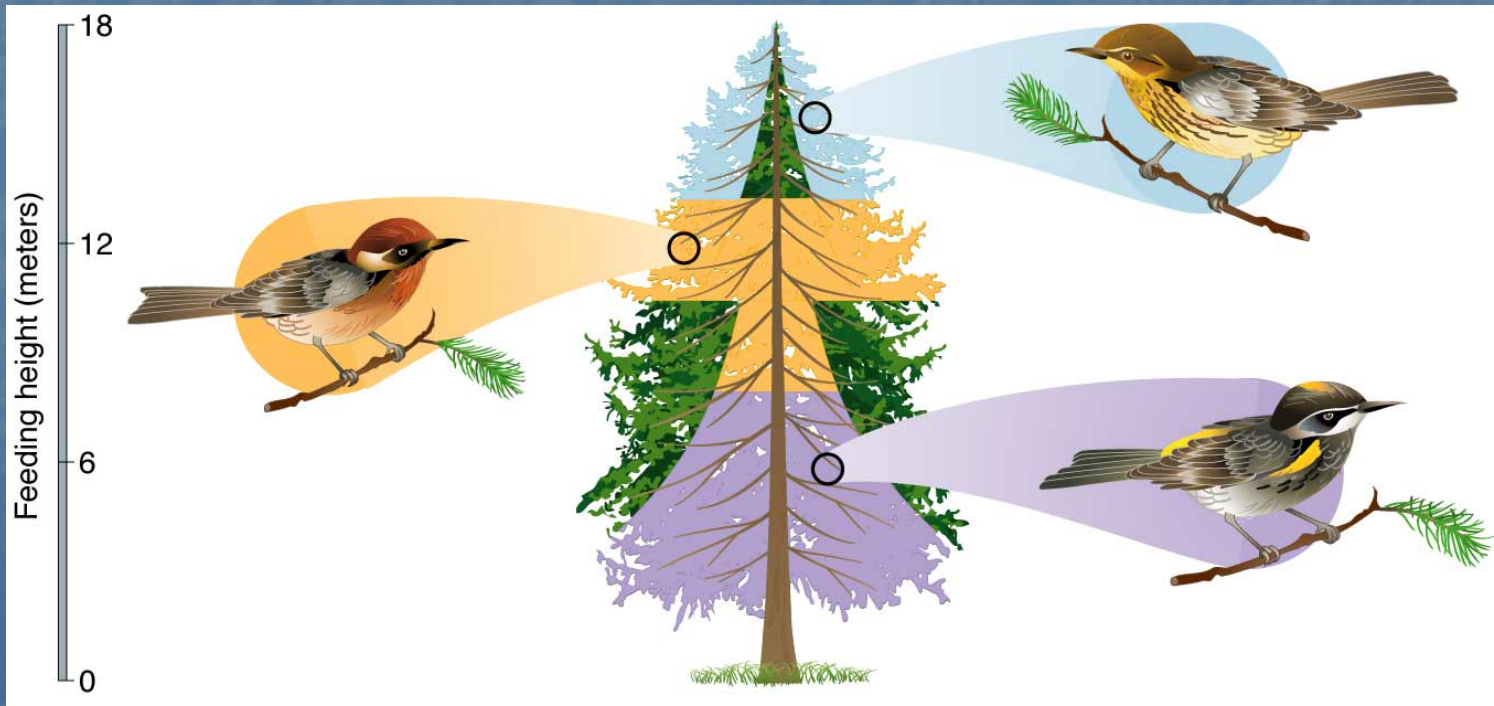
- Sunlight hits the earth most directly at the equator
- Intense rays make the equator very warm
- Indirect rays at the poles make these areas much colder



# Community Interactions

- Niche – An organism's role in an ecosystem
  - What it eats, how it gets its food, habitat
- Competition – When organisms compete for the same resource
  - Water
  - Food
  - shelter



- Predation – When an animal (predator) kills and eats another animal (prey)
- Symbiosis – When two species live closely together
  - Mutualism – both species benefit
    - Flowers and pollinators
    - Ants and aphids
    - Sharks and cleaner fish
  - Commensalism – one member benefits, the other member is not harmed
    - Orchids in a tree
    - Barnacles on a whale
  - Parasitism – one member uses and harms another
    - Mistletoe
    - fleas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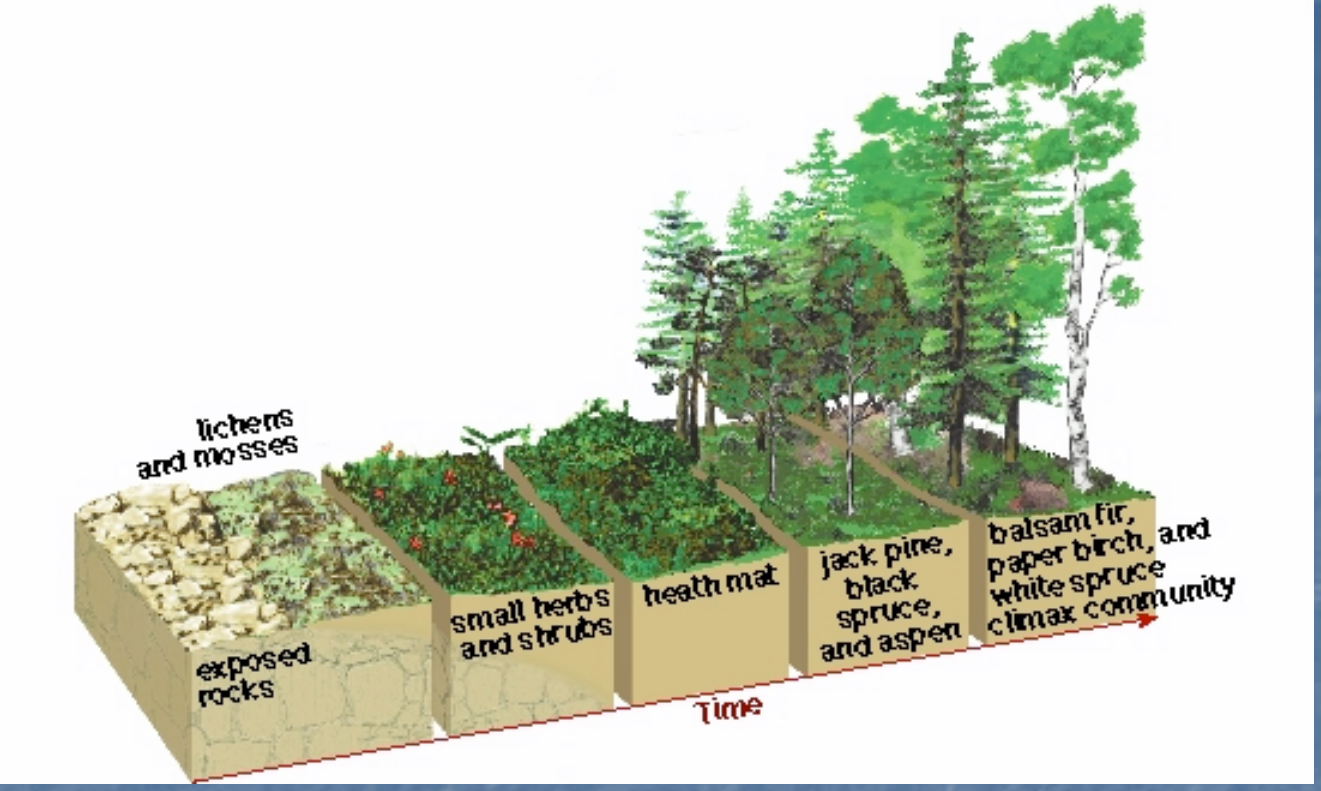
Flowers seen under regular light (humans)
and UV light (bees)

# Primary Succession

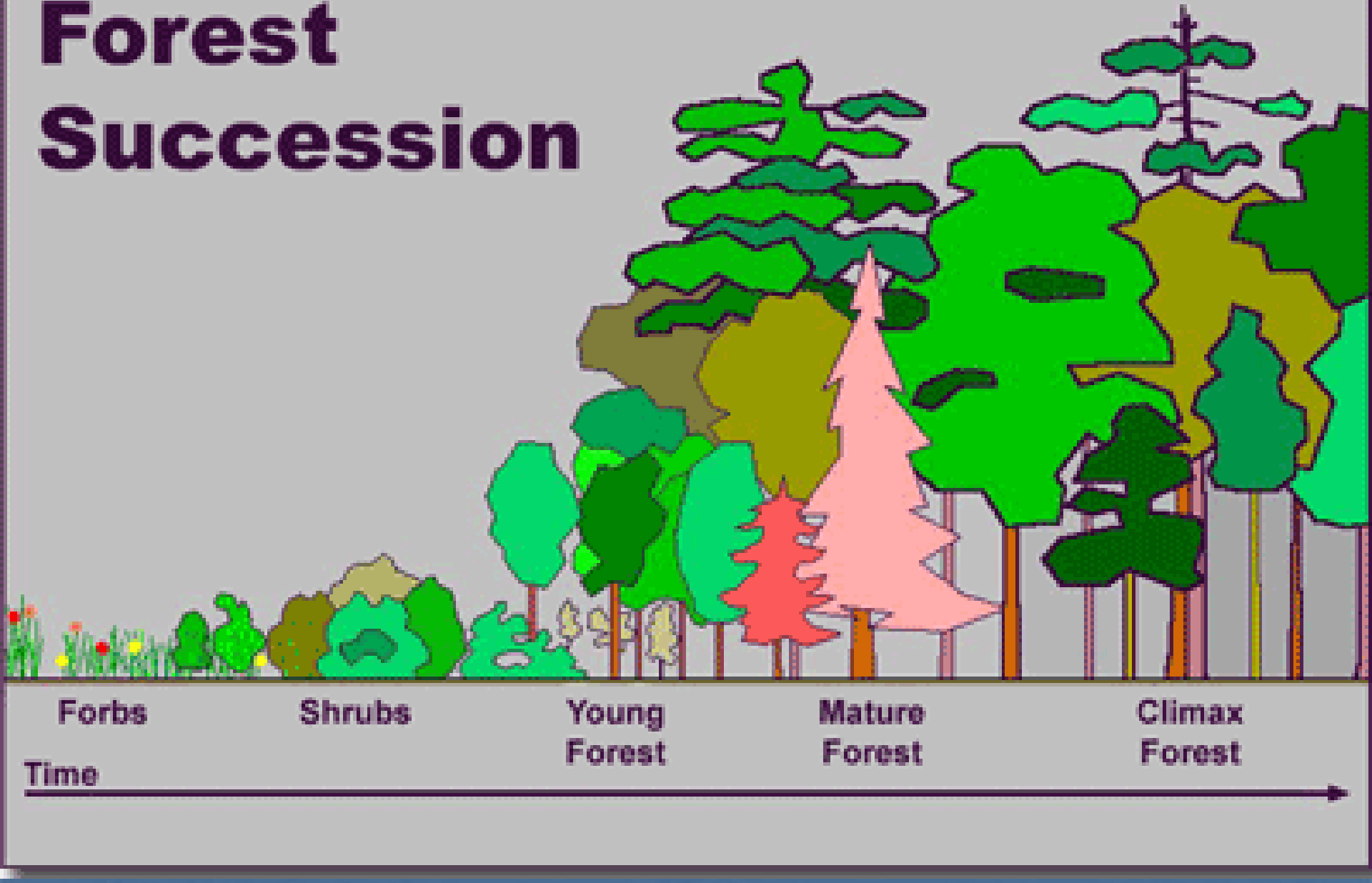
- Changes that occur in a place with no soil yet like new volcanic islands
- Pioneer species – first to inhabit an area
  - Lichens – symbiotic relationship between algae and fungi
  - Break down rock to form soil
- Secondary Succession – succession that takes place after a disturbance (fire)


lichens and mosses
exposed rocks
small herbs and shrubs
heath mat
jack pine, black spruce, and aspen
balsam fir, paper birch, and white spruce climax community
Time


3 years after fire

# Meadow Succession
# Lake → Meadow → Forest

# Forest Succession



# Threats to Biodiversity

Michael Rogers / University of Florida
The Asian Citrus Psyllid sits on a young citrus plant.

- Invasive exotic species don't have any predators
- They can crowd out native species
- Reduces biodiversity

Yellow Star thistle
Crowds out native plants
Causes neurological disease in horses
Reduces grazing