

# Chapter 4: Ecosystems and Communities

## Essential Questions:

- How does the ***greenhouse effect*** maintain the biosphere's temp. range?
- What are Earth's 3 main climate zones?
- How do ***biotic*** and ***abiotic*** factors influence an ecosystem?
- What interactions occur within communities?
- What is ***ecological succession***?
- What are characteristics of the major land biomes?

# 4-1 The Role of Climate

## A. What Is Climate?

1. Weather vs. Climate
2. The Greenhouse Effect

sun's heat energy trapped by  $\text{CO}_2$ ,  $\text{CH}_4$ ,  $\text{H}_2\text{O}$  vapor, etc. in atmosphere

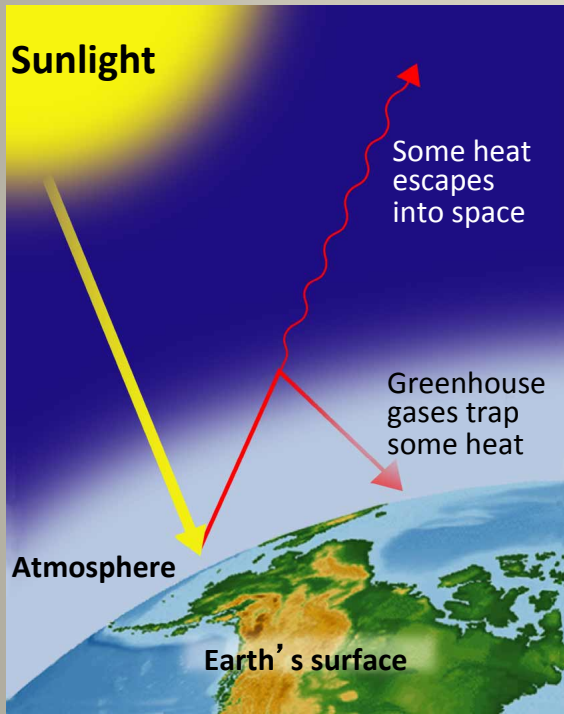
## B. Effect of Latitude on Climate

1. Angle of incoming sun energy determined by latitude
2. 3 main climate zones based on latitude
  - a. Polar – between  $66.5^\circ$  &  $90^\circ$  north & south – cold
  - b. Temperate – between  $23.5^\circ$  &  $66.5^\circ$  north & south – fluctuates warm/cold
  - c. Tropical – between  $23.5^\circ$  north and  $23.5^\circ$  south - warm

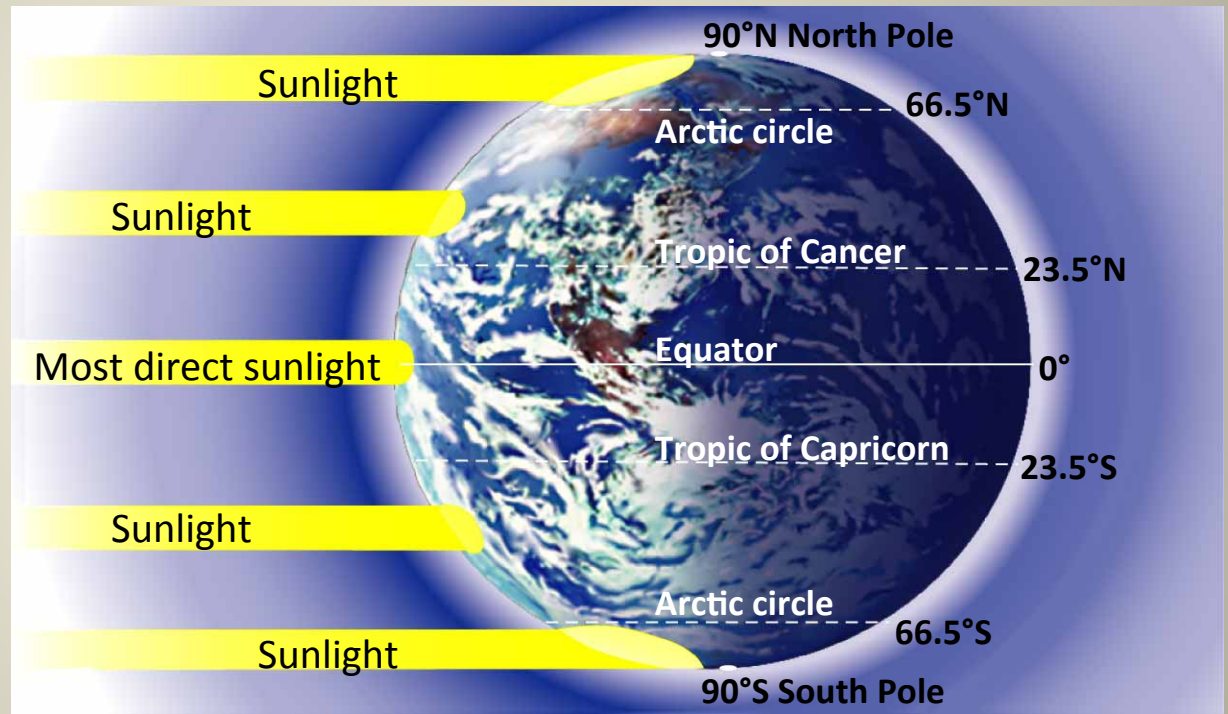
## C. Heat Transport in the Biosphere

1. Unequal heating of earth surface drives wind and ocean currents, moves heat
2. Land masses can interfere with movement of air masses, affect climate

## Greenhouse Effect



## Different Latitudes



## 4-2 What Shapes an Ecosystem?

### A. Biotic & Abiotic Factors

1. Biotic = living
2. Abiotic = non-living

### B. The Niche

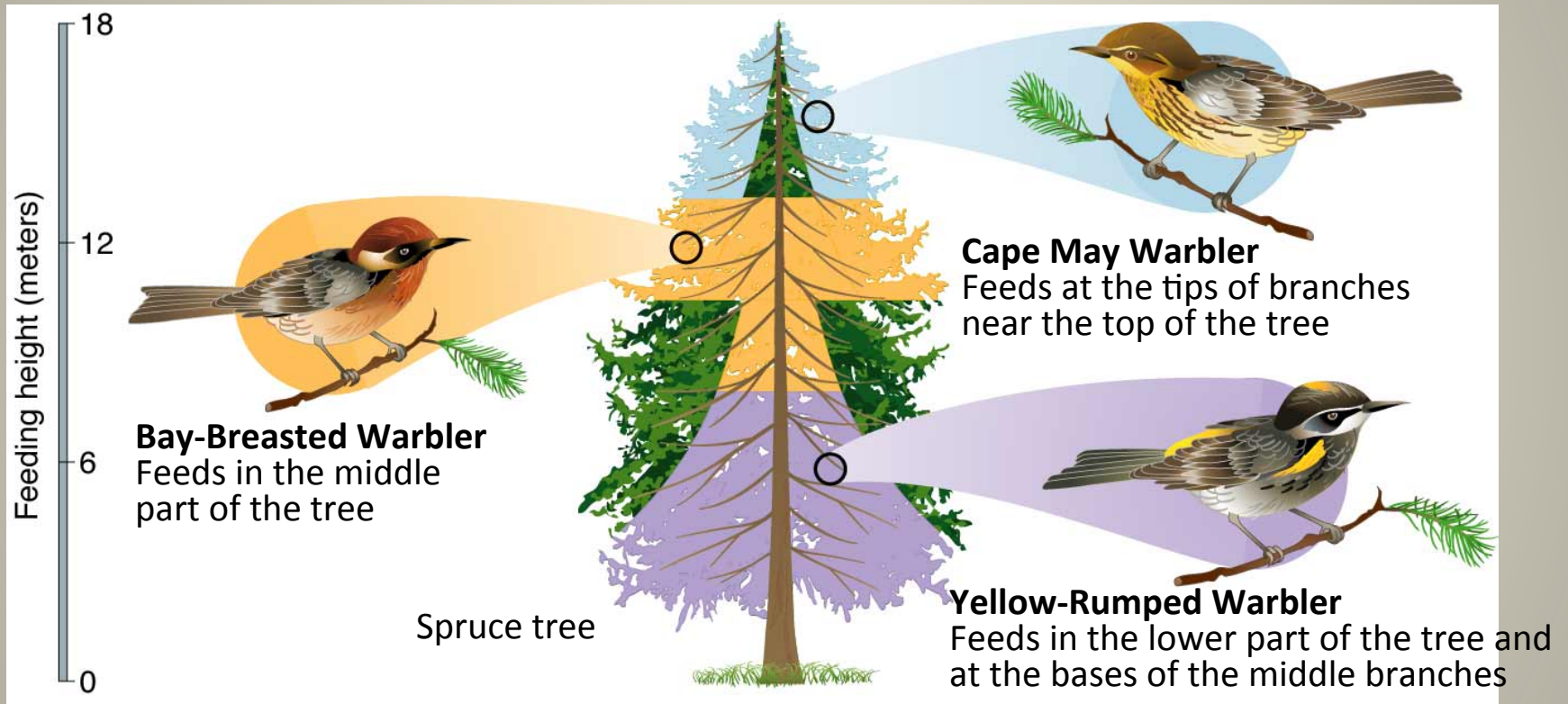
1. Habitat = address, niche = occupation

### C. Community Interactions

1. Competition – for resources
  - a. Competition exclusion principle: no 2 species can occupy same niche @ same time
2. Predation – 1 organism captures & feeds on another
3. Symbiosis – "living together"
  - a. Mutualism – both benefit
  - b. Commensalism -1 benefits, other neither helped nor harmed
  - c. Parasitism – 1 benefits, other is harmed



# Figure 4-5 Three Species of Warblers and Their Niches



D. Ecological Succession – ecosystems change in response to disturbances

1. Primary succession – on surfaces where no soil exists
2. Secondary succession – disturbance changes existing community without removing soil

## 4-3 Land Biomes

- A. Biome – particular physical environment containing characteristic assemblage of plants & animals
- B. Climate and Microclimate
  1. Climate diagram – shows 2 main factors determining climate – temp & precip
  2. Microclimate – climate in small area different from surrounding climate
- C. The Major Biomes – see map
- D. Other Land Areas – don't fall neatly into major biome categories
  1. Mountain Ranges – biotic & abiotic conditions vary with elevation
  2. Polar Ice Caps – cold year-round, plants few

# Figure 4-17 The World's Major Land Biomes

