

## Focus on Ecosystems: *Environment* chapters 3-6 (selected passages)

### Chapter 3: Ecosystems and Energy [6<sup>th</sup> ed: 46, 50-59 / 7<sup>th</sup> ed: 48, 51-60]

- **Energy, potential and kinetic**
- What distinguishes **closed systems** from **open systems**?
- **First and Second Laws of Thermodynamics**
- Extremophiles and **chemosynthesis**: why are hydrothermal vent ecosystems of particular interest to scientists?
- **Producers, Consumers (primary, secondary and tertiary), and Decomposers (autotrophs and heterotrophs)**. How are **omnivores** different from secondary and tertiary consumers?
- What determines an organism's **trophic level**? [See figure 3.9]
- **Food webs** (Figure 3.10). Why does the text point to **krill** as a critical species in a food web?
- **Ecological Pyramids** (remember the second law of thermodynamics...)
  - **Pyramid of numbers / Pyramid of biomass / Pyramid of Energy**

### Chapter 4: Ecosystems and Living Organisms [6<sup>th</sup> ed: 64, 73-82 / 7<sup>th</sup> ed: 65, 72-80]

- **Symbiosis** as a product of **coevolution**
  - **Mutualism / Commensalism / Parasitism and pathogens**
- What are some resources for which individuals would be in **competition** (either *intraspecific* or *interspecific*)
- **Ecological niche**: “the totality of an organism’s adaptation, its use of resources,” and its lifestyle
  - Why does the book distinguish between **fundamental** and **realized niches**?
    - § Example of the green and brown anole (a lizard) in Florida [Figure 4.13]
- What is a **limiting resource**? A **keystone species**?
- Under **competitive exclusion**, no two species with absolutely identical ecological niches can coexist. How is **resource partitioning** a solution to competitive exclusion?

### Chapter 5: Ecosystems and the Physical Environment [6<sup>th</sup> ed: 97-105 / 7<sup>th</sup> ed: 99-106]

- **Biogeochemical cycles** (not in reading: to be discussed in class)
- Effects of solar radiation
  - The **albedo effect**; solar intensity and latitude; Layers of the atmosphere; **Coriolis effect**
  - The three prevailing winds: polar easterlies, westerlies, and trade winds
  - Oceanic gyres

### Chapter 6: Major Ecosystems of the World [6<sup>th</sup> ed: 117-118, 129-139 / 7<sup>th</sup> ed: 117-118, 128-139]

- The case of wildfires
- Terrestrial **Biomes** (not in reading: to be discussed in class)

**Aquatic ecosystems**, the effects of salinity (freshwater versus saltwater), and plankton, nekton, and benthos

- Freshwater ecosystems
  - Flowing-water ecosystems (rivers and streams)
  - Standing-water ecosystems (lakes and ponds): littoral zone, limnetic zone, profundal zone
  - Freshwater wetlands (marshes and swamps)
- **Estuaries**: salt marshes and mangrove forests
- Marine Ecosystems
  - intertidal zone
  - benthic environment
  - pelagic environment