Wed Sept 23, *Environment* chapters 3 and 4: Ecosystems day 1

Chapter 3: Ecosystems and Energy (skip 60-61)

- Levels of biological organization (Figure 3.1)
    - What distinguishes a **species** from a **population** from a **community** from an **ecosystem**?
- What is the **biosphere**? **Atmosphere**? **Hydrosphere**? **Lithosphere**?
    - **Energy**, **potential** and **kinetic**
        - What distinguishes **closed systems** from **open systems**.
    - **First Law of Thermodynamics**
    - **Second Law 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 Pyraminds** (remember the second law of thermodynamics…)
    - **Pyramid of numbers**
    - **Pyramid of biomass**
    - **Pyramid of Energy**

Chapter 4: Ecosystems and Living Organisms (65-69 and 85-6 optional)

- Why does the Indonesian island of Krakatoa provide a perfect study for the process of **primary succession**? What is **secondary succession**? Where does it happen?
- **Symbiosis** as a product of **coevolution**
    - **Mutualism**
    - **Commensalism**
    - **Parasitism** and **pathogens**
- What are some examples of 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 the lifestyle to which it is fitted"
    - 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**?
- Under **competitive exclusion**, no two species with absolutely identical ecological niches can coexist. How is **resource partitioning** a solution to competitive exclusion?
- **Keystone species**: "a species, often a predator, that exerts a profound influence on a community in excess of that expected by its relative abundance"
- Why do **ecotones** result in the **edge effect**?
- What are some examples of **ecosystem services**?