Chapter 13.1: How Populations Change in Size

- World population is 6+ billion and climbing
    - Estimated to be 9+ billion by mid-21st century

Population – group of individuals of the same species living in a particular place

- Birth and immigration add individuals to a population
    - Immigration – species moving in
- Death and emigration subtract individuals from a population
    - Emigration – species moving out
- A population grows when:
    - # of births + # of immigrants > # of deaths + # of emigrants
- Population shrinks when reversed

- Most organisms produce more offspring than can survive
    - Herring (fish) lays 1,000,000 eggs/year
        - If all hatched we'd have an overcrowding problem
- What would happen if there were no limits on growth of population?
- Each population has a characteristic max growth rate

Biotic potential – rate at which a population would grow if every new individual survived to adulthood and reproduced at its maximum capacity

- Causes exponential growth
    - Larger #'s of individuals added each generation
        - Produces a J – curve

Limiting Factors

- Habitats contain limited supplies of food, water, shelter and other resources for living
- Populations grow, members consume greater amounts of resources

Limiting resources – resources that limit the growth of a population

    - For animals: food, water, shelter, nesting sites
    - For plants: water, sunlight, certain mineral nutrients
- Populations increase → competition for limiting resources forms
- Crowding increases exposure to predators, parasites and disease
- Survival becomes difficult
    - Birth rate **down**
    - Death rate **up**

Environmental resistances – the force opposing biotic potential

- Combined effect of all of the factors that limit population growth.
- Population naturally increases, environmental resistant acts to slow growth

Carrying capacity – maximum population size an environment can support for a long period of time

- Population can increase above but can't stay there for a very long
- Population naturally fluctuates above and below based on environmental changes
    - Ex: seasons