Ch. 45 – Population Ecology

Elusive Heads to Count (45.2)

1. **Quadrats** – sampling areas of same size & shape
2. **Capture-recapture method**:

limitations:

Population Size and Exponential Growth (45.3) & Limits on Growths of Populations (45.4)

1. Population size:

2. $G = rN$

3. doubling time - Rule of 70 $T_d = 70/R$

a-If the annual population growth rate is 5 percent, what is the doubling time?

b-If the doubling time is 7 years, what is the percent annual growth rate?

c-A parent invests $500.00 for a newborn infant in a savings account with a 10 percent interest rate. How long will it take to double? How old will the child be when the account has grown to $2,000.000? What will be the value of the account when the child has become a 28-year old? If the "child" never touches the account until retiring at age 70, how much money will be in the account?

4. a-Exponential growth → J-shaped curve

b-logistic growth → S-shaped curve

5. Biotic potential, Carrying capacity (K) & limiting factors
   -*ideal* (humans seldom give birth to 20 kids)

6. $G = r_{max}N \left(\frac{K - N}{N}\right)$

•There are two different approaches to ensuring that some of your offspring reach maturity:

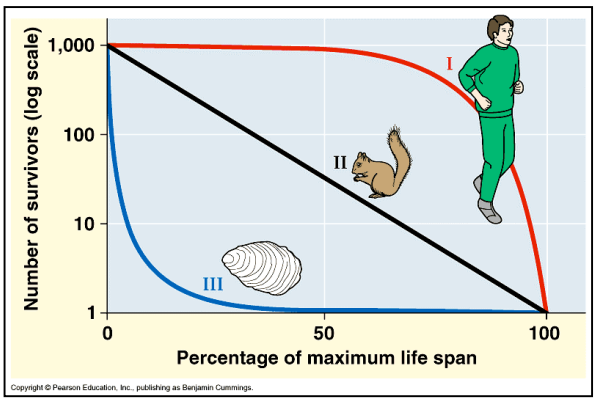
a-**K STRATEGISTS** have few large offspring, but ensure a high survival rate through intense parenting aover a slow maturation (e.g. humans)
b- **R STRATEGISTS** have many small offspring, plus little to no parenting, to compensate for a low survival rate. (e.g. insects)
[c-You can remember these two by thinking K for Kangaroo, and R for Roach]

7. **Density-dependent factors** competition, predation, parasitism and disease

Density-independent factors weather, natural disasters, seasonal cycles, pesticides, habitat destruction

Life History Patterns (45.5)

1. **Survivorship curves**: number of individuals in a cohort still alive at each age



Human Population Growth (45.7)

1. agriculture, medicine, hygiene, fossil fuels → ↑K

Control Through Family Planning (45.8)

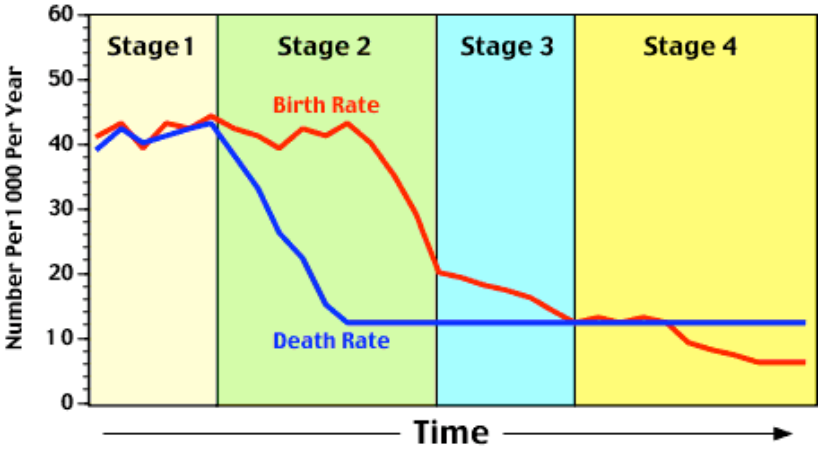
1. **Fertility rate**—the average number of children each woman has in her lifetime
   b-**replacement fertility rate** -

Population Growth and Economical Development (45.9)

1. Comparing nations

	Developing Nations	Industrialized Nations
Birth rate		
Death rate & Infant mortality rate		
Population growth rate		
Population doubling time		
Quality of medical care		
3 Examples		

3. **Demographic transition**—
   a model that tries to explain how countries go from having high birth and death rates to low birth and death rates. This usually coincides with the process of industrialization.



Misc.

Social Impact of No Growth (45.10)