Populations can change in size when individuals are added or removed

- 4 factors can change pop size
  - Natality
  - Mortality
  - Immigration
  - Emigration

- Natality – the # of offspring of a species born in one year

- Mortality - # of individuals of a species that die in one year

- Immigration - # of indiv. of a species moving into an existing pop

- Emigration - # of indiv that move out of an existing pop

Calculating Population growth

- pop growth (ΔN) = [births + immigration]-[deaths + emigration]

Ex. What is the population growth for a colony of beaver using the following info?

Births = 10 Deaths = 2
Immigration = 0 Emigration = 4

Calculating Growth Rate (gr)

$$gr = \frac{\text{change in population (pop. growth)}}{\text{change in time}} = \frac{\Delta N}{\Delta t}$$

Calculating per capita growth rate (cgr)

$$cgr = \frac{[\text{births + immigration}]-[\text{deaths + emigration}]}{\text{initial \# of organisms (N)}} \times 100$$

ΔN

$$cgr = \frac{\Delta N}{N}$$

cgr = per capita growth rate
ΔN = change in population size
N = initial # of organisms in pop

Over 2 years, a population of 900 experienced 66 births and 14 deaths. Five individuals left the population and 13 individuals joined the population. Using this information, determine

(a) the population change

$\Delta N = (66+13)-(14+5)$

(b) the new population size

960

(c) the growth rate

$gr = \frac{\Delta N}{t} = \frac{60\ ind}{2a}$

$= 30\ ind/a$

(d) the per capita growth rate

$cgr = \frac{\Delta N}{N} = \frac{60\ ind}{900\ ind}$

$0.067\ ind/ind$

$67\ ind/1000\ ind$