

## INVESTIGATION 1.2: 'A Sample Census - Wildlife on the Move'

- **population** - the total number of individuals of a single species that live in a designated region at a given time.
  - > ex: human population is ~ 6 billion
- **population density** - the number of individuals of a single species that live in each unit area (km<sup>2</sup>, mi<sup>2</sup>, hectare, acre) of habitat at a given time.
  - > ex: deer population is 6 deer per square mile
- **census** - a count of the population.
- **true census** - actual count of all of the individuals of a species in a given area.
- **sample census** - is an estimate of the population.
  - (used when actual count is not possible)

**ESTIMATED POPULATION = Estimated Population Density x Area of Habitat**

- The '**mark-return-recapture method**' is used to estimate population density.
  - ex: DFO at Millerton and Cassillis estimate salmon populations on Miramichi River.

$$P = \frac{T_F T_L}{M}$$

P - estimated population

T<sub>F</sub> - total animals captured in first trapping

T<sub>L</sub> - total animals captured in later trapping

M - recaptured animals that are marked

## Calculating Exponential Growth

### Formula for Exponential Growth

A quantity  $A$  that has exponential growth can be modeled by

$$A = P(1 + r)^n$$

$A$  measures the quantity at any time.

$P$  is the initial value of  $A$ , when  $n = 0$ .

$r$  is the rate (%) of growth, in decimal form.

$n$  is the elapsed time.

**EXAMPLE:** The growth rate of a bacteria culture is 52% each hour. Initially, there are two bacteria. How many bacteria are there after 12 hours?