

## TOPIC: LINEAR POPULATION GROWTH

- ◆ Linear population growth is a very \_\_\_\_\_ model.
  - Provides a basic, oversimplified framework for understanding population growth.
- ◆ Linear population growth rate is \_\_\_\_\_, regardless of current population size.
  - Used for \_\_\_\_\_ stages of growth, \_\_\_\_\_-term projections, or in controlled experimental settings.

Equation for a Line:

$$y = mx + b$$

Linear Population Growth Equation:

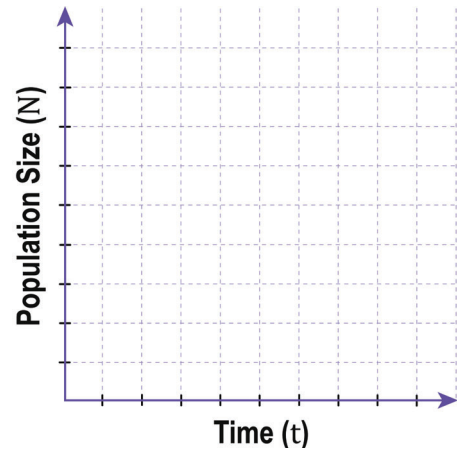
$$N_t = rt + N_0$$

$N_t$  = final population size.

$r$  = absolute population growth rate =  $\frac{\Delta N}{\Delta t}$ .

$t$  = amount of elapsed time.

$N_0$  = initial population size.



## EXAMPLE

A proliferating stem cell whose progeny does not reproduce would grow via the linear population growth model. Which of the following best explains why this is the case?

- a) The progeny continue to reproduce, leading to exponential growth.
- b) The progeny only reproduce during certain seasons, causing cyclical growth patterns.
- c) The progeny exhibit high rates of reproduction, but the growth is offset by a greater rate of cell death.
- d) The progeny do not contribute to further population growth, resulting in constant addition of cells over time, regardless of the current population size.

## PRACTICE

In a small, isolated island, a population that initially consists of 50 birds is observed to grow by a constant number of 5 birds per month. What is the population size after 2 years?

- a) 110 birds.
- b) 170 birds.
- c) 250 birds.
- d) 60 birds.