

## Objectives

- **Describe** the three main properties of a population.
- **Describe** exponential population growth.
- **Describe** how the reproductive behavior of individuals can affect the growth rate of their population.
- **Explain** how population sizes in nature are regulated.

## What Is a Population?

- A **population** is a group of organisms of the same species that live in a specific geographical area and interbreed.
- A population is a reproductive group because organisms usually breed with members of their own population.
- The word *population* refers to the group in general and also to the size of the population, or the number of individuals it contains.

## Properties of Populations

- **Density** is the number of individuals of the same species in that live in a given unit of area.
- **Dispersion** is the pattern of distribution of organisms in a population. A population's dispersion may be even, clumped, or random.
- Size, density, dispersion, and other properties can be used to describe populations and to predict changes within them.

## How Does a Population Grow?

- A population gains individuals with each new offspring or birth and loses them with each death.
- The resulting population change over time can be represented by the equation below.



## How Does a Population Grow?

- **Growth rate** is an expression of the increase in the size of an organism or population over a given period of time. It is the birth rate minus the death rate.
- Overtime, the growth rates of populations change because birth rates and death rates increase or decrease.
- For this reason, growth rates can be positive, negative, or zero.

## How Does a Population Grow?

- For the growth rate to be zero, the average number of births must equal the average number of deaths.
- A population would remain the same size if each pair of adults produced exactly two offspring, and each of those offspring survived to reproduce.
- If the adults in a population are not replaced by new births, the growth rate will be negative and the population will shrink.

### How Fast Can a Population Grow?

- Populations usually stay about the same size from year to year because various factors kill many individuals before they can reproduce.
- These factors control the sizes of populations.
- In the long run, the factors also determine how the population evolves.

### Reproductive Potential

- A species' biotic potential is the fastest rate at which its populations can grow. This rate is limited by reproductive potential.
- **Reproductive potential** is the maximum number of offspring that a given organism can produce.
- Some species have much higher reproductive potentials than others. Darwin calculated that it could take 750 years for a pair of elephants to produce 19 million descendants. While bacteria could produce that in a few days or weeks.