

Lesson 15-2

Populations



How do populations change in size?



What factors limit population growth?

I. How do populations change in size?

A. Ecologists are scientists who study biotic and abiotic factor of an ecosystem and the interactions between them

*some study populations and monitor the populations over time

* populations can change in size when new members join the population or when members leave the population

B. Births and deaths

The most common way in which new individuals join a population is by being born into it

*if more individuals are born into a population than die, the population can grow

So when the birth rate, the number of births per 1000 individuals for a given period of time, is greater than the death rate, the number of deaths per 1000 individuals for given time, the population may increase

* The main way individuals leave a population is by dying

* If the birth rate = the death rate, the population may stay the same.

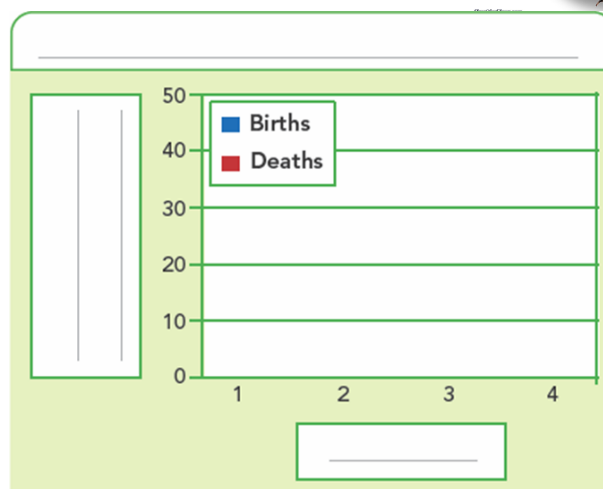
* If the death rate is greater than the birth rate, then the population may decrease

Population Size

Using the data table, create a double bar graph showing alligator births and deaths for four years.



| Data Table | | |
|------------|--------|--------|
| Year | Births | Deaths |
| 1 | 32 | 8 |
| 2 | 28 | 13 |
| 3 | 47 | 21 |
| 4 | 33 | 16 |



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C. The Population Statement

When the birth rate in a population is greater than the death rate, the population will increase.

*This is written with a $>$ sign

If birth rate $>$ death rate, population size increases

*If the death rate is greater, than the population will generally decrease

If death rate $>$ birth rate, population size decrease

D. Immigration and Emigration

The size of a population may change when individuals move into or out of the population

Immigration- moving into a population

Emigration- leaving a population

ex. When food is scarce some members of a herd of antelope may move off to find more food and become permanently separated from the population



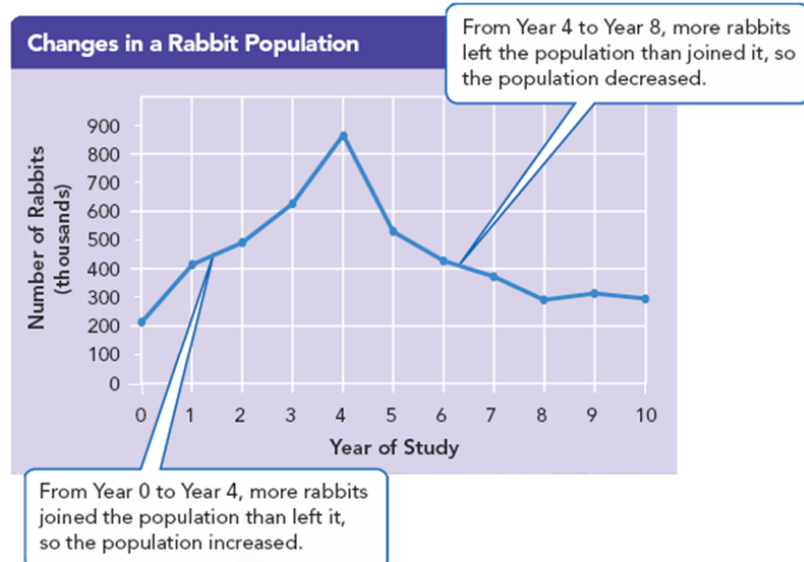
E. Graphing changes in population

Changes in population can be displayed on a line graph

Vertical axis shows the changes in population

Horizontal axis shows time

Changes in a Rabbit Population
This graph shows how the size of a rabbit population changed over ten years.



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F. Population Density

Sometimes an ecologist needs to more than just the total size of a population

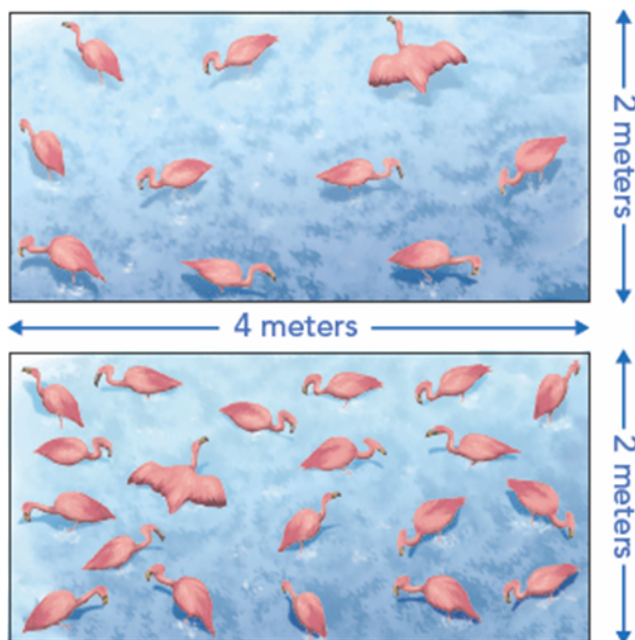
Population density- number of individuals in an area of a specific size

Population density can be written as an equation

$$\text{Population density} = \frac{\text{Number of individuals}}{\text{unit area}}$$

Population Density of the Flamingos in the Pond

In the pond on the top, there are 10 flamingos in 8 square meters. The population density is 1.25 flamingos per square meter.



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II What factors limit population growth

A. When living conditions in an area are good, the population will generally grow

*Eventually some environmental factor will cause the population to stop growing

*A limiting factor- is an environmental factor that causes a population to stop growing or decrease in size

ex. weather conditions, space, food, and water

B. Climate

Changes in climate conditions such as temperature or the amount of rainfall, can limit population growth

ex. cold springs can kill many organisms

including plants, birds and mammals

ex. floods, hurricanes and tornados can

have long lasting affects on a population

size

C. Space

Space is another limiting factor for populations

ex. gannets- sea birds that fly over the ocean and only nest on rocky shores. Nesting spaces are very limited

If they can't find a place to nest, they can't add more to the population

ex. plants



D. Food and water

Organisms require food and water to survive. When food and water are in limited supply, they can be limiting factors

ex. Giraffes- suppose a giraffe eats 10 kg of leaves a day. Trees in that area can supply a 100 kg and remain healthy.

5 giraffes could live healthy, but 15 could not. The population could not grow beyond 10 giraffes

The largest a population that an area can support is called its carrying capacity.

The size of a population may vary, but it usually stays around its carrying capacity

