

Factors That Affect Populations

Populations

- * Various combinations of abiotic factors can cause populations to increase or decrease.

Populations

Populations grow due
to:

Natality
(birth rate)

Immigration
(moving into an
area)

Populations decrease
due to:

Mortality
(death rate)

Emigration
(moving out of an
area)

Populations

- * **Population Growth = (births + immigration) - (deaths + emigration)**
- * **Birth rate and death rate tend to have the greatest effect on population size.**

Populations

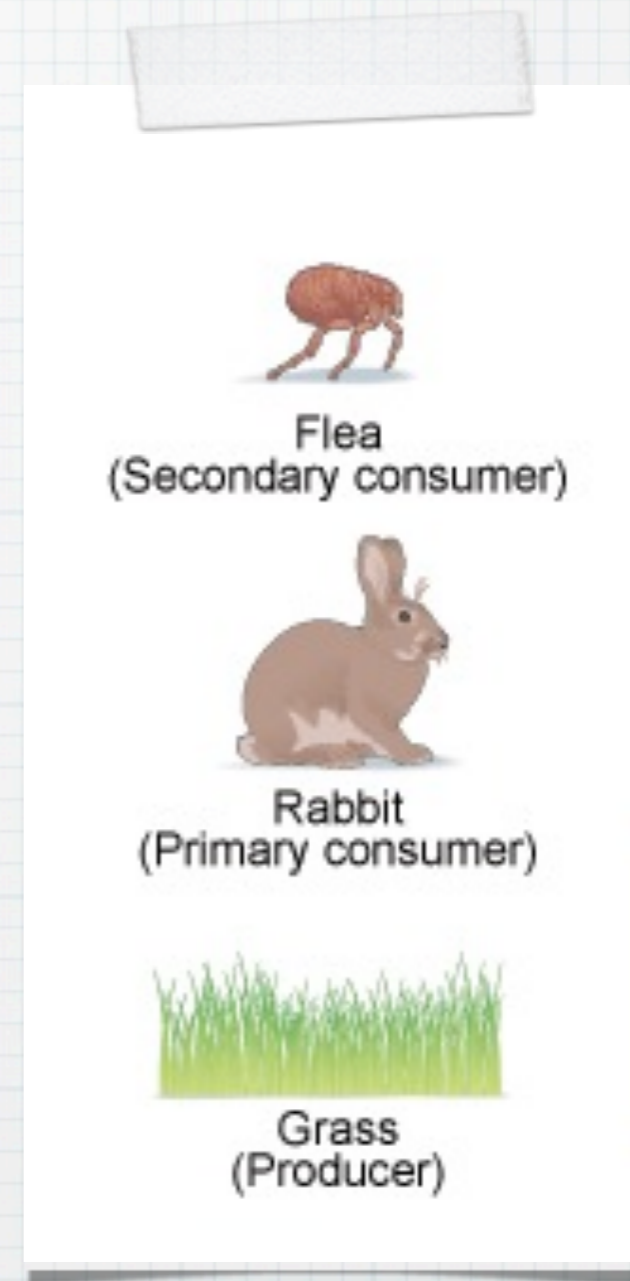
- * **Open populations: allow for births, deaths, immigration, and emigration to occur.**
- * **Examples: forest, lake, field**

Populations

- * **Closed populations:** do not allow for individuals to move into or out of an area.
- * **Example:** a fenced yard, game reserves, lab settings

Populations

- * Example: There is an unlimited amount of food, water, and space in a rabbit population. Without any limits, 10 breeding pairs of rabbits could expand to 10 million breeding pairs in only 3 years.
- * What affect might this have on other populations?



Limiting Factors

- * In a healthy functioning ecosystem, limiting factors prevent overpopulation.
- * Limiting factors are any factor that restricts population.

Abiotic Limiting Factors

- * Abiotic Limiting Factors:
 - * Amount of Light
 - * Temperature
 - * Acidity
 - * Natural Disturbances (Storm, Fire, Drought)
 - * Human Disturbances



Biotic Limiting Factors

- * Competition (two species vie for the same resource)
- * Predation (one species feeds on another)
- * Symbiosis (two species live near each other)

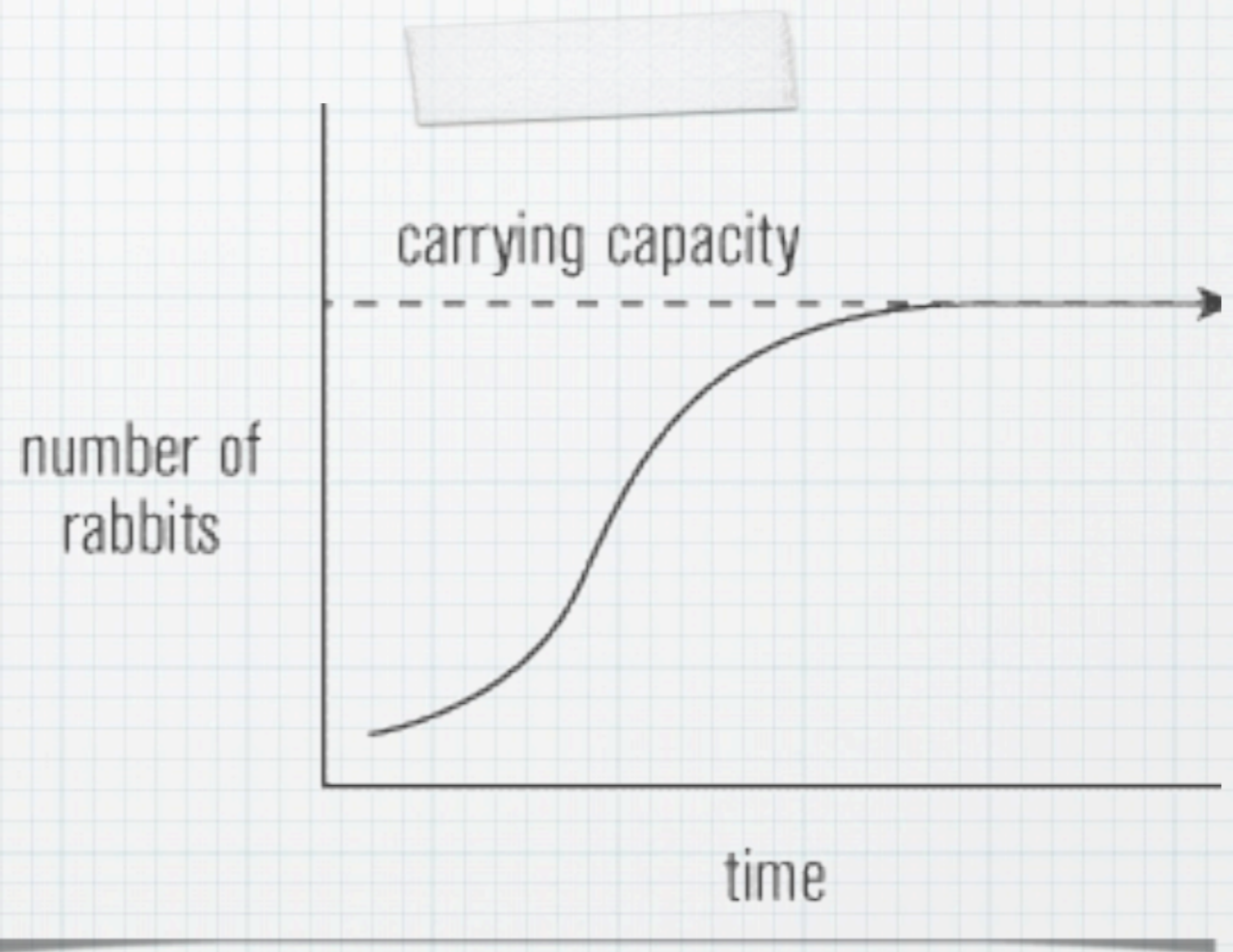


Carrying Capacity

- * As the population grows, it requires more food, water, and space.
- * At some point the population reaches the maximum number of organisms that it can continuously support.

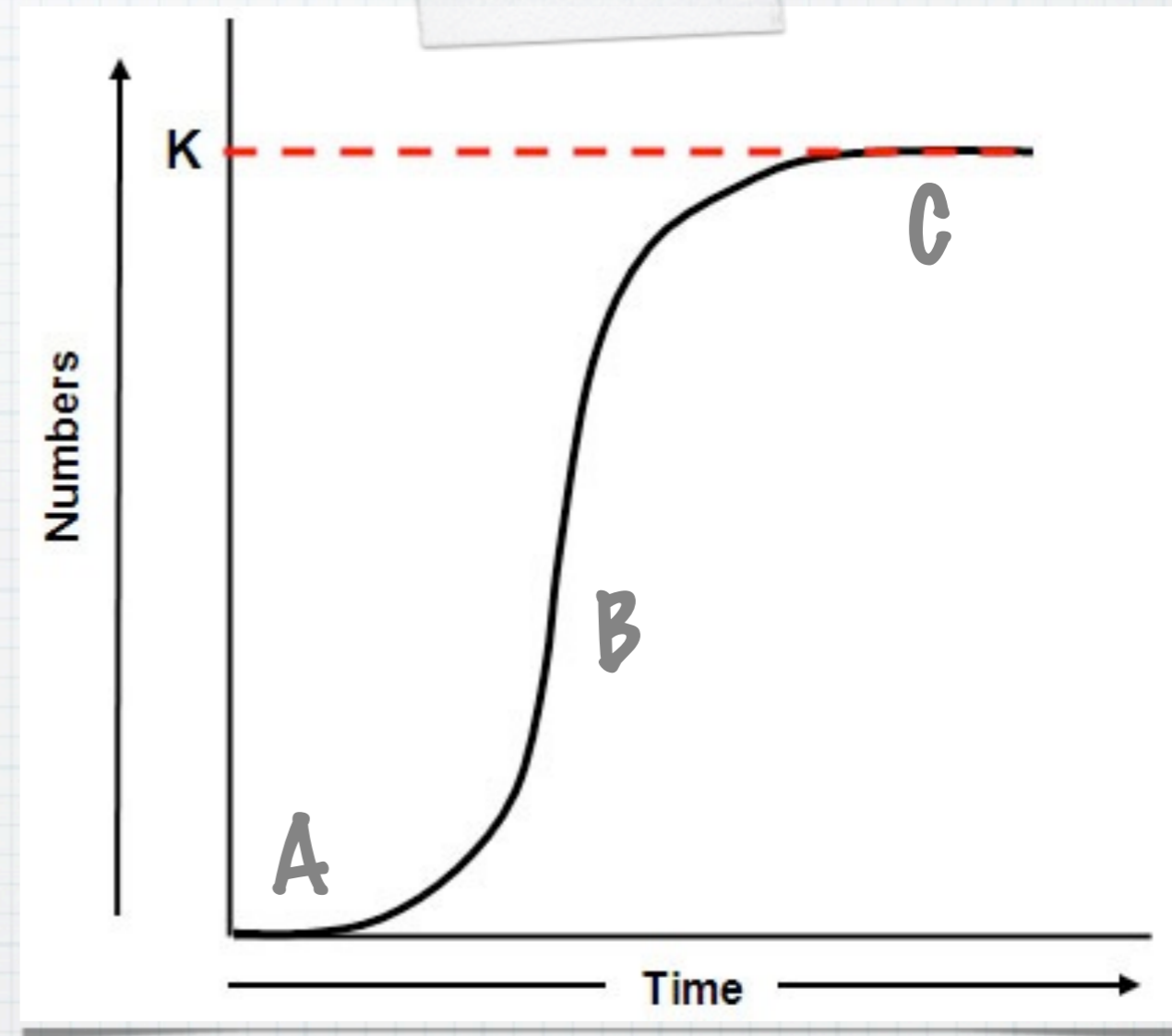
Carrying Capacity

- * **Carrying Capacity:** Maximum population size of a species that an ecosystem can sustain.



Population Growth Curve

- * A) Region of slow growth population
 - * Small number of organisms, adjusting to new environment
- * B) Region of rapid population growth
 - * Organisms ready to reproduce.
- * C) Region of steady population growth
 - * Carrying capacity reached



Carrying Capacity

- * Carrying capacity can be altered through natural or human activity.
- * A forest fire can increase the number of blueberry bushes since more light/space is available.
- * Irrigation, which increases the productivity and fertility of land, can change a desert into a lush oasis.
- * The removal of wolves by human hunters can cause an increase in the deer population since there are fewer predators.

Carrying Capacity

- * For an ecosystem to be sustainable, none of the populations can exceed the carrying capacity for very long.