

# Populations

## Learning Targets:

1. Compare and contrast logistic and exponential growth models.
2. Identify examples of populations that demonstrate different types of population growth.
3. Identify factors that affect population growth.
4. Predict the effects of limiting factors (ex. carrying capacity) on population growth.

# What is a population?

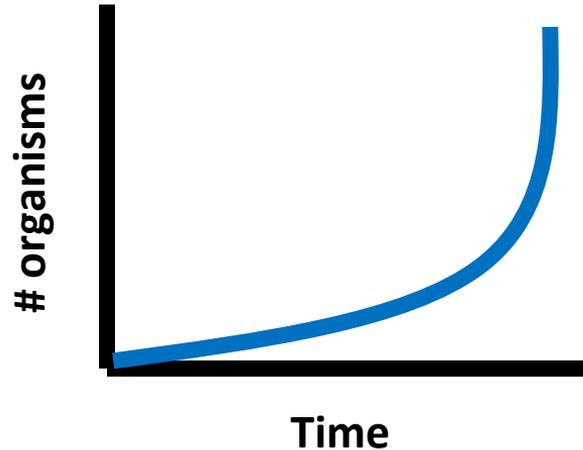
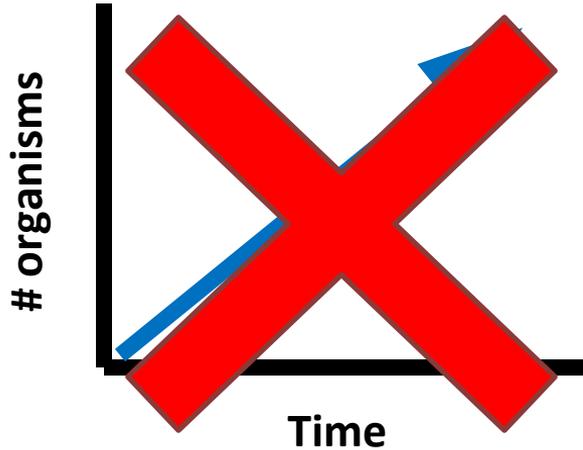
- **Population**: a group of organisms that are the same species and live in the same area.
  - Healthy populations should grow and die at a relatively steady rate.
  - Unless the population runs out of water, food, space, or is attacked by disease or a predator, it will continue to grow.

# What factors affect populations?

- 1. Growth Rate**
- 2. Population Density**

# What is growth rate?

- Populations of organisms do not experience linear growth.
- Usually show a **J-curve** growth.



# What are the two types of population growth?

**Exponential Growth:** occurs under ideal conditions with unlimited resources when a population is able to reproduce exponentially.

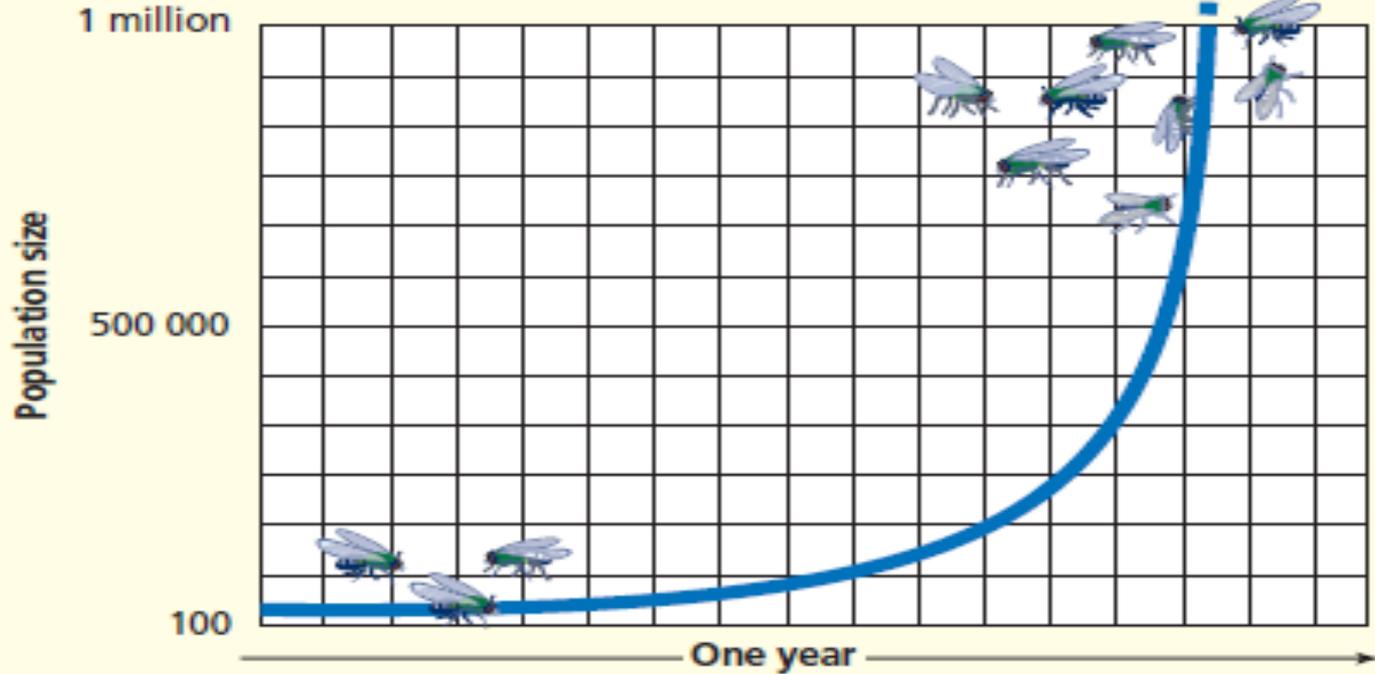
Each generation will be larger than the generation before

**Logistic Growth:** Occurs when a population's growth slows and then stops, following a period of exponential growth.

Population reaches carrying capacity

# Exponential Growth

## Population Growth of Houseflies



# What affects the number of individuals in a population?

- **Carrying Capacity**: number of organisms of one species that an environment can support.
  - If a population overshoots the carrying capacity, limiting factors take effect.

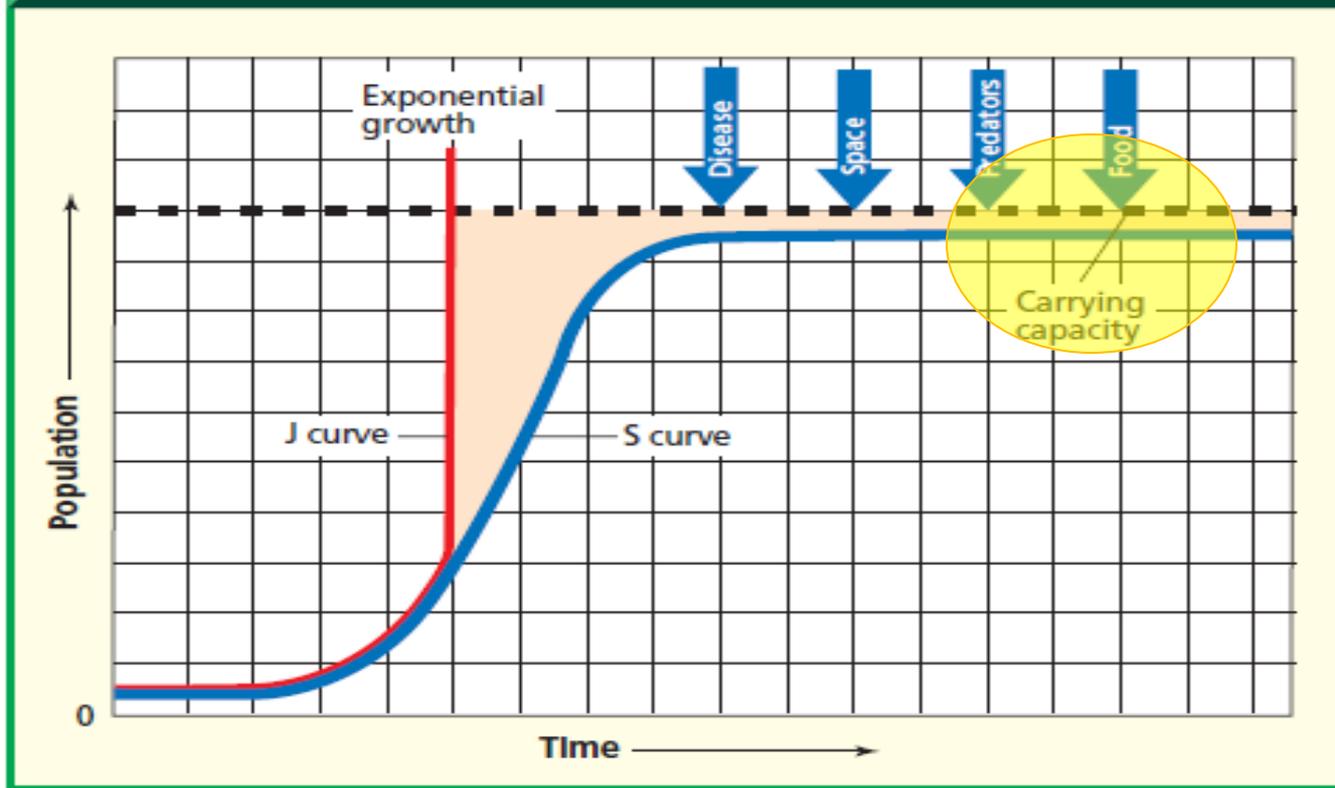
# What affects the number of individuals in a population?

**Limiting Factors**: restricts the existence, reproduction, or distribution of organisms (slows population growth).

- **Abiotic**: sunlight, climate, temperature, water, fire, soil chemistry, etc.
- **Biotic**: predators, food availability
- Limiting factors often affect the dispersal of individuals.

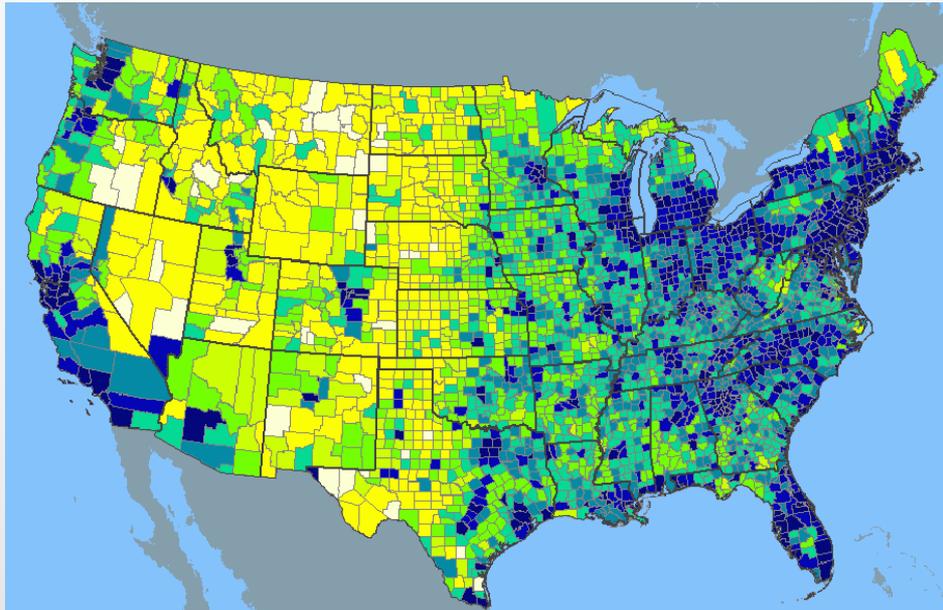
# Logistic Growth

## Characteristics of Population Growth



# How does density affect populations?

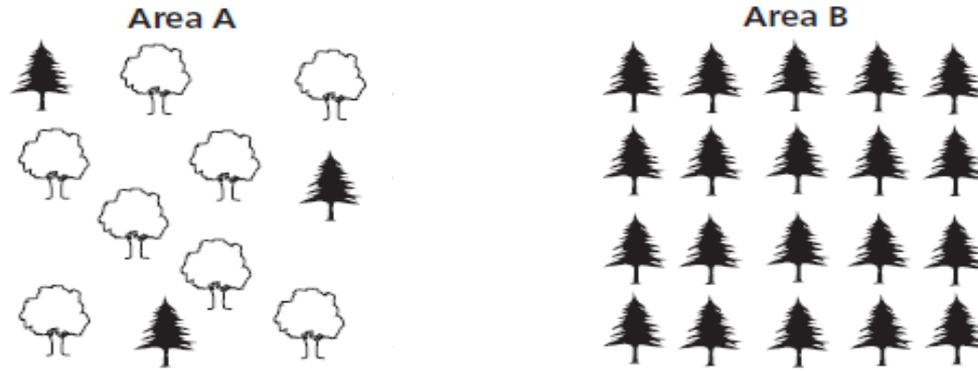
**Population Density:** refers to the number of individuals per unit area.



# Population Density

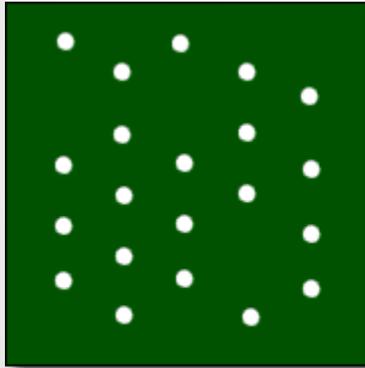
- **Population Density**: the number of individuals in a given area.

Density-Dependent Limiting Factors	Density-Independent Limiting Factors
<b>DEFINITION:</b> As the population size increases, the <b>greater the effect</b> of the factor.	<b>DEFINITION:</b> Affect population size <b>regardless</b> of population size and dispersal.
<b>EXAMPLES:</b> disease, competition, predators, parasites, and food	<b>EXAMPLES:</b> Temperature, storms, flood, drought, pesticides, habitat destruction.

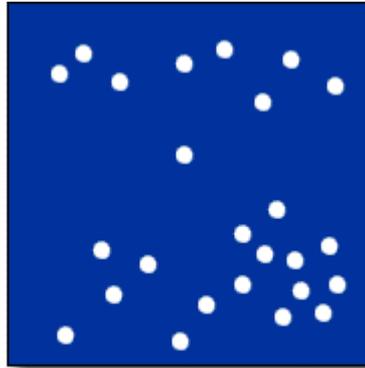


- An invasion of disease-carrying insects that preys upon evergreens has arrived! Which area would most likely be affected more?
- Are predators considered a density-dependent or density-independent limiting factor?

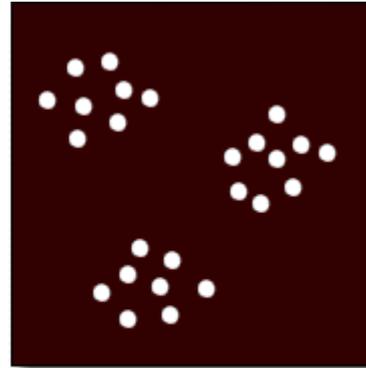
**Distribution:** refers to how individuals in a population are spaced



nearly  
uniform



random



clumped