

POPULATION DENSITY

- **Population density** – the number of individuals per unit area or volume
 - Ex: In humans, urban areas have higher population density than rural areas (New York City vs. Perris)
- **Population density varies with**
 - Birth
 - Death
 - Immigration- organisms moving into the area
 - Emigration- organisms moving out of the area

DENSITY-DEPENDENT FACTORS

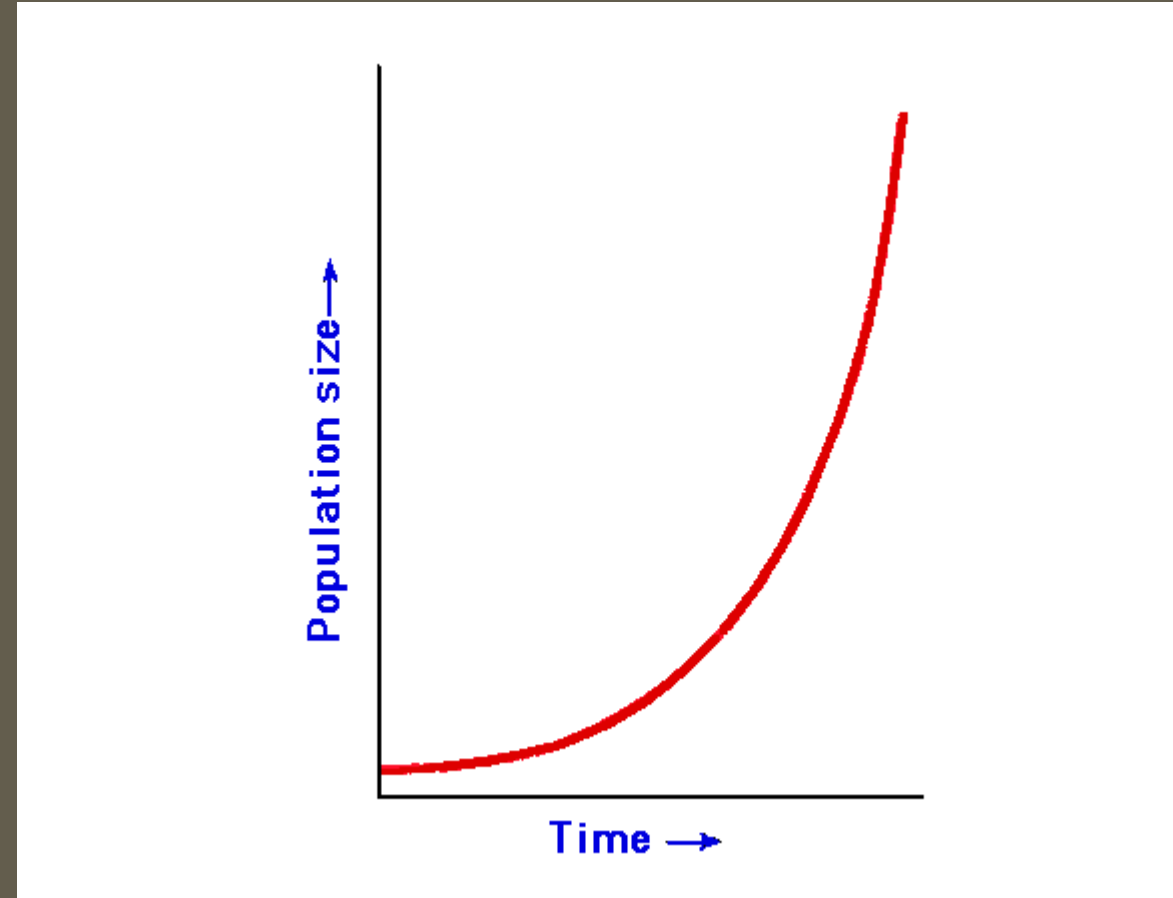
- Affect populations more as the population density increases
 - Ex: diseases, infections, predation
 - Because there are more organisms generally closer together, they can spread disease more easily
- Usually biotic (living)
- “Predator-Prey relationship”
 - High numbers of prey increase the predator population
 - Decrease in prey numbers will decrease predator numbers

DENSITY-INDEPENDENT FACTORS

- Do not correspond with population density.
- Usually abiotic (nonliving)
- Can affect a dense population just as much as one that is more dispersed
 - Ex: Weather, a hurricane, can just as easily wipe out a large population it can a small population.
- Non-infectious diseases are a biotic example
 - Ex: Cancer

EXPONENTIAL POPULATION GROWTH

- Occurs when the growth rate is density-independent and constant
- Populations in ideal conditions, with no limitations
- Population increasing rapidly over time
- Shown as a J-shaped curve on a graph



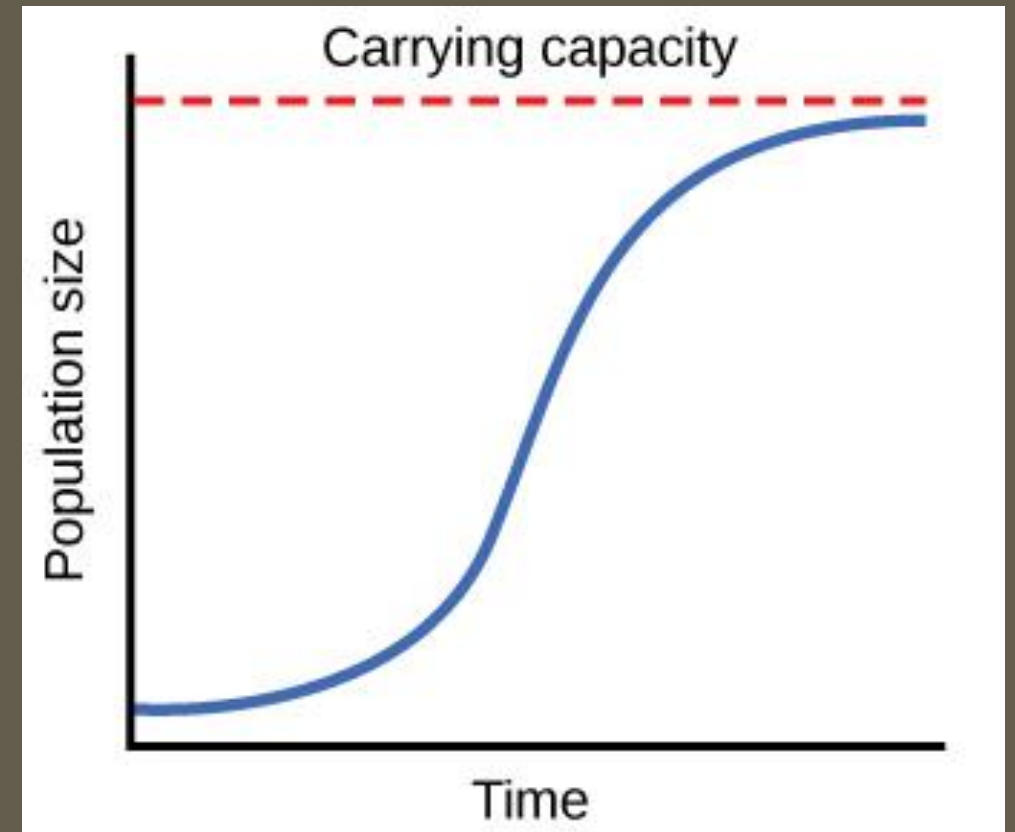
WHEN DOES EXPONENTIAL GROWTH OCCUR AND HOW LONG DOES IT LAST?



- Populations in ideal conditions, with no limitations
 - Ex: Invasive species initially have exponential growth
- Populations will grow exponentially until they are lacking resources
- Carrying Capacity – largest population size that can be supported by the ecosystem

LOGISTICAL POPULATION GROWTH

- Logistical growth is density-dependent
 - Density of the population is what is limiting its growth
- Occurs when a population reaches carrying capacity.
- Shown as an s-curve on a graph



WHEN DOES LOGISTICAL GROWTH OCCUR AND HOW LONG DOES IT LAST?

- In populations regulated by density-dependent factors... like, predators.
- These populations stay near carrying capacity and are in stable environments
- Logistical growth will continue until something significantly changes the population size or carrying capacity.



CARRYING CAPACITY GAME!

1. Get into groups of 3-4.
2. Move the desks into tables.
3. Get the following:
 1. One data table per group
 2. One worksheet per student
 3. One sheet of paper in the following colors: blue, green, red, yellow and white
 4. Game cards
 5. Instructions Handout
 6. One dice