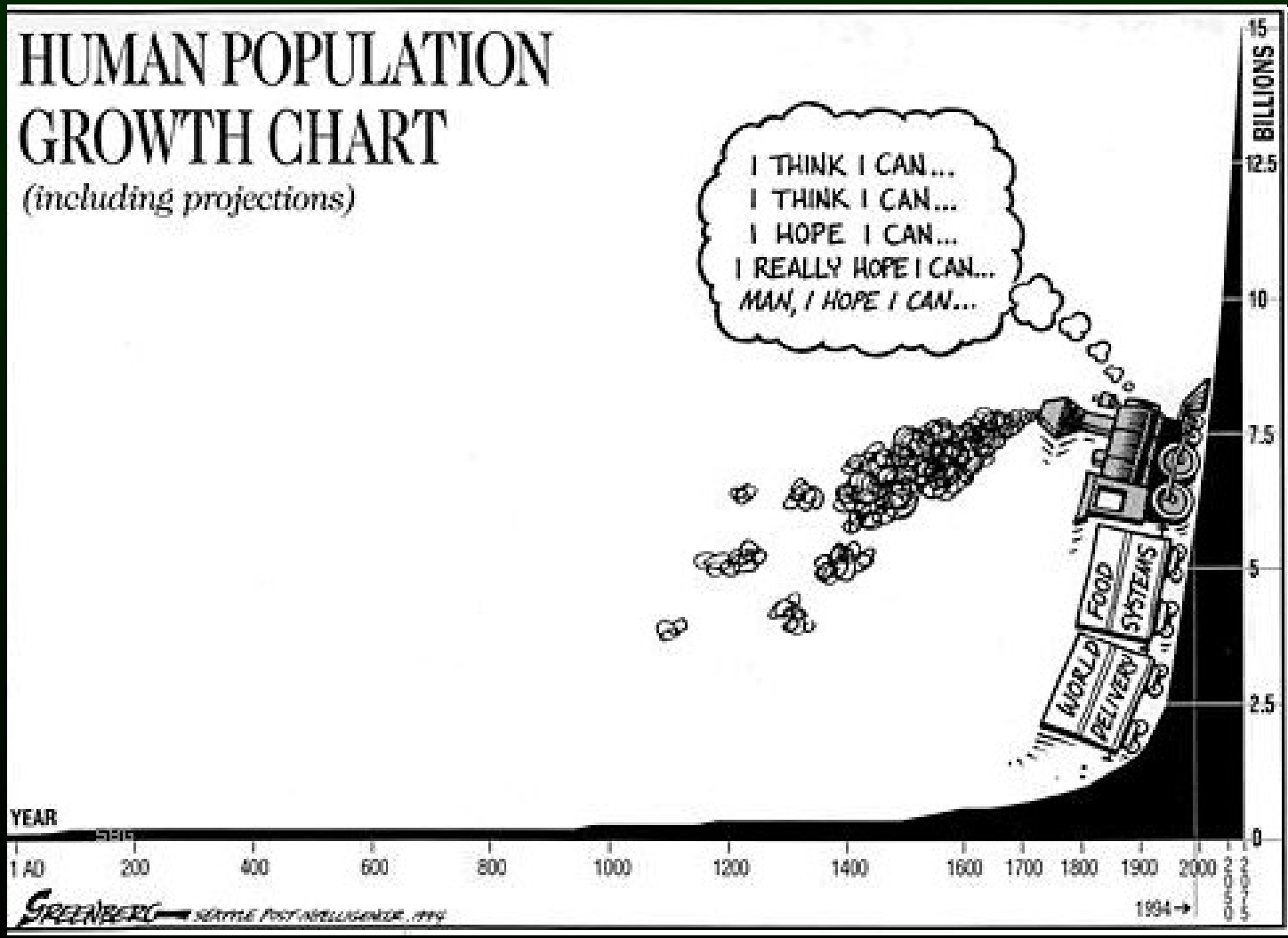
Population Growth
Chapter 11

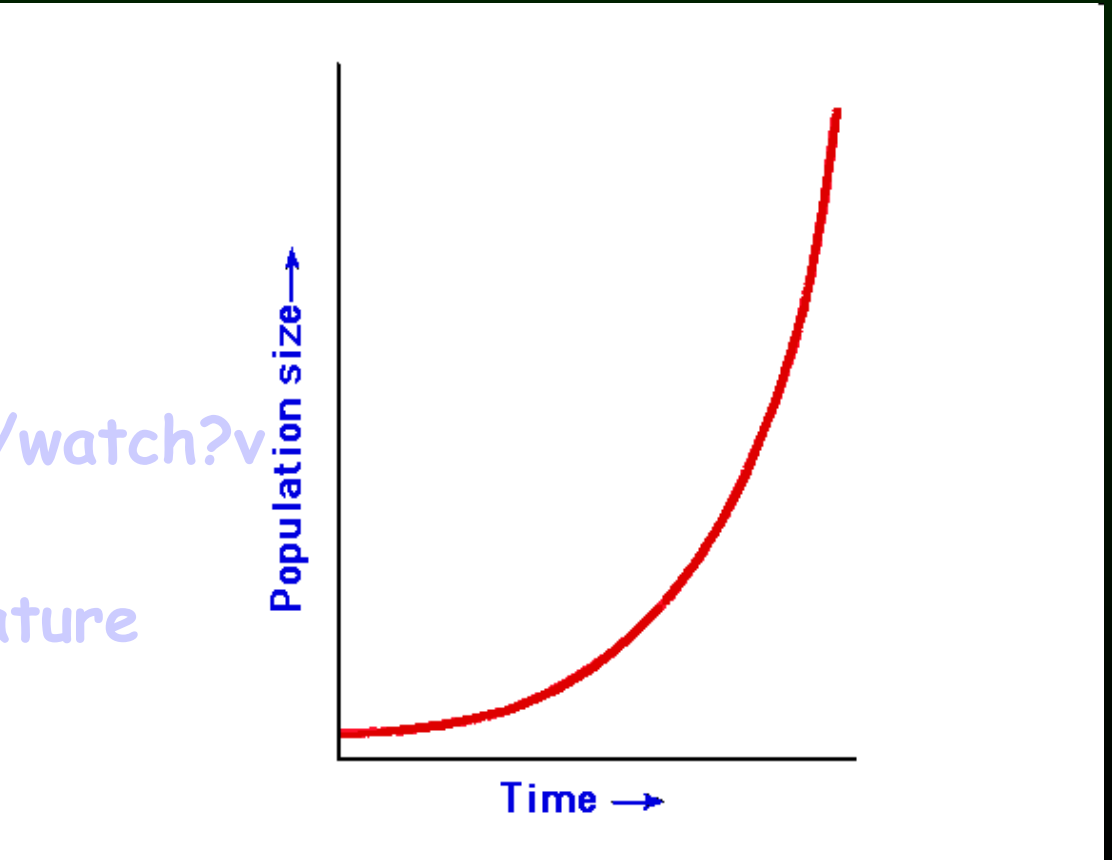
Populations grow at different rates!



Exponential Growth

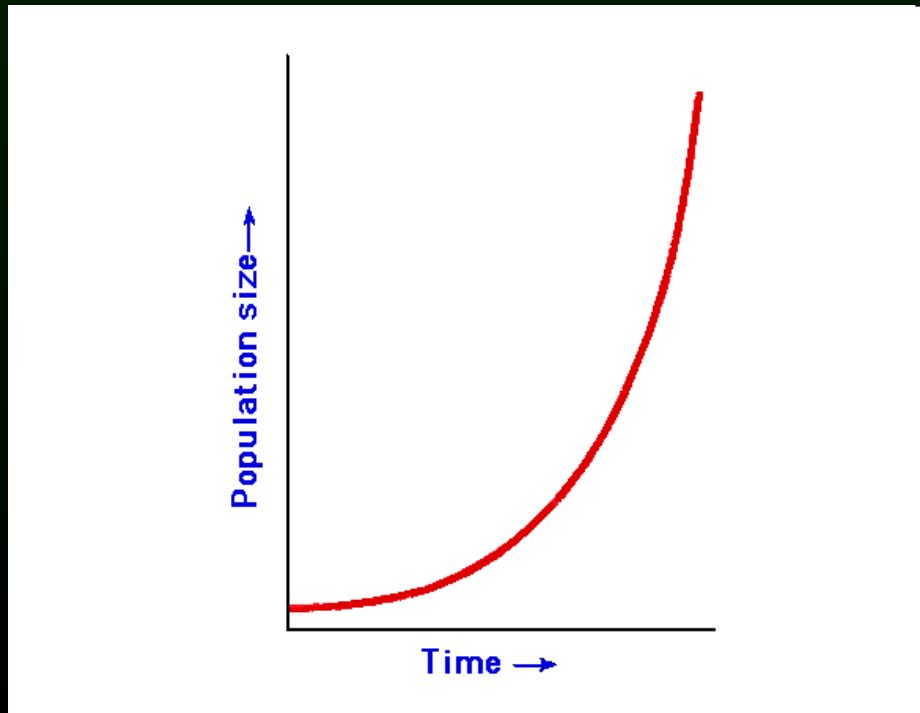
- FAST growth!
- Abundant resources
- The larger the population gets, the faster it grows!!!

http://www.youtube.com/watch?v=gEwzDydciWc&feature=related



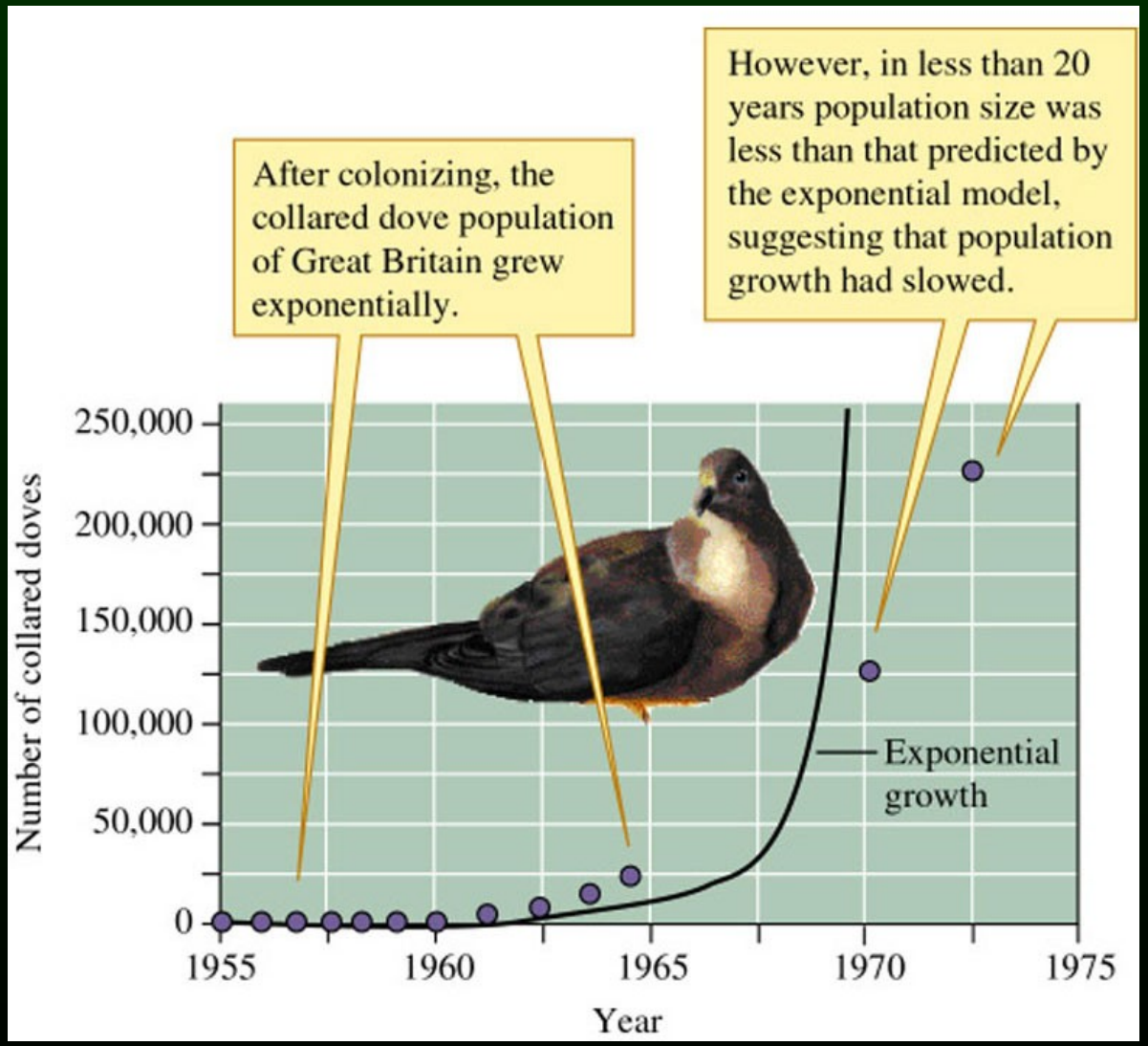
Exponential Growth

- For what types of organisms is this model appropriate?
- Under what conditions is this model appropriate?



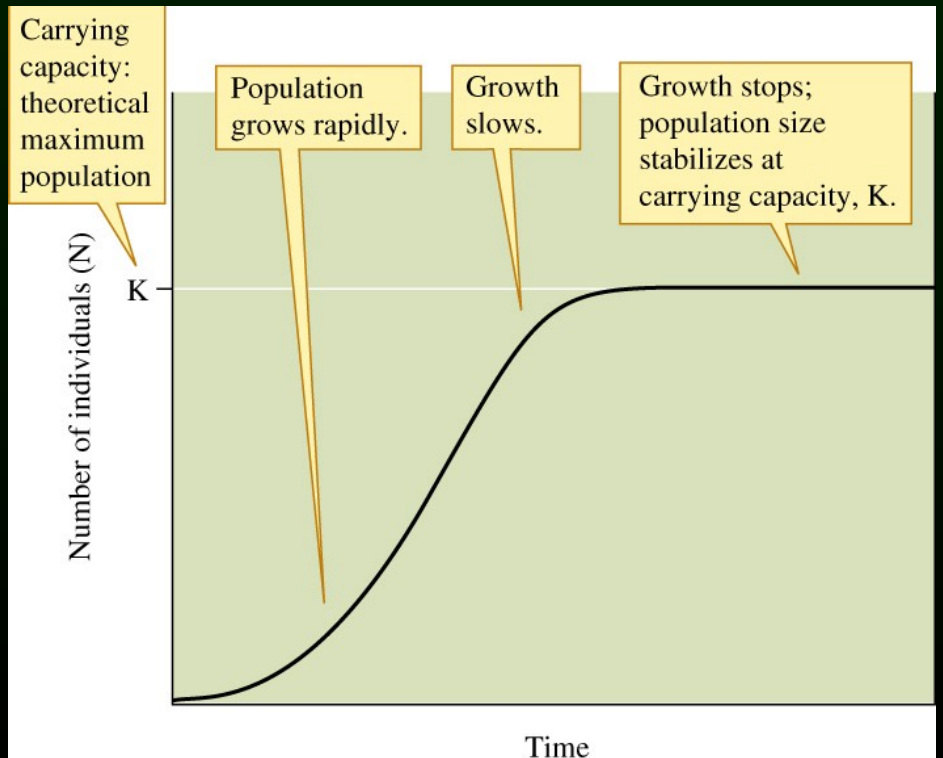
Exponential Population Growth

For all populations this type of growth can't go on forever… Why not?



Logistic Population Growth

- As resources are depleted, population growth rate slows and eventually stops: logistic population growth.
  - Sigmoid (S-shaped) population growth curve.
  - Carrying capacity (K) is the number of individuals of a population the environment can support

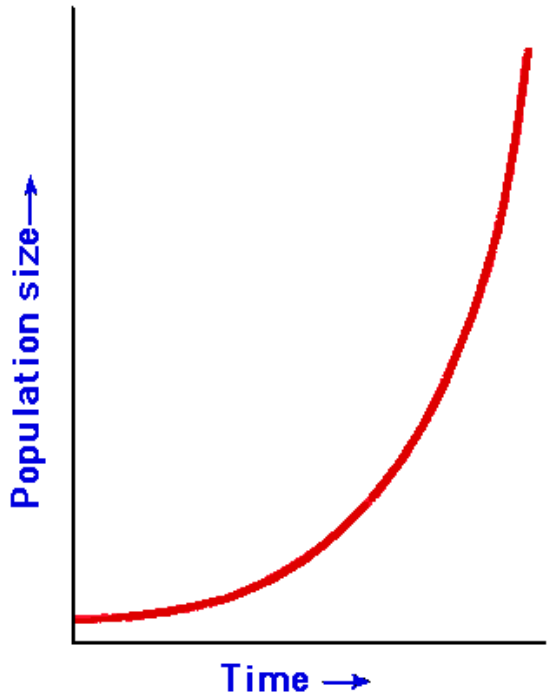


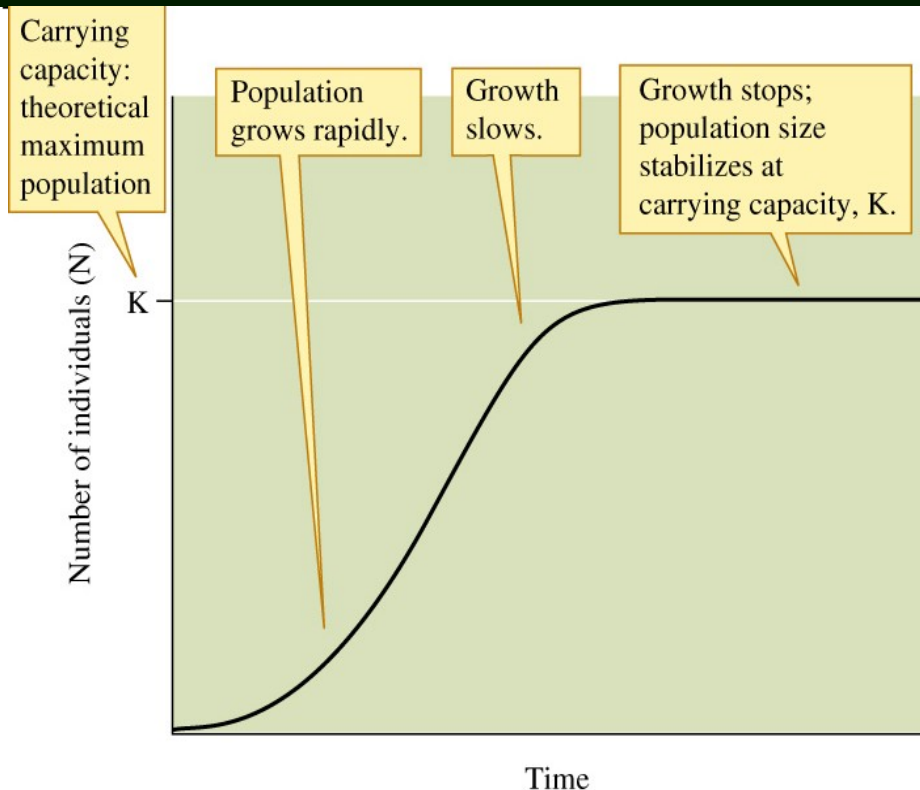
Birth rates = Death rates

Logistic Population Growth

How does exponential growth and logistic growth relate to each other?

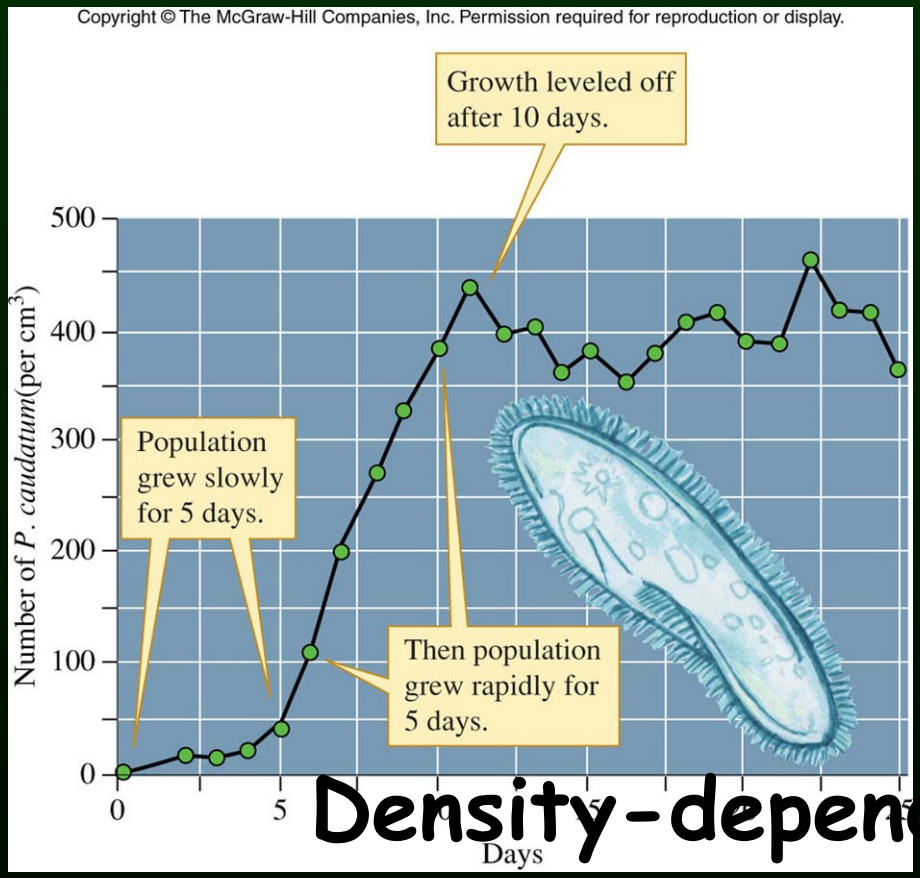
Let's pick an organism. What are the factors that limit its growth?



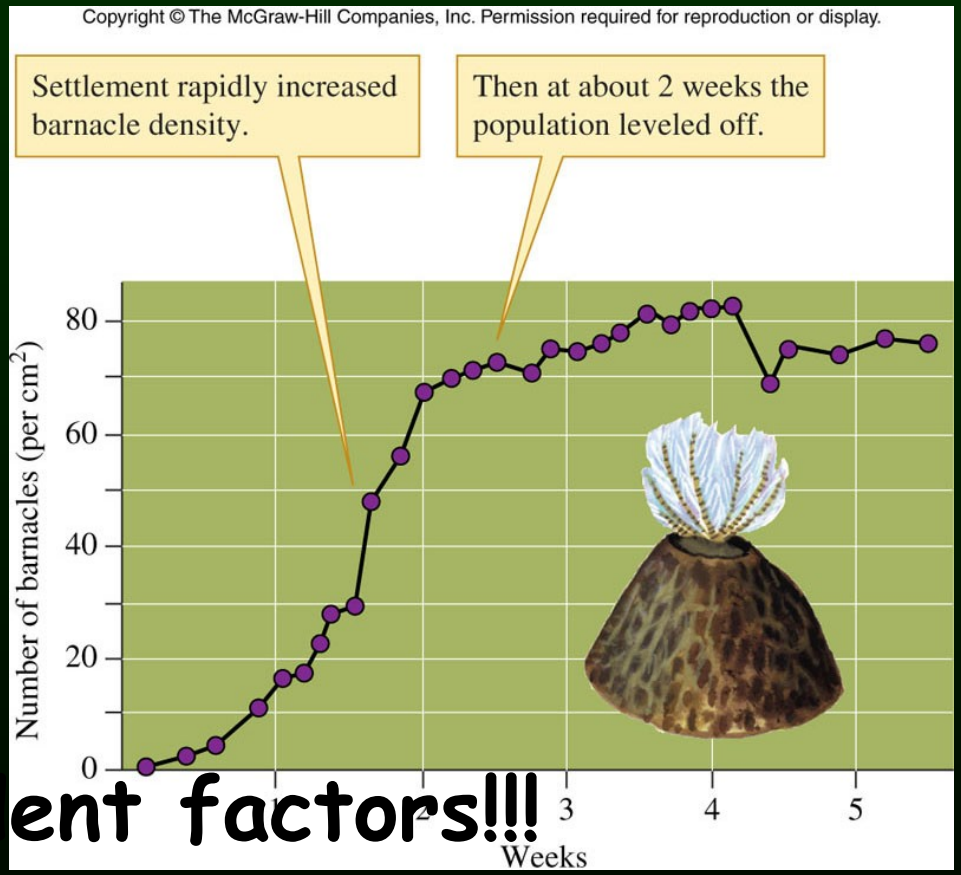


Logistic Population Growth

What limits *Paramecium* growth?



What limits *Balanus* growth?

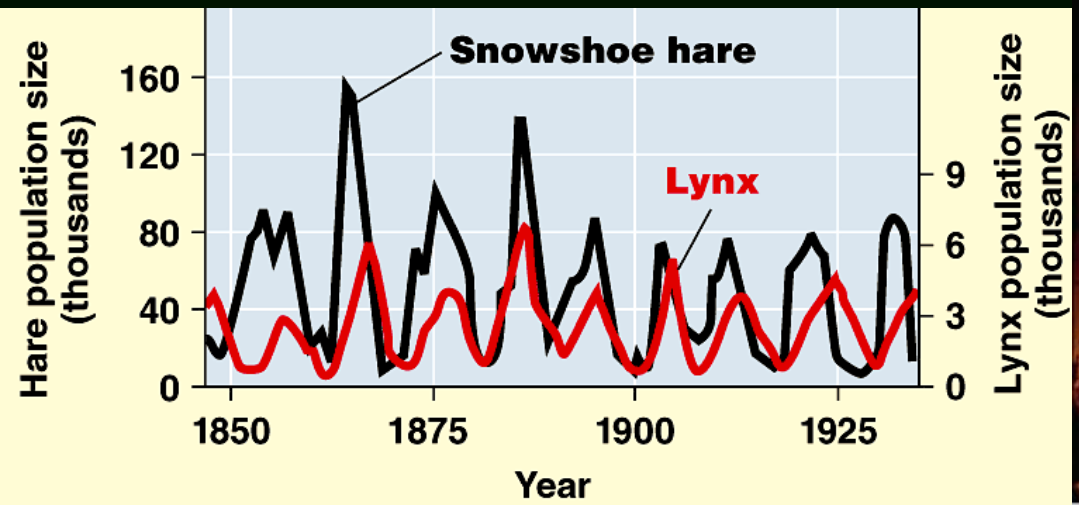


Density-dependent factors!!!

A variety of populations exhibit logistic growth with a variety of limiting factors!

Limits to Population Growth

- Environment limits population growth by altering birth and death rates.
  - Density-dependent factors
    - Disease, Resource competition
  - Density-independent factors
    - Natural disasters, Weather



Limits to Population Growth

- Density-dependent factors
  - Disease, Resource competition
- Density-independent factors
  - Natural disasters, Weather

Do you think density-independent factors are completely independent of density? Why or why not?

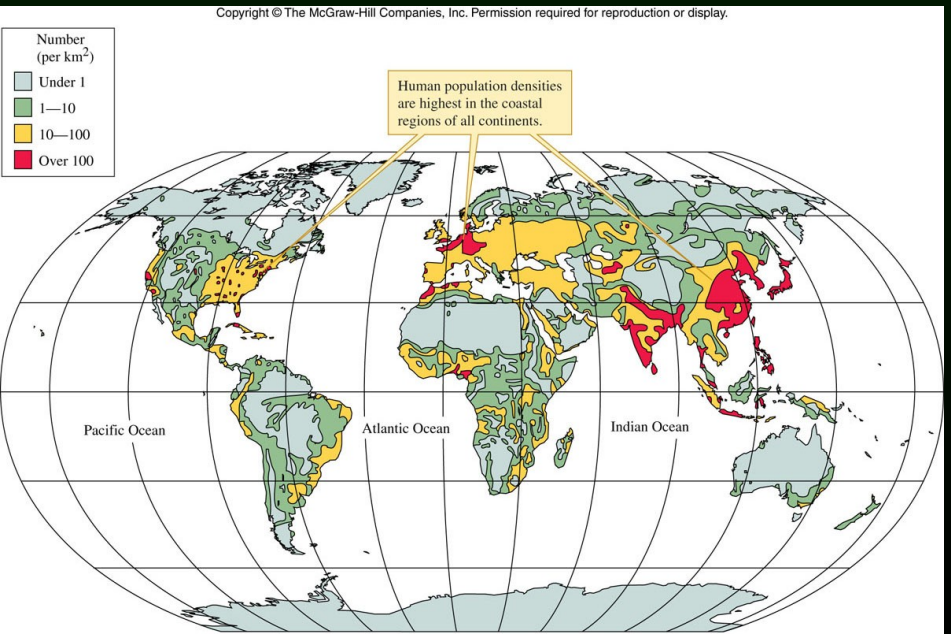
The Human Population

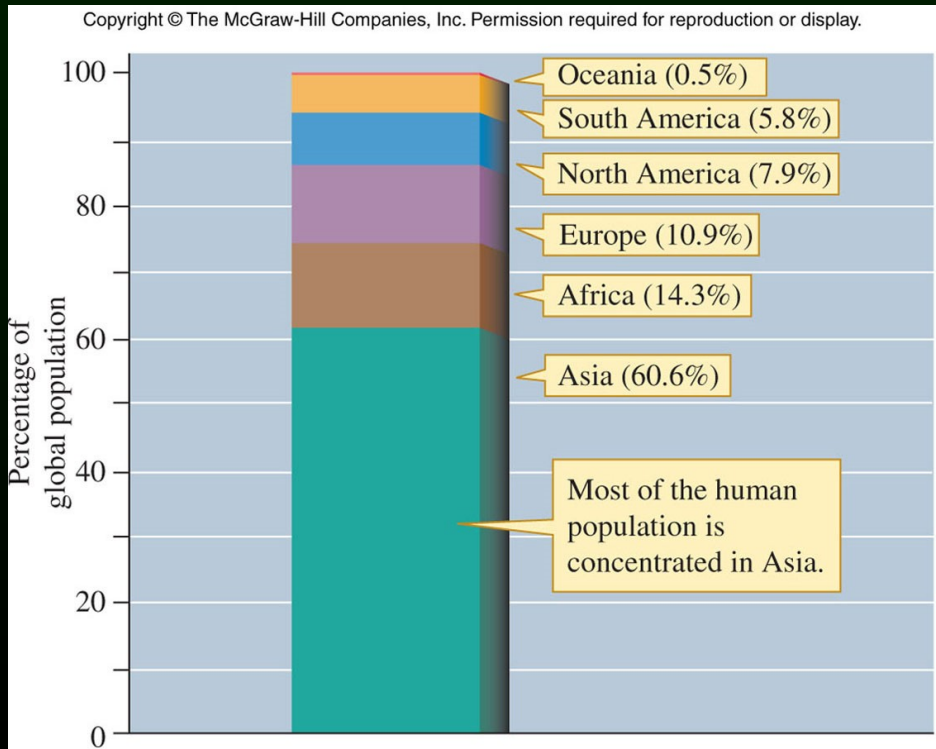
- What is the extent of the dispersal of the human population?

We're pretty much everywhere!

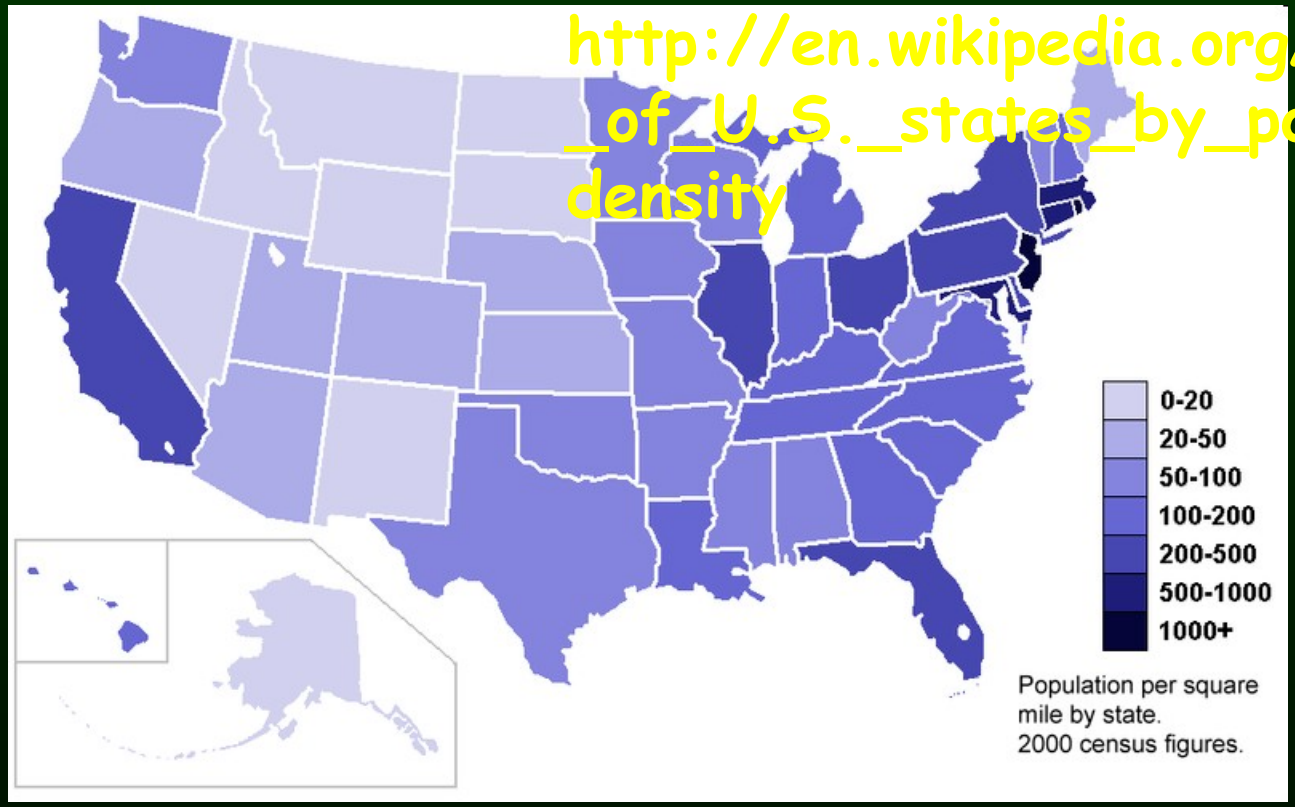
- What is the population distribution of humans? Random? Clumped? Regular?

We're clumped!





U.S. Population Density



http://en.wikipedia.org/wiki/List_of_U.S._states_by_population_density

Highest? (as of 2010 census)

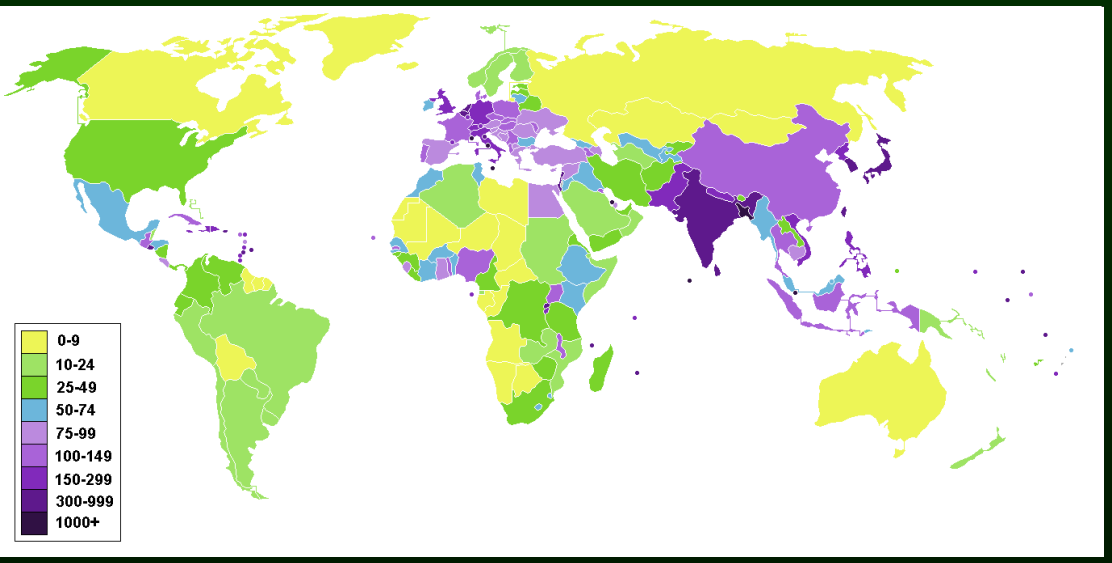
District of Columbia – 9857 individuals per square mile

New Jersey – 1196 individuals per square mile

Lowest?

Alaska – 1.2 individuals per square mile

World Population Density



http://en.wikipedia.org/wiki/List_of_sovereign_states_and_dependent_territories_by_population_density

North America - 32 people per square mile

South America - 73 people per square mile

Europe - 134 people per square mile

Asia - 203 people per square mile

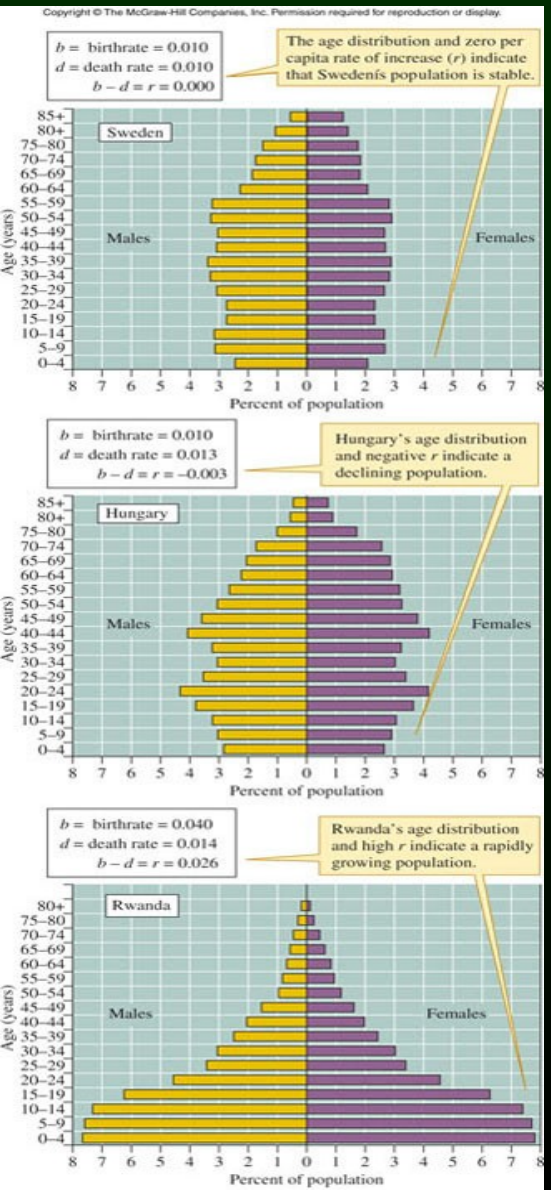
Africa - 65 people per square mile

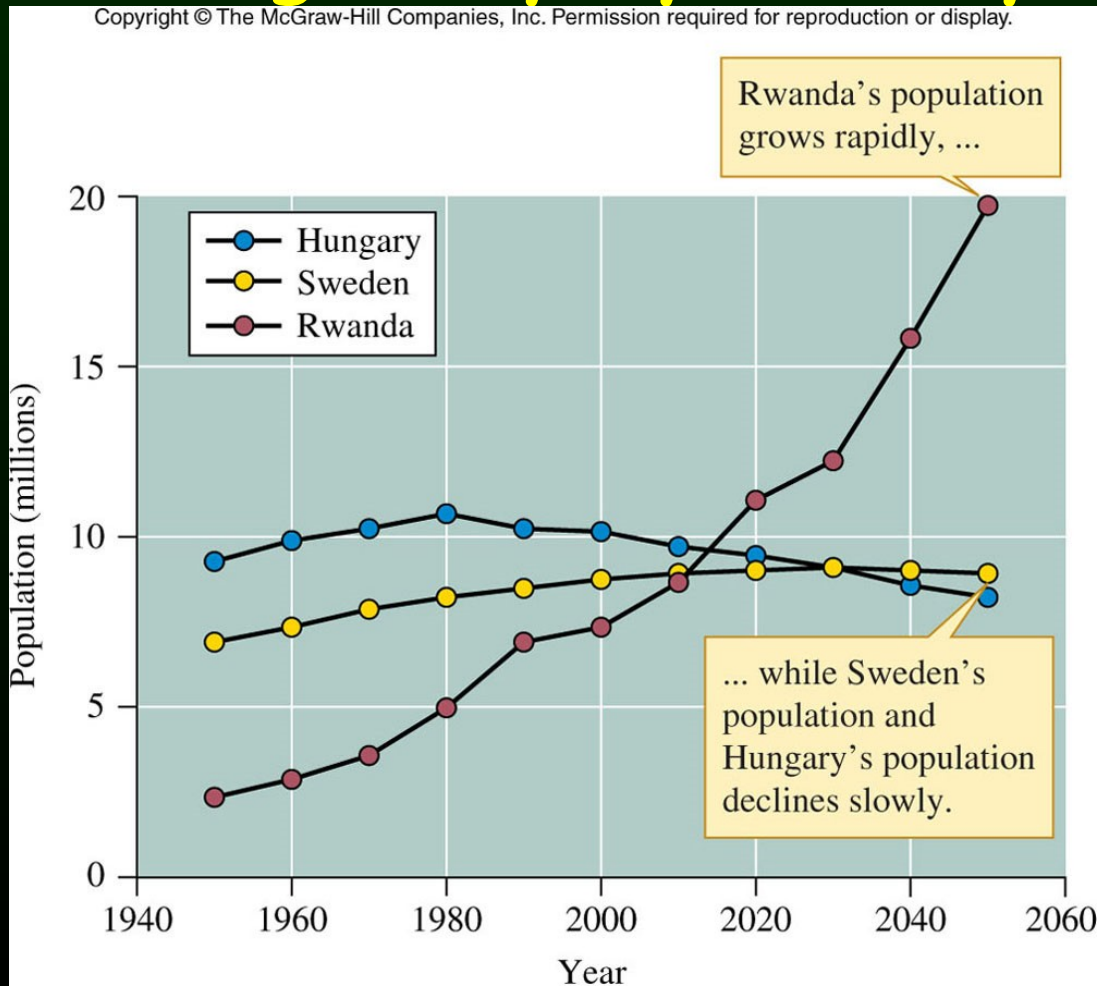
Australia - 6.4 people per square mile

Human Population Dynamics

- How is the world population changing?

It varies greatly by country!

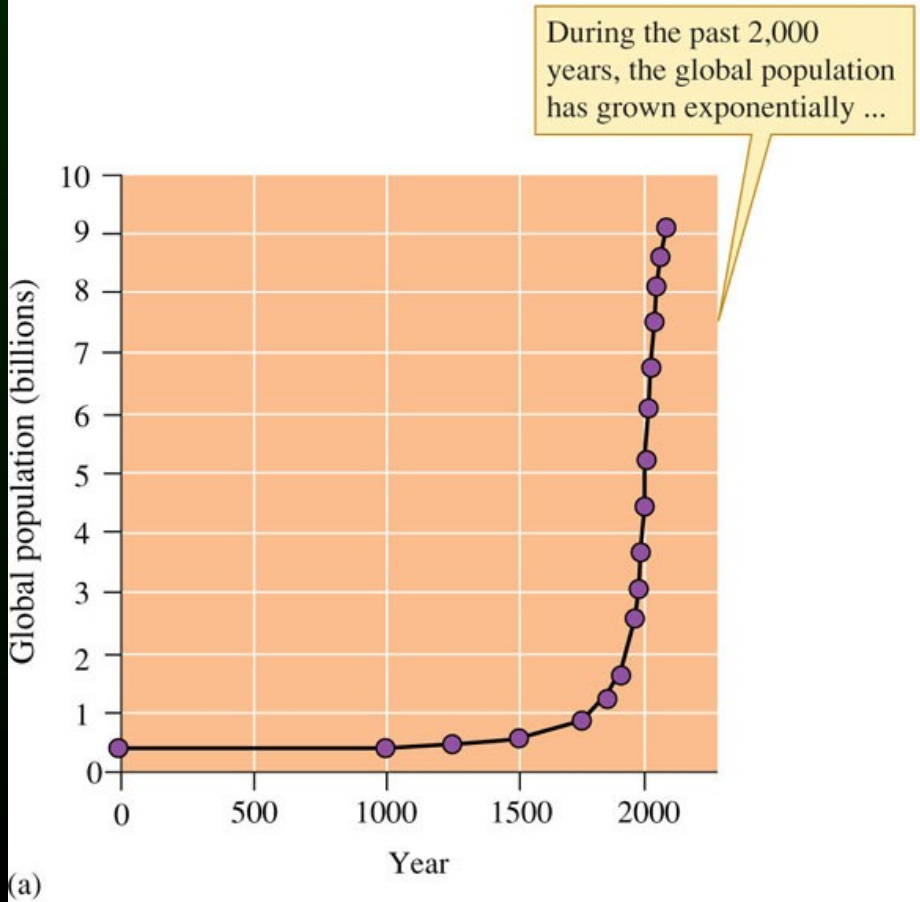


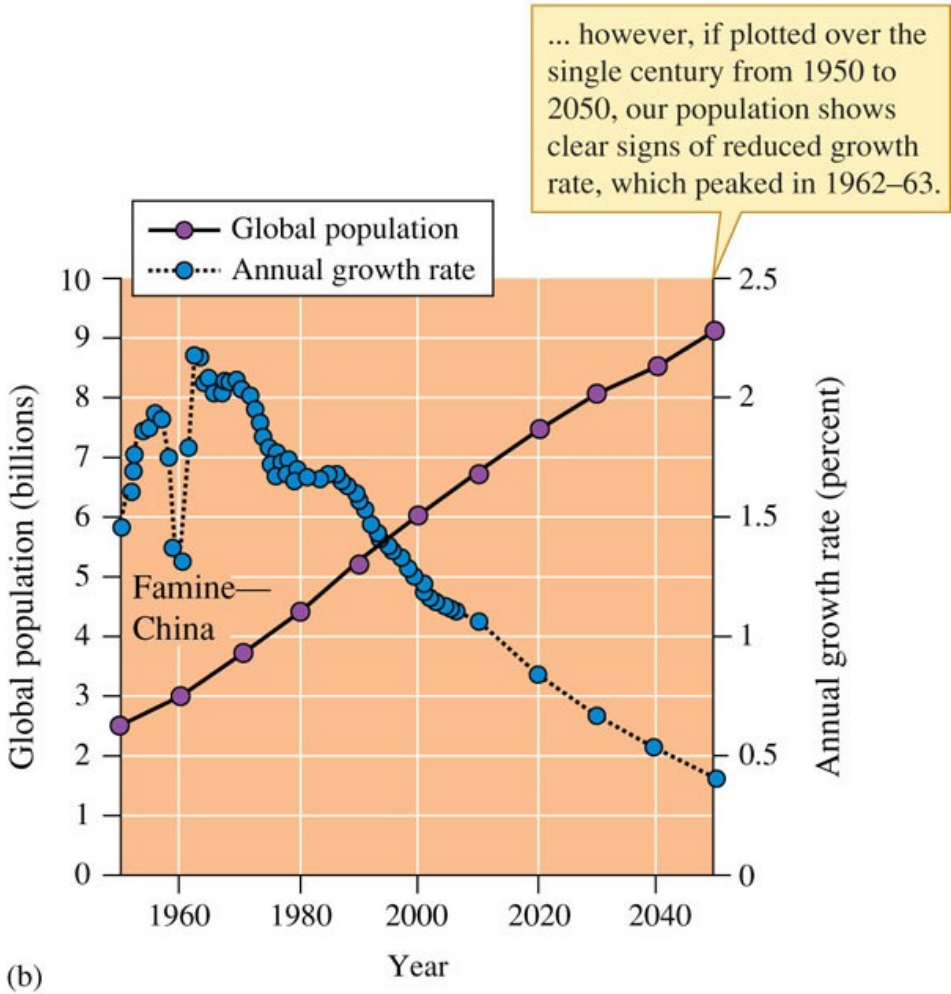


Global Population Growth

- Exponential or logistic?

A bit of both!





POPULATION GROWTH ACTIVITY!!!

We are currently adding 210,000 people (net growth) to the world's population each day. Below is a listing of some of the world's worst death tolls. At today's present rate of growth, determine how many days, weeks or months it would take to replace those people lost in the column to the right. Round off to one decimal place.

Hundred Years War	1337-1453	185,250
American Civil War	1861 – 1865	620,000
World War I – All Countries	1914-1918	15,000,000
World War II – All Countries	1937-1945	55,000,000
Black Death plague	1347-1351	75,000,000
Influenza –Worldwide	1918 - Present	45,000,000
AIDS	1978-Present	37,000,000

http://2010.census.gov/2010census/data/index.php

Assignment #2 – On Catalyst

Part 1: Look at the U.S. Census Bureau's World Population Clock. This clock gives an up to the second estimate of the world population. By how much does the population grow in 1 minute? How many people is that per second?

Part 2: Go to the following document: Tell me the cool thing about San Jose! You can work together, but submit your answers separately!!!

http://www.census.gov/prod/cen2010/briefs/c2010br-01.pd