

Warm Up

****Take out your hw to be stamped****



- ***Imagine*** you have been given the task of estimating the total amount of sunflowers in a population.
- ***Discuss*** what methods you might use for your estimation **that does not** involve counting every single sunflower.

Agenda

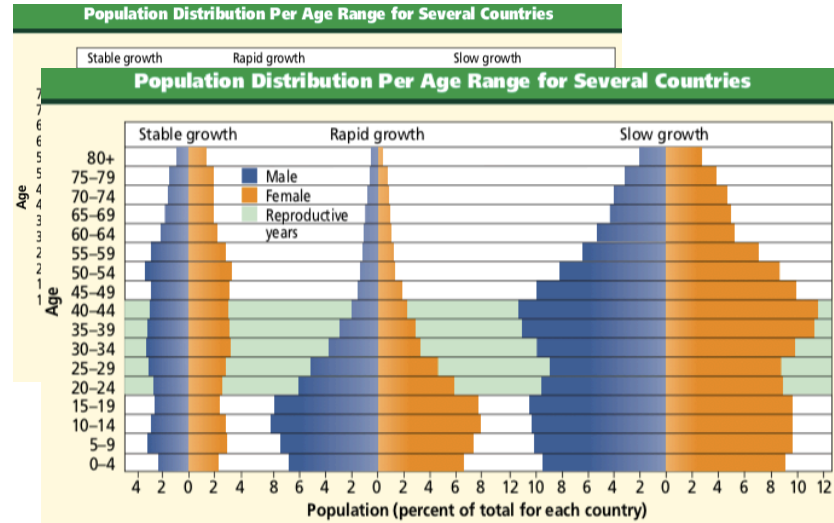
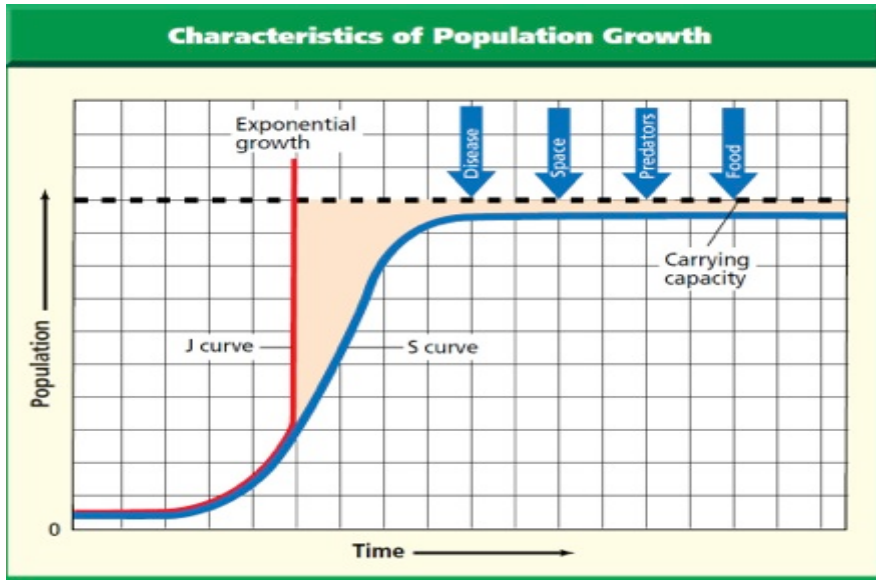
- Review homework
- Ch 4 Notes: Population Biology
- Unit 2 Quizlet Live
- Lab: Determining Population Size

Homework:

4.1 Section Assessment (pg. 99 #1-5)

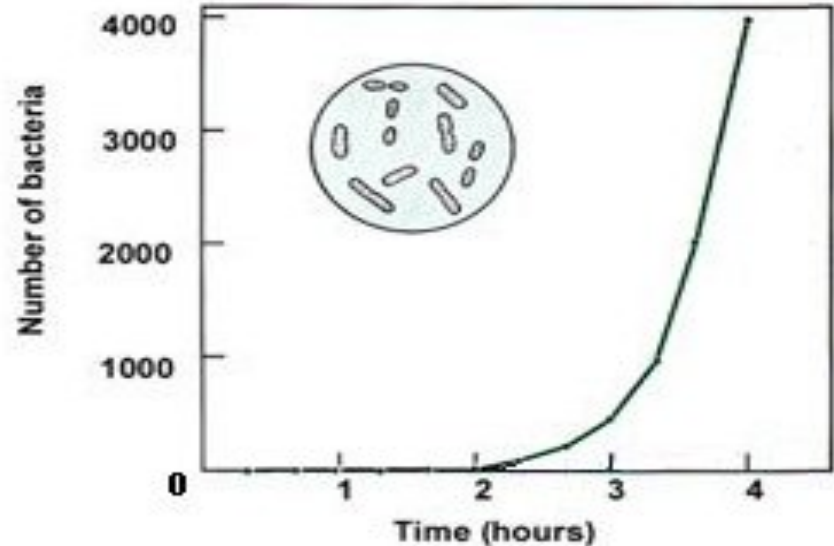
Ch 2-4 Exam next Wed/Thurs (3/27 or 3/28)

Chapter 4: Populations



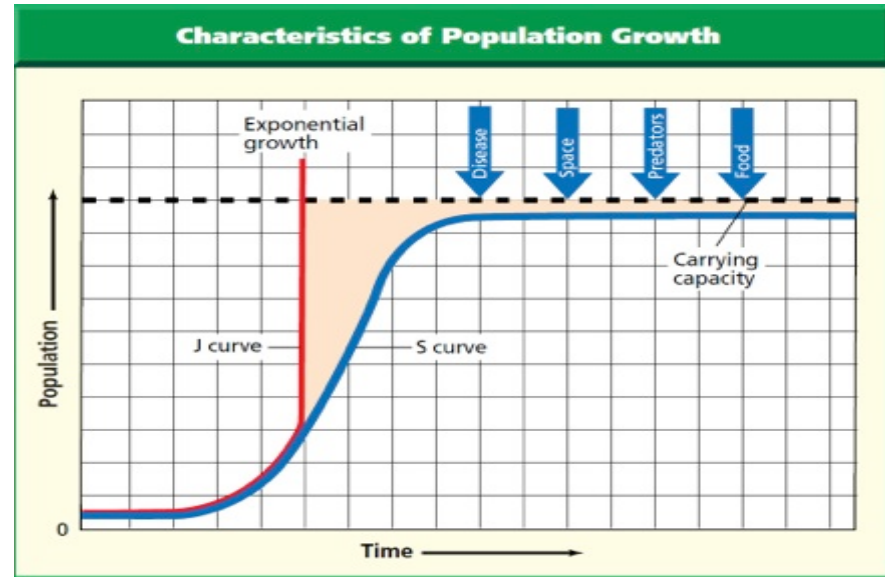
How Fast do Populations Grow?

- Populations grow exponentially – graph is **initially** a J-shaped curve
 - **Exponential growth:** As a population gets larger, it also grows at a faster rate
- For any organism, growth starts slow, then increases rapidly. Why?



Can a Population of Organisms Grow Indefinitely?

- Populations have **limiting factors** that level off growth – S-shaped curve
- **Carrying Capacity (K)** – Number of organisms an environment can support.
- If under K, birth rate exceeds death rate; if over K, death rate exceeds birth rate





D Carrying capacity The environment can support this many organisms. If population size rises above the carrying capacity, more organisms die than are born. The population drops below the carrying capacity.

E Fluctuations The number of organisms tends to rise above and fall below the carrying capacity due to limiting factors.

Carrying capacity

C Leveling off As the population grows, more organisms are using the existing resources. Growth slows. Overall, the graph begins to resemble the letter S.

B Rapid growth There are many organisms, each reproducing, resulting in a faster increase in the number of individuals. Growth is exponential.

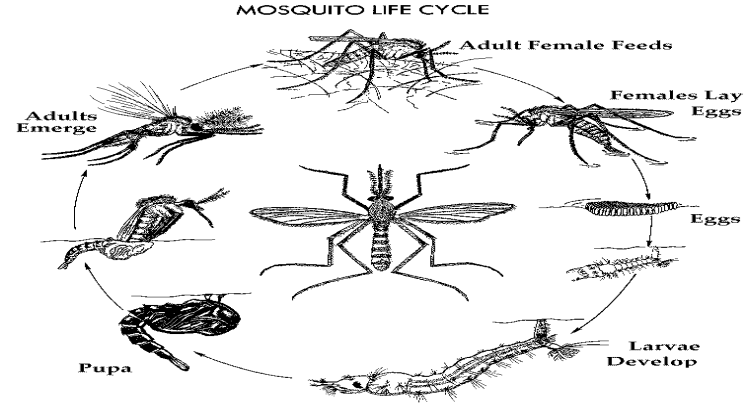


A Beginning growth The population increase begins slowly, as the few starting members have offspring.



Types of Population Growth

- **Life-History Pattern** vital factor in determining population growth
- Two growth patterns; **rapid** (mosquitoes) and **slow** (elephants)
- Environmental conditions determine life-history pattern (mature rapidly, reproduce early, and short life span)



Environmental Limits to Population Growth

- **Density-dependent factors**- limiting factors such as disease, competition, and parasites
- Increasing effect as population size increases
- Proximity determines intensity of limiting factor



Disease in soybean crops

Environmental Limits to Population Growth

- **Density-independent factors**- affect all populations regardless of their density
- Most are abiotic- temperature, storms, flood, drought, habitat destruction



Flooding from Hurricane Andrew (1999); all worms drowned – not dependent on numbers

World Population

- Calculating growth rate
 - Birthrate- death rate=Population growth rate (PGR)
 - Doubling time: the time needed for a population to double
 - Age structure: proportions of population in different age levels



Population Distribution Per Age Range for Several Countries

