Name: _____ **Date:** _____ **Env. Science Period:** _____

Chapter 8: Understanding Populations Student Guided Notes

Section 1

What Is a Population?

- A _____ is a group of organisms of the _____ species that live in a specific geographical area and interbreed.
- A population is a _____ group because organisms usually breed with members of their own population.

Properties of Populations

- _____ is the number of individuals of the same species in that live in a given unit of area.
- _____ is the pattern of distribution of organisms in a population.
- A population's dispersion may be ***even***, ***clumped***, or ***random***.
- What are three properties that can be used to describe populations and predict changes within them? _____

  _____

How Does a Population Grow?

- Populations gain individuals with each new offspring or _____.
- Populations lose individuals with each _____.
- The resulting population change over time can be represented by the equation below:

- _____ is an expression of the increase in the size of an organism or population over a given period of time.
- Growth rate = _____
- Over time, the growth rates of populations change because birth rates and death rates _____ or _____.
- For the growth rate to be zero, the average number of births must _____ the average number of deaths.

Reproductive Potential

- A species' _____ is the fastest rate at which its populations can grow.
- _____ is the maximum number of offspring that a given organism can produce.
  - Example: Bacteria can grow at an exponential rate
- Reproductive potential _____ when individuals produce more offspring at a time, reproduce _____, and reproduce earlier in life.
- Reproducing earlier in life has the greatest effect on reproductive potential.
- Reproducing early _____ the generation time, or the average time it takes a member of the population to reach the age when it reproduces.

Exponential Growth

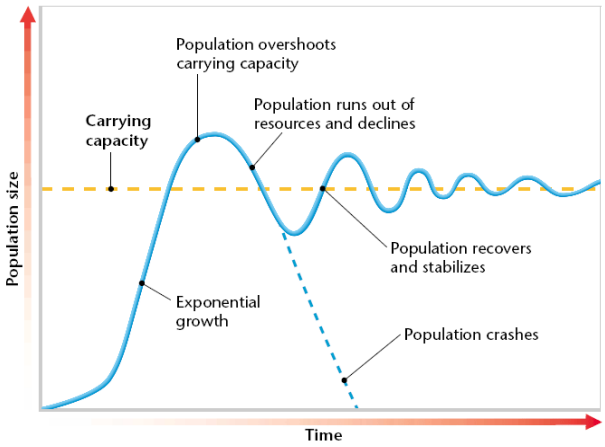
- _____ is logarithmic growth or growth in which numbers increase by a certain factor in each successive time period.
- Exponential growth occurs in nature only when populations have _____ and have _____.
- For example, population explosions occur when bacteria or molds grow on a new source of food.
- In exponential growth, a large number of individuals is added to the population in each succeeding time period.

What Limits Population Growth?

- Eventually, resources are used up of the environment change, and deaths increase or births decrease.
- Under the forces of _____ in a given environment, only some members of any population will survive and reproduce. Thus, the properties of a population may change over time.

Carrying Capacity

- _____ is the largest population that an environment can support at any given time.



Resource Limits

- A species reaches its carrying capacity when it _____ a particular natural resource at the same rate at which the ecosystem produces the resource.
- That natural resource is then called a _____ _____.
- The supply of the most _____ limited resources determines the carrying capacity of an environment for a particular species at a particular time.

Competition within a Population

- Instead of competing for a limiting resource, members of a species may compete indirectly for _____ or for a _____.
- A _____ is an area defended by one or more individuals against other individuals.
- The territory is of value not only for the _____ but for the _____, food or _____ it contains.

Two Types of Population Regulation

- Causes of death in a population may be _____ or _____.

Population Regulation

- When a cause of death in a population is _____, deaths occur _____ in a crowded population than in a sparse population.
- This type of regulation happens when individuals of a population are _____ (tightly) packed together.
- _____, predation, and _____ result in higher rates of death in dense populations than in sparse populations.
- When a cause of death is _____, a certain proportion of a population _____ regardless of the population's density.

- This type of regulation affects all populations in a _____ or _____ way.
- _____ and _____ are often density independent causes of death.

Section 2

An Organism's Niche

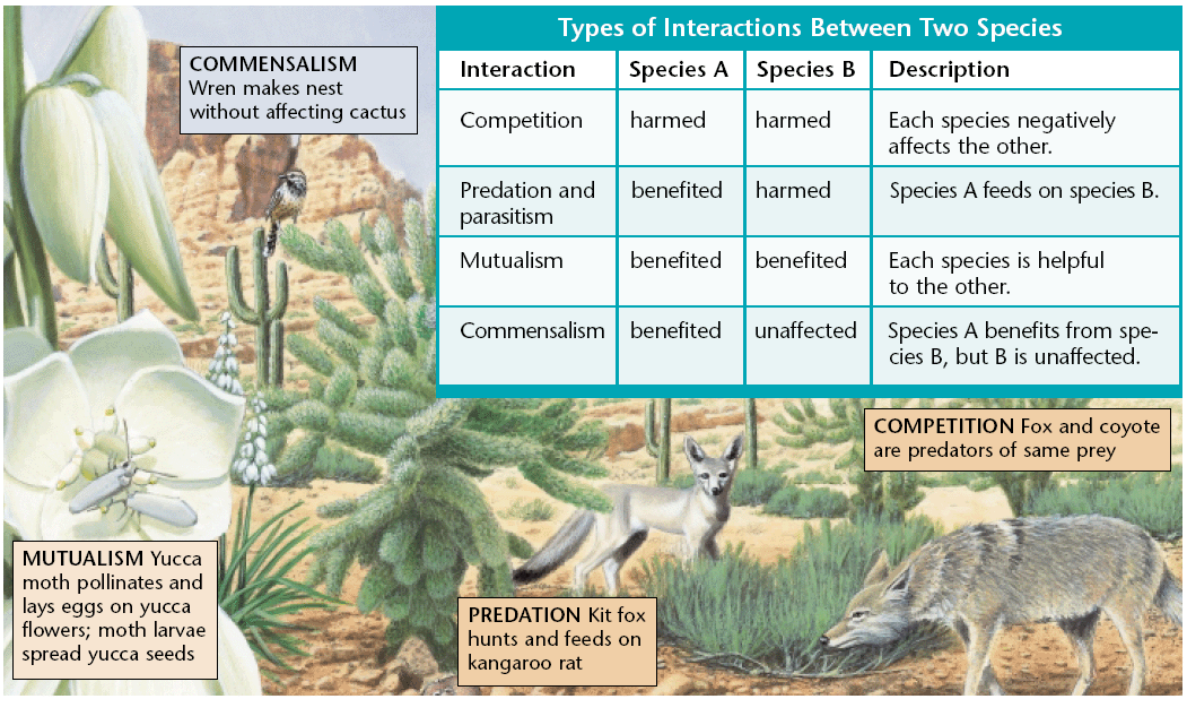
- A _____ is the unique position occupied by a species, both in terms of its physical use of its habitat and its function within an ecological community.
- A niche is different from a habitat. A habitat is a _____, however a niche is an organism's _____ of its habitat.
- A niche can also be thought of as the _____ of a particular species in an ecosystem.

Symbiosis and Coevolution

- _____ is a relationship in which two different organisms live in close association with each other.
- Symbiosis is most often used to describe a relationship in which at least _____.
- Over time, species in close relationships may _____.
- These species may evolve adaptations that _____ or _____ of the relationship.

Ways in Which Species Interact

- Interactions between species are categorized at the level where one population interacts with another.
- The five (5) major types of species interactions are:
  - _____
  - _____
  - _____
  - _____
  - _____



Types of Interactions Between Two Species

Interaction	Species A	Species B	Description
Competition	harmed	harmed	Each species negatively affects the other.
Predation and parasitism	benefited	harmed	Species A feeds on species B.
Mutualism	benefited	benefited	Each species is helpful to the other.
Commensalism	benefited	unaffected	Species A benefits from species B, but B is unaffected.

- These categories are based on whether each species causes _____ or _____ to the other species in a given relationships in terms of total effects over time.

Competition

- _____ is the relationship between two species (or individuals) in which both species (or individuals) attempt to use the same limited resource such that both are negatively affected by the relationship.
- Members of the same species must compete with each other because they _____ the same resources because they occupy the same niche.

Indirect Competition

- Species can compete even if they never come into direct contact with each other.
- For example, if one insect feeds on a certain plant during the day and another feeds on the same plant during the night.
- Because they use the same food source, the two species are _____.

Adaptations to Competition

- When two species with similar niches are placed together in the same ecosystem, we might expect one species to be more successful than the other.
- But in the course of evolution, adaptations that _____will also be advantageous for species whose niches overlap.
- One way competition can be reduced between species is by _____ in time or space.
- _____ is when each species uses less of the niche than they are capable of using.
- It is observed in closely related species that use the same resources within a habitat.

Predation

- _____ is an interaction between two species in which **one species, *the predator*, feeds on the other species, *the prey*.**
- Some predators eat only specific types of prey.

Parasitism

- An organism that lives in or on another organism and feeds on the other organism is a _____.
    - Examples include ticks, fleas, tapeworms, heartworms, and bloodsucking leeches.
- The organism, the parasite, takes its nourishment from is known as the _____.
- _____ is a relationship between two species, ***the parasite***, **benefits from the other species, *the host*, and usually harms the host.**
- The differences between a parasite and a predator are that a parasite spends some of its life _____ or _____ the host, and that parasites do not usually kill their hosts.
- The parasite has an advantage if it allows its host to live longer, however, the host is often weakened or exposed to disease..

Mutualism

- _____ is a relationship between two species in which **both species benefit**.
    - Examples include a dog and a human some bacteria in your intestines which help break down food while the bacteria are provided a warm, food-rich habitat in which they can live.

Commensalism

- _____ is a relationship between two organisms in which **one organism benefits and the other is unaffected**.
    - Examples include sharks and remoras; remoras attach themselves to sharks and feed on scraps left over from sharks' meals, the shark is unaffected by this interaction.