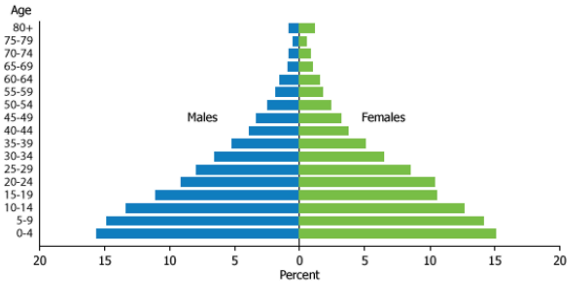
Population Ecology

Practice Test

A researcher is studying a fish population in a lake using the mark-recapture method. On the first day, they capture and mark **50 fish**. After releasing them back into the lake, the researcher captures another **100 fish** a week later, of which **10** are marked. Using this information, estimate the total population of fish in the lake.
A) 200
B) 500
C) 1,000
D) 2,000

If **50 percent** of a given population is **composed of children**, what would most likely happen to this population in 30 years?



A. the population size would remain the same
B. the population size would decrease
C. the population size would increase

Which of the following factors can affect the size of a population?
A) Birth rate
B) Weather patterns
C) Predators
D) All of the above

What does **carrying capacity (K)** refer to in relation to a population?
A) The maximum size of a population that an environment can sustain indefinitely
B) The number of predators in an ecosystem
C) The average size of individuals in a population
D) The rate at which individuals migrate out of a population

Which of these is an example of a density-dependent factor that can regulate population size?
A) Earthquakes
B) Competition for food
C) Forest fires
D) Seasonal changes

What happens to a population when there is a **decrease** in its primary food source?
A) The population decreases
B) The population increases
C) The population moves to a new habitat
D) The population remains unchanged

Which statement **best** describes the concept of population **density**?
A) The total number of different species in an ecosystem
B) The number of individuals of a species per unit area or volume of habitat
C) The number of births per individual in a population
D) The average age of individuals in a population

Which of the following best describes a limiting factor in an ecosystem?
A) A factor that increases the population growth
B) A resource that is abundant in an environment
C) A factor that prevents a population from growing too large (food)
D) A process by which populations migrate

What does alpha diversity measure in an ecosystem?
A) The total number of plants in an ecosystem.
B) The variation in species diversity between two or more ecosystems.
C) The species diversity within a specific area or ecosystem.

What is **immigration** in population ecology?
A) The movement of individuals into a population
B) The movement of individuals out of a population
C) The movement of populations between ecosystems
D) The rate at which organisms reproduce

Which of the following is an example of a **biotic** factor in a population's environment?
A) Water availability
B) Temperature
C) Competition
D) Soil type

What typically happens to a population when the **death rate is greater than the birth rate**?
A) The population increases
B) The population decreases
C) The population stays the same
D) The population migrates to a new area

If a population reaches its carrying capacity, what will most likely occur?
A) The population will continue to grow without stopping
B) The population will slow and then decrease due to lack of resources
C) The population will decline rapidly

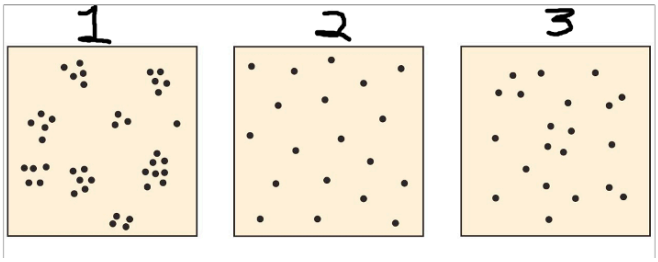
Which of the following is **NOT** an abiotic factor that can influence a population?
A) Sunlight
B) Temperature
C) Competition for mates
D) Water availability

In a predator-prey relationship, what generally happens to the prey population when the predator population increases?
A) The prey population increases
B) The prey population decreases
C) The prey population remains constant
D) The prey population migrates

What is emigration in population ecology?
A) Movement of individuals into a population
B) Movement of individuals out of a population
C) A sudden increase in population size
D) A population reaching its carrying capacity

Which of the following best describes the importance of **age structure** in a population?
A) It shows the number of predators in the population.
B) It determines the reproductive potential of a population by showing the distribution of individuals among different age groups.
C) It indicates the migration patterns of individuals within the population.
D) It predicts the total size of the population in the next year.

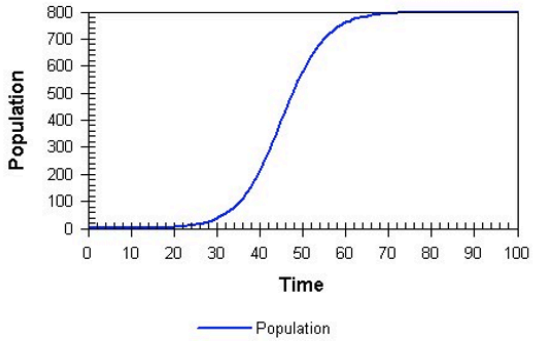
Which diagram represents each dispersion pattern. Mark 1,2 or 3.



Clumped dispersion _____1_____
Uniform dispersion _____2_____
Random dispersion _____3_____

What is the primary purpose of the mark-recapture method in population studies?
A) To count every individual in a population.
B) To estimate the size of a population by capturing, marking, releasing, and recapturing individuals.

C) To determine the migration routes of animals.
D) To study the behavior of animals in their natural habitats.



As the population number N approaches K for a population, which of the following is predicted?

A. The growth rate will not change
B. The growth rate will slow and approach zero as N gets close to K
C. The population will increase rapidly
E. No effect

In a forest, a researcher identifies **5 different tree species**. The number of individual trees of each species is as follows:

Species A: 15 trees
Species B: 5 trees
Species C: 10 trees
Species D: 20 trees
Species E: 50 trees

Based on this data, which of the following is **true** about the forest's **alpha diversity**?

A) The forest has high species richness but low species evenness.
B) The forest has low species richness but high species evenness.
C) The forest has high species richness and high species evenness.
D) The forest has low species richness and low species evenness.

Answer: A) The forest has high species richness but low species evenness.
Explanation:

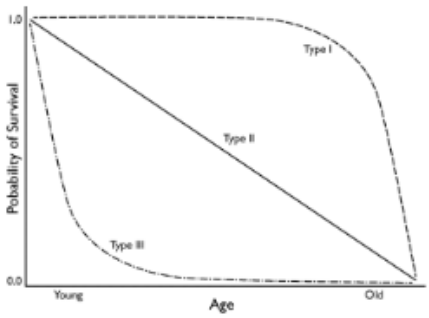
- **Species richness** refers to the number of different species (5 species, so richness is high).
- **Species evenness** refers to how evenly individuals are distributed among the species. Since one species (Species E) dominates with 50 individuals compared to others, evenness is low.

What is the **Allee effect** in population ecology?

A) A phenomenon where a population grows more rapidly as it becomes larger.
B) A situation where individuals in a small population have higher survival and reproduction rates due to the presence of more resources.
C) A condition where individuals in small populations have reduced survival or reproduction rates due to difficulties like finding mates or cooperating in groups.

D) An effect that only applies to predator-prey relationships, where prey populations benefit from the presence of predators.

A type I survivorship curve would be expected in a species in which
(The type I curve is shown below)



A. organisms have a high survivorship until late in life
B. parental care is minimal
C. mortality is quite high in the young
D. many offspring are produced
E. mortality occurs at a constant rate over the life span

Vocabulary Section

Abiotic factors
Provide two examples

biotic factors
Provide two examples

Carrying Capacity (K)