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Population Ecology Graph Worksheet

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Part 1: Building a Foundation

What is the primary focus of population ecology?

Hint: Consider what population ecology studies.

○ Individual organisms
○ Communities of different species
○ Populations of a single species
○ Ecosystems as a whole

Which of the following are considered biotic factors affecting population size? (Select all that apply)

Hint: Think about living factors that influence populations.

☐ Predation
☐ Climate
☐ Competition
☐ Natural disasters

Explain the concept of carrying capacity and its significance in population ecology.

Hint: Consider how resources limit population growth.

List the phases of a logistic growth curve and provide a brief description of each phase.

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Hint: Think about the stages of population growth.

1. Lag phase

2. Exponential growth phase

3. Stationary phase

4. Decline phase

Part 2: Understanding and Interpretation

In a logistic growth model, what happens when a population reaches its carrying capacity?

Hint: Consider the implications of resource limitations.

○ The population continues to grow exponentially.
○ The population size stabilizes.
○ The population size decreases rapidly.
○ The population becomes extinct.

Which factors can lead to changes in carrying capacity? (Select all that apply)

Hint: Think about both biotic and abiotic influences.

☐ Availability of resources
☐ Predation rates
☐ Climate change
☐ Birth rates

Describe how density-dependent factors differ from density-independent factors in regulating population size.

Hint: Consider how population density influences these factors.

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Part 3: Application and Analysis

If a population of rabbits in a forest experiences a sudden increase in predators, what is the likely immediate effect on the rabbit population?

Hint: Think about the impact of predation on population dynamics.

◯ Increase in population size
◯ Decrease in population size
◯ No change in population size
◯ Population becomes extinct

Which of the following scenarios demonstrate density-dependent regulation? (Select all that apply)

Hint: Consider how population density affects these scenarios.

☐ A drought reduces water availability for all organisms.
☐ A disease spreads more rapidly in a densely populated area.
☐ A hurricane destroys habitats regardless of population size.
☐ Increased competition for food as population size grows.

Predict how an increase in human population might affect the carrying capacity of a local ecosystem.

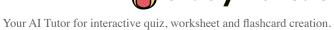*Hint: Consider the impact of human activities on resources.*

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Part 4: Evaluation and Creation

Which phase of the logistic growth curve is characterized by the fastest population growth?

Hint: Think about the stages of growth in a population.

◯ Lag phase
◯ Exponential growth phase
◯ Stationary phase
◯ Decline phase

Analyze the following scenarios and identify which are likely to cause a population bottleneck. (Select all that apply)

Hint: Consider events that drastically reduce population size.

☐ A new predator is introduced to the environment.
☐ A severe storm reduces the population drastically.
☐ A disease outbreak affects only a small portion of the population.
☐ A significant portion of the habitat is destroyed by human activity.

Analyze how immigration and emigration can alter the genetic diversity of a population.

Hint: Consider the effects of gene flow between populations.

Which strategy is most effective for managing an endangered species population?

Hint: Think about conservation methods.

◯ Increasing hunting quotas
◯ Habitat restoration and protection
◯ Introducing more predators
◯ Allowin natural selection to take its course

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Evaluate the following conservation strategies and identify which are likely to enhance biodiversity. (Select all that apply)

Hint: Consider strategies that promote diverse ecosystems.

☐ Establishin protected areas
☐ Implementin sustainable resource management
☐ Promoting monoculture farming
☐ Restoring natural habitats

Propose a conservation plan for a declining fish population in a freshwater lake, considering factors such as carrying capacity, human impact, and ecological balance.

Hint: Think about sustainable practices and community involvement.

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