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Patterns Of Natural Selection Worksheet Questions and Answers PDF

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Part 1: Building a Foundation

What is the primary mechanism by which traits that enhance survival become more common in a population?

Hint: Think about the process that favors certain traits over others.

○ A) Genetic Drift
○ **B) Natural Selection** ✓
○ C) Mutation
○ D) Gene Flow

> The primary mechanism is Natural Selection.

Which of the following are necessary conditions for natural selection to occur? (Select all that apply)

Hint: Consider the factors that must be present for natural selection to take place.

☐ **A) Variation in traits** ✓
☐ B) Random mating
☐ **C) Differential survival and reproduction** ✓
☐ **D) Inheritance of traits** ✓

> Necessary conditions include variation in traits, differential survival and reproduction, and inheritance of traits.

Explain the concept of stabilizing selection and provide an example of how it might occur in a natural population.

Hint: Think about how certain traits are favored in a population.

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> **Stabilizing selection favors average traits and reduces variation. An example is birth weight in humans.**

List the three main types of natural selection and provide a brief description of each.

Hint: Consider the different ways natural selection can operate.

1. Stabilizing Selection

> Favors average traits and reduces extremes.

2. Directional Selection

> Favors one extreme trait over others.

3. Disruptional Selection

> Favors both extreme traits over average traits.

> The three main types are stabilizing selection, directional selection, and disruptive selection.

Which type of natural selection is most likely to lead to speciation?

Hint: Think about which selection type promotes divergence in populations.

○ A) Stabilizing Selection
○ B) Directional Selection

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○ **C) Disruptional Selection** ✓
○ D) Artificial Selection

| Disruptional selection is most likely to lead to speciation.

Part 2: Comprehension and Application

How does directional selection affect the average phenotype of a population?

Hint: Consider how traits shift in response to selection pressures.

○ A) It increases variation around the average.
○ **B) It shifts the average phenotype in one direction.** ✓
○ C) It maintains the average phenotype.
○ D) It decreases variation by favoriting extremes.

| Directional selection shifts the average phenotype in one direction.

Which of the following scenarios illustrate the concept of directional selection? (Select all that apply)

Hint: Think about examples where one trait is favored over others.

☐ **A) A population of rabbits where only the fastest survive predators.** ✓
☐ B) A population of birds where medium-sized beaks are favored.
☐ **C) A population of moths that become darker due to industrial pollution.** ✓
☐ D) A population of fish where both small and large sizes are favored over medium sizes.

| Examples include faster rabbits and darker moths due to pollution.

Imagine a scenario where a population of fish is introduced to a new environment with different food sources. How might natural selection act on this population over time?

Hint: Consider how changes in food availability could affect fish traits.

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> **Natural selection may favor fish with traits that allow them to exploit the new food sources.**

If a new predator is introduced to an environment, which type of natural selection is most likely to occur in the prey population?

Hint: Think about how the introduction of a predator affects prey traits.

○ A) Stabilizing Selection
○ **B) Directional Selection ✓**
○ C) Disruptional Selection
○ D) Balancing Selection

> Directional selection is most likely to occur as prey adapt to avoid predation.

Part 3: Analysis, Evaluation, and Creation

Which type of natural selection is illustrated by a population of birds where only the largest and smallest beaks are favored, but not the medium-sized ones?

Hint: Consider how certain traits are selected against.

○ A) Stabilizing Selection
○ B) Directional Selection
○ **C) Disruptional Selection ✓**
○ D) Balancing Selection

> This scenario illustrates Disruptional Selection.

Consider a population of plants where some individuals have developed a resistance to drought. Which factors could influence whether this trait becomes more common in the population? (Select all that apply)

Hint: Think about environmental and genetic factors that affect trait prevalence.

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☐ **A) The frequency of droughts in the environment. ✓**
☐ **B) The genetic variation within the population. ✓**
☐ C) The presence of other plant species.
☐ **D) The rate of reproduction in resistant plants. ✓**

> Factors include frequency of droughts, genetic variation, and reproduction rates.

Analyze how gene flow between two populations can affect the process of natural selection in each population.

Hint: Consider how the mixing of genes influences adaptation.

> **Gene flow can introduce new alleles, affecting adaptation and genetic diversity.**

Which of the following statements best evaluates the role of natural selection in the evolution of antibiotic resistance in bacteria?
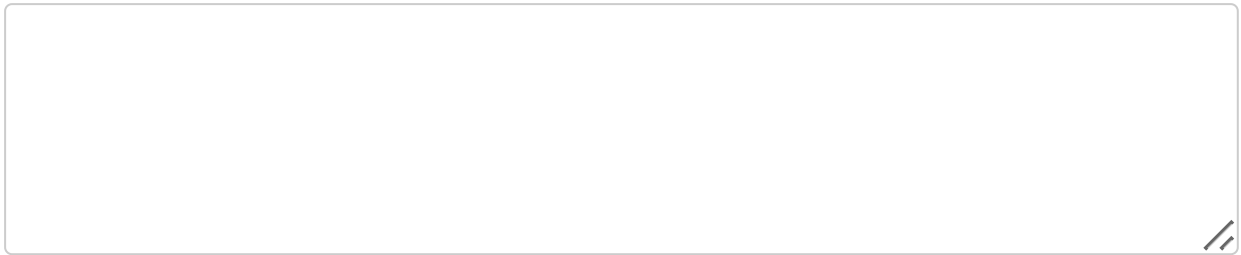
Hint: Think about how natural selection impacts bacterial survival.

◯ A) Natural selection has no impact on antibiotic resistance.
◯ B) Natural selection favors bacteria that are susceptible to antibiotics.
◯ **C) Natural selection leads to the survival of bacteria with resistance traits. ✓**
◯ D) Natural selection eliminates all bacteria, resistant or not.

> Natural selection leads to the survival of bacteria with resistance traits.

Propose a hypothetical scenario where a new environmental pressure leads to the development of a new trait in a population. Describe the steps of natural selection that would lead to this outcome.

Hint: Consider how environmental changes can drive evolution.

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New environmental pressures can lead to trait variation, selection, and adaptation over generations.

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