

Module 16: Evolution of Populations (Microevolution)

Comprehension & Critical Thinking Questions

Part 1: Core Concepts

1. Defining Evolution

- If a population's allele frequencies change from 50% A / 50% a to 90% A / 10% a, has evolution occurred?

2. Hardy-Weinberg Equilibrium

- What does the Hardy-Weinberg principle describe?
- List the five conditions required for equilibrium. Are these conditions common in nature?

3. Genetic Drift

- Define genetic drift. Does it affect large or small populations more strongly?
- Distinguish the Bottleneck Effect from the Founder Effect.

Part 2: Application

1. Types of Selection

- Sketch graphs representing:
 - Directional selection
 - Stabilizing selection
 - Disruptive selection
- Provide a real-world example of each.

2. Heterozygote Advantage

- Sickle cell disease is recessive and often lethal. Why is the allele common in malaria-endemic regions?

- How does this demonstrate that fitness is environment-dependent?

Part 3: Analysis & Evaluation

1. Sexual Selection

- Peacocks have elaborate tails that increase predation risk. How can natural selection permit this trait?

2. Gene Flow

- Two deer populations are separated by a mountain. A tunnel allows interbreeding.
- Will the populations become more similar or more different? What is the effect on speciation potential?