

MICROEVOLUTION

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CAUSES OF MICROEVOLUTION

QUESTIONS:

1. Use the key provided to identify the microevolution cause described in each of the following.

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|----------------------|----------------------|
| A. Bottleneck effect | D. Mutation |
| B. Founder effect | E. Nonrandom mating |
| C. Gene flow | F. Natural selection |

_____ Changes in the gene pool of a small population due to random chance

_____ Examples of genetic drift

_____ Much of the population is wiped out by a natural disaster; the allele frequency of the population is determined by a small surviving population

_____ A few individuals colonize a new habitat; genetic drift in a new colony

_____ Change in the gene pool of a population due to the migration of fertile individuals or the transfer of gametes between populations

_____ The introduction of new alleles

_____ Mates not chosen randomly; sexual selection

_____ Differential reproductive success; some phenotypes selected against; individuals best adapted to the environment survive to reproduce and pass their genes onto the next generation

_____ The appearance of blue M&Ms in a population of red and green M&Ms

_____ A few birds separate from the rest of the flock, fly to a new area, and establish a new colony

_____ At the end of the last ice age, cheetahs almost became extinct – only a few survived.

_____ Only a small number of flies survives a harsh winter.

_____ Female flies prefer to mate with white-eyed males

_____ Pollen from one field of seed corn is blown across the county to another field of seed corn.

2. Is all variation within a population heritable? Explain.

3. The phenotypic expression of a trait is dependent upon 2 factors. List them.

4. Match the description / example with the correct term. Use the key provided to indicate your answers.

A. Polymorphism
C. Cline

B. Geographical variation

_____ The height of asters decreases as the altitude on a mountainside increases

_____ One species of king snakes exist in several different varieties with the population

_____ ABO blood groups in humans

_____ 2 or more morphs are present in a population in noticeable frequencies

_____ Differences between populations in their frequencies of alleles

_____ Presence or absence of freckles in humans

_____ Subpopulations within a population

_____ Could result from localized inbreeding in a "patchy" environment

_____ Type of geographical variation that is a graded change in a trait along a geographic transect

5. What are the sources of genetic variation within a population?

6. Which source of genetic variation produces the greatest variety?

Explain why this is true. _____

7. If natural selection tends to reduce variation, then how is variation preserved within the population?

8. If sickle-cell anemia is so destructive, why hasn't the sickle-cell allele been eliminated from the population?

9. What are neutral variations? _____

How is the frequency of neutral alleles affected by natural selection?

10. Adaptive evolution is the blend of what two factors?

11. "Survival of the fittest" is defined in terms of reproductive success not just in terms of survival. Why?

12. Why does selection act faster against a harmful dominant allele than a harmful recessive allele.

13. Selection acts directly on _____ and indirectly on _____.

14. Explain why the connection between phenotype and genotype is not simple.

15. Use the key below to identify the mode of natural selection described / represented by each of the following:

- | | |
|---------------------------|--------------------------|
| A. Stabilizing selection | B. Directional selection |
| C. Diversifying selection | D. Sexual selection |

_____ acts against the extremes

_____ favors both extremes

_____ favors one of the extremes

_____ favors the intermediate

_____ reduces the intermediate

_____ reduces phenotypic variation

_____ females select males that are showier, more colorful, etc. for mating

_____ a plant population is found in an area that is becoming more arid; the average surface area of the leaves had been decreasing over generations

_____ female chickens prefer to mate with roosters with large, red combs

_____ as the trees in central and southeastern England became covered with dark pollutants, the dark variety of the peppered moth became more abundant

_____ Average-sized seeds become more common; the birds that eat the seeds become more specialized with around the same (average) size beak length

_____ Larger seeds become more common; the bird population evolves larger beaks

_____ Average-sized seeds become less common and larger and smaller seeds become more common; the bird population splits into 2 subgroups specializing in eating larger and smaller seeds.

_____ Human infants have the best chance of surviving the trials of birth if they weigh between 7 and 8 pounds at birth; mortality is higher at higher or lower birth weights.

16. What is sexual selection? _____

Why are sexual adaptations often at odds with other adaptations?

17. Why doesn't evolution produce perfect organisms?
