

Evolution Study Guide

Biology

1. Define the following terms:
 - a. Evolution
 - b. Gene/Allele frequency
 - c. Biological fitness
 - d. Natural selection
 - e. Derived character/trait
 - f. Speciation
 - g. Reproductive isolation
 - h. Variation
 - i. Mutation
 - j. Phylogeny
 - k. Cladogram
 - l. Common ancestor
 - m. Adaptation
 - n. Adaptive radiation
 - o. Homologous character
 - p. Analogous character
 - q. Convergent evolution
2. What are the “raw materials” of natural selection? Give some examples and explain them in detail.
3. In the “Predator” game, describe a hunting strategy that would result in NO EVOLUTION of the dots over time. Assume that the colors of the dots are determined genetically (i.e., each dot color is represented by a different allele of the “color” gene).
3. Explain, when interpreting a cladogram, how to find the following:
 - a. Derived characters
 - b. Ancestral characters
 - c. Common ancestors
 - d. Closely vs. distantly related organisms
4. Describe a situation – real or imagined – in which natural selection is occurring, but speciation is not. Be detailed – describe the raw materials of natural selection, and explain how allele frequencies change over time in terms of the phenotype of the organism you’re describing.

5. Describe a situation – real or imagined – in which reproductive isolation and natural selection leads to speciation. What criteria could you use to determine whether or not different populations are different species?
6. Explain how, in the speciation activity, new species of creatures could evolve without the original species of creature disappearing or becoming extinct. Be detailed – where is the original species located in space and how does it give rise to new species without changing itself?
7. What can phylogenetic trees tell us about how species are related, how they evolved, and whether characters are homologous or analogous?
8. In the Virtual Lizard Lab, describe how scientists classified the different lizards, how the different lizards on the two islands are related, and explain the methods and results of the experiment involving lizards placed on new islands. In your response, correctly use the terms “ecomorph”, “natural selection”, “common ancestor”, “variation”, and “allele frequency”.