

Name: _____ Date: _____

The Genetic Kaleidoscope: Senior Biology Phylogeny Quiz

Examine the intricate boundaries between Archaea and Eukaryota while analyzing synapomorphies that move classification beyond simple morphological observation.

1. Which molecular evidence is most critical for distinguishing between the domains of Archaea and Bacteria, given that both are prokaryotic?

- A. The presence of a circular chromosome
- B. The composition of 16S ribosomal RNA sequences
- C. The ability to fix atmospheric nitrogen
- D. The presence of flagella for locomotion

2. In phylogenetic systematic analysis, a shared derived character that defines a specific clade is known as a _____.

- A. Sympleisiomorphy
- B. Homoplasy
- C. Synapomorphy
- D. Analogy

3. The Endosymbiotic Theory suggests that Kingdom Protista is a monophyletic group because all members share a direct, exclusive common ancestor.

- A. True
- B. False

4. Consider the classification of the Ginkgo biloba. To which kingdom does it belong, and what unique cellular characteristic supports this placement?

- A. Protista; presence of contractile vacuoles
- B. Fungi; cell walls comprised of chitin
- C. Plantae; presence of large central vacuoles and cellulose
- D. Animalia; lack of cell walls during the gamete stage

5. Organisms like Halobacterium, which thrive in high-salinity environments such as the Dead Sea, are classified under the Domain _____.

- A. Eukarya
- B. Bacteria
- C. Archaea
- D. Monera

6. Horizontal Gene Transfer (HGT) complicates the 'Tree of Life' model by allowing exchange of genetic material between different domains.

- A. True

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B. False

7. Which of the following describes the fundamental distinction between the nutritional modes of Kingdom Fungi and Kingdom Animalia?

- A. Fungi are autotrophs; Animals are heterotrophs
- B. Fungi exhibit absorptive heterotrophy; Animals exhibit ingestive heterotrophy
- C. Fungi use glycogen for storage; Animals use starch
- D. Fungi are primarily anaerobic; Animals are primarily aerobic

8. The hierarchical taxons move from general to specific. Following 'Class', the next most specific level of classification is _____.

- A. Family
- B. Phylum
- C. Order
- D. Genus

9. The use of binomial nomenclature ensures that a species like the *Sequoia sempervirens* has a unique, globally recognized identifier.

- A. True
- B. False

10. In a cladogram, what does a 'node' represent in terms of evolutionary history?

- A. The extinction of a lineage
- B. A point of horizontal gene transfer
- C. The most recent common ancestor of descending clades
- D. A period of environmental stasis