

Name: _____ Date: _____

Unveiling the Tree of Life: A Sophisticated College Phylogeny Quiz

Scholars refine their understanding of molecular systematics and cladistic analysis through this rigorous formative assessment for upper-level biology seminars.

1. When examining the transition from the classical 'Five Kingdom' model to the 'Three Domain' system, which underlying discovery necessitated the reclassification of Monera?

- A. The identification of peptidoglycan in bacterial cell walls
- B. RNA polymerase and rRNA sequence divergence between Bacteria and Archaea
- C. The discovery of horizontal gene transfer in eukaryotic organisms
- D. Morphological differences in flagellar structure between prokaryotes

2. In phylogenetic systematics, a _____ group includes an ancestral species and all of its descendants, serving as the only valid clade in cladistics.

- A. Paraphyletic
- B. Polyphyletic
- C. Monophyletic
- D. Homoplasious

3. The presence of introns and histones in Archaea suggests a more recent common ancestor with Eukarya than with Bacteria.

- A. True
- B. False

4. Which of the following scenarios best illustrates the concept of 'synechology' within the context of taxonomic shifts in the Kingdom Protista?

- A. The grouping of all photosynthetic eukaryotes into a single phylum
- B. The recognition that Protista is a paraphyletic grade rather than a clade
- C. The discovery of secondary endosymbiosis in Chromalveolata
- D. The use of binary nomenclature for newly discovered extremist amoebae

5. The principle of _____ is often used by taxonomists to choose the phylogenetic tree that requires the fewest evolutionary changes.

- A. Maximum Likelihood
- B. Parsimony
- C. Convergent Evolution
- D. Adaptive Radiation

6. Horizontal Gene Transfer (HGT) complicates the 'Tree of Life' model by suggesting that the early history of life might be better represented as a web or network.

- A. True

Name: _____ Date: _____

B. False

7. In the context of fungal classification, what is the primary distinction between Ascomycota and Basidiomycota?

- A. The presence of chitin in the cell wall
- B. The mechanism of nutrient absorption via extracellular digestion
- C. The structure in which karyogamy and meiosis occur
- D. The ability to form symbiotic mycorrhizal relationships

8. Biologists distinguish between homologous traits and _____ traits, which are similar due to convergent evolution rather than shared ancestry.

- A. Synapomorphic
- B. Plesiomorphic
- C. Apomorphic
- D. Analogous

9. Which developmental characteristic is used to differentiate the major clades within Kingdom Animalia, specifically Protostomes and Deuterostomes?

- A. The presence of a fluid-filled coelom
- B. The fate of the blastopore during gastrulation
- C. The symmetry of the adult organism
- D. The number of embryonic germ layers

10. Under the Biological Species Concept, all members of a specific genus must be able to interbreed and produce fertile offspring.

- A. True
- B. False