

Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Answer Key: Taxonomic Tensions: The Great Grade 7 Grouping Game

Biological detectives will decode DNA evidence and morphological traits to solve complex classification puzzles in this advanced taxonomic challenge.

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**1. A scientist discovers a multicellular organism in a deep-sea hydrothermal vent. It lacks chloroplasts, has cell walls made of chitin, and absorbs nutrients from decaying tube worms. How should this be classified?**

**Answer:** C) Kingdom Fungi

Chitinous cell walls and absorptive heterotrophy are the defining synapomorphies of Kingdom Fungi, distinguishing them from plants (cellulose) and animals (no cell wall).

**2. When comparing two organisms, they share the same Domain, Phylum, Class, and Order, but belong to different Families. This implies that they are \_\_\_\_\_ related than organisms that only share the same Phylum.**

**Answer:** A) More closely

In the taxonomic hierarchy, sharing lower (more specific) levels like Order indicates a more recent common ancestor compared to sharing only broad levels like Phylum.

**3. Organisms within the Kingdom Archaea are genetically more similar to Kingdom Bacteria than they are to the Domain Eukarya because both are prokaryotic.**

**Answer:** B) False

Critically, molecular evidence shows Archaea share more metabolic pathways and genetic transition processes with Eukarya than with Bacteria, despite their similar cell structure.

**4. You are analyzing a microscopic organism collected from a stagnant pond. It is unicellular, possesses a nucleus, utilizes a flagellum for locomotion, and contains chloroplasts. Which group does it likely belong to?**

**Answer:** D) Plant-like Protists

The presence of a nucleus identifies it as a eukaryote, and the mix of plant-like (chloroplasts) and animal-like (locomotion) traits in a single cell is characteristic of Protista.

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**5. The scientific name for the Red Maple is *Acer rubrum*. In this binomial nomenclature system, the word 'Acer' represents the \_\_\_\_\_ level of classification.**

**Answer:** B) Genus

Binomial nomenclature uses the Genus (capitalized) followed by the specific epithet (species) to uniquely identify an organism.

**6. The primary difference between the Kingdom Animalia and the Kingdom Plantae is that animals are heterotrophs while plants are autotrophs.**

**Answer:** A) True

While both are multicellular eukaryotes, plants produce their own food via photosynthesis (autotrophy), and animals must ingest other organisms (heterotrophy).

**7. Modern taxonomists are increasingly moving away from relying solely on physical morphology (shape and structure). What specialized evidence provides the most accurate data for modern phylogenetic trees?**

**Answer:** C) DNA and RNA sequencing

Molecular biology allows scientists to see genetic mutations and conserved sequences, providing a much higher resolution of evolutionary distance than physical appearance alone.

**8. An organism that can survive in extreme boiling sulfuric acid is mostly likely a member of the Domain \_\_\_\_\_.**

**Answer:** C) Archaea

Domain Archaea is famous for including extremophiles—organisms adapted to thrive in conditions (high heat, acidity, salinity) that would be lethal to most other life forms.

**9. Why is the group previously known as 'Monera' now split into two distinct Domains (Bacteria and Archaea)?**

**Answer:** B) They have significant biochemical and genetic differences.

Even though both look similar under a microscope (prokaryotic), their cell membrane lipids and ribosomal RNA are different enough to justify separate domains.

**10. A phylum is a more specific taxonomic category than a class.**

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**Answer:** B) False

In the Linnaean hierarchy, Phylum is broader. Several Classes make up a Phylum; therefore, a Class is more specific than a Phylum.