

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

## Microbial War Zone High School Biology Quiz

Analyze predatory prokaryotes and viral recombination mechanisms to evaluate how microscopic evolution impacts global health and biotechnological innovation.

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**1. Which mechanism of horizontal gene transfer involves the uptake of 'naked' DNA from the environment following the lyse of a donor cell, and is a primary driver of transformation in species like *Neisseria meningitidis*?**

- A. Specialized Transduction
- B. Natural Transformation
- C. Conjugal Transposition
- D. Generalized Transduction

**2. In the context of metabolic diversity, organisms like *Nitrosomonas* that oxidize ammonia for energy and fix CO<sub>2</sub> for carbon are classified as \_\_\_\_.**

- A. Photoautotrophs
- B. Chemoheterotrophs
- C. Chemoautotrophs
- D. Photoheterotrophs

**3. The Lysogenic cycle of a bacteriophage results in the immediate destruction of the host cell's genomic integrity and rapid release of virions.**

- A. True
- B. False

**4. An investigator observes a microorganism thriving in an environment with a pH of 2.0 and a temperature of 85°C. This organism likely belongs to the domain Archaea and is classified as a(n):**

- A. Thermoacidophile
- B. Obligate Halophile
- C. Psychrophilic Anaerobe
- D. Barophilic Mesophile

**5. During the Nitrogen Cycle, the process of \_\_\_\_\_, primarily performed by bacteria like *Pseudomonas* and *Clostridium*, converts nitrate back into gaseous nitrogen.**

- A. Nitrogen Fixation
- B. Nitrification
- C. Ammonification
- D. Denitrification

**6. Gram-positive bacteria possess an outer membrane rich in Lipopolysaccharides (LPS) that protects them from certain antibiotics like Penicillin.**

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- A. True
- B. False

**7. Considering the Endosymbiotic Theory, what is the primary evidence that mitochondria were once free-living proteobacteria?**

- A. Presence of a Golgi apparatus within the organelle
- B. Circular DNA and 70S ribosomes independent of the host nucleus
- C. The ability to perform anaerobic fermentation
- D. A cell wall composed of chitin and cellulose

**8. A mutation in the gene encoding the \_\_\_\_\_ protein would directly inhibit a bacterium's ability to undergo conjugation by preventing physical contact with a recipient cell.**

- A. Flagellin
- B. Peptidoglycan
- C. Pilus
- D. Capsule

**9. Certain fungi, such as Mycorrhizae, form symbiotic relationships with plant roots. How does the plant primarily benefit from this exchange?**

- A. Direct synthesis of glucose by the fungal partner
- B. Increased surface area for phosphate and water absorption
- C. Protection from atmospheric CO<sub>2</sub> fluctuations
- D. Conversion of oxygen into ozone for the plant

**10. Retroviruses, such as HIV, utilize the enzyme Reverse Transcriptase to synthesize DNA from an RNA template, contradicting the traditional Central Dogma of biology.**

- A. True
- B. False