Name: _____ **Date:** _____

The Pathogen's Paradox: 8th Grade Microbiology Investigation

Moving beyond basic classification, this evaluation demands synthesis of metabolic pathways and the evolutionary mechanisms driving microbial resistance.

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1. A scientist discovers a new entity that displays metabolic activity only when it integrates its genetic material into a host's genome. Why is this entity classified as an obligate intracellular parasite rather than a living cell?

A. It lacks the independent machinery for protein synthesis and homeostasis.
B. It utilizes RNA as its primary genetic storage molecule.
C. It possesses a protein capsid rather than a phospholipid bilayer.
D. It can be crystallized and stored for long periods without expiring.

2. In an extreme environment like a hydrothermal vent, you find a unicellular organism that lacks a nucleus but contains ether-linked lipids in its cell membrane. To which domain does this organism likely belong?

A. Bacteria
B. Archaea
C. Eukarya
D. Protista

3. The process of _____ is a form of horizontal gene transfer where a bacterium takes up 'naked' DNA from its surrounding environment, often leading to rapid antibiotic resistance.

A. Transduction
B. Conjugation
C. Transformation
D. Binary Fission

4. Gram-negative bacteria are generally more resistant to many antibiotics because they possess an outer lipopolysaccharide membrane that prevents the entry of chemical agents.

A. True
B. False

5. When examining a sample of *Giardia lamblia*, a researcher notes the presence of two nuclei and lack of mitochondria, though it has reduced organelles called mitosomes. This organism is best categorized as a:

A. Chemoautotrophic Prokaryote
B. Multicellular Saprobe
C. Eukaryotic Protozoan
D. Lysogenic Bacteriophage

Name: _____ Date: _____

6. Cyanobacteria changed the course of Earth's history by performing _____, a process that released vast amounts of oxygen and led to the development of the ozone layer.

A. Nitrogen Fixation
B. Oxygenic Photosynthesis
C. Anaerobic Respiration
D. Chemosynthesis

7. A phage enters a bacterial cell and integrates its DNA into the host chromosome, staying dormant for several generations. What is this viral cycle called?

A. The Lytic Cycle
B. The Lysogenic Cycle
C. The Krebs Cycle
D. The Calvin Cycle

8. Prions are unique pathogens because they consist entirely of misfolded proteins and contain no DNA or RNA.

A. True
B. False

9. Microscopic fungi like *Penicillium* produce secondary metabolites as a survival strategy to _____ competing bacterial populations in their niche.

A. Inhibit
B. Stimulate
C. Fertilize
D. Encapsulate

10. Which of the following scenarios best describes the role of a decomposer in the nitrogen cycle?

A. Converting atmospheric N2 into ammonia for plant use.
B. Breaking down proteins in dead organic matter into ammonium.
C. Returning nitrogen gas to the atmosphere from nitrates.
D. Absorbing nitrates from the soil to build plant tissues.