

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

## Modeling Microbes: Your 8th Grade Microbiology Mastery Quiz

Synthesize complex biological data to evaluate how metabolic diversity in extremophiles and pathogens informs modern bio-engineering and epidemiology.

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**1. When examining a newfound organism discovered near a deep-sea hydrothermal vent, you observe it lacks a nucleus and utilizes hydrogen sulfide for energy. How would you categorize its metabolic strategy?**

- A. Photoautotrophic
- B. Chemoautotrophic
- C. Heterotrophic
- D. Saprophytic

**2. A scientist uses \_\_\_\_ to integrate a specific gene into a bacterial plasmid, creating a recombinant organism capable of producing human insulin.**

- A. Binary fission
- B. Endospore formation
- C. Restriction enzymes
- D. Gram staining

**3. Antibiotics are an effective primary treatment for eradicating viral infections such as Ebola or the common cold because they disrupt protein synthesis in the host cell.**

- A. True
- B. False

**4. In a scenario where a population of bacteria is exposed to a sub-lethal dose of penicillin, what is the most likely driver of the 'superbug' phenomenon in subsequent generations?**

- A. Spontaneous generation of new species
- B. Acquired immunity through the nervous system
- C. Horizontal gene transfer via conjugation
- D. Increased rate of binary fission

**5. To visualize the internal 3D ultrastructure of a bacteriophage at a nanometer scale, a researcher would most likely utilize a \_\_\_\_.**

- A. Compound light microscope
- B. Scanning electron microscope
- C. Digital dissection scope
- D. Petri dish culture

**6. Retroviruses, such as HIV, utilize the enzyme reverse transcriptase to convert their RNA genome into DNA before integrating it into the host's genome.**

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- A. True
- B. False

**7. Which of the following describes the secondary role of Mycorrhizal fungi in forest ecosystems?**

- A. Synthesizing glucose through photosynthesis
- B. Fixing atmospheric nitrogen into nitrates
- C. Extending root systems for phosphorus absorption
- D. Infecting trees to reduce overpopulation

**8. During the process of \_\_\_\_\_, yeast cells convert glucose into ethanol and carbon dioxide in the absence of oxygen.**

- A. Aerobic respiration
- B. Photolysis
- C. Anaerobic fermentation
- D. Transpiration

**9. In the Lysogenic cycle of a viral infection, what is the fate of the viral DNA?**

- A. It immediately destroys the host DNA
- B. It remains dormant as a prophage within the host genome
- C. It is converted into proteins by ribosomes instantly
- D. It lyses the cell membrane to spread to neighbors

**10. Prions are unique infectious agents because they consist entirely of misfolded proteins and contain no nucleic acids (DNA or RNA).**

- A. True
- B. False