Name: _____ **Date:** _____

Answer Key: Unseen Warriors vs. Deep Space: The 6th Grade Microbe Challenge

Evaluate how extremophiles might survive on Europa and analyze microbial interactions in this 10-question high-level diagnostic.

---

1. If an astrobiologist discovers a single-celled organism near a hydrothermal vent on the ocean floor that lacks a nucleus and possesses a unique cell membrane structure, how should it be classified?

Answer: B) Archaea

Archaea are prokaryotic (no nucleus) and are famous for surviving in extreme environments like hydrothermal vents, distinguishing them from bacteria and eukaryotes.

2. While bacteria are living organisms that can reproduce independently, _____ require a biological host to replicate their genetic material.

Answer: B) Bacteriophages

Bacteriophages are a type of virus. Unlike bacteria, viruses are non-cellular entities that must hijack a host cell's machinery to create copies of themselves.

3. True or False: In a forest ecosystem, microscopic fungi play a role as primary producers by converting sunlight into chemical energy.

Answer: B) False

Fungi are decomposers or heterotrophs, not primary producers. They obtain energy by breaking down organic matter, whereas algae or plants perform photosynthesis.

4. Which piece of evidence would most strongly support the argument that a specific microbe is an autotroph?

Answer: C) The detection of chloroplasts or chlorophyll

Autotrophs, like certain algae and cyanobacteria, produce their own food. Chlorophyll is the pigment required for photosynthesis, the process of converting light to energy.

5. A scientist observing a sample of pond water notices an organism using small, hair-like projections called _____ to create water currents for feeding.

Name: _____ **Date:** _____

Answer: B) Cilia

Cilia are short, hair-like structures used by many protozoa (like Stentor or Vorticella) for both locomotion and bringing food particles into their oral groove.

6. True or False: Antibiotics are an effective treatment for eliminating a sickness caused by the Tobacco Mosaic Virus.

Answer: B) False

Antibiotics only target bacterial structures or metabolic pathways. Since viruses are non-living and lack these structures, antibiotics have no effect on them.

7. In the nitrogen cycle, certain soil bacteria perform 'nitrogen fixation.' Why is this process critical for the survival of animals in that ecosystem?

Answer: B) It converts nitrogen into a form plants can use to build proteins.

Most organisms cannot use atmospheric nitrogen. Bacteria 'fix' it into ammonia or nitrates, which plants use to grow; animals then get that nitrogen by eating the plants.

8. A mutation occurs in a population of Dictyostelium (cellular slime mold) that prevents individual cells from signaling each other. What is the most likely consequence?

Answer: B) The cells will fail to aggregate into a multicellular 'slug'.

Slime molds rely on chemical signaling to move together and form multicellular structures during times of stress. Without signaling, they remain as individual amoeboid cells.

9. Unlike prokaryotes, eukaryotic microorganisms such as _____ contain a membrane-bound nucleus that houses their DNA.

Answer: C) Dinoflagellates

Dinoflagellates are a group of eukaryotic algae. The other options (E. coli, thermophiles, methanogens) are all prokaryotic bacteria or archaea.

10. True or False: Some species of bacteria are used in 'bioremediation' to clean up oil spills because they can metabolize hydrocarbons.

Answer: A) True

Name: _____ Date: _____

Bioremediation is a biotechnology process where microbes (mostly bacteria) are used to break down environmental pollutants into less toxic substances.