

Name: _____ Date: _____

Answer Key: Escape the Bio-Lab: Case Files for 7th Grade Microbiologists

Analyze microbial behaviors and structures to solve real-world mysteries, moving beyond basic recall to evaluate how tiny organisms impact global health and ecology.

1. A scientist finds an organism in a hot spring that lacks a nucleus and has a unique cell wall. To which domain does this extremophile likely belong?

Answer: B) Archaea

Archaea are prokaryotic microorganisms (no nucleus) often found in extreme environments, distinct from Bacteria in their genetic and chemical makeup.

2. Viruses are considered living organisms because they can reproduce independently outside of a host cell.

Answer: B) False

Viruses are non-cellular entities that lack their own metabolism; they must hijack the machinery of a living host cell to replicate.

3. During the process of _____, certain bacteria convert nitrogen gas from the air into a form that plants can use to grow.

Answer: C) Nitrogen Fixation

Nitrogen fixation is a critical ecological process where microbes like Rhizobium turn atmospheric nitrogen into ammonia, essential for the food chain.

4. Which of these specialized structures does an Amoeba use for both movement and capturing food?

Answer: D) Pseudopods

Pseudopods (meaning 'false feet') are temporary cytoplasmic projections that allow amoebas to move and engulf prey through phagocytosis.

5. A baker uses _____, a microscopic fungus, to make bread rise by releasing carbon dioxide gas during the fermentation of sugars.

Answer: B) Yeast

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Yeast is a unicellular fungus; its metabolic process of fermentation produces CO₂, which creates air bubbles in dough to make it light and fluffy.

6. Eukaryotic microorganisms, such as Diatoms, contain their genetic material inside a membrane-bound nucleus.

Answer: A) True

Diatoms are eukaryotic algae; like all eukaryotes, they possess organized organelles and a nucleus to house their DNA.

7. If you observe a slide of lake water and see a spiral-shaped, single-celled organism with a long tail-like structure, how would you classify that tail?

Answer: A) Flagellum

A flagellum is a whip-like appendage that many bacteria and some protists use for locomotion in aquatic environments.

8. Penicillin, one of the world's first antibiotics, was originally derived from a microscopic _____, showing that microbes can fight other microbes.

Answer: C) Mold

Alexander Fleming discovered that the mold *Penicillium* produced a substance that killed bacteria, leading to the development of antibiotics.

9. Antibiotics are an effective treatment for viral infections like the common cold or the flu.

Answer: B) False

Antibiotics target biological structures in bacteria (like cell walls); they have no effect on viruses, which require antiviral medications or vaccines.

10. Why are decomposers like saprophytic bacteria and fungi considered the 'recyclers' of the ecosystem?

Answer: B) They break down dead organic matter into nutrients for soil

Decomposers break down complex organic molecules from dead organisms, returning essential nutrients like carbon and nitrogen to the soil for reuse by plants.