

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

## Stellar Strata: A 11th Grade Galactic Geocaching Mission

Decode isotopic signatures and faunal succession patterns to reconstruct paleoenvironments as if you were an exogeologist analyzing a newly discovered planet.

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**1. Which isotopic ratio in the shells of Foraminifera is primarily used by paleoclimatologists to determine ancient sea-surface temperatures and ice volume?**

- A. Carbon-14 to Carbon-12
- B. Oxygen-18 to Oxygen-16
- C. Uranium-238 to Lead-206
- D. Potassium-40 to Argon-40

**2. The 'Great Oxygenation Event,' evidenced by Banded Iron Formations (BIFs) in the rock record, was primarily driven by the metabolic waste of anaerobic heterotrophs.**

- A. True
- B. False

**3. In the context of biostratigraphy, a(n) \_\_\_\_\_ fossil is a species that was geographically widespread but existed for a very short geological duration, making it ideal for correlating rock layers.**

- A. Trace
- B. Facies
- C. Index
- D. Cast

**4. When observing an unconformity where horizontal sedimentary strata overlie tilted or folded sedimentary rocks, a geologist is looking at a(n):**

- A. Disconformity
- B. Nonconformity
- C. Angular unconformity
- D. Paraconformity

**5. The principle of \_\_\_\_\_ states that in an undisturbed sequence of rocks, the fossils at the bottom are older than the fossils near the top, reflecting the evolution of life through time.**

- A. Cross-cutting relationships
- B. Faunal succession
- C. Inclusion
- D. Lateral continuity

**6. The boundary between the Cretaceous and Paleogene periods is chemically marked worldwide by a thin layer of iridium, an element rare on Earth's surface but common in asteroids.**

- A. True

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B. False

**7. Which of these lagerstätten (extraordinary fossil sites) is most famous for preserving soft-bodied organisms from the Cambrian Explosion, such as Opabinia and Hallucigenia?**

- A. The Burgess Shale, Canada
- B. The Solnhofen Limestone, Germany
- C. The La Brea Tar Pits, USA
- D. The Messel Pit, Germany

**8. If a sample contains only 12.5% of its original Parent isotope after undergoing radioactive decay, how many \_\_\_\_\_ have passed?**

- A. One half-life
- B. Two half-lives
- C. Three half-lives
- D. Four half-lives

**9. Stromatolites are trace fossils representing the activity of ancient burrowing trilobites during the Devonian Period.**

- A. True
- B. False

**10. The 'Hadean' is distinct from other divisions of the geologic time scale because it is primarily defined by:**

- A. The dominance of angiosperms
- B. The first appearance of shelled organisms
- C. The lack of any rock record from Earth's initial formation
- D. The formation of the Pangea supercontinent