Name: _____ **Date:** _____

Answer Key: Geologic Gaps & Great Gradations: 8th Grade Geochronology Quiz

Challenge students to synthesize carbon dating data and stratigraphic principles to resolve complex puzzles in Earth's deep-time history and faunal succession.

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1. Which geologic principle would a scientist use to determine that a granitic intrusion is younger than the sedimentary layers it pierces?

Answer: B) The Principle of Cross-Cutting Relationships

The Cross-Cutting Relationships principle states that any feature that cuts across a body of rock must be younger than the rock it interrupts.

2. The _____ describes a significant gap in the rock record, representing a period of erosion or non-deposition where layers of time are missing.

Answer: C) Unconformity

Unconformities are structural features that indicate a break in the continuity of the geological record, representing 'missing time'.

3. True or False: Carbon-14 dating is the primary method used by geologists to determine the absolute age of Precambrian metamorphic rocks.

Answer: B) False

Carbon-14 has a short half-life (5,730 years) and can only date organic material up to about 50,000 years old; Precambrian rocks are billions of years older and require isotopes like Uranium-238.

4. If a geologist finds an index fossil like a Graptolite in a shale layer in Scotland and the same fossil in a shale layer in New York, what can they conclude?

Answer: A) The layers were deposited at the same time.

Index fossils are used for correlation, allowing scientists to match rocks of the same age across different geographic locations.

5. The transition from the Paleozoic Era to the Mesozoic Era was marked by the _____, the largest mass extinction event in Earth's history.

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Answer: C) Permian-Triassic Extinction

Known as 'The Great Dying,' the Permian-Triassic extinction eliminated about 96% of marine species and defines the boundary between these two eras.

6. True or False: Cast and mold fossils provide a 3D physical replica of the internal organs of an organism.

Answer: B) False

Cast and mold fossils generally only preserve the external surface morphology and hard parts, rarely capturing internal soft tissue or organs.

7. Using radiometric dating, a rock sample is found to have a parent-to-daughter isotope ratio of 1:3. If the half-life of the parent is 700 million years, how old is the rock?

Answer: C) 1.4 billion years

A 1:3 ratio means two half-lives have passed (1 -> 1/2 -> 1/4 parent remaining). 2 x 700 million = 1.4 billion years.

8. While searching for evidence of early life, a scientist discovers _____, which are layered mounds formed by the trapping of sediment by ancient cyanobacteria.

Answer: A) Stromatolites

Stromatolites are the oldest known fossils and represent the earliest evidence of life on Earth, dating back over 3.5 billion years.

9. Which of the following would be considered a 'trace fossil' rather than a 'body fossil'?

Answer: C) A fossilized burrow from an ancient crustacean

Trace fossils record the activity or behavior of an organism (footprints, burrows, nests) rather than the physical remains of the organism itself.

10. True or False: The principle of 'Uniformitarianism' suggests that the geological processes we see today have operated similarly throughout Earth's history.

Answer: A) True

Coined by James Hutton, this principle is summarized as 'the present is the key to the past,' and is fundamental to interpreting the rock record.