

Cosmic Palaeontology

Palaeontology · Answer Key · 20 Questions

1. Which element, found in high concentrations in the K-Pg boundary layer globally, serves as primary evidence for the asteroid impact hypothesis?

- A) Iridium**
- B) Osmium
- C) Platinum
- D) Palladium

2. The Chicxulub impact occurred at the end of which geological period, coinciding with a mass extinction event?

- A) Triassic
- B) Jurassic
- C) Cretaceous**
- D) Paleogene

3. What are 'tektites', often found in strata associated with extraterrestrial impacts, composed of?

- A) Crystalline diamond
- B) Natural glass**
- C) Metamorphic limestone
- D) Solidified igneous magma

4. Which crater, located in Quebec, Canada, is one of the oldest known impact structures and is linked to the Manicouagan impact event?

- A) Vredefort
- B) Sudbury
- C) Manicouagan**
- D) Popigai

5. The Permian-Triassic extinction, the most severe in Earth's history, is sometimes hypothesized to have been influenced by a large impact; which site was initially proposed but later disputed as a primary candidate?

- A) Bedout**
- B) Wilkes Land
- C) Araguainha
- D) Mistastin

6. Which mineral, formed under intense shock pressure during meteor impacts, is a key diagnostic indicator for researchers studying fossilized impact sites?

A) Stishovite

B) Muscovite

C) Orthoclase

D) Biotite

7. What is the specific name of the circular, shock-deformed feature found in rock structures that indicates a high-velocity meteor strike?

A) Shatter cone

B) Melt breccia

C) Impact spherule

D) Tectonic slickenside

8. Evidence suggests the Eltanin impact, which occurred approximately 2.5 million years ago, happened in which type of environment?

A) Deep ocean

B) Continental desert

C) Arctic ice cap

D) Tropical forest

9. What is the primary scientific significance of the 'Late Heavy Bombardment' period in the context of the early Earth fossil record?

A) It created early oceans

B) It hampered the establishment of early life

C) It triggered the Cambrian Explosion

D) It provided oxygen to the atmosphere

10. Which specific isotope ratio in fossils and sediments is used to measure the cooling of the Earth, sometimes linked to volcanic or cosmic-induced 'impact winters'?

A) Oxygen-18/Oxygen-16

B) Carbon-13/Carbon-12

C) Nitrogen-15/Nitrogen-14

D) Sulfur-34/Sulfur-32

11. The Popigai crater in Siberia is notable for containing which economically significant material created by the impact event?

A) Impact diamonds

B) Pure gold deposits

C) High-grade cobalt

D) Rare earth elements

12. Which chemical marker, found in the fossil record, suggests an extraterrestrial source of amino acids in the early solar system?

- A) Left-handed chirality**
- B) Right-handed chirality
- C) Inorganic carbon chains
- D) Non-carbon based structures

13. What is the 'Fern Spike' observed in the fossil record immediately following the K-Pg boundary considered evidence of?

- A) Rapid reforestation after impact-induced firestorms**
- B) A sudden rise in global temperature
- C) The arrival of extraterrestrial flora
- D) Increased volcanic ash deposition

14. Which celestial body is currently hypothesized to have potentially influenced the periodicity of mass extinctions on Earth via its motion through the galactic plane?

- A) Nemesis (hypothetical star)**
- B) The Moon
- C) Mars
- D) Venus

15. What is the significance of 'Shocked Quartz' in the context of terrestrial impact craters?

- A) It indicates rapid heating from internal volcanic activity
- B) It possesses distinct planar deformation features**
- C) It is only found in mantle-derived rocks
- D) It is proof of ancient atmospheric oxygen spikes

16. The Haughton impact crater in Nunavut, Canada, is frequently used by astrobiologists to study life in extreme conditions because it mimics the environment of which planet?

- A) Mars**
- B) Venus
- C) Jupiter
- D) Mercury

17. Which of the following describes the 'impact-winter' theory often cited in mass extinction studies?

- A) Atmospheric aerosols blocking sunlight**
- B) A sudden increase in CO2 levels
- C) The freezing of the Earth's core
- D) Excessive UV radiation destroying the ozone

18. Which crater is considered the largest verified impact structure on Earth, created approximately 2 billion years ago?

A) Vredefort

B) Chicxulub

C) Sudbury

D) Aorounga

19. The 'Great Oxygenation Event' is evidenced in the rock record by the appearance of which specific geological formation?

A) Banded Iron Formations

B) Coal seams

C) Limestone platforms

D) Evaporite deposits

20. Which radioactive isotope, with a half-life of 5,730 years, is used to date biological materials, though it is limited to the last 50,000 years of the fossil record?

A) Carbon-14

B) Uranium-238

C) Potassium-40

D) Rubidium-87