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**NAME**

**DATE**

1. What is the K-T boundary?
2. If the rocks outside of Gubbio, Italy used to be at the bottom of an ocean, how are they now part of a mountain?
3. Describe the differences scientists saw in the foraminifera found in rock layers above (after) and below (before) the K-T boundary.
4. Which of the following events are possible sources of high levels of iridium in sediments? Write 'yes' or 'no' next to each of the four possibilities. There may be more than one 'yes' response.  
An asteroid impact \_\_\_\_\_  
Rain \_\_\_\_\_  
Fossilized foraminifera \_\_\_\_\_  
A supernova \_\_\_\_\_
5. Which of the following pieces of evidence prompted researchers to abandon the hypothesis that a supernova caused the high levels of iridium in the K-T layer? Select one response.
  - a. Coarse sediment mixed with uniform Cretaceous mud in Texas
  - b. Differences in foraminifera fossils above and below the K-T boundary layer
  - c. High levels of iridium in the K-T boundary layer
  - d. Lack of an isotope of plutonium in the K-T boundary layer
6. Is the following statement true or false? Justify your answer in one or two sentences: "The entire scientific community accepted the asteroid hypothesis after Dr. Alvarez published his paper showing high iridium levels at the K-T boundary."



7. Explain why the scientific community was slow to accept the asteroid impact hypothesis.
8. Many different pieces of evidence lead to the formation of the asteroid hypothesis and provided support for the hypothesis, including
- Finding tsunami deposits in the Brazos River Basin, Texas.
  - Determining that rocks taken from the Chicxulub crater are the same age as the K-T boundary.
  - Discovering gravitational field anomalies on the Yucatan peninsula, from surveys done for oil exploration.
  - Finding high levels of iridium in the K-T boundary layer.
  - Identifying spherules and shocked quartz in Haiti.
  - Finding that an isotope of plutonium is not in the K-T boundary layer.
  - Observing differences in foraminifera fossils above and below the K-T boundary layer.
- Which piece of evidence (a-g) lead scientists to conclude that the cause of the K-T boundary layer was extraterrestrial in nature? \_\_\_\_\_
  - Which piece of evidence (a-g) lead scientists to dismiss the supernova hypothesis? \_\_\_\_\_
  - What was the **critical** piece of evidence (a-g) that supported the hypothesis that an asteroid had struck Earth 66 million years ago? \_\_\_\_\_
9. How could an asteroid impact kill off so many different species? Select one response.
- Debris from the impact orbiting around the Earth shields sunlight, halting photosynthesis.
  - Tsunamis, landslides, and earthquakes caused by the impact killed organisms near the site of impact.
  - The impact was so extreme that life at ground zero was vaporized.
  - Both A and C are possible.
  - A, B and C are possible.
10. Why do we define the K-T event as a mass extinction event? Write 'yes' or 'no' next to each of the five possibilities. There may be more than one 'yes' response.
- Many species of foraminifera went extinct \_\_\_\_\_
- A large proportion of species went extinct \_\_\_\_\_
- The extinction occurred in many habitats around the world \_\_\_\_\_
- Tyrannosaur rex* went extinct \_\_\_\_\_
- Many life forms near Gubbio, Italy were obliterated \_\_\_\_\_



11. Which fields of study contributed to the research that led to the impact hypothesis? Circle all that apply.

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|----------|---------|------------|
| Biology  | Economy | Physics    |
| Geology  | Math    | Philosophy |
| Theology | Music   | Chemistry  |

12. What did Dr. Carroll mean at the end of the film when he said, "It's not always the survival of the fittest; sometimes it's the survival of the luckiest?"