



Student Sheet

Activities

1. Observation of the Cretaceous-Tertiary Boundary

Observe the following photograph:

- stratigraphic section of the Cretaceous-Tertiary boundary

http://nature.ca/education/cls/lp/lpextktct_e.cfm

The photo emphasizes a thin layer of iridium-enriched dark clay. The layers above the boundary represent the Tertiary Period, while the layers underneath represent the Cretaceous Period.

Also, observe these photographs:

- shocked quartz

http://nature.ca/education/cls/lp/lpextqu_e.cfm

- tektites

http://nature.ca/education/cls/lp/lpextmet_e.cfm

Answer the following questions. The interactive periodic table of the elements and specifically, information about the element iridium, might give you some clues.

1.1 In what ways does the identification of the element iridium help in determining what may have happened at the K-T boundary (also known as the K/T boundary and Cretaceous-Tertiary boundary)?

1.2 What could possibly explain the formation of shocked quartz?

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1.3 What are tektites and what does their formation suggest about the potential cause(s) of the K-T extinction event(s)?

2. Winners and Losers

Do the interactive activity *Declining Diversity*.

http://nature.ca/discover/exf/dclnngdvrsty/index_e.cfm

Observe the image of a rock layer from Hell Creek, Montana, U.S.A. It indicates where specific fossil specimens were found along a cross-section that includes the Cretaceous-Tertiary boundary.

The following resources will also help you answer the questions.

- Interactive activity: *Winners and Losers*
http://nature.ca/discover/exf/wnnrsndlosrs/index_e.cfm
- Chart: *Winners and Losers of the K T Boundary*
http://nature.ca/education/pdf/kt_ai_e.pdf

2.1 Which groups of organisms were able to survive the K-T event?



2.2 What proportion of the total number species that was living before the extinction do the surviving species represent?

2.3 Is it possible that there was already a gradual decline in biodiversity among those species that did not survive the K-T event?

2.4 Can this assessment be made with certainty, based on the information provided?

3. Comparison of Great-Extinction Theories

There are two main theories that try to explain the great extinction that happened on Earth 65 million years ago:

- a comet or meteor impact
- large-scale volcanic eruptions

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In small group, study the theory that your teacher has assigned to you. Then:

- give the most compelling arguments in support of your theory
- suggest how the outcome of your theory may have resulted in the extinction of a large amount of life on Earth, while the rest was able to survive.

Consult the following documents for assistance, whether online or in handouts:

- *Geologic Time Scale*
http://nature.ca/education/pdf/2007-08_gts_e.pdf
- Chart: *Winners and Losers of the K-T Boundary*
http://nature.ca/education/pdf/kt_ai_e.pdf
- Map: locations where iridium has been found worldwide
http://nature.ca/education/pdf/lpextmp_e.pdf

You will also find information by browsing the Gallery Interactives about fossils, from the **Canadian Museum of Nature**. The **K-T Globetrotting** section presents pertinent information and clues about the various extinction theories. The clues range from results from prominent scientists to interactive components that illustrate supporting evidence for each theory.

http://nature.ca/discover/exf/index_e.cfm

4. Discussion of Extinction Theories

4.1 In a class discussion, analyze the merits and shortcomings of each theory. You are attempting to resolve whether any of them, in isolation, is sufficient to explain the great extinction event that marked the end of the dinosaurs.

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Answer the following questions.

4.2 Was the K-T event perhaps caused by a combination of the factors presented by the student groups?

4.3 Are there other feasible explanations?

5. A Modern-Day Extinction Event?

5.1 Pool your newly acquired collective knowledge to ponder the circumstances and results of a speculative modern-day K-T event. In small groups, develop and present an original scenario outlining the **cause**, **effect** and **aftermath** of a modern-day extinction event.



Answer the following question.

5.2 How might this new catastrophe shape the course of evolution?

Online Version

http://nature.ca/education/cls/lp/lpext_e.cfm

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