

Cretaceous Impact Kit

To order this kit contact: jswanseen@oceanleadership.org

Overview

Sixty five million years ago, a 10km meteorite crashed into what is now Mexico's Yucatan Peninsula, creating a 177km crater and causing mass extinctions across the globe. This kit contains a set of colorful images, a core replica, and interactive materials designed to:

- Introduce the *JOIDES Resolution* research vessel and scientific ocean drilling;
- Demonstrate how cores and sediment records drilled from the ocean floor can be used to make inferences about past events;
- Present different careers associated with conducting science on the ship.

Audiences: informal learners, upper elementary to high school students, second language learners, scouts, and home-schoolers.

National Science Education Standards

- **Unifying Concepts and Processes**
 - Evidence, models, explanation
 - Change, consistency, measurement
 - Evolution
- **Science as Inquiry**
 - How we know what we know
 - Nature of science
 - Skills for independent inquirers about the natural world
- **Earth and Space Science**
 - Origin and evolution of the Earth system
- **History and Nature of Science**
 - Nature of scientific knowledge



Time: The kit is suitable for a brief introduction during one class period, or a more in-depth exploration over a longer period of time.

Kit Contents: There are two versions of the kit. One contains a number of colorful fabric images that stick with velcro to a six foot long felt backdrop. The other has laminated images that can be used on a desk top or with magnets on a whiteboard. Images include the *JOIDES Resolution*, ocean and layers with deep sea sediment layers, references to the ship's dimensions, photographs from different areas of the ship, core model, core evidence, time period globes, event pictures, and a drill site map.



Additional materials included in the kit to keep or give away to your audience:

- 40 *Blast from the Past* pencils
- 40 *Lab Book Core Description Cards*
- 40 *KT Sticker Sheets*
- 1 The New *JOIDES Resolution* and *Scientific Ocean Drilling in Film DVD*

How to use the Cretaceous Impact Kit

This kit is designed to be flexible so it can meet the interests and needs of a wide range of audiences. Here is just one example:

1. Introduce scientific ocean drilling and the *JOIDES Resolution* using the vessel's image, dimension numbers, ocean layers, and photographs from the ship. Discuss:

- the *JOIDES Resolution* and show how it is a wonderful example of science, technology, engineering, and math (STEM),
- how scientific ocean drilling is conducted and how core flows through the labs,
- what it is like to sail as a scientist, crew member, technician, or engineer, and
- the wide range of ocean-related careers that exist.

2. Introduce your audience to the remarkable Core 171b by revealing some key information such as; where the core was taken, the time periods represented in the core layers, and the core's orientation. Then have individuals or teams record observations about the core's color, texture, size, etc. on the *Core Description Cards*.

3. Invite participants to make inferences from their observations to explain what event(s) the core evidence contains.

4. Have students use the core evidence, time period globes, and event picture images to unravel the story that the core tells, giving time for participants to write their own hypotheses and inferences about the impact's evidence.

5. Discuss and/or research:

- other evidence that supports the hypothesis that a meteorite hit the Earth 65 million years ago causing a mass extinction,
- how such an event could have changed the local environment, weather, climate and ultimately, the biosphere,
- what other Earth events and processes scientific ocean drilling has helped us understand,
- what the *JOIDES Resolution* is doing right now.



Background and Supplemental Material

- **About the Cretaceous/Tertiary Impact** - access other activities, scientific literature, and resources about the extinction event, and the Expeditions that have retrieved cores from the Cretaceous/Tertiary boundary at: <http://www.oceanleadership.org/education/deep-earth-academy/i-dea-resources/teaching-kits-and-models/cretaceous-impact-kit/cretaceous-impact-resources/>.
- **Introduction to the JOIDES Resolution Power Point** – downloadable from the Deep Earth Academy website at www.oceanleadership.org/education/deep-earth-academy/.
- **The JOIDES Resolution website** – read scientist blogs, watch videos from the ship, see where the JR is right now, and learn more about the ship, crew, scientists, and expeditions at www.joidesresolution.org.
- **Tour of the JOIDES Resolution** <http://joidesresolution.org/node/8>
- **What is a Core?** www.oceanleadership.org/education/deep-earth-academy/educators/classroom-activities/grades-9-12/what-is-a-core/
- **Marine Careers** – <http://joidesresolution.org/node/904>

Give Away Materials – order materials such as posters, 171b KT core pencils, and stickers at www.oceanleadership.org/education/deep-earth-academy/i-dea-resources/.

Acknowledgements and Credits

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- Cretaceous and Tertiary Scenes illustrated by Karen Carr (<http://www.karencarr.com/>)
- Microfossil photos from Huber, Brian T, MacLeod, Norris (2002). Geological Society of America Special Paper 356 (2002) 277. *Abrupt extinction and subsequent reworking of Cretaceous planktonic foraminifera across the Cretaceous-Tertiary boundary: Evidence from the subtropical North Atlantic*