

Asteroid Hunters



Watch it online <http://www.kqed.org/quest/television/view/26> | TV story length 8:18 minutes
Listen online <http://www.kqed.org/quest/radio/an-asteroids-close-call> | Radio story length 5:45 minutes

QUEST SUBJECTS

- | | |
|---|---|
| <p>Life Science</p> <p>Earth Science</p> <p>Physical Science</p> | <p>Biology
Health
Environment</p> <p>Geology
Weather
Astronomy</p> <p>Physics
Chemistry
Engineering</p> |
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CA SCIENCE STANDARDS

Grade 3

Earth Science

1. An object's motion can be described by recording the change in position of the object over time. (b)

Grade 5

Earth in the Solar System

5. The solar system includes the planet Earth, the Moon, the Sun, seven other planets, their satellites and smaller objects, such as asteroids and comets. (b)

Grades 9-12

Earth Science

Earth's Place in the Universe

1. Evidence for the dramatic effects that asteroid impacts have had in shaping the surface of the planets and their moons and in mass extinctions of life on Earth. (a)

PROGRAM NOTES

Watch **Asteroid Hunters**

Call them traveling wanderers through our solar system, asteroids and their fellow wanderers, comets, have the potential to greatly impact and alter life as we know it should one strike planet Earth.

Listen to **An Asteroid's Close Call**

On January 30, 2008, it seemed possible that an asteroid the size of a Boeing 737 jet was due to collide with Mars. Today that seems far less likely, but, as this radio segment describes reports, astronomers consider the event a wake up call.

In these segments you'll find...



- ⦿ what tools and techniques scientists use to find asteroids.
- ⦿ possible ways to deflect asteroids heading toward Earth.
- ⦿ the implications of an asteroid of substantial size hitting Earth.

TOPIC BACKGROUND

Too small to be considered planets, asteroids, also known as minor planets, are rocky and metallic objects that inhabit our solar system. Usually found in the Asteroid Belt (the area between Mars and Jupiter), asteroids usually take between three to six Earth years to complete their orbit around the Sun. Ranging in size from pebbles to larger than 150 miles in diameter, asteroids are kept in line by Jupiter's gravitational force, which prevents asteroids from slipping out of orbit and hitting the inner planets.



Not much is known about the origins of the asteroids, but one hypothesis suggests that they were formed from material that did not accrete (condense) into a single planet.

Occasionally, some of these asteroids have hit Earth (near-Earth asteroids) and left impact craters as evidence. The most recent example of a collision with a significantly-sized asteroid was in 1908, when a large asteroid hit Tunguska, Siberia, exploding with the force of a nuclear bomb. That impact took place in the wilderness with no major loss of human life and property. However, there has been much discussion about the role of asteroids in several mass extinctions of plant and animal life on Earth in the past, and what must be done to prevent the same thing from happening in the future. Ideas abound on how to alter the paths of asteroids headed toward Earth.

More Background Information and Resources for Teachers

http://www.nasa.gov/worldbook/asteroid_worldbook.html

VOCABULARY

Asteroids

rocky, metallic objects, too small to be considered planets, that orbit the Sun

Comet

a celestial object made of dust and ice

Tunguska

a powerful explosion that occurred in Russia, believed to be caused by a near-Earth object like an asteroid, comet, or meteor.

Gravity Tractor

a spacecraft that hovers in space and changes the speed of asteroids

Apophis

asteroid named after the Egyptian god of chaos and destruction

Solar System

eight planets and all other celestial bodies that orbit the Sun.

Planet

a celestial body larger than an asteroid or comet

Keyhole

small corridor in space

Minor Planet Center

an international body that tracks asteroids and comets

PRE-VIEWING

- What is an asteroid?
- Do you think we should worry about asteroids hitting the Earth?
- Start a KWL chart

VIEWING FOCUS

NOTE: You may choose to watch the television and radio segments twice with your students: once to elicit emotional responses and get an overview of the topic and again to focus on facts and draw out opinions.

- Does the size of an asteroid matter?
- How often do asteroids hit Earth?
- What is the method used for finding asteroids?
- Where is the main asteroid belt located in the solar system?
- What are some of the ideas scientists have to prevent a future asteroid collision?

QUEST, PBS, and NPR LESSON PLANS & RESOURCES

NOTE: Resources from the Teachers' Domain collection require a fast and free registration

What Killed the Dinosaurs? Teacher's Domain

<http://www.teachersdomain.org/resource/tdc02.sci.life.div.dinokill>

This activity focuses on the investigation of evidence and clues that suggests the asteroid-impact hypothesis as the most convincing reason why dinosaurs became extinct.

Doomsday Asteroid NOVA

http://www.pbs.org/wgbh/nova/teachers/activities/2212_spacewat.html

This activity investigates crater force, size and mass of objects that strike a surface through a simulation of crater impacts.

Nudging with Nukes? QUEST

<http://www.kqed.org/quest/television/web-extra-asteroid-hunters>

This video segment focuses on the theories of David Dearborn of Lawrence Livermore National Laboratory about how nuclear explosives could be used to effectively nudge an asteroid into a new orbit that causes it to miss Earth entirely.

Comets, Asteroids, and Meteors Science Friday

<http://www.sciencefriday.com/topics/c020300/>

A collection of past Science Friday conversations on comets, asteroids, and meteors.

The Asteroid That Hit L.A. NOVA: Science NOW

<http://www.pbs.org/wgbh/nova/sciencenow/3313/01-aste-flash.html>

A catastrophe calculator lets you try some "what if" scenarios.

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www.ebparks.org

Exploratorium
www.exploratorium.edu

Girl Scouts of Northern California
www.girlscoutsbayarea.org

Golden Gate National Parks Conservancy
www.parksconservancy.org

The J. David Gladstone Institutes
www.gladstone.ucsf.edu

Lawrence Berkeley National Laboratory
www.lbl.gov

Lawrence Hall of Science
www.lawrencehallofscience.org

Monterey Bay Aquarium
www.mbayaq.org

Monterey Bay Aquarium Research Institute
www.mbari.org

Oakland Zoo
www.oaklandzoo.org

The Tech Museum of Innovation
www.thetech.org

UC Berkeley Natural History Museums
<http://bnhm.berkeley.edu/>

U.S. Geological Survey
www.usgs.gov

MORE EDUCATIONAL RESOURCES FOR USING QUEST MULTIMEDIA TO ENHANCE 21st CENTURY SKILLS IN TEACHING AND LEARNING

Why Use Media in Science Education?

www.kqed.org/quest/downloads/QUEST_Why_Media_08-09.pdf

- “As science educators, we know how important critical thinking and new technology skills are in the scientific community...” ([read more](#)).

Science Multimedia Analysis

www.kqed.org/quest/downloads/QUEST_Science_Multimedia_Analysis_08-09.pdf

- “By increasing students’ awareness of the intersections between media and science, we give them the tools to think like scientists...” ([read more](#)).

How to Use Science Media for Teaching and Learning

http://www.kqed.org/quest/downloads/QUEST_Media_Tips_08-09.pdf

- If we consider all forms of media “texts” from which students gather information, we can use similar literacy strategies to engage them in video, audio, blogs and Explorations. Once students have obtained information from multiple media sources, how do they share what they have learned? Through their own media-creation projects, of course!

Using Google Maps to Create Explorations

http://www.kqed.org/quest/files/download/52/QUEST_ExplorationCreation.pdf

- Do you like the science hike Explorations on the **QUEST** site? Use this place-based educational guide for educators and group leaders to create similar science-based maps with youth.

OTHER WAYS TO PARTICIPATE IN QUEST



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www.kqed.org/quest



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**KQED 88.5 FM San Francisco &
89.3 FM Sacramento
Mondays at 6:30am and 8:30am**



WATCH

**KQED Channel 9
Tuesdays at 7:30pm**

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