



Assignment Discovery Lesson Plan Dangerous Earth

Subject

Earth Science

Grade level

6-8

Duration

Two class periods

Objectives

Students will

- discuss the experience of the Kobe earthquake described in the video;
- review personal accounts, photographs, and newspaper reports about an historic or recent earthquake; and
- create a piece of artwork or writing to portray the experience of that earthquake.

Materials

- Computer with Internet access
- Print resources about earthquakes
- Markers, glue, poster board, paint, and other art materials
- Color printer for printing Web research images (optional)

Procedures

1. The video uses photographs, video, and scientific and personal accounts to describe the Kobe earthquake of 1995. As a class, brainstorm words, images, and quotes to describe the destruction and experience of this earthquake. Possible answers include: I thought I was going to die, terrifying, flames, state of chaos, expressway fallen on its side, tracks twisted like spaghetti, buildings toppled over, people trapped in homes, horrifying experience.
2. Tell the class that they are going to work in small groups to research an historic or recent earthquake. By finding personal accounts, photographs, and newspaper reports, they will get a close-up picture of what it was like to live through that earthquake and its aftermath. Assign groups to one of these quakes:
 - San Francisco, California (1906)

- Loma Prieta, California (1989)
- Hebgen Lake, Montana (1959)
- Owens Valley, California (1872)
- New Madrid, MO (1811-1812)
- Lisbon, Portugal (1755)

3. Refer students to the relevant Web sites below. These sites include basic information about the earthquake, as well as photographs, newspaper articles, and personal accounts. (The groups may choose to assign a site to each member.) As students conduct their research, encourage them to write down the most vivid quotes from personal accounts or newspaper articles and print out (or describe in writing) the most dramatic photographs or drawings. Give students at least one class period (and perhaps an evening homework assignment) to review these sites, and one class period to share their research with the rest of the group.

San Francisco, California (1906)

- <http://www.sfmuseum.org/1906/06.html>
- http://neic.usgs.gov/neis/eqlists/USA/1906_04_18.html
http://www.exploratorium.edu/faultline/1906/1906_2.html
- <http://www.crustal.ucsb.edu/ics/understanding/accounts/london.html>
- <http://www.notfrisco.com/calmem/earthquake/1906.html>

Loma Prieta, California (1989)

- http://www.exploratorium.edu/faultline/loma_prieta/index.html
- <http://geology.about.com/library/weekly/aa101799.htm>
- <http://www.sfgate.com/cgi-bin/article.cgi?file=/chronicle/archive/1999/10/12/MN41QUA.DTL>
- <http://www.notfrisco.com/calmem/earthquake/lomaprieta.html>

Hebgen Lake, Montana (1959)

- http://www.seis.utah.edu/NEHRP_HTM/1959hebg/1959he1.htm
- http://neic.usgs.gov/neis/eqlists/USA/1959_08_18.html

Owens Valley, California (1872)

- <http://www.crustal.ucsb.edu/ics/understanding/accounts/muir.html>
- http://neic.usgs.gov/neis/eqlists/USA/1872_03_26.html

New Madrid, MO (1811-1812)

- <http://hsv.com/genlintr/newmadr/index.htm>
- http://www.eas.slu.edu/Earthquake_Center/SEISMICITY/Nuttli.1973/nuttli-73-app.html
- <http://wwwneic.cr.usgs.gov/neis/eqlists/USA/1811-1812.html>

Lisbon, Portugal (1755)

- <http://geology.about.com/library/bl/bllisbon1755eq.htm>
- <http://www.fordham.edu/halsall/mod/1755lisbonquake.html>

4. After students have shared their research within their groups, ask them to think about the most striking or memorable story, image, quote, or fact about that earthquake. What do they think it was like to live through that earthquake or experience the destruction it caused? Explain that their final assignment is to work individually to create a piece of artwork or writing that portrays the experience of the earthquake they studied. Students might write a poem or an imaginary first-person journal, paint a picture, or create a collage. They may want to focus on that one, striking story, image, or quote from their research. Encourage students to title their work, and include the earthquake's location and date.
5. Have students display their work in a classroom Earthquake Exhibit.

Extensions

- Why did dinosaurs become extinct? As a class, discuss the theories proposed in the video. What evidence is given to support each? Have students research and present existing theories about dinosaur extinction, such as: an asteroid impact, a volcanic eruption, disease, or gradual changes in the earth's climate. These sites provide a good starting point.
 - Earth Science Explorer: Dinosaur Floor
<http://www.cotf.edu/ete/modules/mse/dinosaur.html>
 - Britannica's Discovering Dinosaurs: Where Did Everybody Go?
<http://search.eb.com/dinosaurs/dinosaurs/study/act03.htm>
 - DinoBuzz: What Killed the Dinosaurs?
<http://www.ucmp.berkeley.edu/diapsids/extincttheory.html>
- Divide the class into groups and have each one create a travel brochure with facts, pictures, and maps of one of the places featured in the video: Antelope Canyon, Red Rock Canyon, San Juan River Canyon, Grand Coulee Canyon, Dry Falls, Basalt Cliffs, and Walla Walla Valley. Student brochures should discuss how and when the canyon, cliff, or valley was formed.
- Create a classroom "Truth About Tsunamis" game. To begin, have each student create two "game cards" with a true/false statement on the front and the answer on the back. (If the answer is false, they should also write the correct answer on the back.) For example: "A tsunami can travel 500 miles an hour." (true); "In Japanese, tsunami means 'tidal wave.'" (False: it means "great harbor wave"). Yahoo!igans has a great collection of tsunami sites at:
http://www.yahooigans.com/Science_and_Nature/The_Earth/Geology/Tsunamis/

Evaluation

Use the following three-point rubric to evaluate students' work during this lesson.

3 points: Students were highly engaged in class discussions; shared with their group several relevant, striking images or quotes from their research; created a thoughtful, engaging piece of art or writing clearly based on their group's findings.

2 points: Students participated in class discussions; shared with their group a few relevant, striking images or quotes from their research; created a satisfactory piece of art or writing loosely based on their group's findings.

1 point: Students participated minimally in class discussions; did not share any images or quotes from their research with their group; created a simplistic piece of art or writing with no connections to their group's findings.

Vocabulary aftershock

Definition: A minor earthquake following a larger one that occurs at or near the same place

Context: There can be many aftershocks felt after a major earthquake.

earthquake

Definition: A shaking or trembling of Earth that is volcanic or tectonic in nature

Context: The 1995 Kobe earthquake was Japan's most deadly quake since 1923, when an earthquake in Tokyo killed 140,000 people.

epicenter

Definition: The part of Earth's surface directly above the focus of an earthquake

Context: The epicenter of the 1995 Kobe earthquake was in a narrow straight between the city of Kobe and Awaji Island.

Richter scale

Definition: A scale for measuring the magnitude of an earthquake; for example, 1.5 indicates the smallest disturbance that can be felt, 4.5 indicates a disturbance that can causes slight damage, and 8.5 indicates a very devastating disturbance.

Context: The 1995 Kobe earthquake measured 6.9 on the Richter scale.

Academic Standards

This lesson plan addresses the following science education standards created by the National Academy of Sciences:

- Earth and Space Science: Structure of the Earth System
- Science in Personal and Social Perspectives: Natural hazards

Credit

Joy Brewster, curriculum writer, editor, and consultant