

Instructional Recipe

How Do Earthquakes Affect the Surface of the Earth?

Third Grade, Science, Social Studies, & Language Arts

Step 1 – Ask

Objectives: Students will locate, analyze, and describe where earthquakes most commonly occur. Students will analyze and describe how earthquakes change the surface of the earth and affect people.

Introduction: View the natural hazards (earthquake) interactive map from the National Geophysic Data Center <http://map.ngdc.noaa.gov/website/seg/hazards/viewer.htm> and/or Britannica's "earthquake: global seismic centres." Online Map/Still. Encyclopædia Britannica Online School Edition. 6 Aug. 2008. <<http://school.eb.com/elementary/art-72282>>. Ask students to make observations about where earthquakes often occur. Discuss what students already know about earthquakes.



"earthquake: Japan." Online Photograph. Encyclopædia Britannica Online School Edition. 5 Aug. 2008 <<http://school.eb.com/elementary/art-88603>>.

Ask:

- ★ What is an earthquake?
- ★ How do earthquakes affect the surface of the earth?
- ★ Where are earthquakes most common?
- ★ How are earthquakes measured?

Vocabulary:

- ★ natural hazard
- ★ earthquake
- ★ Richter scale
- ★ fault

Science TEKS:

(3.6) **Science concepts.** (B) identify that the surface of the Earth can be changed by forces such as earthquakes and glaciers.

Social Studies TEKS:

(3.4) **Geography.** (A) describe and explain variations in the physical environment including climate, landforms, natural resources, and natural hazards.

(3.5) **Geography.** (D) Draw maps of places and regions that contain map elements including a title, compass rose, legend, scale, and grid system.

English/Language Arts TEKS:

(25) **Research/Research Plan.** Students ask open-ended research questions and develop a plan for answering them. Students are expected to: (A) generate research topics from personal interests or by brainstorming with others, narrow to one topic, and formulate open-ended questions about the major research topic;

(26) **Research/Gathering Sources.** Students determine, locate, and explore the full range of relevant sources addressing a research question and systematically record the information they gather. Students are expected to: (A) follow the research plan to collect information from multiple sources of information, both oral and written, including: (ii) data from experts, reference texts, and online searches; and (iii) visual sources of information (e.g., maps, timelines, graphs) where appropriate; (C) take simple notes and sort evidence into provided categories or an organizer; (D) identify the author, title, publisher, and publication year of sources; and (E) differentiate between paraphrasing and plagiarism and identify the importance of citing valid and reliable sources.

Technology Application TEKS:

(4) Information acquisition.

(A) apply appropriate electronic search strategies in the acquisition of information including keyword and Boolean search strategies.

(5) **Information acquisition.** The student acquires electronic information in a variety of formats, with appropriate supervision.

(A) acquire information including text, audio, video, and graphics.

7A Use software programs with audio, video, and graphics to enhance learning experiences

7B Use appropriate software to express ideas and solve problems including the use of word processing, graphics, databases, spreadsheets, simulations, and multimedia

7C Use a variety of data types including text, graphics, digital audio, and video

Step 2 – Investigate

K-12 Databases Resources:

Britannica

- ★ "earthquake." Britannica Elementary Encyclopedia. 2008. Encyclopædia Britannica Online School Edition. 6 Aug. 2008
<<http://school.eb.com/elementary/article?articleId=353075>>.

Searchasaurus

- ★ [After the Earthquake](#). Time for Kids, 11/18/2005, Vol. 11 Issue 11, p3-3, 0p, 1 color; Reading Level (Lexile): **540**; (AN 19033972)
- ★ [Quake Rocks Japan](#). Scholastic News -- Edition 3, 10/20/2003, Vol. 60 Issue 6, p3-3, 1/2p, 1c; Reading Level (Lexile): **690**; (AN 11136469)
- ★ [The Power of Earthquakes](#). By: Greenberg, Glenn. *Scholastic News -- Edition 3*, 11/9/2009, Vol. 66 Issue 7, p2-2, 3/4p; Reading Level (Lexile): 960; (AN 50795981)

Additional Websites:

Earthquake for Kids- <http://earthquake.usgs.gov/learning/kids/>

USGS- <http://pubs.usgs.gov/gip/earthq1/>

FEMA- Earthquakes- <http://www.fema.gov/kids/quake.htm>

National Geographic- Forces of Nature-

<http://www.nationalgeographic.com/forcesofnature/interactive/index.html?section=e>

Books: *Earthquakes* by Franklyn Branley
Earthquakes by Ellen Prager
Earthquakes by Seymour Simon



Step 3 – Create

Students will create a K-W-L chart to take notes on what they know, what they want to learn, and what they find out about earthquakes. They will cite the sources of new information.

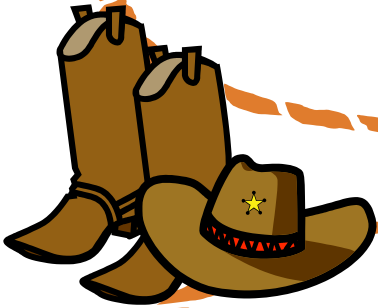
What do I know about earthquakes and how they affect the surface of the Earth?	What do I want to know about earthquakes?	What did I learn about earthquakes?	Source of new information (citation)

Step 4 – Discuss

Earthquake Poster

- ★ Map- Students will choose a region of the world and create an outline map showing where earthquakes frequently occur in that region. On the map they will label earthquake zones and cities/towns with large populations. Students will create a key to explain their map.
- ★ Five Facts- Students will write at least five fascinating facts about earthquakes Those facts will be included on the poster. The facts should answer the leading question, “How do earthquakes affect the surface of the earth?”
- ★ Presentation- Students will present their posters to the class showcasing the geographic area they chose to depict as well as the facts about earthquakes they found most interesting.

🔗 Technology Link – Students may use a multimedia program, such as PowerPoint, to show what they learned about earthquakes.



Step 5 – Reflect

Allow students to present their projects to the rest of the class. Use the following suggested rubric to assess the students' work. Make sure that the students are familiar with the rubric *before* they begin creating their project. They should refer to the rubric repeatedly to monitor their progress in creating their project.

🔗 Technology Link: You can also create your own rubric with your students at <http://rubistar.4teachers.org/index.php>.

Rubric- Map/Poster- Earthquakes

CATEGORY	4	3	2	1
Map- Title	Title tells the purpose/content of the map, is clearly distinguishable as the title (e.g. larger letters, underlined, etc), and is printed at the top of the map.	Title tells the purpose/content of the map and is printed at the top of the map.	Title tells the purpose/content of the map, but is not located at the top of the map.	Purpose/content of the map is not clear from the title.
Map Labels - Accuracy	At least 90% of the items are labeled and located correctly.	80-89% of the items are labeled and located correctly.	79-70% of the items are labeled and located correctly.	Less than 70% of the items are labeled and located correctly.
Map Legend/Key	Legend is easy-to-find and contains a complete set of symbols, including a compass rose.	Legend contains a complete set of symbols, including a compass rose.	Legend contains a set of symbols that is almost complete, including a compass rose.	Legend is absent or lacks several symbols.
Poster Required Elements	The poster includes all required elements as well as additional information.	All required elements are included on the poster.	All but 1 of the required elements are included on the poster.	Several required elements are missing.
Poster Title	Title describes content well, can be read from 6 ft. away and is quite creative.	Title can be read from 6 ft. away and describes content well.	Title can be read from 4 ft. away and describes the content well.	The title is too small and/or does not describe the content of the poster well.
Mechanics	Capitalization and punctuation are correct throughout the poster.	There is 1 error in capitalization or punctuation.	There are 2 errors in capitalization or punctuation.	There are more than 2 errors in capitalization or punctuation.
Grammar	There are no grammatical mistakes on the poster.	There is 1 grammatical mistake on the poster.	There are 2 grammatical mistakes on the poster.	There are more than 2 grammatical mistakes on the poster.
Attractiveness	The poster is exceptionally attractive in terms of design, layout, and neatness.	The poster is attractive in terms of design, layout and neatness.	The poster is acceptably attractive though it may be a bit messy.	The poster is distractingly messy or very poorly designed. It is not attractive.