

Geology and Earthquakes in Japan Worksheet

Objective: Investigate the geologic conditions that make Japan a frequent location for large-magnitude earthquakes.

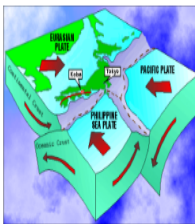
Materials: Work in pairs sharing one computer with Internet access.

Engage: Take a moment to think about what you already know about Japan.

1. Where is it located?
2. What do you know about the geology of Japan?
3. Have you heard of earthquakes in the Japan area?

Explore: Navigate to the Earthquakes Living Lab at <http://www.teachengineering.org/livinglabs/earthquakes/>.

4. Notice the four main focus regions in the Earthquakes Living Lab, each based on one of four historic earthquakes. For this activity, select the third option, the “Japan” box. Then follow the link on the right side of the page: “Why did the earthquake happen at Kobe? What were the short- and long-term effects of the earthquake?”



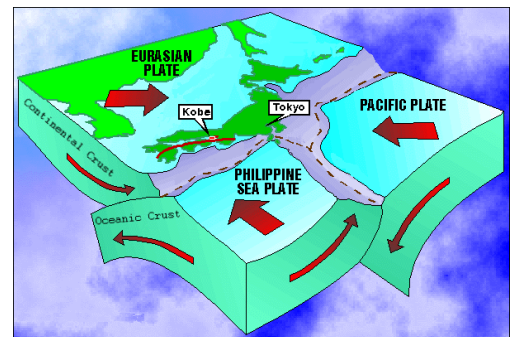
Why did the earthquake happen at Kobe? What were the short- and long-term effects of the earthquake?

[Click to learn!](#)

5. Read the screen information about “Why did the earthquake happen here?”

Explain: Record the following information in your journal:

6. Draw a labeled sketch of the plate tectonics present in the Kobe region. Include the name of the fault, crusts and plates. Make the sketch large enough to add additional information to it later in the activity.



Name: _____ Date: _____ Class: _____

7. Describe the motion of each tectonic plate relative to the other plates. (Hint: Look at the arrows.)
8. Plot the epicenter of the Kobe earthquake on your sketch. (Hint: Look for the red line.)

Elaborate: Read through the given information provide answers to the following items.

9. Identify which two plates likely caused the 1995 Kobe earthquake.
10. Consider the movement of all three plates in the region. Identify two other potential locations that similar earthquakes might occur (or may have occurred in the past).
11. Describe the short-term and long-term effects of the earthquake.

Evaluate: Another significant earthquake occurred in this same region in 2011. Complete some quick research to find out the location of the epicenter of the 2011 Sendai earthquake near Japan. Start with this link http://en.wikipedia.org/wiki/2011_T%C5%8Dhoku_earthquake_and_tsunami or do your own search.

12. Was the epicenter associated with any tectonic plates?
13. Was this earthquake associated with a fault or trench?
14. Were the “experts” surprised by the location of the Sendai earthquake, the size of the Sendai earthquake or both? Answer the question using specific information from this article written by Devin Powell, originally published in *Science News* on March 17, 2011 at: <http://www.wired.com/wiredscience/2011/03/japan-earthquake-surprise/>

Name: _____ Date: _____ Class: _____

15. How does predicting where earthquakes might occur relate to engineering? For what instances in the 1995 earthquake could the engineering have been improved?

Extra Exploration:

16. Let's see how many earthquakes occurred this week near Japan and what magnitudes they were.

Make a sketch of the locations and magnitudes of earthquakes for the last seven days in the Japan region. Use the following link to get current earthquake data near Japan and anywhere in the world (you may have to zoom in on the Japan area to get details):

<http://earthquake.usgs.gov/earthquakes/map/>

Congratulations—you have completed this activity! This is only a small part of all there is to know about earthquakes, and researchers are learning new things all the time. Feel free to come back to this resource to keep learning as often as you like.