ELEMENTARY

Seismic events: natural hazards or natural disasters?

Target audience – Grade 4 **Time required – 15 minutes**

Activity	This activity explores seismic natural hazards and at what point they become natural disasters.
Standards	**NGS: ESS3.B.** A variety of hazards result from natural processes. Humans cannot eliminate the hazards but can take steps to reduce their impacts. **NGS: ESS2-2.** Analyze and interpret data to make sense of phenomena using logical reasoning.
Learning Outcomes	• Students will be able to distinguish between a natural hazard and a natural disaster. • Students will be able to make connections between seismic disturbances and tsunami occurrences.

Map URL: http://esriurl.com/fourGeoInquiry13

Engage

What is a natural hazard?

→ Open the map URL link above.

– Natural hazards are extreme, naturally occurring events caused by weather, climate, or earth processes. There are many types of natural hazards, but you will examine earthquakes, volcanoes, and tsunamis in this activity.

→ Pan (click and drag) the map so that you are centered on where you live.

→ Click the plus button to zoom in to the volcano nearest to where you live on the map.

? How far away is the volcano to where you live? Estimate the distance using the scale bar at the bottom left of the map, *[Students will have varying estimates but should begin to think about volcano locations relative to where they live.]*

Explore

What about earthquakes?

→ Click the Home button (on the map) to zoom out to the entire map.

→ In the Details pane, click the button, Show Contents Of Map.

→ Click the checkbox to the left of the layer name, Earthquakes 30 Days.

→ Pan and zoom your map until you are again centered on where you live.

? Estimate how far the nearest earthquakes are to you. *[Answers will vary, although only 30 days of earthquakes are shown, whereas the volcanoes shown represent all known locations on the planet.]*

? Have you felt an earthquake? *[Answers will vary.]*

? What are the similarities between where earthquakes and volcanoes are located? *[Earthquakes and volcanoes typically fall along plate boundaries.]*

more ▶

Explain

What do tsunamis have to do with it?

– Tsunamis are large ocean waves caused by large movements under the ocean. There are buoys that include detection devices to provide a warning when there has been a disturbance at the bottom of the ocean.

→ Click the Home button to zoom out to the entire map.

→ Turn on the U.S. Tsunami Warning Buoys layer.

? What do you notice as to the placement of the U.S. tsunami warning buoys? *[The buoys are placed in areas where there is a greater chance for major disturbance of the ocean floor.]*

Elaborate

So, what is a natural disaster?

→ Click Bookmarks and select Hawaiian Islands.

? What do you notice about the Hawaiian Islands? *[There were several earthquakes in that 30-day period, seven volcanoes, and also one tsunami buoy off the shore of the Big Island of Hawaii.]*

→ Click Bookmarks and select Hawaii Tsunami 1946.

→ Click the large tsunami wave marker and read the text about the tsunami wave.

→ To expand the legend, click on the layer name, 1946 Tsunami Wave Heights. Notice tsunami heights.

– When a natural hazard negatively affects humans and where they live, it is a natural disaster.

IDENTIFY A MAP FEATURE

- Click any feature on the map, and a pop-up window will open with information.
- Links and images in the window are often clickable.
- An arrow icon in the upper-right of the window indicates that multiple features have been selected. Click the button to scroll through the features.

ZOOM TO A BOOKMARK

- Click the button, Bookmarks.
- Select a bookmark name to zoom to its map location and scale.

Next Steps

DID YOU KNOW? ArcGIS Online is a mapping platform freely available to U.S. public, private, and home schools as a part of the White House ConnectED Initiative. A school subscription provides additional security, privacy, and content features. Learn more about ArcGIS Online and how to get a school subscription at http://connected.esri.com.

THEN TRY THIS...

• Explore the Esri UK story map, *Boxing Day 2004 Tsunami: Then and Now*, at http://esriurl.com/Geo532.

TEXT REFERENCES

This GIS map has been cross-referenced to material in sections of chapters from these texts

- *Exploring Science by Cengage/National Geographic — Earth Science Chapter*
- *Inspire Science by McGraw-Hill Education — Natural Hazards Module*
- *Science by Harcourt — Unit 3*

Version Q2 2016. Send feedback: http://esriurl.com/GeoInquiryFeedback