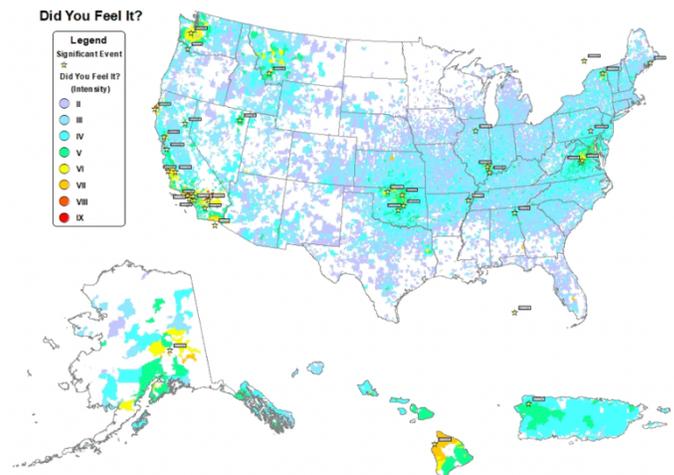


Did You Feel It?

Crowd-sourcing earthquake impacts

Did You Feel It (DYFI) is a collaborative on-line program hosted by the United States Geological Survey (USGS) that collects information from people who felt an earthquake. Reported experiences of shaking and damage are compiled on maps, helping to visualize the unique effects of earthquake ground motion across a broad area within a short period of time. In this activity, learners can report an earthquake event, and/or browse data reported by others to better understand earthquake intensity.



Essential Questions:

- What does shaking feel like?
- How is the severity of an earthquake measured?

Essential Understanding:

- The fundamental controls on earthquake shaking at a given location are the magnitude of the event, and the distance from the epicenter and depth to the hypocenter
- Earthquake intensity may vary with geologic factors such as the type of soil or rock, resonance, and topographic effects

Goals

Learners will:

- Understand how earthquake intensity data is gathered for the Modified Mercalli Index
- Identify the DYFI portal as a place to contribute information about experienced earthquakes
- Articulate the importance intensity data for describing the severity of an earthquake event

Various contexts for using Did You Feel It with learners

- To participate in community science by reporting an earthquake as a class
- To demonstrate how partnerships work to increase scientific understanding of seismic events
- To describe the Modified Mercalli Intensity Scale
- To better understand how tools such as ShakeMaps are made

Materials

- **Computer**
- **Did You Feel It portal**
<https://earthquake.usgs.gov/data/dyfi/>

NGSS Science Standards

- **MS-ESS2-2** Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales
- **MS-ESS3-2** Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects
- **HS-ESS3-1** Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity

Teacher Background & Instructions

Background

The severity of an earthquake can be described using two different scales: *magnitude* and *intensity*. Magnitude is a quantitative measure of the amount of energy released in the earthquake, and is measured using the **Moment Magnitude** scale. In contrast, intensity is a measure of the impact of the earthquake, in terms of shaking and destruction caused. In general, the intensity decreases with increasing distance from the earthquake. However, a variety of factors, such as the type of earthquake, rupture direction, local geography, soil conditions, and type and age of buildings, result in an often-complicated pattern of varying intensities from place to place.

One way to measure the pattern of shaking during an earthquake uses the **Modified Mercalli intensity (MMI)** scale. This qualitative scale is based on anecdotal descriptions of how strong the shaking is, such as “objects swing,” “dishes rattle” or “heavy furniture overturns.” Since 1931, the USGS has collected citizen reports of the observed shaking and damage during an earthquake, using a postal questionnaire. Now such descriptions about earthquake effects are mostly collected through the online Did You Feel It report form. Data for the MMI scale is often plotted spatially, in a ShakeMap, depicting the geographic distributions of reports of shaking and damage. Gathering citizen reports online results in ShakeMaps being produced more quickly.

Read more about Moment Magnitude and the MMI Scale in this USGS article:

<https://www.usgs.gov/faqs/moment-magnitude-richter-scale-what-are-different-magnitude-scales-and-why-are-there-so-many>

Read more about the ShakeMap program:

<https://earthquake.usgs.gov/data/shakemap/>

How is the DYFI data used?

Reports help the USGS:

- Quickly and cost-effectively gather immediate, high quality and large quantity of data
- Constrain instrumental data used for ShakeMap and PAGER
- Obtain data in areas where there are no seismic instruments
- Obtain data for smaller earthquakes that we cannot normally record

Reports help emergency responders:

- Obtain a rapid assessment of the extent of shaking and damage

Reports help the general public:

- Learn the difference between magnitude and intensity
- Feel more in control of their experience
- Confirm and share experiences with others
- Contribute to the advancement of earthquake science

Instructional Sequence

Step 1: Engage learners with the context in which you are presenting Did You Feel It (see page 1). For example, if you experience a mild earthquake in class, after you Drop – Cover – Hold, you could review as a class what you noticed during the event and submit a report immediately. Alternatively, during a unit on plate tectonics, you could introduce DYFI while you are discussing the difference between magnitude and intensity, or explaining how ShakeMaps are made.

Step 2: Go to Did You Feel It:

<https://earthquake.usgs.gov/data/dyfi/> If you are reporting an earthquake, select *Report it Here - Tell Us!* First, scan through the list of known earthquakes within the past 24 hours to see if the earthquake has already been identified. If you don't see the earthquake you felt, there is also a green button to report an unknown event. Once you select a given earthquake event, a short list of easy to answer questions appears.

If not reporting an earthquake, you can take a tour of the website. Click on *Summary Maps* to view a map depicting the reports for the entire year, which gives you a great perspective on the patterns of seismicity, which can be related to plate boundaries. From the *Summary Maps* page, there is a link to the *Did You Feel It Annual Data Viewer*, with which you can look at cumulative annual reports of shaking back to the year 1991.

Suggested Follow-up Activities

Learn more about local site effects and impacts of earthquake shaking in *Engaging With Earthquake Hazard and Risk*
https://serc.carleton.edu/ANGLE/educational_materials/activities/245160.html

Learn more about how shaking is measured in *Reading an Earthquake Seismogram*
https://serc.carleton.edu/ANGLE/educational_materials/activities/245164.html