



# Earthquake Safety

grade level: 5<sup>th</sup> - 8<sup>th</sup> grade | time needed: 90-120 minutes



## Lesson Objectives:

Students will compare fault lines and earthquake incidents, and identify factors that influence earthquake safety.

## Materials:

### Provided:

Laminated diagrams of faults

Map of Oregon with major faults labeled

## Curriculum Benchmarks:

5.4D.2 Design a proposed engineering solution

6.4D.1 Define a problem that addresses a need and identify scientific principles that may be related to solutions

7.2E.4 Explain how landforms change over time.

8.2E.2 Describe the process of Earth's geosphere and resulting major geologic events.

## Activity:

1. Have students as a group come up with a list of facts they know about earthquakes.
2. Go over types of faults with students (using hand gestures helps a lot), and the fault lines found around Oregon.
3. Have students go to the site [http://earthquake.usgs.gov/earthquakes/world/seismicity\\_maps/](http://earthquake.usgs.gov/earthquakes/world/seismicity_maps/) and look at where earthquakes around the world are found compared to where plate boundaries are found. Are there any similarities? Places where it isn't the same? Why might this be?
4. Next have students go to the site <http://earthquake.usgs.gov/earthquakes/map/>, set the settings to the last 30 days and all earthquakes, and zoom into Oregon. Have student teams pick an earthquake, and find out when the earthquake happened, what the magnitude was, where it occurred (the epicenter) and how deep it was.
5. Next, have students research historical earthquakes in Oregon. This can be done very easily by searching "Oregon earthquakes" into a search engine. Afterwards, have a discussion about earthquakes in Oregon. Possible discussion questions are:
  - Are you surprised by how many earthquakes there are in Oregon?
  - Where do the most earthquakes seem to occur?
  - Where there any historical earthquakes that you had heard of before?
  - What makes an earthquake dangerous?
6. Next, go over earthquake safety, and take a walk around the block.

**Extensions**

Have students design a house that would protect them in an earthquake. What kinds of materials would they use, and what part of the valley would they try and build it in?

**Assessment:**

Have students do a scavenger hunt for buildings that might be safe based on building material, design, and placement in the landscape. See checklist on the following page. Have students discuss why earthquake safe building is important for living in southern Oregon. What can they do to keep their homes and families safe?





# NOTES

## **Background information:**

Earthquakes are a shaking of the ground caused when the boundary between two tectonic plates, called a fault, get hung up on each other and pressure builds. The crust of the earth is made up of pieces that fracture and float and these pieces are called tectonic plates. When the pressure is finally released, the movement is ragged, and an earthquake results. There are three types of faults:

1. Normal fault: two plates pulling apart. Vertical direction.
2. Reverse fault: two plates pushing together. Vertical direction.
3. Strike-slip fault: two faults moving past each other. Horizontal direction.

The most important of the faults around Oregon is the Cascadia subduction zone, a reverse fault, off the Pacific coast. A subduction zone is when one plate is being pushed underneath another plate. The Cascadia subduction zone is where the Juan de Fuca, Explorer, Gorda, and North American plates converge together. This means that there are a lot of different fault lines going on in different directions.

For earthquake safety, things to consider are building material, flexibility, soil type, unattached, or flimsily attached items. The more flex a building has, the more likely it is to survive an earthquake without serious damage. Masonry (bricks or concrete) that doesn't have rebar in them to provide support and flexibility are especially dangerous. Soil type can also be very dangerous- if the soil is loose and saturated with water, it can suddenly behave more like a liquid than a solid- not a good thing if a house is built on it.