



# Earthquake Quakes

Earthscience Tech-lesson Guide Lite

ED F694  
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## Earthquake

Alaska is not new to earthquakes; therefore residents of Alaska may pay little attention to earthquakes. One earthquake recently hit Fairbanks, and the magnitude of the earthquake can be read about here: [http://www.newsminer.com/news/local\\_news/earthquake-felt-over-much-of-interior-southcentral-alaska/article\\_9b8861ae-c5b2-11e3-818a-001a4bcf6878.html](http://www.newsminer.com/news/local_news/earthquake-felt-over-much-of-interior-southcentral-alaska/article_9b8861ae-c5b2-11e3-818a-001a4bcf6878.html)

However, one of the largest and most violent earthquakes ever recorded in North America hit Alaska on March 27, 1964. The moment magnitude (M<sub>w</sub>) of 9.2 was recorded for this tremendous earthquake that left 128 people dead. Footage of this earthquake can be viewed at: <https://www.youtube.com/watch?v=G6uPvzl-Hgg>

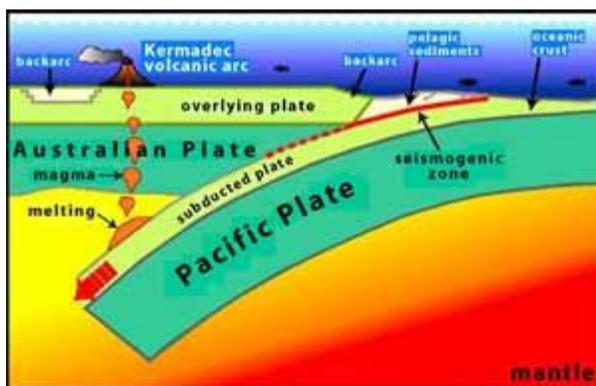
What is an Earthquake? An earthquake is ground shaking caused by the sudden and rapid movement of one block of rock slipping past another along fractures in Earth's crust called faults.

The 1964 Alaska Earthquake classification is a megathrust/subduction zone earthquake.

## Subduction zones

Subduction zones form when a continental plate is colliding with an oceanic plate. Subduction zones also form when two oceanic plates collide. The continental crust is lighter because of quartz and feldspar minerals in granite. Iron and magnesium are much heavier minerals found in the ocean floor basalt.

When the two plates meet the oceanic crustal plate always subducts beneath the continental plate. The subducting oceanic plate bends and plunges beneath the lighter continental plate until it melts. When two oceanic plates meet and form a subduction zone the heavier and denser of two oceanic plates subducts.



## Earthquake Fault Block Earthquake Activities

### Objective:

In this earthquake activity, students will experience a simulated Oceanic-Continental Convergence with the subduction of the oceanic plate beneath the continental plate. Students will gain knowledge about subduction.



### Materials:

- 7 x 8 x 2 inch Styrofoam block
- Paint (blue, green, grey, and brown)
- Paint brush
- Sharp knife (adult helper needed)

### Engage:

Have students cut the Styrofoam block at an angle the length of the block with a sharp kitchen knife.

Rub the two cut edges together to break off the rough edges and smooth the cut surfaces.

Paint the Styrofoam pieces like the picture. The green, grey and brown side represents a continental plate. The blue and brown side represents an oceanic plate.

1. After the blocks are dried hold the plates together while pushing the oceanic plate beneath the continental plate.
2. A loud noise should be heard with the sudden downward movement of the oceanic plate.

**Explain:**

Megathrust earthquakes that occur in subduction zones are often hundreds of miles long. The ocean floor often slips downward and sideways during one of these events.

On December 26, 2004, a megathrust earthquake occurred when rocks broke along a fault line in the Indian Ocean approximately 994 miles long. The entire length of the break and the seafloor lifted several feet creating tsunami waves and vibrations recorded around the entire Earth by seismographs for an entire week after the event. To learn more about the megathrust earthquake that took place on December 26, 2004, visit this link at: <http://www.geologie.ens.fr/~vigny/aceh-e.html>

To learn more about the causes of Megathrust Earthquakes, watch the Youtube video segment, 1964 Quake: The Great Alaska Earthquake, which can be viewed at: <https://www.youtube.com/watch?v=IE2j10xyOgI>

**Extend:**

To learn more about earthquake terms, concepts, visit this link:

<http://earthquake.usgs.gov/learn/animations/>

To learn more about various faults, P-S Waves and Surface waves, visit this link:

<http://www.pbs.org/wnet/savageearth/earthquakes/index.html>

To learn more about locating an epicenter, visit this link at:

<http://www.sciencecourseware.com/virtualearthquake/vquakeexecute.html>

To learn more about the tectonic setting in Alaska and how this setting causes earthquakes in Alaska, view this link at: <http://www.aeic.alaska.edu/vltpage2.html>