

# Introduction to Plate Tectonics

## Lesson Plan

**Grade Level:** 6–8

**Curriculum Focus:** Plate Tectonics

**Lesson Duration:** Three class periods

### *Student Objectives*

- Understand plate tectonics and the effects shifting plates have on the Earth.
- Understand the different types of plate boundaries.
- Map major earthquake epicenters and locations of different types of volcanoes.
- Connect different types of plate boundaries to specific earthquake epicenters and volcanoes on their map.

### *Materials*

- Discovery School video on *unitedstreaming: Greatest Discoveries With Bill Nye: Earth Science*. Search for this video by using the video title (or a portion of it) as the keyword.

Selected clips that support this lesson plan:

- Continental Drift
  - The Sea Floor Is Spreading
  - Plate Tectonics
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- Print materials with information on plate tectonics
  - Computer with Internet access
  - World map outlines with no place-name labels, 1 per student
  - Pencils and erasers
  - Markers, colored pencils, or crayons

### *Procedures*

1. Discover the concept of plate tectonics and how shifting plates affect our planet. Introduce this topic by showing clips from *Greatest Discoveries With Bill Nye: Earth Science*. Review examples of shifting plate boundaries. What is taking place at the Mid-Atlantic Ridge? What are the types of plate boundaries? Discuss convergent boundaries, divergent boundaries, transform

boundaries, and plate boundary zones. What kinds of Earth changes occur at each type of plate boundary?

2. Give students outline maps of the world and tell them to show areas of seismic activity and active volcanoes. Each finished map must have at least six volcanoes and ten recent or historically important earthquakes from sites from all over the world. Have students create a key, using colored symbols to indicate volcanoes and a scale of seismic magnitude. Students must label the continents, too.
3. Allow students to use the Internet to complete their maps. The following Web sites have information on seismic activity and volcano locations:
  - The Virtual Times: Recent Earthquakes & Active Volcanoes  
<http://www.hsv.com/scitech/earthsci/quake.htm>
  - U.S. Geological Survey: Earthquake Hazards Program  
[http://wwwneic.cr.usgs.gov/current\\_maps.html](http://wwwneic.cr.usgs.gov/current_maps.html)
  - Geographic Region: Earth's Active Volcanoes  
<http://www.geo.mtu.edu/volcanoes/world.html>
  - U.S. Geological Survey: Earthquakes, Volcanoes, and Plate Tectonics  
[http://vulcan.wr.usgs.gov/Glossary/PlateTectonics/Maps/map\\_quakes\\_volcanoes\\_plates.html](http://vulcan.wr.usgs.gov/Glossary/PlateTectonics/Maps/map_quakes_volcanoes_plates.html)
4. Next, have students research plate boundaries to determine which type of plate movement is occurring at each location on their maps.
5. Have students work with a partner to discuss their findings. Walk around the classroom to assess understanding of plate tectonics and the different types of plate boundaries.

### **Assessment**

Use the following three-point rubric to evaluate students' work during this lesson.

- 3 points: Students were highly engaged in class and partner discussions; created maps that correctly and clearly mapped at least six volcanoes and ten examples of earthquake activity around the world; and correctly identified types of plate boundaries occurring at all their mapped sites.
- 2 points: Students were engaged in class and partner discussions; created maps that correctly and clearly mapped at least four volcanoes and seven examples of earthquake activity around the world; and correctly identified some types of plate boundaries occurring at their most of their mapped sites.
- 1 point: Students participated minimally in class and partner discussions; created unfinished maps that mapped at least three volcanoes and five examples of earthquake activity around the world or used incorrect keys and did not create clearly labeled maps; and did not identify types of plate boundaries occurring at their mapped sites.

## Vocabulary

### **crust**

*Definition:* The outer layer of the Earth

*Context:* The Earth's crust is thicker under the continents than it is under the oceans.

### **earthquake**

*Definition:* Shaking and vibrating at the surface of the Earth resulting from underground movement along a fault plane

*Context:* Earthquakes have helped scientists define the size and shape of tectonic plates.

### **mantle**

*Definition:* The layer of the Earth between the crust and the core

*Context:* The melted rock in the mantle causes the Earth's plates to move.

### **Mid-Atlantic Ridge**

*Definition:* An underwater mountain range in the Atlantic Ocean, stretching from Iceland to Antarctica

*Context:* Eruptions from the Mid-Atlantic Ridge creates new oceanic crust.

### **plate tectonics**

*Definition:* A scientific theory that unifies many of the features and characteristics of continental drift and seafloor spreading into a coherent model; it has revolutionized geologists' understanding of continents, ocean basins, mountains, and Earth history.

*Context:* The theory of plate tectonics did not gain wide scientific interest until the 1960s.

### **subduction**

*Definition:* When an oceanic plate collides with a continental plate and sinks below the latter; results in the creation of oceanic trenches and mountain building

*Context:* Subduction of an oceanic plate consumes, or recycles, the crust.

### **volcano**

*Definition:* A fissure in the Earth's crust through which molten lava and gasses erupts

*Context:* Mount St. Helens is an active volcano in Washington State.

## Academic Standards

### **National Academy of Sciences**

The National Academy of Sciences provides guidelines for teaching science in grades K-12 to promote scientific literacy. To view the standards, visit this Web site:

<http://books.nap.edu/html/nses/html/overview.html#content>.



This lesson plan addresses the following national standards:

- Earth and Space Science: Structure of the Earth's system; Geochemical cycles; Properties of earth materials
- Science and Technology in Society: Science and technology in society
- Science in Personal and Social Perspectives: Natural and human induced hazards; Science and technology in local, national, and global challenges
- History and Nature of Science: History of science; Historical perspectives; Science as a human endeavor

### **Mid-continent Research for Education and Learning (McREL)**

McREL's Content Knowledge: A Compendium of Standards and Benchmarks for K-12 Education addresses 14 content areas. To view the standards and benchmarks, visit

<http://www.mcrel.org/compendium/browse.asp>.

This lesson plan addresses the following national standards:

- Science – Life Sciences: Understands relationships among organisms and their physical environment
- Language Arts – Viewing: Uses viewing skills and strategies to understand and interpret visual media; Writing: Gathers and uses information for research purposes
- Visual Arts – Understands the visual arts in relation to history and cultures
- Science, Technology, and Society

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## **Support Materials**

Develop custom worksheets, educational puzzles, online quizzes, and more with the free teaching tools offered on the Discoveryschool.com Web site. Create and print support materials, or save them to a Custom Classroom account for future use. To learn more, visit

- <http://school.discovery.com/teachingtools/teachingtools.html>