

RESOURCE LIBRARY  
ACTIVITY : 50 MINS

## Tectonic Plates and Physical Features

Use an online map to guide students through an analysis of Earth's tectonic plates, how they interact, and shape the location of physical features.

### GRADES

4 - 10

### SUBJECTS

*Earth Science, Geology, Geography, Geographic Information Systems (GIS), Physical Geography*

### CONTENTS

1 Link, 1 Image, 2 Resources, 1 PDF

## OVERVIEW

Use an online map to guide students through an analysis of Earth's tectonic plates, how they interact, and shape the location of physical features.

For the complete activity with media resources, visit:

<http://www.nationalgeographic.org/activity/tectonic-plates-and-physical-features/>

## DIRECTIONS

**1. Teacher Materials Preparation: Watch both videos to familiarize yourself with the materials and to backfill any information needed for the activity.**

- If necessary, fill in their knowledge of volcanoes prior to introducing the volcano map layers with the article [Plate Tectonics and Volcanic Activity](#).
- Prior to assigning it to students, watch the video [Plate Tectonics](#) (5:47).

**2. Preset Activity: Familiarize students with tectonic plate boundaries and plate movements through viewing Plate Tectonics (5:47) then check for understanding.**

Have students watch Plate Tectonics (5:47). Then, use what you learned in the Plate Tectonics and Volcanic Activity article to lead a class discussion on how Earth's crust moves and runs into, pull away from, or slides against other pieces of independent crust and how that creates or triggers volcanoes. Next ask: *What are boundaries called where plates are stretching or drifting apart?* [Divergent] *What are boundaries called where plates are moving toward each other?* [Convergent] *What are boundaries called where plates are in a side-swipe collision?* [Transform]

**3. Investigate: Utilize the interactive features of an online map to investigate and further familiarize students with the location of plate boundaries.**

Open the online interactive map. Next, have students find and click on each of the boundary types (convergent, divergent, and transform) represented. Encourage them to notice the terrain of the land near the boundaries as they click on each type. Ask: *What do you generally notice about the terrain near the convergent boundaries? Divergent? Transform?*

**4. Build Knowledge: Access a new interactive map layer provided to add to student knowledge of the location of volcanoes relative to plate boundaries.**

Have students turn on the Volcanoes map layer. Ask them to click on different plate boundaries to see summary graphs of the types of volcano/es that occur within 402 kilometers (250 miles) of each boundary. Next, instruct students to drag their map or use the search tool to view and click on the plate boundary that runs along the Andes Mountains in South America. Have students view the popup and graph. Ask: *What type of boundary is this and how many volcanoes are near to this type of boundary around the globe?* [Convergent] Again, instruct students to navigate to the Mid-Atlantic Ridge and click on the plate boundary. Ask: *What type of boundary is this and how many volcanoes are near to this type of boundary around the globe?* [Divergent] Ask: *Why do you think there is such a difference in the number of volcanoes at one type of boundary than the other?* [Convergent boundaries have two plates colliding and the denser plate sinking beneath the less dense plate. The

plate below causes pressure and temperature to increase and can cause the mantle to melt and magma to rise, causing volcanoes. Divergent boundaries with two plates pulling apart, typically result in submarine volcanoes found thousands of meters below the ocean surface.]

## Tip

### Basic Map Navigation and Exploration

1. The map should have opened with the map layer, Plate Boundaries showing on the map. (Hint: to stop showing Plate Boundaries on the map, click the HIDE button.) Click on the map and drag the cursor to focus on a continent and the nearest plate boundaries.
2. Click on the zoom in (+) and zoom out (-) buttons, lower-right corner of the map to view the physical features (terrain) of the land.
3. If the legend or layer panel is in the way, click on the HIDE LEGEND or HIDE LAYER PANEL button on the bottom left of the map. ( To reopen the LAYER PANEL, click on the two downward arrows next to the map name TECTONIC PLATES AND PHYSICAL FEATURES).

## OBJECTIVES

## Subjects & Disciplines

### Earth Science

- Geology

### Geography

- Geographic Information Systems (GIS)
- Physical Geography

## Learning Objectives

Students will:

- Analyze maps of tectonic plates to predict the location of physical features.

## Teaching Approach

## Teaching Methods

# Skills Summary

This activity targets the following skills:

- 21st Century Student Outcomes
  - Information, Media, and Technology Skills
    - Media Literacy
  - Learning and Innovation Skills
    - Critical Thinking and Problem Solving
- Critical Thinking Skills
  - Analyzing
  - Evaluating
- Geographic Skills
  - Analyzing Geographic Information
- Science and Engineering Practices
  - Analyzing and interpreting data

## National Standards, Principles, and Practices

### NATIONAL GEOGRAPHY STANDARDS

- Standard 17:

How to apply geography to interpret the past

### Preparation

### What You'll Need

### REQUIRED TECHNOLOGY

- Internet Access: Required
- Tech Setup: 1 computer per learner

### PHYSICAL SPACE

- Classroom

- Computer lab

## BACKGROUND & VOCABULARY

### Background Information

This activity, with the related map and data, is designed to enable a one-period exploration with students of plate boundaries and related volcanoes. A National Geographic video and an article are provided for the teacher to obtain a refresher in plate tectonics if needed, and to gather ancillary information. The video is appropriate, short, and interesting media for the students as a preset activity. The map activity will allow students to explore plate boundaries and volcanoes around the globe. The activity can be completed entirely in the classroom or can be assigned for independent student consumption and exploration.

### Prior Knowledge

#### [] Recommended Prior Activities

- None

### Vocabulary

<b>Term</b>	<b>Part of Speech</b>	<b>Definition</b>
<b>convergent plate boundary</b>	<i>noun</i>	area where two or more tectonic plates bump into each other. Also called a collision zone.
<b>divergent boundary</b>	<i>noun</i>	area where two or more tectonic plates are moving away from each other. Also called an extensional boundary.
<b>erupt</b>	<i>verb</i>	to explode or suddenly eject material.
<b>eruption</b>	<i>noun</i>	release of material from an opening in the Earth's crust.
<b>fissure</b>	<i>noun</i>	narrow opening or crack.
<b>magma</b>	<i>noun</i>	molten, or partially melted, rock beneath the Earth's surface.
<b>map layer</b>	<i>noun</i>	part of a map representing specific features of a place.
<b>oceanic crust</b>	<i>noun</i>	thin layer of the Earth that sits beneath ocean basins.
<b>plate tectonics</b>	<i>noun</i>	movement and interaction of the Earth's plates.

<b>Term</b>	<b>Part of Speech</b>	<b>Definition</b>
<b>tectonic plate</b>	<i>noun</i>	massive slab of solid rock made up of Earth's lithosphere (crust and upper mantle). Also called lithospheric plate.
<b>terrain</b>	<i>noun</i>	topographic features of an area.
<b>transform boundary</b>	<i>noun</i>	site of tectonic plates sliding next to each other in opposite directions. Also called a transform fault.
<b>viscous</b>	<i>adjective</i>	liquid that is thick and sticky.
<b>volcano</b>	<i>noun</i>	an opening in the Earth's crust, through which lava, ash, and gases erupt, and also the cone built by eruptions.

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## For Further Exploration

### Articles & Profiles

- [USGS: How Many Active Volcanoes are There on Earth?](#)
- [Ready.gov: Volcanoes](#)

### Websites

- [Oregon State University: Volcano World](#)

