



Mount Rainier National Park

Sister Mountain Project

Mapping the Ring of Fire

Overview	This activity is meant to help students orient themselves geographically to the regions addressed in the Sister Mountains Project. Students identify continents, bodies of water, countries and plate boundaries to become familiar with the Pacific Rim/Ring of Fire geography. As students work through other activities, they may want to refer back to their map as a reminder.
Grade Level	6-9
Objectives	Students will be able to: <ul style="list-style-type: none">• Use resources to locate geographical information• Draw boundaries on a map• Identify important Pacific Rim countries, bodies of water and tectonic structures
Setting	Classroom, Library or Computer Lab
Timeframe	2 50-minute class periods
Materials	Student handouts— Black and White Pacific Rim outline map (from http://alliance.la.asu.edu/maps/PACIFR~1.PDF) Mapping the Ring of Fire instruction sheet Atlases, Plate Tectonic maps, computers with internet access Colored pencils or markers Internet access or PowerPoint if choosing to complete the “What’s on Your Plate” extension
Vocabulary	Political boundary, continent, ridge, trench, plate boundary
Standards	Social Studies 3.3.1 3.1 Understands the physical characteristics, cultural characteristics and location of places, regions, and spatial patterns on the Earth’s surface. Science 6-8 ES2F-- Describe what may happen when plate boundaries meet (e.g., earthquakes, tsunamis, faults, mountain building), with examples from the Pacific Northwest.

<p>Background</p>	<p>The Pacific Rim is a conglomeration of Pacific Ocean border countries including Australia, Peru, Argentina, China, Russia, Japan, Canada and the United States each with its own economic, geographic, political, environmental and cultural backgrounds. The countries of the Pacific Rim have a rich history of interconnected trade, travel and geologic processes known as the Ring of Fire.</p> <p>Political boundary—a line on a map that confines or limits the jurisdiction of a ruling body</p> <p>Continent—one of the 7 large landmasses on the Earth’s surface</p> <p>Mid ocean ridge—a submarine mountain range where sea floor spreading is occurring. Usually located on a divergent plate boundary.</p> <p>Trench—a long, steep sided furrow in the ocean floor formed when one tectonic plate is subducted beneath another tectonic plate. Notable trenches include the Cascadia trench, Tongan trench, and Mariana Trench.</p> <p>Plate boundary—a line on a map that defines the edge of a tectonic plate usually indicating where one plate is in contact with another. Plate boundaries are further divided by the direction that they are moving in reference to one another. When plates are moving towards one another it is called a convergent plate boundary. When plates are moving away from each other it is called a divergent plate boundary and when plates are sliding past each other horizontally it is called a transform plate boundary.</p>
<p>Procedure</p>	<p>Part 1</p> <ol style="list-style-type: none"> 1. %Introduce the Pacific Rim and the interconnections and similarities of people living in the Pacific Rim. 2. %Hand out a copy of the Pacific Rim map to students. It may be good to review reading a map and using latitude and longitude to identify locations on a map. 3. %Distribute Mapping the Ring of Fire (part 1) handout and review instructions with students. 4. %Students use a variety of resources such as atlases, encyclopedia, plate tectonic maps and the internet to locate and label each item on the list. <p>Part 2</p> <ol style="list-style-type: none"> 1. %Review the students’ maps with the locations from part 1 identified. 2. %Give students Mapping the Ring of Fire (part 2) handout. 3. %View slideshow with seismic maps of the Pacific Rim. During the slideshow pause and allow students to sketch inferences on their map when viewing the maps of seismic data of the Pacific Northwest, Southeast Asia and the Pacific Rim. 4. %Also during the slideshow pause and have students complete questions from slideshow in their journal, notebook or as a printed worksheet. 5. %Have students draw in the plate boundaries of the plates located beneath the Pacific Ocean. It may be good to review completed maps as a class or check them as a formative assessment.

	<i>You may consider having students keep their map, this way they can have it close at hand, as a reference, as they work through Sister Mountain lessons. As students work through activities found in the Mount Rainier-Mount Fuji Sister Mountains Project, they will be referred to many localities around the Pacific Rim.</i>
Suggested Assessment	A simple quiz can be constructed by placing numbers on a blank copy of the map. Students would then identify what each numbered feature is on the map.
Adaptations	<p>Students can work in small groups or with partners to complete their maps. Or they can complete what they know individually and then compare their maps with a partner/small group to fill in missing information.</p> <p>Enlarge map to 11" X 14" to allow more room for labeling. Another alternative is to project the map on a screen or whiteboard and label as a class activity.</p> <p>This activity can be made more competitive by having students form teams and race against each other to see who can be the first to finish labeling their map.</p>
Extensions	<p>Plate and Political boundaries can be added before making copies. List can be edited as needed to support the student objectives.</p> <p>A classroom sized map can be copied by printing a blank map onto a transparency, blown up by overhead and copied on to butcher paper. Students can work together researching the list and then adding information to the map.</p> <p>To break the activity into smaller chunks, the list of labels can be edited to reflect a more focused purpose of the mapping exercise or different components can be added at different times in the progression of the unit, or additional copies of the map can be used for differing topics such as wind belts, ocean currents and tectonic plates.</p> <p>Students can color code divergent, convergent and transform plate boundaries, ocean currents, global wind belts etc.</p> <p>Rather than using the maps from the slideshow for seismic data for students to construct their inferences for plate boundary an alternate source can be utilized. Other sources include:</p> <ul style="list-style-type: none"> • Software (Seismic/Eruption) that plots data through time on various maps available from IRIS http://www.iris.edu/hq/programs/education_and_outreach/software • The last month's worth of earthquake data can be viewed at http://earthquake.usgs.gov/earthquakes/ <p>Students can add rivers, cities, biomes, climate zones and other such information to their maps.</p>

<p>References/ Resources</p>	<p>About.com:Geography. "Countries of the pacific rim." Available online at http://geography.about.com/library/misc/blpacificrim.htm</p> <p>Arizona Geographic Alliance. "Pacific Rim map." Department of Geography, Arizona State University. Available online at http://alliance.la.asu.edu/maps/PACIFR~1.PDF</p> <p>Cascades Volcano Observatory. "Plate tectonics and sea-floor spreading maps and graphics, etc." United States Geological Survey (USGS). Available online at http://vulcan.wr.usgs.gov/Glossary/PlateTectonics/Graphics/</p> <p>Kious, W., Tilling, R. (1996). <u>This dynamic Earth: the story of plate tectonics</u>. United States Geological Survey. Available online at http://pubs.usgs.gov/gip/dynamic/dynamic.html</p> <p>Shedlock, K., Pakiser, C. (1997) "Earthquakes." United States Geological Survey. Available online at http://pubs.usgs.gov/gip/earthq1/</p> <p>Simkin, T., Tilling, R., Vogt, P., Kirby S., Kimberly, P., and Stewart, D.,(2006) <u>Geologic investigations map I-2800: This dynamic planet 3rd edition</u>. USGS. Available online at http://pubs.usgs.gov/imap/2800</p> <p>United States Geological Survey. "Understanding plate motions." Available online at http://pubs.usgs.gov/gip/dynamic/understanding.html</p> <p>United States Geological Survey. "Earthquake Hazards Program: Earthquake Center." Available online at http://neic.usgs.gov/neis/epic/epic_global.html</p>
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