

# Ring of Fire

## Lesson 10

**G**reat chains of mountains surround the Pacific Ocean where approximately four hundred of the five hundred known active volcanoes are located. Geologists refer to the chains of volcanic mountains and the regions where they are located as the **Ring of Fire**. This lesson will help you to understand why stratovolcanoes dot the landscape of the Pacific Northwest and Alaska but do not occur in other parts of the country.

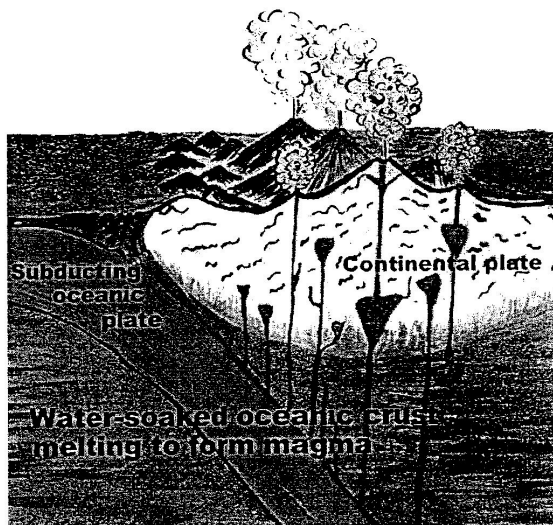


### Volcanoes in the Ring of Fire

**Volcanic mountain arcs** surround the Pacific Ocean like beads on a necklace creating the Ring of Fire. Starting in the Pacific Northwest with the Cascade Mountains the chain continues north to Alaska and the Aleutian Islands. The chain then moves over to the Kamchatka Peninsula and down to Japan, the Philippines, Papua New Guinea and New Zealand. The chain next crosses the Pacific Ocean to the Andes of South America, moves up through Central America and finally to Mexico where the chain is completed.

A subduction zone is located off the coast of northern California, Washington and Oregon because the **North American Plate** is growing larger as new land is being formed in the middle of the Atlantic Ocean at the Mid-Atlantic Ridge. The spreading ridge forces the North American Plate westward where it meets the **Juan de Fuca Plate**, a small plate located off the coast of California, Washington and Oregon. The Juan de Fuca Plate is made of basaltic rocks that are heavier and denser than the continental

crust of the North American Plate. The heavier and denser Juan de Fuca Plate is forced beneath the North American Plate creating a subduction zone. The subducting water soaked oceanic plate begins to melt as it moves downward. The melting rocks and ocean water mix together producing magma that contains a lot of dissolved fluids. The magma begins to rise beneath the continents through cracks in the Earth's crust. Melting continental crust mixes with the rising magma creating a pasty lava that does not allow the gases to escape as easily like as they do in basalt. Expanding gases cause the magma to froth forming pumice as pressure rises inside the volcano. Eventually the pressure in the volcano is greater than the pressure from the overlying rocks and the volcano explodes in a violent eruption. Active stratovolcanoes are located on shore next to the Pacific Ocean because that is where the magma forms as a subducting oceanic plate melts.



**Volcanic mountain arc**

Mt. St. Helens and Lassen Peak, two volcanoes in the Cascade Mountains, erupted during the 20<sup>th</sup> century. Mt. Baker in Washington erupted several times between 1792 and 1880. Mt. Rainier spewed pumice between 1820 and 1854. Just five years before the 1980 eruption of Mt. St. Helens heat, steam, and sulphur emissions on Mt. Baker dramatically increased leading geologists to believe an eruption might be eminent. These are just a few of the volcanoes located on the Ring of Fire that could erupt again with violent force at any time.

### Lesson summary

- ◆ The regions and volcanoes that surround the Pacific Ocean are called the Ring of Fire.
- ◆ The Juan de Fuca Plate in the Pacific Northwest is subducting beneath the North American Plate.
- ◆ Magma in subduction zones is a mixture of melted oceanic crust, sea water, and melted continental crust.
- ◆ The Aleutian Islands in Alaska are part of the Ring of Fire where the Pacific Plate is subducting beneath the North American Plate.