

**As You Read...****Think about:**

1. **What is the cause of earthquakes?**
2. **How are faults and earthquakes related?**
3. **What is the cause of volcanoes?**
4. **How does gas content affect how a volcano erupts?**
5. **How is volcanism at a hotspot different from volcanism at a mid-ocean ridge. How are they similar?**
6. **Why are mountains found in regions where the lithosphere is thick?**

Digging Deeper**EARTHQUAKES, VOLCANOES,
AND MOUNTAINS****The Nature of Earthquakes**

Like all solids, rocks have strength. It takes a large force to break them. Plate movements cause large forces to build up within the lithosphere, and at certain times and places, the forces become greater than the strength of the rock. The rock then breaks, along a fracture surface that sometimes extend for tens of kilometers. This surface is called a fault. Faults are fractures in the Earth's surface along which there has been rupture and movement in the past. When the rocks break, the rocks on either side of the fracture plane slide past one another, until the forces are relieved. Strong vibrations are produced as the rock masses slide past one another. Those vibrations are felt as an earthquake. The vibrations travel away in all directions in the form of seismic waves, which you learned about earlier. Over time, the fracture "heals," making the strength of the rock greater again. For this reason, faults tend to slip, then stick, then slip again, and so on. As the rocks on either side of a fault slide past one another, they produce strong vibrations.

**Earthquakes and
Plate Movements**

Many of the largest earthquakes occur along subduction zones, as the downgoing plate slides downward. The pattern of forces within the plate that cause the earthquake fracture is very complicated. The result of those forces, however, is the occurrence