



■ **Figure 17.18** Oceanic plates are mostly basalt. Continental plates are mostly granite with a thin cover of sedimentary rock, both of which are less dense than basalt.

VOCABULARY

ACADEMIC VOCABULARY

Parallel (PAIR uh lel)

extending in the same direction, everywhere equidistant, and not meeting

The commuter train runs parallel to the freeway for many kilometers.

Convergent boundaries At **convergent boundaries**, two tectonic plates are moving toward each other. When two plates collide, the denser plate eventually descends below the other, less-dense plate in a process called **subduction**. There are three types of convergent boundaries, classified according to the type of crust involved. Recall from Chapter 1 that oceanic crust is made mostly of minerals that are high in iron and magnesium, which form dense, dark-colored basaltic rocks, such as the basalt shown in **Figure 17.18**. Continental crust is composed mostly of minerals such as feldspar and quartz, which form less-dense, lighter-colored granitic rocks. The differences in density of the crustal material affects how they converge. The three types of tectonic boundaries and their associated landforms are shown in **Table 17.1**.

Oceanic-oceanic In the oceanic-oceanic convergent boundary shown in **Table 17.1**, a subduction zone is formed when one oceanic plate, which is denser as a result of cooling, descends below another oceanic plate. The process of subduction creates an ocean trench. The subducted plate descends into the mantle, thereby recycling oceanic crust formed at the ridge. Water carried into Earth by the subducting plate lowers the melting temperature of the plate, causing it to melt at shallower depths. The molten material, called magma, is less dense, so it rises back to the surface where it often erupts and forms an arc of volcanic islands that parallel the trench. Some examples of trenches and island arcs are the Marianas Trench and Marianas Islands in the West Pacific Ocean and the Aleutian Trench and Aleutian Islands in the North Pacific Ocean. A volcanic peak in the Aleutian Island arc is shown in **Table 17.1**.

Oceanic-continental Subduction zones are also found where an oceanic plate converges with a continental plate, as shown in **Table 17.1**. Note that it is the denser oceanic plate that is subducted. Oceanic-continental convergence also produces a trench and volcanic arc. However, instead of forming an arc of volcanic islands, oceanic-continental convergence results in a chain of volcanoes along the edge of the continental plate. The result of this type of subduction is a mountain range with many volcanoes. The Peru-Chile Trench and the Andes mountain range, which are located along the western coast of South America, formed in this way.