


Springs occur when the  
rises at points where the  
sects Earth's surface.



## Springs

Groundwater moves slowly but continuously through aquifers and eventually returns to Earth's surface. In most cases, groundwater emerges wherever the water table intersects Earth's surface. Such intersections commonly occur in areas that have sloping surface topography. The exact places where groundwater emerges depend on the arrangement of aquifers and aquicludes in an area.

 **Reading Check Explain** how the slope of the land can affect where groundwater emerges.

As you learned on the previous page, aquifers are permeable underground layers through which groundwater flows easily, and aquicludes are impermeable layers. Aquifers are commonly composed of layers of sand and gravel, sandstone, and limestone. In contrast, aquicludes, such as layers of clay or shale, block groundwater movement. As a result, groundwater tends to discharge at Earth's surface where an aquifer and an aquiclude are in contact, as shown in **Figure 10.4**. These natural discharges of groundwater are called **springs**.

**Emergence of springs** The volume of water that is discharged by a spring might be a mere trickle or it might form a stream. In some regions called karst regions, an entire river might emerge from the ground. Such a superspring is called a karst spring. Karst springs occur in limestone regions where springs discharge water from underground pathways. In regions of nearly horizontal sedimentary rocks, springs often emerge on the sides of valleys at about the same elevation, at the bases of aquifers, as shown in **Figure 10.5**. Springs might also emerge at the edges of perched water tables. In a perched water table, a zone of saturation that overlies an aquiclude separates it from the main water table below. Other areas where springs tend to emerge are along faults, which are huge fractures along which large masses of rock have moved, and sometimes block aquifers. In limestone regions, springs discharge water from underground pathways as karst springs.