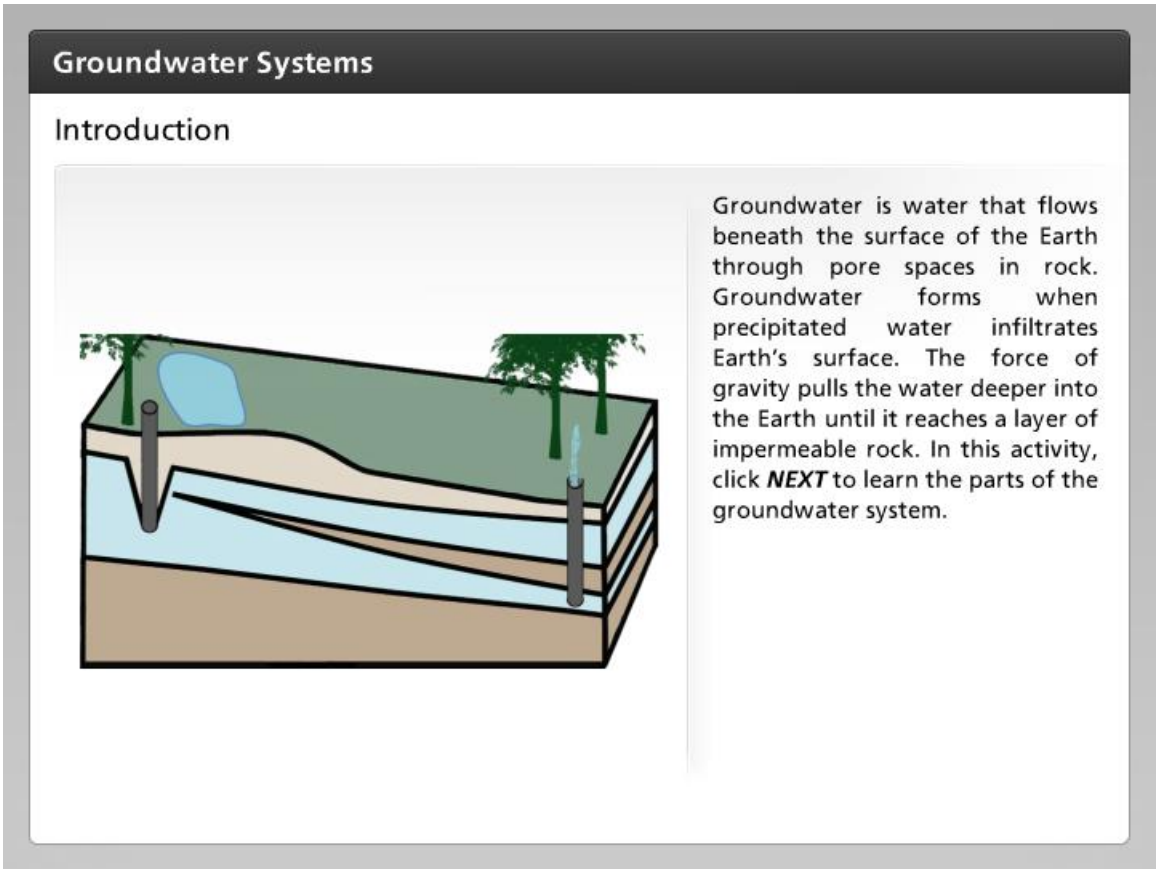
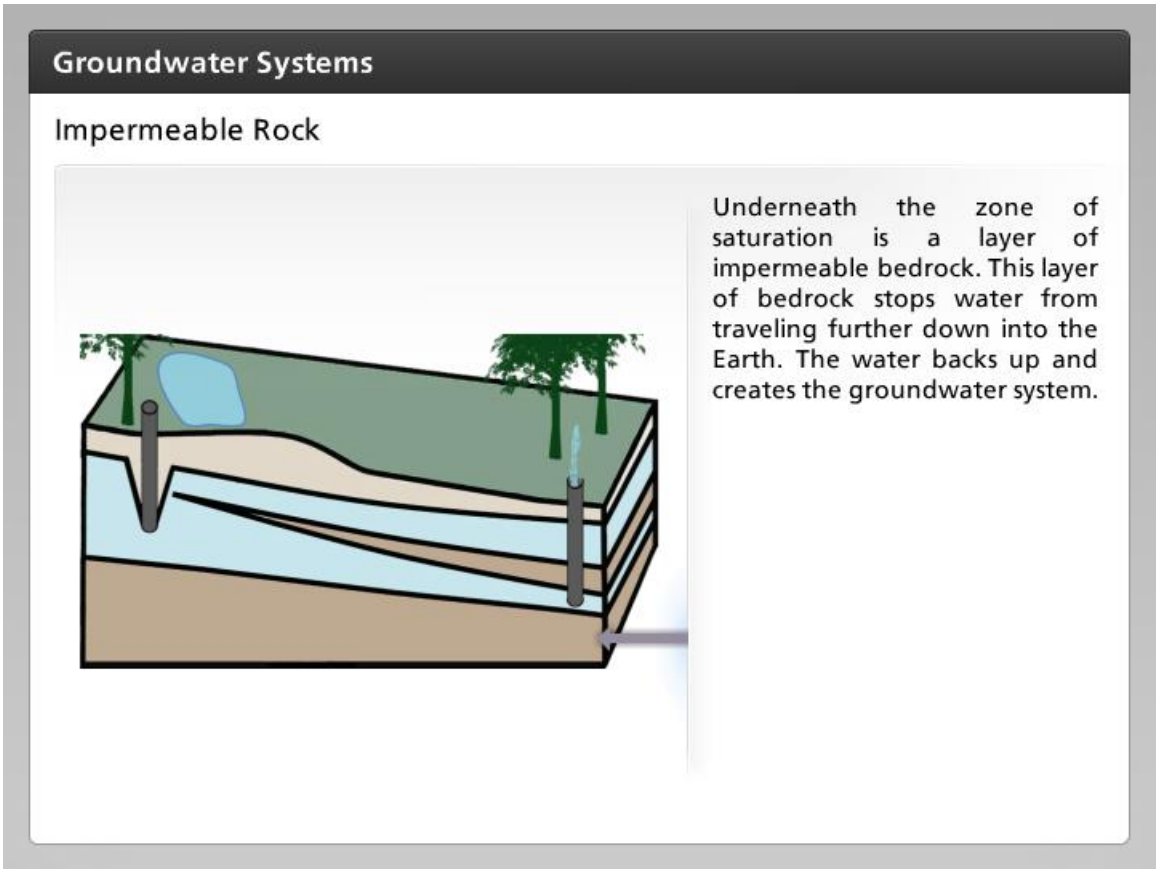
Module 8: Weathering, Erosion, and Groundwater
Topic 6 Content: Groundwater Systems

Introduction



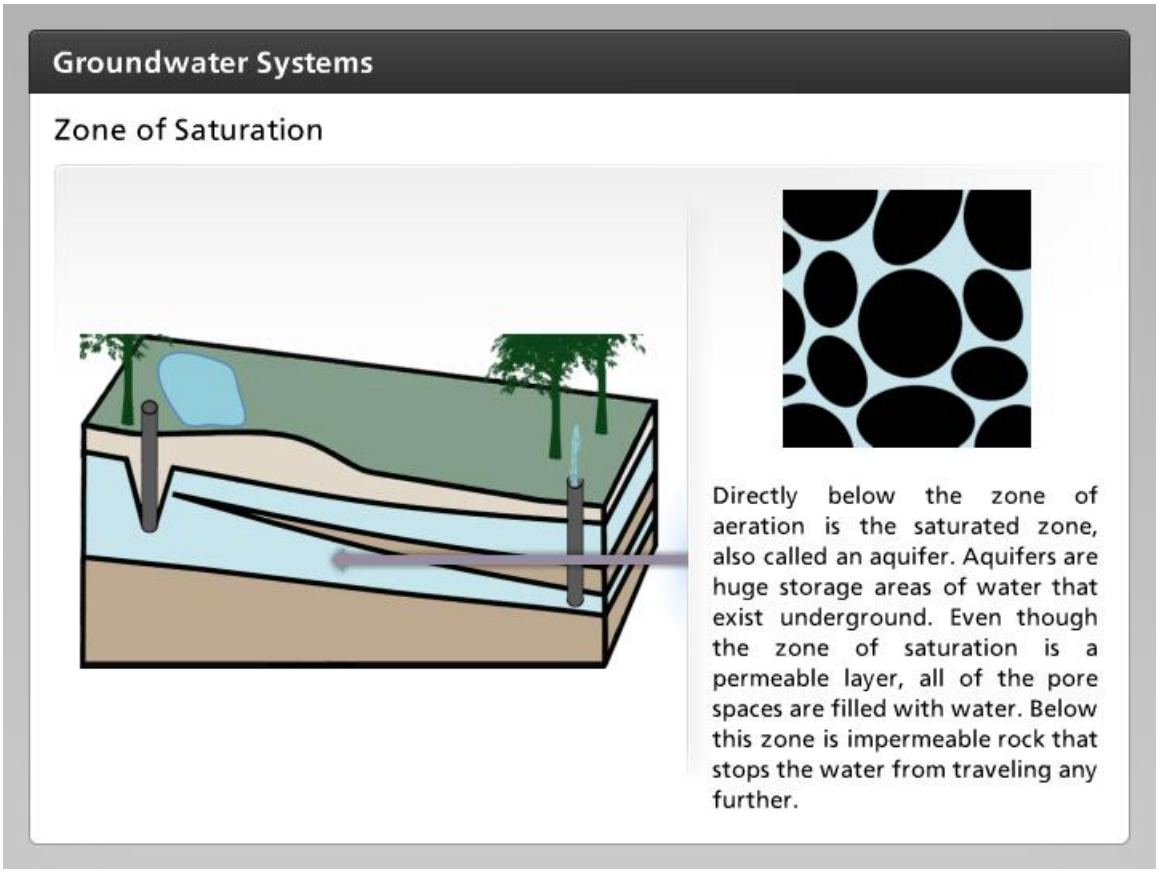
Groundwater is water that flows beneath the surface of the Earth through pore spaces in rock. Groundwater forms when precipitated water infiltrates Earth's surface. The force of gravity pulls the water deeper into the Earth until it reaches a layer of impermeable rock. In this activity, click ***NEXT*** to learn the parts of the groundwater system.

Impermeable Rock



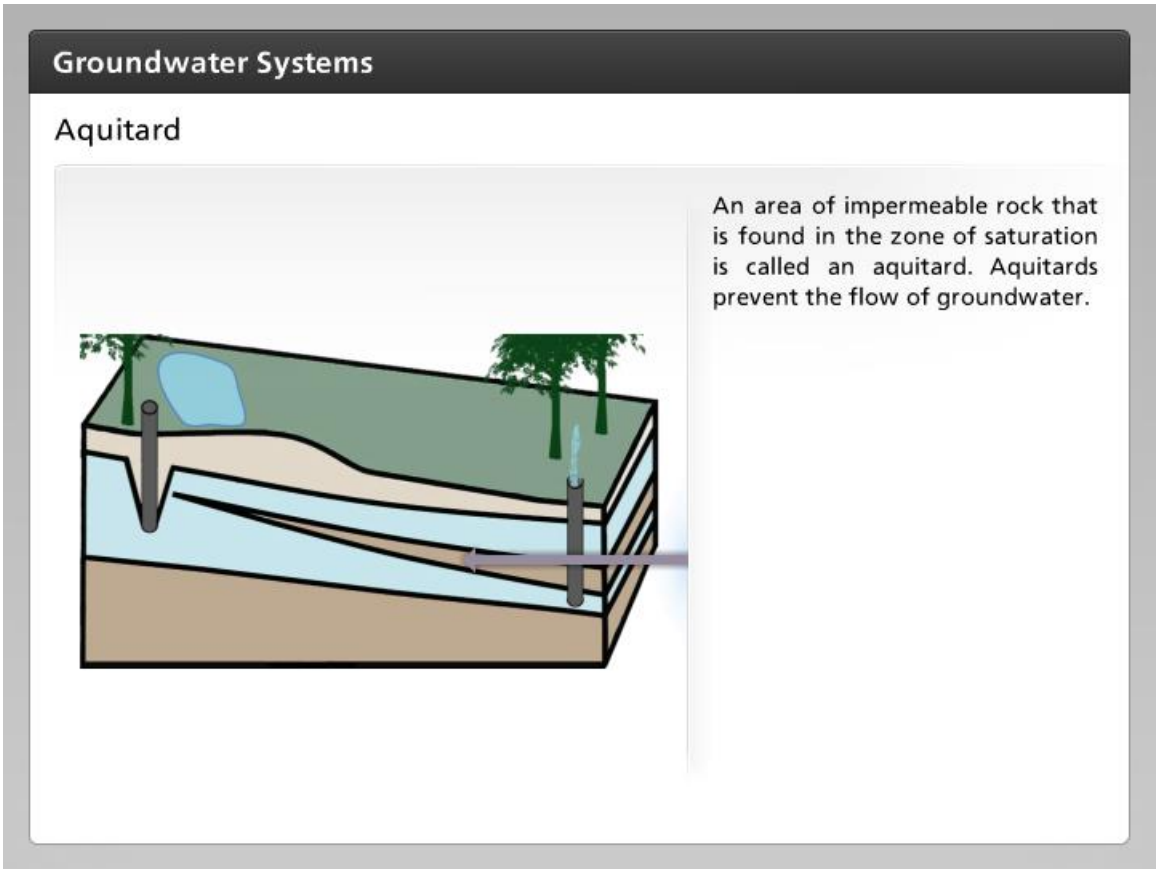
Underneath the zone of saturation is a layer of impermeable bedrock. This layer of bedrock stops water from traveling further down into the Earth. The water backs up and creates the groundwater system.

Zone of Saturation



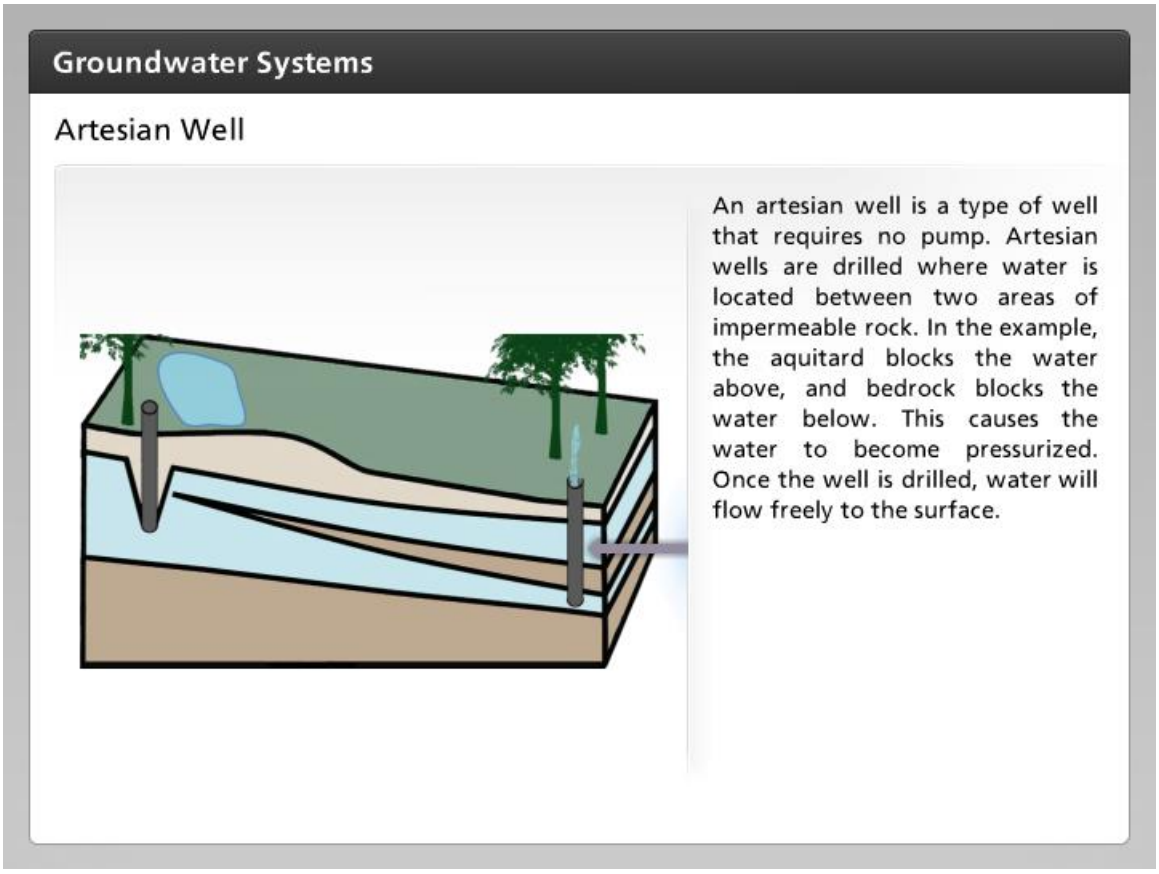
Directly below the zone of aeration is the saturated zone, also called an aquifer. Aquifers are huge storage areas of water that exist underground. Even though the zone of saturation is a permeable layer, all of the pore spaces are filled with water. Below this zone is impermeable rock that stops the water from traveling any further.

Aquitard



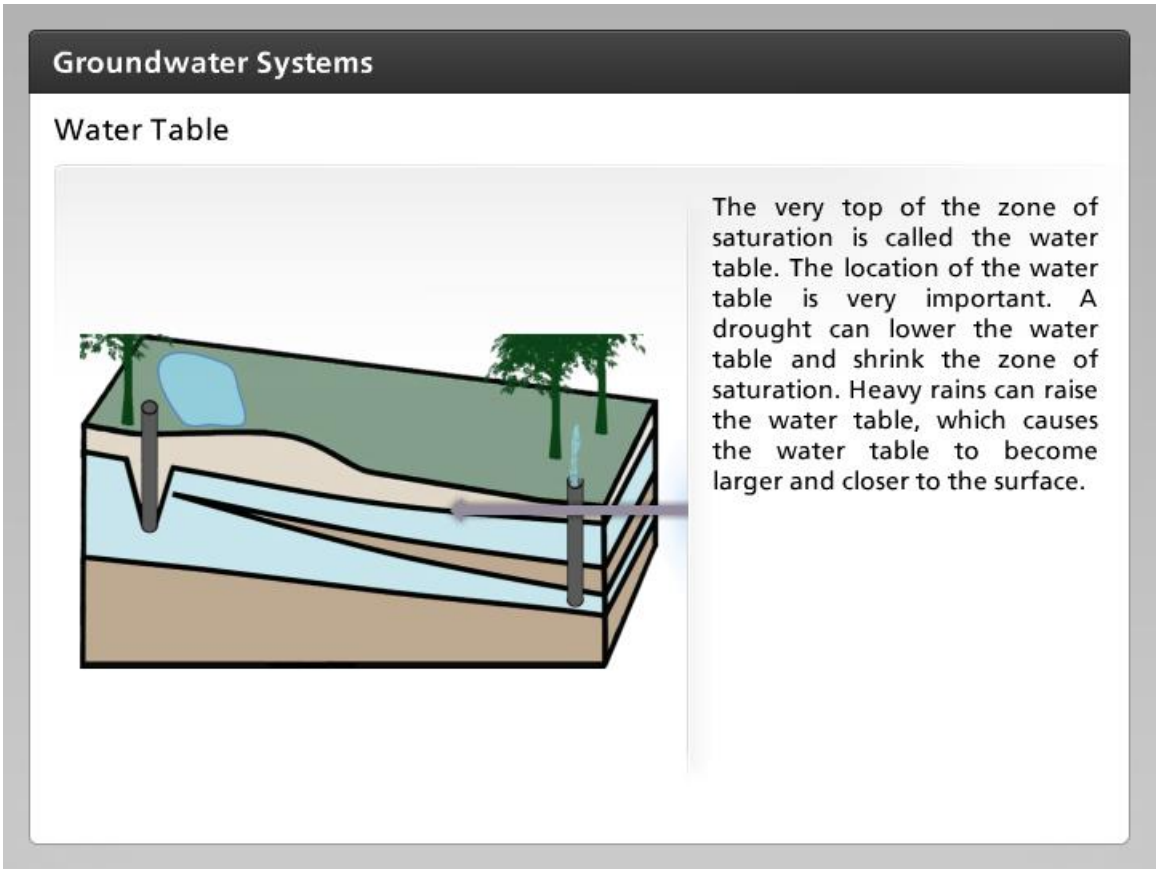
An area of impermeable rock that is found in the zone of saturation is called an aquitard. Aquitards prevent the flow of groundwater.

Artesian Well



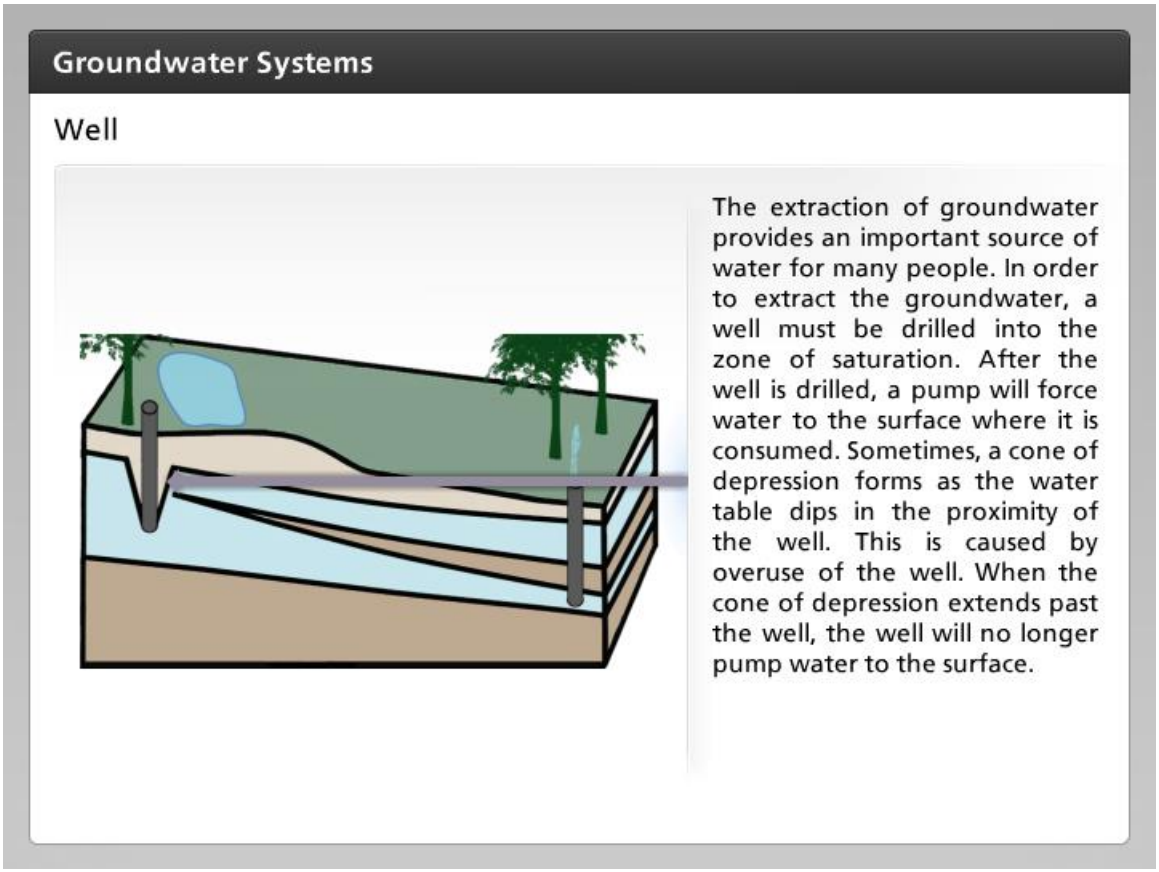
An artesian well is a type of well that requires no pump. Artesian wells are drilled where water is located between two areas of impermeable rock. In the example, the aquitard blocks the water above, and bedrock blocks the water below. This causes the water to become pressurized. Once the well is drilled, water will flow freely to the surface.

Water Table



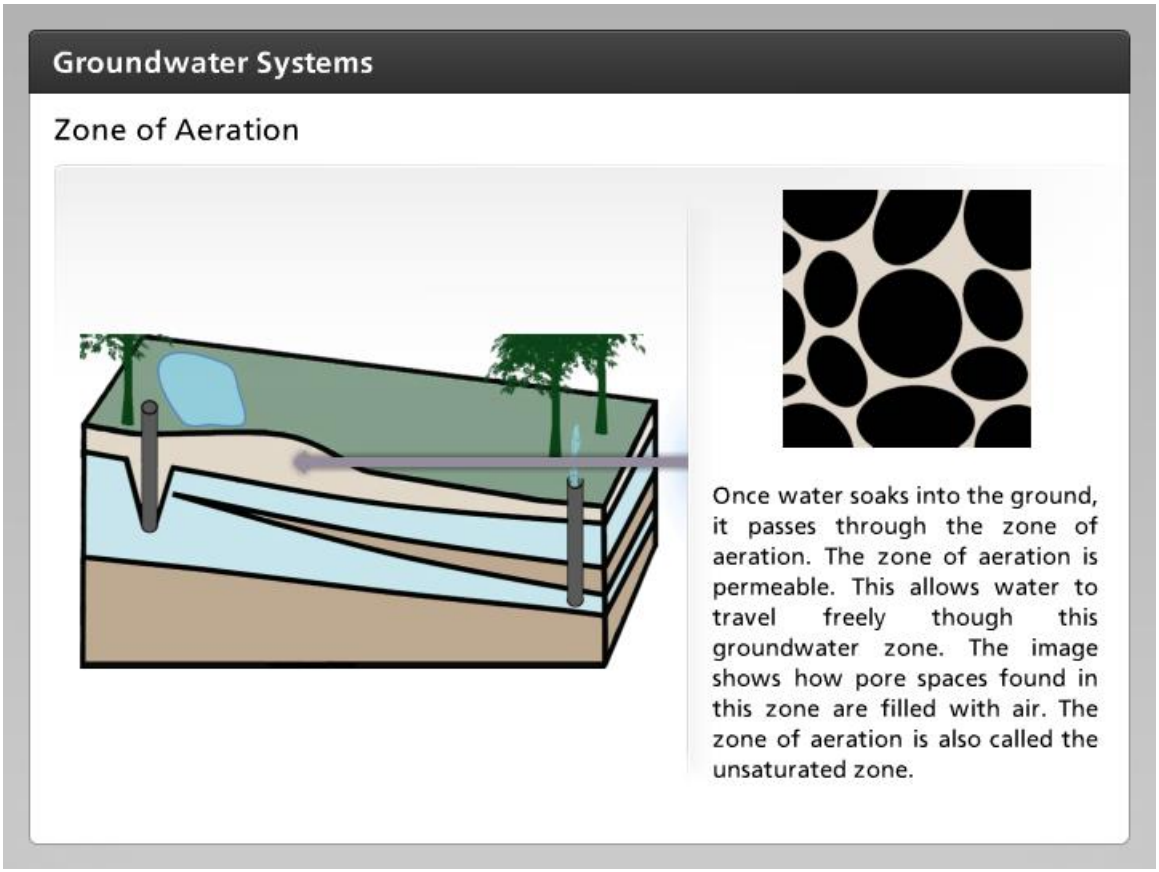
The very top of the zone of saturation is called the water table. The location of the water table is very important. A drought can lower the water table and shrink the zone of saturation. Heavy rains can raise the water table, which causes the water table to become larger and closer to the surface.

Well



The extraction of groundwater provides an important source of water for many people. In order to extract the groundwater, a well must be drilled into the zone of saturation. After the well is drilled, a pump will force water to the surface where it is consumed. Sometimes, a cone of depression forms as the water table dips in the proximity of the well. This is caused by overuse of the well. When the cone of depression extends past the well, the well will no longer pump water to the surface.

Zone of Aeration



Once water soaks into the ground, it passes through the zone of aeration. The zone of aeration is permeable. This allows water to travel freely though this groundwater zone. The image shows how pore spaces found in this zone are filled with air. The zone of aeration is also called the unsaturated zone.