

The third part of the Piedmont is a notable area called the Gettysburg-Newark Lowland, most of which was formed during the Triassic period (Triassic refers to the age of geologic history during which the basins were formed - about 200 million years ago, when dinosaurs roamed the earth). The Gettysburg-Newark Lowland is made up of red and gray sandstone and shale with some dark crystalline intrusions (rocks that were injected, while they were still hot and melted, into the sedimentary rocks that were already there). As the intrusions cooled, they hardened and crystallized.

Often in the Piedmont Upland, there is a generous soil layer overlying the fractured crystalline rocks. Water quality tends to be very good because of the overlying protective soil layer. The sandstones and shales of the Gettysburg-Newark Lowland also are typically good quality aquifers. Soil cover over the Piedmont Lowland varies quite a bit. However, when the cover is thin, aquifers can be easily contaminated because of human activities.

## BLUE RIDGE

This province is made up of mostly igneous and metamorphic rocks that mark the northern limit of the rocks of the Blue Ridge Mountains. The mountains of this province rise 1,300 to 1,600 feet above the surrounding lowlands. The Ridge and Valley Province is to the northwest, and the Piedmont Province is to the southeast.

# : Demonstration 6: Sinkholes and Caves

**PURPOSE:** To demonstrate how sinkholes and caves form

**MATERIALS:** • stream table or box lined with a plastic garbage bag • sand • sugar • water  
• plant mister or gardenwatering can

**PROCEDURE:** If you don't have access to a stream table, line a heavy cardboard box with a plastic garbage bag. Punch a hole in one corner of the box and liner for water to drain through.

Fill the box with sand. Dig out a hole 5"-10" wide (depending on the size of your box) and 3"-5" deep. Pour in enough sugar to nearly fill the hole (leave about 1/2" to 1"). Fill in the last 1/2" to 1" with sand, so that the sugar deposit is buried.

Using a watering can or a plant mister, water the box of sand. Use enough water to saturate the top few inches of the sand, but be very careful not to disturb the surface. (You must water the sand gently, or the force of the water will rearrange your sand and sugar deposits. Be sure not to pour the water from too high above the sand and do not pour in one place too long.)

Tilt the box (prop something under the high corner) so that the water drains toward the corner with the hole.

"Rain" on the sand once a day until the sand begins to sink where the sugar deposit is buried. Once the subsidence (sinking) begins, continue the daily watering process but use a smaller amount of water.

**CONCLUSION:** As the water leaches away the sugar, increasingly large spaces are left empty. Eventually there are so many "solution channels" or empty spaces that the overlying sand layer cannot be supported. When the sand finally collapses, a sinkhole has formed.

Limestone is a rock easily dissolved by groundwater. The dissolution of limestone by groundwater over many thousands of years creates the sinkholes and caves which occur in some limestone regions of Pennsylvania.

### QUESTIONS:

1. What natural process does the watering represent?
2. What rock might the sugar represent?
3. What characteristics must a rock have to be suitable for forming sinkholes and caverns?
4. Why did the sinkhole form only over the sugar deposit?