Ancient rivers carved channels into the basement rocks. Then sediments filled the channels (these sand deposits are the best producing aquifers) and covered the area that is now the Coastal Plain of southeastern Pennsylvania.

Shallow (near the surface) aquifers in the sands and gravels lie on top of clay layers. Clay is relatively impermeable (the water can't soak through it) so water collects on top of the clay, in deposits of sand and gravel.

BUT, water that filters only through sand or gravel doesn't have much chance to get rid of unwanted tag-alongs. If the water goes in polluted, it comes out that way, too.

The Coastal Plain also has sand and gravel aquifers caught between clay beds. These are called confined aquifers (remember our discussion under Unit 2?).

The bad points about these confined aquifers are: it costs more to drill wells into deeper aquifers; and deeper water may have too many dissolved minerals and salts to be drinkable.

The good points are: they often have higher yields (you can get more gallons per minute out of them) than the shallow aquifers do; and the quality may be better because the water is protected from surface contamination by the overlying clay layer.

BUT, in the past, industrial and urban development polluted much of the groundwater in this province. This is because Philadelphia is one of the oldest and most intensely developed areas in the United States. Although the upper aquifers were polluted first, the confined aquifers also have been polluted in recent decades. Northeast of Philadelphia, the deep aquifers have also been affected by agriculture practices.

Simplified cross-section of Pennsylvania showing the seven physiographic provinces.