Glacial Geology Matters Script

During the past 2.3 million years, a number of continental glaciers advanced and retreated across much of Wisconsin’s landscape. The last of these glaciers melted and retreated some 12,000 years ago.

These massive flowing ice sheets reshaped much of the original landscape here while also depositing a variety of sediments. In the end, the glaciers had changed much of surface geology. And geology of the land affects a great many things in our lives today.

For instance, much of the glacial material deposited by the glaciers is sand and gravel. The torrents of melt-water flowing off the leading edge of the glaciers washed away much of the finer clay and left behind sandy soils in many areas. These sandy soils create a very important part of our water cycle.

To help understand how, first try this simple experiment and record your results.

Take two paper cups of the same size. In one, fill it within 1 inch of the top with clean sand, such as sandbox sand. In the other, fill it within 1 inch of the top with clay soil that you might find along the banks of rivers or in low areas.

Next put 1 cup of water in a graduated measuring cup, and begin pouring it into the cup with the sand. When you’ve filled the cup to the top, record how much water is left in the measuring cup. Subtract that from the 1 cup you started with. That will tell you how much water seeped into the sand. Repeat the same steps using the cup containing clay soil. Record your findings and summarize the results.

Chances are that the cup with the sand held many times more water than the cup with the clay. That’s because clean sand, similar to what the glaciers left behind, absorbs more water than any other type of soil. The reason is that all the tiny interconnected pore spaces between the sand grains allow the water to easily percolate downward. On the other hand, soils containing clay prevent the water from percolating downward.

So what does this mean to us? When winter snows melt or spring rains fall, they represent important parts of the water cycle. If this happens in areas with mostly clay soils, much of the water runs off the landscape and drains into rivers. It doesn’t have time to soak into the soil.

However, in sandy soils, much of the water is easily absorbed by the soil and percolates downward. It continues to seep downward from gravity until it reaches a level where all the pore spaces in the sandy soil are filled with water. This underground water level is called the “water table”.

The water table is very important part of the water cycle. It does a number of things that we sometimes take for granted. For instance, many people get their clean drinking water from water wells that pump water up from the ground water table. Sandy soils that allow surface water to enter the ground water help refill the ground water table with fresh water. Also, as water moves through sandy soil, it helps to naturally purify the water we drink.

Many of our lakes in Wisconsin are filled with water that comes from their underground connection with the water table. For example, kettle lakes near glacial moraines get much of their water from melted snow and rain that seep into nearby moraines that feed the ground water table. Ground water that seeps out at the base of slopes can form springs that in turn help feed the flow of our rivers. Ground water also helps supply water to many of our wetlands.

Besides affecting the water we drink, our lakes, wetlands, and rivers, glacial geology also impacts the types of forest cover that grows in different areas. For instance, the amounts of sand, gravel, and clay in glacial soils often affect what types of trees grow there. That in turn affects how forests will be managed in different areas. Here in Wisconsin, areas with glacial washed sands grow mostly pin oak and jack pine trees. Those soils are also locations for managed pine plantations. However, hilly moraines with more clay content in the soil might be better for growing maple and basswood forests. The great diversity of forests in Wisconsin directly relates to the types of soils deposited by the glaciers. So next time you see different trees in different types of forests, consider how they are affected by what the glaciers left behind.

Finally, the soils deposited by the glaciers even affect what crops are grown in different areas. For instance, Wisconsin’s famous dairy herds are fed alfalfa hay that grows best in soils with higher clay content. Our state’s important potato fields are located in flat glacial outwash areas with high sand content. And Wisconsin’s noted cranberry fields are located in areas with sandy soil where the ground water table is located near the surface.

So next time you see a farm field, consider how the type of crop growing there is affected by the types of soils deposited when the last glaciers left here 12,000 years ago.