Soil and Plant Science Division

Soil Survey Region 10

Albert Lea, Minnesota, Soil Survey Office

Local Elementary Schools Benefit from Soil Survey Interaction

Purpose

Minnesota elementary schools have an Earth Science curriculum but it lacks hands-on activities relating to soil. Most students learn best with hands-on experience, and so soil scientists from Major Land Resource Area (MLRA) 103 have been asked to come into the classroom to fill this need.

Background Information

Earth Science standards for Minnesota schools deal with describing, grouping, and classifying soils and rocks. Instruction does not introduce students to how the soil is useful in our daily lives, the fragility of the soil, or soil texturing. Without active and hands-on learning many students lose interest quickly and become disengaged. Over the last several years MLRA 103 staff have developed a lesson plan with hands-on activities and demonstrations to keep students and teachers engaged while they explain complex soil functions in a simple and fun way.

The lesson plan is geared towards 5th grade students and covers the concept of soil as a living thing, why soil is important and useful to humans, and what makes up soil. The lesson plan also delves into more scientific properties of the soil, such as porosity, permeability, and particle size. Soil demonstrations, such as the table-top rainfall simulator, slake tests (fig. 1), and hand texturing soil, keep the students' interest while they learn about these more complex topics. One of the favorite group activities involves a permeability exercise. In a class of 20 to 30 students, the class is divided into two groups. One group stands in three lines; each student represents a sand particle. They space themselves an arm's length away from each other. The other group then acts as raindrops and infiltrates their way through the "sandy soil." The class then states observations of their experience representing water moving through soil. Next, the raindrop group gets to act as clay particles; they stand shoulder to shoulder. Then the other half of the class tries to infiltrate "the soil." The students are able to see and feel that it is much harder for water to move

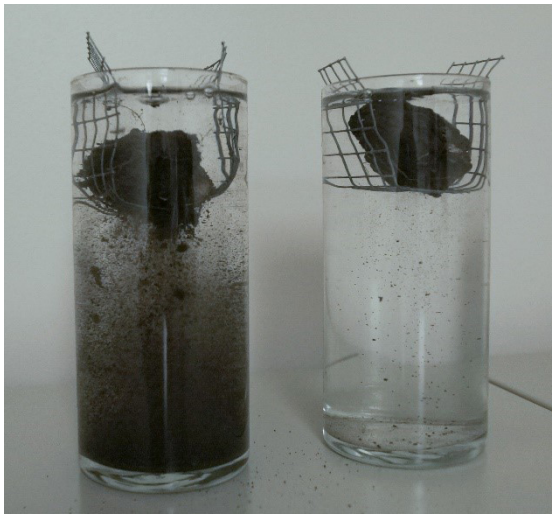

Figure 1.—Rainfall simulator and slake test demonstrations (pictured) show the consequences of soil management decisions.

through a soil that has more clay. This exercise is also referred to later in the lesson plan when the instructors compare a well structured soil to a massive or structureless soil during the rainfall and slake demonstrations.

Key Outcomes/Products

Teachers report that having a soil scientist come and work with students keeps the children interested and active with individual and group activities and also with in-depth discussions, something that the standard curriculum lacks. For example, the students engage with grouping and classifying soils and rocks in terms of color, shape, and size (fig. 2). The students are able to discuss earth science at a much higher level than if the teachers only followed the curriculum provided.

Figure 2.—MLRA 103 Soil Scientist Myles Elsen teaches students why soil has different colors, how to texture soil, and how soil texture is a reflection of the particle size of soil minerals.

Future Goals/Conclusions

In a society where some think that their food comes from the grocery store, many consumers are disconnected from the soil. It is important that youth be educated about this incredibly fragile natural resource. In the words of the African Conservationist Baba Dioum: “For in the end, we conserve only what we love. We will love only what we understand. We will understand only what we are taught.”