

Teaching Stewarding Soil

Let's Get Our Hands Dirty

Article by JO PICKEN

Photos courtesy of CONSERVATION LEGACY



Jo Picken supervises a ball/ribbon test conducted by sixth graders in Barber Middle School's STEM science class.

Due to increasing urbanization, there is a lack of firsthand outdoor experiences that teach many young people about our relationship with nature and with the land. In the classroom, students are being introduced to the topics of soil and its impact on our existence. “Stewarding Soil” is the newest addition to the L.A.N.D.S. Education Team’s set of classroom presentations jointly entitled Wildlife by Design. And, gratefully, it is being well received by Texas teachers and their students.

As groups of students enter the room, they are greeted by a display board with pictures and the appropriate vocabulary: Sand, Soil and Clay; Color, Texture and Particle Size alongside these descriptors.

I am going to give you a chance to behave as a scientist. While I introduce myself and get things started, observe the clues that are before you, and make some inferences—educated guesses—about the things we will talk about today.

After fielding some answers, and pointing out that there is a difference between dirt and soil, we move ahead.

Is soil manmade or a natural resource? Yes, it is a natural resource. And though we may feel like it is absolutely everywhere, we should not consider ourselves as having an unlimited supply, since we must consider the amount of time it takes to form.

Can you name some other natural resources? We are truly fortunate to live in a country and a state with an abundance of natural resources. With an agreed upon list in hand, it is a good



time to break down this two-word term: natural resources. The items on our list, things like water, fossil fuels and soil, all come from nature. Furthermore, they are useful to us.

Is soil alive? While this seems like a straightforward question, it may elicit an incorrect response due to the number of living things that can be found in soil. It is a full-time home, a habitat for creatures like worms and moles. Burrows or tunnels in the soil are a safety net for others; they provide shelter for prairie dogs, armadillos and more. And then there is the whole other category of living things that soil supports....

Soil is the literal base for plant life, providing physical support as well as nutrients and water via the plant's roots. Soil facilitates the growth of food, one of the basic needs required to sustain life on Earth.

Can you give me an example of an animal, a wildlife species, who must have plants to fulfill its dietary needs? A typical first response would be a herbivore, often a cottontail rabbit or a white-tailed deer. When an omnivore is proffered, students accept that logic fairly readily. When asked about a carnivore, the answering looks are more skeptical. The correct response, of course, is yes; but the challenge in comprehending this reliance lies in thinking through additional links in order to reach this position on the food chain.

We have proven that soil safeguards the lives of animals. Does it do the same for you? Does it play a part in the construction of your home or school? It absolutely does. Trace the lumber inside the walls back to the trees from which they were sourced. We wouldn't have glass windows or bricks either without the soil used to manufacture these building materials.

Different soil types are better suited for certain uses due to their differing characteristics. Soils whose mixture leans heavily toward sand, silt or clay are more adept at growing certain crops or plants. They also vary in their ability to meet the needs of particular wildlife species.

If you are a burrowing animal in need of a tunnel system, in what type of soil



Dickinson ISD sixth graders attempt to form a stable ribbon with their sample of sand.



would this activity prove most successful? Wouldn't tunnels into beach-like sand collapse? If tunnels were dug out in an area with sticky clay soils, what would happen in the event of heavy rains? Would a reptile's eggs be properly incubated in a soil other than sand?

Where do we find crawfish in nature, where they aren't being farmed? We find them in areas of high clay concentration. Think back to your own childhood. Did you ever spend a few hours trying to coax a critter up out of a hole in the ground using nothing more than a length of string and a piece of bacon? If you consider the dwelling of a crawfish, that individual had to be able to excavate a section below ground that holds water as well as a section above the water level. His home extends beyond the surface, assuming the shape of a bricked chimney to ventilate the entire space. Clay

makes this impressive and complicated construction possible.

In what type of soil are we likely to find beavers living? Beavers take up residence along rivers, lakes and other waterways where erosion and deposition have created a high concentration of silt. This soil type facilitates the construction of bank lodges where water conditions are suitable.

And though beavers are often the recipients of ill will, they are one of the few remaining keystone species whose range spans all of Texas. In creating (or recreating) wetlands, a habitat type that is disappearing from our planet at an alarming rate, beavers increase the diversity of both plant and animal populations in a given space. Engineering wetlands is an applaudable feat. These lands are undeniably crucial to our planet's wildlife.

- Up to a half of all North American bird species feed or nest in wetlands.
- More than a third of our planet's endangered or threatened species rely on wetlands in one way or another.
- Wetlands are home to nearly a third of our planet's plant species.

Soil is comprised of rock particles, water, air and humus. This last "piece of the puzzle" is the one that can vary so greatly from one soil sample to another, and its presence or absence impacts the available nutrients more than any other component.

Humus is decayed material from plants or animals, which may include scat. Scat is waste deposited by wildlife. It is a potentially beneficial additive and ought to not be confused with the wastes of domestic animals that may be routinely deposited in your backyard. Due to the differences in



Damp silt leaves evidence of its moisture retention capabilities on the hands of these eager students.



scale and content, dog waste should not be considered a positive addition to our soil. In practice, it represents a pollutant to both our soil and our water.

We at TWA subscribe to the wisdom:

“Tell me; I’ll forget.

Show me; I’ll remember.

Involve me; I’ll understand.”

This mentality is why we insist on incorporating a hands-on component in our programs, and Stewarding Soil is no exception. We expect to get our hands dirty.

At the conclusion of our discussion, younger students will be given the opportunity to interact with the three particle types: sand, silt and clay. Using their fingers and a hand lens, they will compare, describe and possibly record the color, texture and particle size of their samples.

Gritty is a good word to describe what sand feels like. This is because of the comparatively large size of each individual rock particle. If a grain of sand were the size of a basketball, a single piece of silt would be the size of a baseball, and one particle of clay would be the size of a golf ball.

If students are confident in those introductory physical properties, they may perform a ball/ribbon test to better grasp the samples’ degree of stickiness and the water retention capabilities to which that property alludes. This same test is often performed by soil scientists in the field, “wearing the hats of” gardeners, farmers or ranchers. They are then quickly able to assess the suitability of the soil for certain uses.

A clay ribbon is the only one of the three that can be picked up like a ribbon and displayed. Clay likes to stick together, and it is good at holding water. In fact, sometimes it is too good. If you can think of one spot in your yard or on your playground that is consistently muddy even though it hasn’t rained recently, that place is likely bare ground where plants seem never to grow.

Upper elementary and middle school students ready to tackle the next challenge can conduct a soil shake investigation, making use of a textural triangle. They

must have a firm grasp on the concept of mixtures and be able to figure percentages in order to complete these calculations.

Why do soil scientists or stewards take the time to learn about their own soil’s makeup? The vast majority of plants are more successful in a balanced mixture. In order to improve a soil, it is necessary to understand its current properties.

Investigation completed, we reflect back. We recollect that soil helps put a roof over our heads, foods into our bellies and clothes on our backs. It is an important resource doing critically important things for us.

If it takes care of us, then in return we ought...

“TO TAKE CARE OF IT,” students excitedly complete the declaration.

What does that look like anyway?

- Limiting or making wise decisions concerning the use of chemicals at your home.
- Making sure you are cleaning up after your pets in a timely manner.

- Reducing the size of your “footprint” by minimizing your waste and the landfill space required to accommodate it.
- Limiting erosion by covering bare soil that might be in danger of eroding.
- Introducing beneficial things into the soil, through the use of a compost pile or worm bin.

In order to help our young people better understand their relationship with nature and the great outdoors, L.A.N.D.S. Educators are positioned in the open spaces of West Texas, the heart of South Texas down into the Rio Grande Valley as well as the urban sprawl around both the Dallas/Fort Worth metroplex and the greater Houston area. We make it our mission to help tomorrow’s decision makers mentally and emotionally connect to our state’s natural resources. Our future depends on it. ☺



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