

Soil Health Amending The Garden

Maine Learning Results: Math:M2, F3, Science:F2

Purpose: Understanding that soil health is important for gardening success and healthy food is the most important concept to understand in becoming an effective and ecologically conscious gardener.

Key Concepts:

- Plants take what they need to grow out of the soil,(and along with sun and water that's how they make their food.)Thus, making sure that the soil has everything that the plants need is really important for enabling them to grow.
- We get pretty much everything that we need to grow and be healthy from plants, (and even when we eat meat, those animals were fed on plants), which ultimately means that we get our nutrition from the soil too, so healthier soil for the plants means healthier people who eat the food.
- In doing a garden with youth, we (at Cultivating Community) teach sustainable practices. That means that we want our gardens to be even better for future generations that they are now. We use organic soil care practices because they help ensure the long term health and productivity of the soil. (As well as being healthier for the environment and for farm workers and gardeners. We have an entire lesson on organic versus conventional agriculture and what those terms mean that we will do later in the year.)

Activity: To prepare for all of the activities to come, a brief lecture on soil is a good starting point. Bring in a seed, a seedling or plant, and a fruit (all of the same plant.) Like a tomato seed, tomato plant, tomato. Show off the three stages of the cycle, and then ask the class, "How does this seed become this plant that makes this fruit?" There are obviously a lot of factors here, but point out the simple mass involved, and ask what is it that helps that tiny seed to become that big leafy plant. The correct answer would be soil, water and sun. While the sun and water help the plant do the chemical reactions that enable it to make it's own food, the nutrients that it draws up out of the soil actually help it build it's body and fruit. It needs the things that it takes out of the soil to grow.

Now turn the focus to ourselves. What do we need to grow our bodies? Good food, basically. Now draw the connection between ourselves and plants. (If you are a parent you can bring in a photo of yourself as a child, and your child, and stand in the middle and you will be the parallel of the seed, seedling and fruit. This can be a good base to ask the question, what did I need to grow? And then you can answer it for yourself, and draw the connection to meat, milk, grains and vegetables, and the connection from those elements to the soil.)

Now we get ready to put this into practice. So if the plants take what they need out of the soil every year as they grow, then one of our main jobs as gardeners is to make sure that the soil is ready for them again next year. And if the plants have what they need, they will be healthy, and if they are healthy, when we eat them we will be healthy. So taking care of the soil is really taking care of ourselves in the long run.

The first thing that we do in the garden is a soil test, because if we are going to care for our soil, we need to know our soil. As we gather the soil for the test we can make observations of the soil and hypothesize about its health. Have kids work in pairs or small groups, each with their own paper cup of soil. The first thing to observe is the soil texture. Is it sandy? loamy? or silty clay? Sand tends to drain well and be low in nutrients. Clay is just the opposite; nutrient high and prone to muddiness. What color is it? The darker the soil often indicates higher levels of nutrients. If you add a little water, how easily does it make a ball? What does it smell like? Have each group predict whether it is sand, clay, or loam, and predict how high in nutrients it is on a scale of 1 to 10. These guesses can be tallied or graphed for the class and examined when the test results come in. If the garden has been grown in before, kids can make observations of places that flooded or that were too dry or that just didn't produce well last season, and make note of these, preferably on a map of the garden.

Tests can be obtained from the U of M Cooperative Extension. They provide a form and a little box which you fill with soil according to the directions and then send in to the U of M in Orono with a check for ten dollars or something like that. In a week or two they send back a comprehensive evaluation of your soil health and make recommendations for amendments as needed for optimum soil health. Before you get the results back though, you can begin preparing a manure delivery, because no matter what the soil is like, manure is always good.

Some things to think about when preparing a manure delivery:

- Look for cheap or free manure sources. Buying bulk is always good. Ask around, put it in the school newsletter, there are always animal owners out there with manure to get rid of. Also look for dairy farms or horse boarding farms.
- Most people find the most desirable manures to be horse or cow. Poultry tends to be too high in nitrogen and can burn the plants, and washes away easily. We have experimented with alpaca, which was not as nutrient rich as horse or cow. Alpacas have very efficient digestive systems, and they fully extract the nutrients out of their food along the way, leaving little leftover useful stuff in the manure. Pig manure can be good, but if the pigs have been fed an omnivorous diet then it must be fully composted and aged. We have never used sheep or goat manure.
- On composting. All manure should be composted or aged at least a few weeks before attempting to spread it. Gloves should be worn by school kids when shoveling and handling manure. Manure spread by Nov 1st will be completely safe to touch by spring time. It can be even better for your garden if the manure is fully composted before you spread it, because the process of fully composting in a maintained pile that is turned regularly should heat the manure enough so that any remaining weed seeds will be killed and thus your garden will have less weeds.
- When arranging manure, you want 2-4 inches of manure over the top of all exposed soil. This can be a great early geometry problem. See attached sheet.
- In arranging a manure delivery, consider your resources. At least one willing volunteer or family member with a truck is necessary. A dairy farm, which might charge you for the manure, will have a bucket loader and will be able to fill up the back of your truck for you. If you don't have access to a bucket loader you will need some volunteers with shovels. Once the truck is loaded, arranging for the youth to unload it is highly recommended. Give notice to parents that kids should dress appropriately, keep gloves and lots of shovels and

pitchforks on hand, and let the janitors know. Kids can be in charge of sweeping and mopping the hallways after they come in. Unloading the manure themselves is a great opportunity for teambuilding, physical exercise, ownership of the garden, and it just gives them a great story to tell.

Once the manure has been obtained and is ready to be delivered and unloaded, the kids should suit up and half of the group can take shovels and unload the trucks onto the garden beds. The other half can take rakes and pitchforks and spread the manure and work it into the soil. Try and appoint at least one or two quality control managers to help make sure that all of the beds get amended evenly.

When soil test results come back in, kids can calculate how much of any other amendments are needed using the ratios given on the cooperative extension's recommendations. Other amendments needed can be ordered from FEDCO seeds (www.fedcoseeds.org), Organic Growers Supply company. (Ordering amendments from Fedco is usually a better value than buying smaller quantities at the hardware or garden store, and you ensure high quality organic brands.)

Materials: Soil test boxes and sheets from the Cooperative Extension, a bucket, shovels, rakes, pitchforks, gloves, a truck. Seed, seedling, plant.

Timeframe: Depending upon the size of your garden, 1-2 weeks of planning and 1-2 hours of shoveling. Soil test takes about 20 minutes. Further calculations of soil test results may take several days to a week.