



North Pond Restoration: Soil Sampling

Looking Closely at the Soil

To help restore the North Pond Nature Sanctuary, scientists studied the soil in and around the pond. (Learn more at <http://lincolnparkconservancy.org/the-campaign-for-north-pond/>) Knowing more about the soils helps us make decisions about what plants and trees will thrive there which is a major goal of our restoration work.

Soil is a mixture of organic material (including dead leaves and decayed plants) and tiny rock or mineral fragments called sand, silt, and clay. Clay particles are so small you cannot see or feel individual particles, while sand is big enough that you can see and feel individual particles. Silt is made of particles a little bigger than clay and much smaller than sand. Some plants prefer soil with a lot of clay because it holds water well. However, because water does not move through clay easily, it can cause flooding and plants can get too wet, and when clay dries out it cracks. Other plants like soil that contains more sand, giving it more drainage and a lighter texture. However, sandy soils can dry out because they drain so quickly. Silty soils are a good compromise because they retain some water, but not as much as clay; they also allow water to move through the soil, though not as quickly as sand. Most plants prefer a mixture of all three: sand, silt, and clay in an ideal ratio of 40-40-20, respectively. Knowing about the relative content of sand, silt, and clay helps us know where to modify the soil and/or manage the plants that grow around the North Pond. This information can also help you grow plants at home, either in your yard or in pots inside.

Materials: soil from your garden or a pot you have used in the past or intend to use in the future for a house plant (do not use potting soil alone, get something with a mix of textures), bucket or bag for sample, small shovel/trowel/metal cup measure, paper to cover your work surface, paper or journals for making notes, glass jar(s) with lid (one jar for each sample, all the same size), masking tape and marker to label the jar(s).

Guiding Questions: Have you ever looked at soil up close? What is soil? What is it made of? Do you think all soils are the same? Are they all made of the same things? If they are all made of the same things, what makes them different from each other? How could we find out? Why would it be important to know what soil is made of? Do all plants like the same kind of soil? How does the type of soil affect the type of plant that lives in it?

NOTE for Grownups: it is fun to do these activities with your children, remember when they lead the activity, they learn confidence and problem-solving skills.

Soil Sampling Directions:

1. Collect soil from your yard or container. Ideally remove all the grass, leaves and other plant material from the surface of the ground before digging into the soil. If you do not have a yard, find somewhere you can get soil that has a mixture of other materials, and is not just potting soil. This could be a pot you intend to use for a new plant, a window box, or a planter you used to grow things in last year.



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2. You can keep things simple and only collect from one place, or you can pick many different locations to collect soil. If you are collecting multiple samples, collect the same amount of soil from each location.
3. Spread your first sample out on a sheet of paper. Remove any large sticks, stones, leaves, and other objects from the soil. Make preliminary observations.
What do you see? What does it feel like? Can you see or feel sand or other fine particles? Make a guess about the composition of the soil.
4. Break up large clumps of soil and put it in a jar. The jar should be about 1/3 full. Add water until it is almost full (leave about an inch at the top). Label the jar.
5. Repeat this process for any other samples you collected.
6. Put the lid on tightly and shake the jar until all the soil is saturated. This can take a while!
7. Let the jar(s) sit for about 24 hours. The soil will slowly settle in layers.
8. Observe your sample again. How many layers are there? Which layers are made of the biggest particles? Which the smallest? Why do you think that is? What else do you see?
Sand particles are generally heaviest and settle first. A good soil for growing most plants is about 40% sand. Next to settle is silt. Silt particles are between sand and clay in size. A good soil is 40% silt. Clay is smallest and settles last, A good soil is about 20% clay.
9. Why would understanding soil conditions benefit the restoration of the North Pond or your yard? If a soil has a lot of clay and retained water, how would that affect the types of plants that lived there? How would sandy soil affect the plants? Would plants that need a lot of water do better in clay soil or sandy soil? What about plants that like it dry?
10. To continue exploring, carefully pour off the water and scoop out the layers, one at a time, with a spoon. Spread the particles on a sheet of paper. Examine each later up close. What other observations can you make? Do the layers feel different? What else do you notice about the layers? What questions does it inspire in you? Where else do your questions, observations, and explorations take you?

Explore more ideas and lesson plans:

<https://familygardenlife.com/learn-make-soil-testing-fun-kids/>

<https://www.kidsdiscover.com/teacherresources/dirt-soil/>

<http://www.ecofriendlykids.co.uk/simple-soil-experiments-for-schools.html>

<https://lifestyle.howstuffworks.com/crafts/science-projects/science-projects-for-kids-soil-experiments.htm>

https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/edu/?cid=nrcs142p2_054300

<https://www.soils4kids.org/experiments>

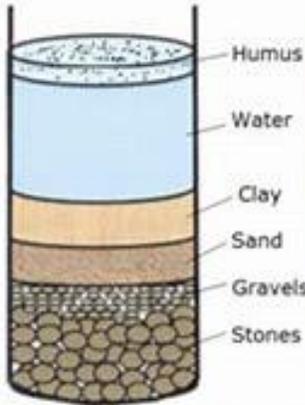
<http://www.gardenality.com/Articles/752/Resources/Terminology/What-is-Loam-Soil/default.html>

<https://www.turfaresupply.com/blog/2017/07/31/soil-management>

https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/?cid=nrcs142p2_054167

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Soil Sampling Images from the web



SOIL TEXTURE COMPARISON

SOIL CHARACTERISTICS	SAND	SILT	CLAY
Ability to Compact	Low	Moderate	High
Air Space	High	Moderate - High	Low
Soil Fertility	Low	Moderate - High	Moderate - High
Tendency to Form Clods	Low	Moderate	High
Water-Holding Capacity	Low	Moderate - High	High
Water & Air Permeability	High	Moderate - High	Low
Workability	High	Moderate - High	Low

