# Soil Types & Tests

By Catherine Chaplin
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**Know your soil: the real dirt on what's underfoot in your garden.**

Soil may not appear complex or even fragile, but when you walk on your lawn you are stepping on an ecosystem as multifaceted and rich as the rainforest. A cup of soil may contain as many bacteria as people on Earth, and most bacteria are highly beneficial.

Here in the Skagit Valley we are fortunate to have some of the best soils in the world.
In spite of this, there may be times when our gardens need help with nutrition.
Knowing the health of the soil is important if growing edible gardens. The makeup of the soil will determine the nutrient value of the foods you harvest.

There three distinct types of soil in Skagit County. The fertile river bottom and flat lands out to the Puget Sound are the bread basket of the valley. If you go up higher in elevation to the gentle slopes you may find highly compressed gravel or hardpan, usually related to the forces of glacial pressure that shaped the Skagit Valley. Even higher, the mountainous and steep slopes are very rocky, with little to no top soil. Along the rivers though, the soil stays consistently lush and productive.

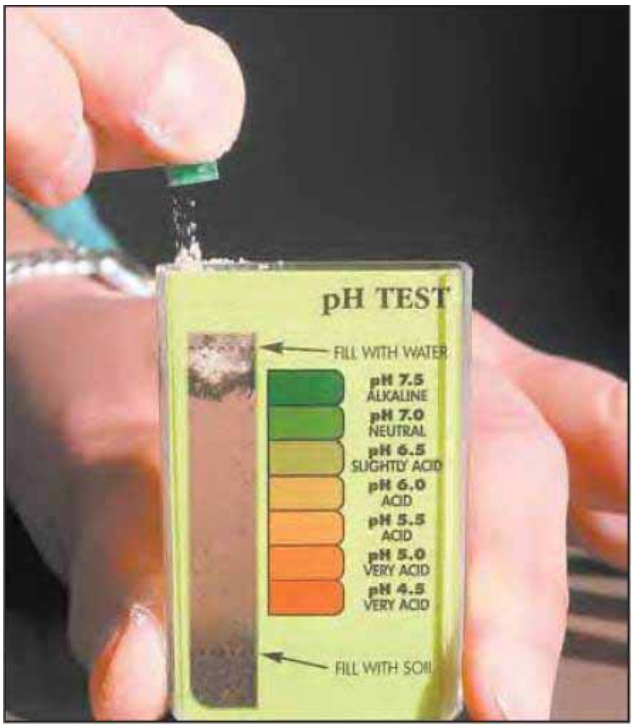
Soil is a mixture of weathered rock fragments and organic matter on the earth's surface. There are four main ingredients to the composition of soil. These are clay, sand, silt, and organic matter with trace elements. If you grab a handful of earth it is about half air. This is what allows it to hold or retain water. It's important to know the components of your soil profile to manage it best.

The number one reason for your soil to be unproductive is the compaction of the soil. Your soil structure can be damaged by digging up the soil when it is too wet. Be patient. Don't rush out to start working with the spade and garden fork when your soil is still saturated with winter's rain. High rainfall also can leach nutrients from the soil. Along with the high level of decomposed natural vegetation in the forest and wetlands, many of our soils have a low or acid pH.

The soil is a living organism. If your plants are not thriving, before applying potentially dangerous chemicals to solve problems please consider first testing your soil to get a valid diagnosis.

**Why Test Soil?**

- Help in diagnosing plant problems.
- Improve the soil's nutritional composition
- Optimize crop production
- Protect environment from contamination by runoff and leaching of excessive fertilizers
- Save money and conserve energy by applying only amount of fertilizer needed
- Identify toxic substances in the soil




Photos by Scott Terrell / Skagit Valley Herald

LEFT: Acidity, or lack of it, is a factor in your soil's productivity. A home pH test can help you determine whether your soil is alkaline, neutral or acidic. ABOVE: A do-it-yourself soil test kit can help you determine the amount of nutrients, or NPK (nitrogen, phosphorus and potash/ potassium), in your garden soil. For a more accurate or detailed test, take your soil sample to a professional.

Consider doing a Soil Profile Test (see Infobox). This is a cross section sample of your soil, usually a foot or two deep. This will tell you the structural composition of your soil – how much sand, clay, and organic matter you have to work with. A Soil Fertility Test will tell you the amount of nutrients or NPK (Nitrogen, Phosphorus and Potash/Potassium) in your garden soil.

Test around your house or outbuildings. Toxins such as old leaded paint chips may have fallen from the buildings, causing toxic chemicals to leech into the soil. Draw a map with labeled areas that you've tested to keep a clear record.

**Testing Soil Fertility**

Buy a Soil Sample test kit, available for $5.00 to $20.00 from your local nursery or garden store. Typically these only test for pH, nitrogen, phosphorus and potassium. For a more detailed test by professionals, package and send to:

Soil and Plant Tissue Testing Laboratory
West Experiment Station
682 North Pleasant Street
University of Massachusetts
Amherst, MA 01003

Soil tests from U of M cost between $5.00 for a soil pH test to $13.00 for a standard soil test (pH, nutrients, heavy metals, percent organic matter, and more).

Note: Pesticide residues and petroleum contaminants are not identified in these tests. For more information on soil testing at University of Massachusetts; www.umass.edu/soiltest

**Soil Sampling Procedure:**

- Sampling can be done at any time, but avoid sampling very wet soils. Don't take samples from areas that have been recently fertilized. Don't use soils on the very edge of the property.
- Sample should be a mixture of about twelve separate scattered sub samples taken over the planting area.
- Using a clean spade or sampling tube, obtain soil through the surface through the primary rooting zone of the crop. For most crops 6-8 inches is appropriate. For grasses, 3-4 inches will suffice.
- Place the 12 samples in a clean container (pail or bag), mix thoroughly. Spread mixture out on a clean paper to dry. (Do not dry soil in the oven. This kills beneficial microorganisms and smells awful).
- Mix the soil again. Take one cup of soil and place in a zip-lock bag. Label the bag with your name, address and name for the sample. (ID)

Courtesy of: http://soils.tfrec.wsu.edu/index.html

## SOIL FACTS

(taken from the USDA NRCS 2001 Soil Planning Guide Calendar)

- One cup of soil may hold as many bacteria as there are people on earth.
- The weight of all the bacteria in one acre of soil can equal the weight of a cow or two.
- Actinomycin, neomycin, and streptomycin are examples of familiar antibiotic drugs produced by soil actinomycetes when grown in laboratory cultures.
- It was from a soil fungus, a *Penicillium* species, that the first modern antibiotic drug, penicillin, was obtained.

## Additional Facts:

- It takes between 80-400 years to form one centimeter of topsoil!!
- The combined erosion (via wind and water) for the U.S. is 1.9 billion tons per year (as of 1997 USDA-NRS data)!
- Imagine our planet without soils (from National Society for Consulting Soil Scientists, Inc.)....
    - Imagine only raw parent material and lifeless dust. Sand and silt are still produced by glaciers, volcanoes and the action of water.
    - Without microbial activity to produce soil structure, the sun would be blocked out by
    - the blowing dust and rivers would clog with sediment.
    - No anaerobic soil conditions would occur to produce distinctive wetlands. The continents would be dustbowls pocked with mud holes and broken by barren, rapidly

- eroding mountain ranges. Our deep oceans would be shallow seas filled with sediments.

This was our planet before soils were formed.

**RESOURCES:**

1. Soil Quality Institute Homepage: http://www.statlab.iastate.edu/survey/SQI/
2. Washington Soil Map: http://remotesens.css.wsu.edu/washingtonsoil/index.htm
3. Soil Quality Test Kit Guide: English language version: http://soils.usda.gov/SQI/assessment/files/test_kit_complete.pdf
   Guía para la Evaluación de la Calidad y Salud del Suelo: http://soils.usda.gov/SQI/assessment/files/KitSpanish.pdf