

How Healthy is Your Soil?

Healthy soil is the foundation of a healthy ecosystem, whether that be your backyard garden or a redwood forest. In some ways, gardening is more about farming soil than it is farming plants. So how can you know how healthy your soil is? One option is to get your soil tested in a lab. This is a great option for larger properties in particular - \$50 is a great deal for acreage of land, but when we're dealing with a backyard garden, it doesn't make as much sense. Luckily, we can learn a lot about the condition of soil using our most basic scientific instruments – our senses – and a few simple gardening tools.



Head out to the garden and dig a hole that's about 1 cubic foot – 12 inches deep, long and wide (if you have plans to dig a swale, rain garden or pond, dig your hole in that spot). Spread the soil you removed on a tarp or similar surface, and get ready to make observations and take notes:

- Is the soil easy to dig or is it like concrete?
- Is it a nice dark brown indicating good organic matter or a less-than-optimal beige, gray or blue indicating low organic matter and lack of air?
- How does it smell? A scent like a nice, earthy forest floor indicates a healthy soil food web
- Grab a handful of the soil and squeeze – what happens? Does it compact, crumble or sift through your hand?
- If you dug in an area with roots, like a lawn, do they go nice and deep or do they stop short, indicating compaction or a hardpan layer in the soil that needs to be broken up?
- Is there a variety of different insects? How many earthworms are there? Species diversity and 10 or more earthworms are good indications that the soil provides a healthy place to live

Beyond these observations, there are a couple of simple home soil tests you can perform after you've dug your hole that will help you understand your soil and its needs:

Percolation Test

A home percolation test is a simple way to measure how quickly your soil drains and to determine how much area you need to infiltrate the rainwater during a major event.

Follow these simple steps to conduct your own percolation test:

- 1) Dig a 6"-12" deep hole in your future swale area.
- 2) Place a ruler (or stick marked in inches) in the bottom of the hole. The measuring device should reach the top of the hole.
- 3) Fill the hole with water several times to saturate the soil. This may take several hours or overnight in clay soils.
- 4) Note the time. Fill the hole with water. When the hole is empty, note the time and calculate the time needed to drain the hole.



- 5) Convert this rate to minutes per inch (divide the minutes by inches- 120min/5 inches is 24min/in)
- 6) Find your percolation rate on the chart below.

Infiltration Rate (min/inch)	Area Needed (sq. ft/ gal/day)	Example: <i>After filling the hole four times, the water level dropped 6 inches in 75 minutes. 75 divided by 6 is about 13 minutes/ inch.</i>
0-30	0.4	<i>13 min/inch is between 0 and 30, so we use this line.</i>
40-45	0.7	
46-60	1.0	
61-120	2	

Type of soil	Sq. ft/ 100 gal/day	GallonsMax. absorption/sq. ft/ 24 hrs
Coarse sand or gravel	20	5.0
Fine sand	25	4.0
Sandy loam	40	2.5
Sandy clay	60	1.7
Clay with considerable sand or gravel	90	1.1
Clay with small amount of sand or gravel	120	0.8

The Mason Jar Test – Soil Composition

A home soil composition test is the best way to determine what your soil is made of and how it will perform in regard to infiltration rates and nutrient availability.

Follow these simple steps to conduct your own soil composition test:

- 1) Use a clear, clean, empty jar with a tight lid. A pint or quart Mason jar works fabulously.
- 2) Fill the jar about half full of garden soil
- 3) Fill the jar nearly to the top with water. Leave room for shaking.
- 4) Tighten the lid and shake the jar for several minutes so that all the particles are in suspension.
- 5) Set your mason jar soil test aside for several hours, so the particles have a chance to settle. They will separate into clay, silt, and sand layers.



Reading the Results of your Soil Composition Test:



Here are the basic percentages for the different soil types:

30% clay, 60% silt, 10% sand = **Silty Clay Loam**

15% clay, 20% silt, 65% sand = **Sandy Loam**

15% clay, 65% silt, 20% sand = **Silty Loam**

As seen in the mason jar:

20% clay, 35% silt, 45 % sand = **Perfect soil conditions**