

SOIL 101

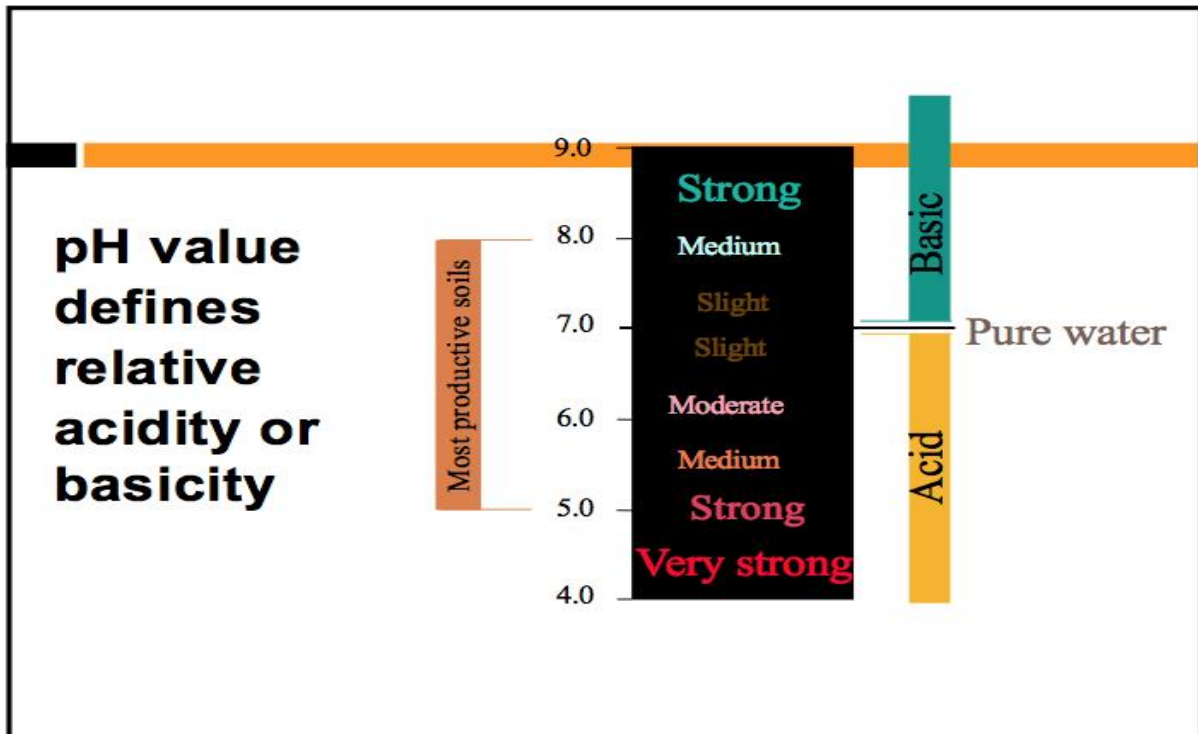
What is tilth? What is pH? What do those numbers on the fertilizer package mean? Want the scoop on dirt? Here are a few soil facts.



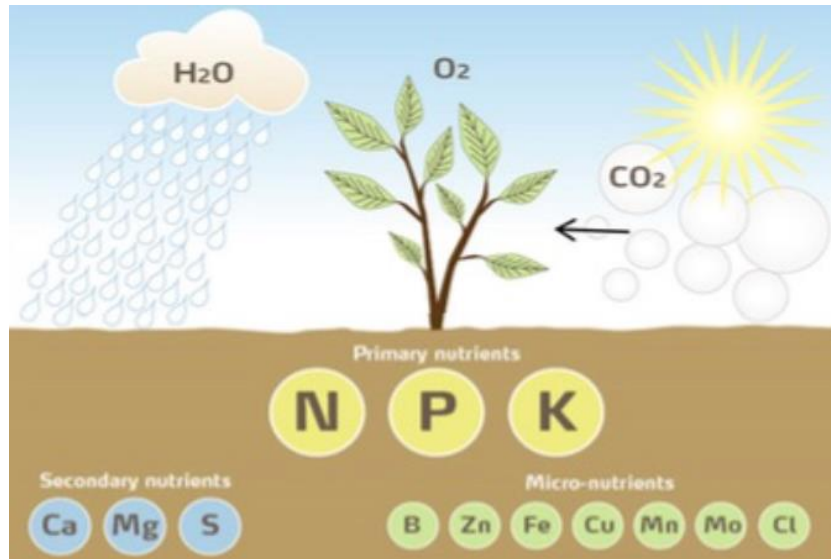
Soil is the unconsolidated cover of the earth made up of minerals, water, air, and organic components, all of which support plant growth. About 48% is a mix of sand, silt, and clay, which are particles of weathered rock. Organic materials only make up about 2% of soil in our area of Oklahoma. Organic material is home to beneficial soil organisms and improves water movement and oxygen transport through the soil. It is a key source of nutrients as it decomposes. Air and water move through the open areas in the soil structure. Together they make up about 50% of healthy soil.



Tilth is the physical condition of soil and its ability to promote seedling emergence, root penetration, and relative ability to hold air, water, and nutrients within. Medium texture is best for air and water movement. Heavy clay soil has a challenging time absorbing water and nutrients but once absorbed, holds them very well. Clay compacts easily thus making it difficult for plant roots to penetrate. On the other hand, sandy soils do not retain water or nutrients very well. Soil with good tilth will be a mix of clay, sand, and organic material with about 50% solids and 50% voids between them for air and water to move. The Tulsa Master Gardeners website has instructions on how to determine the structure of your soil. Under ***Lawn and Garden Help*** choose the ***Soil*** tab and the ***Soil Classification Test*** tab.



Soil pH is a measure of its acidity or alkalinity. Nutrient availability is dependent on proper pH. Alkaline soil has a pH above 7; acidic soil has a pH below 7. Most plants grow best in soil with a neutral to slightly acidic pH between 6 and 7. A soil test will tell you what your pH level is and how best to improve it. Instructions for getting a good soil sample and test instructions are on the Tulsa Master Gardeners website. Under the **Lawn and Garden Help** tab choose the **Soil** tab and the **Soil Test Instructions** tab.



NPK & Other Nutrients

There are sixteen plant nutrients in soil. Nitrogen, phosphorus, and potassium, or NPK, are the Big Three of nutrients that plants require. Most nutrients are attached to and retained by the organic material and clay particles found in soil. Nitrogen is the most mobile of these three. It moves by water through soil and it is the nutrient most often deficient in our lawns and gardens. Potassium and phosphorus are much more stable in the soil. Most fertilizer is a combination of these three elements. The numbers on the package are the ratio of each in the product. Nitrogen is listed first, phosphorus is second, and potassium is third. A bag of 10-20-10 is 10% nitrogen, 20% phosphorus and 10% potassium. The other 60% of the product is filler like sand, dirt, or peat moss. The filler keeps the nutrients evenly distributed and makes the product easier to use. In addition to telling you your soil pH, a soil test will also tell you if your soil is deficient in one or more of the Big Three nutrients and how much is needed to properly amend your soil. Instructions for getting a good soil sample and test instructions are on the Tulsa Master Gardeners website as noted above under the pH section.

Sources:

- OSU E-1003 Oklahoma Homeowner's Handbook for Soil and Nutrient Management
- "Soil and Nutrient Management" Zhang, Hailin OSU Dept. of Plant Sciences