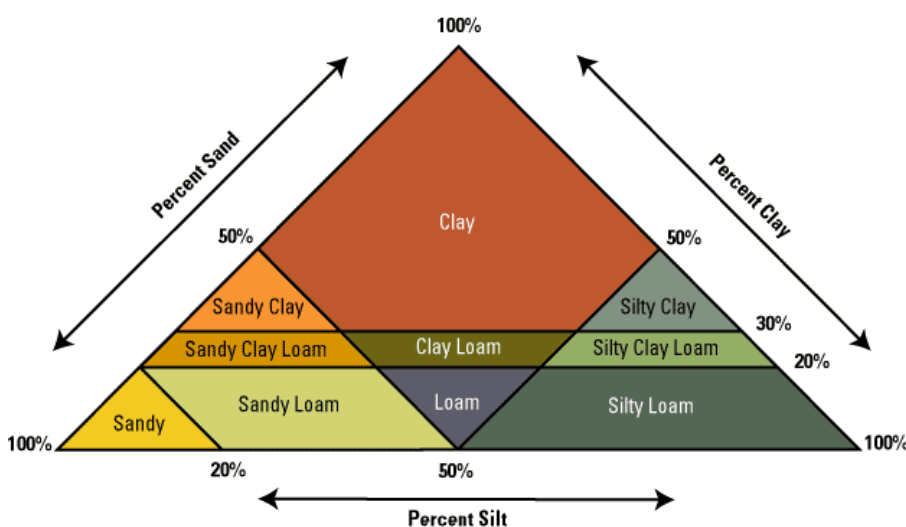




# Soils and Fertilizers

**Soil Texture** in eastern Idaho can vary from sand to clay and everything in between. Texture can even vary significantly from one part of your yard to the next. Luckily, but both heavy clay soils and light sandy soils are improved in much the same way--by adding organic matter, which decomposes into humus. Humus gives soils a spongy texture. It separates the flat, clay particles and improves aeration. In sandy soils, humus acts like "glue" holding the round, sand particles together and helping the soil hold moisture. The humus allows roots to expand more easily, while retaining the nutrients and water in the soil. All soil benefits from the addition of organic matter. Doing this is an easy and natural way to use materials that would otherwise be thrown away.



If a particle of sand were the size of a  basketball, then silt would be the size of a  baseball, and clay would be the size of a  golf ball.

**Organic matter** is anything that was once living. Look around. Chances are you already have a lot of good organic matter around your yard and kitchen. Are there grass clippings, leaves and garden residue, such as stalks, plants and vines available? If you're lucky, you'll even have access to hay and well-rotted manure. All of these things add valuable nutrients and condition the soil, and they can be added right to the garden. To make them more readily available to the plants, you can make them into compost before applying them to your garden. Tumbling compost bins are available and they can speed up the compost process significantly. Also available are organic matter such as compost, peat moss, soil pep (partially composted forest products) and sterilized steer manure.

**The three major nutrients** are always prominently displayed on a fertilizer bag. These numbers, such as 10-10-10 or 28-4-4, refer to the three major nutrients in the fertilizer contained in the bag. The first number is nitrogen, the second phosphorus and the third is potassium. They are always listed in this order, and the numbers indicate the percentage (by weight) of each nutrient. For example, a hundred-pound bag of 28-4-4 fertilizer contains 28 lb. nitrogen, 4 lbs. of phosphorus and 4 lbs. of potassium.

Each of the three major nutrients has a special job to do during the growing season. Nitrogen is essential to all living things. It stimulates healthy foliage growth. Phosphorous is important in root development and flower and fruit production and especially benefits root crops such as carrots, beets, and potatoes. Potassium, or potash, helps the development and vigor of the whole plant and aids in disease resistance.

**Macro-nutrients** also include calcium, magnesium and sulfur, all supplied by the minerals in your soil. If your soil is deficient in any of these major nutrients, your crop production and quality will suffer. Most crops require 3 lbs. of nitrogen per 1,000 sq. ft. per season. This takes approximately 1 ½ qts. of 10-10-10 fertilizer for 100 square feet.

Some examples of organic sources of nutrients (analysis can vary widely):

Bone Meal:	0-10-0	Blood Meal:	12-0-0
Rock Phosphate:	0-3-0	Cow Manure:	1-0-.5
Green Sand:	0-0-1	Horse Manure:	1-0-.5
Ocean Kelp Meal:	1-0-2	Poultry Manure:	2-1-.5
Cottonseed Meal:	6-1-1		

**Manures** are one of the best sources of both nutrients and organic matter. Their nutrient levels will vary depending on their freshness. Older, composted manures are weaker and are recommended more highly. Remember, uncomposted manures may contain weed seeds.

**Minor nutrients** include boron, chlorine, copper, iron, manganese, molybdenum and zinc. These 16 plant nutrients, whether used in large or small quantities, are absolutely essential for plant vigor and productivity. A deficiency of any of these nutrient elements can limit plant growth and development, and ultimately yield.

**Soil pH** is the level of acidity or alkalinity of the soil. A pH level of 7.0 is neutral. Seldom will soils get lower than 4.5 or higher than 9. Almost all soils in eastern Idaho are alkaline with typical readings from about 7.5 to 8.5, while most plants prefer a slightly acid pH of 6.0 to 6.8. This creates some problems as some nutrient elements in the soil (most commonly iron and zinc) may be chemically tied up or bound to soil particles and unavailable to plants if the pH is outside of this range. Soil pH can be raised (seldom needed in our area) by applying ground agricultural limestone which contains calcium and some magnesium. Lowering soil pH is achieved by adding sulfur, either in its elemental form or as a component of some fertilizers.

**Humic acids** are contained in most manures and composts and are also available in highly concentrated forms called humates. Humates help release unavailable nutrients to the plants. Amazing results have been found using products that are high in humic acids- such as *Natural Guard Soil Activator* in granular form, or *Save-A-Tree* in liquid form applied to the soil.

**Beneficial organisms** including beneficial fungus and bacteria are an important component of healthy soils. Avoiding excessive chemical use, and adding additional organisms with products such as MYKE® (beneficial fungi) and Legume inoculants (beneficial bacteria) along with the liberal use of organic matter can dramatically improve plant performance.

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