

Video Transcript

Elementary Lesson 2: Properties of Soil

- Speaker 1: Today we're going to talk about the properties of soil. Soil is the main ingredient and very important to farmers and gardeners trying to raise food. The soil here around my home is very high in clay and not good for growing vegetables. Thankfully, I can improve my clay soil by adding compost and fertilizer, making it a very rich media for growing my vegetable plants.
- Speaker 1: Okay, we are in my strawberry bed. I want my strawberries to grow big, red strawberries, and in order for them to do that, it has to be in the right soil conditions, so we need to take a soil sample out of this garden bed and have it tested. That analysis is going to tell us the level of pH in the soil. That's going to tell us how acidic and how alkaline the soil is. It's also going to tell us the essential elements that are in the garden soil, nitrogen, phosphorus, and potassium. Those are the three important elements that I need to know what level they are so I know how to fertilize my soil correctly.
- Speaker 1: So we have a soil probe. Your soil sample needs to be four to six inches deep. You can also, if you didn't have a soil probe, you could also use a shovel to dig the soil up, so we're going to take the samples, we're going to put them in the blue bucket, we're going to mix them up, and then we'll take one cup of soil and put it in this Ziploc bag. This Ziploc bag will then be sent to a lab and be tested. Those test results will be sent back to me, and will tell me how fertile my soil is.
- Speaker 1: As we continue to talk about soil, I want you to know that all soils are not alike. They have different ingredients in them. Soil scientists identified sand, silt, and clay are the three particles that make up a soil, so we had a group of farmers send soil to us so that you can see the different soils that are in the United States. First, let's start with Florida. Florida's soil tends to be very sandy, and you can see from this sample that it's dark. You have a little bit of organic matter in here. The next sample is very light, and generally light soil does not have a lot of nutrients in it. If we planted a seed in this soil, it would do relatively well because of the nutrients in it. If we planted a seed in this soil, it wouldn't do as well and we would have to add more nitrogen, phosphorus and potassium for this soil to produce any kind of a crop.
- Speaker 1: Next I'm going to move over to this Kansas soil. This soil, unlike the Florida soil, is very sticky and clay-like. Again, this one is not the greatest for growing any kind of vegetables in because it doesn't let water drain through it. It holds the water very tightly. What we did also to show you what the clay looks like is we put it in a jar, we added water and we shook it up. After we shook it up, it all settled, and you can see from this sample that the majority of the soil is clay. It's very fine and silky. At the top of the jar is organic matter, and that organic matter makes the soil structure better and adds nutrients to the soil. We also have some Kansas garden soil. This soil's been amended with compost and fertilizer, and you can see how dark it is. It has a lot of organic matter, it crumbles easily, and this is a great soil for planting your garden in, and you can see in this jar how it settled. There are different layers in this jar. The bottom has the sand, this layer is the silt, and the top on the top is a little bit of clay, and then way up here is the organic matter. This is a very good soil for growing a garden in.

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Speaker 1: We're going to take a look at the Virginia soil. You can see that it's almost a little bit red in color. It has sand, silt, and clay in it, and as it settled in the jar, you can see the different layers. This, again, is a very nutritious soil. It has the right nutrients in it, and this would produce a good crop for any farmer or gardener. Then we have some Texas soil. Again this soil is going to be more sandy like the Florida soil, and if you feel it it's very gritty and it falls apart. This is not going to hold a lot of nutrients in it. The nutrients are going to run right through it, so this is not the best soil for producing the crop in. The farmer would have to amend it with compost and fertilizers to get a good crop out of it. You can also see how it settled into the different layers, the sand, the silt, and the clay.

Speaker 1: Then here at the end we have soil from New York. Again, this soil is very fine. It doesn't have a lot of clay in it. It has a lot of silt in it. This again would be a great soil for growing a garden in, and here you can see again that is separated into different layers. I also want to show you potting soil. A lot of us use potting soil to grow vegetables on our deck, or we use potting soil to put flowers in a container, and you can see that a little bit is settled at the bottom, but most of it is very lightweight and has gone to the top of the jar. This up here is all organic matter, and the organic matter has a lot of nutrients in it.

Speaker 1: To define organic matter, it is plant, animal or insect material that has died and is decomposing, and that decomposition process, as it breaks down, it becomes part of the soil, and that decomposition adds nutrients to the soil. As you view these, you'll be able to see that not all soil is the same, but all soil can be amended and fertilized to produce a vegetable crop.

Speaker 1: We've been talking about soil properties, and I want to show you the difference in size of sand, silt and clay. If we put sand, silt, and clay under a microscope, we'd be able to see how different in shape and size that they are. The first one I have is sand. Look how big sand is. It's the size of this large volleyball. The next comparison would be silt. Silt is much smaller than sand. The third one is clay. Under a microscope, if you looked at sand, silt, and clay, this would be the relative size of each of them.

Speaker 1: So I just showed you the different sizes of sand, silt and clay. Now I want to show you what real sand, silt, and clay looks like. Here I have example of sand. This is large sand, and the I have an example of fine sand, so not all sand is made equal. If you are a seed and I planted you in sand, would you grow? Most likely you'd have a hard time growing. Water and nutrients flow right through this sand, so it's important that you probably shouldn't plant in this sand. Now, here we have a loamy sand, and we have a sandy loam. Both of these soils have quite a bit of sand in them, but they also have loam. The loam carries and holds the water and the nutrients better, so if i was planting a seed, this type of soil would be better than the sandy soil. As you can see, it's still sandy and gritty, but it's going to have more water holding capacity and nutrient holding capacity than the big sand.

Speaker 1: I also have a sandy clay loam, and you can see that it's darker in color. Generally, darker soils have more nutrients in it than the lighter soils, so a sandy clay loam has sand, clay, and silt in it. You can also see here we have some other samples, and I know that you can see that this is not the right kind of soil. It's not the best condition for a seed to grow

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and germinate in, and this one over here is a silt loam. Kind of like the others, if we added water to this, we would make a great soil ribbon and this would be another good media for plants to grow in. Then the last one, I just want to show you what clay looks like in a powder. It's just like flour. It's light, it's airy, and it's very, very tiny like I showed you on the three balls. It's so tiny it feels like silk.

Speaker 1: In conclusion, I just want you to know that all soils are different and not made equally. Some of them are better for growing crops than others, and the only way to know for sure what type of soil you have is to have a soil analysis taken.