The Effect of Carbon on the Soil Content at Hartford High School, VT

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Introduction

Everything that is alive and living has carbon in it. The dry weight of all living things is two-thirds carbon. Carbon stitches all living things together.

Our hypothesis was as the density increases in the levels of soil, the amount of carbon should decrease. We came to this hypothesis through the following thought process. As the density levels increased the soil became more compacted. By the soil becoming more compressed, there would be less room for water, and O_2 for the organisms to breath in. By there being less space for water and oxygen, there would also be less available nutrients for the living organisms. Since organisms are primarily made up of carbon, there wasn't enough nutrients for living things to be in the deeper layers of soil, so that means there was less carbon in the deeper parts of the soil.

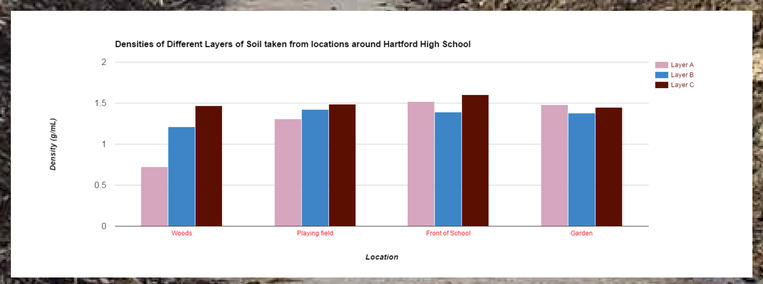
Materials and methods

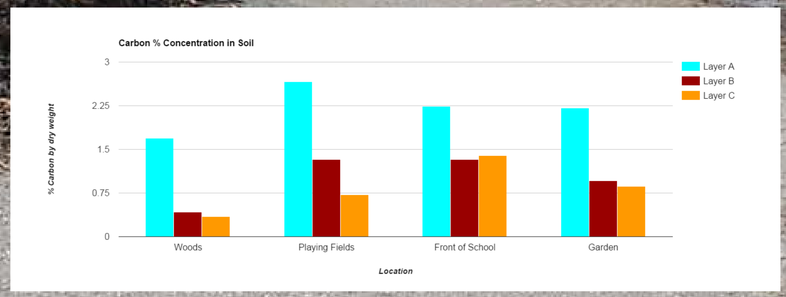
- First we went out to 4 locations at Hartford High School which where a garden, a woods, the playing field and in front of the school.
- We took soil samples from each location. From each site we took 3 samples; layer A was 0-10 centimeters down in the soil, layer B was 10-20 centimeters down in the soil and layer C was 20-30 centimeters down into the soil.
- Second we took the soil samples through many tests these tests included the density of the soil and the carbon test.
- To find the carbon percentage we sent the soil samples to UVM and they found the amount of carbon for us.

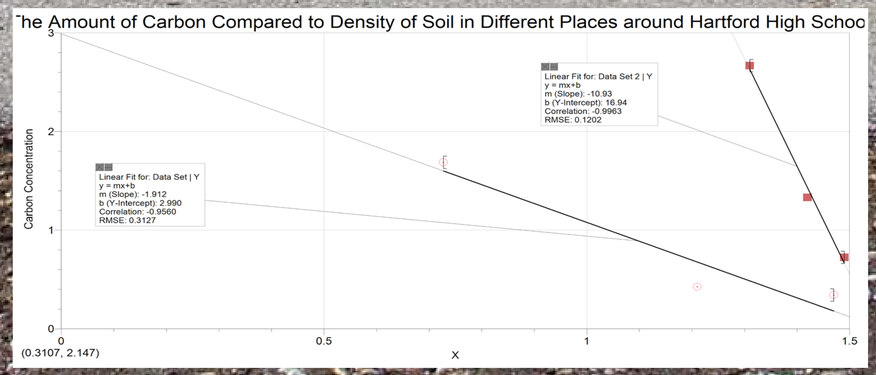
Results

For the densities of the Garden, layer A to layer B decreased by .10g/mL, from layer B to layer C it increased by .07g/mL. The woods densities went up as we got deeper into the soil. From layer A to layer B the density increased by 0.483g/mL, from layer B to C in increased by 0.26g/mL. For the densities for the front of school they didn't all increase, from layer A to layer B it decreased by a very little amount of 0.13g/mL. From layer B to C it increased by 0.21g/mL. For the density of the playing field layer A to layer B it went up 0.11g/mL and from layer B to it increased by 0.07g/mL.

For the carbon levels in the garden, layer A to layer B decreased by 1.252%, from layer B to layer C it decreased by 0.096%. The woods carbon levels from layer A to layer B decreased by 1.263%, from layer B to layer C it decreased by 0.082%. For the carbon levels of the front of school the levels both increased and decreased. From layer A to B it decreases by 0.0912% and from layer B to layer C, it increases by 0.069%. For the carbon levels in the playing field, layer A to layer B decreased by 1.337%, and for layer B to layer C the amount of carbon also decreased by 0.608%. In the Density Vs. Carbon graph, the density gets bigger as the amount of carbon gets smaller for only two of our sites, these sites were the woods and playing fields. The woods had a negative slope of -10.93 percent carbon concentration over density, where as the playing field had a negative slope of -1.9 percent carbon concentration over density.







Conclusions and discussion

Our data showed that as the densities increase the amount of carbon decreases. Some of the data matched our hypothesis but some of it did not. In the locations, woods and playing fields, they matched for the density increasing but for the locations, front of school and garden, they did not match for densities increasing. We think it didn't match because the garden and front of school have more people walking on them and treating them. The data also showed that as we got deeper into the soil the carbon levels did decrease. The reason the carbon levels decreased as we get lower into the soil is because there are fewer living organisms as there are in the top layer of soil.

The locations: Woods, Playing Fields, and Garden matched our hypothesis about the carbon percentage concentration. At those three locations the amount of carbon decreased as we got deeper into the soil. We believe that the Front of School location didn't do this is because there is a parking lot around it so gas from cars get into the soil, another reason is because people walk on the Front of School island on a daily basis and the different chemicals from everyone's shoes go into the ground.

What we found interesting was that all of our data did not match our hypothesis. We thought that all four of the locations would do the same thing, as the densities increase the amount of carbon will decrease. The graph comparing density vs. carbon showed that the only two out of our four locations matched our hypothesis. The two locations are the woods and playing fields.

Next time we would take more samples of the soil to see if the pattern matches, we would measure layer A (0-5 cm) in the ground, layer B (5-10cm) in the ground, layer C (10-15 cm) in the ground, layer D (15-20 cm) in the ground, and then layer E (20-25 cm) in the ground.

Some further questions we have are if there was any fertilizer or chemicals put on the playing fields and garden before we took the samples? How often does the garden get weeded out? How does the chalky spray paint effect the soil samples on the playing fields? And finally, does the air quality around the location at the playing field cause the soil to be different than the other areas?

Literature cited

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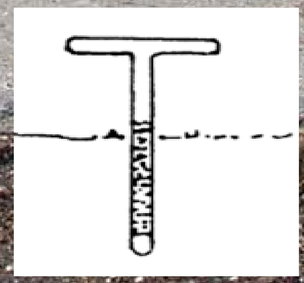
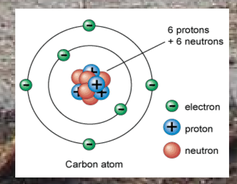


This is a soil auger like the ones we used to collect the different soil density.



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