



**CALIFORNIA STATE SCIENCE FAIR  
2011 PROJECT SUMMARY**

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| <b>Name(s)</b><br>Michael A. Castillo  | <b>Project Number</b><br><b>J0802</b> |
| <b>Project Title</b><br><b>Which Organic Mixing Has the Least Soil Compaction Rate?</b>  |                                       |
| <p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b><br/>The purpose of my science fair project is to determine which organic mixings have the least compaction rate when mixed with water and soil. The reason I am investigating this is to determine the best way to prepare the soil to promote maximum growth to plants once they are transplanted into the ground.</p> <p><b>Methods/Materials</b><br/>For testing I will use a 5 gallon bucket with a hole drilled into the side 5in. from the bottom, in the hole will be a wooden dowel with a compaction tool attached to it. For my control I will fill the bucket 3/4 full with soil, then I will add 2 cups of water, then I will place 2 4lb. garden bricks on top of the test soil after 2 minutes I will pull on the compaction tool attached to the dowel to measure the compaction rate (measured in newtons). For my test groups I will repeat these steps but I will also mix in 2 cups of my test substance to the soil before adding the water. My test substances are: grass clippings, leaves, small rocks, wood chips, and potato peelings. I will repeat the test 10 times with each test substance for a total of 60 tests and log results in my data book.</p> <p><b>Results</b><br/>My results showed that all test substances lowered the soils compaction rate when compared to my control test. The leaves and small rock compaction test averaged 9 newtons of compaction, potato peels averaged 8 newtons of compaction, grass clippings were 7 newtons of compaction, while wood chips only had 6 newtons of compaction. Clearly all test substances had an affect on the compaction rate, but soil with the wood chip mixture had the greatest change in compaction by having the least compaction rate.</p> <p><b>Conclusions/Discussion</b><br/>After completing my testing I learned that my hypothesis was incorrect, I thought that by adding grass clippings to soil I would get the lowest compaction rate; when in fact, it was the addition of wood chips to soil that produced the lowest compaction rate. I feel further testing needs to be done on different types of soils to determine if we would have the same results and to find out if a lower compaction rate will allow the root system of a plant an easier time growing through the soil and if this will promote healthier plants and trees.</p> |                                       |
| <b>Summary Statement</b><br>The objective of my project was to determine if the addition of organic materials to soil will ease the force of soil compaction.  |                                       |
| <b>Help Received</b><br>Father took photographs of experiment; Mother helped with typing.  |                                       |