CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY

Name(s)

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Project Number

J0810

Project Title

Stable Soil: Comparing Soils Before and After Compaction

Abstract

Objectives/Goals

Our objective was to see how much different types of soils compact when a weight was dropped on them, what their bearing capacities were before and after compaction, and how their bearing capacities changed. The purpose was to see if compacting a soil can make it a better foundation. We thought azalea soil would compact most, gravel would compact least, gravel would have the best bearing capacity before compaction, clay soil would have the worst bearing capacity before compaction, sandy soil would have the best bearing capacity after compaction, and clay soil would have the worst bearing capacity after compaction.

Methods/Materials

We tested four different types of soils: sandy soil, azalea soil, gravel, and clay soil. We put them into cans. To compact them, we dropped a slightly smaller can filled with rocks through a tube into the can. We measured how far down the level of the soil went. To measure their bearing capacity, we put a 1-inch dowel into the can, and we put a weight on top of them. We gradually increased the weight and measured the penetration depth of the dowel for each amount of weight. We tested each soil three times.

Results

The azalea soil compacted most, the gravel compacted least, the clay soil had the best bearing capacity both before compaction and after compaction, and the azalea soil had the worst bearing capacity both before compaction and after compaction. Unexpectedly, the gravel#s average bearing capacity worsened after compaction. This might have happened because the weight didn#t compact the the gravel, but it could have rearranged the gravel so that the bearing capacity measuring tool was able to penetrate further.

Conclusions/Discussion

We were right about the amount of compaction, but we were wrong about the bearing capacities. This could be because the clay soil was very hard and had to be broken into hard chunks to fit into the can, so the clay soil did not let the tool penetrate, and the azalea soil was very light and airy, so the tool could penetrate further than the rest of the soils. Our results mean that compaction has a positive effect on the bearing capacity of a soil when it actually is able to compact the soil. We also conclude that the clay soil we used is the best soil to have as a foundation both before and after compaction out of the soils we tested.

Summary Statement

Our project compares how much soils compact, the bearing capacity of different soils before and after compaction, and how their bearing capacity changes.

Help Received

Teacher helped look over project; Mother helped put together board; Mother helped cut wood