How Strong Is Your Soil?

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Where exactly does the strength of everyday items come from? What would happen if the traditional material was substituted with something else? Glass from wine glasses to glass windows are typically formed by melting sand and placed in a mold afterwards. What if instead of sand, other particle sizes of soil were melted to form glass? In this experiment, I took sand, silt, and clay (each with varying particle sizes), melted them, and tested the strength of each of the formed glass samples. I hypothesized that the sand would result in the strongest glass. My experiment was done at my high school which held all the materials necessary for my project, including the kiln that reached temperatures above 1000 °C. Through careful planning, I was able to mix borax, which significantly decreased the melting point of the soil, and various soils from various states and melt them to create black glass, similar to obsidian. By utilizing the Pasco Testing Apparatus, I was able to find the force necessary to break the glass. Upon testing all of the glass, the pier glass was the weakest. The clay glass was the strongest on average. My hypothesis was wrong because the clay resulted in the strongest glass, being able to withstand over 4500 Newtons on average. Despite this being my first time working with glass-making and all the imperfections of the glass, I still reached a definite conclusion that clay created the strongest glass.