



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Emily J. Sutton	Project Number J0226
Project Title Castles Made of Sand: Comparing the Strength of Sandcastle Walls Made from Caribbean Sand	
Objectives/Goals The purpose of my experiment was to determine which Caribbean island has the best sand to build sandcastles. The optimal sand for sandcastle construction is strong enough to support weight when it is mixed with water and compacted into a sandcastle mold.	
Abstract I constructed a sandcastle wall mold out of wood and clamps. I mixed ½ cup of sand with one teaspoon of water, which is an eight to one ratio of sand to water. I filled the mold with the sand/water mixture, compacted it, and then released the clamps. The mold disassembled, leaving a sandcastle wall. I placed marbles one at a time into a plastic container, which was placed on top of the sandcastle wall, until the sandcastle wall collapsed. I measured the weight of the marbles the sandcastle wall held. I repeated the procedure two more times and got an average weight each sand sample was able to hold. I then met with my teacher and looked at each sand sample under a magnifying glass, determining the minerals in each sample and the size of the sand grains.	
Methods/Materials I constructed a sandcastle wall mold out of wood and clamps. I mixed ½ cup of sand with one teaspoon of water, which is an eight to one ratio of sand to water. I filled the mold with the sand/water mixture, compacted it, and then released the clamps. The mold disassembled, leaving a sandcastle wall. I placed marbles one at a time into a plastic container, which was placed on top of the sandcastle wall, until the sandcastle wall collapsed. I measured the weight of the marbles the sandcastle wall held. I repeated the procedure two more times and got an average weight each sand sample was able to hold. I then met with my teacher and looked at each sand sample under a magnifying glass, determining the minerals in each sample and the size of the sand grains.	
Results The sandcastle wall made from sand from Antigua held the most weight, with an average of 868.3 grams. The second strongest sandcastle wall was made from sand from St. Lucia (855.2 grams), then St. Thomas (744.7 grams), Puerto Rico (536.7 grams), Dominica (391.0 grams), St. Kitts (286.1 grams), and Barbados (253.4 grams).	
Conclusions/Discussion The sandcastle walls that held the most weight were made from fine-grained sand, and the sandcastle walls that held the least amount of weight were made from coarse-grained sand. Smaller grains of sand are able to fit together (compact) better. More surface tension is achieved with smaller grains of sand, allowing for better bonds between the water molecules which hold the sand grains together, providing more strength to the sandcastle wall.	
Summary Statement I compared the strength of sandcastle walls made with sand from seven different Caribbean islands.	
Help Received Mrs. King, my teacher, helped me identify the mineral content of the sand and the size of the sand grains.	