



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

Name(s) Daniel R. Freeman, Jr.	Project Number J0708
Project Title Surfs Up: Will Different Ocean Bottoms Affect the Height of a Breaking Wave?	
Abstract Objectives/Goals The purpose of my project was to find out if different ocean bottoms affect the height of a breaking wave. Out of my three bottoms sand, rocks, and gravel (which mimicks a reef) I think gravel will produce the highest wave. I chose this project to help surfers choose a safe and fun break to ride. Methods/Materials I made three oceanscapes by pouring my three materials into three clear plastic tubs and forming them to an even slope. I then added water into my tubs. I used a plastic paddle to gently push and form a wave. I practiced on a scale to make sure all my pushes were the same strength. I then recorded my results in centimeters as the wave passed by a ruler. Results The results showed that the best bottom was gravel at 4.5cm. In second was rocks at 3.5cm. In dead last was sand at 3cm. Conclusions/Discussion My results supported my hypothesis that the gravel produced the highest wave. Since rocks displaced the water the wave was destroyed before it broke. The sand was shifted so much that the wave had a hard time forming. The gravel had a solid bottom and was not as bumpy as the rocks. I met my objective by proving that surfers can now search for new breaks in areas that can be safe and fun.	
Summary Statement My project shows which ocean bottom will produce the highest wave.	
Help Received Mom helped supervise the construction of my board and guided me; Dad helped with the heavy lifting; Mrs. Cloud helped me with the interviewing process.	