



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

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Project Title Is the Sand at Our Beaches Contaminated?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals I like to surf and spend time at the beach. I've noticed that after rain, ocean water may become polluted due to runoff. Lifeguards sometimes close beaches due to high bacteria counts in the water, but in my research I found few studies on beach sand quality. I wondered, if the sand on our beaches might be contaminated in areas with high mammal use, such as "dog" beaches or seal use areas?</p> <p>Methods/Materials I tested dry (upper beach) and wet (lower beach) sand samples from several beaches. All the sand samples were collected in sterile bottles. I added 30 ml of sterile water for every 100 g of test sand. Bottles were inverted multiple times to mix the sand and water, then placed on a shaker table for approximately 20 minutes. Next, I poured water from the sand samples into Coliscan Easygel using sterile, serological pipettes. I also plated dilutions. I incubated the test samples, I performed two separate trials.</p> <p>Results Unexpectedly, sand from two ordinary beaches and a "dog beach" revealed low levels of bacteria. La Jolla Cove area sand had very high levels of bacteria. The La Jolla site was just south of a large seal population. The sand samples were loaded with Coliforms and E. Coli. Another local beach, Moonlight, for reasons unknown, had sand that was like the La Jolla site. I repeated the test for "Dog Beach" and Moonlight Beach. Again, "Dog Beach" sand samples grew very few bacterial colonies. Moonlight Beach upper sand samples grew thousands of E. Coli colonies.</p> <p>Conclusions/Discussion Perhaps the difference in contamination was due in part to the fact that the water does not reach the upper parts of Moonlight Beach often enough to cleanse the sand while water covers the sand at Dog Beach twice daily during every high tide. This was an interesting project with surprising results, and I had fun performing the experiment.</p>	
Summary Statement The goal of this project was to test for sand bacterial contamination at five local beaches; two of the beaches were associated with high mammal use by dogs or seals.	
Help Received Thanks to my mother who drove me to the beaches to collect samples. Thanks to my science teacher who helped supply the lab equipment.	