



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

Name(s) Rose L. Leopold; Ella R. Madsen	Project Number J1024
Project Title Sandy Beaches: Pleasure or Pollutant? An Analysis of Sand Bacteria as a Possible Source of Ocean Contamination	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals We tested if beach sand could be a source of bacterial contamination of the ocean water causing many California beaches to be closed frequently. Our local beach, Capitola Beach, is our case study. We tested the sand for Escherichia coli (E.coli) bacteria and total coliform bacteria and to see if there was any correlation with the water content of the sand, organic matter content, grain size, depth (six, twelve and eighteen inches), and distance from the seawall/road.</p> <p>Methods/Materials We built two incubators out of Styrofoam coolers and light bulbs. We collected sand from depths of 6, 12, and 18 inches at nine different locations at the beach. We tested the sand for water content by weighing and baking it to evaporate the water. We tested for organic matter weighing and baking the sand for four hours to bake out organics. We tested for sand grain size by putting dried sand through a sieve and individually weighed each section of the sieve. Finally we tested for Escherichia coli (E.coli) bacteria and coliform bacteria. We tested strictly to state regulations using materials such as: distilled water, pipettes, sterilized jars, and iron, and Quanti-Trays. We then put the sealed Quanti-Trays in an incubator for 22 hours.</p> <p>Results Bacteria vs. water content: Less bacteria occurred with higher water content. Bacteria vs. organic matter: Data is inconclusive. Too few samples with organic matter. Bacteria vs. grain size: The smaller the grain size, the more bacteria. Bacteria vs. distance: Sites closer to the ocean, the bacteria MPN (most probable number) decreased. Bacteria vs. depth: Higher bacteria levels were found at 6 inch depth.</p> <p>Conclusions/Discussion In conclusion we proved all of our hypotheses incorrect except for the one about how organic matter would be higher with more bacteria. This one inconclusive because we had too few samples with organic matter.</p>	
Summary Statement To see if water content, organic matter, grain size, distance from seawall, or depth had any correlation to the presence of Escherichia coli (E.coli) bacteria and coliform bacteria in the sand at the beach.	
Help Received Dr. Adina Paytan (Stanford University) helped figure out project, Surfrider Foundation for donating supplies, Li Erikson for helping analyze data, parents for helping test	