



**CALIFORNIA STATE SCIENCE FAIR  
2005 PROJECT SUMMARY**

<b>Name(s)</b> <b>Virginia G.M. Lodge</b>	<b>Project Number</b> <b>J1915</b>
<b>Project Title</b> <b>Under the Boardwalk: Starfish and Mussels</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> On pilings under Stearns Wharf and Goleta Pier, I always noticed that mussel beds were out of water for a long time at low tide and that very few mussels were lower. My goals were to see if sea stars are a major predator of mussels, if they eat more mussels more at deeper depths, and if mussels can even survive under water below the depth at low tide. I predicted that starfish would eat mussels a lot, that mussels in deeper water would be eaten more, and that mussels could live well underwater just as well as above.</p> <p><b>Methods/Materials</b> Nine boards each with four clumps of living mussels were attached to wharf pilings so that the each clump of mussels was at a different, deeper depth in the water. Starfish were placed on or removed from the pilings for three treatments: plus treatment where three pilings had four starfish, the control treatment where there were either one or two starfish on three pilings (the natural number of starfish), and the minus treatment where there were no starfish on three pilings. Almost every day for 9 days, I counted the number of mussels that had been eaten at each depth.</p> <p><b>Results</b> I found out that starfish are definitely the main predator of mussels. The number of mussels eaten was positively related to the number of starfish. I also found out that mussels can survive at deeper depths: where there were no starfish (the minus treatment), the mussels survived fine. The results of my depth test were not as clear. Mussels were eaten at all depths, although it seemed my hypothesis was true only in the plus treatment.</p> <p><b>Conclusions/Discussion</b> I think that my experimental design may not have tested depth as well as it could have. Most of my mussels were still above water at low tide, but under water more than a regular mussel bed. If I had had longer boards so that some mussels were always under water, the test would have been more accurate. I still do not know why mussel beds are always situated high on pilings. On the pilings that I was using, I realized that there were lots of crabs. This helped to prove that sea stars are the one of the main predators of mussels because I could see that crabs were not eating the mussels, even in the minus treatment.</p>	
<b>Summary Statement</b> My project tested three hypotheses about whether starfish predation is important for the population and location of mussels.	
<b>Help Received</b> Dad helped with the set-up and snorkeled with me when I was collecting data.	