



**CALIFORNIA STATE SCIENCE FAIR  
2004 PROJECT SUMMARY**

<b>Name(s)</b> <b>Stefan J. Portale</b>	<b>Project Number</b> <b>J0513</b>
<b>Project Title</b> <b>Effects of Soap, Salt, and Temperature on Water Surface Tension</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> I experimented to find the effects of certain variables on the strength of water surface tension. The three variables that will be tested are salt, dish soap, and different temperatures. I wanted to find out which of the variables had the most effect.</p> <p><b>Methods/Materials</b> To complete the experiment my Father and I made a balance out of plastic pieces. On one end of the balance was a small basket and on the other end there was a small plastic disc. This disc rested on the water. I applied staples to the other side until the disc was pulled off the water. The approximate weight of the staples was the amount of surface tension for the particular liquid mixture.</p> <p><b>Results</b> All the variables tested had an effect on the surface tension. Out of the three, soap had the most lowering effect. Salt also lowered the surface tension, but after a point it stopped influencing the surface tension. The higher the temperature was, the weaker the surface tension got. The concentrations used were 33 grams/litre and 78 grams/litre of salt, .001 ml/l, .01ml/l, and 1 mg/l of soap. The temperatures were 48 degrees C, 23 degrees C, and 7 degrees C.</p> <p><b>Conclusions/Discussion</b> Surface tension in liquids is caused by a phenomenon know as cohesion. Cohesion is when the molecules of a substance cling together more tighly to each other than to molecules of other substance. The water molecules at the surface have fewer molecules around them than the ones in the middle, so the bond between these surface molecules is stronger than the bonds of other water molecules. This attractionof the surface molecules to each other is also much greater than their bond to the air molecules surrounding them.</p>	
<b>Summary Statement</b> I tested how different variables affected the surface tension of water.	
<b>Help Received</b> Father taught me how to use Power Point to make graphs and use a drill to build scale.	