



**CALIFORNIA STATE SCIENCE FAIR  
2007 PROJECT SUMMARY**

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<b>Project Title</b> <b>Proof of Waterproof: Quantifying UVA Penetration of Water-Exposed Sunscreen</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> I have noticed that after I go swimming I sometimes get sunburned. I wear sunscreen whenever I swim. I wondered if the types of sunscreens I wore made a difference in how my skin burned. I wanted to know if waterproof sunscreens would still be protective after being soaked in water for 30 minutes. I wondered how waterproof sunscreens would compare to ordinary sunscreens. My hypothesis was that after water exposure, waterproof sunscreens would be more effective in blocking UVA rays than ordinary sunscreens.</p> <p><b>Methods/Materials</b> I obtained bead containers 3.2 centimeters in diameter. I spread 0.5 grams of sunscreen on each case. I tested Aveeno waterproof sunscreen SPF 30, Banana Boat waterproof sunscreen SPF 30, Neutrogena sunscreen SPF 30, Coppertone sunscreen SPF 30, and a container with no sunscreen (the control). I placed red UVA sensitive beads inside each container. I used three different bead containers for each sunscreen type. Each container stayed under a black light (which I switched on and off remotely), for time intervals of one minute, 3 minutes, and 5 minutes. I placed the bead containers in a plastic tub filled with water for 30 minutes. I removed the containers and placed them under the black light for each time interval: one minute, 3 minutes, and 5 minutes. I took images both before and after water exposure. I uploaded the pictures onto my computer. Using a formula I created based on RGB color values, I evaluated how red each bead was (how far away its color was from white). I repeated the entire experiment. I performed a total of 60 tests and assessed 240 bead values which I scored according to the formula I created using RGB color ratings.</p> <p><b>Results</b> I found Aveeno waterproof sunscreen most effective in blocking UVA rays. Consistently, the beads remained nearly white. In contrast, the Banana Boat waterproof sunscreen produced the reddest (darkest) beads in nearly all the trials. Coppertone and Neutrogena sunscreens "chipped" while underwater, and UVA light was able to reach the beads.</p> <p><b>Conclusions/Discussion</b> According to my results, "Aveeno" waterproof sunscreen was most effective in blocking UVA rays. Although the sunscreens were tested on an acrylic surface rather than skin, in this experiment, ordinary sunscreens were more protective than the other brand of waterproof sunscreen tested, "Banana Boat".</p>	
<b>Summary Statement</b> My project compared the protectiveness of ordinary sunscreens to waterproof sunscreens through the use of UVA sensitive beads and a formula I created using RGB color value.	
<b>Help Received</b> Father took bead containers out from under UVA light source.	