



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

Name(s) Ashley N. Muirheid	Project Number 22391
Project Title How Do Various Fabrics Compare as Barriers Against Ultraviolet Radiation?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of my experiment was to compare the effectiveness of various common clothing fabrics as barriers against UV radiation. My hypothesis was that the thickest, most tightly woven fabrics, as determined by visual examination when held up to indirect light, would provide the greatest protection against UV rays. In my experiment, Sample #5 (100% cotton interlock) appeared to best meet this criteria.</p> <p>Methods/Materials Fabric-covered petri dishes containing YED agar and UV-sensitive yeast (<i>saccharomyces cerevisiae</i>) were exposed to sunlight for 6 hours. Three samples each of 11 different common clothing fabrics were tested, plus uncovered controls. Yeast growth was compared at 48 and 72 hours. Fabric weight, thread count, and the closeness of the weave were recorded as a means to analyze the yeast growth results. (The greater the yeast growth, the more effective the barrier performs at blocking UV radiation.)</p> <p>Results There were obvious differences in the effectiveness of the various fabrics. My hypothesis was supported, but not by the reasons I predicted. The fabric with the loosest weave and lowest thread count performed equally to Sample #5 (my hypothesis). In addition, fabric weight was not a significant factor by itself. The lightest fabric, 100% nylon, performed very well. The factor that was significant was the total area of the air spaces, or holes, between the threads.</p> <p>Conclusions/Discussion The effectiveness of a fabric as a barrier to ultraviolet radiation was dependent on the total area of air spaces (or holes) within the weave of the fabric. Weight, thread count, and fiber content were disproved as significant factors. 100% cotton interlock and 100% polyester fleece were the most effective at blocking UVR, as determined by the proliferation of yeast growth for these two samples. These results suggest that people who wish to protect themselves from UV rays, such as those at risk for skin cancer or burn victims, should consider wearing 100% cotton interlock or 100% polyester fleece versus other fabrics for the greatest UVR protection.</p>	
Summary Statement My project compares the effectiveness of various clothing fabrics at blocking the UV rays of the sun.	
Help Received My father taught me how to work with digital photos on the computer. He also took a few of the pictures where my hands needed to be shown. I used the lab equipment and supplies at Reedley Junior College under the supervision of Mrs. Rose Elizondo, My mother chaperoned me to the various places I needed	