



**CALIFORNIA STATE SCIENCE FAIR  
2012 PROJECT SUMMARY**

<b>Name(s)</b> <b>Erik J. Godlewski</b>	<b>Project Number</b> <b>J2117</b>
<b>Project Title</b> <b>It Burns! Do Our Clothes Protect Our Skin from Harmful Ultraviolet Rays?</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective was to determine which fabrics will best protect the wearer from ultraviolet rays. Does color matter? Does darkness of color or tightness of weave affect performance? Is polyester better than cotton? Does it matter if the fabric is wet or dry?</p> <p><b>Methods/Materials</b> I tested 100% cotton broadcloth fabric in various bright colors and in black and white, as well as 100% cotton fabrics of different weaves, including gauze, voile, t-shirt fabric, and flannel. I also tested 100% polyester knit and lining fabrics. My procedure was to put a fabric piece in an embroidery hoop and set it under an ultraviolet lamp set up to produce a UV Index of 10 below the lamp. I measured the UV index beneath the fabric using an ultraviolet sunlight meter, and also using UV-sensitive color changing beads.</p> <p><b>Results</b> This experiment showed that not all clothing provides the same level of protection, and that the type and characteristics of the fabric are important. The biggest difference in protection resulted from the weave of the fabric. My hypothesis was correct that a tighter weave provides more protection than looser weave. Polyester fabric blocked more UV light than cotton fabric. Wetting the fabric reduced protection, but it was only by a small amount. Various bright colors of the same fabric didn't make much difference in performance. However, darker colors protected better than lighter ones.</p> <p><b>Conclusions/Discussion</b> In conclusion, I would recommend wearing a dry, dark, long-sleeve, tight-weave shirt, to provide the most protection from UV radiation. Looser weave fabric that reduces the typical Los Angeles summer UV Index from 10 to 2 under the clothing increases the safe exposure time by five. However, tighter weave fabric that reduces the UV index to 1 increases the exposure time by ten. This is especially important for people with skin types that burn easily.</p>	
<b>Summary Statement</b> Determine which fabric characteristics provide the most protection from ultraviolet radiation.	
<b>Help Received</b> My parents helped with photos and with typing. My father helped with graphs.	