# CALIFORNIA STATE SCIENCE FAIR
# 2015 PROJECT SUMMARY

**Name(s)**

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**Project Number**

35884

**Project Title**

## Rays of Our Lives: Where Color Matters. UVAB Penetration of Different Color T-Shirts Treated/Untreated w/ UV Protectant

**Abstract**

**Objectives/Goals**

My objective was to determine if the amount of UV protection that clothing provides to a person#s skin is dependent upon the color of the fabric and whether it has been treated with Sun Guard, a UV sun protectant for fabrics, then the untreated lightest color fabric (white) will provide the lowest UV protection and the UV protectant treated darkest color fabric (black) will provide the greatest level of UV protection.

**Methods/Materials**

Materials: Digital UVA UVB Light Meter; 10 new cotton T-Shirts (White, Natural, Azalea, Yellow, Retro HTH Purple, Kelly, Burnt Orange, True Red, Royal Blue, and Black); Sun Guard; 1 piece white paper. Procedure: Experiment #1- Brand new t-shirts: Cut t-shirts in 3 pieces. Use 1st piece of t-shirts. Steps for measuring UV penetration of each color shirt: Select spot in full sun to conduct experiment. Do experiment between +/- 1 hour from solar noon. Do the following with each shirt: enter in data table: solar noon, time of day, temperature, humidity, UV Index and air quality. As a control, take a UV measurement with UV meter on piece of white paper. Place one shirt at a time over the UV sensor of the meter and note UV level. Repeat 8 times. Experiment #2 - Washed t-shirts without Sun Guard Additive: Wash and dry 2nd piece of t-shirts. Follow steps above for measuring UV penetration. Experiment #3: Washed t-shirts with Sun Guard Additive: Wash 3rd piece of t-shirts with Sun Guard according to directions. Follow steps above for measuring UV penetration.

**Results**

I found, in general, the treated darker colored t-shirts allowed for less UV penetration thereby providing more protection from the sun's damaging rays while the untreated lighter colors allowed for more UV penetration providing less protection.

**Conclusions/Discussion**

Conclusion: The data collected has proved the hypothesis to be generally correct. This means that the darker colored t-shirts are likely to protect you the most from the UVAB rays from the sun. Also, the Sun Guard provides additional protection the sun particularly when applied to the lighter colored t-shirt (Unwashed T-Shirts [No Sun Guard] White t-shirt-94.37%; Washed With Sun Guard White t-shirt-96.58%).

**Summary Statement**

A Comparative Study of The Ultra Violet A & B Ray Penetration Through Different Color Cotton T-Shirts Treated and Untreated with Sun Guard an Ultra Violet Ray Fabric Protectant.

**Help Received**

My dad cut the sun out of the form board because it required using a large knife. My mom showed me how to use the graphing function in Excel.

Preliminary