



**CALIFORNIA STATE SCIENCE FAIR  
2011 PROJECT SUMMARY**

<b>Name(s)</b> Samantha S. Brennan	<b>Project Number</b> <b>J1803</b>
<b>Project Title</b> <b>Which Roof Color Is Most Effective and Least Effective at Absorbing the Sun's Energy?</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> My project was to determine which roof color is the most effective and least effective at absorbing the sun's energy. I predicted that black would be the most effective and white would be the least effective at absorbing the sun's energy.</p> <p><b>Methods/Materials</b> Nine pieces of 10 cm by 10 cm metal about 1 mm thick; One 10 cm by 10 cm strip of aluminum foil; 33 cm by 33 cm of a wooden board about 25 mm thick; Gold spray paint; Black paint; White paint; Gray paint; Blue paint; Yellow paint; Red paint; 2 screws; A screwdriver; Elmers glue; Wood glue; Skill saw for cutting wood; Drill; 6 mm drill bit; Two metal hinges; A 10 cm by 10 cm piece of grass.</p> <p><b>Results</b> As I had predicted white was the least effective at absorbing the sun's energy and black was the most effective at absorbing the sun's energy. The average temperature of black was 35.1 degrees C. The next hottest temperature was red with an average temperature of 31.2 degrees C. Then, gray with an average temperature of 30.7 degrees C, blue with 30.1 degrees C, gold with 29.7 degrees C, grass with 27.0 degrees C and aluminum foil tied with yellow. Their average temperature was 26.5 degrees C and white was the least effective at absorbing the sun's energy. White's average temperature was 24.7 degrees C.</p> <p><b>Conclusions/Discussion</b> All nine roof colors were exposed to the same outside conditions. As predicted, white would absorb the least amount of sun's energy and black would absorb the most. In this experiment there was a trend. This trend showed that all of the darker colors had higher temperatures than the lighter colors. Darker colors absorb the sun's energy more than lighter colors which reflect the sun's energy. The high and the low points on the graph symbolize another trend. The hotter and sunnier the day was, the higher the temperatures were. This data did support my hypothesis because black absorbed the greatest amount of sun's energy and white absorbed the least amount of the sun's energy. If this experiment were to be repeated, the wood that held the nine pieces of metal would have been bolted down because the grass kept falling off of the stand due to the wind. The practical application of this experiment helps the subject determine the best roof color. Not only can this apply to a subject's roof color, but on hot days dark colored clothing should not be worn, especially outside because they will absorb heat.</p>	
<b>Summary Statement</b> Out of nine different roof colors tested, black was found to be the most effective and white was found to be the least effective at absorbing the sun's energy due to the different amounts of absorption from the visible light spectrum.	
<b>Help Received</b> Parents bought all my materials. My dad helped me build the stand that held my experiment.	