



**CALIFORNIA SCIENCE & ENGINEERING FAIR  
2019 PROJECT SUMMARY**

<b>Name(s)</b> <b>David Heinrichs</b>	<b>Project Number</b> <b>J2010</b>
<b>Project Title</b> <b>Does Limiting Direct Sunlight with Different Types of Shade Materials Make an Air Conditioner Work More Efficiently?</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives</b> The objective of my study is to determine if shading can increase the efficiency of an air conditioner.</p> <p><b>Methods</b> Temperature sensors, PVC frame, heat lamps, and various shade materials. I followed a process of repeatedly heating the air conditioner, and then testing its ability to cool. I recorded the temperature changes inside the house from the air intake to the vent and outside between the heat lamps and underneath the shade materials.</p> <p><b>Results</b> Different materials were compared to see if they would increase the efficiency of an air conditioner by providing shade and a lower operating temperature. The performance of the air conditioner showed that the temperature inside the house cooled faster when using shade coverings compared to the control which had no shading. I also found that there were differences in the cooling factors between the types of shade materials used.</p> <p><b>Conclusions</b> I found that reducing the amount of solar rays that hit an air conditioner will make it run more efficiently. Through my repeated tests, I found that thicker materials are more effective in reducing heat transfer to the air conditioner. This insulating characteristic resulted in the cooler working more efficiently.</p>	
<b>Summary Statement</b> I created a shade structure that reduces the amount of sun rays that hit an air conditioner making it run more efficiently.	
<b>Help Received</b> I designed and built both the shade structure and the solar simulator. I received minimal set-up help with heavy material from family members.	