



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

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Project Title Catching Rays: Passive Solar Energy	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Our project objective is to determine which of 3 materials--rubber, aluminum, and copper--would be the optimum solar energy collector. We chose to do an experiment regarding solar energy because (based on current non-renewable resource consumption levels) coal, gas, and oil reserves are low and will disappear completely very soon. This will require the use of renewable energy sources, such as solar and wind energy.</p> <p>Methods/Materials We chose 3 common building materials and used these as our variables. We first went to hardware stores to obtain the materials for the collector (a shallow box with a removable, transparent lid). We also acquired Styrofoam to insulate the collector and a sensitive thermometer to record the temperature inside the collector and the ambient air. We then researched the conduction levels of each material and created a hypothesis. We believed that copper would be the most efficient collector of solar heat. Our method entailed measuring the temperature inside the collector every 5 minutes for 30 minutes with 1 of the 3 materials inside. A complete cycle of the experiment was finished when all 3 variables were tested. We ran our experiment 4 times, each time noting weather conditions and time of day. Then we compared our data to our hypothesis.</p> <p>Results Our results were extremely varied. Aluminum had an overall high temperature, but copper was a better conductor. Copper got hot no matter what the weather conditions or time of day. Aluminum was unpredictable because it would only warm up with hot and sunny weather. Rubber collected a reasonable amount of heat and stored it for a long time.</p> <p>Conclusions/Discussion The results of our experiment only partly supported our hypothesis. Copper did not reach the highest temperature, but overall it was predictable and reliable. To improve our experimental design, we could use a more accurate thermometer with a larger range and 3 separate collectors. During our experiment, our accurate thermometer reached its upper limit, so we used a thermometer with a larger temperature range but with less accuracy. With 3 collectors, we could test all 3 materials at the same time and under the same conditions. With these modifications, our project would be more effective.</p>	
Summary Statement The objective of our project is to determine which of three materials--rubber, aluminum, and copper--would be the optimum solar energy collector if placed in the sun in an insulated box.	
Help Received Parents provided transportation to obtain materials, helped assemble collector, and provided advice on our project. Math and science teachers helped us use spreadsheet program.	