



CALIFORNIA SCIENCE & ENGINEERING FAIR 2019 PROJECT SUMMARY

Name(s) Faith Inverary	Project Number S1708
Project Title Solar Controller: How Varying Weather Patterns Affect Light to Heat Conversion within Solar Ovens	
<p style="text-align: center;">Abstract</p> <p>Objectives The objective of this project was to determine how varying weather patterns and colder temperatures would affect multiple solar ovens with different reflective mediums within.</p> <p>Methods Multiple cardboard boxes, reflective mediums, and crafting materials were used to create four solar ovens. The design implemented a side door echoing a convection oven door and a panel reflector atop the base. Each oven-like base contained a different type of reflective material in its interior: aluminum foil, Mylar film, white semi-gloss, or foil tape. In each trial, the four solar ovens were placed outdoors for three hours, each oven containing oven/meat thermometers and rice/chickpeas cooking within. Periodically, the temperature in each cooker, the temperature of the external environment, and different weather patterns (wind, precipitation, and humidity) would be recorded.</p> <p>Results After several trials, results revealed that Mylar film had the most dramatic temperature difference in a majority of the trials, deeming the project's hypothesis as correct. Weather patterns of wind and precipitation didn't have much of an effect on any cooker, except for their extremes. If it was too windy or it ended up raining, it prohibited the ovens from cooking and converting sunlight. Comparatively, low to mid-range humidity and external temperature had a stronger effect on the ovens' efficiency. All ovens cooked the staple foods relatively well.</p> <p>Conclusions The project results contribute to the building efforts of finding more efficient ways to cook food or pasteurize water without electricity or natural cooking resources. More information will be accessible on what materials are most efficient in a wider range of weather patterns, so a person can heat their resources more efficiently.</p>	
Summary Statement I found out how weather patterns affected light-to-heat conversion within different homemade solar ovens.	
Help Received I built the solar ovens and experimented by myself. My science teachers, Mrs. Bowles and Mrs. Bickel, reviewed my work.	