CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)

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Project Number

22439

Project Title

Harnessing the Sun: Determining Economical but Optimal Solar Reflectivity through Design and Material

Abstract

Objectives/Goals

Find a low-cost material combined with cost-effective design that produces the most reflective sunlight to a given focal area.

Methods/Materials

Research began in December, and by late January we visited three Solar Electric Generating System Plants in the High Desert region of Southern California. We set up two 500-watt halogen lamps, and arranged each type of material in a 30.5 cm x 30.5 cm array around the lamps to reflect light onto four solar cells each measuring 15.25 cm x 15.25 cm. We took note of array angles, distance from light source, and corresponding voltage produced by solar cells for each array setup. Tests were conducted at night to limit light energy, specifically to the output of the lamps.

Results

Of the five materials tested, the reflective film gave off the most light as evident by the DC voltage output of the solar cells, while the compact discs gave off the least. Angling the material did have a significant impact on voltage variation because at 180 degrees, each material gave off its maximum amount of light.

Conclusions/Discussion

At the end of the experiment our hypothesis proved inaccurate. The mirrors ranked second in reflectivity levels, while the reflective film was superior in light reflectivity. The foil would be the most economical, but not as effective. Finally, the mirrors ranked relatively high on the amount of light given off, but proved most expensive.

Summary Statement

A project that determines the type of material that has the best light reflectivity, and at the same time is inexpensive.

Help Received

Father helped with use of wood working tools and construction; Partner's father helped with supplies; SEGS Plant gave us information and background on solar electricity.

Preliminary