CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)
Josephine Welch

Project Number
J1537

Project Title
Long and Short Wavelength Colors: Will They Balance Out Interior and Exterior Temperature and Insulation Rate?

Abstract

Objectives/Goals
This project studied the interior and exterior temperatures of houses and their insulation rates given that the houses were painted with both solid colors (red, blue, green, orange) and combination colors (red/blue and green/orange). The colors were combined to test long wavelength colors in combination with short wavelength colors. The goal was to determine whether or not long and short wavelength combination colors would balance toward the middle in terms of averaging out temperatures and insulating rates of solid color counterparts.

Methods/Materials
Oil paints were used on foamboard houses. A control house was painted white. Digital and infrared thermometers were used to obtain temperatures.
Temperatures were taken throughout the day at set times.

Results
Data showed that the order of interior temperature readings from highest to lowest followed fairly closely the color wavelengths from longest to shortest. Combination color houses fell generally in between their solid counterparts. Exterior temperature data showed that the green/orange house was the warmest, followed by red, red/blue, green, blue, orange, and control. The highest insulation rate was obtained from the blue house, followed by green, green/orange, red/blue, red, orange, and control.

Conclusions/Discussion
Regarding interior temperatures, my hypothesis was proven with the red/blue combination house; interior and exterior temperatures were nearly at an exact average of the red and blue solid houses.
In the case of the green/orange house, data was not as consistent. Its interior temperature nearly matched the orange solid house, while its exterior was warmer than either of the two solids. I believe that in this case, the wavelength difference between the green/orange house was not as great as in the red/blue house. The further the wavelengths lie from each other, the better the averaging tendency.
Insulating rates were highest on the blue house. The rates increased as the wavelengths decreased. Importantly, combination house insulation rates maintained an average between that of their solid counterparts.

Summary Statement
This is a study on interior and exterior temperature and insulation rate differences among houses of combination wavelength colors.

Help Received
Teacher as facilitator.