



CALIFORNIA STATE SCIENCE FAIR 2017 PROJECT SUMMARY

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| Name(s) Ellorie Mariano | Project Number J1812 |
| Project Title How Does Color Affect Heating by Absorption of Light? | |
| <p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of my experiment was to figure out the reasons of how and why heat is absorbed faster into specific colors compared to other colors by using light, supported with statistical analysis and the engineering design process. Find which colors do so. My hypothesis was that darker colors would heat up at a faster rate, while lighter colors would heat up at a slower rate.</p> <p>Methods/Materials I constructed a new contraption using thermostats, various colored cloth, plastic bottles, a heat lamp, a fan, wiring, boxes, and a thermometer to measure the temperature of colors within a designated area for heat to vent out to. 8 colors of cloth were wrapped around bottles to be placed in the contraption and timed with a stopwatch as each temperature reached 90 degrees. Data was recorded in statistical data formats for easier comparison among the times of the colors.</p> <p>Results Repeated test trials of the eight colors showed that black had the fastest trial times and averages (5 minutes and 41 seconds average), while white withstood timing the longest (10 minutes average). Darker colors appeared in the faster range, while lighter colors appeared in the slower range during timing.</p> <p>Conclusions/Discussion Relating my concept to my research, I soon came to the conclusion that colors with longer wavelengths in nano-meters from the electromagnetic spectrum (lighter colors) will result in longer times, while colors with shorter wavelengths (darker colors) will result in faster times. I was able to prove this theory through my accumulated results, which showed that lighter colors, such as yellow and orange, had longer times, and darker colors, like blue and purple, had shorter times. Research from online articles had also supported my new theory, and my hypothesis was proven correct.</p> | |
| Summary Statement By using my innovative contraption to provide heat and measure the temperature of each color, I was able to show the reasons of how and why specific colors absorbed more heat than other colors. | |
| Help Received My father was the reason being that I had prior knowledge of wiring. I applied my previous knowledge of basic wiring structures from him to help me plan and construct a contraption all on my own to relate to my concept. My science fair coordinator and science teacher gave me constructive criticism. | |