CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
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Project Number
J1604

Project Title
CD Disk Rainbows

Abstract

Objectives/Goals
The objective of this project was to figure out whether a CD disk could act as a spectrometer and distinguish different light sources.

Methods/Materials
A CD disk was placed under different light sources: a classroom fluorescent, an incandescent desk lamp, a halogen desk lamp, a sodium street light, an incandescent car headlamp, a fluorescent light used to light the outside of homes, candlelight, a laser pointer, and an LCD computer screen. After adjusting the angle of diffraction until the rainbow that appeared on the CD disk can be observed, I took pictures of the rainbows, wrote down observations, and categorized each rainbow pattern.

Results
When the CD disk was put under sunlight, the incandescent light, the halogen light, the car headlamp, and candlelight, the rainbow spectrum had a blended, continuous color change. The fluorescent lights had a stepped continuous color change, and the LCD computer screen and sodium light had a discontinuous color change. The laser pointer only had one spot of color. The sodium light, LCD computer screen, and laser pointer's CD spectrum all fit with my research on them. There are two yellow peaks in the spectrum of a sodium light at around 589.0 and 589.6 nanometers. The CD#s spectrum does not seem specific enough to distinguish the two peaks, but instead they merge into one large, yellow smudge. The pixels of an LCD computer screen, when it is white, is made up of red, green, and blue subpixels. The CD disk under this light showed three rings, in red, green, and blue. The red laser#s wavelength is around 670 to 650 nm, and this would be the color red on the light spectrum. On the CD under the laser pointer, there was only a red smudge.

Conclusions/Discussion
My hypothesis was partly correct. A CD disk can be used as a spectrometer to distinguish some light sources from others, although it is not detailed enough to distinguish all of them. It can be deduced that fuzzy colors blended together indicate about the same intensity of each wavelength in the light the CD is under, and bright, sharp lines of color indicate a high intensity of that color, or wavelength. Using this method, it is possible to estimate the relative intensity of different wavelengths in different lights.

Summary Statement
This project determines whether a CD disk could act as a spectrometer and distinguish different light sources.

Help Received
Father provided helpful information on the research and topic