



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Spreeha Debchaudhury	Project Number J1614
Project Title Sunless Sunflowers: How the Intensity of Artificial Light Affects the Growth of Sunflower Plants	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective was to test how the intensity of artificial light affected the growth of sunflower plants. My hypothesis was that the plants closest to the light will grow the tallest, then wilt, because of phototropism; the plants farthest away, will not have enough light to carry out normal cellular processes and barely grow; the plants in the middle group will grow the second tallest, but be the healthiest</p> <p>Methods/Materials Sixteen sunflower seeds and terra cotta pots, potting soil, fertilizer, four agro-lights, a plant light intensity meter, thermo-hygrometer, moisture meter, soil pH meter and timer were used. The soil was checked to ensure it had a pH of 6 to 7.5 for optimum growth. The moisture level of the soil was measured regularly and kept between 5 and 6. The thermostat and the thermo-hygrometer were set to 65°F. The control plant, was placed outside at sunrise. Simultaneously, the timer turned on the agro-lights for the 15 experimental plants, kept in three groups (five plants each) at a distance of 20, 60, and 100 cms from the artificial lights. The control plant was placed under artificial light at sundown so that all 16 plants got the same Critical Light Exposure Period of 14 hours. The plants were measured every week during the 5-week study period.</p> <p>Results In the first experiment, plants in Groups 1, 2, and 3, exposed to a light intensity of about 9,000, 6,000, and 2,000 footcandles, respectively, grew to an average of 8.64, 6.192 cm, and 2.96 cm. Graphs and scatter plots demonstrated light intensity vs. plant group/plant number, plant height and plant growth each week. The results of the second and third experiments corroborated those of the first.</p> <p>Conclusions/Discussion My hypothesis was correct: the plants nearest to the light, Group 1, grew the tallest but burned because of phototropism. The pigment phytochrome, maintaining the circadian rhythms of plants, was tricked into thinking that it was summer, when the sunflower petals and leaves open the widest. The plants farthest away from the light, Group 3, performed inadequate photosynthesis to carry out normal cellular processes, which stunted their growth. The phytochrome in Group 3 plants was deceived into believing it was winter, when most plants do not grow. The plants in Group 2 grew the second tallest, but were the healthiest, being neither burned nor etiolated.</p>	
Summary Statement The project is a study of how different intensities of artificial light affect the overall growth of sunflower plants	
Help Received Mom bought digital camera; Dad taught how to do excel spreadsheets; Ms. A. Dev provided two relevant websites; teacher gave relevant comments.	