



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Jennifer A. Shipley	Project Number J1636
Project Title The Mysteries of Plants and Light: The Effects of Wavelengths of Light on Plant Food Production	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Is plant food production affected by different wavelengths of light? My hypothesis is that the plant under the green filter, which only allows green wavelengths through, will not absorb a wide enough photosynthetic light spectrum for healthy food production. Knowing which wavelength is most effective in food production is a valuable tool in artificial plant settings.</p> <p>Methods/Materials I made five experimental chambers. I cut the bottom off of tissue box. I lined the inside with Mylar reflective film sheeting. I covered three tops with Roscolux colored filters, numbers 4690 (red), 67 (light sky blue) and 94 (Kelly green). One chamber was covered with black tape, the fifth had no covering. I placed 5 Chinese minuet cabbages under the chambers. The plants were exposed to a full spectrum Bulbrite plant growth light bulb for 48 hours.</p> <p>I placed each leaf sample in 100 milliliters of boiling water for 30 seconds. Wearing goggles, I removed the chlorophyll from each leaf by placing each in 100 milliliters of Ethanol alcohol at 75 C for five minutes. The ethanol was heated in the 250-milliliter beaker placed in 600-milliliter beaker full of water over a hot plate. After five minutes, I removed the leaf from the alcohol with tongs. I dipped each in a cup of water to cool and rinse them. I dried them with a paper towel. I dripped about 20-25 drops of Lugols solution onto the leaf. I labeled each sample and used a digital camera to take pictures. I transferred the picture of leaf onto the computer in Microsoft Word. I enlarged the picture of the leaf and placed a grid over it. I rated each cell of the grid on a scale of zero to five, five the darkest number and zero almost white. I transferred the whole grid to Microsoft Excel where it added the total of all the cells, and then I went back to Word to find the amount of characters. I divided the total from Excel by the number of characters. This gave me the average number value for each cell of each leaf.</p> <p>Results It turned out that the green filter sample produced the least amount of food. The plant under the blue filter produced the most amount of food.</p> <p>Conclusions/Discussion The green filter only allowed the green wavelength through, which was reflected from the green leaf. Whereas the blue and red filters allowed the wavelengths through which were absorbed by the leaf.</p>	
Summary Statement A plant depends upon certain wavelengths of light for its own food production.	
Help Received Father assisted in creating graphs. Mother supervised experiment.	