



**CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY**

Name(s) Zachary Barram; Joyce Wilson	Project Number S1903
Project Title Germination Differences in Lettuce Seed Associated with Modifying Full Spectrum Light with Red, Green, and Blue Filters	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals To determine how green, blue, and red wavelengths of light would affect lettuce seed's percentage of germination and to observe the effects of different wavelengths of light on newly germinated seedlings as compared to the two white light controls.</p> <p>Methods/Materials Five isolated and insulated cardboard boxes were constructed with light fixtures suspended inside them. Blue, red, and green polycarbonate light filters were secured just beneath the light fixtures inside the boxes, a different colored filter was placed in each box. 20 lettuce seeds were planted in each of the five seedling trays equidistant from each other, and from the surface of the soil. One tray of seeds was placed beneath each of the filters in each of the five boxes. The trays were each watered every other day for ten days with 100 mL of water. This process was repeated, and data was gathered in four subsequent trials.</p> <p>Results It was found that the average germination percentages of the different wavelengths of light were: red: 65%, green: 62%, blue: 50%, the white light controls: 23%, and 2%. The average heights of the germinated seedlings were: red: 1.89 cm., green: 1.9 cm., blue: 1.3 cm., the white light controls: 0.12 cm., and 0.5 cm.</p> <p>Conclusions/Discussion It was determined that red light had the highest percentage of germination, green had the second highest percentage of germination, and blue had the the lowest percentage of germination among the colored filters. It was discovered that red light encourages stem growth, blue light encourages leaf growth, and green light is absorbed by seeds and the energy is then used in germination and growth for a short period of time, followed by the seedling withering. In conclusion, light wavelength does affect the germination process, height, and overall health of lettuce seedlings.</p>	
Summary Statement To determine how red, green, and blue wavelengths of light affect the germination percentages of lettuce seeds, the average heights, and the effects on newly germinated lettuce seedlings.	
Help Received Both Mothers proofread the different components of the project, Father helped with the construction of the project setup, and Mother helped with recording data.	