



# CALIFORNIA SCIENCE & ENGINEERING FAIR 2019 PROJECT SUMMARY

<b>Name(s)</b> <b>Adani Ahmad</b>	<b>Project Number</b> <b>J1801</b>
<b>Project Title</b> <b>Understanding Light Spectrum for Optimal Germination and Growth of Bean Sprouts</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives</b> The purpose of this project is to figure out whether different colors of light would affect plant growth, and whether the seasonal changes in sunlight affect how a plant from the summer grows in the winter. How will imitating the color of light affect how a plant from the summer grows in the winter? The hypothesis concluded was - If red colored light that has the longest wavelength is used to grow plants, that will affect the plant to grow faster, taller/longer, and healthier.</p> <p><b>Methods</b> In the procedure made for this project or experiment, the petri dishes and clear plastic cups had to be wrapped in colored (red, blue, green and yellow) and clear (as control) cellophane paper in order for it to work using different colors of light on germination and growth, respectively. For germination, the cotton balls were dampened slightly using a syringe, with the same amount of water. 20 beans were then placed onto the wet cotton. The number of germinated beans were counted at 24, 36, and 54 hours. For sprout growth, the cups were 1/4 filled with cleaned beans and rinsed daily. The height of sprouts were measured in 12 days when one of them reach the top of cup. All experiments were duplicates and exposed to sunlight at the same location.</p> <p><b>Results</b> The results at the end of the project proved that red was the color of light that will benefit a bean plant s germination, in which it has the most germinated beans in 24 hours compared to other colors. Actually, regular sunlight was, but if this color of light was excluded from the experiment, red would have been the most beneficial. For the growth of sprout, blue colored light had the tallest sprout in 12 days, even better than clear colored cellophane.</p> <p><b>Conclusions</b> The conclusions to this project ended up supporting the hypothesis because the bean sprouts using the red colored light ended up germinating the healthiest compared to the other ones. However, blue colored light is needed to have the fastest growing sprout. By understanding light spectrum (e.g. color and wavelength) and how it affects plant biology, it is possible to manipulate plant growth by using different light colors to achieve optimal germination and growth. This means we will be able to grow plants out of their season and out of this world - for example to provide food to our astronaut in space.</p>	
<b>Summary Statement</b> Different light colors (wavelengths) are needed for different stage of plant growth	
<b>Help Received</b> I conducted the research, literature review and plan experiment procedure, as learned from my previous science fair projects.	