



# CALIFORNIA SCIENCE & ENGINEERING FAIR 2019 PROJECT SUMMARY

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<b>Project Title</b> <b>Effects of Infrared and Visible Light Wavelengths on Planaria Regeneration</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives</b> Planaria can regenerate into 270 different separate organisms. Our goal is to further understand this type of regeneration and in the future possibly apply this to humans. We will test whether different wavelengths of light affect the regeneration of planaria. We became interested in Planaria in school when we were studying invertebrates and learned about the phylum, Platyhelminthes. The regenerative qualities interested us. We wondered if the regeneration rate could affect the mortality rate as well. We decided to test the effects of infrared light, red light, green light, blue light and white light on Planaria regeneration rates.</p> <p><b>Methods</b> We tested a total of 240 Planaria in two tests. Each test included 120 Planaria in twelve Petri dishes; each dish containing 10 planaria. We exposed each experimental group to a certain wavelength of light. We used red, green, blue, infrared and white light. For the control we used dark conditions. We cut the Planaria using a scalpel and recorded the rate of regeneration over a period of two weeks, and then we repeated the entire test. We used a dissecting scope to document regeneration of the eye spots.</p> <p><b>Materials</b> Brown Planaria from KLM Scientific, Artec LED (Blue light 470nm, Green light 510nm, Red light 725nm, White LED, UltraFire A100-IR Infrared 850nm, Petri dishes, Microscope, Thermometer, Hydrometer</p> <p><b>Results</b> The Planaria under infrared light had the fastest rate of regeneration, and on average fully regenerated their eye spots in 8.7 days. The second fastest rate of regeneration was with white light, taking on average 9.2 days to regenerate. Close behind, was the control condition with an average speed of 9.4 days. The green light and the blue light both had a speed of 9.8 days. Lastly, we have red light, with a speed of 10.2 days to regenerate, making it the slowest.</p> <p><b>Conclusions</b> Our hypothesis that the Infrared light would have a beneficial effect on Planarian regeneration, was supported by the findings that Planarian exposed to infrared light had by far the fastest rate of regeneration amongst the wavelengths of light that we tested. We were surprised to find that white light had not been as detrimental as we had thought, since our hypothesis stated that it would have resulted in the slowest rate of regeneration. Our prediction that the effect of red, green, and blue light would be similar was supported by the results, although green and blue were a little faster than red, the differences were within the margins of error.</p>	
<b>Summary Statement</b> We tested the effects of near infrared, red, green, blue and white light on Planaria regeneration rate.	
<b>Help Received</b> We designed and performed the experiments, and also did the analysis ourselves.	