



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Elizabeth M. Salmond	Project Number S2214
Project Title Livin' the Hydra Life: Regeneration of Brown Hydra Heads Under Varying Light Wavelengths	
Abstract Objectives/Goals To determine if speed and extent of regeneration of brown Hydra heads is affected by exposure to varying wavelengths of light after dissection. Methods/Materials Obtain 3 polished glass light filters of different wavelengths. Obtain 5 Petri dishes. Darken bottoms/sides with black duct tape or paint to block out light. On 4 lids place a cardboard square the same size light filters in middle of lids. Spray paint 5 lids black (one will be all black). Fill dishes halfway with clean spring water. Dissect a Hydra at mid-body, separating food end and place it in first dish. Repeat until 5 foot ends in each dish. Place lids on dishes. Place a glass color filter on three of the lids lining up on open spots from squares. Place an infrared glass filter (Heat Absorbing Filters) on each color filter to block out infrared light. Place 4th lid (painted with open square) and 5th lid (painted completely black) on last 2 dishes. Turn on LED light over dishes during daylight hours. Using microscope, check each dish at regular intervals post amputation: 6, 9, 18, 24, and 36 hours. Using head regeneration chart, count how many Hydra in each dish are at each of 6 stages. Results I did 2 trials so 10 total per dish. Tracking Final Head Count of Hydras, most successful was group exposed to blue light, having 9 of 10 fully regenerated heads with tentacles. Control group had 7 of 10. Green group was third with 2 out of 10. Red group did not produce any fully regenerated heads, although 1 made it to Stage 5 and 6 made it to Stage 4. Dish with no light at all did worst with none reaching Stage 5 or 6. Tracking regeneration speed, blue group regenerated at a faster rate than all others. The worst of filters again was red group which had only 1 at Stage 3, the rest remaining at Stage 2 after 6 hours. Worst of all was blackened dish. Conclusions/Discussion Hydras need some light to regenerate. Surprisingly, those exposed to blue visible light fared better than control group, both in speed and extent of regeneration. Further research would be helpful as to why this occurred. My research also revealed that without visible light or with only red light, Hydras do not thrive and regeneration is inhibited. For future application, studying Hydra regeneration is beneficial for researching how cells differentiate and know which body part to #grow into.# Knowing the prime environment to enable such studies will be helpful in this regard.	
Summary Statement This project tracks both the speed and the extent of regeneration of brown Hydra heads and tentacles under varying wavelengths of visible light using a 6-stage regeneration scale.	
Help Received Mom helped set up spreadsheets, Dad took me to buy equipment, HOYA OPTICS assisted with selection of light filters.	