



**CALIFORNIA STATE SCIENCE FAIR  
2014 PROJECT SUMMARY**

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<b>Project Title</b> <b>A Worm's Life: A Study of the Effects of Magnetism, UV Light, and Temperature on Regeneration of Lumbriculus variegatus</b>	
<b>Abstract</b>	
<b>Objectives/Goals</b> To determine whether exposure to magnetism, UV radiation, or colder temperature affect the regenerative abilities of Lumbriculus variegatus.	
<b>Methods/Materials</b> Four environments were constructed: magnetism, UV light, cold temperature, and control. Lumbriculus variegatus were purchased and measured. For each environment, 10 were cut in one-half and one-third/two-third segments and placed in test tubes labeled head or tail. Daily temperature measurements recorded. Worms length and mortality were measured weekly. Materials include: Neodymium magnets, microscope, water, cooler, UV light, test tubes, scalpel, infrared thermometer.	
<b>Results</b> Survival rates for groups: control 80%; cold temperature 50%; magnetism 35%; UV light 20%. Growth rate averages for 1/2 cut worms: UV Light environment 7.2mm; magnetism 5.4mm; cold temperature 3.9mm; and control group 4.6mm. Growth rate averages for 1/3 and 2/3 cut worms: magnetism 7.4mm; UV light 7.8mm; cold temperature 4.3mm; and control 8.3mm.	
<b>Conclusions/Discussion</b> Worms exposed to cold temperature and control regenerated better than those exposed to magnetism and UV light. Few worms survived exposure to UV light and magnetism and regenerated better compared to worms in cold temperature and control. Findings confirm prolonged exposure to magnetism and UV light negatively affects worms# ability to regenerate. The results indicate that lowering the temperature improves regeneration. Increasing the temperature likely harms it. The part of the worm severed affects its ability to survive and regenerate. One-half cut worms survived and were able to regenerate themselves more favorably compared to when 1/3 of the worms# posterior was cut off, only 32.5% of the worms survived and regenerated. No worms cut 1/3 from posterior end survived for four weeks in either the magnetism, UV light, or the control group environments. All 1/3 cut worms in the cold temperature group survived and regenerated. Overall reducing the average environment temperature improves worms# regeneration. Worms in cold group did not grow as much as some of the worms in the other environment but survived and regenerated at a very high rate. This compares favorably to the control group (50% overall rate, 80% for 1/2 cut and 20% for 1/3 cut groups) and the magnetism group (35% overall rate, 50% for 1/2 cut and 20% for 1/3 cut) and the UV light group (25% overall rate, 30% for 1/2 cut and 20% for 1/3 cut).	
<b>Summary Statement</b> Whether magnetism, UV radiation, or colder temperature affect regenerative abilities of Lumbriculus variegatus.	
<b>Help Received</b> Father helped buy supplies and build UV light environment. Microscope provided my teacher at my high school.	