



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Nathan G. Mermilliod	Project Number J1916
Project Title Plant Transpiration Under Light Sources	
Objectives/Goals The objective of this experiment is to test the rate of plant transpiration under different light sources.	
Abstract Methods/Materials Two experiments were conducted. In the first experiment, three different kinds of plants were placed in 2-liter terrariums under three different light sources-sunlight, incandescent light, and fluorescent light. The plants were watered with the same amount of water at the same time each day for five days. After eight hours, the transpired water was collected using a spatula and measured using measuring cups and spoons. The second experiment was performed in much the same way, except that three samples of the same type of plant were placed under each light source and a fourth light source, a plant light bulb, was added. In addition, taller 2-liter tops were placed over samples planted in regular pots, a swamp cooler was used in the sunlight room to better control room temperature, the plants under sunlight were placed in a dark closet outside the hours of the experiment, and the experiment was carried out for ten days.	
Results In both experiments, the data showed that the plants under sunlight had the highest rate of transpiration, particularly on sunny days, the plants under regular incandescent light produced a lower, more consistent rate of transpiration, and the plants under fluorescent light did not transpire. The plant bulb in the second experiment produced a very low and consistent rate of transpiration.	
Conclusions/Discussion The data supports the original hypothesis in that the plants under sunlight, the hottest light source, transpired the most. Environmental condition resistance did affect transpiration under the cooler artificial light sources. In addition, none of the artificial light bulbs, including the plant light, was able to mimic the effects of the white light of the sun, which provides both the blue and red light plants are most sensitive to for stomatal opening and efficient transpiration, photosynthesis, and growth. The results of the project may help us become better plant growers, increase our understanding of the water cycle or lead to improvements in green house construction.	
Summary Statement My project tested the plant transpiration rate under different light sources.	
Help Received Jenessa Stemke, graduate student in Department of Environmental Science, UCR, was my mentor for Experiment II; Parents helped with data collection and board assembly.	