



**CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY**

Name(s) Bridget J. Macmillan	Project Number J0610
Project Title The Effect of Biodegradable Dye on the Evaporation Rates of Salt Water	
Abstract Objectives/Goals The purpose of my experiment was to test the effectiveness of biodegradable dye on the evaporation rates of a 20% brine solution. My hypothesis was that blue dye, as indicated by the New Mexico State University study of 1965, would prove the most effective, as its darker color increases the amount of light energy absorbed. This light energy would increase the speed of the water molecules allowing more of them to escape from the water's surface. Methods/Materials The experiment consisted of six trial sets, measuring the evaporation rates and temperatures. Each trial set included five trials, where each possible layout combination was tested to eliminate error. Results The results supported my hypothesis, in that the blue dye consistently has higher evaporation rates and temperatures, though the difference between it and the control was minimal. I concluded that the results were significant enough however, to warrant additional testing on a larger scale. Conclusions/Discussion The initial application of the experiment was to increase potash production at the Intrepid Potash Site, located in Utah, adjacent to the Bonneville Salt Flats. As I did more research, I discovered other applications such as disposal of brackish water, and mineral laden water as mining byproducts. Increasing the evaporation of brine is also useful for increasing the production of pure water in desalination projects. The use of a biodegradable dye would be additionally useful as the byproducts would be environmentally friendly and at the ANSI/NSF Standard 60 for use in drinking water.	
Summary Statement This project tested the effect of blue biodegradable dye on the evaporation rate of a 20% brine solution, and found that the blue dye caused the solution to evaporate faster than the other colors and control that were tested.	
Help Received Mom helped with the board and Dad with assembling the environment.	