



**CALIFORNIA STATE SCIENCE FAIR
2017 PROJECT SUMMARY**

Name(s) Sidra Xu; Russell Yang	Project Number J1136
Project Title A Novel Solution to Algal Blooms by Inhibiting Photosynthesis Using Polystyrene Balls	
Abstract Objectives/Goals Endangering aquatic species and threatening global ecosystems, algal blooms pose a serious environmental problem around the world; yet current control methods are costly, inefficient, and use toxic chemicals which further damage the ecosystem. The goal of our project was to identify an inexpensive, reusable, and environmentally-friendly method for algae control. By floating closed-cell polystyrene balls on top of algae, certain wavelengths of light are prevented from reaching the algae as they are reflected and absorbed by the balls, thereby inhibiting photosynthesis and reducing algae growth. Methods/Materials Freshwater algae from a local pond, culture dishes, polystyrene balls, National Institute of Health ImageJ image analysis software Method: Five different groups each with three replicates were set up, including one control and four experimental groups with floating polystyrene balls of different colors (blue, red, mixture of blue and red, and white). The control group consisted of algae samples without covering. Algae growth was monitored every day for 10 days. The percent coverage of the algae in culture dishes was determined by images processed through ImageJ, and the average percentage increase was calculated. Results The results indicated that the control group had a 3098% increase in percentage coverage, showing that the amount of algae multiplied by nearly 32 times. The algae covered with white balls experienced a 218% increase in algal growth, while the blue ball cover exhibited just 253% increase. The mixture of blue and red balls had an increase of 383%, and red balls alone had an increase of 452%. Conclusions/Discussion Our results show that white and blue are the most effective colors in inhibiting algal growth, reducing algal growth by more than ten-fold compared to the control group. Unlike current algal prevention methods, our method does not kill the algae once it has grown but instead prevents algae from developing in the first place.	
Summary Statement We invented a novel solution to combat the harmful algal bloom problem by inhibiting photosynthesis with a floating layer of polystyrene balls.	
Help Received We did the project by ourselves at school. Our mentor, Dr. Thomas Artiss, provided us feedback on our work.	