



**CALIFORNIA STATE SCIENCE FAIR
2017 PROJECT SUMMARY**

Name(s) Herin Kang	Project Number J1608
Project Title Algae Oxygen Generator	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals This engineering project is building an oxygen generator using micro algae. High carbon dioxide concentration from breathing can cause headaches and breathing discomfort. Thus, regular ventilation and air circulation is needed for healthy living. However, air circulation is not always easy in an indoor environment. Because of temperature and air quality differences between indoor and outdoor regular ventilation often wastes energy and let allergens indoors. The indoor algae oxygen generator system was designed to provide oxygen alternatively using photosynthesis.</p> <p>Methods/Materials The oxygen generator consists of four main components: a container for the algae, an air pump to continuously pump air bubbles into the container with algae, the algae (mixed with water and nutrients), and an LED lamp to provide light. During the initial testing, my analysis showed that to provide oxygen for an actual bedroom (990 cubic ft. of the measured space) would require fairly large system, so a simulator room (8 cubic ft.) was made instead. By comparing the size between the two rooms, I could calculate the size and energy cost for the actual generator. To determine the effectiveness of the generator, a carbon dioxide sensor was used to determine the carbon dioxide level (ppm).</p> <p>Results My results showed that the algae oxygen generator reduced the carbon dioxide concentration effectively. An oxygen generator with approximately 0.7 gallon of algae in 8 cubic ft. simulator room was able to convert carbon dioxide into oxygen at the same rate as a person consuming oxygen in a normal bedroom. Between regular bottle container and slim design container, the latter showed faster reduction of carbon dioxide.</p> <p>Conclusions/Discussion Based on my analysis, a generator with size of 6 ft. by 6 ft. by 4 inch wall-mountable design can provide enough oxygen. Estimated energy cost of the full size oxygen generator would be 27 cents per day, which is much less than air conditioning or heating energy would require in many circumstances. With more design improvement, I believe there is an opportunity for commercial application of the algae oxygen generator, where normal ventilation is not ideal.</p>	
Summary Statement I designed an oxygen generator using micro algae that saves energy and provides an alternative when normal window ventilation is not ideal.	
Help Received I designed the algae generator and the simulator room but got help from my dad on building the simulator room using various tools (drills and saw, etc.).	