



**CALIFORNIA STATE SCIENCE FAIR  
2009 PROJECT SUMMARY**

<b>Name(s)</b> <b>Rohan Sharma</b>	<b>Project Number</b> <b>J1217</b>
<b>Project Title</b> <b>The Dilemma: Too Little or Too Much? Nitrogen and Algal Blooms</b>	
<b>Objectives/Goals</b> My hypothesis was that the contamination of the oceans with nitrates derived from fertilizers has led to massive algal blooms. Subsequent algal decomposition contributes to areas of decreased oxygen (<2ppm) in the oceans called Dead Zones, jeopardizing marine life.	
<b>Abstract</b> <b>Methods/Materials</b> Incremental concentrations of sodium nitrate solution in water were prepared by dissolving an increasing number of sodium nitrate tablets in 1000 mL water. Uniform length (7.5 cm) of Chara vulgaris algae specimen with 29 branchlets each was incubated, in 300 mL of this sodium nitrate solution at 2ppm, 4ppm, 6ppm, 8ppm, 10ppm, 12ppm and 14ppm in open lid containers, at 18 degrees Celsius and diurnal variation light conditions for 21 days. A control specimen was incubated in water without sodium nitrate (0 ppm). Using a low-power magnifying lens, new algal branchlets and dead branchlets were counted every week. Then a specimen of 5 grams of Chara vulgaris was incubated in closed-lid glass container containing water. The dissolved oxygen concentration was measured at 48-hour intervals for 35 days.	
<b>Results</b> There was an incremental growth of algal branchlets in the containers with 2 to 12 ppm concentration of sodium nitrate solution. At the highest concentration of sodium nitrate (14 ppm), there was a decline in the number of new branchlets and an increase in the number of dead branchlets. In the closed lid experiment, as the algae decomposed, the dissolved oxygen concentration in water decreased progressively with time.	
<b>Conclusions/Discussion</b> My conclusion is that the Nitrates make algae flourish like the vegetation on land. The death of these massive algal blooms causes oxygen deprivation of the ocean water contributing to areas of decreased oxygen in the oceans (Dead Zones). Fertilizers are a two edged sword. Nitrogen from our farmlands and lawns finds its way to the estuaries and oceans contributing to algal blooms and jeopardizing marine life.	
<b>Summary Statement</b> Nitrogen derived from fertilizers is finding its way to our oceans, contaminating them and leading to algal blooms that contribute to increasing Dead Zones around the world.	
<b>Help Received</b> Mother helped get the supplies and dispose of the chemicals.	