



**CALIFORNIA STATE SCIENCE FAIR  
2012 PROJECT SUMMARY**

<b>Name(s)</b> <b>Devon A. Block-Funkhouser</b>	<b>Project Number</b> <b>J1101</b>
<b>Project Title</b> <b>Do Plants Make Fish Healthier?</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> To determine if aquatic plants affect the ammonia and nitrate count in fresh water. I believe that the plants will lower both ammonia and nitrate levels, therefore making it safer and healthier for the fish.</p> <p><b>Methods/Materials</b> I used six ½ gallon fish bowls filled with equal amounts of gravel and water. Bowls 1 and 2 had neither fish nor plants, bowls 3 and 4 had fish and plants, and bowls 5 and 6 had only fish. I tested the ammonia and nitrate every other day for 2 and ½ weeks. The constants in experiment were the amount of water and the environment the bowls were placed. The independent variable was the presence of plants and the responding variables were the amount of nitrate and ammonia. I measured the responding variables using commercial chemical testing kits.</p> <p><b>Results</b> I accept my hypothesis, that if aquatic plants are added to the fish tanks the levels of ammonia and nitrate that builds up in the tank will be lower, because, according to the results, the ammonia levels in the bowls with fish and plants (Bowls 3 and 4) stayed in the range of 0.5-1.5 ppm while the ammonia levels in the bowls with fish and no plants (Bowls 5 and 6) ranged from 1.5- &gt;2 ppm. The nitrate levels in Bowls 3 and 4 ranged from 25-60 ppm, while the nitrate levels in Bowls 5 and 6 went all the way from 25- 100.</p> <p><b>Conclusions/Discussion</b> The presence of aquatic plants reduced the amount ammonia and nitrate in the water; thus making it healthier for the fish to live in. The plants reduced the amount of ammonia because plants give off oxygen, which increases the conversion of ammonia to nitrite in step two of the Nitrogen Cycle. The plants utilize nitrate in their cellular metabolism which reduced the levels of nitrate, which is the end product of the Nitrogen Cycle. This research is important for managing the freshwater lakes in our environment as well as for commercial fish farmers that are raising fish for food.</p>	
<b>Summary Statement</b> The presence of aquatic plants makes the water healthier for fish by reducing the buildup of ammonia and nitrate in the water.	
<b>Help Received</b> Dr. Bill Wise, Professor Emeritus, University of California- Santa Barbara	