



**CALIFORNIA STATE SCIENCE FAIR  
2002 PROJECT SUMMARY**

<b>Name(s)</b> <b>Robyn N. Strumpf</b>	<b>Project Number</b> <b>S0615</b>
<b>Project Title</b> <b>Effect of Nitrate, Phosphate, and Hydrogen Ion Concentration on Synedra ulna: Diatoms as Indicators of Water Composition</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> Can an artificial environment be designed to determine if the pennate and epilithic diatom, <i>Synedra ulna</i>, can be used as an indicator of changing water conditions such as nitrate, phosphate, and hydrogen ion concentration.</p> <p><b>Methods/Materials</b> Substrate, rocks, and stream water were taken from Limekiln Creek and distributed into control and treatment containers. Levels of nitrate, phosphate, and hydrogen ion concentrations were altered in the treatment containers using standard solutions. The percentage of <i>Synedra ulna</i> was determined at baseline, and 6 days after altering the treatment sample.</p> <p><b>Results</b> Increased nitrate concentrations affected the reproduction of <i>Synedra ulna</i> when compared to controls. There was no change in reproduction with alteration of the phosphate and hydrogen ion concentrations. An unexpected observation in pH treatment samples was that creek water pH reverted from an altered pH of 6.6 back to a baseline pH of 8.3.</p> <p><b>Conclusions/Discussion</b> <i>Synedra ulna</i> was demonstrated to be a durable organism, able to survive in a variety of environments, within the following ranges: a nitrate concentration of 4.4 mg/l to 17.6 mg/l, a phosphate concentration of 0.5 mg/l to 1 mg/l, and pH of 6.6 to 8.7. An artificial environment was successfully developed to study the effects of changing water conditions on <i>Synedra ulna</i>.</p>	
<b>Summary Statement</b> An artificial environment was developed to study the effects of nitrate, phosphate, and hydrogen ion concentration on <i>Synedra ulna</i> , an organism used as an indicator of water quality.	
<b>Help Received</b> Mentors: Craig Campbell, Sarah Spauling, Mark Abramson; Kaiser Permanente - equipment; Parents - support and encouragement	