



**CALIFORNIA STATE SCIENCE FAIR  
2002 PROJECT SUMMARY**

<b>Name(s)</b> <b>Christine Austin; Amy Rice</b>	<b>Project Number</b> <b>S0603</b>
<b>Project Title</b> <b>The San Joaquin River: A Three Year Study</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> Our objective was to find out how the chemical and biological factors are affected by golf courses along the San Joaquin River.</p> <p><b>Methods/Materials</b> Chemical Test Materials/Methods: 1)We used a sterile glass jar to collect a water sample from set testing sites. 2)Conduct phosphorous (phosphates) test using procedure from, A Qualitative Introduction to Water Pollution Guide, with sample water and chemicals. 3)Conduct nitrate (nitrogen) test using procedure from the guide booklet with sample water and chemicals. 4)Conduct ammonia nitrogen test using procedure from guide booklet with the sample water and chemicals. 5)Conduct pH test using chemicals and procedure stated in guide booklet for the sample water. Biological Test Materials/Methods: 1)Using fishing waders and kick net, wade four feet out from bank of river at each site. 2) Face upstream and collect biologic sample with kick net. 3)Separate and identify micro-invertebrates using pollution intolerant, pollution moderately tolerant, and pollution tolerant identification keys. The results from the chemical and biological tests will indicate what kind of affect golf courses have on a river. We will test for biologic and chemical factors above, along, and below a series of golf courses. The chemical tests show specific health levels, while the biological tests show whether the river is healthy enough to support a wide range of micro-invertebrates. Together both tests indicate the effect of golf courses along the river.</p> <p><b>Results</b> Our experiment indicated that the golf courses along the San Joaquin River have affected it in sites next to or below a golf course. The biological results showed runoff from golf courses made the river less healthy, but that the river could still support a healthy variety of micro-invertebrates. The chemical results showed increased levels of phosphates, nitrates, and ammonia, by and below the golf courses.</p> <p><b>Conclusions/Discussion</b> From our biological and chemical results we conclude that golf courses along the river, affect it slightly. Our hypothesis was partially correct, because the level of healthiness lowered due to golf courses, but it did not lower to an unhealthy level. Although the river still shows signs of healthiness, golf courses and other development will pollute the river if precautions are not taken. Testing the health of a river is the first step to restoring it.</p>	
<b>Summary Statement</b> Our project is testing how golf courses affect biological and chemical factors of the San Joaquin River.	
<b>Help Received</b> Teacher provided chemicals ; Mothers drove to river sites and bought science board; Borrowed biological supplies from 7 grade teacher; Got expert advice from Betty Yee and Cat Croshelle.	