



**CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY**

Name(s) Kaitlyn K. Fitzgerald	Project Number J1408
Project Title Alcohol and Tobacco: Will It Affect Your Heart?	
Objectives/Goals The objective of my project was to find out through experiments if alcohol and tobacco had an affect on the heart of the crustacean Daphnia magna. The Daphnia magna heart is similar to that of a human, so therefore, the effect will be the same.	
Abstract Methods/Materials The materials used were: tobacco, alcohol (rum), pure spring water, 50-mL graduated cylinder, 9 16-oz plastic bottles, 44 test cups, permanent marker, labels, Daphnia magna (approximately 100), pipet (used to transfer Daphnia from one place to another), dip slide, Eagle 340 trinocular laboratory microscope, stop watch, digital camera, computer and printer. In this experiment I made different solutions of tobacco and alcohol, these solutions were 100%, 50%, 25%, 12.5%, 6.25%, 3.125% 1.56%, and .78% for tobacco and 100%, 50%, 25%, 12.5%, 6.25%, and 3.125% for the alcohol. I put the Daphnia magna into these solutions and after six hours I checked the mortality rate and the heartbeats per minute of the Daphnia magna that were still alive.	
Results Tobacco and alcohol reduced heart rates and produced a higher mortality rate much faster than the Daphnia magna with the spring water. I did a second six-hour experiment because the tobacco concentrations were too strong and the mortality rate too high for the first experiment to be valid. I felt that doing a second experiment with lower concentrations was necessary to achieve valid results.	
Conclusions/Discussion Both tobacco and alcohol adversely affect your heart. The toxic effects of tobacco products killed the Daphnia magna faster than the alcohol or pure water did. I also found out that both the tobacco and alcohol caused the heart rate to decrease. It was evident in my experiment, even though the alcohol had a high mortality rate, that tobacco is much more harmful to the heart than alcohol or spring water because of the higher mortality rate. The six-hour experiment was needed for valid results. When a person smokes on a regular basis, they don't just smoke a little amount of time, or when a person drinks on a regular basis they don't just drink three drinks their whole life. Which is why it is necessary to leave the Daphnia in the testing solutions for as long as I did. These results clearly show that both tobacco and alcohol definitely affect your heart in an adverse way.	
Summary Statement My project was done to show others what the effects of tobacco and alcohol have on the human heart.	
Help Received During the experiment my father helped me make the tobacco and alcohol concentrations and my mother helped me on the general layout of the board.	