



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

Name(s) Codi L. Hirsch	Project Number J1516
Project Title Magnified Magna: The Flea Beat!	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of this experiment was to see the effects of caffeine, nicotine, and alcohol on the heart rate of a <i>Daphnia magna</i>, a water flea.</p> <p>Methods/Materials The method of this experiment was I first made three different concentration solutions for the caffeine, nicotine, and alcohol. In total, I had 9 different concentrations. I used Stay Awake caffeine tablets, 80-proof whiskey, and an all-natural cigar. Then I exposed <i>Daphnia magna</i> to the least amount concentration (.25% of original) after I took a control average heart rate. Then I exposed them to the .5% and finally the 1%. I did this with three fleas for each substance. I used a total of 9 fleas. After I took averages of all the heart rates, I looked for change.</p> <p>Results I found that flea #1 with alcohol had an average decreased heart rate of 61.9 beats per minute. Flea #2 with alcohol had an average decreased heart rate of 72 beats per minute. Flea #3 with alcohol had an average decreased heart rate of 1.9 beats per minute. Flea #4 with caffeine had an average increased heart rate of 28 beats per minute. Flea #5 with caffeine had an average increased heart rate of 52 beats per minute. Flea #6 with caffeine had an average increased heart rate of 48 beats per minute. Flea #7 with nicotine had an average increased heart rate of 42 beats per minute. Flea #8 with nicotine had an average increased heart rate of 28 beats per minute. Flea #9 with nicotine had an average increased heart rate of 5 beats per minute.</p> <p>Conclusions/Discussion In conclusion, I found that my hypothesis was mostly correct. Caffeine increased the heart rate at an average of 42 beats per minute. This is about a 14% increase. Alcohol decreased the heart rate at an average of 44 beats per minute, which is about a 17% decrease. Nicotine increased the heart rate at an average of 27 beats per minute, which is about a 8% increase. But I also noticed that with the alcohol, the heart rate actually started to increase when going from the control heart rate to the .25% and .5%. But when the fleas were exposed to the 1% concentration, their heart rates decreased dramatically.</p>	
Summary Statement My project explored the effects of caffeine, nicotine, and alcohol on the heart rate of a <i>Daphnia magna</i> .	
Help Received Father helped record time while I counted heart rate under the microscope and mother took pictures.	