



**CALIFORNIA STATE SCIENCE FAIR  
2011 PROJECT SUMMARY**

<b>Name(s)</b> <b>Leslie Magana</b>	<b>Project Number</b> <b>S1716</b>
<b>Project Title</b> <b>Cup O' Joe for Vertebrates and Invertebrates: Caffeine's Effect on Fish and Crickets</b>	
<b>Objectives/Goals</b> My objective was to see how vertebrates and invertebrates react when exposed to small doses of caffeine. I expect to see heightened activity in fish opercula movement and cricket chirping.	
<b>Abstract</b> <b>Methods/Materials</b> 3 goldfish, 30 crickets, caffeine pills (Walgreens 'Stay Awake' Caffeine Tablets), 2 cricket cages and 3 goldfish bowls, water (2.5 cups), 2 small containers for cricket drinking source, pill cutter, and stopwatch. Separate fish and crickets into separate bowls and cages, respectively. Set one minute on the stopwatch and count how many times the fish opercula moves. Do the same with crickets, but count chirps. Five rounds, a minute each, for each fish and cricket group. In a cup of water, dissolve one-fourth of a caffeine pill. Give half the cup to one fish, after 5 minutes begin to count opercula movement (same five round process). Do this for each fish. Fill the small cricket drink container with 2 teaspoons of the caffeine solution and place in cage. Once crickets have come in contact to the caffeine solution, wait five minutes and count chirps (same five round process).	
<b>Results</b> Rates of fish opercula movement and cricket chirping were higher with caffeine exposure: average of 104.3 opercula flaps/minute (with caffeine) compared to 74 among fish with no caffeine; and an average of 97.6 chirps/minute among crickets exposed to caffeine, compared to 45.9 in the control cricket group.	
<b>Conclusions/Discussion</b> After given caffeine and taking account for standard error, the vertebrates (fish) and invertebrates (crickets) had a significant response to the caffeine. This indicates that my hypothesis was correct--the average rates more than doubled for cricket chirps, while fish experienced an about 25% increase. While caffeine exposure tests were being done, the vertebrates would squirm much faster around in their bowls and the invertebrates would start to excitedly jump and chirp. The results are important because as Americans continue to consume more and more caffeine in their coffee and energy drinks, the effects on small animals can be large if people are not careful with the disposal of the leftover drinks and/or containers that may end up in parks, lakes, and oceans, the places animals like fish and crickets depend on as habitats.	
<b>Summary Statement</b> An experiment on the effects of caffeine on fish and crickets.	
<b>Help Received</b> Brother helped with Microsoft Excel graphing; mom helped with board; science teacher helped with data analysis.	