



**CALIFORNIA STATE SCIENCE FAIR  
2006 PROJECT SUMMARY**

<b>Name(s)</b> Anna A. Chen	<b>Project Number</b> <b>J1109</b>
<b>Project Title</b> <b>A Method to Quantify the Efficacy of Solvents to Remove Petroleum Contamination from Avian Plumage</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The purpose of this project was to develop a scientific method to accurately measure which washing solution was most effective in cleaning the petroleum off the birds in an oil spill. Instead of using live birds, a safer and more controlled method was developed.</p> <p><b>Methods/Materials</b> The feathers retain the oil so an experiment was constructed using individual bird feathers dipped in oil. The challenging aspect of the experiment was how to quantitatively compare the effectiveness of each solution, because the feathers are not exactly the same size. The smaller feathers would retain less oil than the larger feathers, so the measure of effectiveness used is the percentage by weight of oil removed obtained by dividing the weight of the oil washed off by the weight of the oil before washing. Thereby, it is possible to accurately quantify and compare the effectiveness of each solvent using different individual feathers.</p> <p><b>Results</b> For the 4 feathers used in the control cases, no change in weight was observed over the duration of the experiment indicating that there were no uncontrolled or external processes that adversely affected the accuracy of the measurements and experiment results. Dawn Dishwashing Detergent, All-free Laundry Detergent, and T-Gel Shampoo proved to be the most effective with 100% of oil removed from among the 10 common household solvents tested.</p> <p><b>Conclusions/Discussion</b> Although Dawn Dishwashing Detergent is traditionally used to wash oil off of birds, it was discovered that T-Gel Shampoo is just as effective and has the advantage of being gentler and eye-safe. The scientific method developed in this project provides an accurate, quantitative method of measuring and comparing solvent effectiveness without any special equipment or risking live birds.</p>	
<b>Summary Statement</b> A scientific method was developed to accurately measure the effectiveness of solvents in cleaning oil off of birds.	
<b>Help Received</b> The pigeon feathers used were collected by Ann Lynch, Director of the South Bay Wildlife Rehabilitation.	