



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Matthew J. Cheng	Project Number 34017
Project Title Rust or Shine?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My objective was to find out what household liquid will take the rust off of pennies the best.</p> <p>Methods/Materials I selected 15 pennies of similar dullness. I picked 5 different household liquids: lemon juice, ketchup, dish soap, Coca Cola and white vinegar. I placed a penny in 2 tablespoons of each of the 5 liquids for 1 hour. After 1 hour, I removed the pennies, dried them off and recorded the results. The experiment was repeated 2 more times.</p> <p>Results I ranked the shininess of the pennies in each of the 3 trials on a scale of 1-7 (1= dullest; 7= shiniest). I averaged the rankings from the 3 trials for each liquid. My results were as follows: vinegar= 3.00; dish soap= 1.33; ketchup= 6.67; Coca Cola= 2.00; lemon juice= 5.00.</p> <p>Conclusions/Discussion Surprisingly, the best rust dissolving liquid was ketchup. This is because the main ingredients, tomatoes and vinegar, are acidic. Dish soap was the worst and had nearly no effect. This is because an object should be scrubbed with dish soap for maximum cleaning. Lemon juice was second best because it is highly acidic with a pH of 2.2. Vinegar was third best and Coca Cola came in fourth.</p>	
Summary Statement My project investigates which household liquid takes rust off of pennies the best.	
Help Received My mom purchased my display board and some materials used in my project. She took me to the bank to get rolls of pennies.	