



**CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY**

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Project Title It's Time to Rust Some Metals	
Objectives/Goals My objective was to test the rusting effect of different metals when they are exposed to different liquids.	
Abstract Methods/Materials I have used four common metal screws: stainless steel, aluminum, brass and zinc, and four common liquids representing different pH levels: distilled water, salt-water, Clorox, and lemon juice. Each test set had 80 test tubes consisting of 16 tests of the various combination of the metals and liquids ($4 \times 4 = 16$) and five experiments of each test ($4 \times 4 \times 5 = 80$). I did three trials for each test set ($80 \times 3 = 240$). I had to expose the metals to the liquids for five days and observed the rusting each day and recorded the results (total data sets of $240 \times 5 = 1200$).	
Results After being exposed for five days, Stainless Steel and Aluminum did not rust in distilled water and lemon juice but they did rust in salt water and Clorox. Zinc rusted in all liquids within about two days except for the salt water solution which took more than five days. There was an average of about two days for brass to rust in all of the liquids used in the experiments. All the metals rusted in Clorox within one to three days.	
Conclusions/Discussion In my experiment I found that most of the metals showed a sign of rust depending on the type of liquid used. Overall, the stainless steel was the most rust-resistant while brass was the least rust-resistant. Clorox (base) had the most rusting effect on all four metals while distilled water (neutral) had the least effect.	
Summary Statement Rust resistivity of different metals when exposed to different types of liquids.	
Help Received Dad and sister provided guidance, helped type, and review report; Mother helped with the board; brother helped with the data collection.	