



**CALIFORNIA STATE SCIENCE FAIR  
2012 PROJECT SUMMARY**

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| <b>Name(s)</b><br><b>Irfan S. Habib</b>  | <b>Project Number</b><br><b>S0618</b> |
| <b>Project Title</b><br><b>Corrosion of Metals</b>   |                                       |
| <b>Objectives/Goals</b><br>Corrosion of metals costs companies millions of dollars each year either through replacing things or trying to prevent it from happening in the first place.<br>For this reason it is vital to understand the chemistry behind this phenomenon in order to investigate cheaper and more effective ways of solving this problem!   |                                       |
| <b>Abstract</b><br><b>Methods/Materials</b><br>1. steel, zinc, copper, aluminium, tin, brass, gold, silver were placed into 4 different solutions (distilled water, salt water, soda, vinegar) for 7 days to see which metal corroded the fastest and in which solution<br>2. salt drop technique was adopted for plain steel, polymer coated steel (coke can), tin coated steel (soup can), zinc plated steel. Phenolphthalein and ferricyanide indicator solutions were used to detect presence of Iron(II) oxides.<br>3. voltmeter was used to determine ranking of metals in order of reactivity |                                       |
| <b>Results</b><br>1. Soda and distilled water did not speed up corrosion as much as salt water and vinegar. Zinc and plain steel corroded the fastest in all solutions. Surprisingly aluminium which is higher on the reactivity series than zinc showed little corrosion. Gold was inactive.<br>2. Salt drop technique showed that the polymer coated lid and galvanized metal did not corrode. However the tin-plated steel did.<br>3. It was possible to rank the metals using the voltmeter.   |                                       |
| <b>Conclusions/Discussion</b><br>Corrosion was most evident in plain steel. Salt water and vinegar caused the greatest corrosion in all metals however Gold was inactive.<br>The salt drop technique showed that the polymer coated and galvanized metal did not corrode even when scratched. This is due to sacrificial protection of galvanized metal.<br>Finally it was possible to rank the metals in order of reactivity by recording the voltage created between two metals in salt solution.  |                                       |
| <b>Summary Statement</b><br>Investigating the chemistry behind 'CORROSION OF METALS'   |                                       |
| <b>Help Received</b><br>Mother helped me understand the chemistry background.  |                                       |