CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY

Name(s)
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Project Number
J1521

Project Title
Metal Corrosion

Abstract

Objectives/Goals
The objective of this project was to determine which metal resists corrosion the slowest, aluminum, brass, copper, iron, or lead, when placed in bottled water, tap water, and salt water. Upon research, the majority of websites indicated that brass would rust the slowest. The project also investigated whether the type of water had an impact on the rate of corrosion.

Methods/Materials
Two-inch strips of aluminum, brass, copper, iron, and lead were cut and submerged into three types of water: tap water, bottled water (Chrystal Gysier) and salt water; made by dissolving 8 grams of sea salt with bottled water. Each clear plastic container held one cup of liquid and maintained a median temperature of 70°. Observations and measurements were logged every two days for sixteen days. In order to not disturb the metal strips, corrosion was measured by visually estimating impact to surface cover.

Results
At the end of the sixteen-day experiment, lead and then aluminum showed the most resistance to corrosion in any water type, while iron rusted the most. Bottled water impacted only 1 of the 5 metals (iron) tested, but salt water impacted 4 of the 5. The rate of corrosion on iron submerged in tap and salt water was 2-½ times quicker than the rate of corrosion in bottled water.

Conclusions/Discussion
During the experiment, brass turned out to rust in tap water, disproving the hypothesis. The conclusion is that lead has the most resistance to corrosion. Bottled water proved to slow the rate of corrosion on all metal types. Future experiments should include extending the length of the experiment; use distilled water instead of bottled water; include an acidic solution; and develop a better method of measuring the impact to the metal surface, either by creating a line grid on the metal strips or by having multiple strips submerged so you can take each one out of the water for testing.

Summary Statement
What metal, aluminum, brass, copper, iron, or lead, corrodes or rusts the slowest when placed in salt water, tap water, or bottled water and what impact, if any, does water type have on the rate of corrosion?

Help Received
Mother helped with Excel spreadsheets and graphs, and provided input on the display board.