



California Science Center
CALIFORNIA STATE SCIENCE FAIR
2001 PROJECT SUMMARY

Your Name (List all student names if multiple authors.) Jacob Fiskin	Science Fair Use Only
Project Title (Limit: 120 characters. Those beyond 120 will be ignored. See pg. 9) Potential Energy and the Electromotive Series: Searching for a Good Junk Battery	J0410
Preferred Category (See page 5 for descriptions.) 4 - Chemistry	Division <u>X</u> Junior (6-8) _ Senior (9-12)
Abstract (Include Objective, Methods, Results, Conclusion. See samples on page 14.) Use no attachments. Only text inside these boxes will be used for category assignment or given to your judges.	
<p>Objective: The purpose of this experiment is to recreate the electromotive series using only simple displacement reactions, then to confirm the results by measuring the electrical potential of those reactions in volts. The most efficient displacement reactions will be used to suggest simple half-cell batteries that can be made using available "junk" metals.</p> <p>Materials: Magnesium, aluminum, zinc, iron and copper in solid form and as salts, such as magnesium sulfate. A salt bridge using potassium nitrate. A voltmeter.</p> <p>Methods: A series of simple displacement reactions --for example, a piece of copper in a magnesium sulfate solution-- will be compared. Using the results and elementary logic, this experiment should be able to place the elements used in their proper electromotive order. In the second experiment the same elements will be immersed in a salt bath and connected with a salt bridge. A voltmeter will read the direction and electron potential of each reaction.</p> <p>Results: The experimental results matched the electromotive series. This suggests various combinations of readily available "junk" materials that might make efficient batteries.</p> <p>Conclusion: The experiment was successful. It is reasonable to suppose that an electromotive series and electrode potential chart for the entire Periodic Table could be arrived at by this method. The experiment further suggests that simple batteries could be made from the elements in the series. That is, a scrap battery could be made from aluminum cans and pennies or scrap magnesium wheels and pennies.</p>	
Summary Statement (In one sentence, state what your project is about.) The electromotive series is an essential starting point for designing an efficient junk battery.	
Help Received in Doing Project (e.g. Mother helped type report; Neighbor helped wire board; Used lab equipment at university X under the supervision of Dr. Y; Participant in NSF Young Scholars Program) See Display Regulation #8 on page 4. Mother helped cut paper and glue the materials on the presentation board. Father helped me research the experiment. He discussed the paper with me and helped edit the final draft. My science teacher, Ms. Sally Bartel, supervised laboratory work and chemical experiments. She also made suggestions regarding clarity of text and presentation.	