



**CALIFORNIA STATE SCIENCE FAIR  
2006 PROJECT SUMMARY**

<b>Name(s)</b> <b>Garrett E. Hara</b>	<b>Project Number</b> <b>J0513</b>
<b>Project Title</b> <b>Making Silicon from Sand</b>	
<b>Abstract</b> <b>Objectives/Goals</b> I hypothesized that silica (SiO <sub>2</sub> ) molecules, or quartz, found in common beach sand, could be separated to create pure silicon (Si), a key material in computer processors. An important by-product of this experiment was hydrogen gas, a primary energy source in fuel cells. <b>Methods/Materials</b> This experiment consisted of two-steps: 1) heating a mixture of silica and magnesium, which created silicon and by-products; and 2) pouring the heated mixture into a solution of muriatic acid (HCl) and distilled water. <b>Results</b> The leftover magnesium reacted with the acid producing hydrogen gas and magnesium chloride (MgCl). The magnesium silicide (Mg <sub>2</sub> Si) byproduct reacted with the acid to produce silane gas (SiH <sub>4</sub> ). The SiH <sub>4</sub> combusted on contact with air, which ignited the hydrogen into a flame. The magnesium oxide (MgO) byproduct dissolved and pure silicon was at the bottom of the solution with other unreacted minerals in the sand. <b>Conclusions/Discussion</b> My hypothesis was successful because pure silicon and hydrogen gas were created.	
<b>Summary Statement</b> To create Silicon and Hydrogen from chemical reactions involving common beach sand, magnesium, heat and hydrochloric acid.	
<b>Help Received</b> Teacher provided lab equipment; Father's friend supervised the project for safety; Father retrieved materials	