



# CALIFORNIA STATE SCIENCE FAIR 2014 PROJECT SUMMARY

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<b>Project Title</b> Electrolysis: The Quest for Hydrogen for a More Sanitary Economy	
<b>Objectives/Goals</b> If I were to use the process of electrolysis to extract hydrogen gas from clean H <sub>2</sub> O, would that hydrogen be able to be used as a renewable energy carrier to make environmental friendly fuel for a more sanitary economy? <b>Abstract</b> <b>Methods/Materials</b> Fill the beaker with 3 quarters of water. Fill 2 test tubes with water. Put stoppers on test tubes. Invert the test tubes into the jar. Remove stopper underwater to avoid spillage. Insert copper wire in test tubes. Attach other end of wire to power source. Add a few mL of sulfuric acid to the water in the jar. Repeat the steps, until 3 trials for 1 electrolyte (i.e. sodium chloride, lemon juice, sulfuric acid) on both voltage powers have been tested. Do each trial for 30 minutes. The empty space in test tube is gas. Identify the gas created in the test tube attached to the #ve electrode as hydrogen. Put the stopper back into the test tubes underwater. Test the presence of hydrogen with a match or candle. A pale blue flame or a soft pop sound indicates hydrogen is present. Note the amount of hydrogen made in mL for each trial. Use a graduated cylinder to measure the water levels to determine the amount of hydrogen made in mL. <b>Results</b> My data consisted of four tables and four graphs. The values showed the hydrogen gas made with a 9v and 12v battery. The trends shown in each of the graphs were that the gas created by a specific electrolyte was in the order, sulfuric acid, sodium chloride, and lemon juice. The results of the experiment showed that the electrolyte, sulfuric acid had the most impact, but with the 12v battery rather than the 9v by a fraction of a difference. <b>Conclusions/Discussion</b> My hypothesis was if I create the electrolysis mode, then it will work best when sulfuric acid if used with the 12v battery. I also predicted that the amount of hydrogen produced from the electrolyte, lemon juice will create the least amount of hydrogen. My trial examples and graphs support my scientific guess. There were many hardships during my project, but I managed to pull through. Some of these included, finding the right tools such as the 0.1 molar sulfuric acid and a graduated cylinder, and keeping the experiment constant so it will have the similar affect. In conclusion, the stronger an electrolyte and voltage of a power source, the better production of hydrogen there is.	
<b>Summary Statement</b> Finding the electrolyte that will create the most amount of hydrogen for a more sanitary economy.	
<b>Help Received</b> Adviser helped direct me on what to do; Father helped me with set-up.	