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Going Green With Water

The purpose of this project was to find out how a hydrogen fuel cell creates hydrogen. A home-built hydrogen fuel cell consisting of ABS pipe, aluminum rods, and tubing was filled with varying strengths of saline solution made of sodium chloride and distilled water. Aluminum rods were attached to a car battery with jumper cables to provide the electric charge. As the charge went from one aluminum contact to the other through the water, the ions in the sodium chloride separated the hydrogen and oxygen molecules in the water. The resulting gas was less dense than the matter surrounding it, causing it to rise to the top of the container. Because the H₂O separated into its two component gasses, Hydrogen and Oxygen, it expanded creating pressure inside the container which forced the gas through the tubing. After capturing the gasses from the tubing in a balloon, I ignited the gasses which resulted in a large fireball, thus proving that the gas created was hydrogen. We know that the gas was created by electrolysis because when the sodium chloride was added, it acted as a catalyst for the electrolysis to occur. Measurements show that stronger saline solutions produce a more rapid reaction to electrolysis and results in more hydrogen production. Hydrogen is used in fuel cells to increase the rate of combustion, resulting in more fuel efficiency.