



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

Name(s) Molly E. Havard	Project Number 22007
Project Title Alcohol as a Fuel: Recycling Wastes into Energy	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals I wanted to find out if a family could produce an alcohol fuel from their kitchen wastes that a household could consume on a regular basis. Also, I wanted to find out if the alcohol would burn cleanly and efficiently.</p> <p>Methods/Materials First, I made the apple mash, and allowed it to ferment for 6 days. Then I distilled it in a still that i made from a pressure cooker, 6 feet of copper tubing which i coiled, a coffee can with the top and bottom removed, and a tray full of ice. I used a burner to boil the alcohol in the pressure cooker, and the vapors went up through the copper tubing, then condensed in the ice, and the distilled alcohol came out into a beaker. I used beakers and oil-burning lamps to burn the alcohol to test the burning efficiency of it.</p> <p>Results The alcohol produced was a very clean-burning alcohol, but it did not have a very long burning time. The longest time that I was able to get from 100 mls. of the alcohol was 5 minutes and 30 seconds in the oil burning lamp. It didn't burn very well in the lamp, so my science teacher (my project advisor) threw a lit match into a beaker of the alcohol, and the vapors lit very well.</p> <p>Conclusions/Discussion I don't think that a family could really run on this alcohol on a daily basis if it is not mixed with something that will give it a longer burning time. It is a very clean fuel, so it would be good for our valley and the areas around us with bad air pollution problems. We should investigate using a fuel like ethyl alcohol, because it is a much cleaner fuel and is not a limited resource.</p>	
Summary Statement My project is about using kitchen wastes to produce an alternative fuel.	
Help Received mom helped peel the apples, dad helped coil the copper tubing, my science teacher helped set up the still, Eva Picci and Todd Moon helped get my lisenca	