



**CALIFORNIA STATE SCIENCE FAIR  
2009 PROJECT SUMMARY**

<b>Name(s)</b> <b>Francesca McClintic; Janel Raab</b>	<b>Project Number</b> <b>S2011</b>
<b>Project Title</b> <b>Green Ethanol: Year 2</b>	
<b>Abstract</b> <b>Objectives/Goals</b> The theme of this exhibit is ethanol production using different materials. Ethanol is alcohol that is produced from sugars by the process of fermentation. This experiment is to explore more options in the materials used in this process other than corn. Using corn to produce ethanol is economically unrealistic; it takes more energy to produce the ethanol than the amount collected. This experiment will compare algae, bamboo, and cornstalk to the corn, sugar, water and sugar cane. The outcome can then be used find a better and more realistic alternative to replace the use of petroleum. <b>Methods/Materials</b> Collect the materials need to get 500mL of grinded malt. Grind each material down using various methods. Divide into to cups of 250mL and boil for 30 minutes. Then put it in a plastic container and add water so that it rises to 2Ls. Add ½ a teaspoon of yeast one gram of enzymes and set a side to ferment for more than five days. After fermentation is done, open the brew and measure alcohol level using a vinometer. <b>Results</b> Corn kernel produced an average of 90mLs of alcohol, and sugar cane produced an average of 240mLs of alcohol. Cornstalk had an average of 95mLs of alcohol, green bamboo had an average of 80mLs of alcohol, and dry bamboo had an average of 40mLs of alcohol. Water had 0mL of alcohol, while Sugar had 51mL average and Algae had 70mL average. <b>Conclusions/Discussion</b> Conclusion: In conclusion, though our hypothesis was close to correct, this experiment provided data that shows that there are other materials that produce more alcohol than corn kernel, such as cornstalk. Cornstalk is not a profitable material, so if used to make into ethanol it will not affect the economy. Also it shows that bamboo can also be used which is a realistic material because it is like grass, in that is grows fast and is a non-profitable. Algae are also an option.	
<b>Summary Statement</b> This experiment is designed to discover other green plants, which are non-cash crops, that can produce more ethanol than corn kernel.	
<b>Help Received</b> Parents supporting and supervising, Paul Jordan for advice in constructing our experiment design and providing tools.	