



**CALIFORNIA STATE SCIENCE FAIR  
2011 PROJECT SUMMARY**

<b>Name(s)</b> <b>Hilarie Sit</b>	<b>Project Number</b>  31020
<b>Project Title</b> <b>Veggie Fruity Paper: To Investigate an Alternative Way to Utilize Agricultural Wastes</b>	
<b>Abstract</b> <b>Objectives/Goals</b> To examine the process of making paper from agricultural wastes, such as orange peel and corn stover, and to investigate the energy requirements for paper production from these materials as compared to the paper made from pine wood and then to determine biodegradability of the resulting papers. <b>Methods/Materials</b> The basic setup of this experiment was to create pulp from each material by using electric blender and heating stove, and then to determine the energy needed for the processes by measuring the time required in the specific power rating electric appliances. Pulp from each agricultural waste was made into papers by using hand-made process and dried under room temperature. For biodegradability testing, five equally weighted pieces of paper made from each type of agricultural wastes were put into soil and then the weight from each type of paper was measured weekly for 5 weeks. <b>Results</b> In this experiment, the energy required to make paper from pine wood was 2590KJ; from orange peel, 964KJ; from pummelo peel, 978KJ; from corn stover, 1636KJ; from cauliflower stem, 658KJ. In biodegradability testing for pine wood paper, there was 0.65g remaining after 5 weeks in soil; for orange peel paper, 0.11g; for pummelo peel paper, 0.05g; for corn stover paper, 0.46g; whereas cauliflower stem paper virtually disappeared in soil in 4 weeks. <b>Conclusions/Discussion</b> Making paper from agricultural wastes actually requires less energy and the products requires less time to biodegrade than that from pine wood. This experiment helps us realize that the traditional way of paper production may not be the best, and paper production can be a viable and sound alternative option for utilizing agricultural wastes such as orange peel and corn stover, and that may also help to reduce landfill overload and the amount of trees being cut down.	
<b>Summary Statement</b> This project investigates paper making as an alternative way to utilize agricultural wastes such as orange peel and corn stover.	
<b>Help Received</b> Dr. Oliver and Mrs. Raco gave me advices and guidance needed; parents helped me with the supplies.	