



**CALIFORNIA STATE SCIENCE FAIR  
2011 PROJECT SUMMARY**

<b>Name(s)</b> <b>Russyan Mark S. Mabeza</b>	<b>Project Number</b>  31096
<b>Project Title</b> <b>Utilizing Corn Cobs, Carton Boxes, and Plastic in the Production of Particle Boards</b>	
<b>Objectives/Goals</b> The goal of this project is to create a particle board out of corn cobs, carton boxes and plastic and to see the quality of each particle board depending on the ratios of the materials. In doing so, the project will help towards alleviating problems with pollution, since materials used are waste products. It will also provide an alternative construction material, aside from the conventional wood products. <b>Abstract</b> <b>Methods/Materials</b> Corn cobs were manually hammered into smaller particles. Carton boxes were cut with a paper shredder, and plastic bags were cut manually with scissors into smaller strips. The materials were mixed according to their ratios (2:1:1, 1:2:1, 1:1:2) along with 453 g of resin and compressed in a mold made out of two metal plates and a 13.5in x 13.5in frame. The materials were then heated up in the oven for a total of 14 minutes and cooled down overnight. The upper metal plate was then removed and the particle boards were allowed to set for 10 more hours. 2in x 2in specimens were cut for all the treatments and tested in terms of water absorption, thickness swelling and flammability. <b>Results</b> Treatment C (1:1:2, or predominantly plastic) outperformed the others in terms of water absorption and thickness swelling. Treatment B (1:2:1, predominantly carton boxes) outperformed the others in the flammability test. <b>Conclusions/Discussion</b> With these results, we can see that corn cobs, carton boxes and plastic can indeed be used as components for particle board. There is also a significant difference among the treatments in terms of water absorption, thickness swelling and flammability with Treatment C outperforming the others in two out of the three tests. While these particle boards are prototypes, they exhibit a lot of promise for further testing in terms of mechanical properties such as modulus of rupture and tensile strength.	
<b>Summary Statement</b> Through this project, we find that corn cobs, carton boxes and plastic can be used as components for particle board, opening up possibilities to help alleviate pollution and provide alternative building materials,	
<b>Help Received</b> Mother helped cut boards and time flammability; Friends helped cut plastic and carton boxes; Mold (metal plates and frame) were produced from a welding shop; Received \$500 grant from UC San Diego California State Summer School for Mathematics and Science; Received suggestion from UCSD faculty	