



**CALIFORNIA STATE SCIENCE FAIR  
2011 PROJECT SUMMARY**

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<b>Project Title</b> <b>Let's Get Drastic With Plastic: Comparing Biodegradation in Traditional and Alternative Plastics</b>	
<b>Objectives/Goals</b> Last summer, I visited a landfill to explore ideas that I could address through an experiment. I was told that if I found a way to help get rid of the plastic coming into the landfills, I would be doing a great service to society! I then visited a local recycling center with the same objective...over there I was told that their biggest problem was not getting enough plastic in through the municipal recycling programs. So I began to look into plastics that are marketed as biodegradable. Are they really substantially different than traditional plastics? <b>Abstract</b> <b>Methods/Materials</b> My experiment consisted of measuring 1 gram of each plastic sample with 15 mls of four substrates representing common environmental conditions. The samples were placed in mason jars, and an infrared gas analyzer was used to measure carbon dioxide over time. There was one sample of each of the four plastics in a mason jar, with each of the four substrates, along with a duplicate. Leading to a total of 32 jars where the carbon dioxide was measured over a period of two months. <b>Results</b> For the most part, the oxo biodegradable additive plastic was the front runner and clearly had higher carbon dioxide concentrations. However, I would say that due to the short duration of the experiment I can not rule out that the other biodegradable plastic samples may biodegrade faster than traditional plastic if more time was allowed for the experiment. <b>Conclusions/Discussion</b> Plastics continue to take up permanent space in our landfills. Recycling programs could be more effective, but significant social behavior changes are needed to increase plastic diversion from landfills. Although oxo-biodegradable plastics are petroleum based (0.5%-2% added to standard plastic pellets with no change in the manufacturing process), they are an effective transitional tool for an immediate solution to the eternal (literally) plastic problem. In fact in Abu Dhabi (UAE) all plastic manufactured after 2013 must contain an oxo-biodegradable alternative. If the US makes a similar regulation, the amount of persistent plastic in landfills could be drastically reduced. We could use the results of my project to change the world!	
<b>Summary Statement</b> Comparing biodegradation of traditional and biodegradable plastics using carbon dioxide measurements	
<b>Help Received</b> Used lab equipment at UCI; Dr. Czimczik Green was my project advisor	