



**CALIFORNIA STATE SCIENCE FAIR  
2016 PROJECT SUMMARY**

<b>Name(s)</b> <b>Erica S. Whiting</b>	<b>Project Number</b> <b>S1028</b>
<b>Project Title</b> <b>Digestion of Styrofoam by Mealworms (larvae of Tenebrio molitor): The Effect of a Nutritional Boost</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> A 2015 study showed mealworm degradation of Styrofoam. To extend this, an experiment could discover if mealworm larvae (larvae of Tenebrio molitor), on a Styrofoam diet, would eat more styrofoam when extra nutrient sources were present. This research could provide better methods for dealing with Styrofoam waste.</p> <p><b>Methods/Materials</b> Seven containers were placed in a larger box in the shade of my home at room temperature. Container 1 held only Styrofoam, Container 2 held bran and larvae as controls. Container 3 held Styrofoam and larvae. Container 4 held larvae, Styrofoam and 0.1 grams of brewer#s yeast, a nutritional source. Container 5 held larvae, Styrofoam, and 0.3 grams of yeast. Container 6 held larvae, Styrofoam, and 1.0 gram of yeast. Container 7 held larvae, Styrofoam, 0.3 grams of yeast, and 0.3 grams of powered eggshells, another nutritional source. The styrofoam and larvae masses will be measured every 5-6 days from 12/11/2015-1/11/2016.</p> <p><b>Results</b> The largest decrease in Styrofoam mass was 0.59 grams, in container 6. More development of pupae occurred in containers with brewer#s yeast, specifically 5 and 6. Container 3#s styrofoam decreased 0.50 grams. Container 7 produced no pupae and its styrofoam decreased 0.4 grams.</p> <p><b>Conclusions/Discussion</b> The larvae ate and developed more when the nutrients of Brewer#s yeast were added. This project confirms the knowledge that Styrofoam, previously thought to resist biodegradation, can be biodegraded via mealworm digestion. Degradation is increased in the presence of added nutrients. Further research could show chemically how larvae digest Styrofoam.</p>	
<b>Summary Statement</b> I found that by sprinkling nutrients over styrofoam, there was increased mealworm degradation of that styrofoam.	
<b>Help Received</b> I designed the tanks and setup myself, and my science teacher, Ms. Mary Hines, and her colleague, Ms. Karen Jain, provided the necessary materials.	