



**CALIFORNIA SCIENCE & ENGINEERING FAIR
2018 PROJECT SUMMARY**

Name(s) Laura A. Krasnow	Project Number 38309
Project Title Studying the Biodegradation of Low-Density Polyethylene by Marine Bacteria	
Abstract Objectives/Goals It was hypothesized that bacteria collected from plastic incubated with ocean water, collected from Scripps pier, are capable of biodegrading plastic. Methods/Materials A sample of surface ocean water was used and eight pieces of low-density polyethylene(LDPE) were incubated for approximately one month. From the plastic pieces, 16 species of marine bacteria were isolated. Each isolate was added to a test tube containing filtered sea water and a piece of LDPE. The independent variable was the different isolated bacteria strains and the dependent variable was the weight difference measured. The experiment was done in triplicate. The control for the experiment included three test tubes with only plastic and filtered sea water. The plastic was weighed before and after being inoculated with the bacteria to measure the weight difference. The isolates were identified by using 16S rRNA gene sequencing. The isolates, which were mostly from the Alteromonas genus, were incubated with strips of LDPE for either two weeks or four weeks and the weight loss of the plastic piece was measured. Results The results were inconclusive. None of the plastic pieces had a statically significant weight decrease that would identify one bacteria capable of degrading plastic. However, one of the bacteria identified as part of the Alteromonas genus, had a weight decrease in both the two week set and the four week set. Conclusions/Discussion Although, no particular genus of marine bacteria was found to have a statistically significant ability to degrade LDPE, this experiment identified key bacteria that can be found on plastic floating in the coastal Pacific Ocean. The knowledge of what bacteria is found on plastic can be beneficial when studying how to use marine bacteria to mitigate plastic pollution.	
Summary Statement I obtained marine bacteria found on plastic, isolated and identified them, and tested their ability to biodegrade plastic by testing the weight decrease of a LDPE plastic piece after a two week and four week isolation.	
Help Received I was able to use Dr. Bowman's lab at the Scripps Institute of Oceanography. He provided me with resources and advice. My advisor at the lab was Natalia Erazo, and she helped me throughout this experiment with instruction.	