



Greater San Diego Science & Engineering Fair

The City of San Diego Environmental Services Department is pleased to recognize the following students whose science fair projects were selected as outstanding examples of environmental science and research. The department's panel of environmental professionals judged more than 80 projects and these students were selected as winners because of their clear, concise presentation, thorough research, and the value of their projects to the preservation of San Diego's environment.



Senior Division

First Place **Marwa Kaisey, La Jolla High School**

Brittlestar Bioluminescence: An Indicator of the Toxicity of San Diego Bay

Marwa's project studied whether there are more metals and higher amounts of toxicity in the back of the bay as compared to the mouth. Using the brittlestar *Amphipholis squamata* she found that while there were more metals in the back of the bay there was more toxicity at the mouth of the bay.

Second Place **Jason G. Mak, Torrey Pines High School**

Effects of Steam on Gas Combustion for Emission Reduction

The objective of the experiment was to find a reliable means of mixing steam in gas combustion to homogenize the flame structure, and hence reduce the amount of emissions. The results showed that proper amount of superheated steam mixed with gas fuel significantly reduced emissions.

Junior Division

First Place **Allie Bidwell, Blessed Sacrament**

Plastic or Not?

In Allie's project, the purpose was to find the best biodegradable substitute for plastic drink containers. After testing wax-coated cardboard, plastic, glass and foil pouches for strength and biodegradability, she found that wax-coated cardboard is the best biodegradable substitute for plastic drink containers.

Second Place **Tony De Andre Lawson, St. Michael's**

Alternate Energy Sources - Part II

Based from a personal experience, Tony sought out to find the best alternative energy source to power an emergency tail light on a vehicle. Using wind as the most practical and effective energy source, his research revealed that a mid-sized fan blade generates enough wind energy to light up the vehicle's tail light.

Honorable Mention

Lauren Bergman

Santa Fe Christian School

Reuse or Lose It: Effects of Recycled Water on Grass and Flowering Plants

Monica Daniels

Lewis Middle School

How Car Cleaner Pollution Affects Plants

Mabi Julit Castro

Preuss School

Effects of Paper Thickness on Brick Strength

Olga Obrastsova

Torrey Pines High School

Marine Bacteria as a Natural Component of Crude Oil Degradation

Congratulations to All Students for their Outstanding Scientific Achievement!