



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

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| Name(s) Kriya E. Wong | Project Number 34482 |
| Project Title The Effects of Sorting Refuse on Methane Generation in Landfills | |
| <p style="text-align: center;">Abstract</p> <p>Objectives/Goals This project is meant to show the benefits of waste segregation under landfill conditions in producing more methane as a source of energy than assorted landfill.</p> <p>Methods/Materials Four 1-gallon Nalgene bottles or #bioreactors# were created, one with paper and organic waste, one with plastic and organic waste, one with only organic waste and one with assorted waste collected from my own home, and the reactors were placed in a waterbath (cooler) at a temperature around 80-90 degrees Fahrenheit and attached to individual Flexfoil bags. The bags inflated as gas was generated and recorded.</p> <p>Results After a time period of 42 days, the organics only reactor produced the most gas and therefore methane, as expected, followed by the paper waste and organics mixed reactor which produced 60% more methane than did the plastic and organics reactor.</p> <p>Conclusions/Discussion First, it would be beneficial to create paper-organics landfills as opposed to assorted ones because it is clear that the plastics and various other kinds refuse in assorted landfills impede their ability to generate methane. Because the paper waste mix generated nearly 60% more biogas than did assorted waste, it is clear that separating refuse in landfills would enhance methane production on a large scale. Since the all organics reactor produced far more gas than the others, why would we not support all organics landfills? Towards the end of my study the organics only reactors began to plateau while the paper mix maintained its increasing trend, suggesting that the paper mix is a more reliable and consistent option. In regards to the fact that the assorted bioreactor and plastics-organics bioreactor produced the same amount of gas which would never occur under natural circumstances, the assorted refuse produced low amounts of gas most likely because it was collected from my own house and did not contain exactly equal percentages of various types of refuse while the plastics-organics bioreactor was exactly half organic material and half plastic waste.</p> | |
| Summary Statement My project demonstrates that segregating waste in landfills yields more methane as a source of renewable energy than does assorted landfills as exist today. | |
| Help Received Father helped prepare waterbath cooler; Mr. Dung Kong, senior engineer ph.D at Puente Hills helped with set-up and equipment; Rick Sanzone manager of Albertsons let me take compostable organic waste | |