



# CALIFORNIA SCIENCE & ENGINEERING FAIR 2019 PROJECT SUMMARY

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<b>Project Title</b>  <b>Reducing Plastic Pollution Brick by Brick: A Sustainable Brick to Combat Plastic Waste in the Water and Environment</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives</b> More than 91% of the world's plastic is not recycled. To solve this, the scientist wanted to test if it was possible to transform plastic waste into functional and sustainable bricks. The scientist hypothesized that the plastic bricks would outperform conventional bricks (burnt clay, concrete, mix of fly ash/clay/sand lime) when testing for strength, insulation, and low-water absorption.</p> <p><b>Methods</b> The scientist constructed plastic bricks (consisting of 70% polyethylene, 25% polypropylene, 5% polystyrene) by shredding plastic, melting it at 201°C, and forming the melted plastic into 20.32 x 10.16 x 6.03cm bricks. The scientist then performed various tests comparing the plastic bricks to commercially available bricks. The scientist constructed an insulation chamber to test insulation. Strength of the bricks was tested through compression and drop tests. A water absorption test was also performed.</p> <p><b>Results</b> The plastic bricks performed most effectively overall, proving the hypothesis correct. After both the compression tests and drop tests, the plastic bricks exhibited no signs of compression, breakage, or changes in weight. The plastic bricks also proved to be the best insulators, having the highest temperatures on the side with the heat source, and lowest temperatures on the side opposing the heat source. In the water absorption tests, the plastic bricks absorbed the second least amount of water, with concrete absorbing the least.</p> <p><b>Conclusions</b> The plastic bricks consistently performed most effectively overall, compared to the other bricks. This research is significant because it proved a way to turn plastic waste into a sustainable building material. This benefits society by reducing plastic pollution that might end up in the water and environment, and transforming it into a cost-effective and versatile building resource.</p>	
<b>Summary Statement</b>  I turned plastic waste that would have normally ended up in the landfills, waters, and environment, and repurposed it into a sustainable and functional brick/building resource.	
<b>Help Received</b>  None. I designed, built, and performed the experiments myself.	