



**CALIFORNIA STATE SCIENCE FAIR  
2017 PROJECT SUMMARY**

<b>Name(s)</b> <b>Anokhi Patel; Saloni Patel</b>	<b>Project Number</b> <b>S1117</b>
<b>Project Title</b> <b>Follow the Green Brick Road: Developing Viable Polystyrene Infused Bricks with Heightened Insulation Capabilities</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> This project sought to answer the question of whether or not plastic pollution could be reduced by integrating polystyrene into bricks while maintaining structural stability and heightening insulation capabilities. The objective was to create bricks with these properties and an effective chamber to test the insulation properties of them.</p> <p><b>Methods/Materials</b> The polystyrene (styrofoam) blocks that would be integrated into the concrete bricks were created by condensing polystyrene in acetone (releasing the trapped air) and pouring the viscous polystyrene into molds in time spaced layers with a lengthy drying process. These blocks were made in heights of 1.5 cm, 3 cm, and 4 cm. Subsequently, concrete bricks were made with the polystyrene blocks in the middle. The insulation chamber was made with a styrofoam cooling box, aluminum ducting insulation, aluminum tape, and a reptile heating lamp, among other materials. The chamber had two air-tight compartments separated by a wall with a space to insert a brick. There were thermometers in both compartments to test the amount of heat that transferred through the brick over time. Strength testing was done with a concrete testing machine and pressure was applied until the bricks reached failure.</p> <p><b>Results</b> The results showed that we had accomplished our objectives. The insulation chamber proved effective and the average chamber compartment temperature disparity was 6 degrees celsius higher in the polystyrene infused bricks than the solid concrete controls. Every brick supported pressures that were thousands of pounds above the 4000 psi industry standard for concrete bricks. This means that polystyrene infused bricks are structurally viable and have heightened insulation properties.</p> <p><b>Conclusions/Discussion</b> These findings are significant because they open up the possibility of integrating condensed polystyrene into building materials. The heightened insulation properties mean buildings would be using less electricity for heating and cooling which is not only financially responsible but environmentally responsible. Implementation of this concept would mean a large-scale reduction of styrofoam waste.</p>	
<b>Summary Statement</b> We created a structurally viable, condensed polystyrene infused concrete brick with heightened insulation properties and an effective chamber to test those properties.	
<b>Help Received</b> Dr. Panahandeh, an engineering professor at Diablo Valley Community College, allowed us to use his concrete testing machine and advised us on the testing process.	