



# CALIFORNIA STATE SCIENCE FAIR 2016 PROJECT SUMMARY

<b>Name(s)</b> <b>Hayley N. Meyer</b>	<b>Project Number</b>          <b>36138</b>
<b>Project Title</b> <b>Insulation Effectiveness: Finding the Best Insulation Product for Your Home</b>	
<b>Abstract</b> <b>Objectives/Goals</b> The objective is to determine which commercial insulation product, fiberglass batt, foam board, spray foam, or blown-in cellulose, will act as the best insulator against heat. <b>Methods/Materials</b> Five 12 by 12 inch mini-walls with identical size and shape were constructed out of 2 by 4s, plywood, and plastic cloth. The four insulation products, each with an R-Value of 13, were placed inside a separate mini-wall. One wall was left empty, acting as the experimental control. All wall edges were sealed with foil tape. Each wall, one at a time, was exposed to heat for 24 minutes. The conditions were exactly the same for each experiment. These included the location of the experiment, a house temperature of 67°F, a wall starting surface temperature of between 68 and 69°F, and the average heat temperature exposed to the walls. Using a laser thermometer, the temperature of both sides of each wall was recorded every 3 minutes. The temperature of the wall side facing the heater was recorded to verify that the heat applied to each wall was consistent. The temperature of the opposite wall side was taken to determine how much heat was escaping through the insulation product. This experiment was repeated 3 times for each insulation product and the control. <b>Results</b> The spray foam insulation had the lowest heat gain in the 24 minutes, making it the best insulator of heat. The average temperature gained in the three trials was 2.7°F. In second place was the blown-in cellulose with an average temperature gain of 4.8°F. In third place was the foam board with an average temperature gain of 7.4°F. And in fourth place was the fiberglass batt with an average temperature gain of 17.2°F. <b>Conclusions/Discussion</b> Each insulation product proved to be successful at blocking the flow of heat because without any insulation, the control wall's average temperature gain was 64.3°F. There are many choices of insulation types with different factors for choosing them including availability, installation process, and price. They all insulate and have the same goal of keeping your house warmer in the winter and cooler in the summer.	
<b>Summary Statement</b> My experiment showed that spray foam insulation is the best insulator against heat.	
<b>Help Received</b> My dad helped me build the mini walls, and my mom taught me how to use Excel for my result tables.	