



# CALIFORNIA STATE SCIENCE FAIR 2014 PROJECT SUMMARY

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<b>Project Title</b> <b>Green Roofs: Smart and Beautiful?</b>	
<b>Objectives/Goals</b> Do green roofs affect the internal temperature of houses and potentially help us conserve energy? <b>Abstract</b> <b>Methods/Materials</b> Build 5 16"x16"x8" wooden boxes without a top. Drill a 1/2" hole on one side of each box for the temperature probe. Place a 16" x 16" piece of wood on top of each box as the roof, but do not glue it down. Put a piece of insulation, tarp, and bubble wrap on each roof top. Line each plastic planter tray with a piece of thin cloth at the bottom. Add dirt and necessary plants to each planter and put on top of roof. Set the five model houses outside the night before you begin the experiment. In the morning, insert the thermometer probe into each of the houses. Set the Lab Quest to record for 4,320 min with 1 sample a minute (3 days) After the Lab Quest has recorded data for the set amount of time, transfer the data onto the computer. Lift the roofs of the houses to level the temperature, and keep the probes in a controlled environment. Perform 4 trials. <b>Results</b> Trial 1- The temperatures for the house with the extensive roof had the lowest range, 32.56°F and hence the most consistent internal temperature. The house with the control roof showed the largest variation with a range of 50.66°F. Trial 2- The house with the extensive roof had the coolest temperature during the time of the day when the ambient temperature was the highest and the house with the semi-intensive roof had the warmest temperature during the night. The house with extensive roof showed the smallest temperature variation. Trial 3 and 4- It was found the house with the intensive roof had the coolest temperature during the day and the house with the intensive roof had the warmest temperature during the night. The house with intensive roof showed the smallest temperature variation throughout both trials. <b>Conclusions/Discussion</b> Throughout all four trials the intensive and extensive roofs had a range that was considerably lower than the other roofs. The house with the control roof had the most extreme temperatures. Green roofs improve the environment by releasing oxygen into the air and managing the urban heat island effect. It can also be used as a method to reduce our energy consumption and hence, money spent. The cost of installation and maintenance would have to be compared with the money saved in heating and cooling costs.	
<b>Summary Statement</b> How different types of green roofs affect the internal temperature of houses.	
<b>Help Received</b> Father helped built house models; Used school lab equipment	