



**CALIFORNIA STATE SCIENCE FAIR  
2010 PROJECT SUMMARY**

<b>Name(s)</b> <b>Frances W. Atkins</b>	<b>Project Number</b> <b>S0802</b>
<b>Project Title</b> <b>Living Roofs</b>	
<b>Objectives/Goals</b> <b>Abstract</b> One important factor that leads to the degradation of our environment can be traced to building construction and operation. We are responsible for engineering improved building designs, which can help compensate for compromised environmental stewardship. A "living roof" that uses healthy, live vegetation is a technological advance utilized in building designs. This project tested how a living roof affects the amplitude and rate of temperature change inside a classroom model by studying the effects of heat transfer interacting with the characteristics of a living roof. Based on research, I predicted that temperatures would increase at a higher rate in a classroom model with a conventional roof compared to a classroom model using a living roof design. By taking the average temperature of five trials for both the living roof and the conventional roof, the results affirmed my hypothesis to be partially correct. The rate of temperature change in the living roof model was significantly less, actually decreasing the temperature by 1.13 °F versus an increase of 6.66°F for the conventional model. This experiment suggests that the living roof absorbed energy from a heat lamp rather than re-radiating it into the building below. The decrease in temperature may be a result of evaporation from moisture within the living roof biomass. A smaller amplitude and lesser rate of temperature change means that a fraction of energy normally used by mechanical systems would be required to cool the building using a living roof design.	
<b>Summary Statement</b> This project tests how a living roof alters the amplitude and rate of temperature increase within a modeled classroom. A decrease in the rate of temperature change would required less energy to cool buildings down.	
<b>Help Received</b> Father helped with math calculations and by proofreading my report; Jack Smith helped with the collection of moss.	