CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
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Project Number
31237

Project Title
Density Matters: Living Roofs Provide Better Insulation

Abstract

Objectives/Goals
I#m into architecture and therefore I find living roofs intriguing. Green roofs have many advantages including managing water runoff, keeping a building cool, filtering water, producing food, and keeping an area green. Green roofs are awesome but since I couldn#t focus on their cool looks, I decided to test their heat insulation compared to a regular roof.

Methods/Materials
First I built three 1 foot by 1 foot cubes. Then I researched the best plants for the project. The plants had to be drought resistant because of the climate they will endure

My procedure was the following:
1.) Take room temperature.
2.) Put thermometer inside model house.
3.) Turn on heat lamp
4.) Set timer for exactly one hour
5.) When timer goes off, immediately check and record the temperature of the thermometer.
6.) Wait 15 minutes and take room temperature again.
7.) Repeat 4 times for each model house.

Results
My results clearly show a significant difference between the heat insulation of the asphalt shingle roofs and the living roofs. For the sedum roof on average, the temperature decreased .5 degrees. The armeria roof showed a slight temperature increase of .75 degrees which means it is not as effective as the sedum. The sedem roof may be slightly better because it is a lot denser than the armeria, giving it an advantage. The asphalt roof performed awfully. On average, the temperature increased 9 degrees.

Conclusions/Discussion
Living roofs definitely provide better insulation than asphalt shingle roofs. The volume and density of the plants greatly outperform the thin asphalt shingles. My procedure was thorough and controlled.
If you live in a city and you don't have a front yard, you could put in a lawn and garden on your roof. If you can find drought resistant, dense plants you will have great insulation. This is particularly good for cities like Los Angeles where cooling insulation is needed all year long and it is hard to find space for a garden. An office building could have a farm on top of it so there would be a better use of space. Overall, there are cool possibilities for using energy efficient living roofs.

Summary Statement
My project compares insulation properties of living roofs to asphalt shingled roofs.

Help Received