



Up on the Roof (Learning Experience #2) Student Procedures



1. Did your team include vegetated or “green” roofs in your plans for reduction of Lancaster’s stormwater flow rates in *Planning for Rain* (Learning Experience #1)? Record a response to the following in your science journal:
 - a. What is a vegetated roof?
 - b. List at least three (3) claims made regarding the benefits of these unusual structures..
2. As a team, read *Lawnmower in the Attic* (Student Sheet #1a) and record the answer to the first two questions on the student sheet. After you read the scenario presented in item #3, proceed to Student Sheet #1b, where the team will locate information to organize the experimental design.
3. Design and implement an experiment using at least three types of roofing materials provided by your teacher. Remember to control all variables except the type of roof. If time permits, run more than one trial to imitate several rainy days in a row. Teams should have the design approved by the teacher prior to the test.
4. The materials listed will model a flat roof for an industrial building. Tilt the pans to produce a slight pitch (no more than 3%). A hole at the lower end of the pan will allow runoff water to be captured and measured after each simulated rain event. Remember to carefully collect and record the team data for every trial of each roofing material. This data will be reported to the rest of the class for analysis.
5. During a class discussion, share your results with the class.
 - a. As a result of the discussion, the class must reach a consensus about the best type of roofing material for limiting runoff into storm drains.
 - b. Are there any major differences in the data between teams? If so, what are possible explanations for those differences?



6. In your science journal write a summary report (several sentences to a paragraph) detailing the experimental results for your team and the class decision on the best type of roofing material for reduction of stormwater runoff.
7. Businesses and homeowners will be reluctant to spend extra money on a green roof unless they know that it will pay off in the long term. While a lower tax bill may help, lower energy costs will also be an incentive. How could you find out potential effects of a green roof on energy consumption before buying a new roof? Complete *Trust but Verify* (Student Sheet #2).
8. Now that your team has some experimental data, return to your plans for the City of Lancaster. Did you include green roofs? If you didn't, do you want to add green roofs now? If so, then you should revise your plans and record the updated plan in your science journal.
9. Prepare for a final team presentation to the citizens and city council of Lancaster, then find out what steps your hometown or region may be doing to address this issue locally. Complete *Goin' Green Everywhere* (Student Sheet #3).
10. In your journal write a brief description of what your hometown or region is doing to meet the Environmental Protection Agency's Total Maximum Daily Load (TMDL) requirements. Reflecting on what you have learned in this scenario, do you think that these measures will be adequate for the present and into the future?