

STORMWATER MANAGEMENT STEM PROJECT TIMELINE

TEACHER RESOURCE

**Please note that each day consists of a 45-minute class period*

Day 1 - Introduction to Project

- Handout Stormwater Management [Introduction Notes](#)
- Show a [map](#) when discussing the opening warm up question.
- Use the [Introduction PowerPoint](#) to present background information on Lancaster City, combined sewer systems, and green vs gray infrastructure.
- Distribute the [letter](#) to each lab group.
- Discuss the problem as a class.
- Each lab group should complete Step 1 on the [Stormwater Management Slides presentation](#) by defining the problem and explaining why it is important to solve.

Day 2 – Demonstration and Green Infrastructure Research

- Pass out the [Project Description Sheet and Timeline](#). Review with class.
- Complete “demo” showing the current amount of runoff for each residence. Record data on slides presentation.
- Pass out Jigsaw Directions and the [Green Infrastructure Graphic Organizer](#) for Step 2 of the STEM project
- Each lab group member is assigned a different GI to research and moves to that section of the room. Use the following Fact Sheets from the Save It! Lancaster Website.
 1. [Cistern/Rain Barrel](#)
 2. [Rain Garden](#)
 3. [“Green” Roof](#)
 4. [Vegetated Swale](#)
 5. [Pervious Pavement](#)
- Experts work together to complete their section on the graphic organizer.
- Students return to lab groups at the end of the period.

Day 3 – Complete Green Infrastructure Graphic Organizer

- Lab groups share findings on Green Infrastructure with their group.
- Each group member should complete their graphic organizer as they collaborate.
- Lab groups should complete this [Edpuzzle](#) to review Green Infrastructure before recording their possible solutions.
- Discuss possible solutions for the challenge as a group.
- Record possible solutions on your Slides Presentation.

Day 4 – Plan

- Each group will select an approach and develop a design.
- They must sketch the design on paper or use a tool they are familiar with online.
- Every group needs to take a picture and upload the picture to their Slides Presentation.
- Have the students create a list of what materials will be needed.

Day 5 and 6 – Create

- Groups will gather their materials and construct their prototype.
- **Materials:**
 - o Each group will use a food tray flipped upside down for their property lines.
 - o A plastic bin will be their house that they cannot modify.

- The roof was a sheet of plastic purchased at Home Depot and cut into different sections. ([ADO Products – Provent 22 in. x 4 ft. Rafter Vent](#))
- Large container to collect runoff and a box to prop up the model.
- Graduated cylinder to measure runoff.
- Beaker to pour 500 mL of rainwater.
- Other materials were available as needed – soil, sand, pebbles, popsicle sticks, plastic water bottles, jumbo plastic straws, and any materials students brought from home.
- Groups are responsible for uploading pictures to their Slides Presentation.
- They should record any problems they run into when building their prototype.

Day 7 – Test

- Test and evaluate their solution based on the established criteria.
- Collect their data and upload pictures.
- Record what worked well and what did not work as well as they planned.

Day 8 – Improve

- Take time to make adjustments where needed.
- Take a picture of any adjustments.

Day 9 – Retest

- Test and evaluate their modified solution.
- Collect their data and upload pictures.

Day 10 and 11 – Share

- Prepare their presentation for the board.
- Be sure each group refers back to the letter that what they need to include in their presentation.
- Take additional time to research any information needed for their presentation.

Day 12 and 13 – Presentation Day

- Groups will present to the board (teacher volunteers over their prep).
- Will their plan get approved?
- Students will complete an evaluation for each group that presents.
- They also must fill out a self- evaluation which includes rating the peers in their group.

Additional Resources:

- “Roof” purchases for model: <https://www.homedepot.com/p/ADO-Products-Provent-22-in-x-4-ft-Rafter-Vent-UPV22480/100561170>
- Chesapeake Bay Program: <https://www.chesapeakebay.net/discover>
- Stormwater PA – MS4: <http://www.stormwaterpa.org/ms4-program.html>
- Chesapeake Bay Foundation: <http://www.cbf.org/about-the-bay/more-than-just-the-bay/>
- Map of Conestoga & Susquehanna River: https://search.yahoo.com/yhs/search;_ylt=AwrCwPTHcGn6QUAUQwPxQt.;_ylc=X1MDMjExNDcwMDU1OQRfcgMyBGZyA3l0cy1pYmEtc3luBGdwcmlkA01ON2ZpTjZMUUVJYUZYdGV0aINpR0EEbl9yc2x0AzAEbl9zdWdnAzEwBG9yaWdpbgNzZWYy2queWFob28uY29tBHBvcwMwBHBxc3RyAwRwcXN0cmwDMARxc3RybAMxOARxdWVyeQNzYWZlJTlwaGFyYm9yJTIwcGEEdF9zdG1wAzE1NDM3Mtc5Mzl-?p=safe+harbor+pa&fr2=sb-top&hspart=iba&hsimp=yhs-syn&type=asbw_7187_CHW_US_tid1103#
- EPA: <https://www.epa.gov/environmental-topics/water-topics>
- The Pearl River Problem (online simulation going over water quality as a case study): <https://www.biomanbio.com/HTML5GamesandLabs/EcoGames/ecodetectiveshtml5page.html>
- Water Use it Wisely: <https://wateruseitwisely.com/>
- Save It! Lancaster – Residential Green Infrastructure (Edpuzzle video source): https://www.youtube.com/watch?v=Y2GOSSpcZ1w&t=10s&disable_polymer=true
- <https://www.lancasterwaterweek.org/create-habitat>