

“Green Stormwater Solutions”

For individuals or groups | Maximum Points: 200

Due at Phipps: Friday, December 7 by 5 p.m.

Your Challenge: Where does the water go when it rains? If rain falls on areas covered with soil and plants, it slowly seeps down into the ground, is filtered by soil, and then recharges the water table. If, however, the rain falls on impervious surfaces such as rooftops, roads or sidewalks, it is unable to soak into the ground, negatively impacting our ecosystems and communities in a variety of ways. This stormwater runoff can cause dangerous flooding of homes and roadways, pollute aquatic ecosystems with surface contaminants, and even cause raw sewage to overflow into the rivers.

While one solution may be to add to existing “gray infrastructure” (more storm drains, larger pipes, or new treatment plants), another approach is to use green infrastructure. Green stormwater infrastructure includes bioswales, rain gardens, and other features that allow the rain water to infiltrate into the earth.

Choose a property in your community such as your home or school and calculate the amount of permeable and impermeable surfaces on it. (You may need to use some basic geometry skills.)* Look up annual precipitation data (in inches) for your area. You can visit NOAA’s National Weather Service webpage for Pittsburgh Climate Data at https://www.weather.gov/pbz/pit_records to find this information. Select “Historical Precipitation Amounts by Month” to view historic and current monthly totals as well as the 30 year average. Use this data to calculate the volume of water that has fallen on the impermeable parts of the property so far this year.*

Now create a design for the area that incorporates green stormwater infrastructure. Design should be on a poster no larger than 22” x 28” and should include a map of your property with the new features clearly labeled. Include captions that explain why you added each element. As an option, you may choose to use either cross-sectional drawings or topographic lines to better illustrate how your features will work. Can you reduce the amount of rain that will become surface water?

*Remember:

Area of a Rectangle = Base x Height

Area of a Triangle = (Base x Height) / 2

Volume of Water = Area of Property x Rainfall this Year (Pay attention to units!)

Entry Requirements: Deliver to high school program coordinator at Phipps in person or via certified mail (electronic submission is not accepted):

- Choose a property in your community and calculate the area (both impermeable and permeable surfaces) of it.
- Using area rainfall data, calculate the amount of water that has fallen on the property so far this year.
- Create a design that incorporates green infrastructure to the property that you choose. Label elements and explain why you chose to use them.
- Design should not exceed 22” x 28”
- Include all calculations with the design.
- Please attach a list of the students and/or classes involved in the project.
- Works Cited
- Maximum Entry: 1 design concept
- Challenge Entry Form

School submits: Challenge Entry Form, 1 design concept