

Calculating Stormwater Runoff



Purpose & Goals

Purpose: This activity aims to discover how land use impacts surface water quality. With mathematical techniques used by stormwater professionals, we can assess how water interacts with the landscape and therefore how human activities on the landscape effect water.

Goal: To connect the schoolyard's various surface coverage to local water quality by calculating rainfall and runoff coefficients.

Standards

Preparation & Materials

- Map of schoolyard (digital PDF provided by VLAWMO)
- Calculator
- Runoff coefficient tables (printed)
- Paper & pencil

Procedure

1. Assess the site conditions. Referring to the schoolyard map, define the surface area types according to the row categories on the coefficient table. Surface cover types need not be precise to the table; an estimate applied consistently through the model provides sufficient data
2. Apply the coefficient value from the table to each surface cover on the schoolyard. Express these values on printed maps or on a projector/SmartBoard. VLAWMO can help with delineating surface covers and obtaining clear square foot measurements for each surface.
3. Do the math. For each surface area/coefficient region on the map, follow the model: $\text{Volume of runoff} = \text{surface area} \times \text{runoff coefficient} \times \text{rainfall depth}$. Make sure surface area and rainfall depth are in the same units.
4. For better visualization of results, convert volume in cubic feet to gallons: multiply by 7.48 gal/ft³
5. Clear the schoolyard map or use another map to again label each surface cover, this time with gallons of runoff. By setting a hypothetical rainfall event at a certain depth, you can now calculate the amount of runoff generated on the schoolyard during that rain event.

Reflection

A series of prompts provide a platform for thoughtful reflection and real-life application.

1. Which surface covers shed more water, and which shed less? Why is this so?
2. What happens on these surfaces that might effect water quality?
3. Thinking about what happens on the surfaces, what are there benenefits and drawbacks of the different types?
- 4 If you were to design a schoolyard, which surface types would you use more of? Which would you use less of?
5. What would you tell visitors to your school if they wanted help keep water clean?