

2: Stormwater Runoff



Stormwater runoff, the number one environmental issues in many towns and municipalities in Pennsylvania.

Goal:

The students will be involved in an action project where they gain an understanding of the attributes of positive and negative stormwater management practices in the Muddy Run Watershed area, thereby being able to make an impact on their local waterways as well as the Chesapeake Bay watershed.

Objectives:

1. The students will define "stormwater management."
2. The students will list three practices that help eliminate water runoff and flooding.
3. The students will explain the impact of excessive water runoff on a watershed.
4. The students will recognize positive or negative attributes of a housing development on site.
5. The students will recall the three major pollutants of stormwater runoff and give examples of each:
 - Toxic materials
 - Sedimentation
 - Nutrients.

6. The students will produce a list of positive stormwater practices that can reduce the level of stormwater runoff in the residential areas of the watershed.

Procedures:

After studying stormwater runoff in the classroom, students participate in a fieldtrip to developments located in the Muddy Run Watershed: 1) Hollywood, 2) Stewart Development, 3) Taylor Highlands, 4) Warm Springs Acres, and 5) Stone Creek Watershed (Onieda Development). The students observe, document, and/or take pictures of positive stormwater management practices and common negative practices that have affected the watersheds. This information is used in different culminating activities of the unit.

Assessment:

Alternative Assessments, e.g., students 1) participate in and complete a cooperative learning activity to chart the water cycle, 2) cooperatively list and explain ten land management practices that prevent stormwater runoff in the Muddy Run Watershed, 3) participate in a stormwater management project, 4) identify ten negative land management practices in the Muddy Run Watershed; Teacher-Made Test

Resources to Implement:

Teacher handouts:

- Pollution: General Fact Sheet
- Solutions to the Problem Activity
- Stormwater Runoff & Erosion Data Sheet (for field study)
- Positive and Negative Land Management Practices of Muddy Run Watershed (based on student findings of field studies)
- Introduction to Environmental Education (adaptations from Aquatic Project Wild)
- What Are The Bay's Problems Today?
- Stormwater Runoff (adapted from Project WET)
- Student Activities from the following resources:
 - 1) Project WET: "The Pucker Effect" (p. 341)
 - 2) S.W.I.M.M.: "When Rain Hits the Land" (pp. 59-66)

Slides:

- Muddy Run Watershed- Location Shots (teacher created)
- Muddy Run Watershed- Stormwater Runoff (teacher/student created)
- Muddy Run Watershed- Negative Land Management Practices (teacher/student created)
- Muddy Run Watershed- Positive Land Management Practices (teacher/student created)

Videos:

- Pointless Pollution (CBF)
- Into the Water, Into the Bay (CBF)

Transparencies:

- The Water Cycle (KARE Water Resources in PA)
- Sources of Water Pollution (Water Quality and Pollution, Milken Company)
- Distribution of Earth's Water (KARE Water Resources in PA)

Literature:

- Distribution of Earth's Water (KARE Water Resources in PA)
- The Water Cycle "
- Rainfall in Pennsylvania "
- Drainage Basins in Pennsylvania "
- Aquatic Project Wild
- Project WET, "Amazing Water" pp. 219-220

Equipment:

- Slide Projector/Screen
- VCR/TV
- Overhead Projector/Screen and/or camera (optional)
- Watershed Model

Field Study:

- Muddy Run Watershed (Hollywood & Shadyside developments)

PA Academic Standards for Environment and Ecology:

- 4.1. Watersheds & Wetlands
 - Identifying various types of water
 - Describe changes that occur from a stream's origin to its final flow
 - Understand the role of the watershed
 - Explain the relationship among landforms, vegetation and the amount and speed of water
 - Describe the impacts of watersheds and wetlands on people, e.g., flood control
 - Identify and describe natural and human events on watersheds and wetlands, floods
- 4.3. Environmental Health
 - Identify how human actions affect environmental health
 - Identify an environmental health issue
 - Describe how human actions affect the health of the environment, e.g., land use
- 4.6. Ecosystems and their Interactions
 - Explain how ecosystems change over time
- 4.8. Humans and the Environment
 - Explain how human activities may change the environment

- Explain how human activities may affect local and regional environments
- 4.9. Environmental Laws and Regulations
Know that there are laws and regulations for the environment



Erica Rhodes and Laura Backstrom explain the students' HAMS Wetland Construction at a national environmental summit presentation. HAMS students spearheaded the project to reduce flooding from stormwater runoff in the local watershed.