

Stormwater Youth Education

Inspire Youth To Be Stormwater Sleuths!

Water! We can't live without it! We all need to do our part to help protect and conserve it.

Stormwater runoff is a major source of water pollution today. We all add to this pollution.

Stormwater runoff is being managed in interesting and creative ways to help protect and conserve fresh water.

Everyone can do something that will help make a difference.



Background Information

Today's youth are the next generation of professionals and decision makers to deal with water and other environmental issues. One issue is pollution of surface waters by stormwater runoff. The purpose of these stormwater education resources is to facilitate youth in learning about stormwater. When it rains, where does it go and what does it take with it? What interesting and creative methods are now being used to manage stormwater? New stormwater management practices focus on **keeping it clean, slowing it down, and soaking it in** to help protect streams, rivers and lakes; and to conserve water. Youth will learn:

- Stormwater is precipitation (rainwater and snowmelt).
- Rainwater, a valuable resource, is often treated as a nuisance to be gotten rid of as quickly as possible; especially in towns and cities where storm drain systems are used to move stormwater away; typically through a pipe and directly into a stream or river.
- As stormwater flows over surfaces, it collects pollutants like soil, chemicals, bacteria, leaves and oil; then carries these to surface water. Pollution in runoff is considered one of the main sources of water pollution.
- **A change in thinking is happening!** Stormwater is being viewed as a resource to be collected and used to help reduce the amount entering streams and rivers. This reduces water pollution and drinking water is conserved when rainwater is used for plant irrigation.
- The new focus for stormwater management is to keep pollutants out of the path of stormwater (keeping it clean); and directing stormwater to pervious surfaces like planted areas or porous pavement instead of impervious surfaces like concrete (slowing it down and soaking it in).
- When stormwater soaks into the ground, soil and plant roots filter and clean it. Valuable soil water and groundwater is also recharged.
- Interesting jobs and careers are changing or being created to help manage stormwater in a sustainable way.



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Learning Objectives:

- Raise awareness of how stormwater runoff is polluting streams, rivers and lakes.
- Help youth to see rainwater as a resource to temporarily collect or redirect to be put to good use rather than most of it going down a storm drain.
- Increase understanding about new methods like rain gardens, green roofs and porous pavement that are being used to manage stormwater differently than it has traditionally been managed.
- Encourage youth to use these practices now and in the future; and to tell others about them.
- Raise awareness about related careers and entrepreneurial opportunities associated with new stormwater management practices.

Stormwater Sleuth and Running Rain Kit:

- **Educational Comic Book:** Follow the characters Stormwater Sleuth and Running Rain on their adventure to discover where running rain goes when it rains, what pollutants it can take with it, and new methods being used to keep it clean, slow it down and soak it in.
- **Sleuth Card Game:** 120 cards with colored pictures and definitions. Threat cards (40) show pollutants or practices that can harm surface water. Best management cards (80) show practices that better manage stormwater to help protect streams, rivers and lakes. Cards can be used to teach definitions, promote discussion, or practice decision-making skills.
- **Activity “How-To” Sheets:** Two to four page guides to aid educators and youth in leading “hands-on” activities to facilitate learning about stormwater issues and best management practices.
- **Awareness Items:** Bookmark, magnet, sponge, rain gauge printed with the motto *Keep it Clean, Slow it Down, Soak it In.*

Did you know?

Kits and individual kit items will be available to purchase at: marketplace.unl.edu.
The activity sheets and comic book can also be downloaded for free at: water.unl.edu.

On-line Resources:

UNL Stormwater Education for Youth: <http://water.unl.edu/web/landscapes/youth>

UNL Stormwater Webpage: <http://water.unl.edu/web/propertydesign/home>

EPA’s Green Infrastructure Webpage: <http://water.epa.gov/infrastructure/greeninfrastructure/index.cfm>

EPA’s Classroom Education on Stormwater:

<http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=browse&Rbutton=detail&bmp=8>

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Terms and Concepts Students will Learn:

Bioinfiltration: Bio refers to living things. Bioinfiltration uses plants and soil to help rainwater soak in.

Curb and Gutter: Pathway along streets that directs stormwater to a storm drain and into a pipe to be transported to a stream or river. Curbs and gutters are often referred to as **gray infrastructure**.

Downspout: The part of roof gutters that directs water away from a building. These are best directed on-to planted areas to reduce the amount of water that runs off of a property and to make good use of the rain.

Drinking Water: Water that has been treated so it is safe to drink, for cooking, etc. Facilities, staff, energy, and money are required to treat water. Conserving drinking water helps municipalities save money.

Ecosystem: Community of living things (plants, animals, microorganisms) and nonliving things (water, air, soil) that interact to create habitats. When water is polluted, that ecosystem is impaired.

Erosion: The process that moves material, especially soil, from one location to another. It is caused by the action of wind, water, or other forces working on the Earth's surface. Runoff water increases erosion.

Filtration: Passing a fluid through a medium to separate solids such as when water passes through soil and solids are trapped by soil particles or plant roots. When water runs directly to a storm drain, it is not filtered as it is when allowed to flow through and soak into a planted area first.

Fresh Water: Water that is not salty. Only about 3% of the Earth's water is fresh water. We all need to do our part to protect and conserve it. As the Earth's population grows, freshwater demands increase.

Groundwater: Water in soil and rock formations located beneath the ground surface. When rainwater runs off, less soaks into the ground to help recharge groundwater. Much of the water used for drinking and irrigation comes from groundwater.

Impervious Surface: Any surface that water cannot soak into such as streets, sidewalks, driveways, rooftops and compacted soils. Urban areas have lots of impervious surfaces; hence more stormwater runoff.

Infiltrate: Process of water moving into the soil from the surface. Infiltration is the focus of many new stormwater management practices. Such practices are referred to as **green infrastructure**.

Nonpoint Source Pollution: Pollution that cannot easily be traced to one source or property because small amounts come from many sources and properties. These numerous small amounts eventually accumulate to become harmful amounts.

Pervious (porous): A surface that allows water and air to move into and through it (i.e. soil, porous pavers). A new type of pervious concrete is now being used to pave driveways and parking lots.

Terms and Concepts Students will Learn (continued)

Point Source: Pollution that can be traced to a specific source or property such as a factory, an oil or chemical spill, or a wastewater treatment plant.

Rainwater Harvesting: Catching or collecting rainwater in a planted area (rain garden, green roof) or container (rain barrel, cistern) so less runs off. Harvested rainwater is often used instead of drinking water for irrigation.

Runoff: Stormwater that runs off of a surface rather than soaking in. The more impervious surfaces there are, such as in towns and cities, the more runoff there is and the faster it moves. Fast moving water can collect more pollutants and cause more erosion of soil and streambanks.

Runoff Pollution: Contaminants like soil, pesticides, litter, oil, grass clippings, tree leaves, and bacteria that are collected by stormwater flowing over a surface and then carried into surface water.

Sediment: Primarily eroded soil; also dirt from roof tops or paved surfaces. Often deposited in water bodies with runoff.

Storm Drain: Openings built into the curbs of streets and connected to a pipe to carry away stormwater. As urban areas grow, older storm drain systems cannot handle all of the runoff during heavier rainstorms and flooding occurs.

Stormwater: Rainwater and snow melt. In towns and cities, stormwater management is an important consideration of developers, engineers, builders, public works employees, policy makers and others.

Water Cycle: The continuous movement of water through its liquid, gas and solid phases above, on and below the Earth. The water on Earth today is the same water as when Earth was formed. New water is not added to the Earth when it rains.

Watershed: The area of land where rain and snowmelt drains (sheds) to the same stream, river or lake. Everyone lives in a watershed. Everyone also lives upstream and downstream of other watersheds. We all need to do our part to take care of the water in our own watersheds and downstream watersheds.

Water Treatment (Sewage) Plant: Municipal plant that treats wastewater (water from toilets, washing machines, dishwashers, showers, etc.) before it is released into a stream or river. In most communities, stormwater is not treated before it is directed to a stream or river.

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