Watershed in a Box

DESCRIPTION:

You and your group will build a simple runoff model and use it to demonstrate how nonpoint source pollution can affect surface water. Whether you live in a city, town or rural area, nonpoint source pollution can be a problem.

OBJECTIVES

By participating in this activity, your group will:

1. Define a watershed.
2. Use powdered drink mix to represent nonpoint source pollution and demonstrate how this pollution affects surface water.
3. Design a community that will try to minimize the effects of pollution on surface water.

TIME

The runoff model is very easy to build and takes approximately 15 minutes to construct. This activity would work well at a club meeting.

AGE

This activity is appropriate for ages 8 and up.

COST

All supplies for the watershed model can be found in grocery stores, craft stores or your home.

YOU WILL NEED:

For each model:

- A box cover or other shallow box that is 12" x 12" or larger
- Foam pieces, styrofoam®, or paper
- Heavy-duty aluminum foil or white plastic bag
- Permanent markers
- Spray bottle
- Cup of water
- Powdered, unsweetened drink mix – two or three different colors
- Bucket

BACKGROUND

No matter where you live, the water quality in rivers and streams is determined by what happens on the land around them. The land around a stream or river is called a **watershed**.

One watershed is separated from another watershed by a low rise, the crest of a hill or a mountain chain. Rain or snow that falls on opposite sides of the higher land causes water to flow into different watersheds.

Not all watersheds are the same. Some watersheds are hilly, while other watersheds are flat plains. In all cases, precipitation that falls on the watershed flows over land to reach the lowest point – a lake, river or stream.

As water flows over land, it picks up soil, chemicals and other pollutants and carries them to lakes, rivers or streams. This water transportation system is called **runoff**.

In rural or agricultural areas, runoff water carries a wide variety of materials, including pesticides, soil and animal wastes, directly into waterways.

In urban areas, hard surfaces such as driveways, sidewalks, rooftops and roadways prevent water from soaking into the ground. As a result, the runoff water, which can be contaminated with road salt, heavy metals, or automobile fluids, flushes quickly into storm drains that dump directly into streams and rivers.

Pollutants that do not have a single source are called **nonpoint source** pollution. This pollution originates from many different places.

Everyone lives in a watershed. We may not realize that what happens somewhere in the watershed will eventually have an impact on the lowest point in the watershed – a lake, a river, or a stream.

HOW TO MAKE THE MODEL

1. Get a box.

Use a box cover or a shallow box to contain the runoff model.

2. Create land forms.

Arrange pieces of foam or crumpled paper to represent hills and land forms in the bottom of the box. Encourage your group to be creative. Remember, the highest points should be near the box walls. Leave a gully or valley in the middle of the box to represent a stream or river.

3. Cover the land forms.

Cover the land forms with a large piece of aluminum foil, shiny side up. Start in the middle of the box and gently press the foil into all of the hills and valleys, working your way towards the box walls. Push the edges of the foil up along the walls of the box and fold the foil over the edge of the box. Be careful not to tear the foil.

4. Create a community.

With a permanent marker, draw on the foil to outline the streams or rivers in your model. Next, draw houses, roads, farm fields, feed lots, stores or anything else that you want in your community.

5. Add some pollution.

Sprinkle different colors of powdered drink mix onto the model. The colors represent different kinds of pollution. For example:

- Use red powder to represent yard care chemicals and sprinkle it around the houses.
- Use green powder to represent salt on the roads or automobile waste and sprinkle it along roadways or in a parking lot.

- Use brown powder to represent exposed soil at a farm field or a construction site.
- Use blue powder to represent human or animal waste and leave little piles of powder near homes and farms.

6. Ask what will happen.

Ask the group what they think would happen if it rained.

7. Make it rain.

Using the spray bottle to represent a rain storm, spray water on the hillsides. Watch the water flow towards the rivers and streams.

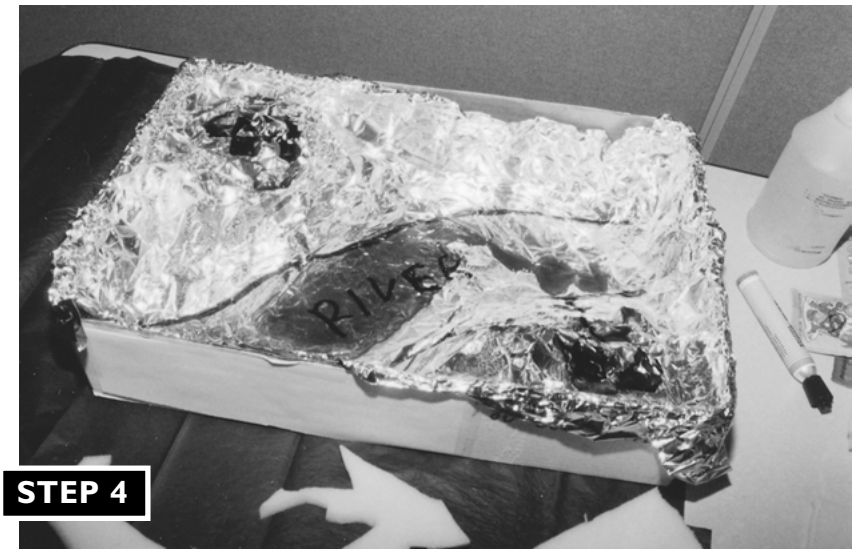
8. Follow up.

Ask the group to tell you what happened. Then ask the group how they would redesign the community to prevent water pollution.

9. Try it again.

Dump the water from the model into a bucket. Remove the foil from the model and set it aside. Place a new piece of foil on the watershed. Ask the group to redesign the community to prevent water pollution.

Sprinkle powdered drink mix in the appropriate areas. Let it rain. Was there an improvement?



STEP 4

STEP 5

STEP 7

RESOURCES

Environmental Resource Guide: Nonpoint Source Pollution Prevention Air and Waste Management Association
c/o Joel Anne Schweiltzhelm
P.O. Box 1020
Sewickley, PA 15143
1-800-275-5851
www.awma.org

It All Adds Up Video Series
This video series is available from the DNR's Madison office, phone 608-264-6127 or 608-266-0140.

The five video titles include:

It All Adds Up (overview, 22 min.)

Conservation in the '90s: Meeting the Water Quality Challenge (19 min.)

From Barnyard to Stream: Managing Manure for Water Quality (17 min.)

Streamside Protection: Finishing the Job for Water Quality (14 min.)

From Curb to Stream: Cleaning Up Our Urban Waters (19 min.)

Pointless Pollution
Bullfrog Films, Inc.
Oley, PA 19547
1-800-543-FROG
www.bullfrogfilms.com

This 28-minute award-winning video focuses on how nonpoint pollution has affected the lives of people in four regions of the country.
Appropriate for grades 7-12.

Water Action Volunteers is a cooperative program between the University of Wisconsin–Extension and the Wisconsin Department of Natural Resources. For more information, contact the Water Action Volunteers Coordinator at 608-264-8948.

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