

An NWO Hands-On STEM Activity

This activity comes from



A partner of the Northwest Ohio Center of Excellence in Science and Mathematics Education. Funding provided by the Ohio Board of Regents.

Non-Point Source Pollution Activity

Non-Point Source Pollutants are pollutants of water that come from several different sources

Recommended for and aligned with revised K-5 science standards.

Background: This activity is designed to demonstrate to students what an average storm drain collects during a rainfall and how the water from storm drains can impact the water quality and aquatic environments of local streams, rivers, and bays.

Materials Needed:

- One small rectangular 2.5 gallon aquarium (PetSmart.com)
- Plant food to represent pesticides/fertilizer (You may also use a 4 oz. mixture of water and green food coloring)
- Foil bread loaf pan (11 ³/₄ in x 5 ⁵/₈ x 3 ³/₁₆) to fit just inside the aquarium
- Metal 1 ½ inch sink strainer basket (drain)
- Duct tape
- 2 oz. of vegetable oil mixed with red food coloring to represent motor oil
- A collection of soil, sand, and pebbles to create erosion
- A one-gallon watering can filled with water
- Grass clippings, twigs, leaves to represent yard/natural waste
- Bits of paper, Styrofoam cups, cardboard containers, and other non-food trash that people throw away
- Banana peels, apple peels, coffee grounds, & eggshells to represent food waste
- Storm Drain Activity Sheet (attached)

Preparation: Fill the aquarium one-third with water and place it on an accessible area where students can easily view it. Cut a hole in the middle bottom of the foil pan to fit the drain and push the drain inside the hole. Use duct tape to secure the drain so that it hangs below the pan. The foil pan/drain represents the storm drain and the aquarium represents the waterway that the storm water mixes into after entering the storm drain. Leave the sides of the aquarium uncovered so that the students can view its contents.

Procedure:

1. Introduce this activity with a discussion of storm drains, storm drain systems and their purposes. (See **Resources & Suggestions** section)
2. Discuss where the water and objects that float down into a storm drain go.
3. Have students list all of the things they can think of that might enter a storm drain during a rainstorm.
4. Assign a group of students to one of **six** stations: (1) Pesticides/ Fertilizer Station, (2) “Motor Oil” Station, (3) Soil, Sand, Pebbles Station, (4) Grass Clippings, Twigs, Leaves Station, (5) “Trash” Station, (6) Food Waste Station

Non-Point Source Pollution Activity continued

5. Ask each group to discuss and record the materials they were given, including their use or origin and ways these materials could enter the storm drain. (**See Storm Drain Activity Sheets.**)
6. One at a time, have each group of students place their materials into the storm drain.
7. Choose one student in each group to use the watering can to create rain to wash his/her station's materials into the waterway. While washing each station's materials into the waterway, review the materials and their use or origin.
8. Discuss the following questions:
 - Are these materials pollutants?
 - How do the material damage the environment? How would they affect aquatic life, people, plant life, etc.?

After adding all of the pollutants to the aquarium, examine the contents of the waterway. Discuss how the waterway has changed and how viewing this change makes the students feel. Record their answers on a whiteboard or poster paper.

Follow-up Questions:

- What types of pollution are natural and what types are man-made?
- What types of pollution are added by people living in local communities?
- How can we remove the pollution from the water?
- What could be done to stop pollutants from entering storm drains?

Design an Investigation:

- 1) Have the groups of students at each station think of ways to remove the pollution from the aquarium.
- 2) Gather materials to try some of the removal methods.
- 3) Have students create a data collection sheet to record what they tried and how successful they were.
- 4) Have each group share their results with the class.
- 5) Determine as a group based on their investigations: Which pollutants were easiest to remove? Which were more difficult to remove? Which could not be removed?

Extension:

If you are not completing the ***Design an Investigation*** activity, leave the contents in the aquarium overnight and have students observe the next day and for several days. Record each day how the water may have changed in the way it looks, smells, etc. Discuss how these changes might affect the environment.

Adapted from Habitat Earth: H₂O a production of WGVU – Grand Rapids
www.wgvu.org/teacher_resources/pdfs/030607/HE102TG.pdf

Suggestions and Resources for teaching Non- Point Source Pollution

Suggestion:

Show pictures of different types of drains...

Resources:

For information and illustration of storm drain system...

<http://protectingwater.com/storm-drains.html>

Teacher's guide for Habitat Earth with activities, puzzles and a coloring page

www.wgvu.org/teacher_resources/pdfs/030607/HE102TG.pdf

Extension Ideas:

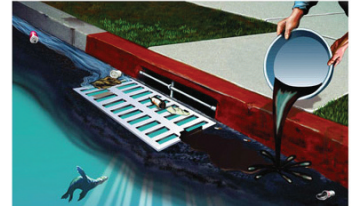
Soil and Water Conservation District, Life Science: Ecosystems

Steve Spangler Science (Oil Absorbing Polymer)

<http://www.stevespanglerscience.com/experiment/00000108>

Name: _____

Storm Drain Activity Sheet



Pesticides/ Fertilizer Station

1. What is this and what is it used for?

2. How could it get into the storm drain?

3. How could this hurt or change the environment?

4. Would the people who put it there want to damage the environment?

5. Could it be stopped? How?

6. What did this pollutant do to change your waterway?

“Motor Oil” Station

1. What is this and what is it used for?

2. How could it get into the storm drain?

3. How could this hurt or change the environment?

4. Would the people who put it there want to damage the environment?

5. Could it be stopped? How?

6. What did this pollutant do to change your waterway?

Soil, Sand, Pebbles Station

1. What is this and what is it used for?

2. How could it get into the storm drain?

3. How could this hurt or change the environment?

4. Would the people who put it there want to damage the environment?

5. Could it be stopped? How?

6. What did this pollutant do to change your waterway?

Grass Clippings, Twigs, Leaves Station

1. What is this and what is it used for?

2. How could it get into the storm drain?

3. How could this hurt or change the environment?

4. Would the people who put it there want to damage the environment?

5. Could it be stopped? How?

6. What did this pollutant do to change your waterway?

“Trash” Station

1. What is this and what is it used for?

2. How could it get into the storm drain?

3. How could this hurt or change the environment?

4. Would the people who put it there want to damage the environment?

5. Could it be stopped? How?

6. What did this pollutant do to change your waterway?

Food Waste Station

1. What is this and what is it used for?

2. How could it get into the storm drain?

3. How could this hurt or change the environment?

4. Would the people who put it there want to damage the environment?

5. Could it be stopped? How?

6. What did this pollutant do to change your waterway?
