Besides the POINT...

Subject Areas:  Science, Math, Language Arts

Setting:  Classroom

Duration: One class period

Skills: reasoning, calculating, critical thinking, writing

Vocabulary: watershed, point source, non point source, stormwater, sediment, nutrients, litter, toxic.

Correlation to Core Curriculum Standards:

Science: 5.1 (A,B), 5.2 (A), 5.8 (B) 5.10 (A,B);
Math: 4.1 (A,B),
Language Arts: 3.1(A,E,H), 3.2(A,B,C,D), 3.5(A,B,C)
Health and Physical Education: 2.1(E)
Arts: 1.2 (d)

Objectives:

1. Understand the difference between point and non point pollution
2. Identify categories of non point pollution
3. Discuss ways of preventing non point pollution
4. Identify that shellfish help “clean” water of Non point pollution

Materials: Aluminum pan or container, water, food coloring, heavy-duty aluminum foil, spray bottle.

Background: Pollution sources can be separated into two types, point – which has an obvious, traceable source, and non point – which is pollution that comes from all over
the watershed, mostly from storm water runoff. Since the implementation of the Federal Clean Water Act of 1972, point source pollution has been regulated by a government permitting system. Non point source pollution, which everyone creates, is a significant problem in our waterways. The major categories are toxic chemicals, litter, excess nutrients, pathogens, and sediment. By educating people to be more careful in their everyday and backyard actions we can reduce the damage that is being done.

**Procedure:** Ask students to define pollution and identify where pollution comes from. Ask them to identify specific types of pollution. Discuss that pollution has different sources - some that you can POINT to (like a pipe from a factory), and some that you can’t tell where it is coming from. Explain the concept of NON POINT SOURCE POLLUTION, which is pollution that comes from everywhere in little bits (a little bit, a lot of times). Move to activity.

**Procedure: Activity - Short Term/Younger Grades**

Fill the pan halfway or less with water, and explain that the area represents their watershed. Take a drop of food coloring and add it to the pan, noting that food coloring is being used to “show” pollution. Describe this as one person adding a small amount of non-point pollution, for instance not picking up after their dog, one time. Ask students if they think the water seems very polluted.

Now have each student come up and add one drop of food coloring to the pan. As the water turns darker, ask the students to assess whether the water seems polluted. Remind them that this is just one day, one walk, by each of their dogs. Have them multiply the number of drops times 3 times a day, times 365 days. Ask them to imagine what that water would look like. What if they multiplied it by the number of people in their town? Express that non point source pollution is “a little bit, a lot of times” and that is what makes it so hard to stop. Remind students that it takes reaching out to every person to make all the non-point pollution go away.
**Procedure: Activity - In-Depth/Older Grades**

Show the demonstration, and have the students specifically name types of non-point pollution...little things that everyone does. Show a picture of a storm drain, and have students identify the positive and negative aspects of these structures (prevent flooding/can transport pollutants). Brainstorm ways with the class to reduce non-point pollution, and make a class list (using commercial car wash, not over fertilizing, cigarette butts, fish waste). Have students create a collage of non-point pollution sources. Have each student commit to teaching one person what they learned in this lesson. *Hand out NJDEP water wheel handout, and have students construct water wheels to take home.*

**Extension: Taking it further**

Repeat the foil watershed model activity from Watershed Address. Using heavy-duty aluminum foil, build a watershed model that has different land areas that drain into a common water body. To do this, crumple up the foil into a ball, and then unfold it. Use the now wrinkled foil to make a rough landscape and place it in the aluminum pan. You may want to fashion mountainous or higher areas, and then create a depression for a lake or bay. You may create rivers or anything else you desire while shaping the foil in the pan, to create a three dimensional replica of land. Add drops of different color food coloring to different areas of the model to represent different pollution types, (you may either add directly to the “land” or place food coloring on a small sponge or piece of tissue.) Using the spray bottle, simulate a rainstorm. Have students watch as the common water body turns colors and discuss the process of that water draining through the watershed. Have students individually suggest ways that they could stop non point source pollution from reaching streams and bays. Have students investigate non-point pollution sources in their homes and neighborhoods, and propose possible solutions in their journals. (This could also be done as an in school activity, and students could assess the school.)
Assessment:

Class participation
Non-point pollution lists
Student collages
Worksheet
Journal entry on non-point pollution assessment

Also see:

Water keeps it moving, Getting to the source, Water Wash, Storm Drain Watch, Clam man a play, NPS live from Beneath the Shell, NJDEP.
What are Storm water Management Ponds?, Building a Watershed Model from Discovering Barnegat Bay.