Lesson Plan for Trash Talk
Grades ~1-5

Updated: 6/26//07

What is Trash? (5 minutes)

- What have you put in the trash today?
- How many pounds of trash does each person throw away each day?
    - Average is 4.4 pounds

Where does our trash go? (10 minutes)

- Draw the "flow" of trash on the board and discuss trash cycle
    - Person
    - Trash Can
    - Dumpster
    - Truck (which uses gas)
    - Landfill
        - Landfills in the U.S. charge between $10 and $100 per ton to dump trash
- Draw a landfill on the board
- Engage the kids in a discussion on why we want to keep as much "stuff" out of the land fill as possible, e.g.,
    - Limited space in a landfill
    - Need trucks and gas to get trash there
    - Smelly
    - Noisy
    - Rats

What can YOU do to have keep trash out of the landfill? (15 minutes)

- REDUCE what you use and only buy what you need
- REUSE or giveaway what you don't need
    - Do demonstration activity with three lunches (school, brown bag, reusable bag)
- REPAIR – Show "broken" toy
- COMPOST – Show compost from home

    - Compost is a dark, crumbly, and earthy-smelling form of decomposing matter
    - Why do we compost?
        - Provides nutrients for the plants
        - Keeps food and yard waste out of landfills
        - Demonstrate what can and can't be composted with a school lunch
- RECYCLE – Show bottle and recycled toy, pencil made from recycled newspaper

Trash sort activity (15 Minutes)

Add your write up here

Summarize what each student can do keep trash out of the landfill? (2 minutes)

- REDUCE what you use and only buy what you need
- REUSE or giveaway what you don't need
    - Do demonstration activity with three lunches (school, brown bag, reusable bag)
- REPAIR – Show "broken" toy
- COMPOST – Show compost from home
    - Compost is a dark, crumbly, and earthy-smelling form of decomposing matter
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        - Provides nutrients for the plants
        - Keeps food and yard waste out of landfills
        - Demonstrate what can and can't be composted with a school lunch

RECYCLE

Optional Take-home Activities

- Word Search
- Challenge Kids to keep a trash diary (5-10 minutes)

QUANTIFIED RESULTS

Weight of your trash bag _____

Your bag X _____ in group = Group Total _____

Group Total

_____ in group = Student Average _____

Group Totals for:

Paper Waste _____

Food Waste _____

Aluminum Waste _____

Steel Waste _____

Glass Waste _____

Other Waste _____

School Totals for :

Paper Waste _____

Food Waste _____

Plastic Waste _____

Aluminum Waste _____

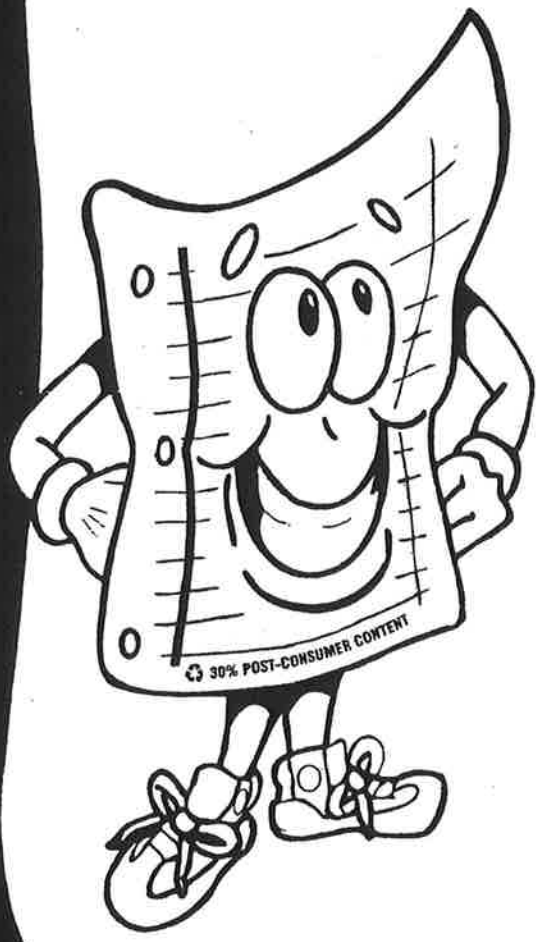
Steel Waste _____

Glass Waste _____

Word Search!

Paper is an important resource. North Carolina recovered the equivalent of over 650,000 trees of wood fiber through paper recycling programs last year. See if you can find these recycling words hidden in the letters below!

Box	Cardboard	Environment	Fiber
Forest	Landfill	Litter	Newspaper
Paper	Pollution	Prevention	Recovery
Recycled	Reduce	Resources	Reuse
Trash	Tree	Waste	Wood



A K R E C O V E R Y M F
N E W S P A P E R R L I
L T A S A B O X E E P B
A I S L P A L N E C R E
N Q T N E X L C O Y E R
D W E T R E U S E C V Q
F A O K E D T M B L E F
I G U O E R I W H E N O
L C A R D B O A R D T R
L T R A S H N T X A I E
R E S O U R C E S H O S
W E N V I R O N M E N T

Optional Questions to Incorporate Math into the Lesson

What We Do Adds Up (Grade Levels: 4 - 6)

(from www.pbs.org/teachers/mathline/concepts/earthday/activity1.shtm

Many people believe that reasonable or small changes in their actions have no real impact. This is not the case! If we all make little contributions, the impact over time can be HUGE! Just check it out!

Did you know that on the average each of us throws away about 4.4 pounds of trash every day? This does not mean that we each throw away 4.4 pounds each day, but if we even out what is thrown away across everyone, it would turn out that each of us would contribute 4.4 pounds of garbage.

1. On average, how much garbage does each person throw away in a week?

2. On average, how long does it take for each person to throw away 100 pounds of garbage?

3. On average, how much garbage will a person throw away this year?

4. At this rate, would a person your age have contributed a ton of garbage? On average, how long does it take for each person to throw away a ton, or 2000 pounds of garbage?

5. About how long would it take for a person to create 4 tons or 8,000 pounds of garbage?

6. So far in your lifetime, about how much garbage have you contributed?

The U.S. Census Bureau can provide estimates of our national, state, and county Populations.

7. Using these population data, estimate how much garbage the people in your county throw away during the month of March? Estimate how much they will throw away during this year?

8. Estimate how much garbage the people in your state will throw away during this year?

9. Estimate how much garbage the people in the U.S. will throw away during this year?

10. Landfills in the U.S. have charged between $10 and $100 per ton to dump trash. If it costs $20 per ton of garbage and none of the trash is recycled, estimate how much money will be spent on throwing away trash this year?

Please return Kit to Kelly Leovic, U.S EPA-RTP, D320B
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Sum of the Parts

■ **Grade Level**
Upper Elementary, Middle School

■ **Subject Areas**
Environmental Science, Government

■ **Duration**
Preparation time: 50 minutes
Activity time: 50 minutes

■ **Setting**
Classroom

■ **Skills**
Gathering information (observing); Organizing (arranging); Analyzing (identifying components); Interpreting (identifying cause and effect); Applying (proposing solutions)

■ **Charting the Course**
Supplement this activity with activities on runoff ("Just Passing Through," "A-maze-ing Water," and "Rainy-Day Hike") and water use practices ("Common Water"). Aspects of water quality monitoring are introduced in "Macro-invertebrate Mayhem."

■ **Vocabulary**
point source pollution, non-point source pollution, Best Management Practices

You have just inherited valuable river front property with a new house and a resort on it. On the day you move in, you discover the beach polluted with oil and littered with construction materials and animal waste! Where did all this stuff come from?

▼ Summary

Students demonstrate how everyone contributes to the pollution of a river as it flows through a watershed and recognize that everyone's "contribution" can be reduced.

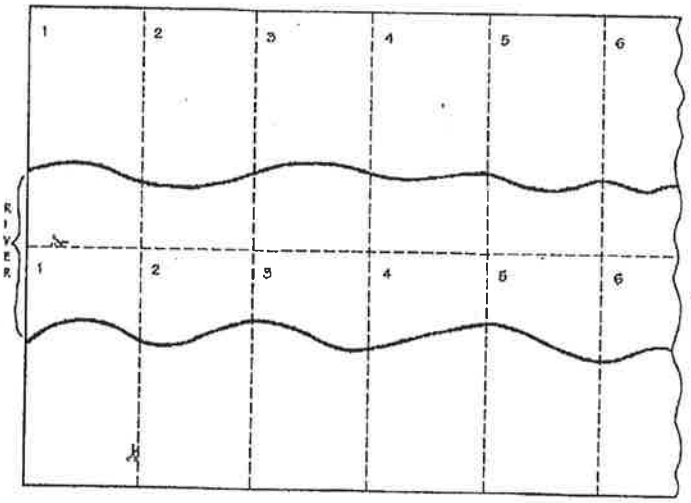
Objectives

Students will:

- distinguish between point and non-point source pollution.
- recognize that everyone contributes to and is responsible for a river or lake's water quality.
- identify Best Management Practices to reduce pollution.

Materials

- *Large piece of poster board or newsprint* (Using blue marker, draw and color a river on poster board, as shown below. Divide the stream in half down the middle and crosswise into sections. Each section should include a bit of river and blank space to allow room for students' drawings. The number of sections should correspond with the number of students or groups of students working together. Number the sections on one side of the river in sequential order, placing numbers in upper left-hand corners and repeat for the other side. Cut out the sections of stream. For durability, sections can be laminated.)
- *Drawing pens and pencils*
- *Items from students' desks (e.g., pencil, paper clip, book)*



Making Connections

In math class, students add a list of figures to obtain the total or "sum" (of the parts). Most students have attended a large gathering (concert, sporting event) and have been amazed at the amount of garbage left behind. Each person in attendance probably did not leave much on the ground, but with 500, 1,000, or more people doing the same, the total amount was large. Taking a closer look at how students can positively or negatively contribute to water quality helps them appreciate their role in water quality management.

Background

The quality of water in a river (or lake) is, to a large extent, a reflection of land uses and natural factors found in its watershed. If soil near a river or lake naturally erodes, chances are the river has sediment and turbidity problems. If

the land has stable vegetative cover, erosion is kept in check. When humans settle and develop land, water quality is affected. Breaking sod, cutting forests, building cities, mining, and other land uses make an impact upon water quality.

Everyone bears responsibility for the health of a watershed and the water systems (rivers, lakes, wetlands, etc.) within a drainage basin. Individual actions, both negative and positive, add up. Understanding a river or lake's water quality and quantity involves investigating the condition of the contributing watershed. If the watershed is polluted, the river will likely be polluted.

Watershed investigations are conducted for many reasons. Some investigations monitor changes in river and stream flows over time, to protect fisheries, to regulate floods, or to meet seasonal demands. Other studies determine the best method of protecting a river or lake from pollutants. One aim of a researcher might be to determine which areas of a watershed contribute the highest percentage of contaminants. This information is vital to policymakers and water managers when determining how best to spend money for improvements. For example, most lake improvement projects address problems in the watershed as well as those of the lake. It would prove fruitless to spend thousands (or even millions) of dollars to clean up a lake, if problems in the watershed will only pollute the lake again.

When watershed managers investigate land use practices that might affect the quality of water, they are concerned with two general sources of pollutants: point and non-point.

Point source pollution involves pollutants that are discharged from, and can be traced back to, an identifiable point or source, such as a

Major Sources of NPS Pollution and BMPs

Source	Best Management Practices:
Roads and Streets	• dispose of paints, solvents, and petroleum products at approved disposal sites, not in storm drains or street gutters • fix automobile oil and fuel leaks • stop oil dumping on rural roads • use nonchemical deicers (sand and ash) on roads, sidewalks, and driveways • construct a sediment catch basin to collect storm water runoff • reduce road construction runoff by building terraces and catch basins, and by planting cover crops
Agriculture	• read and follow all labels and ask for application directions before using chemicals, fertilizers, and pesticides • use conservation tillage • use contour farming • use strip cropping • leave filter strips and field borders along wetlands and streams • use a cover crop to protect exposed soil • rotate crops • plant shelter belts and windbreaks • institute pasture management • terrace areas prone to erosion • construct livestock waste collection and treatment ponds for confined livestock • use grassed waterways • seal abandoned or waste disposal wells • fence waterways to reduce riparian zone impact by livestock
Logging	• monitor water entering and leaving cut areas • prevent sediments from reaching streams and lakes by building terraces, catch basins, and natural filters • leave a vegetative buffer zone in riparian areas • maintain and restore effective watersheds • implement a plan to reduce erosion from roads
Mining	• monitor all water entering and leaving mine sites • intercept and reroute uncontaminated water away from contaminated areas (keep clean water clean!) • construct catch basins and terraces, and plant cover crops, to catch sediment and prevent erosion • catch and treat contaminated water (clean contaminated water!) • stabilize stream channels • stabilize mining waste areas to prevent release of materials to streams • maintain buffer strips along streams
Construction	• implement a sediment control plan • plant ground cover to reduce erosion • dispose of solvent, paint, and other wastes at approved disposal sites • build temporary, small dikes to slow and catch runoff • build sediment catch basins to collect construction runoff • build earth berms and filter runoff before water enters stream
Residential	• use nonchemical deicers (sand and ash) on residential driveways and sidewalks • read labels prior to using pesticides and fertilizers • consider xeriscaping • use nonchemical fertilizers (compost) on gardens • dispose of household hazardous waste at approved disposal sites • maintain septic tanks if sewers are not available

factory's discharge pipe or a sewage ditch. Non-point source (NPS) pollution occurs when the source of a contaminant is unidentifiable; that is, the pollutant can come from one of many places. Examples of Non-point source pollution include runoff from agricultural fields containing fertilizers and pesticides, motor oil filtering from urban areas, and sediments from eroded stream banks.

Surface runoff and ground water can transport both point and nonpoint source pollutants. Since point source pollutants are identifiable, they are easier to monitor.

The protection of surface and ground water resources from NPS pollution presents an enormous challenge because of the widespread and diverse nature of the problem. Land and water managers rely on methods called *Best Management Practices*, or BMPs, to describe land use measures designed to reduce or eliminate NPS pollution problems. A list of nonpoint source pollution sources and suggested BMPs can be found in the side bar on the previous page.

Procedure

▼ *Warm Up*

Determine student knowledge about watersheds by asking them to name several major North American rivers (e.g., Mississippi, Columbia, Missouri, Hudson, and Rio Grande). Where do these rivers originate (where are the headwaters) and end? How many states does each cross or touch?

Discuss some of the predominant types of land uses found along one river as it flows through a single state. Do students think these practices could affect the river? What do students think the attitude of downstream state residents might be about the water received from their upstream neighbors?

▼ *The Activity*

1. **Inform students that they have just inherited a piece of riverfront property and a million dollars. Have them list ways they could use the land and the money.**

2. **Pass out "pieces" of property and drawing pens and pencils. Explain that the blue is water and the blank space is land they own. They have one million dollars to develop their land as they wish.** They can farm or ranch; build resorts, homes, factories, or parks; plant forests, log, mine—whatever they like.

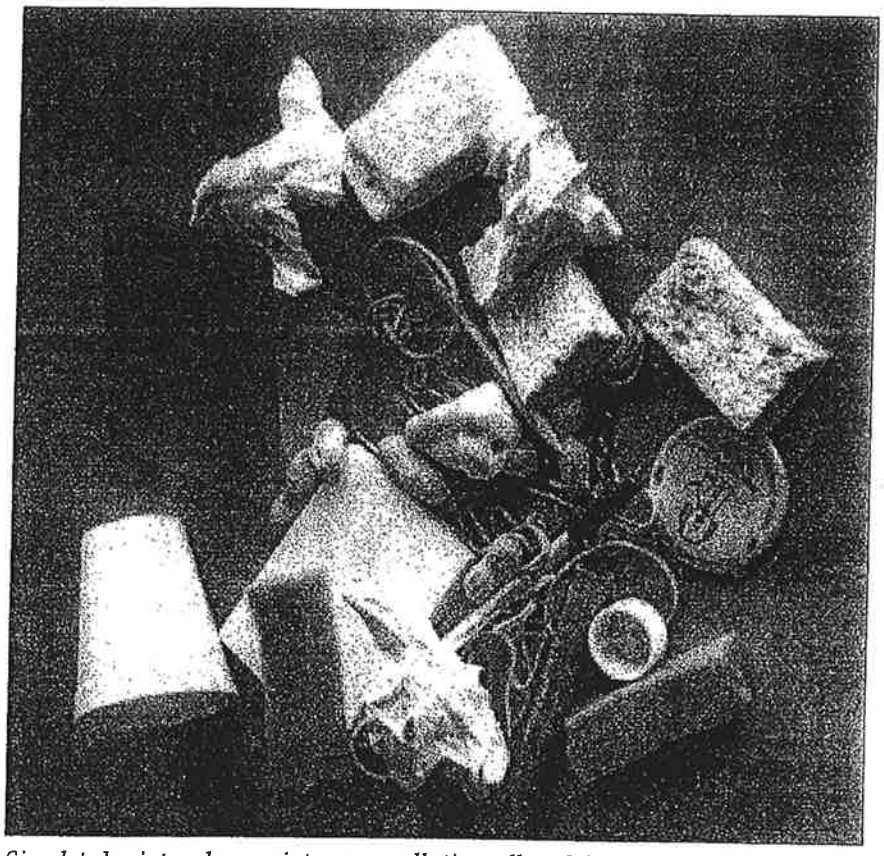
3. **When students have completed their drawings, ask them to look in the upper left-hand corner of their property for a number. Explain that each piece is actually a part of a puzzle. Starting with number one, have students assemble their pieces.** They will construct the stream pathway and adjacent land area in proper order. (The ones should face each other, with the twos next to them, and so forth.)

4. **Have students describe how they developed their land and how they used water. They should identify any of their actions that polluted or added materials to the waterway. Have students represent each of their contributions to the river with an item from their desks (e.g., book, piece of paper, pen, pencil).**

5. **Tell students to take their item(s) and line up in the same order as their pieces of river front property. They are going to pass their pollution pieces downstream. Have them announce what kind of pollutant they are holding before they pass it on.** The ones will pass their item(s) to the twos, the twos will pass everything to the threes, and so on, until the last students are holding all the items.

▼ *Wrap Up and Action*

After all the items have reached the final students, discuss the activity. How did those students toward the middle or at the end of the river feel? What about their property use plans? Could a student downstream be affected by the actions of a student upstream? Could upstream users



Simulated point and nonpoint source pollution collected during "Sum of the Parts."

alter the water quality of those downstream?

Tell students to reclaim their items. Explain that the items easily identifiable as their own simulate point source pollution. Other items (e.g., pencils, paper clips, notebook paper) may be more difficult to claim, because these kinds of pollutants originated from multiple sources. Tell students these represent nonpoint source pollution.

As a follow-up, have each student write one paragraph detailing ways to reduce the amount of pollution he or she contributed. (Share the *Major Sources of NPS Pollution and BMPs* from **Background.**) Students can research the regulations governing waterfront property in their communities. If they believe their waterways are poorly treated, they may want to write letters to local government officials supporting environmentally sound land use legislation.

Assessment

Have students:

- express their opinions about individual contributions to total water quality (***Wrap Up***).
- write a paragraph identifying what they can do to protect water quality (***Wrap Up***).
- discriminate between point and nonpoint source pollutants (***Wrap Up***).

Upon completing the activity, for further assessment have students:

- design a community that uses Best Management Practices that allow for minimum contribution of pollutants.

Extensions

Instead of a river, have students represent a lake system. One student represents a lake. A group of students encircle the student representing the lake; they are houses around the lake. Other students, standing in lines extending from the lake, can be streams flowing to the lake. Students pass their item(s) downstream and into the lake until all the items are held by the person in the middle who represents the lake.

Have students adapt the activity to represent a river system that includes tributaries flowing into a main channel.

Complete the main activity using real water users within the watershed where students live. Or assign roles (farmers, suburban dwellers, etc.) to students and have them develop their land accordingly. How would they manage their land to protect water resources?

Resources

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Myers, Carl F., and Hal Wise. 1989. "Non-Point Sources of Water Pollution: A New Law for an Old Problem." *Western Wildlands* (Winter).