

The Nonpoint Source Pollution Matching Game



*a fun way to explore
the causes and effects of
nonpoint source pollution
and to learn
what you can do to help*



Introduction

This exercise is designed to help students recognize some of the important problems which contribute to nonpoint source pollution and ways to control it.

The exercise is a matching game in which students are challenged by clues describing nonpoint pollution sources and must match an appropriate prop (representing sources) with the correct clue. Classroom discussion questions and answers are also included to supplement the game.

By the end of the exercise, students will be familiar with sources of nonpoint pollution, as well as its impacts on aquatic plants, animals, and the entire ecosystem.

Materials Needed

- ✓ 1 piece of large posterboard, any color
- ✓ a marker, any color
- ✓ a motor oil can (preferably empty)
- ✓ a road salt container (or the rock salt itself in a clear container)
- ✓ a plastic grocery bag
- ✓ a container of soil
- ✓ a 6-pack ring
- ✓ a container labeled “pesticide” (empty and cleaned for safety!!)
- ✓ a container labeled “fertilizer” (also empty and cleaned for safety!!) or plastic poop
- ✓ a small picture of a tree
- ✓ a small container of water

Before you begin

Check the following terms to see if your students are familiar with the definitions:

- nonpoint source pollution (also called polluted runoff, runoff pollution)
- pollution
- erode and erosion
- toxic and non-toxic
- plankton
- oxygen
- debris
- runoff
- food chain
- food cycle or web
- pesticide
- fertilizer
- estuary

If these terms are new, introduce them before you begin the game.

Suggested definitions:

nonpoint source pollution (also called polluted runoff or runoff pollution): things that don't come from a pipe but that wash off land when it rains or snows into water, tipping nature's balance.

pollution: things that make water or air unclean or that tip nature's balance.

runoff: things that wash away from their origin on land to the sea.

erode and erosion: to wear away.

food chain: a sequence of plants and animals, in which the higher ones feed on the lower ones. Example: a plant gets eaten by a bug, then a bug gets eaten by a fish and the fish gets eaten by a person.

food cycle/web: all the food chains in a watershed.

toxic: poison (non-toxic is not poison).

plankton: tiny plant or animal organisms; they are smallest in the food chain.

pesticide: chemicals people use to kill bugs and weeds.

fertilizer: chemicals people use to make plants grow. These chemicals are found naturally in animal waste, such as cow and even dog manure.

oxygen: a gas animals and people breathe and that plants give off.

debris: trash, litter.

estuary: a place where freshwater from a river or stream mixes with saltwater from the ocean; very important to marine life.

To begin

There are multiple options for playing the game. Here are two:

Option 1:

Place the enclosed game masthead on the poster board

In the remaining space, draw 9 large squares on the posterboard.

Cut out the clues from this booklet and glue or tape them to the posterboard, one in each of the squares.

Place the clues near the game poster

Students, independently or in teams, take turns matching the props to the appropriate clues.

Use the discussion before or after the game to learn more about pollution.

Option 2:

Post the game masthead on a bulletin board.

Cut out the clues from this booklet and place them in a shoe box.

Divide the students into two groups and distribute the clues to individuals or teams of one group and the props to individuals or teams of the second group.

Ask the students to find their match.

Use the discussion before or after the game to learn more about pollution.

Text for the clues

I am used on farms and gardens to keep insects away, but I am toxic to most marine life. I can kill tiny animals called plankton, which are the base of the food chain.

(pesticide)

I prevent soil on land from eroding and keep fertilizer from washing away into streams and bays when it rains. I also provide you and your family with clean air.

(picture of a tree)

Sea turtles can mistake me for a jellyfish, favorite food. The turtles choke trying to eat me.

(plastic bag)

I can be leaked by cars and boats. Once I am in the water, I can poison animals and coat the feathers of shorebirds, keeping them from staying warm.

(motor oil can)

People put me on roads and sidewalks to help melt snow and ice. When the snow and ice melt, I wash off the roads and sidewalks, polluting our streams and bays.

(road salt)

Once I erode from land, I muddy up the water and clog the bodies of clams and oysters, who filter water through their entire bodies for food.

(soil)

Fish and birds can get tangled in me. As the animals spend energy trying to get free, they can get sick, weak, and even die.

(6-pack ring)

I fall to the ground in the form of rain or snow. Then I wash pollution, such as oil and plastics into rivers, bays, and lakes, where they can hurt the entire ecosystem. Eventually, I drain to the coast.

(container of water)

I am used to help gardens and crops to grow. Once I get into water, I can also make aquatic plants grow like crazy. Too much of me blocks out sunlight, and when I die, it reduces oxygen levels in water which can kill fish.

(bottle of fertilizer, plastic poop)

Discussion Questions

Please take a few minutes of classroom time to discuss nonpoint source pollution with your students. Here are a few questions that may spark debate.

Question 1:

Motor oil and car fluids can be leaked from cars or dumped into storm drains, where they then become nonpoint source pollution.

What are some of the actions that you can take to prevent these fluids from entering our waters and harming aquatic animals and the entire food cycle/web?

Suggested Answer:

Cars and boats should always be checked for leaks, and if found they should be repaired immediately.

Oils and other engine fluids should never be dumped down storm drains or sewers, and instead should be recycled at service stations.

By disposing of motor oils and car fluids properly, and preventing them from ever leaking onto the ground, you can stop these harmful substances from becoming nonpoint source pollution.

Question 2:

Applying fertilizers and pesticides to places like lawns, gardens, and farm fields happens everyday. When it rains, the chemicals are carried into storm drains and from there into our streams, lakes, and oceans. Sometimes these chemicals wash directly into our waterways.

What steps can you take around your house to stop these sources of nonpoint pollution?

Suggested Answer:

Farm, lawn and garden chemicals should be used wisely, and most importantly, only when needed.

Pick up after your pet. Animal manure acts as a natural fertilizer!

Purchase a soil testing kit from the local hardware or nursery and use the kit to see if your soil needs fertilizer and if so, how much.

Question 2 Suggested Answer (continued)

Some bugs live by eating other bugs. Instead of using pesticide to kill bugs, check the library or bookstore for books and magazines about natural gardening, which will give you ideas on which bugs eat the kind of bugs damaging your garden or farm crops. You can even find out where to buy the kind of bugs you need.

Apply fertilizers and pesticides only when there is no chance of rain and use non-toxic products whenever possible.

Only buy and mix enough of the chemicals to do the job needed, and always follow instructions.

Question 3:

Plastics are one source of nonpoint pollution. They are also called marine debris or trash.

What are some of the ways that plastics get introduced into our waters and some simple actions can you take to keep them out?

Suggested Answer:

Most plastics get into our waters when people litter.

The easiest way to keep plastics and other trash out of our rivers, lakes, and oceans is to dispose of the trash properly:

- recycling plastics like bags, cups, or containers,
- cutting plastic 6-pack rings apart before you throw them away, and
- throwing all your trash into a trash can with a lid or far enough down so the trash doesn't blow away.

Question 4:

What are some of the reasons why we would want to eliminate runoff and nonpoint source pollution?

Suggested Answer:

Simply put, people like to do things which need clean water. People like vacationing at pretty beaches; people like owning businesses by the shore, and a lot of other people, such as fishermen, depend on clean water for their jobs.

If we pollute the water at home, it washes to the coast/beach causing lots of problems. Fish can die; the water can become too dirty for swimming, and the beaches can close!

When these things happen, people will living at the beach and visiting there. Without people at the shore to buy houses, stay in hotels, or eat in restaurants, these stores could close and the people who work there could lose their jobs. Without fish to catch, fishermen could also lose their jobs.

Cleaning up nonpoint source pollution might be difficult, since this kind of pollution is caused by the things we do everyday. We are all part of the problem. Getting everyone to become part of the solution is the hard part.

Question 5:

What are some easy steps that you can take around your house to reduce nonpoint source pollution?

Suggested Answer:

- Make sure your parents check car and boat engine for leaks and repair them immediately.
- Plant trees to absorb excess fertilizers and prevent soil erosion.
- Cut up 6-pack rings before throwing them in the trash can.
- Use fertilizers and pesticides only when needed, and use as little as possible.
- Use fertilizers and pesticides only when there is no threat of rain.
- Recycle used motor oil at service stations; never pour any wastes down a drain or sewer.
- Clean up after your pet so that its waste doesn't become part of the nonpoint source pollution problem.
- Dispose of plastics and other trash in the appropriate places. Recycle whenever you can.
- When you water your garden or lawn use only the water that you need, when you need it.
- Use only small amounts of road salt on your driveway or walkway to melt snow and ice.
- Organize a stream or coast cleanup and other water quality projects.

Additional References and Resources

Please contact any of the organizations listed below for more information on nonpoint source pollution and what role you can play in helping to stop it.

Government agencies:

Coastal Nonpoint Source Pollution Program
National Oceanic and Atmospheric Administration
Office of Ocean and Coastal Resource Management
1305 East West Hwy, N/ORM3, Silver Spring, MD 20910
(301) 713-3155

Nonpoint Source Pollution Program
U.S. Environmental Protection Agency
Public Information Center, PM-211B
401 M Street, SW, Washington, DC 20460

Chesapeake Bay Program Office
U.S. Environmental Protection Agency
410 Severn Ave., Annapolis, MD 21403

Non-Profit Organizations:

Chesapeake Bay Foundation
162 Prince George Street
Annapolis, MD 21401
(310) 268-8816

The Conservation Foundation
1250 24th Street, NW, Suite 500
Washington, DC 20037
(202) 778-9575

Alliance for the Chesapeake Bay
6600 York Road, Suite 100
Baltimore, MD 21212
(301) 377-6270

Center for Marine Conservation
1725 DeSales Street, NW Suite 500
Washington, DC 20036
(202) 429-5609

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