

Title: Where Litter Ends Up

Grades: 2

Time 45 minutes

Subjects: Science, Health, Language Arts

Objectives

- Describe litter; explain how litter moves and its connection to water pollution.
- Identify ways humans can help improve the environment by preventing litter.
- Differentiate between point source and non-point source pollution.
- Make observations and draw conclusions about a litter related event.



Standards

Technology Standard 3: Understand the relationship among science, technology, society and the individual.

- Benchmark # 3: Know that man-made materials, products, and systems can affect the environment adversely, yet there are things that can be done to circumvent this process (e.g., disposing of waste properly).

Science Standard 10: Understand force and motion.

- Benchmark # 5: Know things move in many different ways (e.g., straight line, circular motion).

Science Standard 12: Understand the nature of scientific inquiry.

- Benchmark # 1: Know learning can come from careful observation and simple experiments.

Health Standard 2: Know environmental and external factors that affect individual and community health.

- Benchmark # 1: Know the sources and causes of pollution in the community.

Language Arts Standard 2: Use stylistic and rhetorical aspects of writing.

- Benchmark # 1: Use descriptive words to convey basic ideas.
- Benchmark # 2: Use declarative and interrogative sentences in written compositions.

Materials

- Student journals
- Pencils
- Mailing tube
- Kiddie pool
- Clean water
- Two or more pails with pouring spout
- Clear glass pitcher
- Tea bags, five or six
- Package of instant chocolate pudding
- Packages of orange and green gelatin
- Assorted small pieces of waste: bottle caps, pieces of paper, foam packing peanuts

Overview: While the general definition of litter is any trash that is inappropriately disposed of, not everyone agrees with the objects that fit into that category. Most people consider items that could be recycled but are not, such as bottles, cans, and food wrappers to be litter; but other items seem to fall into a gray area. Some people don't think of their pet droppings as litter, while others don't consider food



scraps, such as banana peels, to be litter. Still others don't believe a cigarette butt is litter, seeing it as something too small to make a difference. However, these views can be very far from the truth. Whenever trash is left unattended and nature's forces, wind and weather, move it from place to place, it can create a problem. It finds its way onto highways and into waterways, to backyards and playgrounds, just about anywhere on Earth.

Litter can be a menace, contaminating natural resources. Some studies suggest that almost 20% of all litter becomes water pollution, posing a threat to drinking water, and the plants and animals that live in water habitats.

There are two kinds of water pollution, point source pollution and non-point source pollution. Litter is an example of non-point source pollution.

Kid's Speak: Litter is trash that has not been properly recycled or thrown away. People sometimes throw trash on the sidewalk, street or out a car window instead of putting it into a garbage can or litterbag. Sometimes it blows out of trucks or away from construction sites. Sometimes animals rip open trash bags left out for trash collectors. When people leave trash behind, not taking responsibility for it, it becomes litter and a problem for everyone.

Litter doesn't stay where it is dropped. Wind and water move it from place to place. It can be found on the ground, in bushes and trees, and in ponds, rivers, and streams. It can be found almost anywhere on Earth. It can pollute our drinking water, harm plants, animals and their habitats, cause accidents and cost a lot of money to clean up. If everyone reduced the amount of trash they made, reused the things they could use, recycled what they couldn't use and carefully threw away what was left, then litter would not be as much of a problem.

Eco-Fact: Cigarette butts are the most frequent items thrown away that become litter. Collected cigarette litter weighs in the millions of pounds annually. Cigarette butts are lightweight and can easily move through storm drains into waterways and water supplies. Water will leach the toxins from cigarette litter, making it deadly to most aquatic life. In fact, the toxins released from one cigarette butt left in a gallon of water for one day will kill about 80 percent of aquatic life added to that water.

Procedure:

Before Conducting the Lesson:

- Explain to students that people have different ideas about what litter is. (See Overview.) Explain that litter can be blown by the wind or washed along with rainwater into sewers and storm drains, where it eventually ends up in rivers, lakes and the ocean. The litter that is found in waterways and along the shores usually comes from a long distance away, and has moved through the water to end up somewhere else.
- Introduce the term pollution. Explain to student what pollution is and that it can be harmful. Tell students that in this lesson they will learn about water pollution, and how litter can cause water pollution.
- Explain to students that there are two kinds of water pollution, point source pollution and non-point source pollution. Point source pollution is caused by, such things as factories discharging wastewater into rivers. This is something people can identify and take steps to stop. Non-point pollution is much harder to stop because it doesn't come from one source or one location. Litter is an example of non-point source pollution.
- Explain to students the effects water pollution has on the environment. Water pollution can poison drinking water, create an imbalance in water habitats, and harm the plants and animals that live there. (See Eco-Fact for details.)

Conducting the Lesson:



1. Demonstrate for students how toxins can leach from the most common type of litter- discarded cigarettes- and get into waterways. Place a large glass pitcher where it is visible by all students. Fill the pitcher with clean water. Place several teabags into the pitcher of water. Explain to students that the tea bags represent the cigarettes, with the tealeaves taking the place of the tobacco and the teabag taking the place of the wrapper around the cigarette. Explain that when cigarettes sit in water, toxins, materials that can cause sickness and disease, seep out of the cigarettes into the water. This poisons the water, making it unhealthy.
2. Have students observe what happens to the water and record their observations. Ask students to describe through words and pictures, how the water is changing? Why would this be a concern if there were real cigarette butts being used for the demonstration?
3. Explain to students that they are going to see how litter can move through a storm drain and end up in a river, lake, pond,... Take the students outside where the kiddie pool has been set up. Fill the bottom of the pool with about an inch or two of water. Explain to students that the pool represents the body of water into which the storm drain empties and from this body of water it continues to move until it finds its way to the ocean.
4. Have a student volunteer hold the mailing tube. The tube represents the storm drain. Have the student lean the tube on the side of the pool so that it is slightly inclined with one end extended over the pool. The runoff will flow into the pool. Have several buckets of clean water ready to pour into the tube. The water represents rainwater. Have students describe in their journals through words and pictures what the rainwater and pool water look like.
5. Before pouring the water into the storm drain tube explain to students that after rainwater falls onto the ground, some of it soaks into the ground and some of it flows to the nearest storm drain. As it seeps into the soil or moves along the ground to the drain it picks up any toxins and pieces of litter it comes across and takes them with it. Explain that sometimes the toxins mix with the rainwater, just as in the teabag demonstration, some stay the way they are. Solid litter cannot seep into the ground.
6. Have students add the samples of litter to the buckets of water. Explain that the teabags again represent cigarette butts, the chocolate pudding represents pet droppings and the colored gelatin represents decomposed food wastes, like orange peels and apple cores. Ask students what they think will happen to these in the storm drain. Ask them what they think will happen to the bits of paper, bottle caps and foam packing peanuts.
7. Have the students position themselves around the pool and have them tap their fingers against their journal notebooks to simulate the sound of rain. While they are doing that have an adult helper pour the pitcher of tea on the ground next to the pool and have another empty the pails of rainwater with litter into the storm drain tube so the water empties into the pool. Have students closely observe the results and record their observations.
8. Before going back into school, ask students what should be done to clean up the demonstration. Can the pool just be turned over and left to drain? Why or why not? Have the adult helpers properly dispose of any waste and put all materials away carefully.

After Conducting the Lesson:

- Discuss the students' observations in a whole group session. Pose questions similar to the following:
- What happened to the liquid from the teabag demonstration? Why? What could have happened if it had actually been water that had held cigarette butts?
- What did the water that came through the storm drain look like? Why might that be?



- What happened to the chocolate pudding and gelatin? How is that like the litter each represented?
- What kind of problems could litter, like pet dropping and food waste, cause?
- What happened to the paper, bottle caps and foam packing peanuts? How is that like the litter each represented?
- What kind of problems could litter like paper and plastic cause?
- What are some things that we can do to help?
- Students will write a conclusion in their journals describing what they learned about non-point pollution and how litter is one cause of it.

Adaptations:

- Use the *Litter From Lunchtime* lesson found on the GEF website as a follow up to this lesson.

Extensions:

- A follow up activity using a watershed model can show students how water flows from higher elevations to lower elevations and eventually drains into the ocean.