

Where Does It Come From? Where Does It Go?

Until recently, “trash” was used mainly as a noun, but now students also use it as a verb. To trash: To ruin a person, place or thing. This activity “untrashes” a site, contributes to the health and beauty of the landscape, and makes the environment safer for animals.

Background

Whether discarded intentionally, blown or washed overboard accidentally or originating from land, the Chesapeake Bay receives tons of litter each year. The litter is as hazardous as it is unsightly. Litter is intentionally and unintentionally discarded on the ground. When it rains, water flows downhill and carries trash into nearby storm drains, tributaries and larger rivers.

Look at a [map of Virginia's waterways](#) and determine which streams are near you and where they drain. The name of the basin where water drains in your region is called your watershed.

Land animals get hurt by litter because they get their heads stuck in jars and tangled in string. Birds use cigarette butts to line their nests, and their babies get sick from the chemicals. Some animals eat litter because it is not part of the natural world so they don't know any better. Sea turtles swallow plastic bags mistaking them for a favorite food, jellyfish, then slowly starve as their digestive systems are inactivated. Scores of fish die in old nets drifting free with the tides. Swimmers cut their feet on broken bottles, and boat engines and propellers are damaged by plastic bags, ropes and fishing line. Small marsh animals perish in drink bottles that outwardly are inviting shelters or nooks in which to find food, but the bottles may, in reality, be death traps.

The ultimate fate of litter in the bay and Virginia's other waterways is varied. Paper products and untreated wood decay. Glass and metals sink and are eventually covered by sediment. But plastics, for the most part, don't degrade and are light enough to float or remain suspended in the water. Thus a single piece of plastic litter might be a problem for hundreds of years.

[The Great Pacific Garbage Patch](#), also known as the Pacific Trash Vortex, is the name of the collection of marine debris that is floating in collections of islands spanning from North America's West Coast to Japan. The patch is about the size of Texas. In 2010, a large garbage patch was discovered in the Atlantic Ocean, too.

Many organizations, government agencies and individuals are working to solve litter problems. Among the attempted solutions are anti-litter laws, public information campaigns and photodegradable (disintegrate in presence of sunlight) and biodegradable (eventually disintegrate biologically) plastics. While these may reduce some negative effects of plastic litter in the environment, they pose other problems. They do not degrade if buried, as in a landfill, and cannot be recycled with other non-degradable plastics.

[The Environmental Protection Agency](#) (EPA) develops regulations for federal laws that concern land and marine debris. Virginia is the first state on the East Coast to have a plan in place to address marine debris. [The Virginia Coastal Zone Management Program](#) (CZM) crafted the Virginia Marine Debris Reduction Plan.

The Virginia Department of Game and Inland Fisheries has a [monofilament fishing line collection program](#). Collection sites are maintained by volunteers

Grade Levels: K-12

Objectives

Students will investigate interrelationships between the environment and litter by:

- *Observing* types and conditions of shoreline litter.
- *Inferring* about possible sources and effects of litter.
- *Collecting, organizing and reporting* data.

Materials

To wear

- sturdy footwear (no sandals or flip-flops)
- leather and rubber gloves

Per team

- land litter cleanup card (for use around streams, too)
- beach cleanup data card - *Only for those who are at the beach who wish to report their data to the Ocean Conservancy.*
- clipboard
- pens or pencils
- 5-gallon bucket
- plastic trash bags (at least one per person)

Where

Note: High use areas of sites are kept clean. Try less frequently used shorelines, river or pond banks.

When

Year-round or, if at a tidal location, near low tide or during a drought.

Time Required

At the Site: 60 to 90 minutes.

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who recycle line and encourage fishermen not to discard their monofilament into Virginia's waters. The monofilament can be recycled and made into other useful products such as tackle boxes. Discarded fishing line is hazardous to aquatic life, and boat motors and swimmers can get tangled in it.

Procedure

Before the Trip

1. Register your event with the [Virginia Adopt-a-Stream program](#) and [Stewardship Virginia](#) if you plan to conduct a litter cleanup around a waterway, such as a pond or stream. Adopt-a-Stream is for groups that plan to conduct regular cleanups. A teacher might register a school or class and conduct litter cleanups each year under the school or class name. If you would prefer to do the cleanup only once, register the event as a Stewardship Virginia event. When you do so, you may request certificates signed by the governor for each participant. To become an Adopt-a-Stream affiliate, [fill out the application](#) and send it to the Adopt-a-Stream coordinator at 600 E. Main St., Richmond, VA 23219, or email the completed application. Tell the Adopt-a-Stream coordinator when you are planning your cleanup by [registering your event](#). The online form covers your order for bags, gloves and vests. If you plan to remove litter from a road near your school but near no waterway, adopt a stretch of road through the [Virginia Department of Transportation's Adopt-a-Highway program](#). Cleaning up beside roadways is important because rain and wind will eventually move litter to tributaries and waterways.
2. Make two copies of the Litter Cleanup Card provided with this activity. On one copy, write the word "COLLECTED" and on the

- other copy write "PREDICTED." Give one set to each team.
3. Divide the class into teams of two to four students and give each team the litter cards.
 4. Lead a class discussion on the problems of litter.
 5. Talk with students about what they consider litter:
 - *What types of litter do you typically see in public places? Do you think that the litter along a roadside, at a park or along the beach might be different? If so, how would it vary?*
 - *Have any of you ever been injured by litter or do you know anyone who has?*
 - *Have you ever seen animals trapped or killed by litter? Reminders from apples or wrappers from food attract animals, and they get hit by vehicles.*
 - *Have you ever observed animals making use of litter in lieu of natural materials?*
 6. Distribute the handouts. On the "Items Predicted" sheet, each team marks the number of each item they predict they will find during the field trip. Review the other handouts, the activity and field trip plans with the class.
 7. Emphasize important safety procedures:
 - Wear gloves.
 - Do not go near large drums. Report these to staff.
 - Be careful with sharp objects.
 - Be careful with potential hazards such as tampon applicators, condoms and syringes (Note: Discussion of these materials is at the discretion of each teacher, depending on the age and maturity of the students. Decide whether to just list them or avoid them altogether, and see that chaperones understand the policy.)

Extensions

1. Encourage independent exploration of topics, such as:
 - Status of local, state and federal litter-related legislation. (For example, investigate the progress of a bottle bill in the Virginia General Assembly over the last decade.) What groups favor and oppose which bills and why?
 - Recent innovations with plastics such as recycling, biodegradables and photodegradables. Debate the pros and cons of using these materials.
2. Students write letters to lawmakers, stating their own positions on litter-related legislation.
3. Students are challenged to invent usable products from recyclable plastics. Check out [How Magnetic is Your Litter in Pollution Solutions](#).
4. Start a class recycling project.
5. Build and maintain a fishing line collection box. Directions are on the Virginia Department of Game and Inland Fisheries website.
6. Make an "edible landfill." There are numerous recipes for edible landfills on the website. Here are some examples:
 - [EPA – Luscious Layered Landfill](#)
 - [SolidWasteDistrict.com](#)
 - [A2ZHomescool](#)Shoreline Cleanups – Part of the International Coastal Cleanup: Your students might be interested in participating in the International Coastal Cleanup if you are cleaning a beach. Here is the link to the [International Coastal Cleanup Data Cards](#) from the Ocean Conservancy website and the [NOAA Marine Debris Shoreline Survey Field Guide](#).

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At the Site

1. Be sure each team has a set of Litter Cleanup Cards – one for predicting and the other for actual finds of types of litter – a clipboard, and pen or pencil. (Bring extras.)
2. Each team chooses a member to tabulate the litter data it finds.
3. Equip each team with receptacles for carrying litter. Use garbage bags for most items and a 5-gallon bucket for sharp items that might cut through garbage bags.
4. Set boundaries for the litter cleanup, such as “from the water’s edge to the high tide mark” and “from the tidal creek to the big log.” Do not avoid marshes with sound footing since waterborne debris readily collects there.
5. The teams spread out and collect litter within the boundaries for a designated period of time.
6. Regroup the class. The teams sort their litter so that all can see the grouped and collected litter as classified on the data card.
7. A member from each team selects a piece of its litter to discuss the following points:
 - With the litter collected, have students name the natural resource that they think the litter came from. Did objects originally come from an animal, mineral, petroleum or plant?
 - *Is the litter from a renewable or a non-renewable resource?*
 - *Can the item be used multiple times, or is it meant to be used only once?*
 - *Can the item be reused as something else or can it be recycled?*
 - *If it is recycled, what items can it be made into?*
 - *How might the litter have gotten here and how could it have been avoided?*
 - *If not picked up, what might happen to the litter in 1, 5, 20 and 400 years?*
8. If this cleanup was part of an Adopt-a-Stream cleanup, submit the cleanup report to the Adopt-a-Stream coordinator.
9. When the discussion is completed, gather all the litter and dispose of it appropriately, preferably by recycling.

Follow-up

1. Each team compares its “Items Collected” list with its “Items Predicted” list and makes bar graphs showing the relative amounts of the types of litter predicted and collected.
2. On the smart-board, compile all the lists and graphs into one.
3. Each team completes its Litter Cleanup Card.

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Resources

Clean Virginia Waterways. Care of the Department of Natural Sciences, Longwood College, Farmville, VA 23909.

O'Hara, K.J., S. Iudicello, and R. Bierce. 1988. A Citizen's Guide to Plastics in the Ocean: More Than a Litter Problem. Center for Marine Conservation, Washington, DC 20036.

Virginia Department of Conservation and Recreation. Pollution Solutions: Activities for Virginia Teachers.

Contact local Litter Prevention and Recycling Coordinators.

An Educator's Guide to Marine Debris.

Center for Coastal Resource Management – Marine Debris and Location Removal Project This website is about Virginia's watermen who were paid to dredge up derelict crab pots from the Chesapeake Bay rather than catch crabs. The derelict crab pots are a concern because they trap marine life.

Code of Virginia – Litter Law.

Earth 911 – Learn where and how to recycle household items. Get craft ideas for reusing some items. The site is searchable by zip code.

EPA: Turning the Tide on Trash: Marine Debris Curriculum.

The EPA has educational materials for K-12 about solid waste.

International Coastal Cleanup – Get the most up-to-date cleanup information for marine debris litter collections. Find a cleanup site near you to join, or register to be a captain at a site and invite other people to join you.

Keep Virginia Beautiful – Offers grants each April to groups that reduce litter, recycle or work on beautification projects. This website also has current information about litter and recycling efforts in Virginia.

National Geographic Great Pacific Garbage Patch. This site has information about microplastics, animals impacted by marine debris and lesson plans for K-12.

Pollution Solutions – This collection of lesson plans about litter was created by the Virginia Resource-Use Education Council from a grant from the Litter Control and Recycling Fund.

Virginia Department of Game and Inland Fisheries monofilament collection program.

Virginia's Local Litter and Recycling Program Managers – Many of these people have litter programs that they can bring to your school.

Virginia Trekkers Podcasts – The Virginia Trekkers have free podcasts about how a landfill and a recycling facility operate. The landfill is podcast #42, and the recycling facility is # 17.

Virginia Naturally – Get community and teacher resources about waste reduction resources and find ways to help the environment.

Land Litter Cleanup Card:

Bags - Paper	Bags - Plastic
Beverage Bottles (Plastic)	Beverage Bottles (Glass)
Beverage Cans	Caps/Lids
Plastic Bottles – Oil/Bleach, etc.	Batteries
Straws/Stirrers	Cups
Plates	Forks, Knives, Spoons
Napkins	Clothes
Rags	Food Wrappers
Cigarette Butts	Cigarette Packaging
Cigarette Lighters	Matchboxes
Tires	Appliances
Car Parts	Other (Name)
Other (Name)	Other (Name)