

# Marine Debris

## K-12 Educator Resources



*Photo: UNCW Marine Quest*



*Photo: Duke University Marine Lab*



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*Product of the North Carolina Marine Debris Action Plan, K-12 Education Committee*

# Marine Debris K-12 Educator Resources

Click on the underlined activity or lesson to access it.

The list is organized by the minimum grade level recommended for each activity and lesson!

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Grades	Activity	Description	Materials
K-2	<a href="#">Plastic Free Curriculum</a>	Each unit differs based on grade level. These lessons are all based on plastic pollution and are Common Core compatible.	Internet access.
K-3	NC State: <a href="#">Fatal Food</a>	Teach empathy for wildlife, show problems associated with trash in our environment and encourage stewardship.	Brown paper bags; food or pictures of wildlife food; examples of "fatal" food such as balloons, plastic bags, etc.
K-3	NC State: <a href="#">Litter Rally Maze</a>	Gain an awareness of what litter is; to learn how to dispose of litter properly; to understand that some litter can be recycled.	Copies of maze; pencils
K-3	NC State: <a href="#">Entangled Crab</a>	Show entanglement of a paper plate crab in litter.	Paper plates, markers, scissors, string or monofilament fishing line.
K-3	NC State: <a href="#">Adventures of the Big Sweep Bunch</a>	Teach conservation concepts of recycling, reusing, precycling, composting and picking up trash through storytelling and finger puppets.	Copies of storyboards and finger puppets; crayons.
K-3	NC State: <a href="#">"Touchy-Feely" Box</a>	Identify objects by touch and classify whether or not they are a natural part of the aquatic environment.	Large shoe box/container; samples of natural items (feathers, rocks, leaves, sticks); non-natural materials often present as litter.
K-3	NC State: <a href="#">Monofilament Mess</a>	Recognize that litter harms wildlife.	Clean six-pack rings, mylar balloons, monofilament fishing line, etc.

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K-3	NC State: <a href="#">What's My Line? Reel Trouble!</a>	Untangle fishing line and rescue entangled wildlife in a fun relay game.	Kite string with handle for each team; copies of entangled animal picture cards; and clothespins.
K-5	NOAA (NAMEPA): <a href="#">An Educator's Guide to Marine Debris: Trapping Trash</a>	This lesson plays on students' creativity by asking them to design a machine that collects debris in the ocean without impacting wildlife.	Drawing and graph paper, Drawing utensils: pencils, Presentation on Marine Debris (on NAMEPA website), Rulers, protractors, Compasses, NAMEPA Plastics Pledge
K-5	Hawai'i Wildlife Fund: <a href="#">Marine Debris Keiki Education and Outreach</a>	Three lessons where students define marine debris and identify threats. Use the Scientific Method to produce a poster about impacts and solutions.	Materials vary depending on lesson.
K-5	The Ocean Race: <a href="#">Ocean Race Sustainability Education Program</a>	These lessons guides students to discover the importance of the ocean, how marine debris is damaging the planet, and solutions.	Materials vary depending on lesson.
K-6	California Coastal Commission and The Ocean Conservancy: <a href="#">Save Our Seas</a>	The curriculum is divided by grade level. Each addresses why we should take care of the ocean and why ocean pollution is a problem.	Materials vary for each lesson.
K-8	California Coastal Commission: <a href="#">Schoolyard Cleanups</a>	This activity includes everything needed to perform a cleanup at your school. Students will learn about marine debris, how to do a cleanup, and data collection.	All lessons provided. Cleanup materials not provided.
K-8	Waste Wise School Program: <a href="#">Healthy Zero Waste Lunch Toolkit</a>	This manual is intended to guide the development and implementation of healthy zero waste lunches in school.	Lessons and Guide provided. Other materials may be necessary
K-12	Hurricane Island Center for Science and Leadership: <a href="#">Understanding Human Impacts: Marine Debris</a>	Students will learn about the major sources of marine debris and how long they take to degrade. Develop questions and hypotheses about marine debris in their local environment.	Materials vary depending on lesson.

Grades	Activity	Description	Materials
K-12	NAMEPA: <a href="#">An Educator's Guide to Marine Debris</a>	This guide provides lessons varying by age. Each lesson allows students to define marine debris and where it comes from.	Lessons and worksheets provided, some materials needed.
K-12	NOAA Marine Debris Program: <a href="#">Understanding Marine Debris</a>	An assortment of activities including coloring, puzzles and brain teasers.	Understanding Marine Debris activity packet
K-12	NOAA Marine Debris Program: <a href="#">Talking Trash and Taking Action</a>	A guide developed to educate students about marine debris and how to prevent it. A flexible curriculum that can be added into any lesson.	Provided packet
K-12	North Carolina Coastal Federation: <a href="#">Distance Learning Lab Guide</a>	Website with a variety of activities based on videos and lessons provided by the Coastal Federation and partners.	Each lesson requires the provided worksheet and computer to watch videos.
Elementary - Middle	<a href="#">Washed Ashore Curriculum</a>	The Washed Ashore Project uses community art created from marine debris to raise awareness about plastic pollution in order to spark change. There are 12 lessons.	Repurposed (washed) items. Gauge wire, large paper clips, glue, acrylic caulk, scissors, styrofoam, wire cutters, pliers.
1-3	Ocean Ever Blue: <a href="#">Tropical Reefs</a>	Students will learn about reef communities and how species interact within them.	Scissors, coloring materials
1-4	Turning The Tide On Trash: <a href="#">All Tangled Up</a>	Students perform an experiment in which they wrap a rubber band around their fingers and and try to disentangle themselves.	A small- to medium-sized (thin) rubber band for each student, One copy of the "Animal Entanglement" Handout
1-6	Turning The Tide On Trash: <a href="#">Coming to Terms with Marine Debris</a>	Students define and discuss marine debris impacts, and sort household trash items. Older students use statistics and graphing.	A large bag of assorted trash items (clean and safe), provided by the teacher.

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1-6	Turning The Tide On Trash: <u>Trash Traits</u>	Students perform experiments to examine whether or not trash can float, blow around, or wash away. The effects are discussed.	"Trash Traits Results" handout, Pieces of trash items. Bucket filled with water, table fan, container, watering can
2-4	Turning The Tide On Trash: <u>Marine Animals and Harmful Debris</u>	Students listen to descriptions of marine animals and then identify marine debris items that could harm them.	"Animal Tales" handout, physical examples of marine debris types.
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3	Kokua Hawaii Foundation: <u>Aina Waste Reduction-Compost Lesson</u>	This educator's guide provides lessons in composting and waste reduction. It teaches students to reduce, reuse, recycle waste.	Lessons provided. Compost materials not provided.
3-7	Turning The Tide On Trash: <u>How Harmful Is Marine Debris?</u>	Students make decisions about how severely different types of marine debris affect animals, people, vessels, and habitat. As a class, results are totaled and analyzed.	"How Harmful Is It?" handouts. Examples of the different types of debris to be discussed.
3-8	Ocean Ever Blue: <u>Plastic With Purpose</u>	Students will explore marine debris and solutions to plastic pollution	Trash bags, gloves, paper, writing utensil, glue, colored pencils, smartphone (optional)
3-9	Turning The Tide On Trash: <u>Waste Inventory</u>	This lesson is designed to increase students' awareness of the waste they and their family produce.	"Waste Inventory Log" handout (Note: Students may need extra paper to complete the log.)
3-12	NJ Sea Grant: <u>Marine Debris Timeline: How long does trash last?</u>	This activity will use a marine debris decomposing timeline and household items to predict how long the products take to decay.	Marine debris timeline (provided), examples of marine debris materials.

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4-5	<a href="#">Duke University Marine Lab: Marine Debris Curriculum</a>	Contains five modules, allowing students to explore and discover issues surrounding marine debris and utilize a mixture of activities, existing research protocols and education resources modified for elementary education.	Materials vary depending on lesson and Module.
4-5	Oregon State: <a href="#">Beach Boxes</a>	Bring the beach into the classroom for this activity to allow students to explore the definition of marine debris	Shoebox sized containers, gloves, trays or plates, tweezers and magnifying lens and materials for beach box.
4-5	Alaska Seas and Watersheds: <a href="#">Human Impact Survey</a>	Students can explore a beach or river bank and assess how humans impact the area via trash	Worksheet (provided), Pencils, clipboards and garbage bags
4-5	Plastic Beach Project: <a href="#">Quantifying Marine Debris</a>	Students use a sampling protocol to collect, sort and quantify marine debris.	1 meter by 1 meter square or rope, 5 gallon bucket, sieve, shovel, data sheet, sample bags or jars, scales
4-6	NC State: <a href="#">Getting Out of a Bind</a>	Teach empathy for wildlife by simulating an animal's entanglement in plastic litter.	One large rubber band for each child.
4-6	NC State: <a href="#">Litter Letters Crossword Puzzle</a>	Expand litter vocabulary by solving a crossword puzzle.	Crossword provided. Pencils needed.
4-6	NC State: <a href="#">Hidden Trash</a>	Develop data collection skills and to identify and classify hidden litter in the drawing.	Drawing and data card provided. Packages of crayons or colored markers needed.



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4-6	NC State: <u>Who's Who in Plastic?</u>	Use charades to increase awareness of plastics in daily life.	Materials vary depending on lesson.
4-6	NC State: <u>Litter Bar</u>	Analyze data from a shoreline litter collection by making bar graphs.	Paper, pencils, colored pencils, rulers, graph paper or facsimile, protractors.
4-6	NC State: <u>Breaking the Litter Code</u>	Use the grid to match the number-letter clues and discover the hidden message, "Don't teach your trash to swim"	Pencils, crayons, or colored pens (optional).
4-6	NC State: <u>Litter to Critter</u>	Recognize the danger waterway litter poses to wildlife by matching litter to the animals it threatens.	Pencils
4-6	NC State: <u>Litter Orphan Eddy</u>	Accept responsibility for the care and cleanliness of a particular stream, beach, or boating access area.	Trash bags, enthusiasm, and good attitudes.
4-6	NC State: <u>The Early Bird Gets The... Plastic?</u>	See how animals can mistake plastic for food.	Trays/shoeboxes, plastic resin pellets, packing pellets or foam pieces, bird seed, a spoon and a cup per child.
4-6	NC State: <u>Wildlife Tug of War</u>	Objective is to understand the danger of six-pack rings to wildlife by demonstrating their strength and durability.	New six-pack rings; two long pieces of rope.
4-7	Turning The Tide On Trash: <u>Nations and Neighbors</u>	Learn how marine debris has no international boundaries. Students will develop map skills by locating various nations on a globe or map, and by identifying various oceans.	A world map/globe, Bag with pieces of paper with the name of a country on it

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4-7	Marine Debris: The Urban-Coastal Connection: <a href="#">Marine Debris Timeline</a>	Students will learn about litter and marine debris, and how it can persist in the environment.	Rope, string, or a whiteboard, 10 marine debris time tags (listed), 10 common street litter items (or pictures)
4-7	Marine Debris: The Urban-Coastal Connection: <a href="#">Litter and Debris in Our Urban Waterways</a>	Students will learn about litter and marine debris, its sources and impacts, and what they can do to help.	Lesson, Quiz and Answers
4-7	Marine Debris: The Urban-Coastal Connection: <a href="#">Trash and Recycling Log</a>	Students will learn how proper waste disposal methods and recycling can help prevent trash and litter from becoming marine debris.	Trash and Recycling Log handout
4-8	Ocean Ever Blue: <a href="#">Coral Bleaching</a>	Extension of Reef Communities lesson. Students will learn about coral biology, animal relationships and climate change.	Writing and coloring utensils, scissors, several medium sized objects (balls, toys, book etc.) and small objects (legos).
4-8	Project Oceanography: <a href="#">Marine Debris: A lesson in conserving the ecosystem</a>	Students will define marine debris and learn the common types and amounts of marine debris, and solutions.	Activity sheet is provided. Needed: rubberbands, art supplies for posters, materials for cleanup
5-8	MarineQuest: <a href="#">Extremes of Entanglement</a>	Students learn about the dangers of entanglement to marine organisms by testing how much weight it takes to break different materials.	1 bucket, 1 luggage scale, 1 S-hook, 1 pound weights, 6 pack ring, plastic bag, fishing line, netted produce bag
5-8	MarineQuest: <a href="#">What is a ghost net?</a>	This module discusses what ghost fishing is, how gear gets lost, and how it can impact ecosystems, especially whales.	Fishing tool cards, pictures to accompany information (powerpoint), sample gillnet, rubber bands
5-8	MarineQuest: <a href="#">What is Marine Debris?</a>	An introduction to marine debris. Students will learn how marine debris gets into the ocean and impacts wildlife.	Large community canvas dropcloth, multiple pieces of cleaned trash.



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5-8	MarineQuest: <a href="#">Ocean Gyres and Marine Debris Collection</a>	Students will learn how ocean gyres form, and how they concentrate marine debris.	8 magnetic stir plates, 4 plastic bins, 8 magnetic stir bars, rubber ducks, confetti, blank map, inflatable globe
5-8	MarineQuest: <a href="#">Passing Through the Perilous Plastic Ocean</a>	Students will learn about the hazards of marine debris on migratory marine populations by completing this fun simulation game.	Globe, stuffed right whale toy, laminated game cards (provided), pictures of various migratory species
5-8	MarineQuest: <a href="#">Biomagnification of Plastic Pieces in Marine Food Chain</a>	Students will learn about the concept of biomagnification, and how plastic concentrates in marine organisms moving up the food chain.	Plastic beads, ziplock bags, photos of marine organisms (provided), wax pencils, data sheets, calculators
5-8	Turning The Tide On Trash: <a href="#">A Degrading Experience</a>	Students perform an experiment to learn how different types of debris degrade and how weather and sunlight affect that rate.	Trash items. • Two large, shallow, containers • netting or screening • rope or string • outdoor thermometer • newspaper • "Degradation Data - Outside" handouts • "Degradation Data - Inside" handouts
5-8	PBS: <a href="#">Debris Dilemmas</a>	Discover what causes huge quantities of garbage to end up on the most remote islands in the world and how this garbage affects wildlife.	All materials online.
5-9	Turning The Tide On Trash: <a href="#">Sources of Marine Debris: From Street to Surf, From Hand to Sand</a>	Students will observe and record litter they see in their neighborhood, make predictions on how the items might make their way to the ocean.	"Data Collection Form—Litter in Our Neighborhood" handout • "Top Ten" Most Frequently Collected Marine Debris Items handout
5-12	Algalita: <a href="#">The Story of Plastic</a>	Students will watch a documentary "The Story of Plastic" and a virtual webinar series where they can learn about the history and making of plastic.	All materials provided.
5-12	California Academy for Science: <a href="#">Carrying Out Investigations</a>	By carrying out an investigation, students collect data and evidence that can help them better understand ocean issues and addressing them.	Materials included, some materials needed for cleanup.

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5-12	California Academy for Science: <a href="#"><u>Math and Computational Challenges</u></a>	Help students understand real-world math and discuss how they can relate to ocean conservation issues.	Materials vary depending on lesson.
5-12	California Academy for Science: <a href="#"><u>Analyzing and Interpreting Data</u></a>	Students can learn how to analyze data and answer questions while learning about human impacts on the ocean.	Materials vary depending on lesson.
5-12	California Academy for Science: <a href="#"><u>Arguing the Evidence</u></a>	Students act as policymakers and stakeholders and can practice arguing from evidence in this activity.	Materials vary depending on lesson.
5-12	California Academy for Science: <a href="#"><u>Designing Solutions</u></a>	Ideas for design challenges you can engage your students in after watching some of the videos in this series to keep oceans healthy.	Upcycling materials (plastic bottles, wrappers etc.)
5-12	California Academy for Science: <a href="#"><u>Science Notebook Reflections with Crosscutting Concepts</u></a>	Students can use this opportunity to explore different ways of thinking about science content. Students will reflect after each video.	Materials vary depending on lesson.
6-8	NOAA (NAMEPA): <a href="#"><u>An Educator's Guide to Marine Debris</u></a>	Students analyze the Ocean Conservancy's International Coastal Cleanup data.	Presentation (available on NAMEPA website), Printouts of The Ocean Trash Index. Global and US maps, Calculator, Graph paper, Projector
6-8	Sea Grant Oregon State: <a href="#"><u>Bags, Bottles, and Beads: Sources of Microplastics</u></a>	An activity that allows students to define marine debris and microplastics while identifying sources of microplastics	Sealing jars, water, soap with microbeads, soap with natural exfoliators, sink, coffee filters, bucket.
6-8	Sea Grant Oregon State: <a href="#"><u>Mitigating Microplastics</u></a>	Use scientific data to design a solution to reduce microplastics and articulate the costs and benefits of their solution.	Notebooks, folders, markers, chart paper, folders

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6-8	NOAA (NAMEPA): An Educator's Guide to Marine Debris <a href="#">Micro-Plastic Investigation</a>	Introduces students to the processes that break marine debris plastic down into small sizes: photodegradation and mechanical degradation.	Clear tubs • String, Duct tape, Markers, 20L of 3.5% saline "ocean water", Blender, dissecting scopes OR magnifying glasses, 600-ml beakers, 50 ml collection beakers, plastic water cups, paper cups.
6-8	NOAA (NAMEPA): An Educator's Guide to Marine Debris <a href="#">The Solution to Pollution</a>	Students examine and discuss data from the EPA's Waste Report from 2012 and create a Public Service Announcement (PSA).	PowerPoint Presentation (available on NAMEPA website), materials needed to make the PSA.
6-8	NOAA (NAMEPA): An Educator's Guide to Marine Debris: <a href="#">Trash Tracker</a>	Using the NAMEPA Trash Tracker form, students record their waste for two weeks (time may vary) and gives insight into waste they can reduce.	PowerPoint Presentation (on NAMEPA website), Examples of common trash items (optional), NAMEPA Trash Tracker Form, Calculator, Print outs of the data sets being used
6-8	Sea Grant Oregon State: <a href="#">Small Plastics, Big Problem</a>	Students will articulate two possible impacts of microplastics, and create an argument using evidence.	Card stock or cardboard, scissors, glue or tape, foam cubes and calculators
6-8	Turning The Tide On Trash: <a href="#">Marine Debris - Data Mining</a>	Students learn about different trash items and define marine debris. Students categorize debris and use statistics and graphing skills.	Handouts with "Top Ten" debris items found during the International Coastal Cleanup • "Marine Debris: Raw Data 2001-2005" handout of from the International Coastal Cleanup (ICC)
7-12	California Coastal Commission and The Ocean Conservancy: <a href="#">Save Our Seas</a>	Focused on science classes, yet still integrates social issues. Secondary level students learn field methods and techniques while analyzing the marine debris problem.	Materials vary for each lesson.
7-12	PBS Newshour: <a href="#">Talking trash and your environment</a>	This activity allows students to isolate and consider the environmental impact of microplastics in toothpaste.	Toothpaste, Microscope/magnifying lens, 2 glass jars/beakers, water, Stirring rod or spoon, Coffee filters, Petri dish or acetate sheet (used to view the beads)

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High School Biology	Virginia Institute of Marine Science: <a href="#">Code in the Water</a>	This activity allows students to identify algae and understand the causes of algal blooms	Provided PowerPoint, algal info sheet, student worksheets, class discussion questions and printed water samples.
9-12	<a href="#">Debris Free Oceans</a>	Interactive presentation about marine debris' impacts on south Florida's ecosystems, economy, and health of its residents, and solutions.	Materials vary depending on lesson.
9-12	Turning The Tide On Trash: <a href="#">A Scientific Cleanup</a>	As a class, students organize and conduct a cleanup of a local beach, lake, or stream. Students keep track of the types and amounts of trash picked up and analyze this information.	Garbage bags, latex gloves, bucket, scissors, camera, first aid kit, 'Cleanup Checklist' handouts, "ICC Data Collection Card" handouts, Clipboards, pencils
9-12	Heidi Averette: <a href="#">Plastics in the Ocean</a>	Allows students to understand marine debris, chemicals found in plastics, how currents move debris, and impacts on food webs.	Copies of article "garbage in, garbage out", internet access, poster/presentation materials.
10-12	Teacher.org: <a href="#">Ocean Pollution</a>	Students will research ocean pollution and compare/contrast current data, hypotheses and other information and check for accuracy.	Materials vary depending on lesson.

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### North Carolina Marine Debris Action Plan: K-12 Education Subcommittee

