Virtual Field Trip On Board the SoundWaters Research Vessel
Teachers Guide and Supporting Materials

Welcome to the SoundWaters Virtual Field Trip on board the R/V SoundWaters.

This Virtual Field Trip focuses on human impact on the environment, and especially on Long Island Sound. The adventure begins with SoundWaters Educator Jess Castoro on the deck of the R/V, and Jess narrates the experience for students. Throughout the Field Trip other SoundWaters Educators present compelling videos about topics such as marine debris, microplastics, runoff, renewable energy, and environmental remediation. To help you organize your lesson plan the order of the presentation and the start and end time of each section, along with the relevant NGSS standards, are listed below.

Also below are resources that you may choose to use with your students. Specifically you will find:

- Field trip video link: http://bit.ly/sw3-5rv
- Worksheets to reinforce the material presented in the Field Trip.
- A sample quiz
- A quiz answer key
- Links to an app and online resources that students can use to enhance their knowledge.
- Links to additional articles and readings to help your students learn more about the way humans impact Long Island Sound.

We trust you will find this Virtual Field Trip to be a valuable learning tool for your students and a terrific way to connect them with the natural world. If you would like to pursue this subject matter in a more significant way please reach out to us to discuss bringing a SoundWaters Educator into your classroom via videoconference. We can customize a program that will support your desired learning outcomes for your students. For more information please contact Olena Czebiniak at olena@soundwaters.org or 203-406-3319.

SoundWaters Virtual Field Trip Supportive Materials

Grades 3-5

Content Timing:

Marine Debris Video

- Start – 1:16
- End – 5:41
- NGSS – Earth's Systems: 5-ESS3-1; Engineering Design: 3-5-ETS-1

Microplastics Video

- Start – 6:04
- End – 10:34
- NGSS – Earth's Systems: 5-ESS3-1

Runoff Video

- Start – 10:49
- End – 14:31
- NGSS – Earth's Systems: 4-ESS2-1

Renewable Energy Video

- Start – 18:10
- End – 24:26
- NGSS – Earth and Human Activity: 4-ESS3-1, 5-ESS3-1; Energy: 4-PS3-4

Remediation Video

- Start – 24:48
- End – 29:17
- NGSS – Earth and Human Activity: 4-ESS3-1, 5-ESS3-1; Engineering Design: 3-5ETS1-1

MARINE DEBRIS WORD SCRAMBLE

Below are common items that might end up as marine debris. Unscramble the words and solve the mystery!

1. HIFGSIN RULE _____
Hint: you won't catch anything if you don't have this on your line.

2. OBHUOTHTRS _____
Hint: you should use this every night before bed.

3. OYBU _____
Hint: These are used to mark a swimming area on a beach.

4. EGTDRENET TLETBO _____
Hint: You can't get clothes clean without this.

5. TAWER TTOLBE_____
Hint: Reusable ones are best.

6. ADRORCDBA _____
Hint: This might come in the mail with something inside

7. SASGL RJA _____
Hint: You might have these in your refrigerator

8. LEOBTT PAC_____
Hint: These don't recycle as what they connect to.

9. LAPSCIT GAB_____
Hint: If you put too much in these, they will break

Which material takes the shortest time to break down? How long do you think it takes?

Which material takes the longest time to break down? How long do you think it takes?

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MARINE DEBRIS WORD SCRAMBLE ANSWER KEY

Below are common items that might end up as marine debris. Unscramble the words and solve the mystery!

1. HIFGSIN RULE: **FISHING LURE**
Hint: you won't catch anything if you don't have this on your line.

2. OBHUOTHTRS **TOOTHBRUSH**
Hint: you should use this every night before bed.

3. OYBU **BUOY**
Hint: These are used to mark a swimming area on a beach.

4. EGTDRENET TLETBO **DETERGENT BOTTLE**
Hint: You can't get clothes clean without this.

5. TAWER TTOLBE_**WATER BOTTLE**
Hint: Reusable ones are best.

6. ADRORCDBA **CARDBOARD**
Hint: This might come in the mail with something inside

7. SASGL RJA **GLASS JAR**
Hint: You might have these in your refrigerator

8. LEOBTT PAC **BOTTLE CAP**
Hint: These don't recycle as what they connect to.

9. LAPSCIT GAB_**PLASTIC BAG**
Hint: If you put too much in these, they will break

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Which material takes the shortest time to break down? How long do you think it takes?

Cardboard - 8 weeks

Which material takes the longest time to break down? How long do you think it takes?

Glass jar - unknown

MICROPLASTICS

Circle the pictures that represent types of microplastics:

What is one thing you can do to help reduce the amount of microplastics going into Long Island Sound?

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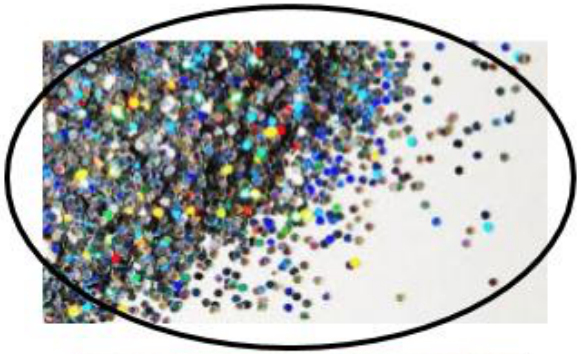
MICROPLASTICS

CIRCLE the pictures that represent types of microplastics:



What is one thing you can do to help reduce the amount of microplastics going into Long Island Sound?

Avoid using single use plastics that could end up in the environment. One they are in the water, they just get smaller and smaller and become microplastics.

Make sure to recycle so additional materials won't be in the environment.

Avoid any cosmetic products that use microbeads.

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RUNOFF

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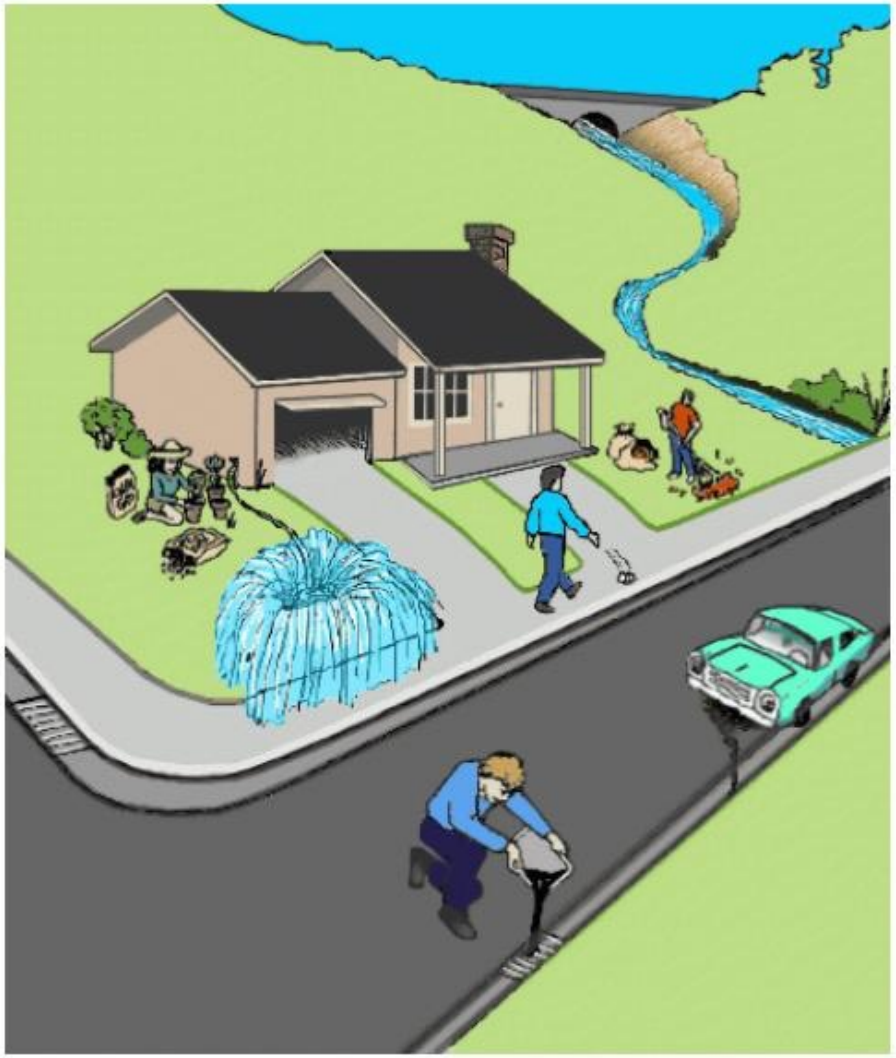
What is runoff?



Give some examples of how runoff could be harmful to this neighborhood

RUNOFF ANSWER KEY

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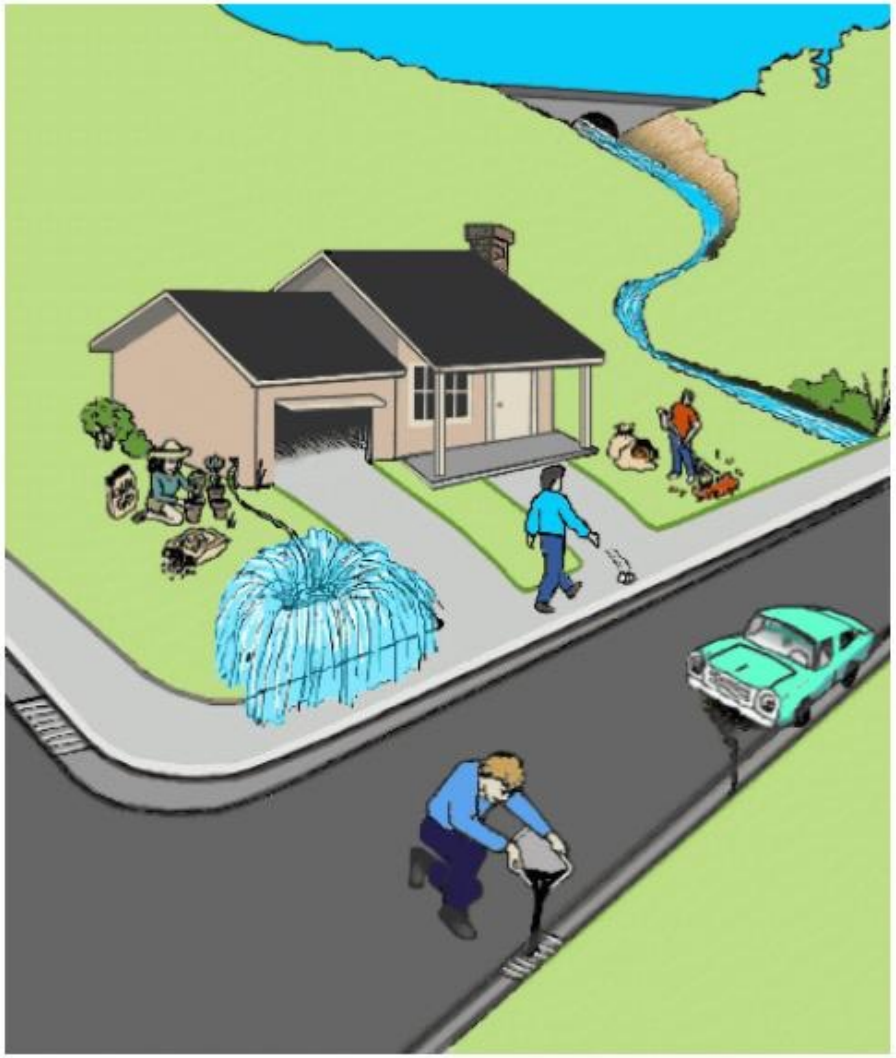
What is runoff?

Extra water draining off of the land into a body of water like a lake, stream, river, or ocean. This can happen when the land can't absorb any more water, so the water flows off of it.



Give some examples of how runoff could be harmful to this neighborhood

The woman working on her plants/garden could be using **fertilizer/pesticides** which could end up going toward the stream if it rains due to runoff

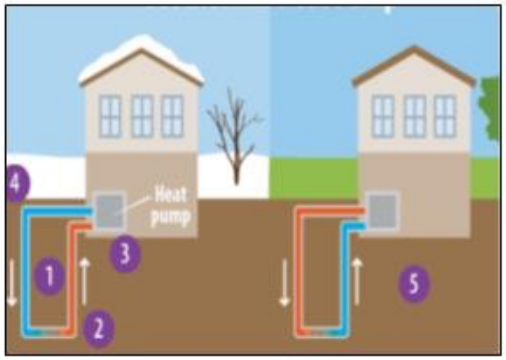
The man on the sidewalk is throwing **trash** on the ground, which could end up in the storm drain and into a river/larger body of water

The car is leaking **oil/gasoline** which could end up in the storm drain if it rains

The man in the street is **dumping chemicals** down the storm drain and those chemicals could end up in the water

RENEWABLE ENERGY

Label these pictures with the correct type of renewable energy they are using



Give 2 reasons why it is important to use renewable energy instead of non-renewable energy

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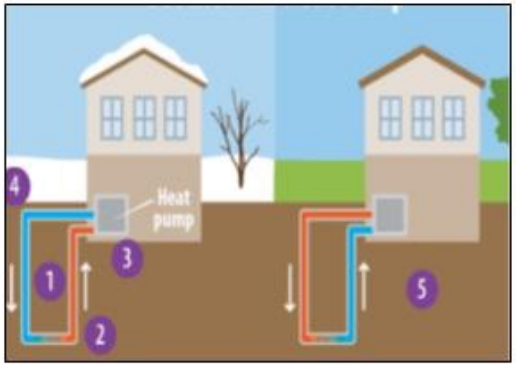
RENEWABLE ENERGY
ANSWER KEY

Label these pictures with the correct type of renewable energy they are using

WIND

SOLAR



GEOTHERMAL

HYDROELECTRIC

Why it is important to use renewable energy instead of non-renewable energy

Answers may vary

Non-renewable resources can only be used once and add to pollution in the air and water.

Since they can only be used once, they may eventually run out.

Renewable energy will help prevent climate change over time.

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REMEDIATION

Draw an arrow from each item to the bin it should be sorted into

Compost

Recycle

Trash

Why are composting and recycling so important to the environment?

What would happen if we stopped recycling and composting?

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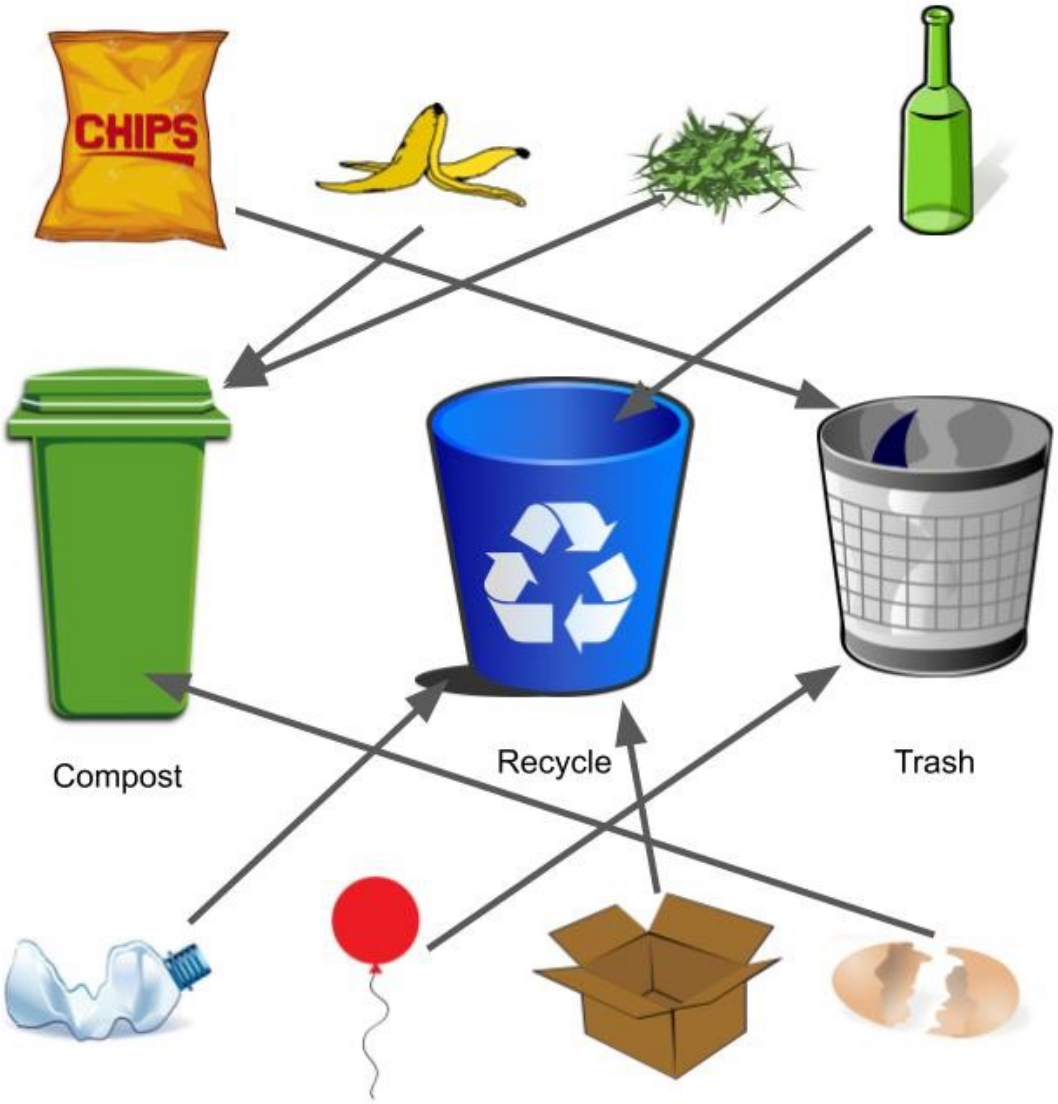
REMEDIATION ANSWER KEY

Draw an arrow from each item to the bin it should be sorted into



Why are composting and recycling so important to the environment?

What would happen if we stopped recycling and composting?

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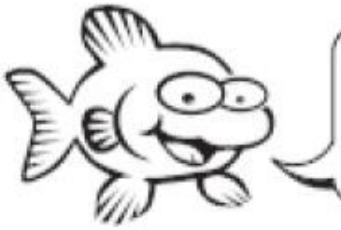
Tons of Trash!



Litter is generated by many sources, from boats and oil rigs on the water to picnickers, fishermen, and beachgoers along the shore. Hidden below is a list of objects that have been discarded into our oceans. See if you can find them all!

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

These hidden words are found horizontally, vertically and diagonally. (Answers on page13).

BAIT CONTAINER	CRATE	FISHING NET	LUMBER	SHOE
BALLOON	CUP	GLASS BOTTLE	PAINT BRUSH	SODA CAN
BUCKET	DIAPER	GLOVE	RADIO	STRAW
BUOY	DOLL	HARD HAT	ROPE	TIRE
CIGARETTE	FISHING LINE	HOSE	RUG	TRASH BAG

Million Bottle Cap Challenge
Classroom Tally Sheet

Please email your final bottle cap counts to bottlecaps@soundwaters.org.

Date	Bottle Cap Amount

TEST YOUR KNOWLEDGE

1. _____ is any type of manmade source of chemicals or garbage that starts on the land and ends up in the water
    a. Terrestrial pollution
    b. Marine pollution
    c. Air pollution
    d. Microplastics pollution

2. Which of these is a way that pollution can end up in the water?
    a. Wind
    b. Rain
    c. Storm drains
    d. All of the above

3. Which of these statements is FALSE about marine debris?
    a. It will not always get collected and recycled by humans.
    b. It will break down into smaller pieces.
    c. Marine debris will always stay in the same place it entered the water.
    d. It will make its way through the food chain if eaten by an animal.

4. True or False. Marine debris does not affect beaches or boats.

5. _____ is a tiny piece of plastic less than 5 mm in length.
    a. Marine debris
    b. Runoff
    c. Macroplastic
    d. Microplastic

6. Which if these is NOT a source of microplastics?
    a. Chemicals going down a kitchen sink.
    b. Larger pieces of plastic breaking down on the beach.
    c. Microbeads from facewash in a bathroom sink.
    d. Fibers from clothing in a washing machine.

7. What happens to animals when they are in the water with microplastics for a while?
    a. Animals avoid the microplastics and only eat their food.
    b. An animal's stomach gets full from eating microplastics by accident.
    c. The microplastics give animals the same nutrients as their food.
    d. The animal has a big enough stomach for both food and microplastics.

8. _____ happens when the land can't absorb any more water and the extra water ends up in another body of water
    a. Marine debris
    b. Microplastics
    c. Renewable energy
    d. Runoff

9. True or False. A river can pick up harmful chemicals and pollution as it travels through a city or farm.

10. What can happen to a water treatment plant if it rains too much?
    a. Nothing will happen, the water treatment plant can always handle extra water.
    b. The water treatment plant turns off so it won't overflow into another body of water.
    c. The large containers that hold the water will overflow into another body of water.
    d. None of the above.

11. Which of these statements is TRUE about fertilizer getting into a body of water like Long Island Sound?
    a. Fertilizer is food for algae and can lead to less oxygen for the animals.
    b. Fertilizer is the reason that Long Island Sound looks green in color.
    c. Fertilizer is food for animals that need it to grow and thrive in Long island Sound.
    d. Fertilizer makes the water cleaner in Long Island Sound.

12. Renewable energy _____.
    a. Involves sources of energy that can only be used once, like coal.
    b. Uses natural sources of energy that are found all over the earth.
    c. Contributes pollution to the air and water.
    d. None of the above.

13. Which type of renewable energy uses a large turbine on the land?
    a. Wind
    b. Tidal
    c. Solar
    d. Geothermal

14. _____panels absorb energy from the _____ and use it to make electricity for a house or building.
    a. Hydroelctric; Sun
    b. Solar; Earth
    c. Hydropower; Water
    d. Solar: Sun

15. Why are tides a great source of energy for a coastal area, like Long Island Sound?
    a. Tides are very strong and rush over a dam to create electricity with a turbine.
    b. Tidal movement happens every day because tides are controlled by the moon.
    c. Tides use large wave action to store energy through a tidal panel.
    d. Tidal water is stored in pipes that get warmed by the earth to warm buildings.

16. True or False. Humans use non-renewable energy because it is often easier to store and more cost effective than renewable energy.

17. _____ is when humans work to stop or fix damage to the environment
    a. Water treatment
    b. Remediation
    c. Runoff
    d. Renewable Energy

18. How does kelp help to clean up the water?
    a. It filters microplastics.
    b. It blocks sunlight from the seafloor.
    c. It's a food source for animals.
    d. It takes up extra nitrogen.

19. True or False. Recycling can give life to old materials, making them into something new.

20. Which of these materials cannot be composted?
    a. Sticks
    b. Plastic bottles
    c. Grass
    d. Food

21. True or False. Trash bags allow food waste to break down and go back into the soil at a landfill.

TEST YOUR KNOWLEDGE ANSWERS

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Apps and Online Resources

(Click on the title to learn more!)

- Marine Debris Tracker App
- NOAA Marine Debris Activity Book
- NOAA Trash Talk Video Series for Kids
- NOAA Marine Debris Toolkit for Educators
- Be an Ocean Guardian Activity Book
- NOAA Microplastic Marine Debris Information Sheet
- NOAA Create A Model Watershed!

Books and Readings

Books

- What a Waste: Trash, Recycling, and Protecting our Planet by Jess French
- Emily Windsnap and the Tides of Tim by Liz Kessler
- How to Save the Whole Stinkin' Planet: A Garbological Adventure by Leee Constable
- Harlem Grown: How One Big Idea Transformed a Neighborhood by Tony Hillery and Jessie Hartland
- The Boy Who Harnessed the Wind by William Kamkwamba
- Plastic: Past, Present, and Future by Eun-ju Kim

Articles

- A New Wave of Gadgets Hits the Water to Clean Up Plastic Trash
- Small particles of plastic have found a home in Arctic snow, scientists say (Lexile level can be adjusted)
- Types of Renewable Energy (Lexile level can be adjusted)
- Water quality improving in Long Island Sound, report says