

TEACHER'S GUIDE



GRADE 3 UNIT: Trashbot



 **Think**Earth

ENVIRONMENTAL EDUCATION CURRICULUM



GRADE 3 UNIT: Trashbot

Teacher's Guide

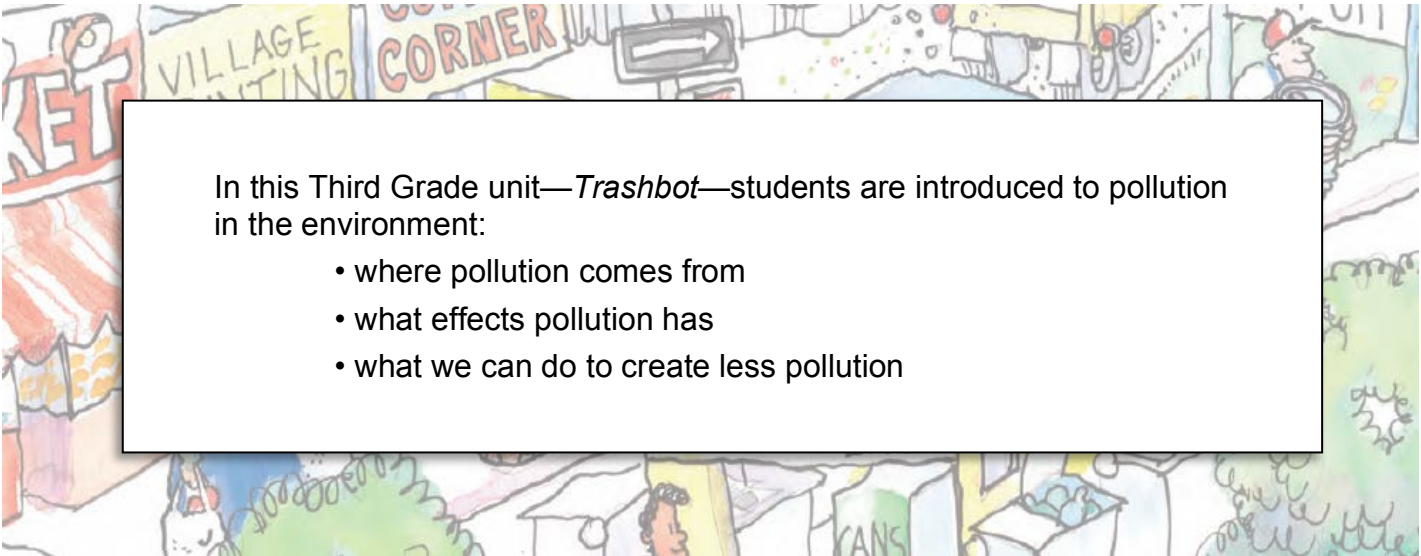
It's time to **THINK EARTH!**

With more than 7 billion people now inhabiting the planet and putting pressure on both our natural and built systems on Earth, environmental education is particularly important. All of us must consider our Earth and learn to:

- conserve natural resources
- reduce waste
- minimize pollution.

The *Think Earth* Environmental Education Curriculum is intended to help students become more aware of their environment and begin to develop responsible behaviors and caring attitudes toward it. By teaching children at an early age that we are part of our environment and by empowering them with behaviors with which they can make a difference, we can help develop a generation of people who will "Think Earth" in their personal lives and as members of our global society.

The *Think Earth* Curriculum consists of 9 instructional units, for preschool through middle school. Each unit introduces new concepts and behaviors, while reviewing those learned at earlier grades. The units are interrelated and sequential, yet independent. Students need not complete one unit before beginning another one.



In this Third Grade unit—*Trashbot*—students are introduced to pollution in the environment:

- where pollution comes from
- what effects pollution has
- what we can do to create less pollution



Introduction	3
Unit Objectives	
Planning	
Materials	
Technology Use	
Standards Correlations	
Teacher Response Form	
Lesson 1: Understanding the Environment	6
A. Administer the Pretest	
B. Introduce and show the <i>Think Earth</i> video	
C. Discuss the video	
Additional Activities	
Lesson 2: Learning About Pollution	11
A. Take an “environmental walk”	
B. Show or read Story 1, <i>Trashbot</i>	
C. Discuss the poster, <i>Our Community</i>	
Additional Activities	
Script: <i>Trashbot</i>	
Lesson 3: Recognizing Pollution Problems	21
A. Conduct a review	
B. Demonstrate emissions from a burning candle	
C. Have students complete Practice Exercise 1	
Additional Activities	
Lesson 4: Learning About Pollution Solutions	27
A. Show or read Story 2, <i>A Little Means A Lot</i>	
B. Provide group practice	
C. Have students complete Practice Exercise 2	
Additional Activities	
Script: <i>A Little Means A Lot</i>	
Lesson 5: Practicing <i>Think Earth</i> Behaviors	37
A. Review <i>Think Earth</i> behaviors using poster	
B. Conduct role-playing	
C. Discuss the Family Activity Sheet	
D. Administer the Posttest	
Unit Follow-Up Activities	44
Glossary	46
Acknowledgements	47

Unit Objectives

- 1. Concepts.** Students will understand the following environmental concepts:
 - a. We use natural resources from the environment to produce products that we use.
 - b. Producing, distributing, and consuming products all create waste.
 - c. Waste goes into our water, onto our land, and into our air.
 - d. Our trash disposal system and water treatment system manage most waste.
 - e. Improper disposal of waste on land or in water can cause pollution.
 - f. Burning fossil fuels for energy puts pollutants into the air.
 - g. Pollution harms the environment and all living things in it.
 - h. We are working on ways to minimize pollution.
 - i. All of us can help create less pollution.
- 2. Skills.** Students will:
 - a. Identify ways that soil, water, and air can become polluted in and around our homes and neighborhoods.
 - b. Identify ways people can help minimize pollution.
- 3. Behaviors.** Students will practice the following behaviors to help the environment:
 - a. Walk or bike or skate short distances instead of asking for a ride in the car.
 - b. Carpool with other children.
 - c. Use public transportation.
 - d. Dispose of hazardous waste (e.g., glue, oil, batteries, paint thinner, household chemicals, electronic equipment) properly, not in the trash or down the drain.
 - e. Dispose of all trash properly.
 - f. Conserve energy, water, paper, and other resources.
 - g. Create less waste by reducing, reusing, repairing, recycling, and other methods.

Planning

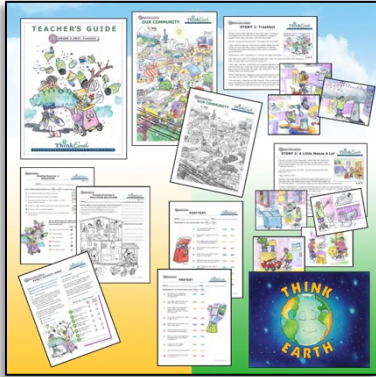
Instruction on the unit's objectives is organized into **five lessons** with detailed instructional procedures for each lesson, including a listing of the objectives addressed, the materials required, and the preparation needed. The vocabulary words introduced in each lesson are listed prior to the procedures, highlighted within the lesson, and defined in the glossary.

At the end of each lesson are **additional activities**, which can help students not only accomplish the lesson objectives but also apply environmental concepts and behaviors to other disciplines and to everyday living. Each of the five lessons can be completed in one or more days, depending on your class and the activities that you do.

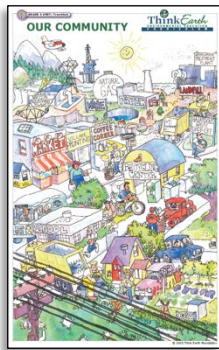
Following Lesson 5 are **Unit Follow-Up Activities** that can be used periodically throughout the remainder of the year to reinforce the unit's objectives and to help students further develop strong environmental attitudes and habits.

Materials

In addition to this teacher's guide, you will need the following instructional materials, which can be found in the [Grade 3 Section](#) of the *Think Earth* website. Links to these items are also included in the procedures in this teacher's guide.



- Student Materials – PDFs of:
 - [Pretest](#)
 - [Practice Exercise 1](#)
 - [Practice Exercise 2](#)
 - [Poster in black and white](#)
 - [Family Activity Sheet](#)
 - [Posttest](#)



- Posters – PDFs of:
 - [Our Community](#)
 - [Think Earth](#)



- *Think Earth* Video
 - [Narrated](#)
 - [Unnarrated](#)



- Stories
 - [Trashbot](#) ([video](#) and [PDF](#))
 - [A Little Means A Lot](#) ([video](#) and [PDF](#))
- Songs
 - [Think Earth, Think Earth](#) ([vocal](#) and [instrumental](#))

Technology Use

The *Think Earth* curriculum is flexible and can be taught using various classroom technologies.

The student practice exercises and the posters can be displayed directly from a computer with a projector or smartboard, or pages can be printed and displayed with a document camera. If students use tablets in class, you can load the pages onto the tablets. If you do not have access to or choose not to use these technologies, simply print copies and distribute them to students.

The videos—*Think Earth* and the two stories—can be presented directly from a computer with a projector, smartboard, or television monitor. Students can also watch the videos on tablets, on individual computers in the classroom, or in a computer lab. The stories are also provided in PDF format so that they can be printed out.

Standards Correlations

Standards correlation information is available on the [Think Earth Standards Correlation Charts](#) on the *Think Earth* website. All units are correlated to:

- [Common Core State Standards](#)
- [NextGen Science Standards](#)
- [McREL Online Standards Compendium](#)

Teacher Response Form

After you have finished teaching the unit, please complete the brief online [Teacher Response Form](#). Your responses will help to improve the program and to inform other teachers about the *Think Earth* Curriculum.





Understanding the Environment

Objectives

Concepts: Students will understand the following environmental concepts:

- We use natural resources from the environment to produce products that we use.
- Producing, distributing, and consuming products all create waste.
- Waste goes into our water, onto our land, and into our air.
- Our trash disposal system and water treatment system manage most waste.
- Improper disposal of waste on land or in water can cause pollution.
- Burning fossil fuels for energy puts pollutants into the air.
- Pollution harms the environment and all living things in it.
- We are working on ways to minimize pollution.
- All of us can help create less pollution.

Materials

- Pretest
- *Think Earth* poster
- *Think Earth* video

Preparation

- Make a copy of the Pretest for each student.
- Preview and prepare to present the *Think Earth* video.
- Prepare to project or display the *Think Earth* poster.



Vocabulary

- **environment** – everything living and nonliving that surrounds us
- **natural resources** – things in nature, such as trees and water, that we use to make products and to live
- **pollute** – to make unclean, especially with harmful waste products

Procedures

A. Administer the Pretest

- Tell students that for the next few days they will be learning about the environment with a program called *Think Earth*. Show students the *Think Earth* poster. Ask students what they think it means to "Think Earth."
- Explain that before they look at the program, they are going to answer some questions to see what they already know. Tell students that it is all right if they do not know some of the answers.

- Give each student a copy of the *Think Earth Pretest*. Have students write their names and the date on the Pretest.
- Read the directions for the Pretest aloud. Then, either read each question aloud and allow students time to circle their answers or allow students to work through the Pretest on their own
- Collect the Pretests and later correct them using the answer key. Calculate the average number of items correct for the class to record later on the *Teacher Response Form*.



GRADE 3 UNIT: Trashbot

PRETEST



Name _____ **Date** _____

Directions: For each question below, circle YES or NO.

1	Are televisions made from natural resources from the environment?	YES	NO	
2	Are waste materials left over when we make products?	YES	NO	
3	Does water that goes down sinks usually get cleaned before it is put back into the environment?	YES	NO	
4	Do we burn most all our trash to get rid of it?	YES	NO	
5	Does most air pollution come from fossil fuels?	YES	NO	
6	Does turning up the heater usually add to air pollution?	YES	NO	
7	Does turning off unused lights and televisions help reduce air pollution?	YES	NO	
8	Should we throw glass bottles in the trash?	YES	NO	
9	Is it easy to stop air emissions?	YES	NO	
10	Should we put leftover paint in the trash?	YES	NO	

© 2015 Think Earth Foundation

B. Introduce and show the *Think Earth* video

- Tell students that they are going to watch a video about how people live in the environment and about what can happen to the environment.
- Ask students what they think the "environment" is. Lead students to understand that the environment is everything around us—people, air, desks, trees, water, windows, cars, etc.
- Ask students what **natural resources** are. (*Natural resources are things in nature that we use to live.*) Ask students to name some natural resources, and as they do, list them on the board (*i.e., air, water, land, trees, plants, animals, sand, minerals, oil, coal, natural gas*).
- Tell students to look for these natural resources in the video and to look for what we do with them.
- Show the video. Either:
 - show the **narrated version** and use the questions below to discuss it; then show the **unnarrated version**, having various students provide narration for short segments;
OR
 - show the **unnarrated version** first and ask students to describe what they saw; then show the **narrated version** and use the questions below to discuss it.

C. Discuss the video

- Use the following questions to discuss the video with the class. Either discuss with the whole class or divide the class into cooperative learning teams and have each team discuss several questions before calling on a team member to respond.

1. What are some natural resources you saw in the video?

(*sun, air, trees, water, fish, oil*)

2. What are some ways people used the natural resources to live?

(*People used trees to build houses. They burned wood to keep warm. They used water to drink and to water plants. They pumped oil from the ground to make gasoline for cars and trucks. They made many kinds of wood and paper products from trees. They grew food on the land and watered it.*)

3. What happened to natural resources like trees and water as people kept buying and using so many products?

(*The natural resources began to disappear. Only tree stumps were left in the forest. The water level behind the dam went down. Animals and fish disappeared.*)

4. What would happen if there were even more people?

(More natural resources would be used to make products for these people.)

5. Why did Earth finally sneeze and look red-eyed and unhappy?

*(People were **polluting** the environment. They tossed their trash on the ground and littered their streets. People used more water than they needed. When people were finished with the products, they put them in the trash, and the trash was dumped in huge landfills. As more and more cars and trucks were needed to transport people and all of the products and trash, the air became dirty and polluted. The Earth sneezed because too many people were using too many products, making too much trash, and polluting the environment.)*

6. Do you ever see anything in our community that might make the Earth want to sneeze?

(Answers will vary. Students might mention things like litter, smog, too much traffic.)

7. How did people change after the sneeze?

(People stopped wasting natural resources; they conserved resources by turning off water faucets, televisions, and lights when not in use; they watered lawns and crops carefully instead of flooding them; they replanted trees. They began to recycle newspapers, cans, and bottles instead of throwing them in the trash. To help reduce air pollution, people walked, took buses, and rode bicycles.)

8. How did the environment improve when people began to change?

(There was less traffic; factories didn't work so hard; streams and lakes were full of water again; trees were in the forest again; and the air was cleaner.)

9. Why do you think people didn't take care of their environment until the Earth sneezed?

(They probably didn't think about how much water, wood, paper, and other natural resources they were using and about whether there would always be enough for everyone. They probably didn't think about where they would put all the trash they were making or about all the air pollution they were creating.)

10. Why do you think this video is called *Think Earth*?

(Sometimes we don't think about the Earth and its resources. We take resources from the environment, turn them into thousands of products, and then throw them away. We're wasting natural resources, making a lot of trash, and creating pollution in the world. We need to "Think Earth" to keep our environment clean and healthy.)

Additional Activities

Note: *The activities at the end of each lesson reinforce and extend the unit's concepts, skills, and behaviors. Some help students apply what they've learned to their own surroundings. Some are "hands-on." Use these activities as time and interest permit.*

- **Identify resource bases.** Ask a student to name and/or point out an object in the room and have students determine what natural resources were used to produce it (e.g., pencil and paper from trees, metal bookcase from mineral ore, plastic chair from fossil fuels). Students should discover that everything in the room originated with natural resources from the environment. Start a graphic organizer on the bulletin board showing natural resources and products made from each resource.
- **Research and discuss natural resources in your community.** Help students find out what natural resources are an important part of the economy in your community (e.g., forests, mineral ores, fossil fuels, fish, crops). Where are these resources located? What happens to them? What products are made from them? If natural resources are not harvested directly in your community, find out what major products are produced there, using natural resources brought in from other places (e.g., furniture, automobiles, computers). You might want to locate these resources and/or factories on a map of your community.
- **Determine energy and water sources in your community.** Help students discover where water and energy come from in your community. For example, what are the sources for most of your water supplies—underground wells, lakes, rivers, reservoirs? Does your community use any reclaimed water? Are students' homes heated with natural gas, heating oil, or electricity? Where are the power plants located? Do the power plants burn fossil fuels or are they hydro or nuclear?
- **Write and illustrate stories.** Have students write stories and draw pictures about a day without a particular natural resource (e.g., water, trees, fossil fuels).



Learning About Pollution

Objectives

Concepts: Students will understand the following environmental concepts:

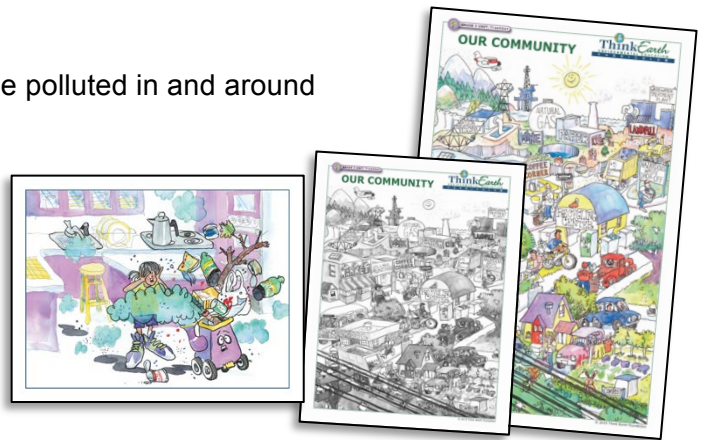
- We use natural resources from the environment to produce products that we use.
- Producing, distributing, and consuming products all create waste.
- Waste goes into our water, onto our land, and into our air.
- Our trash disposal system and water treatment system manage most waste.
- Improper disposal of waste on land or in water can cause pollution.
- Burning fossil fuels for energy puts pollutants into the air.
- Pollution harms the environment and all living things in it.
- We are working on ways to minimize pollution.

Skills: Students will:

- Identify ways that soil, water, and air can become polluted in and around our homes and neighborhoods.

Materials

- Story 1, *Trashbot* (video or PDF)
- *Our Community* color poster
- *Our Community* poster in black and white



Preparation

- Prepare to present Story 1, *Trashbot*. (Show students the video, **or** project the PDF pictures and read the story aloud, **or** print the PDF and create a book to read.)
- (Optional) Make copies for students of Story 1. See Procedure B.
- Prepare to project the *Our Community* color poster.
- (Optional) Make a copy of the black and white poster for each student.

Vocabulary

- **built environment** – everything people build or make from natural resources
- **fossil fuels** – oil, coal, and natural gas—which formed in the earth from the remains of prehistoric plants and animals
- **landfill** – area of land where trash is buried
- **minerals** – substances we take from the ground, e.g., metal ore and sand, and make into products
- **natural environment** – everything from nature—sunlight, air, water, land, plants, animals, humans
- **pollution** – filled with a lot of unclean and harmful substances
- **wastewater treatment plant** – a place that cleans water that goes down our drain

Procedures

A. Take an "environmental" walk

- Write the following two terms on the board: *Natural Environment* and *Built Environment*. Ask students what they think these terms mean. Explain that the natural environment:
 - comes from nature
 - consists of sunlight, air, water, land, plants, animals, and humans—which are all natural resources.

Point out that the built environment:

- is made by people
 - includes buildings, roads, clothes, computers, and other products that we use to live
 - is all made from natural resources, such as trees and fossil fuels, from the environment.
- Tell students that they are going outside to look for examples of these two environments. Have students bring paper and pencil on the walk. (**Note:** *If your class is unable to go outside, conduct this activity as a class discussion. Ask students to think about what they might find outside that would be part of the natural environment and part of the built environment.*)
- Take students on a brief walk, perhaps around the perimeter of the school. Have students work either in teams or individually. Ask them to make two lists—things they see in the natural environment and things they see in the built environment.
- After the walk, list on chart paper or on the board what students found in the natural environment and in the built environment.
- Ask students how each of the following elements of the natural environment help us live and how they affect other things in the environment.
 - **Sun** (*The sun gives us warmth and light. Without sunlight, plants could not grow, and we'd have no food.*)
 - **Air** (*Living plants and animals, including people, must have plenty of fresh, clean air to breathe and grow.*)
 - **Water** (*Plants, animals, and people need fresh, clean water to live.*)
 - **Land** (*We build our homes and grow our food on land. We live on the land, and we take many natural resources from the land.*)
 - **Plants and Animals** (*Plants and animals give us the food we need to live. We also use them for many other things, such as clothing, paper, fabric.*)
- Ask students to imagine life without either the natural environment or the built environment. Help students to see that both environments are important to us.

B. Show or read Story 1, *Trashbot*

- Present the story *Trashbot* to students in one of the following ways:
 - Show the [video](#).
 - Project the pictures from the [PDF](#) and read the text from the script (included in the PDF and at the end of this lesson).
 - Give each student a copy of the story or project the script and have students either follow along as you read the story or read the story aloud themselves while you show them the pictures from the [PDF](#).
 - Print the [PDF](#) and create a book to read to students.
- Use the questions below to discuss the story. Either call on individual students to answer questions or reproduce the questions for students and have them work in teams to answer the questions.

1. What natural resource is a comic book made from?

(A comic book is made mainly from trees.)

2. What are some of the wastes from producing one comic book?

(Leaves and branches are sometimes left over from trees that are used for paper. Ink cans and chemical bottles are left after the ink and chemicals are used. Boxes and wrappings that held the paper become waste when they are empty. The bag the comic book came home in might get thrown away. And water gets dirty all along the way, from making the paper to cleaning things. Waste goes into the air when [fossil fuels](#) are burned to make the electricity needed to make the comic book and to transport it.)

3. Does all this "waste" need to be thrown away?

(No. Many things, such as boxes and bags, can be reused. Other things—such as cans, bottles, and paper—can be recycled.)

4. Do all these "waste" products come from natural resources?

(Yes. Paper comes from trees; electricity, chemicals, and plastic come from fossil fuels; metal and glass come from [minerals](#) in the ground.)

5. What happens to the waste that we put into trash cans?

(Trash gets picked up by trash trucks and is usually taken to a [landfill](#) where it is buried under dirt.)

6. What happens to the waste that goes down our drains?

(In most places, especially in cities, dirty water goes down our drains through the sewer to a [wastewater treatment plant](#) where dirt and germs are removed before the water is put into rivers, lakes, oceans, or the ground—back into the water cycle.)

7. What can happen if dangerous chemicals get into landfills or into our water?

(They can pollute the soil and the water, making them unsafe and unhealthy.)

8. What should we do with dangerous chemicals, such as bug spray and paint remover, and with old electronic equipment, such as computers, printers, and cell phones?

(Dangerous chemicals and electronic appliances and equipment must be taken to special places so that they will not pollute the environment. They should not be put in the trash or down drains.)

9. How does waste get into our air?

(Particles, gases, and smoke are released into our air whenever we burn things. We burn fossil fuels for most of the energy we use—to make electricity, to make heat, and to run our cars.)

10. What happens when our air gets polluted?

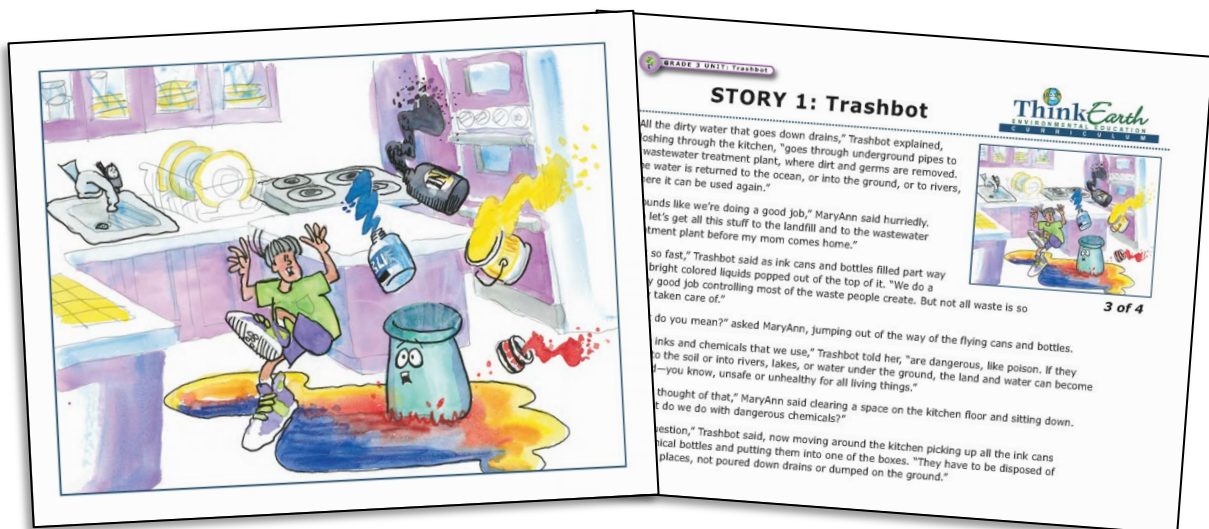
(The air is not clean so it can make us cough or make our eyes sting. Sometimes it is not safe to breathe.)

11. What do we do about **pollution in our air?**

(We've found ways to cut down on how much gets released into the air, but a lot of harmful substances still go into the air. Once the air is polluted, there is not much that we can do.)

12. What happens when our land gets polluted? When our water gets polluted? When our air gets polluted?

*(When our **land** gets polluted, we can't safely grow plants to eat. When our **water** gets polluted, people, plants, and animals can't safely drink it. And when our **air** gets polluted, people and animals have a hard time breathing, and plants do not grow as well.)*

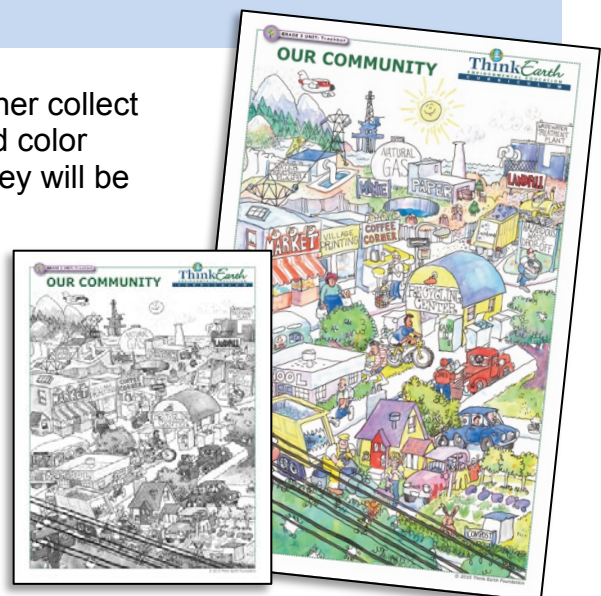


C. Discuss the poster, *Our Community*

- Project the color version of the *Our Community* poster for students to view. If applicable, have them view the poster on their tablets or computers, or give each student a copy of the *black and white poster*.
- Explain to students that the poster shows the environment within a community where people live and work. Ask students to point out the following on the poster:

Find...	Possible Answers
1. things in the natural environment	<i>sun, water, air, soil, plants, animals, people</i>
2. things in the built environment	<i>houses, buildings, cars, clothes, bicycle, power poles and lines, etc.</i>
3. places where people produce products from natural resources	<i>paper mill, water treatment plant</i>
4. places where products from natural resources are sold	<i>grocery market, Coffee Corner</i>
5. the "lifecycle" of a comic book that gets thrown away	<i>from forest to paper mill, to print shop, to market, to someone's home, to the trash can, to the trash truck, to the landfill</i>

- If you distributed black and white posters, either collect them or have students keep their posters and color them in their spare time. Tell students that they will be looking at the posters again later.



Additional Activities

- **Demonstrate solid, liquid, and gaseous forms.** Melt an ice cube (solid) to form water (liquid). Then boil the water to create steam (gas). Continue to boil the water until it disappears. Ask students to figure out where the water went (*evaporated into the air*). Ask students to determine common wastes that are solids (paper, cans, leaves, glass, plastic); liquid (leftover beverages, dishwater, bathwater, paint); and gas (gases from burning fossil fuels in cars, heaters, factories; vapors from chemicals and paints).
- **Learn a song.** Teach students the following song. If desired, have students listen and sing along to the audio of either the **vocal** or **instrumental recording**. (**Note:** A new verse is added to this song at every grade level.)

(to the tune of "Twinkle, Twinkle Little Star")

Think Earth, Think Earth is our song.
Everyone should sing along.

Don't waste paper, save a tree.
It is good for you and me.

Think Earth, Think Earth is our song.
Everyone should sing along.

Turn off lights and the TV.
It is good for you and me.

Think Earth, Think Earth is our song.
Everyone should sing along.

Reduce, reuse, recycle too.
It is good for me and you.

Think Earth, Think Earth is our song.
Everyone should sing along.

Water, land, air, and sea,
Keep them clean for you and me.

Think Earth, Think Earth is our song.
Everyone should sing along.



- **Create a hazardous waste display.** Collect pictures of hazardous products and create a display. Mark the display with clear "HAZARDOUS" and "DANGEROUS" signs and various hazardous labels (e.g., "Warning," "Danger," "Skull and Crossbones"). Items to display might include: moth crystals, ant and roach killer, radiator flush, pesticides, oven cleaner, paint thinner, motor oil, bleach, nail polish, nail polish remover.
- **Learn about and discuss fossil fuels.** Teach students about how fossil fuels were formed. Explain that when prehistoric plants and animals died, they were covered by mud, sand, and water and that the pressure of the earth on these dead plants and animals over millions of years turned them into coal, oil, and natural gas—fossil fuels. Have students research fossil fuels and prepare presentations.
- **Make a fossil fuel display.** Create a display in the classroom showing the different types of fossil fuels. Use chunks of coal if coal is available in your area or use charcoal. Use motor oil to show the consistency of oil, and use a Bunsen burner, if allowed, to demonstrate natural gas. During the program, have students find pictures depicting uses of various fossil fuels (cars, appliances, heaters, etc.) and add these pictures along with captions to the fossil fuel display.
- **Demonstrate how fossil fuels are used to produce electricity.** Gather the following materials: non-electric fondue or food warmer stand, Sterno[®] canned heat, teakettle, oven mitt, water, toy pinwheel (can be made or bought). Fill the teakettle with water and place on the heating stand. Explain to students that the Sterno is the fuel, like oil, coal, or natural gas. Light the Sterno and place under the teakettle. When the water boils and steam comes out of the spout, put on the oven mitt and hold the pinwheel over the steam so that the steam pushes against the blades of the pinwheel to turn them. Explain to students that in a power plant, the steam is used to turn the blades of turbine generators, which produce electricity.

Script: *Trashbot*

1



MaryAnn had finished reading her new comic book, "Earthlings," and tossed it into the trash can as she walked by. Just as the booklet hit the trash, she heard, "Get that out of here!"

MaryAnn turned around, surprised. "Who said that?" she asked.

"I did," said the trash can, which all of a sudden looked less like a trash can and more like a robot or something—a Trashbot.

"Throwing away that perfectly good comic book is not good for the environment."

"What do you mean?" said MaryAnn. "It's just one little comic book."

"One little comic book!" the Trashbot shouted back. "Why the waste that comes from producing that one comic book could fill this entire kitchen!"

"Yeah, right," MaryAnn muttered as she turned to walk away. But she was stopped short as the one-time trash can turned into various machines, factories, and vehicles and began spewing out leaves and branches, boxes and bags, cans and bottles. Then, out the bottom of this contraption flowed a little river of dirty water.

"Whoa!" said MaryAnn, stepping around and pushing aside all the waste now filling the kitchen. "You mean all this waste comes from making one comic book?"

"This and more," answered the little Trashbot. "From producing the paper from a tree, to printing the words and pictures, to delivering the comic book to the store, to your bringing it home in this plastic bag," it said, coughing up a bag that came from the local market, "all kinds of wastes are created."

2



"Gosh, I had no idea," MaryAnn replied, looking around her kitchen. "There's a lot of stuff here."

"More than most people realize," the Trashbot continued. "And people don't think of all the natural resources that are not only in the comic book but also in all this waste that is left over. Trees, minerals, fossil fuels," it said, tossing up a product that came from each natural resource. "We use up a lot of natural resources for every product we make. Even if natural

resources would never run out, we have to put this waste somewhere."

"You're right," said MaryAnn, trying to stuff some of the trash back into what used to be her trash can. "What do we do with all this waste?"

"Well," answered the know-it-all trash can, "we have developed systems to take care of most of our wastes. Without these systems, our environment would look a lot like your kitchen right now and would be unsafe and unhealthy."

"So, what do these systems do?" MaryAnn wanted to know, realizing that all the waste in her kitchen was certainly not going to fit back in her trash can.

"As you know," the Trashbot started, "paper, plastic, glass, cans, and other things we throw into our trash cans get picked up by trash trucks. Most of it gets taken out to landfills and buried."

"Oh," said MaryAnn, "I know about landfills. They are sort of like mountains of trash."

"That's right," Trashbot said, sort of nodding its head. "Or maybe mountains of natural resources."

"Hmmm, I see your point," said MaryAnn. "Now what do we do with all this dirty water?"



"All the dirty water that goes down drains," Trashbot explained, sloshing through the kitchen, "goes through underground pipes to a wastewater treatment plant, where dirt and germs are removed. The water is returned to the ocean, or into the ground, or to rivers, where it can be used again."

"Sounds like we're doing a good job," MaryAnn said hurriedly. "So let's get all this stuff to the landfill and to the wastewater treatment plant before my mom comes home."

"Not so fast," Trashbot said as ink cans and bottles filled part way with bright colored liquids popped out of the top of it. "We do a pretty good job controlling most of the waste people create. But not all waste is so easily taken care of."

"What do you mean?" asked MaryAnn, jumping out of the way of the flying cans and bottles.

"Some inks and chemicals that we use," Trashbot told her, "are dangerous, like poison. If they leak into the soil or into rivers, lakes, or water under the ground, the land and water can become polluted—you know, unsafe or unhealthy for all living things."

"I never thought of that," MaryAnn said clearing a space on the kitchen floor and sitting down. "So what do we do with dangerous chemicals?"

"Good question," Trashbot said, now moving around the kitchen picking up all the ink cans and chemical bottles and putting them into one of the boxes. "They have to be disposed of in special places, not poured down drains or dumped on the ground."

4



"MaryAnn and Trashbot finished putting all the ink cans and chemical bottles in a box. Just when MaryAnn thought that her trash can was going to go back to being a trash can, it began spurting smoke and fumes into the air.

"What's all this?" MaryAnn frowned, waving the smoke out of her face.

"Air pollution," the trash-can-now-turned-smoke-stack answered. "A lot of waste is released into the air. When we burn fossil fuels—oil, coal, and natural gas—particles,

gases, and smoke go into the air. And we burn fossil fuels for almost all the energy we need. It takes fossil fuels to run the saw that cuts down the tree, to create the heat to make the paper, to make the electricity that runs the printing presses, to power the trucks that transport the logs and the paper and the comic books, to power your car so you can get to the store to buy the comic book, and to make the plastic bag that you bring the comic book home in."

"So don't we have a system to take care of the pollution in the air?" coughed MaryAnn.

"We've found ways to cut down how much pollution goes into the air," the transformed trash can answered. "But not much can be done once it is released. So we must try to pollute the air as little as possible."

"Boy," said MaryAnn, shaking her head. "This pollution stuff doesn't sound good or look good."

"It isn't good," replied Trashbot. "All living things need clean air, water, and land to live. If our soil is polluted, or if we fill up our land with trash, where will people and animals live, and how will we grow plants to eat?

"If our water is polluted, what will we drink, and what will happen to plants and animals that need the water?

"And if our air is polluted, how will we breathe, and what will happen to plants and animals that need that air?"

"I'm sure I don't know," answered MaryAnn, pulling her comic book out of a once-again-trash-can. "But I do know that this pollution stuff is not good."



Recognizing Pollution Problems

Objectives

Concepts: Students will understand the following environmental concepts:

- We use natural resources from the environment to produce products that we use.
- Producing, distributing, and consuming products all create waste.
- Waste goes into our water, onto our land, and into our air.
- Our trash disposal system and water treatment system manage most waste.
- Improper disposal of waste on land or in water can cause pollution.
- Burning fossil fuels for energy puts pollutants into the air.
- Pollution harms the environment and all living things in it.

Skills: Students will:

- Identify ways that soil, water, and air can become polluted in and around our homes and neighborhoods.

Materials

- Demonstration materials: large- or medium-size candle, matches, white ceramic plate or mug
- Practice Exercise 1

Preparation

- Gather materials for the demonstration in Procedure B and practice the demonstration before class.
- Prepare to present Practice Exercise 1. Make copies to hand out to each student **and/or** project on a screen or smartboard to use with the entire class.



Vocabulary

- air emissions** – gases and particles that go into the air

Procedures

A. Conduct a review

- Conduct a review of the concepts students have learned so far in one of the following ways:
 - Have students write answers individually at their desks and then share them with the class.
 - Call on individual students to respond orally as you go.
 - Divide the class into teams and give a point to each team when it supplies a correct answer.
- Ask students the following questions. Make a list on the board as answers are provided.

Questions	Possible Answers
1. What problems come from making too much trash?	<i>Land gets covered with trash.</i> <i>Landfills fill up and new ones have to be found.</i> <i>There's more chance for litter.</i> <i>Soil and water can become polluted.</i> <i>There's more air pollution from using energy to make new products.</i> <i>Natural resources are wasted.</i>
2. What problems come from wasting natural resources?	<i>We might run short of some resources.</i> <i>We may have to spend more money to find or grow more resources.</i> <i>More air pollution is created from using energy to make and distribute more products.</i> <i>We have to disturb the ground to get more resources.</i> <i>The homes of plants and animals may be disturbed.</i>
3. What problems does pollution cause?	<i>Polluted land may be dangerous to live on and may not be able to grow plants.</i> <i>Polluted water can hurt or kill plants, fish, animals, and people.</i> <i>Polluted air can look bad, make it hard to breathe, damage lungs, and harm plants and animals.</i>

B. Demonstrate emissions from a burning candle

- Tell students that they are going to see how burning fossil fuels emits gases and particles into the air.
- Set a medium to large candle on a table where students can see it. Light the candle. Explain to students that we often burn things in our environment. Ask students if they can think of some things we burn. (*We burn candles. We burn wood logs in fireplaces. We burn charcoal in our BBQs. We burn natural gas or heating oil in our furnaces, stoves, and water heaters. We burn gasoline from oil in our cars. We burn all of the fossil fuels—oil, natural gas, coal—in power plants and factories to make electricity and to produce heat to make products.*)
- Explain to students that the wax in the burning candle is made in part from oil (petroleum), a fossil fuel. Remind students that fossil fuels—oil, natural gas, coal—are natural resources that we take from under the ground and that there is only a limited supply of them, which means that once we use them up, we can't create more.
- Hold the white ceramic plate or mug in the flame until a black sooty smudge appears on the white surface. Ask students where they think the black soot came from.
- Tell students that when the candle burns, some of the candle wax turns into hot gases and tiny particles, which rise quickly up into the air. Explain that the gases and particles are invisible when combined with oxygen and suspended in air, but when they hit the cup or plate, they separate from the oxygen and form soot.
- Demonstrate that the plate is not burned or scorched by wiping off some of the soot.
- Explain that these gases and particles are called **air emissions** and that they are part of air pollution. Ask students where they think air emissions come from. (*Air emissions come mostly from cars and other vehicles, from power plants and factories, and from homes and other buildings.*) Inform students that the different fossil fuels produce different emissions: Coal usually produces the most air emissions; natural gas produces the least.



C. Have students complete Practice Exercise 1, *Pollution*

- Have students complete **Practice Exercise 1** in one of the following ways:
 - give a copy to each student or cooperative learning group
 - project the exercise on a screen or smartboard
 - give each student or group a copy **and** project the page
- Work through the exercise with the class. If students have their own copies, have them mark their answers as you go, **or** have students read and answer questions on their own, **or** assign students to work with partners or in small groups.
- Correct and discuss the exercise as a class using the answer key. **IMPORTANT:** Be sure students correct any wrong answers.

GRADE 3 UNIT: Freshwater

Practice Exercise 1:
POLLUTION

ThinkEarth
ENVIRONMENTAL EDUCATION
FOUNDATION

Page 1 of 2

Name _____

Part A: What Makes Waste? Circle **YES** or **NO** to answer each question.

- 1 Is a comic book made from natural resources? **YES** **NO**
- 2 Does producing products make a lot of waste? **YES** **NO**
- 3 Can some chemicals pollute our soil and water if we don't dispose of them properly? **YES** **NO**
- 4 Is all of our waste handled by trash and water disposal systems? **YES** **NO**
- 5 Do we bury most of our trash in landfills? **YES** **NO**
- 6 Is there plenty of land left in our cities to open new landfills when old ones fill up? **YES** **NO**

Part B: Where Does Our Waste Go?
Mark the box showing where the waste produced in each activity goes.

	to the landfill	to wastewater treatment plant	into the air
7 throw a box in the trash	☒	☐	☐
8 take a shower	☐	☒	☐
9 drive to school	☐	☐	☒
10 wash dishes	☐	☒	☐
11 rake leaves	☒	☐	☐
12 turn up the heater	☐	☐	☒

© 2015 Think Earth Foundation

GRADE 3 UNIT: Freshwater

Practice Exercise 1:
POLLUTION

ThinkEarth
ENVIRONMENTAL EDUCATION
FOUNDATION

Page 2 of 2

Name _____

Part C: Where Does Pollution Come From?
Circle **YES** or **NO** to answer each question.

13 Air pollution comes mainly from burning fossil fuels. Do we burn fossil fuels to:

- a. make electricity? **YES** **NO**
- b. run cars? **YES** **NO**
- c. heat homes? **YES** **NO**
- d. run water heaters? **YES** **NO**
- e. power lawn mowers? **YES** **NO**

14 Which of the following things could pollute our environment if not disposed of properly:

- a. batteries? **YES** **NO**
- b. leaves? **YES** **NO**
- c. ink? **YES** **NO**
- d. carrot peels? **YES** **NO**
- e. motor oil? **YES** **NO**

15 Can pollution harm:

- a. people? **YES** **NO**
- b. plants? **YES** **NO**
- c. animals? **YES** **NO**
- d. soil? **YES** **NO**
- e. water? **YES** **NO**

© 2015 Think Earth Foundation

Additional Activities

- **Take a pollution walk.** Take students on a walk around the school and/or nearby neighborhood to identify sources of pollution. Have them write about or draw pictures of what they saw, for example:
 - cars, buses, and trucks moving on the street, emitting air pollutants through tail pipes
 - vents from heaters, stoves, and water heaters on roof above cafeteria and on roofs of homes or other buildings
 - unclean dumpster area where trash is collected
 - litter that is unsightly, unclean, unsafe, and unhealthy
 - storm drains in street gutters
- **Build a watershed.** Discuss how fertilizers, bug sprays, oil, and other pollutants can be washed down gutters and into storm drains by rainwater. Explain that water that goes down the storm drain, along with the pollutants in it, may go straight into a river, a lake, the ocean, or the ground without being treated or cleaned. To demonstrate this, construct a model of a watershed—an area from which water drains. Have students set up the model as follows:
 1. Fill a small aquarium halfway with gravel and build up the ground slightly higher around the sides.
 2. Cover the gravel with a layer of soil and some little plants.
 3. Create two or three trenches in the soil from the high ground to the lower ground.
 4. Cover some of the soil with plastic wrap or flat Lego pieces to simulate roads, parking lots, and other areas covered with concrete. Place some "buildings" (pencil sharpeners, erasers, Legos).
 5. Slowly sprinkle or spray water into the aquarium to simulate rain, allowing rivers to flow, perhaps a lake to form, and groundwater to collect.

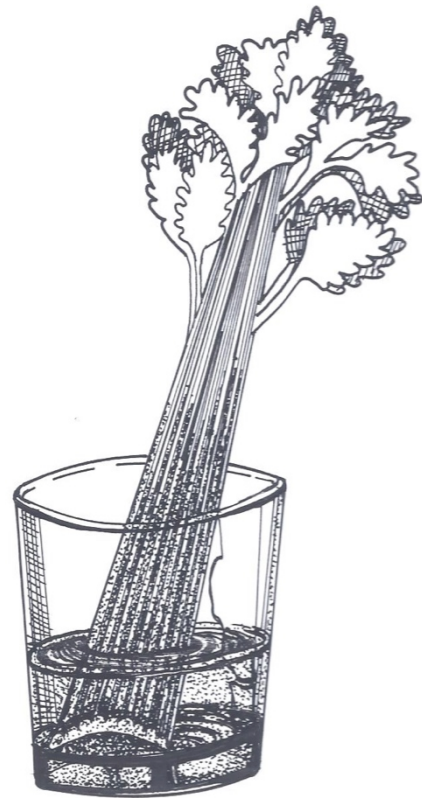
Ask students what might get into the water as it runs across the land. As students answer, place some "pollutants" throughout the model on both the soil and the "paved" areas, as appropriate. For example:

- *chemicals, pesticides, paint* – use red and/or blue food coloring
- *fertilizer, pet waste, litter* – use pepper
- *motor oil, gasoline* – use cooking oil

Sprinkle more water on the model and ask students:

1. What happened to the pollutants on the "roads" and "pavement"?
2. What happened to the pollutants on the soil?
(Use a meat baster to "pump" some water out of the ground to observe.)

- **Research other sources of air pollution.** Have students research other sources of air emissions besides burning fossil fuels, for example paint fumes, evaporation of chemicals, decomposition of plant and animal waste, and gases from landfills.
- **Study air quality.** Examine your local newspaper, search the Internet, or contact weather experts (perhaps people at local TV or radio stations) to see if information on air quality is available for your area. Have students create a chart, marking air quality each day as healthy or unhealthy.
- **Demonstrate pollution in plants.** Place celery stalks upright in glass jars that are half-filled with water. Add different food colorings to each jar. Have students record what happens to the celery and how long it takes. Ask students what would happen if the food coloring was a pollutant that had leaked into the soil or water.





Learning About Pollution Solutions

Objectives

Concepts: Students will understand the following environmental concepts:

- h. We are working on ways to minimize pollution.
- i. All of us can help create less pollution.

Skills: Students will:

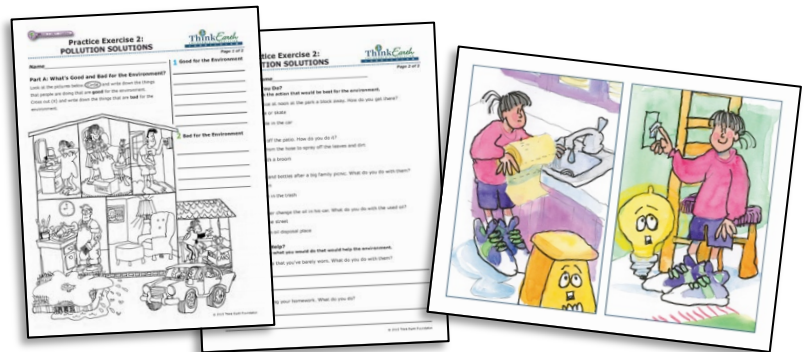
- b. Identify ways people can help minimize pollution.

Behaviors: Students will practice the following behaviors to help the environment:

- a. Walk or bike or skate short distances instead of asking for a ride in the car.
- b. Carpool with other children.
- c. Use public transportation.
- d. Dispose of hazardous waste (e.g., glue, oil, batteries, paint thinner, household chemicals, electronic equipment) properly, not in the trash or down the drain.
- e. Dispose of all trash properly.
- f. Conserve energy, water, paper, and other resources.
- g. Create less waste by reducing, reusing, repairing, recycling, and other methods.

Materials

- Story 2, *A Little Means A Lot* ([video](#) or [PDF](#))
- 3"x3" pieces of green, red, and blue paper for each student
- [Practice Exercise 2](#)



Preparation

- Prepare to present Story 2, *A Little Means A Lot*. (Show the video, **or** project the PDF pictures and read the story aloud, **or** print the PDF and create a book to read.)
- (Optional) Make copies for students of Story 2. See Procedure A.
- Cut three small pieces of colored paper (about 3"x3") for each student—one green, one red, and one blue (or have students cut their own).
- Prepare to present Practice Exercise 2. Make copies (back-to-back, if possible) to hand out to each student **and/or** project on a screen or smartboard to use with the entire class.

Vocabulary

- **carpool** – sharing car rides instead of going alone
- **recycle** – turning old products into new ones

Procedures

A. Show or read Story 2, *A Little Means A Lot*

- Present the story to students in one of the following ways:
 - Show the [video](#) of *A Little Means A Lot*.
 - Project the pictures from the [PDF](#) and read the text from the script (included in the PDF and at the end of this lesson).
 - Give each student a copy of the story or project the script and have students either follow along as you read the story or read the story aloud themselves while you show them the pictures from the [PDF](#).
 - Print the [PDF](#) and create a book to read to students.
- Use the questions below to discuss the story.

1. What was wrong with MaryAnn dumping all the trash into the trash bin?

(The cans, bottles, and papers in the trash could be recycled.)

2. What is [recycling](#) and why is it good for the environment?

(Recycling means using the resources in old products to make new products. It is good for the environment because we reuse the natural resources in the products instead of burying them and because it takes less energy to make products from recycled material.)

3. Why is turning on the heater and air conditioner when you don't really need them not good for the environment?

(Heaters and air conditioners run on natural gas or heating oil, which are fossil fuels, or on electricity, which is usually made from burning fossil fuels. Fossil fuels are natural resources that we must get out of the ground. Burning fossil fuels puts harmful emissions into the air.)

4. Why is it not good to leave the water running?

(All the water we use is taken from the natural environment—lakes, rivers, groundwater—and there isn't always enough for all the people and for the environment. Also, all the water that goes down the drain must be pumped to a wastewater treatment plant and cleaned. It takes energy to pump and to clean the water. When we waste hot water, we're also wasting the energy it takes to heat the water, which also creates pollution.)

5. What are some other ways we can conserve water?

(For example, we can turn the water off when we brush our teeth. We can take short showers and not fill the bathtub all the way up. We can use a bucket full of water to wash the car or put a nozzle gun on the hose instead of letting the hose run. We can be sure water stays on the lawn and doesn't run onto the pavement.)

6. What does wasting electricity have to do with air pollution?

(We burn fossil fuels to make most of our electricity. So the more electricity we use, the more fossil fuels we have to burn, the more emissions go into the air, creating air pollution.)

7. What can we do not to waste electricity?

(For example, we can turn off lights when we don't need them. We can turn off televisions, radios, computers, and other electric appliances when we are not using them.)

8. How do cars add to air pollution?

(Cars run on gasoline, which is made from oil, which is a fossil fuel. Every time we drive our cars, emissions go into the air.)

9. What can we do not to drive our cars so much?

(We can walk, ride bicycles, skateboard, take the bus, carpool, make fewer trips.)

10. Why don't we just stop burning fossil fuels?

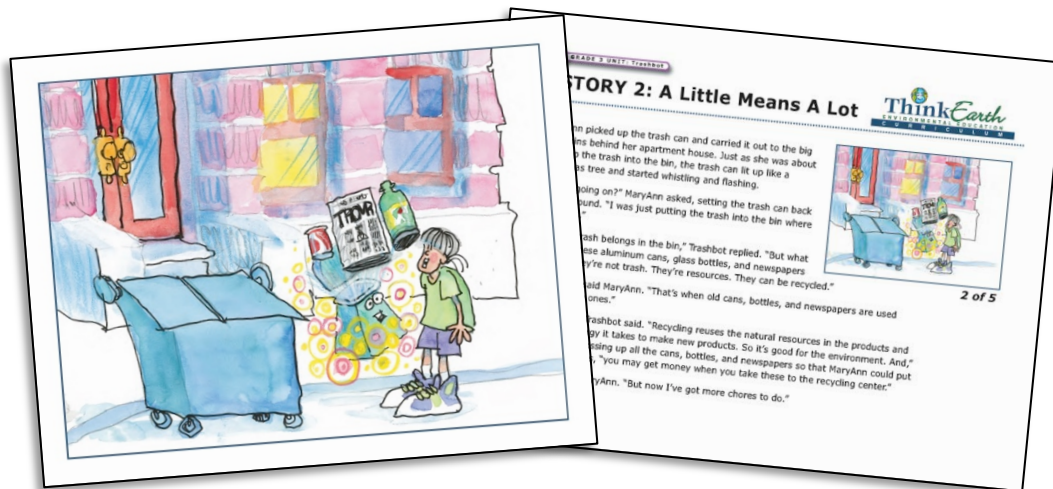
(We do use other energy sources—hydro power, solar energy, wind power—but fossil fuels are still the most available and affordable in most places. And we burn fossil fuels for almost everything we do—generate electricity, heat buildings, make products, and run cars, trucks, airplanes, and other vehicles.)

11. What happens to the environment as the population increases?

(There are more people using more products, using more electricity and water, driving more cars. More natural resources will be used up and more trash will have to be disposed of.)

12. What other little things can you do to help the environment?

(Answers will vary.)



B. Provide group practice

- Give each student one piece of each color paper—green, red, and blue. Have students label the pieces as follows:
green: Conserves Natural Resources
red: Makes Less Trash
blue: Controls Pollution
- Tell students that you are going to read aloud several behaviors and that as each one is read, they are to hold up the appropriate pieces of paper to show whether this behavior conserves natural resources, makes less trash, or controls pollution. To turn this practice into a contest, divide the class into teams and keep score.
- Remind students that several of the behaviors have more than one effect. Provide an example: Read "Turn off unused lights, TVs, and other electrical appliances" and then hold up the green piece of paper, indicating that behavior conserves fossil fuels, and also hold up the blue piece of paper, indicating that behavior controls pollution by burning fewer fossil fuels. Discuss answers as you go.
- Read aloud each behavior listed below. Check that students are holding up the appropriate pieces of colored paper. If students have answers other than those listed, discuss as a class.

Behavior	Conserves Natural Resources (<i>green</i>)	Makes Less Trash (<i>red</i>)	Controls Pollution (<i>blue</i>)
Water the yard, not the pavement.	G		B
Use only the paper towels, tissues, and other paper you really need.	G	R	B
Don't set the heater higher than you really need it.	G		B
Recycle paper, cans, glass, plastic, and electronics.	G	R	B
Use reusable plates and cups instead of paper.	G	R	B
Walk or bike or skateboard when possible instead of riding in a car.	G		B
Carpool with other kids.	G		B
Ride buses or trains instead of taking the car when possible.	G		B
Turn off water when brushing your teeth.	G		B
Save dangerous chemicals for special disposal.			B

C. Have students complete Practice Exercise 2, *Pollution Solutions*

- Have students complete **Practice Exercise 2** in one of the following ways:
 - give a copy to each student or cooperative learning group
 - project the exercise on a screen or smartboard
 - give each student a copy **and** project the page
- Work through the exercise with the class. If students have their own copies, have them mark their answers as you go, **or** have students read and answer questions on their own, **or** assign students to work with partners or in small groups.
- Use the answer key to have students correct and discuss the Practice Exercise. **IMPORTANT:** Be sure students correct any wrong answers.

GRADE 3 UNIT: Freshwater

**Practice Exercise 2:
POLLUTION SOLUTIONS**

Page 1 of 2

Name _____

Part A: What's Good and Bad for the Environment?

Look at the pictures below. Circle and write down the things that people are doing that are **good** for the environment. Cross out (X) and write down the things that are **bad** for the environment.

1 Good for the Environment

Brushing teeth with water off _____

Donating used items _____

Recycling cans _____

Carpooling _____

2 Bad for the Environment

Turning up heater with window open _____

Pouring paint thinner down drain _____

Leaving lights and TV on _____

Overwatering lawn _____

© 2015 Think Earth Foundation

GRADE 3 UNIT: Freshwater

**Practice Exercise 2:
POLLUTION SOLUTIONS**

Page 2 of 2

Name _____

Part B: What Would You Do?

After each question, check the action that would be best for the environment.

3 You have soccer practice at noon at the park a block away. How do you get there?

☒ walk or bike or skate

☐ ask for a ride in the car

4 Your chore is to clean off the patio. How do you do it?

☐ use water from the hose to spray off the leaves and dirt

☒ sweep it with a broom

5 You have empty cans and bottles after a big family picnic. What do you do with them?

☒ recycle them

☐ throw them in the trash

6 You helped your brother change the oil in his car. What do you do with the used oil?

☐ pour it in the street

☒ take it to an oil disposal place

Part C: How Can You Help?

After each question, write what you would do that would help the environment.

7 You've outgrown shoes that you've barely worn. What do you do with them?

I give them to a friend or a charity.

8 You get cold while doing your homework. What do you do?

I put on a sweater or a sweatshirt.

© 2015 Think Earth Foundation

Additional Activities

- **Conduct a traffic survey.** Post teams of students at various places near the school at various times to record the number of people in each passing car. Have students make a graph indicating number of riders per car. Have students analyze the results of the survey and create an awareness campaign if they see a need for more carpooling.
- **Observe, write, and draw.** Have students "fly" over their community to view their environment. Either use Google Earth[®] or have them just imagine flying over their community. Have them observe the areas, think about what happens in those areas, and then write about and create pictures of:
 1. what people are doing (*e.g., going to school and work, driving on roads and freeways, building houses or other buildings, walking dogs, eating and drinking, planting gardens*)
 2. what pollution they see and how it is affecting the environment (*e.g., An overflowing trash can in the park looks and smells terrible; exhaust fumes from cars are making people cough.*)
 3. what is being done to help control pollution (*e.g., Trash and recycle trucks are picking up bins; people are riding buses and carpooling; people are dropping off electronic waste to be recycled.*)
- **Research air pollution solutions.** Have students contact a local air quality agency and/or search the Internet to find out what is being done to reduce air pollution. Perhaps find out:
 - how cars can emit fewer emissions (*e.g., cleaner fuels, hybrid and electric vehicles*)
 - how power plants can emit fewer emissions (*e.g., regulations, equipment used to cut down on emissions, cleaner energy sources*).
- **Study natural cycles.** Discuss how nature recycles water (water cycle), air (oxygen cycle), and soil (nitrogen cycle). Compare nature recycling with our recycling paper, metal, glass, and plastic.
- **Tour a wastewater treatment plant.** Contact your local wastewater treatment facility to see if a guided tour can be arranged.
- **Research products made from recycled material.** Tell students that the items they recycle are not always made into the same kinds of items. For example, a glass jar might become new floor tile, and a plastic bottle might become a backpack or a plastic toy car. Have students research what recycled items get turned into and create a pictograph.

Script: *A Little Means A Lot*

1



MaryAnn skipped in the house after school and went right to the list of chores her parents always left for her. She stood in front of the bulletin board in the den and read the first item on the list, "Take out the trash."

"Oh no," said MaryAnn out loud. "I'm not going anywhere near that trash can!"

"Hey, what's wrong?"

MaryAnn heard the words and felt the gentle nudge against her at the same time. She looked down to see Trashbot right beside her. It continued talking. "Only trying to help you do what's best for the environment."

"I know," said MaryAnn, wondering what this one-time-trash-can was going to turn into now. "But what can I do? I took the comic book out of the trash and gave it to a friend. There's not much else I can do to help the environment. I'm just a kid."

"Is that what you think?" said Trashbot. "Come on, I'll show you how you can help the environment every day."

"Where are we going?" MaryAnn wanted to know, not sure what to expect from this contraption.

"Nowhere special," it responded. "You just do what you normally do and I'll let you know what you're doing to hurt the environment and what you can do instead to help it."

"I bet you will!" MaryAnn said. "Okay. First I'm supposed to take you out."

"Good," said Trashbot, turning back into a trash can. "Let's go!"

2



MaryAnn picked up the trash can and carried it out to the big trash bins behind her apartment house. Just as she was about to dump the trash into the bin, the trash can lit up like a Christmas tree and started whistling and flashing.

"What's going on?" MaryAnn asked, setting the trash can back on the ground. "I was just putting the trash into the bin where it belongs."

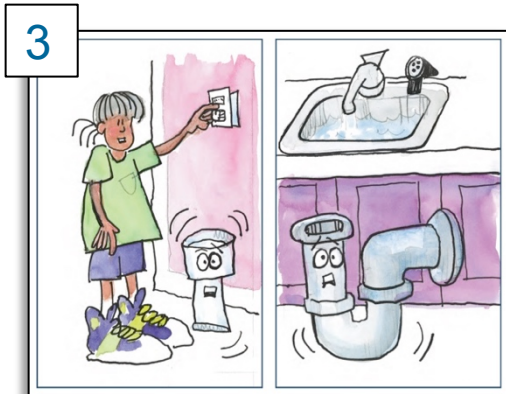
"Yes, the trash belongs in the bin," Trashbot replied. "But what about all these aluminum cans,

glass bottles, and newspapers in here? They're not trash. They're resources. They can be recycled."

"Oh, yeah," said MaryAnn. "That's when old cans, bottles, and newspapers are used to make new ones."

"Very good," Trashbot said. "Recycling reuses the natural resources in the products and saves the energy it takes to make new products. So it's good for the environment."

"Great," said MaryAnn. "But now I've got more chores to do."



Once MaryAnn and Trashbot were back inside, MaryAnn headed straight toward the heater thermostat. "It's cold in here," she announced.

As soon as her hand touched the thermostat, Trashbot, who now looked sort of like the vent on the top of MaryAnn's house, started rattling and coughing. MaryAnn quickly took her hand away and looked right at Trashbot.

"You could help the environment by putting on a sweatshirt instead of turning up the heat," it said.

"How's that?" she asked, not quite sure she believed that.

"Your heater," Trashbot began, "runs on natural gas, a fossil fuel. When you use your heater more than you need to, that means we must get more natural gas out of the ground, and it means that more emissions from burning the natural gas are going into the air."

"And that means more air pollution," MaryAnn chimed in. "I'll put on a sweatshirt. And then I've got to water the plants."

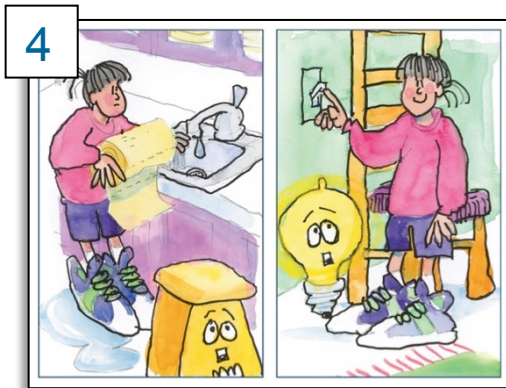
MaryAnn, warm in her sweatshirt, turned on the water faucet in the kitchen. Trashbot watched as she filled a little cup and took it into the living room to water a plant, leaving the water running in the kitchen. When she came back to the kitchen to fill the cup again, the little robot, which had now become a water pipe, started clanging and sloshing.

MaryAnn looked down at it. "Come on," she said. "Watering the plants must be good for the environment?"

"It is," was the answer. "But leaving the water running isn't. All that water just runs down the drain. That means we have to get more water from the environment, and we have to clean all the water that goes down the drain. And when it's hot water you waste, that means we had to burn fossil fuels to heat it."

"Which means more air pollution," MaryAnn added, turning off the water.

"You got it," Trashbot agreed.



MaryAnn quickly finished watering the plants, with the water turned off. Then she grabbed a handful of paper towels to clean up the water she spilled on the counter. And, of course, Trashbot sounded off and spun in circles.

"Okay," said MaryAnn. "I'll figure this one out on my own. If I used a sponge instead of all these paper towels, I'd be saving the trees and the energy it takes to make these towels; and I'd be creating less trash that would have to go to the landfill."

"My, my," Trashbot said, obviously impressed. "I think you've learned quite well."

"Good," replied MaryAnn, "because now I'm going to Robin's house to play." She walked out of the kitchen, but only got a few steps before Trashbot was wailing like a siren.

"What now?" she asked, sticking her head back into the kitchen.

Trashbot had turned into a giant light bulb and was blinking off and on. "Leaving this light on when you don't need it is not good for the environment," it warned.

"Let me guess," said MaryAnn as she switched off the light. "We burn fossil fuels to make electricity. That means the more electricity we use, the more fossil fuels we burn, and the more pollution we put into the air."

"Okay," it blinked off. "You're on your way to Robin's."



"Thank you," said MaryAnn. "I'll just go ask my brother if he's done with his homework and will drive me."

As MaryAnn headed to her brother's room, she was followed by a little car that was really a trash can honking its horn loudly.

MaryAnn stopped dead in her tracks and waited for Trashbot to explain.

"Cars use gasoline, which is made from oil, which is a fossil fuel," the trash-can-now-turned-car informed her. "Cars and other vehicles create most of our air pollution. Couldn't you get to Robin's house another way?"

"Well, it is only two blocks," MaryAnn admitted. "I could walk or ride my bike."

"You have great ideas!" Trashbot said excitedly. "And while you're at Robin's, maybe you could talk about carpooling to school instead of each of you arriving in separate cars."

MaryAnn sat right down in front of her little trash can/robot. "You mean," she asked thoughtfully, "if I do all these little things, I can help the environment?"

"That's right," Trashbot replied. "If everyone helps a little, the environment will be helped a lot. It's up to each of us."





Practicing *Think Earth* Behaviors

Objectives

Behaviors: Students will practice the following behaviors to help the environment:

- Walk or bike or skate short distances instead of asking for a ride in the car.
- Carpool with other children.
- Use public transportation.
- Dispose of hazardous waste (e.g., glue, oil, batteries, paint thinner, household chemicals, electronic equipment) properly, not in the trash or down the drain.
- Dispose of all trash properly.
- Conserve energy, water, paper, and other resources.
- Create less waste by reducing, reusing, repairing, recycling, and other methods.

Materials

- *Our Community* color poster
- *Our Community* black and white poster
- Family Activity Sheet
- Posttest
- Props for role-playing



Preparation

- Prepare to project the *Our Community* color poster.
- Make a copy of the Family Activity Sheet for each student (back-to-back, if possible) **or** post it online **or** email it to families.
- Make a copy of the Posttest for each student.
- (Optional) Gather props for role-playing (trash bag or can, paper cup, paper towel, aluminum can, glass bottle, plastic container, game, book, cell phone, bicycle, paint can). See Procedure B.

Procedures

A. Review *Think Earth* behaviors using poster

- Display the *Our Community* color poster. (Optional: Have students also look at their own copies of the black and white poster or view the poster on their own tablets or computers.)
- Ask individual students to come up to the poster to point out the items listed below.

Find...	Possible Answers
1. the trash collection and disposal system	<i>trash cans to trash trucks to landfills</i>
2. the wastewater disposal system	<i>pipes to wastewater treatment plant to ocean</i>
3. examples of people conserving natural resources	<i>People are:</i> - <i>riding the bus, bicycling, carpooling, and walking to save gasoline</i> - <i>sweeping instead of hosing sidewalk to save water</i> - <i>recycling to save the resources from being buried in a landfill.</i>
4. examples of people helping make less trash	<i>People are:</i> - <i>recycling</i> - <i>giving things to charity</i> - <i>putting yard waste in a compost pile</i> - <i>drying clothes outdoors</i> - <i>reusing things, such as a tire for a swing.</i>
5. examples of people helping reduce pollution	<i>People are:</i> - <i>throwing trash in basket rather than littering</i> - <i>putting hazardous waste in a special place</i> - <i>carpooling, riding buses, walking, biking</i> - <i>recycling.</i>

B. Conduct role-playing

- Tell students that they are now going to show what they can do to help save natural resources and help the environment. Explain that you are going to read several unfinished little stories and that they are to act out what they would do.
- Read each of the stories on the role-play cards aloud to the class or print the scenarios to give to groups of students. Then have groups of students act out the stories and provide endings. (**Note:** *Sample endings follow each story, but encourage students to do whatever they like.*) Perhaps have students do two different endings—one that is helpful for the environment and one that isn't. Use the questions after each story to discuss why people act in certain ways.

Role-Play Cards

The Birthday Party

Characters: Julio, Kelly, Marco, Christina

Julio, Kelly, Marco, and Christina have all received invitations to Winnie's birthday party on Saturday afternoon at the park across town. They are discussing the presents they plan to bring when Julio asks what time everyone is going to be at the park. Kelly says that her mom will drive her to the park about one o'clock. Marco says his parents will drop him off about that time, too. Christina isn't sure. She thinks her brother will drop her off on his way to work. Julio doesn't know how he's getting there.

(Someone suggests that they carpool to the park instead of coming separately. This would save gasoline and reduce air pollution. Someone offers to ask his or her parent to drive everyone.)

Ask: Why don't people carpool more often?

(Some people don't realize that carpooling helps the environment. Sometimes it takes time to arrange the carpool. People think it's easier and more convenient just to drive separately.)

Ask: Do you or anyone in your family carpool? Where are some places you go that you could carpool more often?

(Answers will vary. Possibilities include school, the movie theater, parties, ball games, team practices, etc.)

The Ride

Characters: Jimmy, Tony, and Jimmy's mom

Props: (optional) telephone

Jimmy is at Tony's house playing basketball. Jimmy is supposed to be home, two blocks away, by 4 o'clock. At 3:30, Jimmy calls his mom to ask if she'll come pick him up in the car because he is too tired to walk home. His mom says she is very busy with Jimmy's little sister for a while.

(Jimmy tells his mom that he will walk home. Perhaps Tony could walk part way with him.

Note: *In some areas, this solution may not be feasible. Perhaps Jimmy's mom can arrange for his dad to pick him up on his way home. Or perhaps Tony's older sister is going out and can drop Jimmy off at home.)*

Ask: Why would it be good for the environment for Jimmy to walk home?

(His mom wouldn't have to drive the car. Driving the car would use up fossil fuels and emit pollutants into the air.)

Ask: Have you ever been in a situation like Jimmy's? What happened? What would you do now?

(Answers will vary.)

The Trash Bag

Characters: Luisa and Luisa's mom and dad

Props: (optional) trash bag or trash can, paper cup, paper towel, aluminum can, glass bottle, plastic container

Luisa has noticed that her family has a lot of trash. It seems she's taking out a big trash bag every day. As she looks at the trash, she sees many paper cups and paper towels, lots of aluminum cans and glass bottles, and plastic containers. "Mom and Dad," Luisa says at dinner that night, "we need to make less trash." Her parents look at her and say, "But Luisa, how can we do that?"

(Luisa tells her parents that they could use fewer paper cups and paper towels, using washable glasses and sponges or towels instead. They could recycle all the aluminum cans and glass bottles and plastic containers. Luisa offers to help set up separate bags or boxes so they can separate their trash and start recycling.)

Ask: Why do you think more people don't recycle?

(It's inconvenient. People don't want to take time to separate their trash. If items to recycle are not picked up at their houses, people sometimes don't know where to take them. Some people don't know how much recycling helps the environment.)

Ask: Are there ways your family could produce less trash?

(Answers will vary.)

Garage Clean Out

Characters: Deanna, Jeff, and their dad

Props: (optional) game, book, cell phone, bicycle, paint can, bottles

Deanna and Jeff are helping their dad clean out the garage. They are finding all kinds of things—games, books, old cell phone, rusty bicycle, leftover paint, and some bottles with "danger" labels. "Let's get rid of this stuff," says Dad. "Empty the liquids into the gutter in the street and take the rest out to the trash."

(Deanna and Jeff tell their dad that dangerous chemicals can pollute the soil and water. The paint and chemicals should be taken to a special disposal place. The old cell phone should be recycled. The old games and books could be given to friends or charity. The bicycle could be repaired.)

Ask: Why do people just throw dangerous waste in the trash or pour it down the drain?

(Sometimes people don't know that what's in the trash or water can pollute the environment. Sometimes people don't know what else to do with their unwanted items.)

Into the Drink

Characters: Cynthia, Devon, Devon's older brother

Props: (optional) oil can

Cynthia and Devon are going for a motorboat ride with Devon's older brother. While they are out in the water, Devon's brother puts some oil in the boat's engine. "This can is empty," he says, pouring the last of the oil into the engine. Then he throws the oil can into the water. What do Cynthia and Devon say and do?

(They tell Devon's brother that the oil left in the can will pollute the water. The oil and the can are unsafe for the animals that live in and around the water. And the environment would be a mess if everyone simply threw his trash into the water. They suggest that they go back and pick up the can.)

Ask: Why do people throw trash into the water?

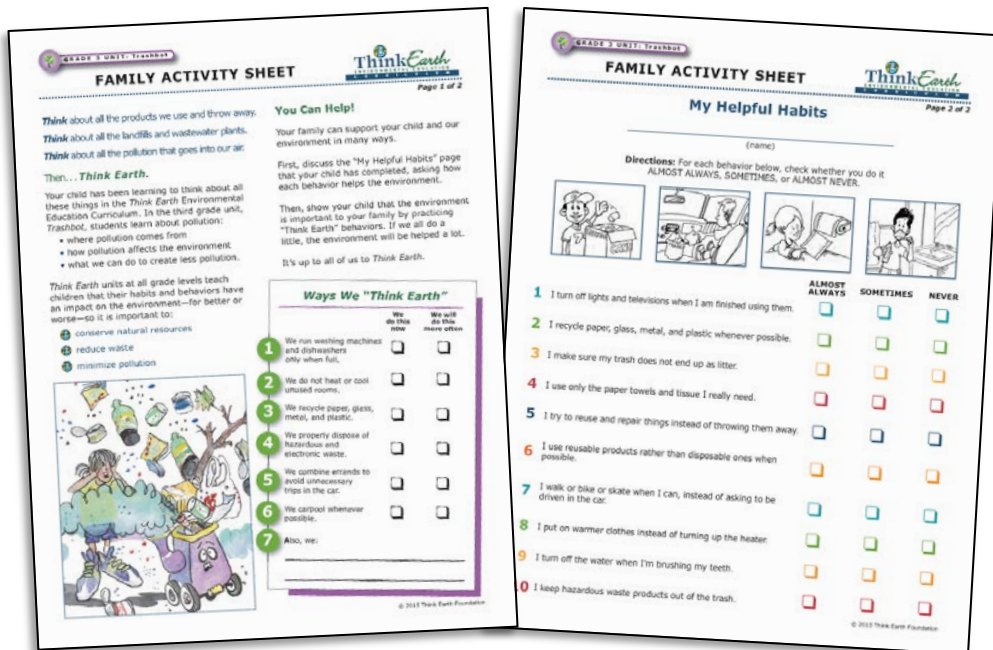
(Sometimes people don't want to carry their trash to a trash can. People might not know that the trash can pollute the water, harming animals and people.)

Ask: What are some other things that people put in the water but shouldn't?

(paint, pesticides, plastic bags, plastic drink-rings, Styrofoam, trash, anything labeled hazardous or toxic)

C. Discuss the Family Activity Sheet

- Hand out a copy of the **Family Activity Sheet** to each student. Have students write their names on both sides of the sheet. Tell them that they are to take this sheet home so that their families can learn about the environment and about how to *Think Earth*. **Alternatively**, project the pages and tell students that you will be emailing the Family Activity Sheet to their families or posting it online for their families to download.
- Have students look at page 2, "My Helpful Habits." Explain that these ten statements describe ways that they can help the environment.
- Ask individual students to read each item aloud. After each statement is read, ask students to mark how often they do this behavior—*Almost Always*, *Sometimes*, or *Almost Never*. Check to see that students are marking only one box for each item.
- Tally answers as you go, or at the end, to see which behaviors need the most improvement. Ask students what they think would help more people always practice helpful habits.
- Have students look at page 1. Explain that the six "Ways We Think Earth" listed on this page are things that families can do together.
- Tell students to be sure to look at the Family Activity Sheet with their parents (whether a copy sent home or posted online). Ask them to discuss all the ways to "Think Earth" and to fill in the family plan together.



D. Administer the Posttest

- Distribute the **Posttest** and administer in the same manner as the Pretest.
- Collect the completed tests. Later, correct the Posttests and compare scores to the Pretest. Calculate the average number of items correct for the class to record later on the Teacher Response Form.
- Return the tests and go over them with the class. Congratulate students on learning to *Think Earth*.



GRADE 3 UNIT: Trashbot

POSTTEST

ThinkEarth
ENVIRONMENTAL EDUCATION
CURRICULUM

Name _____ Date _____

Directions: For each question below, circle YES or NO.

1	Are magazines made from natural resources?	YES	NO
2	Does all our waste go into our water?	YES	NO
3	Can waste cause pollution if it is not disposed of properly?	YES	NO
4	Can pollution harm plants and animals?	YES	NO
5	Does most air pollution come from burning paper?	YES	NO
6	Should everything we no longer want be thrown in the trash?	YES	NO
7	Does recycling reuse natural resources?	YES	NO
8	Is it OK to pour all liquid waste down the sink drain?	YES	NO
9	Can trash pollute our water?	YES	NO
10	Can everyone help make less pollution?	YES	NO

© 2015 Think Earth Foundation

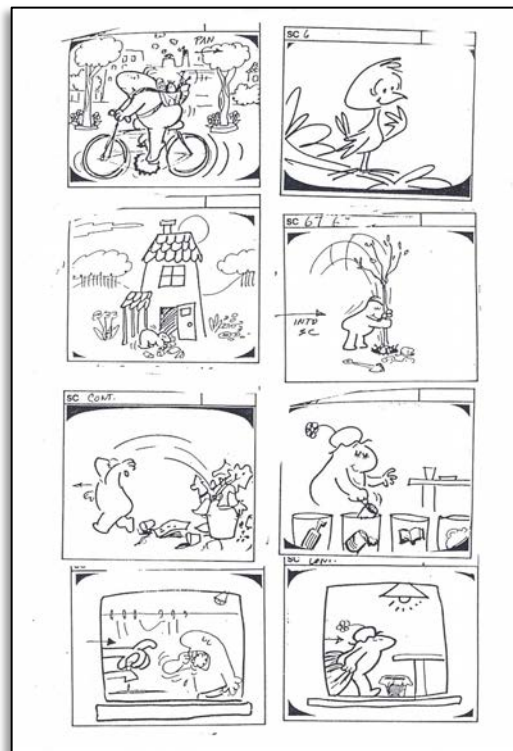
Note: Upon completion of this curriculum unit, please fill out and submit the online **Teacher Response Form**.



Note: Use the following activities during the remainder of the year to reinforce the unit objectives and to help the students develop strong environmental attitudes and behaviors.

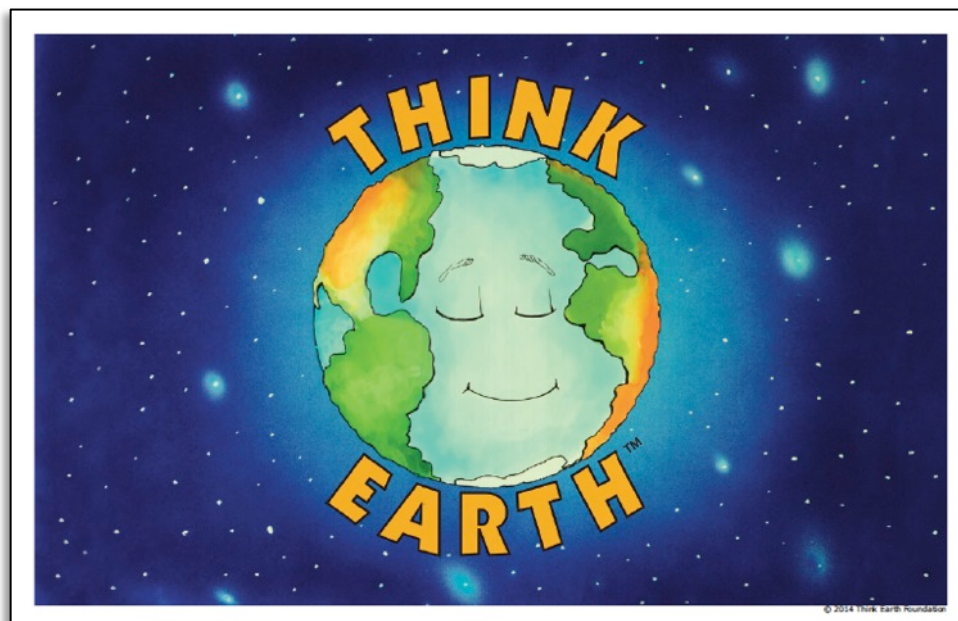
- **Read stories.** Read students other stories about living in the environment. A [literature list](#) is included on the *Think Earth* Curriculum Page.
- **Invite speakers.** Contact various environmental organizations in your area and arrange for speakers to address your class.
- **Conduct more role-playing.** Make up or have students make up more unfinished stories to act out about helping the environment. Have students create a video of their skits.
- **Review Helpful Habits.** Review the ten items on the Family Activity Sheet to survey students periodically to keep students focused on the behaviors and habits they are developing. Keep a chart online or posted in the classroom.
- **Conduct a litter habits study.** Tell students that they will be conducting an experiment to study other students' litter habits. Have students select a classroom and get approval from the teacher of that class to conduct the experiment. At the end of the school day, have students hand out wrapped candy to the students leaving the classroom. Have other students observe what the students do with their wrappers. How many dropped them as litter? How many put them in a nearby trash can? How many put the wrappers in their pockets? Have students make graphs showing the results. Vary the study by placing a trash can closer or further away or by removing the trash can altogether.
- **Make a helpful habits mural.** Put a long stretch of butcher paper across a wall. Across the bottom of the paper, have students write various behaviors that will help the environment. Then have them draw or paint pictures of the "helpful habits."
- **Start a pollution patrol.** Tell students that they are going to have a class "pollution patrol" for one week. Designate several "pollution cops." Have the class make "silver star" cutouts out of white paper and print the words "I'M CLEAN" on each silver star. Then have them make "tickets" out of red paper and print the words "POLLUTER PLEASE CLEAN UP YOUR ACT!" on each ticket. Distribute stars and tickets to the pollution cops. Explain to the class that the pollution cops will give silver stars to those classmates that they see picking up litter and putting it in its proper place, conserving natural resources, or reusing paper. The pollution cops will give tickets to those classmates that they see littering or wasting resources. Tell the students that when they receive a star or a ticket to put it in the appropriate labeled shoebox at the front of the classroom. At the end of the pollution patrol week, empty out the shoeboxes in front of the class. With students, count and contrast the number of stars and tickets. Ask the students for ideas on how during the next pollution patrol the boxes might hold even more stars and fewer tickets.

- **Establish an environmentally sound classroom.** Be sure that your classroom follows all "helpful habits" plus other behaviors helpful to the environment. For example, set up separate bins for recycling and for trash, turn off all lights not being used, reuse paper for scratch paper, etc. Ask students for ideas.
- **Plant trees.** Have students participate in planting trees, preferably on the schoolyard, and help in taking care of the trees. Contact local environmental groups that might be able to donate trees and/or provide information on planting and care of trees.
- **Make compost.** Gather the following materials: large clear plastic garbage bag, soil, water, and organic wastes (fruit peels, leaves, bread, coffee grounds, green tops of vegetables, potato peels, etc., but **no** meat). Have students place the organic wastes in the plastic bag. Add some soil and a small amount of water so that the mixture is moist, but not wet. Twist and tie the bag securely. Once a day, have students open the bag and mix the compost slightly to allow oxygen in. The compost should be ready to use in about three to six months, depending on the weather. (The higher the temperature, the less time is needed for decomposition.) The compost is ready for planting when all wastes have decomposed and the mixture is sweet and earthy smelling. Have students mix the compost with soil for planting.
- **Reshow the *Think Earth* video.** Show the unnarrated version of the video and ask various students to narrate short segments.





- **air emissions** – gases and particles that go into the air
- **built environment** – everything people build or make from natural resources
- **fossil fuels** – oil, coal, and natural gas—which formed in the earth from the remains of prehistoric plants and animals
- **carpool** – sharing car rides instead of going alone
- **environment** – everything living and nonliving that surrounds us
- **landfill** – area of land where trash is buried
- **minerals** – substances we take from the ground, e.g., metal ore and sand, and make into products
- **natural environment** – everything from nature—sunlight, air, water, land, plants, animals, humans
- **natural resources** – things in nature, such as trees and water, that we use to make products and to live
- **pollute** – to make unclean, especially with harmful waste products
- **pollution** – filled with a lot of unclean and harmful substances
- **recycle** – turning old products into new ones
- **wastewater treatment plant** – a place that cleans water that goes down our drains





The *Think Earth* Environmental Education Foundation greatly appreciates the following organizations who have contributed to the development of the *Think Earth* Online Curriculum.

Evergreen Level: \$20,000 or more

Edison International



Joseph Stanley Leeds Foundation



Sanitation Districts of Los Angeles County

South Coast Air Quality Management District



Sapling Level: \$10,000 to \$15,000

Water Replenishment District of Southern California



Conrad N. Hilton Foundation



Sempra Energy



Toyota Motor Sales, U.S.A.

