

Putting It All Together

A Review of Lessons and Options

Once students understand the range of available solid waste management options—including their different purposes, benefits, and impacts—they are ready for a series of activities that utilize and reinforce their accumulated knowledge. This unit allows students to integrate the key lessons learned from previous sections and exercise decision-making and analytical skills while having fun.





Waste Race (Grades 2-3)	201
Join the Planet Protectors Club! (Grades 3-6)	203
Trash Town (Grades 4-6)	209
Locker Leftovers (Grades 7-8)	213
Memorable Media Messages (Grades 6-8)	215

Grade • Subject • Skills Index

Activity Name	Waste Race	Join the Planet Protectors Club!	Trash Town	Locker Leftovers	Memorable Media Messages
Grade Range					
K					
1					
2	✓				
3	✓	✓			
4		✓	✓		
5		✓	✓		
6		✓	✓		✓
7				✓	✓
8				✓	✓
Subjects Covered					
Math		✓	✓		
Science	✓	✓		✓	
Language Arts		✓			✓
Social Studies	✓	✓	✓	✓	
Art		✓			✓
Health		✓		✓	
Skills Used*					
Communication	✓	✓			✓
Reading		✓	✓		
Research		✓			✓
Computation			✓	✓	
Observation/Classification	✓	✓		✓	
Problem Solving		✓	✓		
Motor Skills	✓	✓			

*See Glossary of Skills for more details.



science



social studies

Waste Race



Objective

To classify trash items as reusable, recyclable, compostable, disposable, or household hazardous waste.



Activity Description

Students will participate in a relay race to place trash items in appropriate bins.



Materials Needed

- A variety of trash items in each of the categories listed in Step 1, supplied by the teacher (see below for suggestions)
- Two trash bags or wastebaskets
- Two sets of colored stickers (e.g., red and blue)
- Five large plastic or metal bins

Waste Race Suggested Items (no food items please)

Napkin	Steel can	Paper lunch bag
Plastic packaging	Plastic fork	Cardboard
Piece of cloth	Aerosol can	Paint can
Glass bottle	Piece of wood	Teabag
Aluminum can	Copy paper	Coffee can
Leaves or grass	Text book	Flowers



Key Vocabulary Words

Reusable
Recyclable
Disposable
Compostable
Household hazardous
Waste



Duration

50 minutes



Skills Used

Communication
Observation/classification
Motor skills



Activity

Step 1: Review the Teacher Fact Sheets titled *Solid Waste* on page 47, *Hazardous Waste* on page 51, *Recycling* on page 101, and *Composting* on page 141 for background information. Review the different waste management options with students to put the activity in context. Discuss the different collected trash items and where they should go when they are

done being used (e.g., trash, recycling bin, compost pile).

Step 2: Label five plastic bins/trash cans as “Reusable,” “Recyclable,” “Compostable,” “Household Hazardous Waste (HHW),” or “Disposable Waste,” respectively, and place them throughout the room. (This activity will work best in a large area like a gymnasium or a playground so the students have enough room to run around.) Review vocabulary with students.

Step 3: Collect trash items over a few days (see above for suggestions). Collect enough for each student to have at least one turn participating in the race. Make sure the items are not dangerous for the students to handle (e.g., no sharp edges on open cans) and they should be cleaned, if necessary. Divide the items into two piles (one for each team), labeling the Red team's items with the red stickers and the Blue team's items with the blue stickers.

Step 4: Have students form two lines/teams in the center of the room.

Step 5: Explain to the students how a relay race works. The teacher should pre-determine and announce a time limit for the race, based on the number of students and their level of familiarity with the subject. When the teacher signals for the race to start, the first student in each line will reach into his or her team's trash bag and pull out an item. The two students will decide in which bin it belongs and run to the labeled plastic bin. After placing the trash item in the bin, the student will run back to the end of the line and the next two students will repeat the same process. When the time limit has been exceeded, the teacher will end the race. The object is to be the fastest team to sort the items correctly.

Step 6: At the end of the race, empty each bin one at a time so all the students can see if the items were placed correctly. Encourage the students to discuss why each trash item was placed in its bin. Discuss whether some trash items can be placed in more than one bin. The team that was able to place the most items in the correct bin wins.



Assessment

1. See Step 6.
2. Have students name an item not included in the game that is reusable, recyclable, compostable, disposable, and/or household hazardous waste.



Enrichment

1. Expand the Waste Race to include other classrooms and possibly a tournament for a great Earth Day activity.
2. Explore the activities found in the Planet Protector's Club kit. This kit was created by EPA as a way to get students involved in learning about their environment. It includes two pocket guides (one for adults and one for children), an official membership certificate, an official Planet Protectors Club badge, activity guides for grades K-3 and 4-6, and a Planet Protectors Club poster. To order this kit, call EPA at (800) 490-9198 and ask for document number EPA530-E-98-002.

Join the Planet Protectors Club!

Objective

Establish a Planet Protectors Club at your school.

Activity Description

At Planet Protectors Club meetings, students can discuss environmental issues and develop projects they can engage in at school and in their community.

Materials Needed

- Planet Protectors Club kits (one for each teacher/group leader; order free copies by calling (800) 490-9198 and referencing document number EPA530-E-98-002 or visiting <www.epa.gov/epawaste/education/kids/ppcform.htm>)
- Welcome Note
- Planet Protectors Club Duties and Responsibilities list

Key Vocabulary Words

- Composting
- Conserve
- Energy
- Incinerator
- Landfill
- Pollution
- Recycling
- Resources
- Waste Reduction

Duration

Regularly scheduled meetings based on local needs and resources.

Skills Used

- Skills will differ based on local projects, but may include:
- Communications
 - Motor skills
 - Observation/classification
 - Problem solving
 - Reading
 - Research



science



social studies



math



art



health



language arts



Step 1: Order and review the contents of EPA's Planet Protectors Club kit. Plan and publicize a kick-off meeting for teachers or volunteers who will lead the meetings. Use the clip art provided to create signs and other materials. If there is an existing, relevant school-wide initiative (e.g., new beverage container recycling program) that could involve Planet Protectors Club members, discuss the members' potential roles (e.g., monitoring collection bins and educating students).

Step 2: Enlist students to join the club and schedule the first meeting. At the meeting, give each student the Welcome Note, Mission Papers folder, and Planet Protectors badge (you may want to reserve several components of the kit to hand out individually at subsequent meetings). Describe the Planet Protectors Club and the types of projects in which members will be involved (these will be unique to your school; see the list of ideas below). Have them read and sign the Planet Protectors Club Duties and Responsibilities.

Step 3: If you have decided to hand out pieces of the Planet Protectors Club kit one at a time, hand out one piece at each meeting and plan activities related to it. Alternatively, or after you have handed out all the pieces, you can plan school- or community-related activities for members. Possible activities include:

- Picking up litter from school grounds.
- Initiating a recycling program (e.g., for cans, bottles, paper) in your school or monitoring one that already exists to make sure it is working.
- Initiate a waste reduction program, such as a "materials exchange" where students and teachers bring in items (e.g., sports equipment, clothing, school supplies) for exchange and/or donation.
- Plan field trips to local recycling centers.
- Invite speakers from your local government's environmental/recycling office or a nonprofit

organization to give presentations. Other ideas for Planet Protectors Club activities/projects can be found in the following resources (visit <www.epa.gov/epawaste/inforesources/pubs> or call (800) 490-9198 for ordering information):

- *Reuse + Recycling = Waste Reduction: A Guide for Schools and Groups* (EPA530-K-03-001)
- *Service-Learning: Education Beyond the Classroom* (EPA530-K-02-001)
- *Volunteer for Change: A Guide to Environmental Community Service* (EPA530-



K-01-002)



Students should be individually assessed based on participation, effort, interest, or other relevant criteria.

1. Enlist adult volunteers to administer Planet Protectors Clubs in several district schools. Prepare a volunteer agreement/code of conduct for them to sign and have them fill out any paperwork required by your school.
2. Hold an "EnviroFair" or other event that brings together all Planet Protectors Club members from your district. Members can share information about their local projects and/or participate in a large-scale project.
3. Integrate Planet Protectors Club activities into the regular school curriculum, such as calculating the results of a recycling survey for a math lesson.



Welcome to the Planet Protectors Club!

This folder contains your Mission Papers. They are very important papers that include an activity book and a Planet Protector badge. At each club meeting, you will work on an activity to add to your Mission Papers. Keep them safe and bring them to every meeting.

As a Planet Protectors Club member, you will learn about environmental issues and help save the planet by performing tasks at your school, at home, and throughout the community. You will also be able to help your fellow students learn about protecting the environment by sharing the lessons you learn with them.

Name: _____

Student Handout

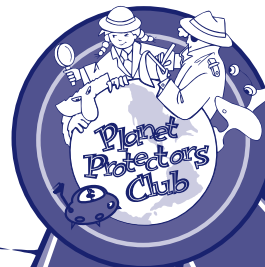
As a member of the Planet Protectors Club, I promise to perform the following duties and responsibilities to the best of my ability:

- 1. Learn how to conserve resources and reduce waste.**
- 2. Encourage other students and adults to conserve resources and reduce waste.**
- 3. Always be courteous and never lose my temper or become "bossy."**
- 4. Obey all school rules and set a good example for other students.**
- 5. Learn and perform Planet Protectors Club duties.**
- 6. Wear my Planet Protector badge while performing Planet Protectors Club duties.**
- 7. Do my best in school and keep my grades and citizenship up to high standards.**

I have read and agree to all the Planet Protectors Club Duties and Responsibilities.

Student's Signature

Date



Clip Art



Trash Town



Objective

To teach students about the costs involved in waste management.



Activity Description

After reading about Trash Town, students will complete math problems to assess the cost of disposal and recycling.



Materials Needed

- One copy of *Trash Town* worksheet per student
- One pencil per student
- One calculator per student (optional)



Key Vocabulary Words

Landfill
Tipping fee
Recycle
Disposal



Duration

1 hour



Skills Used

Reading
Computation
Problem solving



Activity

Step 1: Photocopy and distribute the *Trash Town* worksheet to each student. Introduce the following concepts to your class (refer to the Teacher Fact Sheet titled *Solid Waste* on page 47 for more information):

- It costs us money to dispose of our garbage. The more garbage we generate, the more money we pay for disposal.
- Landfills charge a fee for accepting trash (tipping fee).
- We can save money by recycling, composting, reusing, or source reducing instead of throwing out garbage.
- We can earn money by recycling because recycled materials can be sold to manufacturers.

The Economics of Trash

- **Landfill Tipping Fee**—Communities that want to dispose of their waste in a landfill must pay the landfill owners a fee, based on the number of tons of waste they discard.
- **Recyclables Market**—Recycling can be profitable! Communities that collect recyclable items can sell those items to manufacturers for reuse. Communities can check the recyclables marketplace to find out the current, per-ton prices associated with different recyclable materials.

Step 2: Pass out calculators to each student. Ask the students to carefully read the *Trash Town* worksheet and complete the math problems related to the town's disposal and recycling practices. (Teachers can decide whether this worksheet should be completed in groups or individually.)



math



social
studies



Journal Activity

Ask students to pretend that they are the mayor of Trash Town. If the residents of their town complained about the price of garbage disposal, what would they tell them?



Assessment

1. Collect the *Trash Town* worksheets and evaluate the computations and answers.
2. Ask students to identify the most expensive element of garbage disposal. Ask them whether it's more costly to recycle and reuse or to throw everything away.
3. Ask students to list some of the cost considerations involved in garbage disposal.



Enrichment

1. Conduct a "Pay-As-You-Throw" (PAYT) experiment in the classroom or lunchroom. Hand out the same amount of fake money to each

student and charge them based on the amount of trash they throw away from their lunch. (One paper bag=\$100, one plastic bag=\$200, one aluminum can=\$500, etc.) Keep this up for a few days and see if the students can bring in lunches that are less costly the next day (less wasteful). See who ends up with the most fake money at the end of the week and give that person a prize for being "waste wise." You can also explain to students that more than 4,000 communities across the country have PAYT programs where citizens are charged based on the amount of garbage they throw away.

2. Contact your local solid waste agency to obtain actual waste statistics and costs for your own community. Have students use these numbers to find out how much money the community spends on garbage disposal per day, per week, or per year.
3. Have students devise a plan for helping the residents of Trash Town save more money and protect the environment. Ask the students to write a speech or article explaining their new plan to the residents of Trash Town—what needs to be recycled and how, how the residents will benefit, and how the environment will benefit.

Answer Key

1. How many tons of garbage does the entire Trash Town generate per day? 110 tons
Per year? 40,150 tons
2. How much does it cost for Trash Town to throw all of its garbage into a landfill each year?
\$1,606,000
3. If Trash Town started a recycling program and recycled 30 percent of its garbage each year, how many tons of recyclables would be collected?
12,045 tons

4. If Trash Town recycled 30 percent of its garbage per year, how many tons of trash would still be sent to the landfill? 28,105 tons
5. How much money (in less tipping fees) would Trash Town save from recycling 30 percent of its garbage per year? \$481,000
6. How much money would Trash Town earn from recycling 30 percent of its garbage per year?
\$120,450
7. How much could Trash Town earn if it started recycling 50 percent of its garbage per year?
\$200,750
What about 60 percent? \$240,900

Welcome to **Trash Town**

Greetings! I'm Ruby Rubbish, the mayor of Trash Town, and I want to thank you for visiting our community. Are you good with numbers? Do you know what's best for the environment? We need your help! The residents of Trash

Town are spending lots of money to haul and dump their garbage in the local landfill. Our landfill is filling up fast, and we worry about what all this trash is doing to our environment. Plus, we can't afford to keep paying so much for our garbage disposal. We've heard that other towns are helping to protect the environment by recycling and reusing items instead of throwing them away. We've also heard that some communities can make money by recycling. Unfortunately, the Trash Town garbage specialist is on vacation and we need someone to answer all of our questions about garbage disposal immediately. If I give you all of the information, can you help? If you can figure out the solutions to our questions on the next page, you'll be the hero of Trash Town!!

Trash Town Trivia

Population: 50,000

Garbage generated by each Trash Town resident per day: 4.5 pounds

Tipping fee for garbage dumped at local landfill: \$40/ton

Money earned for collecting recyclables: \$10/ton

Other important information

1 ton = 2,000 pounds

1 year = 365 days



Trash Town

Student Handout

Name: _____



1. How many tons of garbage does the entire Trash Town generate per day?

Per year? _____

2. How much does it cost for Trash Town to throw all of its garbage into a landfill each year?

3. If Trash Town started a recycling program and recycled 30 percent of its garbage each year, how many tons of recyclables would be collected?

4. If Trash Town recycled 30 percent of its garbage per year, how many tons of trash would still be sent to the landfill? _____

5. How much money (in less tipping fees) would Trash Town save from recycling 30 percent of its garbage per year? _____

6. How much money would Trash Town earn from recycling 30 percent of its garbage per year?

7. How much could Trash Town earn if it started recycling 50 percent of its garbage per year?

What about 60 percent? _____

CHALLENGE CORNER

Can you face the Trash Town challenge? The following information will help you solve the word problems below.

Different types of recycled materials earn different amounts of money in the recyclables marketplace. For example:

Plastic bottles: \$15/ton	Cardboard: \$40/ton	Magazines: \$5/ton	Steel: \$40/ton
Aluminum cans: \$40/ton	Newspaper: \$15/ton	Glass: \$15/ton	

- How much money would Trash Town earn for recycling 250 tons of newspaper and 30 tons of steel per year? _____
- If Trash Town recycles 20 percent of its total annual garbage and 15 percent of that garbage is aluminum cans and 5 percent is magazines, how much money will it earn in total? _____
- How many pounds of cardboard would Trash Town have to recycle in order to earn more than \$39,000 per year? _____

Locker Leftovers



Objective

To help students realize the amount of trash they produce and help them recognize the difference between trash, recycled products, and reusable materials.



Activity Description

Students from one class or one grade will collect items while cleaning out lockers and desks and sort them into recyclables, reusables, and trash.



Materials Needed

Large trash bags or containers
Scale



Key Vocabulary Words

Recycling
Reuse



Duration

2 hours



Skills Used

Computation
Observation/classification



Activity

Step 1. Before winter break, spring break, and/or at the end of the school year, have students clean out their lockers and/or desks and place the contents into large bags or containers. Have them pay close attention to items that can be reused or recycled. Before beginning the clean-out, give some examples of items that are trash and items that can be reused or recycled. For example, old papers and notebooks can be recycled. Pens and other writing implements that are in working order can be reused. Bottles and cans are recyclable, and books can be donated to a local charity. Generally, food items should be thrown away, unless they are compostable or the packaging (e.g., bottle, can, cardboard) can be recycled.

Step 2. After their lockers are empty, have students take the trash bags to a large sorting area, such as the school gym. Have the students sort through the bags/containers for reusable and/or recyclable items, discarding trash (students can work in shifts if space is limited or if the volume to be sorted is very large). Before sorting, count the number of trash bags. When finished sorting, count the number of bags actually being disposed of. Students can also quantify recyclables by weighing or counting them.



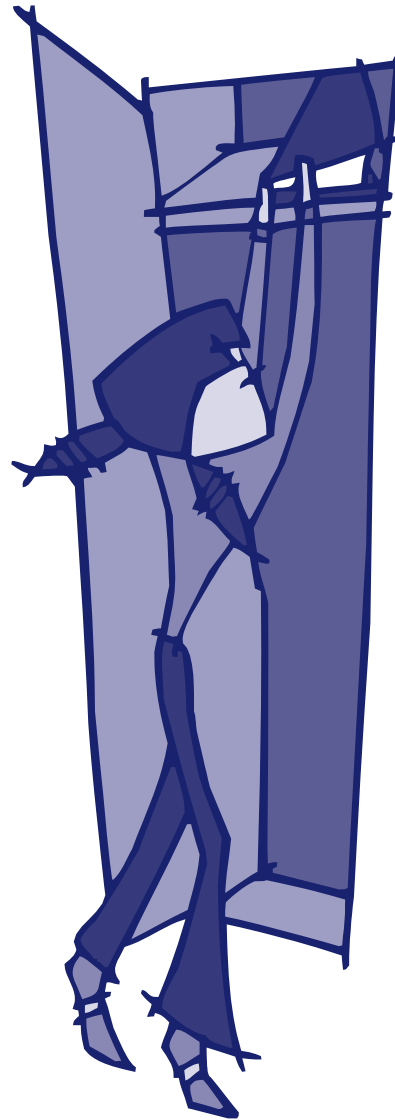
Assessment

1. Ask students how they have gone about cleaning out their lockers in the past. What was different this time?



Enrichment

1. Extend the activity to your school's library or storage rooms and donate books and other materials to local organizations. (It's best to line up an organization willing to accept the reusables before beginning a clean out project.) **Note: Chemical storage areas should not be part of this activity. Only personnel trained in chemical hazards should take on this task.**
2. Expand this activity to include more classes, more grades, or the whole school. A 7th-8th grade class can coordinate the effort. They can collect and sort items for their own classroom to develop a baseline for estimating volunteers, bags/containers, and volumes of trash and recyclables.
3. If recyclables can be returned for deposits in your area, use this activity to raise funds for your school's band, science or environmental club or other activities.



language
arts

art

Memorable Media Messages



Objective

To encourage students to develop their own environmental beliefs and messages by creating a public service announcement (PSA) about the topics they have covered previously in the Quest for Less curriculum.



Activity Description

Work in groups to develop a live production (a live “television” or “radio” PSA) promoting environmental messages from the Quest for Less curriculum to present to other students.



Materials Needed

For a televised PSA, students can create props using classroom materials, or items made during other Quest for Less activities.



Key Vocabulary Words

Natural resources
Products
Waste
Recycling
Composting
Source reduction
Landfills
Combustion



Duration

Two classroom periods



Skills Used

Communication
Research



Activity

Step 1: Introduce and define a public service announcement (PSA) with students. Explain to the students that successful PSAs must grab the attention of the intended audience and present the key message effectively so that it is retained in the minds of the target audience. To do this, the PSA must use an appropriate type of appeal/incentive and be credible, understood, and considered relevant by the intended audience. Present to students examples of a television, radio, or magazine PSA (refer to PSA example on page 217) so that they understand the concept.

Step 2: Divide students into groups. Assign or allow them to choose a topic from the Quest for Less curriculum (e.g., the value of composting, recycling, reducing waste).

Step 3: Devote one classroom period for students to research, brainstorm, and plan their PSA.

Step 4: Give students a deadline for research homework to supplement information gleaned from Quest for Less.

What Is a Public Service Announcement (PSA)? A PSA is an announcement on television, radio, or promotional materials (e.g. billboards, posters, brochures) serving the public interest and run by the media at no charge. PSAs differ from regular commercials because rather than selling a product, they are generally developed to prevent a behavior from starting, stop a behavior, or encourage adoption of a new behavior.

Step 5: Devote a second classroom period for each group to perform their PSA for the class.



Assessment

1. Ask students which PSAs were the most effective and why.
2. Ask students why PSAs are an effective method of educating the public about environmental issues.
3. Ask students to discuss what other methods can be used for disseminating environmental information to the public.



Enrichment

1. Have students create a survey assessing knowledge on their designated PSA topic. Allow students to administer the survey to another class, preferably a class that had not worked on the Quest for Less curriculum. Then allow students to perform their PSAs to the other class. They may also create a follow-up survey to compare to the first survey to determine how effective their PSAs were to the other class.
2. Have students create print PSAs (e.g., posters or brochures) advocating their positions. These could be displayed in the school or in a community center.
3. Allow students time to create props and costumes for their PSAs. Videotape their commercials and have them broadcast on a school educational channel or a public access television. Radio PSAs can be recorded or broadcast over the school's public address system.

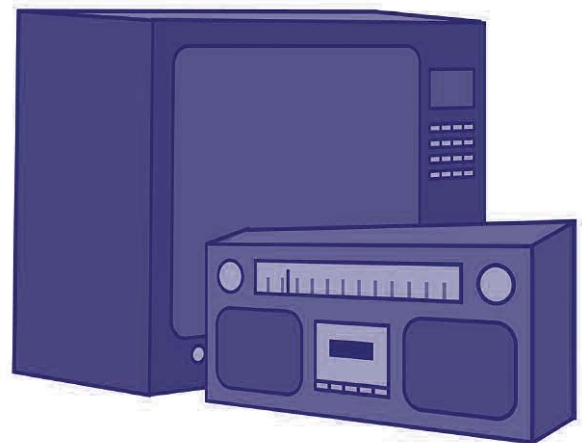
Examples of Public Service Announcements

Radio

1. <<http://www.epa.gov/safewater/psa.html>>
2. <<http://www.energyhog.org/>>
3. <<http://www.italladdsup.gov/>>

Television

1. <<http://www.epa.gov/iaq/tvads.html>>
2. <<http://www.energyhog.org/>>
3. <<http://www.turner.com/planet/tune-in/psa.html>>
4. <http://www.energystar.gov/index.cfm?c=promotions.pt_psa>
5. <<http://www.italladdsup.gov/>>
6. <<http://www.smokeybear.com/>>
7. <http://www.kab.org/site/PageServer?pagename=media_multimedia>



Examples of Public Service Announcements

Print

This PSA, used to promote sun safety, was used in subway stations and on city buses in Washington, D.C.



**MAKE SUN SAFETY
YOUR GOAL**

Overexposure to the sun can result in a painful sunburn and more serious health effects like skin cancer, premature aging of the skin, cataracts, and immune system suppression.

Most people are not aware that skin cancer, although largely preventable, is the most common form of cancer in the United States, with more than 1 million new cases annually.

To help prevent the harmful effects of sun exposure, follow these simple action steps:

- Apply sunscreen
- Cover up with protective clothing, a hat, and sunglasses
- Use lip balm
- Seek shade
- Check the UV Index
- Check your body regularly, and if you see anything suspicious, see your dermatologist

For more information visit the EPA SunWise website at www.epa.gov/sunwise.

Brandon PrIDEaux
Defender, #4
D.C. United

UNITED FC
D.C.

AMERICAN ENVIRONMENTAL FOUNDATION
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