

Talkin' Trash

Grades: 6th-12th

Duration: 30 minutes

Program Description

Municipal Solid Waste, more commonly known as trash, consists of everyday items such as product packaging, grass clippings, clothing, bottles, food scraps, newspapers, appliances, and batteries. Every year, the United States generates over 200 million tons of “trash”—about 4.5 pounds per person per day. Learn several techniques that you can do to reduce your impact on the environment such as source reduction, recycling, and composting.

Louisiana GLE:

Grades 5–8 Science as Inquiry

11. Construct, use, and interpret appropriate graphical representations to collect, record, and report data (e.g., tables, charts, circle graphs, bar and line graphs, diagrams, scatter plots, symbols) (SI-M-A4)

Grade 6 Science

1. Measure and record the volume and mass of substances in metric system units (PS-M-A1)

Science and the Environment

45. Describe methods for sustaining renewable resources (SE-M-A6)

46. Identify ways people can reuse, recycle, and reduce the use of resources to improve and protect the quality of life (SE-M-A6)

47. Illustrate how various technologies influence resource use in an ecosystem (e.g., forestry management, soil conservation, fishery improvement) (SE-M-A8)

Grade 7 Science

39. Analyze the consequences of human activities on ecosystems (SE-M-A4)

Grade 8 Science

51. Analyze the consequences of human activities on global Earth systems (SE-M-A4)

Physical Science

1. Measure the physical properties of different forms of matter in metric system units (e.g., length, mass, volume, temperature) (PS-H-A1)

Biology

27. Analyze positive and negative effects of human actions on ecosystems (LS-H-D4) (SE-H-A7)

Environmental Science

13. Evaluate whether a resource is renewable by analyzing its relative regeneration time (SE-H-B1)

14. Analyze data to determine the effect of preservation practices compared to conservation practices for a sample species (SE-H-B2)

17. Analyze data to determine when reuse, recycling, and recovery are applicable (SE-H-B5)

18. Identify the factors that affect sustainable development (SE-H-B6)
24. Identify the advantages and disadvantages of using disposable items versus reusable items (SE-H-D1)
26. Determine local actions that can affect the global environment (SE-H-D4)
27. Describe how accountability toward the environment affects sustainability (SE-H-D5)

Chemistry

1. Convert metric system units involving length, mass, volume, and time using dimensional analysis (i.e., factor-label method) (PS-H-A1)
47. Assess environmental issues related to the storage, containment, and disposal of wastes associated with energy production and use (PS-H-G4)

Physics

1. Measure and determine the physical quantities of an object or unknown sample using correct prefixes and metric system units (e.g., mass, charge, pressure, volume, temperature, density) (PS-H-A1)

Key Terms:

Trash: Worthless material that is to be disposed of [syn: Municipal Solid Waste]

Recycling: To treat or process (used or waste materials) so as to make suitable for reuse: recycling paper to save trees.

Connections to Permanent Exhibits:

Ants: Observe a large leafcutter ant farm from above ground and inside the colony. Visitors gain access for closer viewing of the ant nest inside the earth by entering tunnels at the side of the exhibit.

Landscaping: Act out the role of a Landscape Designer and beautify the gardens around the Sci-Port house.

Web Resources:

Shreveport Green: Shreveport Green is a non-profit organization dedicated to improving the city's environment and enhancing its economy through public education and community beautification, litter abatement, and recycling projects. <http://www.shreveportgreen.org/>

Environmental Protection Agency; Municipal Solid Waste: A US environmental protection agency web site with a host of resources about municipal solid waste to recycling. <http://www.epa.gov/epaoswer/non-hw/muncpl/index.htm>

Direct Marketing Association- Mail Preferences Service: To be placed on the no junk mail list. <https://www.dmaconsumers.org/cgi/offmailing>

Pre-Visit Activity

The Case of the Broken Loop

Before attending the "Talking Trash" program have your students do the activity "The Case of the Broken Loop" found on the Environmental Protection Agency website. This activity may be downloaded from the following website:

<http://www.epa.gov/osw/education/pdfs/4-6.pdf>

Garbage Pizza

Understanding Integrated Waste Management

Objectives

Students will be able to 1) identify the five options for solid waste management: source reduction and reuse, recycling, composting, waste-to-energy, and sanitary landfills; 2) identify appropriate methods of waste management for items commonly found in the municipal solid waste stream; and 3) learn that these methods can vary in different communities.

Web-Directed Research

These activities correlate with the Keep America Beautiful “Clean Sweep U.S.A.” web site targeted to grades 6-8, and are designed to expand on the objectives in this lesson. The web site can be found at <http://www.kab.org/cleansweepusa>.

1. Locate one or more sites on the web that describe the five ways to handle waste. Define the terms “**municipal solid waste**” and “**integrated waste management**”. Locate the solid waste management plan for their community.
2. Create a “garbage pizza” (using the activity on the Keep America Beautiful web site) that reflects the waste stream in their house. They could also select just one room in the house, such as a bedroom, kitchen, or living room. Use a visual estimate, or complete a quick sort of materials in the trash can. Include parents and other family members in this activity.
3. Find the total amount of solid waste generated in their city or community and how different materials are managed. Select one method to manage waste used in their community and gather information about it. Report back to the class.

Web sites to consult:

U.S. Environmental Protection Agency Office of Solid Waste (<http://www.epa.gov/osw/>)
Earth 911 (<http://www.earth911.org/>) environmental glossary and search by zip code for local recycling opportunities
How Stuff Works trash audit (<http://home.howstuffworks.com/composting4.htm>)
Completing a waste audit at school (<http://www.cuyahogawd.org/pdf/ConductingWasteAud>)
Shreveport Department of Operational Services (www.ci.shreveport.la.us)
1731 Kings Hwy, Shreveport - (318) 673-6300

In-Class Activity

Method

Students will participate in an activity in which they select waste items and identify the best waste management option.

Materials

items from the “Trash List” at the end of this lesson printed on 35 index cards or note paper backed with re-usable adhesive (or masking tape)

Vocabulary

composting, light weighting, recycling, sanitary landfill, source reduction, waste-to-energy

Procedure

1. Before class, post the items from the “Trash List” on the chalkboard or a wall of the classroom. Arrange the items randomly.
2. Discuss with students the five methods of managing municipal solid waste: source reduction and reuse, recycling, composting, waste-to-energy, and sanitary landfill. Have students describe each method. Clarify any misconceptions students may have about what each method involves. Review the “Teacher Backgrounders” on the Keep America Beautiful web

site (<http://www.kab.org/cleansweepusa>) to help prepare for this discussion.

3. Divide the class into five teams. Assign each team one of the five methods of waste management. For example, Team 1 would be Source Reduction and Reuse, Team 2 would be Recycling, Team 3 would be Composting, Team 4 would be Waste-to-Energy, and Team 5 would be landfill. Team members will decide in what order they will take a turn for their team.

4. Instruct students that on your mark the first person in each team will go to the chalkboard and choose a waste item that would be appropriate for their group to manage. For example, the composting team would choose a banana peel but not a glass jar. If necessary, discuss two or three examples with the students. Some extra explanation may be needed for the Source Reduction and Reuse Team. The items they choose will primarily be objects that could be reused rather than disposed of. After the first player chooses an item, the next member chooses a card for their team, until all the items have been selected.

5. When all of the items have been removed from the chalkboard, have students return to their seats. On the chalkboard draw five columns, one for each team (representing each waste management method), and label them at the top with the team name. For example, Recycling, etc. Call on a member of the team to place the cards from their team under the correct heading.

6. At this point some lively discussion should be generated. Some of the items on the list should obviously be recycled, composted or landfilled, etc. Some of the items can be handled in a number of ways. For instance, automobile tires can be reused as swings or playground equipment. They can be ground and recycled into a number of products. For items such as this, ask the class to discuss and/or research these items based on what waste management options are available in your community. Remember that waste management options may change from time to time in a community

Assessment

Ask students to name five items they have thrown out as garbage recently. Have the students decide which waste management method would be most appropriate for each item.

Materials

Trash List

aluminum beverage can	HDPE milk jug	plastic container marked "other"
apple core	hub cap	plastic grocery bag
ash (from a waste-to energy facility)	music cassette	pumpkin seeds
automobile tire	newspaper	rubber band
automotive oil	notebook paper	shirt button
cereal box	orange peel	steel can (soup)
chicken bones	paper clip	t-shirt
clock	paper egg carton	telephone book
coffee grounds	paper grocery bag	used bandage
doll	paperback book	used dental floss
egg shell	pencil stub	used facial tissue
glass jar	PETE soda bottle	
grass clippings	piece of aluminum siding	
	piece of lumber 2"x4"	

Post-Visit Activity

Recycled Art Work

This activity is for grades 3-6.

Overview

Students use found objects to make art.

Objectives

Students will appreciate how found and recycled objects can be made into art.

Students will understand cultural differences regarding recycling.

Materials

Wide array of found objects, junk, or garbage, such as movie stubs, bicycle parts, car parts, fabric and sewing implements, food wrappers and containers, clothing such as shoes and neckties, etc. Consider sources of recyclables at your school such as the cafeteria, the janitorial areas, art and industrial arts rooms, etc. You might give students a week's advance notice to bring objects from home.

Recycled Art Reflection Questionnaire

Procedure

1. Review the following vocabulary words with students prior to beginning the lesson: **recycling, found object, folk art, fine arts, aesthetics.**
2. Write the following on the board, leaving space under each for a short list:
tires
paper
plastic drink bottles
3. Ask students whether they and their families recycle any of these items. Then ask them to list some of the items that are made from these objects once they are recycled. Answers may include soft playground flooring and running tracks from tires; paper bags, confetti, and toilet paper from paper; and sleeping bags and fleece from plastic drink bottles.
4. Ask the students if they can imagine wearing a pair of sandals made from an old car tire. These are quite common in Africa and are called "thousand milers" because of the long distance the rubber carries not only the car, but also the sandal wearer. Have students search the Web for information on African folk art and recycling, and then discuss what they find.
5. Tell students that it's not only folk artists who use recycled goods to make useful, interesting-looking objects, such as the vase and briefcase, so-called fine artists (those concerned mainly with aesthetics rather than usefulness) also use recycled goods. Two famous 20th-century American artists who have incorporated found objects into their art are Louise Nevelson and Robert Rauschenberg. Find a website that provides examples of this artwork.
6. Ask the students to identify recognizable objects in the artworks. It will help for them to have a sense of the very large size of both artworks, so note the dimensions that are given for each. Identification is harder with the Nevelson, but tell students that she worked entirely in wood and painted the objects black after she was done. Given that information, what kinds of things might be included?
7. Now show the students the recycled and found objects you have accumulated and brought into the classroom. Working in groups, students must create works of art

using a minimum of three objects. They can choose whether to make a useful piece of folk art, such as the African art they read about, or a more fanciful piece of art, in the vein of Nevelson and Rauschenberg. Encourage students to use their [Recycled Art Reflection Questionnaire](#) for help in organizing the project.

Assessment

Display the artworks for the class or even for the whole school. Have the students individually reflect on their work using the Recycled Art Reflection Questionnaire.

Extensions

Study the work of Nevelson and Rauschenberg, along with other collage and assembly artists, in more detail. Have students create take-offs of one artist's work, using found objects.

Recycled Art Reflection Questionnaire

Name: _____

Group

Members: _____

1. How did your group choose the objects it used to create the artwork?
2. Did you have a goal for what you were making, or did it unfold as you worked? Describe the process.
3. What do you think are the one or two most important features of your artwork? Consider such things as color, shapes, patterns, and usefulness.
4. Where did you get ideas for your artwork? For example, did you get ideas from the works of other artists you've studied? From an everyday object you hoped to mimic? Or purely from your imagination
5. Describe how your group worked together.
6. How did you contribute to the artwork?

Recycle City

This is a website developed by the Environmental Protection Agency. There are many diverse ways you can use this in your classroom. Below is the introduction and some ideas for incorporating this into your classroom for teachers

This interactive website may be found at
<http://www.epa.gov/recyclecity/first.htm>

Welcome to Recycle City!

Just a few years ago, this place was called Dumptown. For years, the folks living here hadn't thought much about where waste went when they threw it out. And, eventually, that became a very BIG problem...

Because Dumptowners didn't know what happened to waste after it was thrown away, they thought nothing of dropping empty soda cans here and there or putting cans of leftover paint right into their trash cans.

Things that easily could have been reused or recycled were tossed in the trash, because nobody believed recycling made a difference. At the dump, they threw dangerous chemicals and poisons (hazardous waste) into the regular garbage (solid waste).

The garbage heap grew and began to smell. Sometimes it caught fire, sending toxic smoke into the air and making it hard for everyone to breathe. Dumptowners tried moving away from the mess, but wherever they moved, the problem was still there—on the ground and in the air. They knew they had to fix it.

They learned to reduce the amount of waste they threw away. For example, they bought items at the store that weren't wrapped in extra packaging, so there would be less to throw away. They learned to reuse other things—like washing out empty jars instead of throwing them away. And, they learned to recycle. They set up bins around town to collect glass, paper, and aluminum that could be converted back into raw materials, then made into new products.

Dumptowners paid special attention to hazardous waste and set up special collection points where people could drop off used chemicals, paints, and cleansers for safe handling and proper disposal. Instead of buying environmentally harmful cleaning products, chemicals, and pesticides, many Dumptowners switched to natural, safe substitutes.

Finally, they closed the old city dump and built a new solid waste landfill outside of town. With the town's new image, it needed a new name, and Recycle City was born. Travel around Recycle City and find out what folks here are doing to reduce waste and make the environment better.

To get started, just click on any section of Recycle City that you want to explore, or click on the Dumptown Game. Create your own Recycle City scavenger hunt or go to the Activities area and see other ways you can put Recycle City to use.

When you leave this place you'll leave knowing much more about what you can do to help protect the environment. Have fun!

Information for teachers

Recycle City was designed with the classroom in mind. All of the games and locations have been designed to make it easy for a teacher to set different goals that can match up with lessons being taught in class. You can also check out "Things To Do In Recycle City" for some more ideas.

Here are some ideas on how you can use Recycle City in your classroom:

Scavenger Hunts:

You can organize students into teams for scavenger hunts through Recycle City. This works especially well if there are fewer computers than there are students. Each team works together to find all the items in a list before the other teams do. Before beginning the assignment, create a list of items that need to be found, for example:

Find:

- Something made from recycled tires
- A way to use vinegar
- A use for old bricks
- Something made from old milk containers

- ❑ An electric car
- ❑ How coffee grounds can be reused

Your list of course, can be customized to emphasize reuse, recycling, or any other topic that you are exploring in class.

Split up the class into several teams and let them go through the site, looking for the items on the list. This will provide them with some incentive to browse around the site looking for items, and will spark team discussions on where the items might be found.

Afterwards, have a discussion with the class as a whole. Encourage students not only to talk about what they did find, but also about anything that they went looking for and didn't find...this can lead to interesting discussions. After the discussion, encourage students to write to us with any suggestions they have at r9.recyclecity@epa.gov .

The Clean Up Dumptown Game

Clean Up Dumptown is designed to be extremely flexible. In fact, there are no goals or winning conditions built into the game **at all!** This was done so that you can assign goals to underscore particular topics and integrate into classroom curriculum.

Goals can include reducing the amount of a particular kind of waste going into the landfill by a particular amount, or by as much as possible. You can add budget caps, or restrict the programs that can be used.

You can also set research goals - determining the impact of composting on the waste stream, for example.

Sample goals:

- ❑ Reduce the amount of paper going into the landfill as much as possible, and spend as little money as possible.
- ❑ Remove as much organic waste from the waste stream as you can.
- ❑ Set an overall spending limit (\$200,000, for example) and find out which combination of programs within your budget achieves the most waste reduction.
- ❑ How much waste can be removed from the waste stream using programs that have no cost to the city?
- ❑ What is the optimum combination of programs for the city? (This is a hard one, and it may take up to an hour to try all the programs and determine the cost/benefit of them all.)

This should give you some ideas. If you come up with any other exercises, please send email to r9.recyclecity@epa.gov, and we will add them to the list!