

Sneak Peek Edition!

WASTE IN PLACE[®]



**KEEP AMERICA
BEAUTIFUL**

**Activity Guide and Resources for Litter Prevention,
Beautification, Community Greening,
Waste Reduction and Recycling**

Early Childhood (EC) - Elementary

Waste In Place: Activity Guide and Resources for Litter Prevention, Beautification,
Community Greening, Waste Reduction and Recycling

Sneak Peek Edition

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Using the Waste in Place Storybooks

Background on Storytelling

Storytelling is the means by which cultural tradition is passed down from one generation to another. The oral tradition is strong in many cultures, and the telling of the tale is also memorable. Children's involvement with a story that is being told is almost immediate. The story teller is the medium through which a story comes to life including voice, choice of words, body language, facial expressions, and tone.

Storytelling promotes expressive language development in oral and written forms. It presents new vocabulary and complex language structures in a profound way that inspires children to imitate the model they have experienced.

Reading aloud to students is an enhanced method of storytelling and provides an excellent method to involve students and to engage them in thoughtful discussions, as well as introducing new vocabulary. The teacher involves the students directly with expressions and gestures. Repetition and questions get the learner involved so they feel they have created a story. Young readers will want to find a book, and young writers will want to draw and retell a story in their own words or even create their own new version.

Waste in Place (WIP) Storybooks

Use these books as an engagement tool before beginning the *Waste in Place: Sneak Peek* activities.

- The books were developed with reading aloud in mind. They offer an introduction to vocabulary and experiences that are relevant to the *Sneak Peek* activities.



- They provide a unique way to prepare learners for the activities and the main theme of the lessons. The illustrations in the books are appealing and culturally diverse.
 - To prepare for using the books as read aloud engagements, begin with the theme or big idea and work backwards creating open-ended questions as you move through the book.
 - These discussions are not looking for the “right answer,” but they are used to spark interest and encourage critical thinking, including bringing in aspects of their cultural background experiences.
 - Review the vocabulary in the text and develop a plan for introducing the words before, during and after the reading. Practice reading the book aloud and retelling the story.
 - Incorporate culturally responsive experiences for all learners. Valuing each child's home culture and incorporating meaningful, active participation will help them develop interpersonal skills and contribute to academic and social success.

The incorporation of the storybooks correspond with some of the activities and lessons from the WIP resource guide. The suggested activities provide for:



1. developmental growth in the areas of language, cognition, social emotional, and physical.
2. literacy development incorporating oral language, reading and writing, phonemic awareness, phonics, vocabulary, comprehension, fluency, and critical thinking.

Read Aloud

- Briefly introduce the initial vocabulary words.
- Begin reading the text, stopping along the way to ask questions and allow for discussion either in groups or with partners.
- Identify and discuss any additional vocabulary or main concept.
- Ask students to find connections that are meaningful for them.
- Introduce your *Waste in Place: Sneak Peek* activity.
- Use the book and questions after the completion of the activity to revisit questions discussed earlier, making new connections and assessing student understanding.

WIP Storybooks

Robles-Goodwin, P. J. (2011). *The Jalapeño Seed*. Stamford, CT, Keep America Beautiful, Inc.

Schertz, L., Robles-Goodwin, P. J., & Carson, C. (2013). *Keeping My Town Beautiful*. Stamford, CT, Keep America Beautiful, Inc.

Schertz, L. (2011). *If It's Litter and You Know It...* Stamford, CT, Keep America Beautiful, Inc.

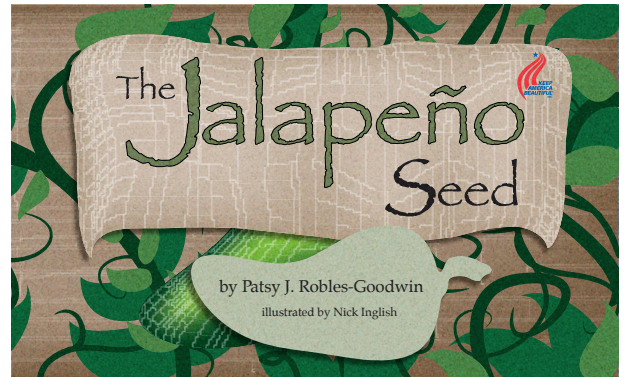
Schertz, L. (2011). *Where Does Gum Go?* Stamford, CT, Keep American Beautiful, Inc.

System Components for Waste in Place (WIP)

- 1 Resource Book—*Waste in Place*
 - (Includes a Spanish Parent Component)
- 4 Children's Story Books
 - *The Jalapeño Seed* by Patsy J. Robles-Goodwin
 - *If It's Litter and you Know it...* by Linda Schertz
 - *Where Does Gum Go?* by Linda Schertz
 - *Keeping my Town Beautiful* by Linda Schertz, Patsy Robles-Goodwin, & Cecile Carson
- 1 package of Story Cards
- 1 Card Game used for
 - Concentration game
 - Memory game
- 1 Game Board
- 1 Frog Puppet, "Buddy"

The Jalapeño Seed

by Patsy J. Robles-Goodwin



Book Summary

The Jalapeño Seed supports *Waste in Place* and Keep America Beautiful impact goals of beautifying America. *The Jalapeño Seed* is a story of a farmer who plants a jalapeño seed in his vegetable garden in hopes of sharing it with his friends and family once it grows. He waters and cares for his garden until a jalapeño plant sprouts one day. Follow his gardening adventures as he encounters a big problem.

Before the Story

- Ask the students to look at the cover of the book. "What do you think this story might be about? What are some clues?"
- Ask them to describe what they see on the cover page? "Does it look familiar? If so, describe your experiences."
- Read the title, *The Jalapeño Seed*. Tell them this is a story about a farmer who has a vegetable garden.

After the Story

- Ask the students questions about the story. "Who helped Farmer Paco with his big problem?" Write the character's name in order given by children on chart paper.
- Ask them to give you the order of help.
- Write numbers next to the characters to sequence.

Activities

The following activities are related to the storybook, emphasizing community assistance, planting and cultivating our own food locally.



Activity 1
Keep it Beautiful and Green



Activity 2
Our Natural Resources

Vocabulary

Have the students define and understand the vocabulary words listed in each activity.

Development

Language

The student:

- Listens with interest to language and experiences of others.
- Understands and begins to use oral language for conversation and communication.
- Develops an expectation that words, books, and pictures can, delight, comfort, inform and tell a story.
- Begins to relate personal experiences, especially about either having a garden or helping plant a garden.

Cognitive

The student:

- Pays attention and expresses interest in the way plants grow.
- Develops the confidence to explore and make sense of the world through simple problem solving and trial-and-error, especially in experimenting with planting a seed.
- Students can design a landscape including the type of plants to be used.

- Students can plant the garden according to the class or individual plan.
- Responds to and interacts with others.
 - Chart the growth of the garden every week and record observations.

Social Emotional

- Shows interest and awareness of others.
- Begins to develop personal relationships with peers.
- Develops emerging skills in caring and cooperation, especially as it may relate to planting and caring for a class garden.

Physical Development

- Develops emerging skills in caring and cooperation.
- Shows imagination, creativity, and uses a variety of strategies to solve problems.
- Moves body to achieve a goal.

Learning Centers/Stations

Construction

- Develops responsive and reciprocal communication skills, such as turn taking.

Creativity Station

- Coordinates eye and hand movements.
 - Uses a variety of planting tools (hand shovel) to plant a seed, flowers, or vegetable plant.

Fine Motor

- Develops control of small muscles—manipulation and exploration.
 - Have students paint flowers using all the space of their paper.
 - Ask them to talk about what happens if people threw trash in their garden. Example: What makes a garden beautiful? What can be done to keep the garden beautiful?

Gross Motor

- Moves body to achieve a goal.
 - Have the students sit on the floor. Play soft music and have them use their bodies to resemble how a plant grows from a seed.

Outdoor Play

- Develops increasing ability to change positions and move body from place to place.
- Having a garden requires a lot of physical movement outdoors.
- Talk about all the movement required for planting and maintaining a garden.

Whole Class Lesson

Comprehension, Vocabulary

- Understands new vocabulary and uses it correctly when reading and writing.
- Identifies elements of a story including the setting, character, and key events.
- Recognizes recurring phrases (Example: “Ay! Ay! Ay! I cannot pull this enormous jalapeño myself! I need help!”) and characters in the story.
- Analyzes, makes inferences, and draws conclusions about theme and genre in different cultural, historical, and contemporary contexts and provides evidence from text to support their understanding.

Modeled Writing

- Demonstrate the one-to-one correspondence between a spoken word and a printed word in text.
- Recognize that sentences are comprised of words separated by spaces and demonstrate the awareness of word boundaries.
- Identify a sentence made up of a group of words.
- Identify syllables in spoken words.
- Recognize the distinguishing features of a sentence.
 - For the students not familiar with the Spanish words in this book, use the glossary provided at the end of the story.

Awareness

Phonological

- Say garden one syllable at a time (gar-den) and have students guess the word.
- Invite students to clap and then count the syllables for gar-den. Have them clap the syllables for other words in the sentence.
- Ask: “Why did we clap once for the word *plant*, and twice for word *garden*?”
- Say each syllable slowly and have students repeat the syllables.

Print

- Write the sentence one word at a time. Have students say each word with you.
 - Farmer Paco pulled at the jalapeño.
 - He pulled, and pulled, and pulled.
- Point out the spaces between the words.

Independent/Partner Workstation

Read for Details, Writing

- Ask and respond to questions about texts read aloud.
 - Ask, “If you had been Farmer Paco, what would you have done to get the jalapeño pulled from the vine?”
- Analyze, make inferences and draw conclusions about theme and genre in different cultural, historical, and contemporary contexts and provide evidence from the text to support their understanding.
 - Ask, “Does this story remind you of another story? If so, why? Explain.”

Listening, Speaking, Art

- **Art**—Expresses ideas through original artworks, using a variety of media with appropriate skill
 - By using various art materials such as colored construction paper, markers, paints, and scissors, have the children create a garden.
- **Reading**—Determine what words mean and how they are used in a sentence, either heard or read.
- **Materials:** empty paper towel tubes, streamer, tape.
- Display the book.
 - Turn to the pages 12 and 13 that illustrate Paco Farmer and Mamá Margarita’s faces as they attempt to pull the enormous jalapeño from the plant.
 - Tell students they are going to make the jalapeño plant. Give each student one empty paper towel tube and 24” strips of crepe (green) paper streamers.
 - Encourage students to tape streamers in a variety of ways to resemble the illustrations on pages 12 and 13.
 - Invite students to tell a partner how they constructed their plant as they demonstrate using their streamer and role play the farmer and his wife.
 - Encourage students to pay attention to the clever ways that their classmates have constructed their plants and their explanations of construction.

Read Aloud Time

Reread to locate key details

- Identify different parts of a book (Example: front and back covers, title page).
- Students analyze, make inferences and draw conclusions about theme and genre in different cultural, historical and contemporary contexts and provide evidence from the text to support their understanding.
- Display the book cover. Introduce the name of the author and illustrator again and read their biographies.
- Read the book using props: straw hat, apron, dog puppet, cat plush, etc.

Shared Writing

Sequence Events

- Dictate or write sentences to tell a story and put the sentences in chronological sequence.
 - Examples: Paco Farmer pulled at the plant. Mamá Margarita pulled at Farmer Paco.
- Write brief stories that include a beginning, middle, and end.
 - Place self-stick notes over the text of “They pulled, and pulled, and pulled.” Encourage students to retell the story in their own words.
 - Record their sentences on the self-stick notes.
 - Read their story aloud.



Keep It Beautiful and Green

Objectives

Students will be able to:

- describe how beautifying and greening an area prevents littering, and
- design and implement a beautification plan.

Method

Students will clean up an area and then beautify it by planting flowers they have started from seeds.

Materials

- Newspaper cups, toilet paper rolls, small non-wax paper cups or peat pots (several per student)
- flower and vegetable seeds
- recipe for Dirt Dessert (included)
- trays
- pens
- soil
- newspaper
- scissors
- trash bags

Time

2 – 2 ½ hours, but may be divided

Vocabulary

- beautify
- graffiti
- beautification
- litter
- community greening

Background

Beautification is the process of making visual improvements to a place. The actions involved frequently include picking up litter, planting flowers and trees, adding decorative features and painting structures to enhance the structure or cover graffiti.



Graffiti is defined as words, colors, and shapes drawn or scratched on buildings, overpasses, and other surfaces. It is done without permission and is against the law. Community greening is the name for a range of projects including edible and community gardens, landscaping public spaces including school grounds, outdoor classrooms, and entry way improvements.

Besides creating beauty, trees and flowers provide important environmental benefits.

- Trees naturally clean and protect the environment
- Produce oxygen
- Remove pollution from the air
- Provide shelter to wildlife
- Slow storm water runoff
- Prevent soil erosion
- Reduce noise
- Reduce energy costs (providing cooling shade and reduce air conditioning costs)

Native plants:

- Reduce maintenance costs
- Are highly resistant to drought
- Attract diverse wild life—insects, birds, and other animals

Other flowering bulbs and plants:

- Produce breathable oxygen helping to clean the air,
- Help to purify water and prevent soil erosion; foliage buffers the impact of rain as it falls to the earth.

Procedure

1. Ask students what it means to litter (throw trash in a place other than a trash can or bag). Have students answer the following questions:
 - How would you feel bad about littering in an area where there is already a lot of trash lying around? Why?
 - How would you feel about littering a very clean area? Why?
 - How would you feel about throwing litter into a flower bed? Why?

Discuss the fact that people may tend to litter less in a well kept and well landscaped area.

2. Introduce the term beautify (and beautification). What does it mean to beautify the community and campus? Introduce the term community greening. What does community greening mean? Ask students to think of ways to beautify an area. For example, we could pick up litter, plant flowers or trees, paint a mural on a wall, or paint over graffiti.
3. Tell students that they will be beautifying an area by cleaning it up and then planting flowers that they have started from seeds. As a class, conduct an assessment of your school grounds. What areas would benefit from planting? Work with a Master Gardener or County Extension Agent to select the planting spot and assess the site conditions. Test the soil. Note the amount of light and the amount of water the site receives. Design a plan. What will be planted? Consider growing season, annual or perennial, color, height, lighting, and maintenance requirements (native wildflowers are often hardier and require no daily watering or other special care). Draw a simple plan of your beautification project. You may want to create two plots: one for beautification, and a separate one for edible plants. Be sure to get approval from the administration for your plan before you proceed. Display the plan in your classroom.
4. Students can make their own, biodegradable planting cups by reusing newspaper or toilet paper rolls. For the toilet rolls, simply cut the roll in half, creating two, deep rings. Bend edges into middle on one end – creating a cup. For newspaper cups, select plain black and white pages. Tear a double page in half lengthwise.

Roll the newspaper around a glass or jar, continue rolling until all of the newspaper is around the jar. Twist the bottom and tuck into the open end of the glass or jar to create a flat bottom. Remove the jar and you will be left with a planting cup.

5. Start your seeds indoors 5-6 weeks before you intend to plant them outside. To prepare to plant the seeds, lay out the following supplies: planting cups, flower seeds, soil, water container, scissors, and pens. Each student should have his/her own cup and be assigned a type of seed to plant. Have each student follow these steps:
 - Cover work area with newspaper (if working indoors).
 - Place cups on trays to help hold them upright and to catch any water that drains out after watering.
 - Fill each cup about two-thirds with soil.
 - Place 2 seeds on top of the soil, and cover with more soil. Water the seeds.
 - Place seeds in a sunny window or under grow lights. Keep soil moist. If more than one seed sprouts in a cup, allow the healthiest seedling to grow by removing the other one.
 - Suggestion: Take this opportunity to discuss the parts of a plant and what a plant needs to grow.
6. A week or so before you plan to plant, conduct a litter pick-up in the area. Pass out trash bags to teams of students; they can each hold one side of the bag and pick up litter with their free hand. Caution students not to pick up any sharp objects. Students should wear gloves to protect their hands.
7. Prepare the ground by adding compost or other soil additives. Plant outside according to plan. Don't forget to water them as needed and keep the area litter free. Use the compost created as part of the "Turn Over a New Leaf" lesson to nourish your plants.

Assessment

- Have students define "beautification" and explain its benefits to their school and community. Students should also be able to explain the value of trees and flowers to the environment.
- Students may write and/or illustrate a booklet about their local beautification project. Display the booklet in the school library or share with other classrooms.
- As a special treat, serve "Dirt Dessert" after flower planting. The students can help prepare the dessert.

Technology Connections

- Use software to create a digital plan for project.
- Take pictures or video of the development of the plan.
- Use graphic software to track the growth of plants.

Students can create an online feature for the school's website highlighting their beautification project and featuring pictures, videos etc.

- America the Beautiful (www.america-the-beautiful.org); get free seeds.
- American Forests (www.americanforests.org); learn how to plant a tree, complete the personal climate change calculator, and check out their Trees Across America campaign.
- American Horticultural Society (www.ahs.org/master_gardeners/index.htm); locate a master gardener.
- Arbor Day Foundation (www.arborday.org); take a quiz on the right tree in the right place (www.arborday.org/trees/righttreeandplace/) and find out if your city is a "Tree City" (www.arborday.org/programs/treeCityUSA.cfm).
- Audubon Nature Centers (www.audubon.org); locate a nature center by state.
- The Gardener's Network (www.gardenersnet.com/bulbs/); how to grow tulips, daffodils and other flowering bulbs.
- Kids Gardening (www.kidsgardening.com/growingideas/projects/feb03/pg1.html).
- Lady Bird Johnson Wild Flower Research Center (www.wildflower.org).

Enrichment

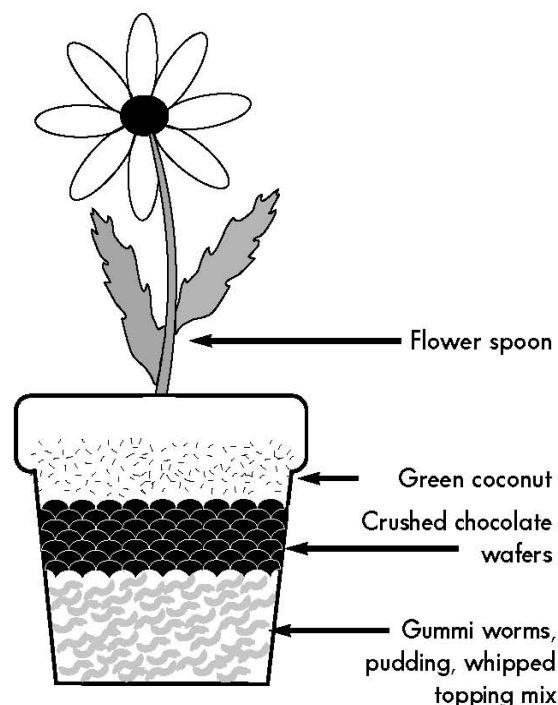
- Build an outdoor garden using the Our Natural Resources lesson in the Enrichment session of the book.
- Plant an edible garden and distribute the produce to a local food bank or have a celebration using the produce grown in the school garden.
- Find out if your community has a beautification or city greening program. Is your city a Keep America Beautiful affiliate? Look it up at www.kab.org.
- Determine whether your city is a "Tree City." What are the requirements to be a Tree City? Discuss how trees support beautification.
- Find out what wildflowers and trees are native to your region or state. What is the advantage of using native trees and flowers?
- Work with American Forests CITYgreen environmental education program to understand how your city can save energy by increasing its tree cover. How do trees help save energy?
- Get planting and care instructions for creating a container garden. What plants and flowers work best? What types of containers are available?

Dirt Dessert Recipe

1. Bottom layer (subsoil): Mix together 3 1/2 cups milk and 2 small packages chocolate instant pudding. Fold in 10 ounces of dessert whipped topping. Then gently fold in gummy worms.
2. Middle layer (topsoil): Finely crush a bag of chocolate layer cookies with a rolling pin, or put the cookies in a food processor (this is the "dirt").
3. Top layer (grass): Dried coconut, colored with green food coloring.

Layer the ingredients in a flowerpot made with foil or make individual servings in 6 oz. clear plastic cups. Refrigerate. Attach (with a hot glue gun) an artificial flower to each spoon for decoration. To serve, spoon into individual cups (make sure everyone gets some worms!)

Note: This recipe serves approximately 10. To double or triple the recipe, serve in a 9" x 13" pan. Consider serving in an ice cream cone as a "waste-free pot."



Our Natural Resources

Objectives

Students will be able to:

- ➔ design, create, and nurture a garden area utilizing local/native resources to foster community pride,
- ➔ name the state symbols,
- ➔ see that a beautified area is less likely to be littered,
- ➔ use composted materials in their garden area,
- ➔ properly dispose of any pesticides used in the garden (use organics, soaps, etc. – no chemicals),
- ➔ understand the water conservation benefits of native plantings, and
- ➔ understand the disease resistance of native plantings.

Materials

Gardening books relating to native planting; guest experts, (e.g. county agricultural extension agent or professional landscape architect), local flora, corn starch to mark garden outline, landscaping edging, native stones, or other border materials, wild flower seeds, driftwood, shells, colored glass, water source, gloves, gardening utensils, gardening soil, compost, manures, biological pest controls, park benches, tables, etc. Check for state symbols on state website or State Library and Archives.

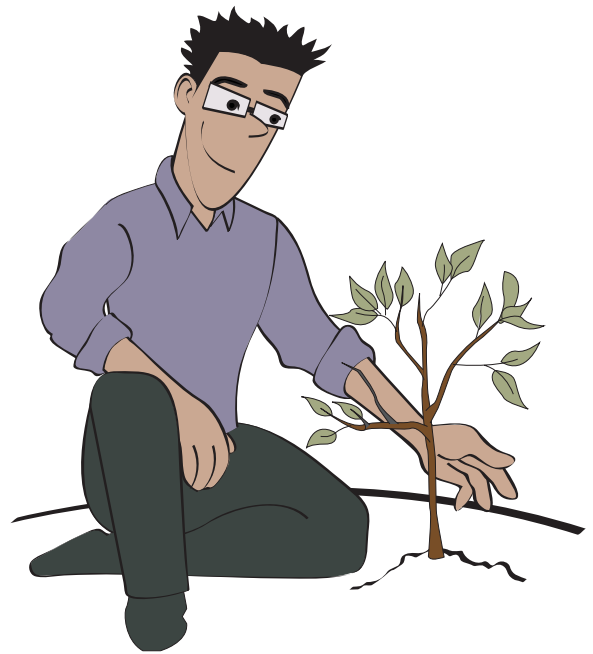
Time

45 minutes to introduce

A designated time period must be determined to plan and plant, plus determine maintenance

Vocabulary

- landscape architecture
- native plants



Background

Native plants do much more than add beauty to the landscape. They help conserve water, reduce mowing costs, provide habitat for birds, butterflies and other wildlife, protect the soil and save money on fertilizer and pesticides. North American native plants, defined as those that existed here without human introduction, are disappearing at an alarming rate due to human activities, such as urban development, agribusiness and the introduction of invasive species. The loss of native plant communities has reduced wildlife habitat and the genetic diversity necessary for balanced ecosystems.

Procedure

1. Discuss how people are less likely to trash beautiful areas.
2. Acquire a map of the school grounds.
3. Obtain administration, principal, or school board approval and consult with maintenance department for summer upkeep of garden.
4. Fundraise, if needed, or solicit community donations.
5. Discuss the following: What is the state flower? Why do you suppose the flower was selected? What is the state motto? Discuss other state

symbols and why they were probably chosen. Compare to school mascot, etc. Explore how these symbols build identity and a sense of state pride.

6. Students will design a landscape including the type of plants to be used and the state symbolism to be represented. Students may want to consider forming garden in the shape of their state or one of its symbols.
7. Research which plants will thrive/survive in your area and will bloom at different times throughout the year. [Color may also be a significant factor].
8. Call or visit nurseries to obtain prices, appropriate plants, maintenance suggestions, etc.
9. Have students obtain suggestions for appropriate locations from students, faculty, and administration (near the flag pole may be desirable) and seek administrative approval for design and final location.
10. Obtain a scale drawing of the design. Layout the design in chosen location by marking with cornstarch (safe for the environment). You may wish to involve the art/drafting department for this phase, or use the services of a local artist.
11. Assemble materials. Review safety measures for proper use of tools.
12. It is suggested that a “permanent” border of rocks, timbers, or shells be used so that the outline of the garden remains defined over the years.
13. Prepare soil according to instructions specific to your area and type of plants to be used.
14. Plant the garden according to instructions for species used to create the design. Label symbols.
15. Nurture and maintain garden. Use composted leaves and grass from school lawn as mulch for beds.
16. Discuss biological pest controls, dangers of pesticide use and disposal of pesticide containers.

Assessment

- Enter your school beautification project in the annual awards sponsored by Keep America Beautiful (www.kab.org) or similar local civic organization.

Technology Connections

- Use software to design project. Use spreadsheet to list out all materials needed and maintenance schedule.
- Create a time-lapse record of project from start to completion.
- **Websites to Consult:**
 - Lady Bird Johnson Wildflower Center to learn more about the research being conducted to promote the use of native plants and wildflowers nationally (<http://www.wildflower.org/>)
 - US Department of Agriculture search for native plants or gardening (www.usda.gov)
 - Native Plant Network (<http://nativeplants.for.uidaho.edu/>)
 - National Wildlife Federation and Backyard Wildlife Habitat (www.nwf.org)
 - Check for Native Plant Society and Master Gardeners in your state

Enrichment

- Visit a public garden and ask which plants are native plants.
- Invite a horticulturist or member of a native plant society to discuss plants.

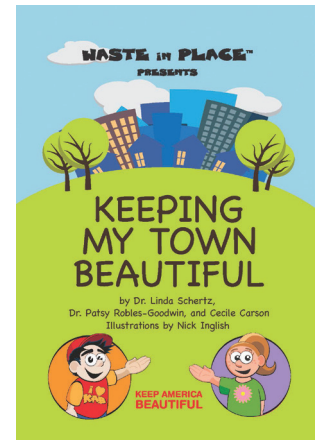
Created by Keep Texas Beautiful, www.ktb.org.

Keeping My Town Beautiful

by Dr. Linda Schertz,
Dr. Patsy J. Robles-Goodwin,
& Cecile Carson

Book Summary

This book introduces the main characters of the *Waste In Place* resource guide as they work together to improve the conditions of their community and their environment. Each character plays an important part in the community and their specific role is emphasized in the story.



Before the Story

- Ask the students to describe the community or neighborhood they live. "What do you see?"
- Tell them the story you are going to read is about how important it is to put waste in place, and how to keep the environment clean and beautiful. Ask:
 - "Is your community clean? How do you know?"
 - "Is your community full of litter? Describe the litter."
 - "How is litter harmful to the environment?"

After the Story

- Ask the students to retell the story in their own words.
- Ask, What are some items you can recycle? Compost? Reuse?
 - "What would you add? What can you do? What can we do to help keep our community beautiful?"



Activity 3
What's In My Community



Activity 4
Waste Audit



Activity 5
Plastics by the Numbers



Activity 6
Garbage Pizza



Activity 7
Paper Making

Vocabulary

Have the students define and understand the vocabulary words listed in each activity.

Activities

The following activities are related to the storybook, emphasizing community involvement, recycling, and waste management.

Language Development

- Listens with interest to language of others.
- Understands and begins to use oral language for conversation and communication.
- Develops an expectation that words, books, and pictures can amuse, delight, comfort, inform and excite.



Development

Cognitive

- Pays attention and exhibits curiosity in people and objects.
- Develops the confidence to explore and make sense of the world through simple problem solving and trial-and-error.
- Responds to and interacts with others.

Social Emotional

- Shows interest and awareness of others.
 - Begins to recognize the important responsibility to help make the community and the environment a clean and safe place.
- Begins to develop personal relationships with peers.
 - Encourages family and friends to help put litter in its place.
- Develops emerging skills in caring and cooperation.

Physical

- Develops emerging skills in caring and cooperation.
- Shows imagination, creativity, and uses a variety of strategies to solve problems.
- Moves body to achieve a goal.
 - With music playing, have students face a partner and do a “mirror dance” using hands and arms.

“Can you do a mirror dance with your feet and legs? How about with different facial expressions?”

Outdoor Play

- Develops increasing ability to change positions and move body from place to place.

Learning Centers/Stations

Construction

- Develops responsive and reciprocal communication skills.
 - Works on constructing the Garbage Pizza activity showing how trash or garbage known as Solid Municipal Waste (MSW) represents a different solid waste category (paper, yard waste, plastics, metals, wood, food, glass, and other).

Creativity Station

- Coordinates eye and hand movements.
 - Adapt a favorite finger play to give children the opportunity to giggle and wiggle without losing control.

Example:

Open, shut them, open, shut them.

Give a great clap.

Open, shut them, open, shut them.

Put them in your lap.

Litter, Litter, Litter, Trash.

Use a trash can or a recycling bin.

Open shut them, open, shut them.

Give a great clap.

Fine Motor

- Develops control of small muscles—manipulation and exploration.
 - Construct a “feel” box or bag. Place an item in the bag or box and have the students guess what it is and to determine if it needs to be recycled (include a variety of items such as: paper, plastic bottles or plastic jars).

A variation for the “feel” box or bag can be to use items for guessing and then to determine how to “Reuse” the items for different purposes. For example: A peanut butter container can be cleaned and used to store items such as beads.

Gross Motor

- Moves body to achieve a goal.
 - Ask the students to jump like “Buddy,” the frog.
 - Have a jumping contest.

Whole Class Lesson

Comprehension, Vocabulary

Understands new vocabulary and uses it correctly when reading and writing.

- Identifies elements of a story including setting, character, and key events.
 - “Who are the characters in the storybook, *Keeping my Town Beautiful?*”
 - “What are they doing to keep their environments clean?”
- Recognizes the role the characters play in the storybook and in their communities.
 - For example: Grandma Ella shows us ways to reuse many things. Mia uses reusable bags instead of the store’s paper or plastic bags. Mr. Victor recycles plastic, aluminum or steel can, glass, and paper.
- Analyzes and makes inferences and draws conclusions.
 - Ask the student to observe and record the recycling practices of their homes for a week.
 - Ask, “What can you conclude? Do they recycle? If so, what do they recycle? Where do they recycle?”
 - Ask, “What are your conclusions? Are the habits acceptable? Needs improvement?”

Modeled Writing

Reading

- Demonstrate the one-to-one correspondence between a spoken word and a printed word in text.
 - As the teacher reads to story aloud, point to each individual word to model left-to-right directionality.
- Recognize that sentences are comprised of words separated by spaces and demonstrate the awareness of word boundaries.
 - Emphasize punctuation marks while reading aloud. The students will recognize that words form sentences.
- Identify a sentence made up of a group of words.
 - Example: How is trash collected in YOUR home?
- Identify syllables in spoken words: Example: use the vocabulary words such as recycle, reuse, reduce, landfill, garbage, compost.
- Recognize the distinguishing features of a sentence.

Awareness

Phonological

- Say the word **recycle** one syllable at a time (re-cy-cle).
 - Ask, “What sound do you hear at the beginning? End?”
- Invite students to clap and then count the syllables for recycle. Have them clap the syllables for other words in the sentence.
- Ask: “Why did we clap twice for word, litter, and three times for word, recycle?”
- Say each syllable slowly and have students repeat the syllables.

Print Awareness

- Write the sentence one word at a time. Have students say each word with you.
 - Use a story starter and print on a sentence strip. Adhere to chart paper and ask each student to complete the story starter.
- For example: Mr. Daniels believes in composting banana peels or apple cores. List what other things can be composted.
- Write the students’ responses including their name at the end of their sentences.

A book can be developed on the class responses to the story starter. The students can illustrate their own response page.

- Explicitly demonstrate leaving a space between the words when writing.



Independent / Partner Workstation

Read for Details, Writing

- Ask and respond to questions about texts read aloud.
- Analyze, make inferences and draw conclusion about theme and genre and provide evidence from the text to support their understanding.

Listening, Speaking, Art

- Art—Expresses ideas through original artworks, using a variety of media with appropriate skill.
 - Using a variety of materials listed in Activity #28, Papermaking, have the students work together to recycle used paper to make new paper.
- Reading—Determine what words mean from how they are used in a sentence, either heard or read.
 - See page 99. In the papermaking process, the following vocabulary is used. Can they define? Have students use the words in a sentence to show comprehension.
 - Couching
 - Deckle
 - Deckle edge
 - Mold
 - Pulp
 - Slurry

Read Aloud Time

Reread to locate key details

- Reading—Identify different parts of a book (e.g., front and back covers, title page).
 - Have the children reread the story aloud together.
 - Using a puppet, Buddy, the frog, retell the story as if he were reading it.

Shared Writing

Sequence Events

- Writing—Dictate or write sentences to retell the story and put the sentences in chronological sequence.
 - Example: The teacher can have sentence strips written with sentences that can be put in sequence of happening in the storybook.

Evan is a young boy.

Gabby is Evan's friend.

Buddy, the frog, lives in the pond in the community park.

Grandma Ella teaches about reusing.

- Writing—Write brief stories that include a beginning, middle, and end.
 - Read the story again and stop in the middle. Ask the students to write a new ending.
 - Have them illustrate their books.
 - Have the students share and read their books.



What's In My Community

There was a great community with wonderful people and places. The City of ABC had people, houses, apartments, schools, stores, restaurants, cars, streets, and even animals.

Objectives

Students will be able to:

- ➔ recognize the need for cooperation among community members in finding a solution to a solid waste dilemma,
- ➔ determine that there may be more than one solution, and
- ➔ work cooperatively to solve a problem.

Method

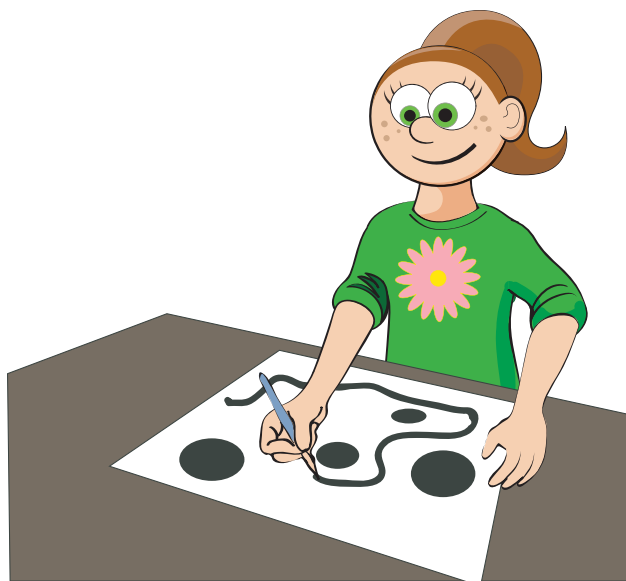
Students will identify where trash is supposed to go and will draw trash and recycling bins for the “City ABC” to use.

Materials

- 4 feet of butcher paper
- Markers or crayons
- Waste samples: office paper, newspapers, plastic containers, etc.
- Pictures from magazines of community sites. For example: school, house, apartment building, store, etc.
- glue stick/glue
- scissors

Time

45 minutes – 1 hour



Vocabulary

- solid waste
- cooperation
- community
- solution

Background

Community is defined as people living in a particular county, city or neighborhood having the common interest in, and impacted by, the program. When dealing with complex environmental issues such as Municipal Solid Waste, the community must work together to identify options, promote collaboration, encourage mutual understanding among diverse constituencies, and ultimately create solutions.

Procedure

1. The educator can read “A Trashy Story” in Waste in Place. Show sample map.
2. Assign students to draw or cut out pictures and glue different segments of the community. Once the community drawing has been completed, the students can review all the items that were drawn or cut out cooperatively to assemble the final picture.

3. Afterwards, the educator starts discussing by asking:
 - What happens to the waste produced at: Homes? Schools? Restaurants?
 - Where is it put?
 - What will happen if the trash is not picked up?
 - What will happen to the beautiful community if trash is everywhere?
 - What are some solutions for all the trash/ waste?
 - Why is it important for everyone to cooperate and place trash in the proper place?
4. After discussing the questions, have the students revisit the community drawing. Look for recycle bins, trash receptacle, etc. The educator may provide illustrations of containers, if desired.
5. Have the students draw trash bins, recycling bins, etc. to add to the drawing. Engage the children in determining the best location for the new additions to their drawing.

Assessment

- Ask the students what they learned; we are all members of a community. Have them explain how we can work cooperatively to solve a problem.
- Ask the students what they can do to help their community with trash or litter problems. How can they involve their families?
- Discuss how the community would look like if everyone did their part and put trash in its place. What effect would it have on us? Animals? Plants?

Technology Connections

- Research current community issues using internet, document with video or photographs.
- Suggested web link:
Environmental Protection Agency:
<http://www.epa.gov/osw/wycd/index.htm>

Enrichment

- Have a guest speaker (waste management director or sanitation engineer) come in and talk to students about the importance of picking up trash.
- Assign several students at a time to be in charge of making sure the trash or recyclables are placed into appropriate bins.

What's in the Can? Waste Audit

Objective

Students will be able to:

- ➔ identify the major waste components of school/site;
- ➔ introduce the idea of where waste goes when it leaves the school/site;
- ➔ have an understanding of the quantity of waste and recyclables, and
- ➔ investigate options on how waste may be reduced.

Method

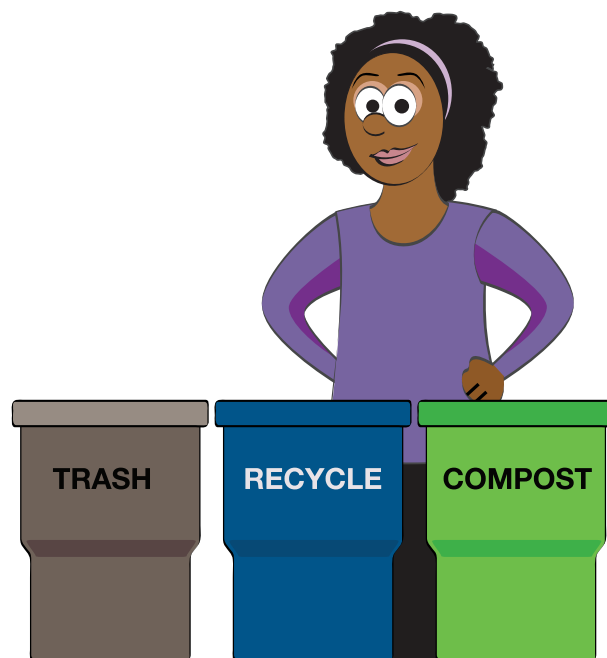
Students will track waste for one day and collect information that will help determine where most of the school's waste is generated. This will allow students to think about how to reduce the amount of waste produced.

Materials

- large protective floor covering
- two large collection containers (clear large storage box or trash cans)
- trash bags
- gloves for each student
- scale (may be typical bathroom scale) and ample space for sorting.

Time

45 minutes – 1 hour to plan and several sessions to conduct audit



Vocabulary

- | | |
|-------------------|----------|
| • audit | • trash |
| • behavior change | • volume |
| • recyclable | • waste |
| • recycle | • weight |

Background

Procedure

1. Lead a discussion with the students to address what an audit is and its purpose. An audit is an accounting and analysis process and may involve counting, weighing and/or observing.
2. Ask students to identify areas where they think waste is generated at school/site cafeteria, office, classroom, etc. For purposes of this audit, waste from the bathroom and “wet waste” from the cafeteria (for example, food or wet paper products) should not be included, but list it as a place where waste is generated.
3. Discuss planning how to conduct the waste audit. This plan may take several days to implement as you will need approval and assistance from administration and staff if you decide to audit areas outside classroom. The more knowledgeable the students and

support staff are the better the project may be implemented.

4. Have students agree upon a representative sample of waste from school/site. The larger the sample, the more accurate your results will be, but a classroom may be a good place to start. Ask students how they will coordinate the waste audit plan and involve custodial service, food service staff (if including food waste), office personnel, and classrooms. Have students think about the most effective way to present the idea such as: visiting individual classrooms, creating and distributing flyers, speaking to a student assembly.
5. Once the sample is selected and the plan created, divide students into teams for collection, sorting, weighing, and analysis. Ask students to devise a plan to keep track of each location where waste is collected. Ask students to devise a plan for disposing of the waste once the audit is finished.
6. Collect samples at the end of the day and analyze it the next. See note below regarding “wet waste” or cafeteria. Copy and pass out the “Statistics” spreadsheet. Or you may want to develop and design an audit specific for the project.
7. Ask the collection team to collect trash from pre-designated locations, keeping record of the location where each sample was collected. Ask weighing team to weigh the empty cans first and record the weight on the appropriate spreadsheet.
8. Ask students to spread the protective covering on the floor and (wearing gloves) empty the contents of the waste container. Ask the students to separate waste into categories: paper, aluminum cans, glass, plastic, and “other” waste. Other waste is used paper from the kitchen, facial tissue, candy wrappers, and anything that does not fit into the other categories. Do NOT include bathroom waste or “wet waste” in your audit. Consider photographing the mounds of separated trash. Pictures are a powerful tool that can be used when sharing the results with the rest of the student body and staff. If the school/site recycles, repeat step 8 and document contents of the recycling container.
9. Once all results are recorded, ask students to dispose of waste according to their previously developed plan in step 5.
10. Copy and pass out “Waste Audit Questions” student page. Use these questions to lead a discussion about what could/should be done to reduce the waste. Talk about advantages

and disadvantages to a recycling or compost program. You may assign students to take the sheet home for further consideration and continue discussion on a second day. Reflection on what was observed may assist students in Enrichment activities. Discuss options of where items could go (i.e., recycle). Discuss what was not audited (e.g., cafeteria – what might they find in “wet waste”).

Assessments

- ➔ Have students prepare posters and graphs to hang near trash or recycling containers showing audit results.
- ➔ Students write a report on what was learned.

Technology Connections

- Document process using camera
- Use presentation and data management software

Enrichment

- ➔ Conduct additional waste audits monthly, quarterly, or semi-annually to monitor the progress in the school's waste reduction. Document if there is a reduction in waste hauling services and report the savings or explain how those savings offset recycling.
- ➔ Ask the students to speak to other students or an assembly of the student body and staff.
- ➔ Develop messages to encourage source reduction and recycling, consider using lessons “Advertise Our Attitudes” and “Logos and Slogans.”
- ➔ Conduct “wet waste” audit from cafeteria. Weigh the can, subtract the weight of the *empty* can and record this weight. This should be done soon after lunch or right after school, the same day the “wet waste” is collected.

*Created by Keep Pennsylvania Beautiful,
www.keeppabeautiful.org.*

Waste Audit Questions

1. Make a list of items found. Rank in order of highest number found. Chart whether item found could be recycled, reused, or composted.
2. How much of the weight comes from packaging materials? What are some reasons for this packaging? Can you think of some alternatives to this kind of packaging?
3. What strategies can be used by students, educators and administrators to change behaviors and reduce waste? (See glossary of definitions)

Commitment:

Social Diffusion:

Prompts:

Norms:

Communication:

Incentives:

Technology and Structural Changes:
4. What can you do to personally reduce the amount of waste at your school/site?
5. What can you do to teach others about where to put these items?

Waste Audit Statistics

Use this form or create your own. You might choose to audit just one grade or 2-3 classrooms. Reference if you use weight or volume.

Waste from:	Paper	Aluminum Cans	Glass	Plastic	Other Waste	Optional
Classroom						
Classroom						
Classroom						
Administrative Offices (if approved)						
Cafeteria (exclude wet waste)						
TOTAL WEIGHT (lbs) or VOLUME						

Plastics by the Numbers

Objectives

Students will be able to:

- ➔ recognize the role of plastics in our society,
- ➔ describe the differences in plastic composition,
- ➔ demonstrate the separation of plastics for collection and recycling, and
- ➔ explain the recyclable nature of different types of plastic.

Method

Students will discover and identify several physical properties of plastics and record this information in a chart to better understand plastic use.

Materials

- Handouts – “Plastic Container Identification Code” and “Plastic Container Worksheet” (included in this lesson)
- Collection of plastic items displaying the recycling symbol (several examples of all seven types)

Time

1 Hour

Vocabulary

- recycle
- source reduction
- waste

Background

The generic word plastic refers to a wide range of materials. This can be confusing since there are 45 basic families of plastics and each can be made with



hundreds of variations. Plastics are made from crude oil and natural gas. Basic compounds of carbon, hydrogen, oxygen, and nitrogen are extracted and combined to produce plastics. Plastics are extraordinarily diverse. From contact lenses to soft drink bottles to computer consoles to automobile airbags, plastics are a family of materials that, through technology, can be used in many different forms.

The plastics industry has developed stronger and more versatile products, allowing manufacturers to do more with less, thereby conserving resources and reducing waste. Plastics manufacturers have invested in technologies that make their products lighter and more energy-efficient. Lightweight plastics often enable companies to ship more products using less fuel. For example, plastic grocery bags use 70 percent less materials now than they did 25 years ago.

Plastics prevent waste by keeping perishable foods fresh longer and by helping protect products from damage, breakage, and spoilage. Some plastic products are durable and easily reusable.

Many communities across the country now recover some type of plastic for recycling, with residents actively participating in curbside or drop-off recycling programs. These collected items are being used by the plastics recycling industry to make new products

such as bottles, office supplies, carpeting, jackets, and even hiking boots.

Since different plastics offer different properties that can be engineered to meet the requirements of a broad range of applications, the success of a product is often dependent on matching the right plastic with the right properties to the right application.

The Society of the Plastics Industry resin identification code enables recyclers to separate the resins by type, ensuring that the recycled plastic is as homogeneous as possible to meet the needs of the end markets. Biodegradable and compostable plastics are increasingly being introduced. These plastics are primarily reproduced from renewable resources (i.e. corn, switchgrass, and grain). These plastics most frequently may be labeled Number 1 or 7.

Local recycling education programs frequently use both the number on the plastic container and product type that may be recycled, as an example “We accept Number 1 and Number 2 plastic containers for water, soda/pop, milk, and similar consumable beverages.” A recycler may be challenged to identify the type of plastic by locating the number on the container and some recycling programs are eliminating the reference to the number or plastic identification code.

Procedure

1. To begin the lesson, ask students to share with the class their favorite type of cake. List on board or use computer to project list onto screen. Ask the students to compare and contrast the ingredients to make different types of cake including questions like do they all have the same ingredients, do some have fruit and others don't. Briefly discuss how these are categorized as cake and yet they are different. You may want to make this an assignment before class for students to research the ingredients for their favorite cake.
2. Introduce the topic of plastics to the students. Brainstorm types and uses of plastics. Different plastics are suitable for different uses. Discuss the need for manufacturers to choose resin type carefully.
3. Give the students copies of the handout “Plastic Container Identification Code.” Discuss the components of the handout. Practice pronouncing the full name of each type of plastic.
4. Give the students copies of the handout “Plastic Container Worksheet.”
5. Ask students to sit in a circle around the pile of plastic containers they have brought in or that you have provided. Have each student select a container and begin to record the required information on the “Plastic Container Worksheet.”

6. On your signal, ask students to begin passing the containers to the right, again asking them to log the required information on their worksheets. Keep the stream flowing until all blanks are filled or until seven types are entered. Students may “draw” from the pile if necessary to keep the activity moving.
7. Have the students share their conclusions based on the data recorded on their charts.
8. In the center of the circle or on a table, group the containers by their plastic code numbers. Discuss the properties of each.
9. Find out the types of plastics that are collected for recycling in your community. Set apart those numbers and/or container types. Have students describe differences in these containers and others to consider why these are recyclable.

Assessment

- Ask students: What role does plastic play in our society? Describe the plastics identification code, including numbers and descriptions of each. Why do we need a plastics identification code?

Technology Connections

Websites to consult:

- American Chemistry Council (http://www.americanchemistry.com/s_plastics/sec_learning.asp?CID=1102&DID=4256)
- Society of the Plastic Industry (<http://www.plasticsindustry.org/>)
- National Association for PET Container Resources (<http://www.napcor.com>)
- Association of Manufacturers of Polyester Film (<http://www.ampef.com>)
- Association of Postconsumer Plastic Recyclers (<http://www.plasticsrecycling.org>)
- Environmental Protection Agency “Recycle on the Go” initiative (<http://www.epa.gov/epawaste/conserve/rrr/rogo/index.htm>)
- Mohawk Industries - learn about carpet made from recycled PET (<http://www.mohawkflooring.com/carpeting/everstrand/default.aspx>)
- PET Container Recycling Europe (<http://www.petcore.org>)
- PET Resin Association (<http://www.petresin.org/>)
- Society of Plastics Engineers (<http://www.4spe.org>)

Enrichment

- Using the handout “Enrichment: Plastic Container Survey” have students survey their homes and/or grocery store. In class, analyze the data collected on the survey sheet.
- Based upon the information collected from other research and reports, have students describe the role of home, school, and community in plastics recycling efforts. Discuss the relationship between the SPI code (SPI stands for Society of the Plastics Industry) and plastics recycling. How can home, school, and community participate in collection and recycling programs?
- Using information provided students will explore the density of plastic. They will learn differences in the composition of different types of plastic, how their compositions impacted whether the plastic can be recycled, and why water bottles are easily recycled when plastic cups are not. They will also learn why all #2 coded plastic cannot be recycled.

Materials

- Pieces of cut up plastic number 1-7
- Plastic bottle #1 with cap
- Container of water for each group
- Salt

Enrichment Density Procedure

- To begin Enrichment, ask students to think about a pancake and a biscuit - although they are made of the same ingredients, (water, eggs, flour and milk) there are different quantities of these ingredients within each item. Pancake

batter is runnier than biscuit batter, making it easier to pour, whereas biscuit batter is more easily molded. Also, once you make the batter for each item, you cook them at the same temperature but for different lengths of time. Pancakes cook relatively quickly at a high direct heat on the stove, while biscuits have to be put in an oven and given time to bake. Plastics are the same way. They all have the same initial components which constitute being plastic and relate to the number they are given (i.e. 1-7); however, the individual makeup within each product dictates our ability to recycle it.

- Explain to students that some of these plastics will sink and some will float. Demonstrate float or sink with an empty bottle with the cap on. Why does it float? Now take the cap off and fill it with water? Why does it sink?
- Discuss with students how the shape of an item can affect its ability to float or sink. Divide students into small groups. Hand out Plastic Container Worksheet and mark float or sink under observable package properties column.
- Have students predict which pieces of plastic will sink and which will float. Allow students to examine the plastic in small groups.
- Put plastic pieces in the water and record observations.
- Discuss why floating litter would be a problem for aquatic animals.
- How would the plastics behave if the water was very salty (like the ocean)? To test this, add several heaping tablespoons to the water and stir well. Retest plastics.

Sample of how plastic pieces will react.

Material	Floats or Sinks
#1 plastic bottle with cap	Floats
#1 plastic bottle without cap	Sinks
#1 plastic non-bottle	Sinks
#2 plastic bottle with cap	Floats
#2 plastic bottle without cap	Floats
#2 plastic bag	Floats
#3 container (with or without cap)	Sinks
#4, 6-pack ring	Floats
#4 plastic bag	Floats
#5 plastic container	Floats
#6 expanded	Floats
#6 non-expanded	Sinks
#7 PLA bio-based plastic	Varies
# 7 plastic bottle	Varies

Enrichment adapted from RE3.org

Definitions

	PETE (or PET) – polyethylene terephthalate Commonly used to package soft drinks, water, beer, juice, sports drinks and other beverages, as well as edible oils, salad dressing, peanut butter, various condiments and sauces, and non-food products like household cleaners and personal products.
	HDPE – high density polyethylene Commonly used for milk, cider and water jugs, as well as detergent, fabric softener and bleach.
	V or PVC– vinyl/polyvinyl chloride Often used for salad dressing bottles, vegetable oil bottles, mouthwash, and PVC pipes.
	LDPE – low density polyethylene Used for flexible bags for dry cleaning, trash, produce, bread and shrink wrap. Recycled LDPE is often used to make grocery bags.
	PP – polypropylene Usually found in drinking straws, battery cases, some dairy tubs, bottle labels and caps.
	PS – polystyrene Commonly used for materials like expanded: packaging peanuts, meat and egg trays, and non-expanded: drinking cups, plastic utensils/cutlery, and yogurt cups.
	OTHER Other plastics are often made of multiple resins or layers of different types of plastics. These may include microwavable packages or snack bags. Compostable plastics are usually included as ‘other.’

Source: NAPCOR

Student Activity Sheet

Plastic Container Worksheet

Name: _____ Date: _____

Container Sample	Letter Code	Type of Product	Observable Package Properties
Numeric Symbol	Examples: PET, HDPE, V or PVC, LDPE, PP, PS, Other	In this column, write the name of the product or sketch its shape	Examples: flexible, rigid, transparent, opaque, translucent, color, white, creases when crushed, sink or float, other...
			
			
			
			
			
			
			

Student Activity Sheet

Enrichment: Plastic Container Survey

Name: _____ Date: _____

Directions

1. Conduct a plastic package survey in a grocery store or at home.

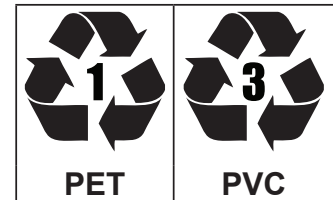


Which store or aisles?



Which rooms at home?

2. Look at the bottom of each plastic package. Find the Society of the Plastic Industry (SPI) code. Record the number symbol and the letter code, e.g.:



Student Activity Sheet

Name: _____ Date: _____

Data Analysis and Conclusion

Analyze your data. Count how many times you found each code.















Which was the most frequent? _____ Which was the least? _____

Calculate the percent for each code. If you filled in all 50 boxes, count the number of boxes for each code, then multiply the number by 2 to get the percent; or use this formula:

$$\frac{\text{counts for a code}}{\text{counts for all codes}} \times 100 = \text{percent of the code in total}$$

What surprised you about your results? (You may use the back of this page to write your answer.)

Garbage Pizza

Objectives

Students will be able to:

- describe the composition of Municipal Solid Waste (MSW),
- identify items within each waste category, and
- visualize the amount of waste and categories of MSW by creating a pie chart to look like a “pizza.”

Method

Students will construct a garbage pizza, a three-dimensional pie chart, which represents the MSW discarded in the United States; each slice of the pizza will represent a different solid waste category.

Materials

- For pizza “crust,” use a 12” cardboard cake circle or paper plate. Alternative for pizza dough: large mixing bowl, spoon, rolling pin, pizza pan, 2 c. flour, 2 c. salt, 1 c. water, oil or shortening.
- For pizza “sauce:” school glue, red food coloring, small paint brush.
- For pizza “toppings:” solid waste samples from these categories:
 - paper: newsprint, shredded paper, boxes, wrappers;
 - yard waste: grass, sticks, leaves, potpourri;
 - plastics: disposable food service products (cups, plates, cutlery), bread bag clips, jug lids, miniature toys;
 - metals: paper clips, staples, aluminum can pull tabs, nuts and bolts;
 - wood: tooth picks, building blocks, cedar chips, golf tees;
 - food: egg shells, pasta, pretzels, dry cereal;
 - glass: marbles, sea glass;
 - other: rubber band, candle, leather, textiles.



Time

45 minutes – 1 hour (additional time needed in preparation if baked crust is used)

Vocabulary

- garbage
- Municipal Solid Waste (MSW)
- trash

Background

MSW—otherwise known as trash or garbage—consists of everyday items such as product packaging, grass clippings, furniture, clothing, bottles, food scraps, newspapers, appliances, and batteries. Not included are materials that also may be disposed in landfills but are not generally considered MSW, such as construction and demolition materials, municipal wastewater treatment sludges, and non-hazardous industrial wastes. In the United States, we generated approximately 243 million tons of MSW in 2009. Over the last few decades, the MSW generation, recycling, and disposal of MSW have changed substantially. Annual MSW generation in 1960 was 88 million tons. The generation rate in 1960 was just 2.68 pounds per person per day; it grew to 3.66 pounds per person per day in 1980, reached 4.50

pounds per person per day in 1990, and increased to 4.65 pounds per person per day in 2000. Since 2000, MSW generation has remained fairly steady with the current generation rate at 4.34 pounds per person per day.

Over time, recycling rates have increased from just over 6 percent of MSW generated in 1960 to about 10 percent in 1980, to 16 percent in 1990, to 29 percent in 2000, and to over 33 percent in most recent reports. Disposal of waste to landfills has decreased from 94 percent of the amount generated in 1960 to 54 percent of the amount generated currently.

The U.S. Environmental Protection Agency (EPA) uses two methods to characterize the MSW generated. The first is by material (paper and paperboard, yard trimmings, food scraps, plastics, metals, glass, wood, rubber, leather and textiles, and other); the second is by several major product categories. The product-based categories are containers and packaging; nondurable goods (e.g., newspapers); durable goods (e.g., appliances); food scraps; and other materials.

PreActivity Procedure

1. Determine “crust” to be used. If using cardboard cake circles, the next procedure is outlined in #2.

If using the alternative pizza “dough” before class, prepare a “Garbage Pizza” crust, using the following recipe:

- Mix 2 cups flour, 2 cups salt, and 1 cup water (adjusting water per altitude and/or humidity) until a stiff dough forms.
- Knead the mixture, as you would bread dough. Flatten the dough into a well greased, 12” round, deep dish pizza pan, pressing the edges up the inside of the pan until it looks like a pizza.
- Cut the pizza into the same slices or sections to look like the Municipal Solid Waste by Weight, pie chart template included in this lesson.
- Using a fork or knife, puncture each slice several times before baking to avoid expanding air pockets. Bake at 350° for 40-45 minutes, or until golden brown. Check the pizza every 10 minutes or so and re-cut the sections. Remove the pizza from the oven and let cool completely. The dough should be hard and dry.
- Label the underside of each pizza slice with the correct type of waste and the percent it represents. A permanent marker works well.

This makes it easier for students to glue the proper waste on the proper slice.

2. For “sauce,” mix approximately 4 oz. of white school glue with approximately 2 oz. of red food coloring (adding a drop of blue food coloring will darken the red, but is not necessary for a successful “sauce”) until you achieve the desired red tomato sauce look.

Optional: Apply sauce with a small paint brush (an apron is highly recommended). Allow to dry thoroughly.

Procedure

1. Ask students to define the words garbage and trash. Garbage refers to only the organic or food waste thrown away. Trash represents broken, discarded or worthless things (e.g., rubbish and other forms of refuse which are not food).
2. Brainstorm with students and list on the board all the waste items thrown away at home or school. Use the following categories: paper, yard waste, plastics, metals, wood, food, glass and other. Introduce the concept of municipal solid waste (MSW). MSW is made up of trash and garbage from household, commercial, and institutional sources in a community. Ask the class if the items listed on the board would also be found in a community’s MSW.
3. Draw a circle on the board. Have the students pretend that all the waste thrown away in the United States will fit into this circle. This circle is filled with waste from all the categories (paper, yard waste, plastics, metals, wood, food, glass and other). Show students how much paper is thrown away by drawing a slice for paper (see chart included in this lesson). Repeat this demonstration for all eight categories.

Reinforce the fact that the biggest slice, marked “paper,” means that there is more paper by weight than any other item in MSW. The next largest slice by weight is yard waste, etc. Ask the students why it might be important to know the amount and kinds of waste thrown away. By understanding the solid waste stream (MSW), and local conditions, (distance from recycling centers, available space for landfills, etc.), communities can implement a responsible waste management plan.

4. Announce that the class is going to make a garbage pizza (with garbage and trash). Show the students the pizza dough either cardboard cake circles, plate plates or the homemade dough. Divide the students in teams and

ask them to collect materials and glue to the applicable slice of pizza.

Optional: You may do individual pizzas instead of team.

5. Share the garbage pizza model with other classes or the entire school. Have students team-up and teach students in other grades about MSW using the garbage pizza model.
6. For an added touch after the glue has dried, spray the garbage pizza with polyurethane or lacquer (in a well ventilated area), available at your local hardware store.

Assessment

- Set up a table with items from the eight categories of MSW: paper, yard waste, plastics, metals, wood, food, glass and other. Make signs for each category, and have students separate the waste items into the appropriate piles.
- Students will be able to look at different MSW categories and discuss the ways these materials are handled in their community. Students may identify creative ways that can assist in changing how these materials are disposed of locally (for example, by recycling).

Technology Connections

- Use internet to research the waste stream in their school, local community or state and make additional pizzas to compare to the national version.
- Create a PowerPoint presentation for decision makers regarding trends in waste collection and recycling rates for school and community.

Enrichment

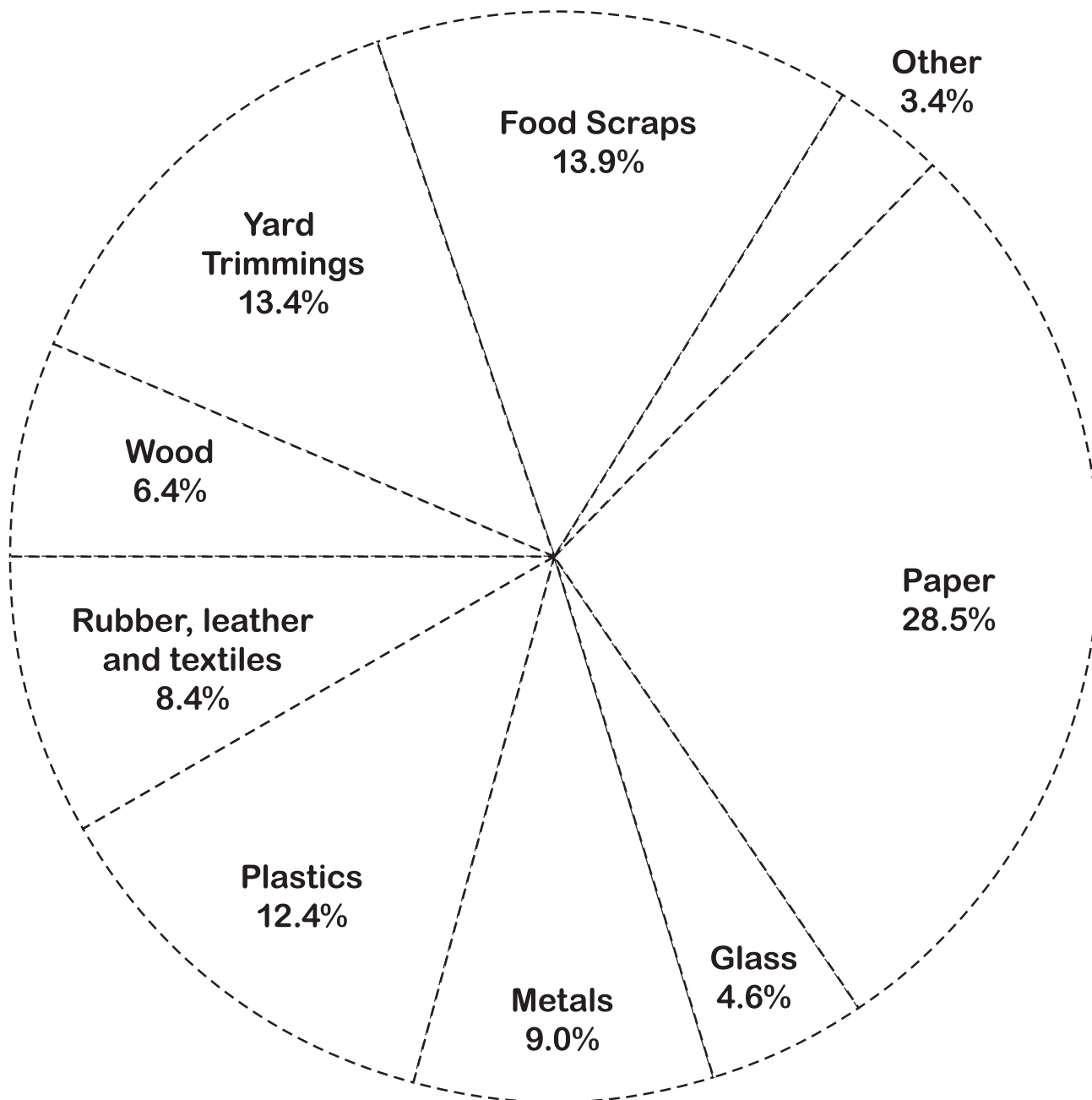
- For more advanced students, discuss the difference(s) between MSW measured by weight and volume by making two pizzas: one using statistics for percent by weight (as used in this lesson), and one using statistic for percent by volume. Weight reflects total municipal solid waste generated; volume represents what's left over after recovery for recycling and composting. Discuss the advantages associated with a reduction in the weight of garbage (less energy to transport, less expensive to deposit at a landfill) vs. reduction in volume (less landfill space required).
- Ask students to look through magazines for pictures of items from each MSW category. Have each student draw a garbage pizza on poster board and glue the pictures on the appropriate sections. Display the posters in the cafeteria.

- Discuss ways students can help better manage solid waste in school. For example:
 - don't waste paper, use both sides of paper, start a reuse box for all kinds of paper;
 - start a paper recycling program, determine what materials your solid waste management company accepts;
 - start a composting program;
 - think of creative ways to reuse different products and materials.
- Create a pizza using disposal methods. Discuss options for disposal and differences between discard (landfill), recovery (recycling and composting) and combustion with energy. How does this compare with local rates? (see EPA MSW Report: www.epa.gov/epawaste/nonhaz/municipal/index.htm).

Note: Keep America Beautiful, Inc. poster "Million Tons of Stuff" provides a visual picture of the waste management options available.

GARBAGE PIZZA TEMPLATE

1. On a large piece of cardboard, draw a circle with a diameter of at least 12 inches. Have a teacher or adult help you, if needed.
2. Use the template below to mark out the slices of your pizza.
3. Cut out the pizza circle (again with the teacher's help if needed).
4. Apply the materials that you have collected or have been provided with by your teacher. Make sure you put the materials on the proper slices.



Total MSW Generation (by material), 2010
250 Million Tons (before Recycling)

Papermaking

Objectives

Students will be able to:

- ➔ name the benefits of paper recycling;
- ➔ summarize the paper recycling process; and
- ➔ make a sheet of recycled paper.

Method

Students will recycle used paper to make new paper.

Materials

Simple Method

- Roll non-metal window screen cut into 10 or 12 inch squares, 2 per station
- Kitchen blender
- Newspaper, about 20 sheets folded in half per station
- 2-3 ounce cups, 2 per station
- Cookie cutters in your choice of theme, 1 per station
- Butcher paper
- Markers
- 2 Plastic dish pans
- Paper towel, 1 sheet per student

Advanced Method

- several papermaking screens (see procedure to make)
- used paper (white and colored)
- kitchen blender
- sponges
- paper or cloth towels
- board for pressing or rolling pin
- pitcher or cups
- water
- aprons (optional)
- clear shallow plastic dish pan

Vocabulary

- recycle
- mold
- deckle
- couching
- pulp
- slurry

Background

Recycling is a way to extend the useful life of a valuable resource. Recycle means to use used materials again by saving them from the trash and



reprocessing them. Reprocessing used materials involves breaking them down and then reforming them into a new product.

Paper recycling is the process of recovering used paper and remaking it into new paper products. Paper recycling is not a new idea—in the 19th century, people used old cloths and rags to make new paper. Papermaking is the process of making paper.

Many different types of paper can be recycled into new products. Notebook paper, for example, can become printing or writing paper, newspaper, or packaging.

Newspaper is usually made into new newsprint, tissue, or paperboard. Cardboard is recycled into new cardboard or paperboard packaging. Magazines, catalogs and telephone directories are made into paperboard, tissue and writing paper. Every ton of paper recycled saves more than 3.3 cubic yards of landfill space. That is about the same size as a small refrigerator. According to the EPA, in 2009 62.1 percent of the paper used in the U.S. was recovered for recycling. And by weight, more paper is recovered for recycling than glass, metals and plastics combined.

In the papermaking process, the following vocabulary is used:

- **Couching:** A method of transferring a sheet of wet paper from the mold onto a drying surface.

- **Deckle:** An uncovered frame which fits on the mold and shapes the paper.
- **Deckle edge:** When pulp slips under the deckle, it forms a soft edge and is called a deckle edge.
- **Mold:** A frame used when making paper which holds a stretched screen.
- **Pulp:** Fibrous material prepared from wood or recovered paper used to make paper products.
- **Slurry:** The product produced when pulp and water are mixed together during the paper making process that is used to make paper.

Pre-Activity (Simple Method)

Setup 1 station for each student that will be working at one time. Ex. 4 students need 4 stations

1. On a flat working area place at least 20 pages of newspaper folded, this will absorb excess water from pulp.
2. Place 1 sheet of paper towel on top of newspaper.
3. Place one square of screen on top of paper.
4. Select your cookie cutter and place sharp edge down on top of the screen.
5. To the side place the second sheet of screen, 2 sponges and cups.

Pre-Activity (Advanced Method)

6. Preparing the Screen:

Wood Screen Option: A mold and deckle are usually made with two wooden picture frames with one as a mold with a screen stapled to it or secured inside and the second wooden frame as the deckle. The screen may be hardware cloth, nylon window screen or craft/embroidery screen. Screen is available at hardware or craft store. Place screen on back of wooden picture frame and secure with staples around the entire edge. Cut away the excess material and you have a mold that will screen paper pulp. The size of the frame depends on the size of paper you would like to make. You may want to vary size depending on both age of students and uses of finished paper (for example: will the paper be used to write on, use for art, or display). You may want to have 3 or 4 molds and deckles so an assembly line process may be used to make several pieces of paper at each time.

Plastic embroidery/craft hoop Option: Two plastic embroidery/craft hoops may be used. One hoop will be used as a mold with the screen secured inside by pressing screen into the outer frame with your fingers and then place the inner

frame into position. Screen should be pulled tight in the hoop. Cut away the excess material and you have a mold that will screen paper pulp. The second hoop without screen acts as a deckle.

7. Gather the Following:

Sponges: Sponges are natural for water removal. Use a sponge small enough to fit in your hand, one that is good for soaking up water.

Towels/Paper Towels: Large towel or paper towels. Towels (couch sheets) get wet from being used and maybe dried and reused.

Board for Pressing: This will be used to press down on a wet sheet of recycled paper between layers of towels. Use a rolling pin or 1" x 4" board cut into 6" lengths works well.

Set up a paper recycling station equipped with the above materials. Be sure to place newspaper or a sheet of plastic on table. This process can be messy.

Procedure

Introduce paper recycling to the students. Discuss the papermaking process outlined in the Background section. Discuss the use of wood and recovered paper in making paper. The raw material used to make paper in the U.S. comes from a combination of wood from trees grown to make paper, recovered paper and the wood residuals (such as wood chips) left behind from lumber manufacturing. For this activity new paper will be made from recovered paper only.

How to Make Pulp:

1. Fill the kitchen blender with water until 3/4 full.
2. Cut or tear scrap papers into small pieces and place the paper into blender, or you may soak the paper pieces in a dish pan of water to soften it, then add to the blender.
3. Place the lid on blender. Start with medium speed. Run the blender in a series of short bursts. This process is turning paper back into pulp. Run blender until the mixture has the consistency of thin oatmeal.
4. Pour blender contents into the plastic container. Add more water until the container is 1/2 full.
Skip this step if using the simple method.
Simply empty the blender into second dish pan.

Making a Paper Sheet (Simple Method):

1. Fill 1 or 2 small cups, depending on size of cookie cutter mold, with pulp.
2. Dump the pulp into cookie cutter on the screen, gently press pulp into all areas of the cookie cutter.

3. Allow to drain for a minute.
4. Slowly remove the cookie cutter and place the second sheet of screen on top of the shape.
5. Gently begin to press the water from the pulp using the sponges. Squeeze the water from the sponges back into the dish pan containing the remaining pulp.
6. When you have removed as much water as you think that you can pick up the paper keeping it flat inside the 2 screens.
7. Remove one screen, place your hand on top of paper shape, turn over and remove the other screen.
8. Place the paper shape on butcher paper and label with student's name. Allow to air dry.

Making a Paper Sheet (Advanced Method):

1. Gently stir the pulp in the container with your hand.
2. Place the deckle against the screen side of the mold. Hold the two parts together.
3. Dip the mold/deckle vertically into the edge of tub with the top edge tipped slightly towards you. As you lower the mold/deckle, tip the top edge away from you in a scooping motion. Lift the fully immersed mold/deckle straight up out of the tub, keeping it horizontal.
4. The pulp will even out and the fibers will bond together while the water is draining out.
5. Carefully lift the deckle off the mold. If you don't like the sheet, turn the mold over, hold it on the surface of the water to release the pulp so that you can try again.
6. If you are pleased with the sheet, place a couch sheet (a dry piece of paper or towel) on it and turn the mold over onto a firm hard waterproof surface. Remove excess water by pressing a sponge on the back of the mold.
7. Lift mold and starting slowly at one corner of mold, peel off the new paper from screen, leaving the new sheet on 1-2 towels.
8. If new paper is still very wet place 1-2 more paper towels on top of the new sheet. Take a flat piece of wood or rolling pin and press down hard on top of the dry towels.
9. Remove the top wet towels. Replace with dry ones. Repeat pressing. Repeat replacement of wet towels with dry ones, and pressing, until little water is removed with dry towels. Do not throw wet towels away. Lay them out to dry. Re-use them in future papermaking.
10. Place newly made paper on a sheet of paper and instruct students to write their names on sheet of paper beside their recycled papers.

11. Let the paper dry overnight. Optional methods to drying paper:

- Place paper in sun
- Place paper on an ironing board with a dishtowel or fabric over them and iron. (Ironing dried paper will flatten it out.)
- Set them in front of a fan.
- Use a hairdryer.

Summary Discussion

Remind students that recyclable paper may include writing paper, paperboard boxes, corrugated boxes, magazines, newspapers and other materials. Share information on the process of recycling and how an existing item may be turned into a new item. Explain that the used item may be made into new items that are the same or different than the used item. For example, old newspapers can be made into new newsprint or paperboard.

Assessment

- Have students describe the process of recycling paper.
- Display students dried paper products
- Ask students to discuss the importance of recycling

Technology Connections

- American Forest & Paper Association (<http://www.afandpa.org>)
- paperrecycles.org (<http://www.paperrecycles.org>)
- Before or after the activity, show students the video "Making Paper" at www.paperrecycles.org to give a real-world overview of the recycling process.
- Design a presentation to pictorially explain the process.
- Video the process of making paper and include the paper recycling collection at the school/site.

Enrichment

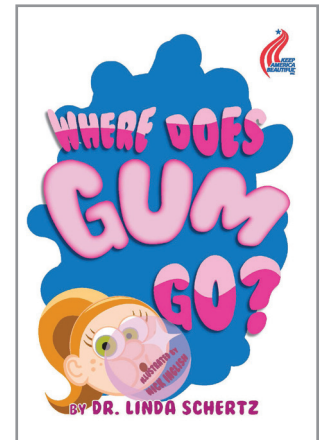
For additional sheets of recycled paper:

- Do a litter cleanup on campus and discuss how items that have been littered could have been recycled if they had been disposed of properly. Select paper items from the litter, soak in a solution of $\frac{1}{4}$ cup of bleach and a gallon of water for 5 minutes, drain and rinse before adding to other paper in the blender.

- Dry flowers, leaves or parts of plants by placing them between two pieces of paper towels and microwave for 30 seconds at a time. Check every 30 seconds until the plants are almost crisp. Or collect items and lay in sunlight for a day to dry. Add the dried plants to your sheets as soon as you have lifted the mold from the pulpy water. Arrange the flowers and leaves in an artistic manner. A toothpick helps to position them.
- Add flower seeds to paper after it is molded to make “plantable” seed cards or seasonal ornaments. If seeds won’t stick wait for the paper to dry and attach seeds with water soluble glue.
- Combine threads, ribbon lengths, in a single new sheet. Add the threads to the pulp when it is in containers just before pouring.
- Try glitter; add it either in the blender and/or in the containers just before pouring.
- Paper can be cut, hole punched, or painted after it has dried.
- Collect examples of recycled paper products. Some possibilities are: food boxes such as cereal boxes, paper napkins, kraft grocery bags, copier paper, greeting cards, stationery and carry-out trays from fast-food restaurants. Make a display.
- The Simple Method can be used to make a free form sheet of paper. Use a larger cup to pour pulp onto screen without a form. Place second screen on top and press out excess water with sponges. When the sheet is dry it can be cut or used as is.

Where Does Gum Go?

by Dr. Linda Schertz



Book Summary

This book follows the adventures of chewing gum and then disposing of it in an appropriate way. Children will enjoy Gabby's adventures and the illustrations.

Before the Story

- Have the students view the cover of the book to predict the storyline.
- Ask them if they are allowed to chew gum and how they discard it after use.
- Read the title, *Where Does Gum Go?* Point out the question mark in the title.
- Tell them that question marks are used when information is needed in response.
- Talk to them about onomatopoeia—words that make the sound noises. Tell them that this story uses onomatopoeia.

After the Story

- Ask the students to retell the story in their own words.
- Ask them to share their experiences with gum—good or bad.
- Ask, “What is the moral of this story?”
- Ask them if they can give you the onomatopoeia words that were used in this story.

Vocabulary

Have the students define and understand the vocabulary words listed in each activity.

Activities

The following activities are related to the storybook, emphasizing community involvement, recycling, and waste management.



Activity 8 Litter Bag



Activity 9 Working Together for an Environmental Solution (City XYZ)

Language Development

- Listens with interest to language of others.
- Understands and begins to use oral language for conversation and communication.
- Develops an expectation that words, books, and pictures can amuse, delight, comfort, inform and excite.



Development

Language

- Listens with interest to language of others.
 - It will be interesting for the children to share their gum experiences, especially if they can identify with some of the ones presented in the storybook—on shoe or in hair.
- Understands and begins to use oral language for conversation and communication.
- Develops an understanding that words, books, and pictures can amuse, delight, comfort, and inform.
 - Encourage open-ended creative dramatics. When teachers provide a beginning structure, they begin to use ideas and experiences from their own lives to create new variations on the original themes.

Allow them to role play Gabby in the book, *Where Does Gum Go?*

Cognitive

- Pays attention and exhibits curiosity in people and objects.
- Develops the confidence to explore and make sense of the world through simple problem solving and trial-and-error.
 - Students begin to understand the responsible decision making, as well as consequences for making wrong decisions.

Social Emotional

- Shows interest and awareness of others.
- Begins to develop personal relationships with peers.
- Develops emerging skills in caring and cooperation.

Physical

- Develops emerging skills in caring and cooperation.
- Shows imagination, creativity, and uses a variety of strategies to solve problems.
- Moves body to achieve a goal.

Outdoor Play

- Develops increasing ability to change positions and move body from place to place.
 - Provide Outdoor Language Experiences to promote awareness of the printed words.

Examples:

- The workbench can have rebus charts (words and pictures) to describe something to build.
- Animal cages and insect containers can have rebus instructions for care.
- Seed packages can be used to label plants in the garden; graphs of plant growth can be created.
- Charts of pictures of safety rules can be on display.

Learning Centers/Stations

Construction

- Develops responsive and reciprocal communication skills, such as turn taking.
 - Record the students retelling the story. Discuss how each person has a different voice tone. Children speak into the recorder, listen to the voices, and guess speaker.

Creativity Station

- Coordinates eye and hand movements.
 - Make a Natural Object Sculpture.
Collect a number of natural objects (seeds, twigs, pinecones, seed pods, stones, driftwood) of various sizes and color. Arrange the items to create a small piece of sculpture. When satisfied with the creation, glue it together. Paint or colored paper can be added to enhance the design.

Fine Motor

- Develops control of small muscles—manipulation and exploration.
 - Sponge painting.
Cut sponges into different shapes. Children may dip each shape in paint. Then dab, press, or run it on paper.

Gross Motor

- Moves body to achieve a goal.
 - Cloud and Sky Watching.
Have the students go outdoors. When the teacher rings a bell, the students stop, lie down on the ground and look up at the sky. They may see clouds of many shapes. Clouds may join together. They can describe the objects they see created by the clouds.

Whole Class Lesson

Comprehension, Vocabulary

Understands new vocabulary and uses it correctly when reading and writing.

- Identifies elements of a story including setting, character, and key events.
- Analyzes, makes inferences, and draws conclusions about theme and genre in different cultural, historical, and contemporary contexts and provides evidence from text to support their understanding.
 - Make a Character Collage.
Provide old magazines, catalogs, sheets of paper, scissors, and paste or stick glue. Talk about the character, Gabby, in the gum storybook. Have the students think carefully about the character Gabby chewing gum. Ask the students go through the magazines; cutting (or tearing) out pictures that in some way represent or remind them of the character.
- For example, a Gabby gum collage may include a picture of a stick of gum, shoes, hair, and chair.

Modeled Writing

Reading

- Demonstrate the one-to-one correspondence between a spoken word and a printed word in text.
- Recognize that sentences are comprised of words separated by spaces and demonstrate the awareness of word boundaries.
- Identify a sentence made up of a group of words.
- Identify syllables in spoken words.

- Recognize the distinguishing features of a sentence
- Recognize function of punctuation.

Phonological Awareness

- Name Games—Playing with children's names can build sensitivity to the sounds of language and the use of words.
 - The patterns and rhymes found in children's names can be explored. Begin by clapping the rhythm of children's names: Ste-pha-nie, Gab-by, All-i-son.
Children can use rhythm sticks, drums, or triangles to follow the beat of their names.

Print Awareness

- Children's names can also be used to further understanding of the connection between the spoken and written word.
 - Use lists of student names whenever possible to observe the similarities and differences between names.



Independent / Partner Workstation

Read for Details, Writing

- Write a descriptive poem on litter, littering, litterbug or other vocabulary for lesson.
- Encourage the students to give you five words that tell something about the subject of litter. Consider adding rhyming words to the descriptive words to produce a poem.

Listening, Speaking, Art

- Play, Are you listening?
- Fill eight margarine tubs (with plastic lids) with different materials. For example, two with buttons, two with sand, two with pins, and two with beads. Have the students find the two that sound alike by shaking them.

Read Aloud Time

Reread to locate key details

- Reading—Noisy Story
- The noisy story develops vocabulary and skill in sequencing of story events. It also allows students of varying levels to participate.

Prepare a set of cards, each card having a noisy word on it such as the one in the book, *Where Does Gum Go?* Example: CHOMP, CHOMP, CHEW, CHEW, WOOSH, WOOSH, POP, POP.

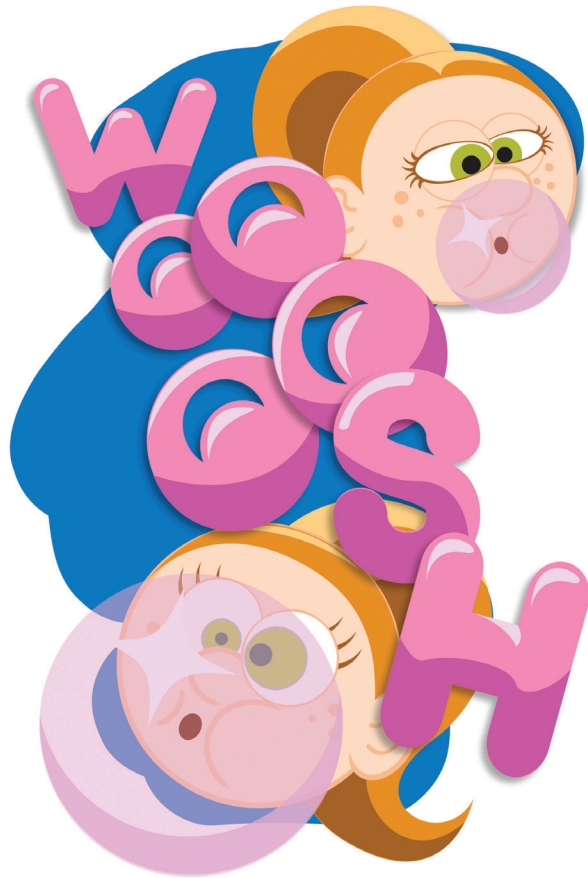
Give each child a card and begin reading the book. When the reader says CHOMP, CHOMP, the student with the CHOMP, CHOMP card raises it up for all to see. (The same procedure is used for the other words in the book).

Shared Writing

Feelings

Writing

- Writing about pictures
- Have the students clip magazine photos that show feelings. Show one of the pictures to a group and have them brainstorm the feelings shown in the photo. Then have them write about why they think the picture reflects a certain feeling.
- Ask, “What is happening in the picture?”
“What is the setting/background of the picture?”
- Ask, “What might have happened after the picture was taken? Before? Why?”



Litter Evaluation Bag

Objectives

Students will be able to:

- discuss why litter is undesirable, and
- state that littering is a behavior that can be changed.

Method

Students will rank a variety of commonly littered items and discuss their reasoning for the ranking.

Materials

One set per group of the following suggested items:

- paper sack
- disposable cup
- small glass bottle
- straw
- string
- candy wrapper
- snack bag
- beverage can
- balloon
- plastic bottle
- orange peel
- paper and pen or pencil per team.

Optional: a picture of each item to be used.

Time

30 minutes – 1 hour

Vocabulary

- biodegrade
- litter
- recycle



Background

Litter is solid waste that is discarded in an inappropriate place (e.g., streets, playgrounds, streams, etc.), or improperly stored waste which has escaped from its container or vehicle. While litter is the actual item found, the behavior called “littering” is what Keep America Beautiful attempts to change. The combined use of education, ordinances, enforcement and resources and tools will result in behavior change. Litter has environmental consequences. Wind and weather, traffic, and animals may move litter into gutters, lawns, landscaped areas, alleyways, and parking structures. Litter near storm drains and beach debris are also likely to wash into local waterways, with potential for environmental contamination.

Keep America Beautiful conducted a visible litter study in 2009 that concludes that at least 51.2 billion pieces of litter are left on roadways in the U.S. The aggregated composition of litter on roadways: tobacco (37.7%), paper (21.9%), plastic (19.3%), metal (5.8%), glass (4.5%), organic (4.2%), construction & vehicle (4.1%), other (2.5%).

A comparative analysis of the 2008 and 2009 research and KAB’s national litter study conducted in 1968 found that successful education, ongoing clean-up efforts, and changes in packaging are having an impact. The survey shows 15% of individuals

self-reported littering in the past month compared to 50% in 1968. While self-reported littering rates have declined in the past 40 years, individual littering—and litter—persists. Preventing litter requires changing individual behavior. Additional research on litter and littering behavior is available at www.kab.org and in the Resource section of this book.

Procedure

1. Assemble “litter” bags with the following items in each bag: paper bag (use it to hold the rest of the items), disposable cup, small glass bottle, string, snack bag, balloon, orange peel, beverage can, plastic bottle and straw.
2. Divide the class into small groups of 4-6 students each. Give a “litter” bag to each group. Explain that the bag and the items in the bag are commonly littered items. Assure students that their bags are filled with clean items, so it is alright to touch them. Each group should also have a piece of paper and a pen or pencil.
3. Ask the groups to empty their bags and arrange the items so that everyone in the group can see and touch them. Write a list of the items including the paper bag on the board, flipchart, paper, or type the list into a computer and show on a screen.
4. Instruct groups that they are to rank the litter items from least harmful to most harmful to the environment. Remind students that the ranking should be a group decision. Do not give the groups any further guidelines or suggestions on criteria to use to rank the items. Let them discover their own criteria for labeling the items.
5. When groups have ranked all items, they should write their order down on a sheet of paper from least harmful to most harmful. Below their list, they should discuss why they ranked the items in this way.
6. After all the groups have finished, have them report their decisions to all groups. On the board, flipchart or computer keep track of order and the reasons groups give for their ranking. Review and discuss the list of reasons. Stress the fact that there is no right or wrong answer. Define litter (see the Glossary of Terms.)
7. Reinforce the concept that littering is an inappropriate behavior. No item can be acceptable as litter. No matter where it ranks, “waste must be in place” or properly disposed of in a trash or recycling container. Litter attracts litter; therefore, because a material is biodegradable does not make it acceptable as litter. Littered food items also impact wildlife,

often drawing them to roadsides where they are killed or injured. As noted in the background section, tobacco products, specifically cigarette butts, are the most frequently counted littered item on roadways.

8. Ask the groups if they had discussed why litter is harmful. Add these reasons to the list on the board. Many of the following points may be raised.
 - Litter is pollution; it is an eyesore that destroys the aesthetics of a location/locale.
 - Litter may be dangerous. Broken glass or a piece of metal littered on beaches, in playgrounds or on a sidewalk can cause cuts.
 - Litter can be a threat to public health; illegally dumped tires are breeding grounds for mosquitoes that carry illnesses and rats may flourish in abandoned waste piles.

Assessment

- Ask students to name three examples of items they have seen as litter on ground. Have them explain why it is undesirable to find these three things littered. Where should the items be placed?

Technology Connections

- Encourage students to research the impact of litter at the Keep America Beautiful website: www.kab.org.
- Conduct a web search on ways to report littering to state or local officials.
- Use a spreadsheet to show all the responses and create a graph of answers.

Enrichment

- Group the “litter” items using the categories of reusable (i.e. *most reusable* to *least reusable*), recyclable (*most recyclable* to *least recyclable*), and compost (*most able to be composted* to *least able to be composted*). Discuss various ways to properly dispose of litter.
- Take the students out to the playground for a litter cleanup. Then come back to the classroom and have the students rank the items they’ve found. Discuss what could be done to encourage proper disposal.

Working Together for an Environmental Solution

Objectives

Students will be able to:

- ➔ recognize the need for cooperation among community members in developing a solution to a solid waste dilemma, and
- ➔ determine that there may be more than one solution.

Method

Students will interact in a cooperative manner to solve a problem.

Materials

- Four decks of cards with the same design on the back
- Clock or timer

Time

45 minutes – 1 hour

Vocabulary

- MSW
- cooperation
- community
- solid waste

Background

“Community” is defined as people living in a particular city, neighborhood, district, county or parish having a common interest in (and impacted by) a cleanup program. When dealing with complex environmental issues such as Municipal Solid Waste (MSW) the community must work together to identify options, promote collaboration, encourage mutual understanding among diverse constituencies and ultimately create solutions.



Procedure

Introduce the concept that cooperation can result in successful solutions by performing the choral reading, “A Trashy Story,” provided at the end of this lesson.

1. Prior to the class, remove the cards from boxes and shuffle four identical decks of playing cards together, so they are thoroughly mixed up. Then divide the entire stack into four piles of 52 cards each. You want each stack of cards to be an incomplete deck, i.e., not all cards in each suit are in a box. Places cards back in boxes.
2. Divide the students into four groups. Each group represents one of the following:
 - Group A: Industry/Business in City XYZ
 - Group B: Elected Officials of City XYZ
 - Group C: Keep XYZ Beautiful
 - Group D: Neighborhood/School leaders

Explain to the students: You are all members of the City XYZ community. The community has a current environmental problem. Because this will directly affect everyone, each group in the community is responsible for making sure that City XYZ finds a solution, so that it will continue to thrive and maintain its current quality of life.

Your task is to find a solution to this dilemma. The solution is represented by one complete deck of cards.

DO NOT tell the students: The solution may include the entire class making one complete deck of cards from the four, or it may include individual groups deciding to make separate complete decks by trading or giving cards to another group. Do not give the students precise directions as their response to the first try will present a teaching opportunity regarding the dynamics of decision making when many groups work together toward a common goal.

3. Give each group one box of cards. Tell them they have two minutes to find a solution. Announce when one minute and 30 seconds has elapsed. At the conclusion of two minutes or when a complete deck of cards is developed, discuss what has occurred. Announce when two minutes have expired and allow groups to continue to work if it appears they may be reaching a solution. (See discussion questions below.)

Optional: At end of the first try, students may not complete a full deck and may even argue about the number of complete decks to make. It is necessary to emphasize the need to try again. Give them two minutes. Repeat the solution you are looking for (a complete deck of cards) each time you start the clock. They will begin to recognize the need to organize and communicate as a group.

4. Questions for group discussion:
 - What did you do first?
 - Did you compete so your group would have the answer?
 - Did you try to trade so you would have one complete deck?
 - Is it possible to have more than one answer? (More than one deck?)
 - How many ways can you think of to cooperate to make complete deck(s)?
5. Points to Emphasize During Discussion:
 - We are all members of the same community.
 - Although we have different interests as separate groups, we all need to cooperate and work together for one common goal.
 - KAB believes in developing partnerships and cooperation between business, government, and civic organizations to make environmental decisions. Isolating one's self

or group does not help. It may cause friction and defensiveness.

- Cooperation among the groups is better at finding a solution than competition. As stated earlier, each group is responsible for 'A' task to be completed for City XYZ to thrive and maintain its quality of life.
6. Explain that students will participate in an activity about a "Trashy Story." Divide the students into four groups, giving each group a label: "Everybody," "Somebody," "Anybody," and "Nobody." During the reading, the instructor points to each group on cue. Members of each group call out their name: "Everybody," "Somebody," "Anybody," or "Nobody." They may stand, and then sit, each time the educator points to them and they call out their names. Read aloud the story on the following page.

Assessment

- Students will name at least four groups who must cooperate to solve a community dilemma. They will also tell some of the ways these groups can work together effectively to solve problems.
- Explain why group cooperation is important to finding a solution that is best for the community.

Technology Connections

- Research current community issues using internet, document with video or photographs

Enrichment

- Brainstorm how this activity relates to solving other environmental dilemmas.
- **Variation:** If you have access to several identical decks of cards (enough for one deck per student), this lesson can be developed as a small group activity. Divide the class into groups with four students per group. Give each group of four students four decks of cards shuffled together. One student in each group will represent one faction of the community. With several groups working simultaneously to achieve the same goal, you may see a greater number of creative solutions in a shorter amount of time.

A Trashy Story

(Read aloud)

There was a big problem to be solved that greatly affected the quality of life in our own community of _____ (*town*), _____ (*state*), U.S.A.

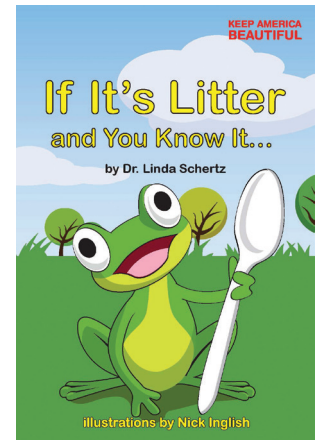
Everybody was sure that **Somebody** would do something about it.

Anybody could have done it, but **Nobody** did. Now, **Somebody** got angry about this problem because it really was **Everybody's** job to help solve it. **Everybody** thought that **Anybody** could do it, but **Nobody** realized that **Everybody** wouldn't do it. It ended up that **Everybody** blamed **Somebody**, when **Nobody** did what **Anybody** could have done.

In case no one has guessed, the dilemma that we are facing is the way we manage solid waste.
(May substitute other environmental issues.)

If It's Litter and You Know It...

by Dr. Linda Schertz



Book Summary

Buddy, the frog, and his friends teach readers where litter belongs. Students can also sing the words of the book to the tune of the song, "If You're Happy and You Know It."

Before the Story

- Talk about litter—what it is, what it looks like, how it affects the environment, and who does it.

After the Story

- Discuss the story.
- Ask about how we can prevent litter.

Vocabulary

Have the students define and understand the vocabulary words listed in each activity.

Activities

The following activities are related to the storybook, emphasizing community involvement, recycling, and waste management.



Activity 10
Walk the Talk



Activity 11
Pollution Solution

Language Development

- Listens with interest to language of others.
- Understands and begins to use oral language for conversation and communication.

Development

Cognitive

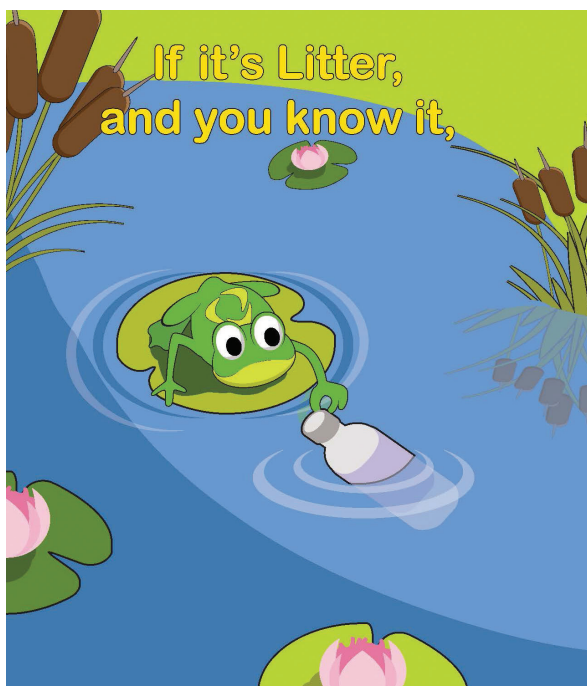
- Pays attention and exhibits curiosity in people and objects.
- Develops the confidence to explore and make sense of the world through simple problem solving and trial-and-error.
- Responds to and interacts with others.

Social Emotional

- Shows interest and awareness of others.
- Begins to develop personal relationships with peers.
- Develops emerging skills in caring and cooperation.

Physical

- Develops emerging skills in caring and cooperation.
- Shows imagination, creativity, and uses a variety of strategies to solve problems.
- Moves body to achieve a goal.



Outdoor Play

- Develops increasing ability to change positions and move body from place to place.

Learning Centers/Stations

Construction

- Develops responsive and reciprocal communication skills, such as turn taking.
 - Have the students bring in recycled items to class. Ask them to “play” with the items to create new settings. For example, cardboard boxes can be stacked next to each other to create a fence.

Creativity Station

- Coordinates eye and hand movements.
 - Ask the class to collect plastic gallon milk cartons and bring the clean cartons to class. Use the cartons for different uses such as a scooper, funnel, tray or basket by having the teacher modify the carton by cutting it in key areas.

Fine Motor

- Develops control of small muscles—manipulation and exploration.

Gross Motor

- Moves body to achieve a goal.
 - Use empty plastic gallon milk jugs as game goals, pins for indoor/outdoor bowling games.

Whole Class Lesson

Comprehension, Vocabulary

Understands new vocabulary and uses it correctly when reading and writing.

- Identifies elements of a story including setting, character, and key events.
 - Have the children sing the storybook, *If It's Litter and You Know it...* to the tune of “If You're Happy and You Know it...”
 - Create musical instruments by making simple tambourines from egg cartons and bottle caps.
 - Put a few bottle caps in each egg carton, tape it close, and you have an instrument that players can shake while singing. Children will love playing it both in rhythm and creative movement activities.

Modeled Writing

Reading

- Demonstrate the one-to-one correspondence between a spoken word and a printed word in text.
- Recognize that sentences are comprised of words separated by spaces and demonstrate the awareness of word boundaries.
- Identify a sentence made up of a group of words.
- Identify syllables in spoken words.
- Recognize the distinguishing features of a sentence.

Awareness

Phonological

- Ask the students to listen as you say two words from the storybook. Ask them what sound they hear at the beginning of the word. For example: recycle/reuse.
 - Have them create a drum to tap the syllable of each word. Glue lids to salt boxes, cereal boxes, or ice cream boxes and decorate with paint to use as drums.

Print Awareness

- Write the storybook on chart paper, and reread and sing the story.
- Point to each word modeling directionality of reading and writing.

Independent / Partner Workstation

Read for Details, Writing

- **Art**—Expresses ideas through original artworks, using a variety of media with appropriate skill.

- Collect empty small plastic bottles. Fill with rice, beans, or nuts until half full. Seal the bottles that don't have childproof lids with tape. These bottles become excellent shakers for tiny hands.

Read Aloud Time

Reread to locate key details

- Reading—Identify different parts of a book (e.g., front and back covers, title page).
 - Provide props to dramatize storybook. Emphasize the sequence of the events.
- Ask them how they can recycle and reuse recycled materials in new ways.

Shared Writing

Sequence Events

Writing

- Dictate or write sentences to tell a story and put the sentences in chronological sequence.
- Write brief stories that include a beginning, middle, and end.
- Write a story about how you can recycle and find new uses for many materials that are discarded in the environment.

For example, by gathering a collection of bottles with both small and large mouths, soft drink bottles, ketchup bottles or mayonnaise plastic containers, demonstrate how different sounds can be made with different-sized bottles by blowing across the various openings. Have them listen for high and low sounds.

Stand the bottles on a table and gently tap them with a spoon. The students can explore different sounds the bottles make by blowing across them and by tapping them with a spoon.

Maracas/egg shakers

- Fill plastic egg-shaped containers (plastic Easter eggs) with dried beans or rice. Tape the halves together and use as maracas or shakers.
- These experiences provide a springboard for ideas about writing or dictating a story.



Walk the Talk

Objectives

Students will be able to:

- understand the attitudes that predominate people's thinking about litter, and
- identify the sources of litter.

Method

Students will look for and document places on campus and in their community, if possible, where littering has occurred and attempt to determine its source.

Materials

- Large rolls of paper or maps of the community for each pair of students
- Seven different colored markers or crayons
- Litter bags
- Sample litter items
- Visual litter assessment

Time

1 hour plus additional time if done more than once or in community.

Vocabulary

- biodegrade
- litter
- behavior
- negligent

Background

For over 30 years, KAB has successfully pursued a behavioral approach to reduce littering and increase beautification and waste reduction and recycling – the five-step KAB Attitude Change Process, developed through research and field-testing. The behavioral scientists identified the need to change behavior as the only effective way to achieve lasting, sustainable improvement in community quality of life.



The three reasons why people feel it is acceptable to litter are:

- they feel no sense of ownership of the property;
- someone else will clean up after them;
- trash has already accumulated.

Primary Source and Locations of Litter

- **Roadway Litter:** There are over 51 billion pieces of litter on U.S. roadways, 4.6 billion of which are larger than four inches. Research shows that littering along roadways is generated by individual actions:
 - Motorists (52%)
 - Pedestrians (22.8%)
 - Improperly covered truck or cargo loads, including collection vehicles (16.4%)
 - Improperly secured containers, dumpsters, trash cans or residential waste or recycling bins (1.5%)
- **Non-Roadway Litter:** Off the roads and highways, litter originates from many sources, but primarily collects at the following locations—starting from where most non-roadway litter occurs to least:
 - **Transition points** – These are entrances to businesses, transportation centers, and other

places where items must be discarded before entering. Confection (candy, chocolate, gum, wrappers, etc.) ranks at the top (53.7%) of what is littered at transition points; this is followed by cigarette butts at 29.8%.

- **Storm drains** – Located primarily in gutters and designed to drain excess rain from paved streets, parking lots, etc. Storm drains tend to attract cigarette butts, confection, and other litter.
- **Loading docks** – Areas behind retail and wholesale business where products are loaded/unloaded from trucks and trailers can become littered with cigarette butts, confection wrappers/debris, and paper.
- **Recreational areas** – Parks, beaches, game courts, and open areas where people congregate for leisure activities create opportunities for littering.
- **Construction sites** – Active residential or commercial construction sites are a trap for litter.
- **Retail** – High-traffic locations such as shopping centers, strip malls, and convenience stores can generate litter, such as packaging, cigarette butts and confection wrappers/debris on the ground.

Procedure

1. Have students brainstorm and list reasons why they think people litter. Have a student list them on a board, some chart paper or a computer projected image. This can also be done in small cooperative groups.
2. Ask the students to look at their lists and see if they can group any of their reasons into major categories.
3. Divide the class into groups. Assign each group one of the sources of litter and ask them to research it. What is each source of litter? What types of items are littered on or near each source? Is the source usually associated with purposeful litter or negligent litter (i.e., litter that was intentionally dropped or litter that might have blown off a table or out of a receptacle)?
4. Ask the class to think about their community. Where would they find the sources of litter? Where have they seen the most litter? Why do they think that is the case? Tell them they are going to create a map of their community (or an imaginary community) and illustrate the places where you would find each type of litter. Provide a large roll of paper or maps. Each group will add illustrations depicting their source of litter.

Students can also glue pieces of litter associated with each source onto the paper.

Have the class assign each of the sources of litter (see above) a different color code (e.g., motorist = green). Before going outside ask the students to make color keys on the backs of their maps. The students will color code on their maps or graph papers where they found the litter (e.g., near houses, near construction sites). The colors will help them identify the possible sources.

Take a walk with the students. Use the Visual Litter Assessment to evaluate the area. Walk the entire site and if students may go off site walk the immediate area around the site.

IMPORTANT: You may want to take gloves and bags to clean up the litter along the way.

5. Once students have completed their litter map, tell them that they are now going to cleanup and greenup our community. Brainstorm strategies with the students to prevent each type of litter, such as placing trash cans at strategic points in the community, beautifying pedestrian walkways to discourage littering, etc.
6. Once students have listed a variety of strategies provide them with a second sheet of paper. Ask students to recreate their map, but this time, illustrate the strategies to prevent litter. If students participated in the “Keep It Beautiful and Green” lesson, make sure they add their garden to the map. For two additional days at varying times, have the students take their litter walk. Varying the time of the litter walk will also help them identify litter (e.g., take the students on the litter walk after a class has been outside for lunch or recess).
7. Lead a discussion with the students based on the maps and their experiences in the community.
 - Have they noticed any trends, patterns, or behaviors related to litter?
 - What places did the class identify as major locations for littering?
 - Why do you think this location is being littered?
 - Where are some of the places that are not littered? Why or why not?
 - Will cleaning up litter after it’s been thrown on the ground really solve the littering problem? Why or why not?

- How could you use KAB's reasons why people litter to educate others about litter prevention?
 - What are some things we could do as a class to prevent littering from occurring in our community?
8. Hang both maps in the hallway or library for other students to see.

Assessment

- Ask students to rewrite the three reasons why most people litter using their own words.

Technology Connections

- Have students look up maps on Google Maps or MapQuest to help them get started.
- Create a digital version of map that can be shared with school or community officials.

Enrichment

- Have students conduct a litter walk around the community and note what they see. Do their observations match the litter maps they created? Students can repeat the walk on a regular basis to see if anything changes.

Student Activity Sheet – Visual Litter Assessment

Team _____

Date _____

Location _____

1. Take a good look at the area and determine as a group how “littered” it is based on the scale below (circle your choice):

No litter

Slightly littered

Littered

Extremely littered

Minimal or No litter = virtually no litter can be observed.

Slightly littered = a small amount of litter is observed.

Littered = visible litter is easily seen throughout the area.

Extremely littered = a continuous amount of litter is observed, some large enough to require equipment or extra manpower to remove (e.g. appliances, construction debris, abandoned vehicles, etc.).

2. Is there one or more trash cans or a recycling bin in the area?
3. What is being littered? Is there one item that stands out as being most of the litter?
4. Who do you think is doing the littering?
5. Why might someone litter in this location?
6. Where is most of the litter?
7. Who is in charge of the area/location?
8. Describe anything else you think is important about the litter conditions in this location.

Pollution Solution

Objectives

The students will be able to:

- ➔ identify the effects of pollution on wildlife.
- ➔ identify and evaluate ways that litter can endanger wildlife and propose ways to help eliminate these dangers to both humans and wildlife.

Method

Students will listen to the KAB book, *If It's Litter and You Know It*. The educator will provide a collection of materials that could be litter for students to drop into a fish aquarium.

Materials

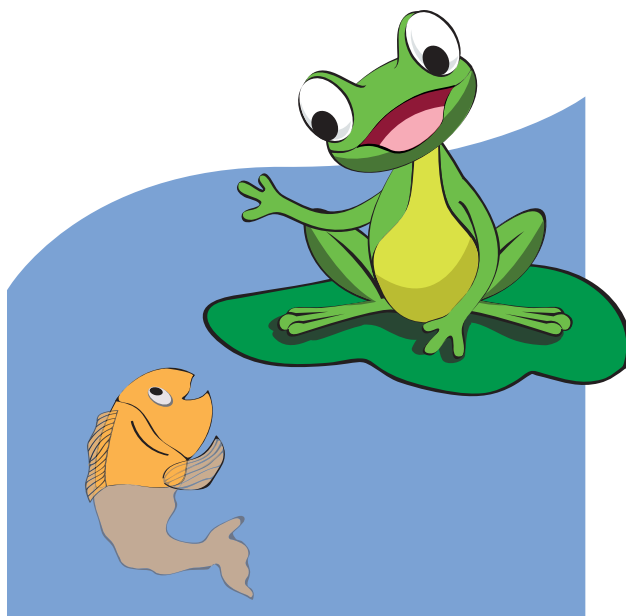
- Book: Schertz, L. (2011) . *If Its Litter and You Know It*: Connecticut: Keep America Beautiful.
- 2 small aquariums, water, sand, aquarium/fish bowl environment set up.
- Small containers with representatives of litter or water containments: oil, food coloring (represent pesticides and fertilizers), paper scraps, plastic spoons or plastic pieces, etc.
- 2 rulers or sticks that can reach across the top of each aquarium.
- String with a washer tied to one end
- Live goldfish (optional)

Time

45 minutes to 1 hour

Vocabulary

- | | |
|--------------|----------------|
| • pollution | • fertilizers |
| • litter | • contaminants |
| • habitat | • aquarium |
| • pesticides | |



Background

The EPA divides water pollution sources into two categories: point and non-point. Point sources of water pollution are stationary locations such as sewage treatment plants, factories and ships. Non-point sources are more diffuse and include agricultural runoff, mining activities and paved roads. Surface water is all water that is naturally open to the atmosphere, such as lakes, rivers, seas and reservoirs. In addition to being an important source of drinking water and recreation, these waters are also vital parts of local and regional ecosystems. Surface water pollution can result from a number of sources, including dredging, storm water runoff, ocean dumping and industrial wastewater discharges.

Surface water is usually rain water that collects in surface water bodies, like oceans, lakes, or streams. Another source of surface water is groundwater that discharges to the surface from springs. Surface water pollution occurs when hazardous substances come into contact and either dissolve or physically mix with the water. Because of the close relationship between sediments and surface water, contaminated sediments are often considered part of surface water contamination. Sediments include the sand and soils on the bottom of an ocean, lake, or stream. Storm water runoff becomes contaminated when

rain water comes into contact with contaminated soil and either dissolves the contamination or carries contaminated soil particles. Surface water can also be contaminated when contaminated groundwater reaches the surface through a spring, or when contaminants in the air are deposited on the surface water. Contaminated soil particles carried by storm water runoff or contaminants from the air can sink to the bottom of a surface water body, mix with the sediment, and remain.

A change in the water chemistry due to surface water contamination can negatively affect all levels of an ecosystem. It can impact the health of lower food chain organisms and, consequently, the availability of the food supply up through the food chain. It can also impact the health of wetlands and impair their ability to support healthy ecosystems, control flooding, and filter pollutants from storm water runoff. Contaminated surface water can also affect the health of animals and humans when they drink or bathe in contaminated water or, for aquatic organisms, when they ingest contaminated sediments. One of the major concerns associated with contaminated surface water is the ability of aquatic organisms, like fish, to accumulate and concentrate contaminants in their bodies. When other animals or humans ingest these organisms, they receive a much higher dose of contamination than they would have if they had been directly exposed to the original source of the contamination.

The most effective approach for cleaning up contaminated surface water is to prevent further contamination. (Source EPA)

Procedure

1. Involve students in filling two small aquariums or fish bowls with water and design of the inside of the bowl environment.
2. Observe how attractive the two aquariums are and how important the clean water is for wildlife.
3. Tie the string (with the washer attached) to the ruler or stick. Place the ruler or stick across the top of the aquarium, suspending the washer as a weight midway down into the water. Do this for each aquarium.
4. Ask the students to observe what happens as the pollution materials are dropped into one of the aquariums. Compare the changes in the polluted container to the clear container. Provide leading questions about how the environment is changing, and how this could impact animals that live in or drink the water. Note how the view of the string changes in the polluted environment.

Assessment

- Have the students discuss how they can do their part to help protect the environment for wildlife.
- Have student identify which environment is best for fish and animals.
- Have students do a journal entry – the students can draw pictures of the contaminated aquarium and the clean aquarium.

Technology Connections

- Take pictures as each item is added to the aquarium and then document changes. Organize pictures into PowerPoint.
- Ask students to take pictures of natural settings where rain is moved toward creeks, lakes, or other water sources. Identify litter and litter sources.

Enrichment

- To further demonstrate water pollution, use *Fred the Fish* activity <http://www.scilitlinks.org/fredthefish.htm>.
- Have students add gold fish to the clear aquarium for a classroom pet. Do not place fish in the polluted aquarium
- Allow the students to create a habitat for animals by using the sand table or sand box, sand tools, toy landscape items such as trees, rocks, sticks, etc. Encourage them to make an animal's habitat in the sand. A small amount of water may be added to provide texture to the sand. The landscape items can be used for creating the habitat.
- Use resources to explore topic such as:
 - Eyewitness: Pond and River Book and Video <http://www.acornnaturalists.com>
 - A River Ran Wild: An Environmental History* by Lynne Cherry www.amazon.com
 - Make Your Own Watershed Kit <http://www.acornnaturalists.com>
 - Organize a Water Festival <http://www.winningwater.org/>

Glossary of Terms

The following terms are defined and described relative to use in Waste In Place.

audit – A review or assessment of existing conditions such as looking at waste disposed of in receptacles to determine what could be recycled rather than placed in waste container.

aeration – To charge with air.

aquarium – A container (as a glass tank) or an artificial pond in which living aquatic animals or plants are kept.

aquifer – A body of permeable rock that can contain or transmit groundwater.

aquifer depletion – The using up of an aquifer.

beautify/beautification – To make visual improvements to an area; actions may include planting flowers, trees, and edible; through research, Keep America Beautiful, Inc. has found that beautifying an area prevents littering.

behavior change – A process designed to modify habits. Specifically, looking at ways that waste is handled and alter the process by using the KAB 5 step process and pressure points for change.

bimetal – Made of two metals; used particularly in reference to bimetal beverage cans which are made of both aluminum and steel.

biodegradable material – Waste material which is capable of being broken down, usually by bacteria, into basic elements; most organic wastes, such as food remains and paper, are biodegradable under the right conditions.

biodegrade – To break down into basic components by biological processes (see biodegradable material).

bulk product – Using less packaging for a product as a result of offering a larger quantity or volume in container.

character – The aggregate of features and traits that form the individual nature of a person. Character

features and traits may include responsibility, respect, caring, and citizenship.

cleanup – The act of picking up litter in an area.

closed-loop recycling – The complete cycle of collecting, processing, recycling and purchasing products with recycled content.

combustible – Waste material which is capable of being burned.

commingle – A mixture of any number of recyclable materials, which usually must be separated before they can be recycled.

commitment – A written or verbal agreement to take some action or involvement.

communication – A written or visual message that emphasizes a clean environment, beautification, and the general community norm.

community – An interacting group of individuals in a common location and may be considered a neighborhood, a city/town or similar identifiable area.

community greening – The name for a range of projects including edible and community gardens, landscaping public spaces including school grounds, outdoor classrooms, and entry way improvements.

compost – A mixture of decomposing organic matter (e.g., food waste, leaves, and lawn clippings) used to improve the physical properties of the soil, such as texture and aeration; compost is not a fertilizer.

composting – The controlled biological decomposition of organic solid waste under aerobic (in the presence of oxygen) conditions; organic waste materials are transformed into soil amendments such as humus or mulch.

confining layers – Geological material through which significant quantities of water move at a very slow rate.

consumer – The user of a product or service.

containerize – To put waste into a proper receptacle, such as a trash can, trash bag or dumpster; properly containerizing waste prevents it from becoming a problem as litter.

contaminants – A substance that is either present in an environment where it does not belong or is present at levels that might cause harmful effects to humans or the environment.

contamination – Containers or materials placed in recycling bins that are not recyclable. Containers

with food or other materials specifically listed such as no metal items in paper container is also considered contaminated. Contamination may result in decrease in marketability of products or may cause products to not be recyclable.

couching – A method of transferring a sheet of wet paper from the mold onto a drying surface.

curbside recycling – The process of collecting recyclable material at the curb of a residence or business for transportation to a recycling center.

deckle – An uncovered frame which fits on the mold and shapes the paper.

deckle edge – When pulp slips under the deckle, it forms a soft edge and is called a deckle edge.

decision – The act or process of making a final choice or judgment about topic based on facts, information or analysis

decompose – To break down into basic components.

discharge – To release.

disposable – Products that are designed to be thrown away after one use.

dispose – To get rid of waste; throw away.

drop-off recycling/center – See recycle center.

dump – An open land site where waste is deposited; unsightly and possibly harmful due to leaching of toxic substances into surrounding groundwater; often incorrectly used as a synonym for landfill.

durability – Able to exist for a long time without significant deterioration or is long-lasting.

energy recovery – Synonym for waste-to-energy (see waste-to-energy).

environment – Everything that surrounds and influences living organisms, including people, animals, plants, soil, water, weather, buildings, etc. Also, the surrounding area and the impact on whether a person litters (i.e., a trash, recycling or ash receptacle provided; litter on ground or clean; distance to a receptacle).

environmental impact – A review of the positive or negative effects of a proposed action on the environment.

ferrous metal – Made of, or containing iron.

fertilizers – A substance (as manure or a chemical mixture) used to make soil more fertile.

garbage – Refuse consisting of food wastes; animal and vegetable wastes resulting from the handling, storage, sale, preparation, cooking, and serving foods.

graffiti – Crude inscriptions or drawings on a wall or other public surface.

groundwater – Water stored in the porous spaces of soil and rock underground; more than half of the people of the United States depend upon groundwater for their drinking water.

habit – An action a person does over and over again without thinking; littering is a bad habit.

habitat – The place or environment where a plant or animal naturally or normally lives and grows.

household hazardous waste – Products used in the home that contain substances that are listed or that exhibit the characteristics of hazardous wastes as defined by the Resource Conservation and Recovery Act (RCRA): toxic, corrosive, ignitable or reactive. RCRA does not require that household hazardous wastes be disposed of as hazardous wastes, but caution should be taken to dispose of them so as to minimize the impact to human health and the environment.

illegal dumping – Disposing of waste in an improper manner and/or location and in violation of waste disposal laws.

impermeable – Cannot be penetrated.

incentives – A reward or recognition to help motivate a particular action or support positive behavior.

incinerate – To burn solid waste; used in energy recovery processes.

integrated solid waste management – A practice of disposing of solid waste that utilizes several complementary components, such as source reduction, recycling, composting, waste-to-energy and landfill.

journal – A book, sheets of paper or electronic document where written thoughts or impressions may be collected for review in the future.

KAB – Abbreviation for *Keep America Beautiful, Inc.*, a national, nonprofit, public education organization dedicated to improving waste handling practices in American communities.

landfill – A method of disposing of refuse on land without creating nuisances or hazards to public health or safety. Careful preparation of the fill area, including the use of clay and/or synthetic liners and control of water drainage are required to assure proper landfilling. To confine the refuse to the smallest practical area and reduce it to the smallest practical volume, heavy equipment is used to spread, compact, and cover the waste daily with at least six inches of compacted dirt; after the area has been completely filled and covered with a final two-or three-foot layer of dirt and seeded with grass, the reclaimed land may be turned into a recreational area such as a park or golf course. "Sanitary" or modern landfills have leachate collection systems, methane gas controls, and environmental monitoring systems.

landscape – Plants, trees, shrubs, sidewalks, edging and both made and natural features that combined create an area of interest.

landscape architect – A professional that designs landscape projects that include natural and made features.

leachate – A liquid resulting from precipitation percolating through landfills containing water, decomposed waste and bacteria; in sanitary landfills leachate is collected and treated to prevent contamination of water supplies.

light-weighting – The process by which a product is made using less materials than its precursors without compromising its integrity; this often results in the conservation of resources required to manufacture the product.

litter – Human generated solid waste that is discarded in an inappropriate place (e.g., streets, playgrounds, streams, etc.), or improperly stored waste which has escaped from its container.

litter prevention – Activities designed to encourage people to not litter.

litterbug – Term used for a person who litters.

littering – The act of discarding solid waste in an inappropriate place (anyplace other than a proper trash receptacle); mishandling waste.

MRF – Abbreviation for Materials Recovery Facility, a system that separates collected, mixed residential recyclables by type so that they can be recycled into new products for the market.

MSW – Abbreviation for municipal solid waste; includes non-hazardous waste generated in households, commercial establishments, institutions, and light industrial establishments; excludes industrial process wastes, agricultural wastes, mining wastes, and sewage sludge.

methane – A colorless, odorless, flammable gas formed by the decomposition of wastes in a landfill.

microbes – Microorganisms.

mold – A frame used when making paper which holds a stretched screen.

native plant – Plants that grow in an area or region of the country and have not been brought from other areas and introduced into the landscape. Native plants may need to be re-introduced into area because they have been removed over time but documents show that plants once grew in the area.

natural packaging – A natural product's covering, wrapping, or container designed to protect the product.

NIMBY – Acronym for “Not In My Back Yard”, originally referred to the syndrome where people oppose the siting of a landfill in their neighborhood; now can also refer to the siting of other waste management facilities, such as a waste-to-energy plant.

non-combustible – Waste materials which are not capable of being burned, especially metals.

non-point source pollution – Pollution from many different sources, usually associated with rainfall runoff moving over or through the ground, carrying natural or man-made pollutants into surface water and groundwater.

norms – A pattern of behavior that is accepted, expected, and reinforced when others behave in the same manner. A norm is “the way things are done around here,” and becomes an expected code of behavior.

obsolescence – The process of something becoming no longer in use or no longer useful

organic – Derived from living organisms; organic wastes include food, leaves, grass clippings, etc.

packaging – A product's covering, wrapping, or container designed to protect a product and to attract purchasers.

pesticides – An agent used to destroy pests.

photodegrade(-able) – A process whereby the sun's ultraviolet radiation attacks the link in the polymer chain of plastic; breaking this link causes the plastic chain to fragment into smaller pieces, losing its strength and ability to flex and stretch.

pollution – The contamination of soil, water, or air; improperly disposed waste can cause pollution.

porosity – Being porous; permeable by air, water, etc.

post-consumer – Refers to waste from municipal sources, not industrial waste; post-consumer content refers to the amount of recycled material from municipal sources that a product contains. For example, recycled paper may contain 10 percent post-consumer waste, and 30 percent industrial waste (waste salvaged before reaching the consumer).

pre-consumer – Refers to waste generated during the manufacturing process and includes industrial scraps, trimmings and overruns.

precycle – To make purchasing decisions based on whether or not an item is made out of or packaged in materials that are recyclable.

prompts – Visual or auditory aids that remind us to carry out an activity we might otherwise forget. A prompt helps to trigger memory. Prompts close in space and time around where you want the behavior to be practiced.

pulp – A watery fiber mixed of paper and water that is used to make paper.

RDF – Abbreviation for refuse derived fuel; a uniform fuel produced from waste, burned as an energy source in waste-to-energy plants.

receptacle – Trash can or recycle bin.

recharge – Refill with water.

recyclable – Waste that can be used again by being manufactured into a new product, i.e., waste that can be recycled.

recycle/recycling – A resource recovery method involving the collection and treatment of a waste product for use as a raw material in the manufacture of the same or another product (e.g., ground glass used in the manufacture of new glass).

recycled – Refers to a product that has been made from the reprocessing of waste materials.

recycling center – A facility where certain waste materials (e.g., aluminum, glass, paper, etc.) are collected and resold for reprocessing into new products (i.e., recycled).

recycle market – The place where material that has been collected curbside or at a recycling center is sold either through a broker or end user. The market price for materials varies due to demand and contamination.

reduce – To lessen the amount of waste generated and thus waste disposed; same as source reduction.

refuse – Useless or unwanted materials that are thrown away; another word for solid waste.

resource recovery – The extraction and utilization of materials which can be used as raw materials in the manufacture of new products, or as values which can be converted into some form of fuel or energy source; an integrated resource recovery program may include recycling, waste-to-energy, composting, and/or other components.

reusable – Waste materials capable of being used again, either as is, or by creating new uses.

reuse – To extend the life of an item by using it again as it is, repairing it, or creating new uses for it.

run-off – Water that leaves an area and runs into another area usually un-obstructed (i.e., when a yard is water excessively water may run over the curb and into the street).

slurry – The product produced when paper and water are mixed together during the paper making process.

social diffusion – A process by which a behavior is communicated through a social network may be involving respected individuals in the community to

model behavior or involving a number of people to demonstrate model behavior.

solid waste – All useless, unwanted or discarded materials: refuse, trash, garbage, debris.

solid waste management – The systematic administration of activities which provide for the collection, separation, storage, transportation, transfer, processing, treatment, and disposal of our solid waste.

solid waste stream – The flow of waste from its source (e.g., households) to its final end use or disposal site.

source reduction – To reduce the amount of waste generated that must eventually be discarded, including minimizing toxic substances in products, minimizing volumes of products and extending products' useful lives; requires manufacturers and consumers to take an active role in reducing the amount of waste that is produced.

source separation – The segregation of various materials from the waste stream at the point of generation for recycling (e.g., householders separating paper, metal and glass from the rest of their waste).

survey – A written or verbal set of questions used to obtain information about one or more topics.

sustainability – The potential for long-term maintenance and typically has environmental, economic, and social dimensions.

technology and structural changes – Equipment or design may include trash or recycling containers which help guide individuals toward proper disposal or behavior.

transfer station – An intermediate collection facility which temporarily holds solid waste en route to the landfill; materials are often sorted and diverted for recycling or energy recovery.

trash – Useless or unwanted materials that are thrown away; synonym for waste.

waste – Useless or unwanted materials that are discarded (including food) in appropriate trash receptacles or littered.

waste collection – A process to collect waste at the generation site and carry the waste generally via truck to a MRF or landfill.

waste reduction – The process and the policy of reducing the amount of waste produced by a person or a society .

waste-to-energy – A recovery process where waste is burned, as received or after being processed to a more uniform fuel, to generate steam or electricity.

waste-to-energy incineration – Disposal method where municipal solid waste is brought to a facility for energy recovery (see waste-to-energy).

water table – The level below which the ground is saturated with water.

watershed – A land area from which water drains into a receiving body of water. Receiving bodies of water can include streams, lakes, wetlands, estuaries and groundwater.

weight – The standard or established amount that an item or thing should weigh.

vericomposting – The process of using worms and micro-organisms to turn waste into nutrient-rich humus (see compost).

volume – The amount of space occupied by an object.

zero waste – An effort to maximize recycling, minimize waste, reduce consumption, and ensure products are made to be reused, repaired, recycled or returned to nature.

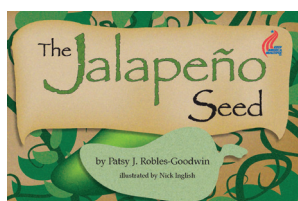
WASTE IN PLACE

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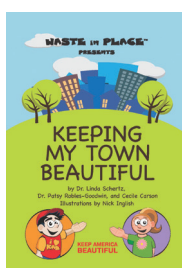
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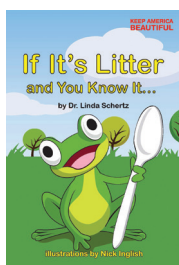
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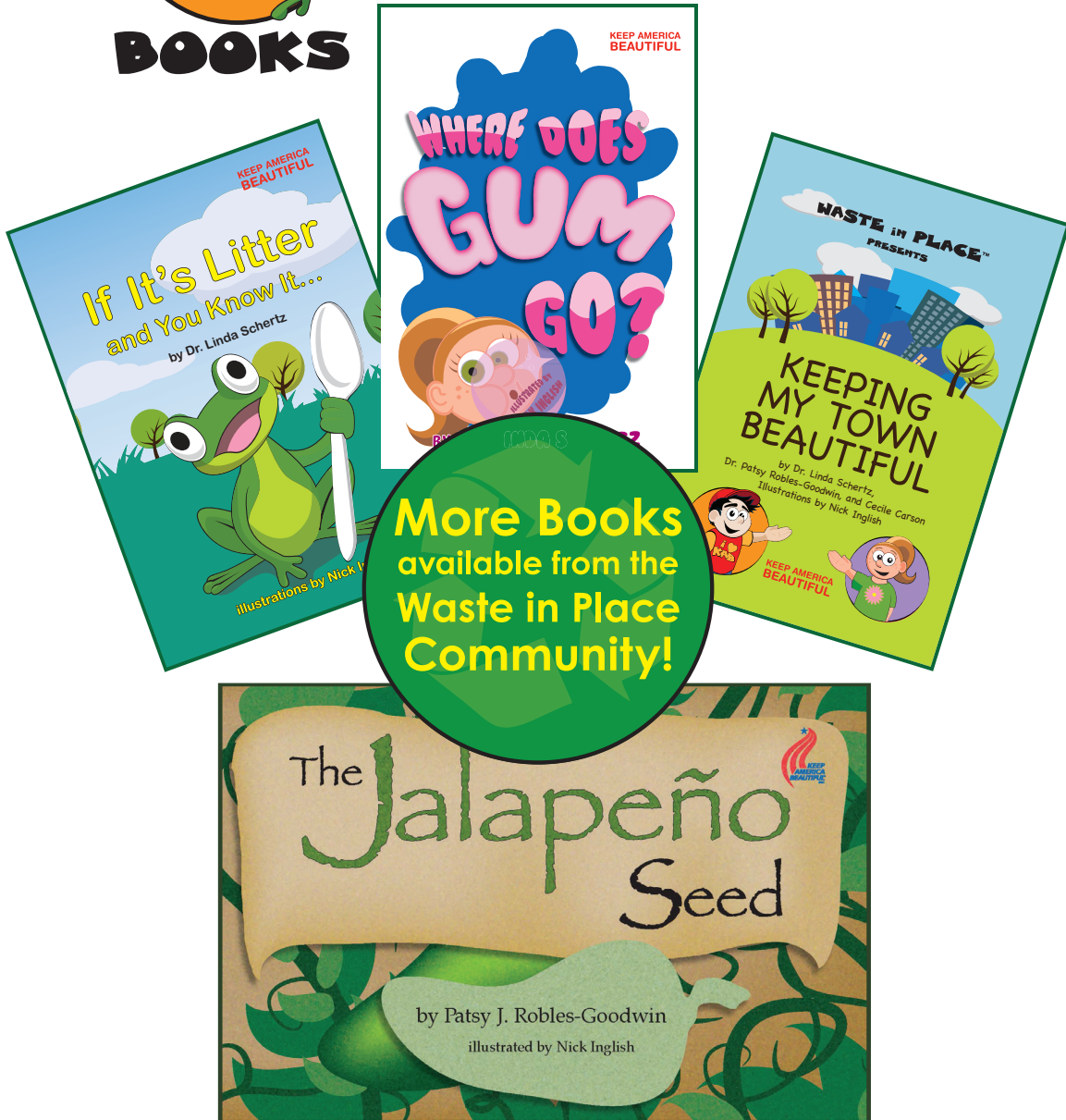


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Nick Inghish is a creative and talented freelance artist and graphic designer. He has illustrated the *Keep America Beautiful* story books and materials, and assists in modifications and additions to the *Waste in Place* kit. Nick works as a multimedia developer for a successful marketing agency in Dallas, Texas.



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