

The Trash Heap

An Educational Curriculum Guide



Presented by

State of Hawai‘i HI-5 Recycling Program

Kahilu Theatre Foundation

Kōkua Hawai‘i Foundation

The Trash Heap

An Educational Curriculum Guide

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**This lesson should be completed prior to attending the performance. For more information please see page 39.*

Introduction

About this Educational Curriculum Guide

Aloha!

This guide has been written to assist you, the educator, in preparing your students to understand ideas presented in our play, “The Trash Heap.” We hope it will encourage them to take action in their daily lives to contribute to the protection and preservation of the environment.

In this guide you will find lessons to enrich, extend and personalize your students’ ideas about the 3 R’s as presented in the show. Additionally, at the end of each lesson are more ideas or activities that you may choose to explore with your class. While the lessons are aimed at

certain grade levels, they are easy to adjust to suit your needs and **we encourage you to use what works best for your students**. You do not need to complete each lesson prior to seeing the show, and you do not need to do the lessons in the order they are presented, however the more lessons you can work through with your students, the better they will internalize the concepts presented in “The Trash Heap.”

One lesson, however, is mandatory. By finishing “Shake Up Your Ideas About Trash” (page 39) in the “Reuse” section of this guide **prior to attending** “The Trash Heap,” your students will have created unique musical instruments that they will use to participate in the show. Your students will not only become an integral part of the show, but they will already have started practicing the 3 R’s.



Photo courtesy of the Kōkua Hawai'i Foundation

Why is this important?

“The Trash Heap” follows Kai as he discovers the principles of reducing, reusing and recycling as a method of preventing unnecessary waste from entering landfills or the environment at large. While the issue of waste management holds relevance to all world citizens, the nature of our unique Hawaiian islands demands that we act now to prevent further environmental imbalance. Your participation in this process, by teaching your students about why the 3 R’s are important and how to incorporate them into their daily lives, will positively impact not only your community, but our global home.

Who Created This Program?

The play “The Trash Heap” was written, directed, and produced by the Kahilu Theatre Foundation in partnership and with support from the Hawai‘i State Department of Health’s HI-5 program. This accompanying Educational Curriculum Guide was created by Bev Kutsunai and Genny Wilson and produced by the Kōkua Hawai‘i Foundation.

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The Kahilu Theatre Foundation is charged with the operation of Waimea's 490-seat theatre, which was completed in 1981. The programs presented by the Kahilu Theatre include, but are not limited to, drama, dance, film and music. The Kahilu Theatre serves residents and visitors to the State and County of Hawai'i by presenting artists and programs of significant stature not only in the State of Hawai'i but often on a national or even international level. The theatre's programs serve a broad audience in an under-serviced rural area and, perhaps most importantly, the children of the Big Island, through extensive educational programming. Through the many children's programs offered by the Kahilu Theatre Foundation, Big Island children are exposed to the visual and performing arts and the myriad of possibilities they represent.



The Kōkua Hawai'i Foundation is a 501(c)3 non-profit organization that supports environmental education in the schools and communities of Hawai'i. Their mission is to provide students with experiences that will enhance their appreciation for and understanding of their environment so they will be lifelong stewards of the earth. Supporting this production is just one example of the many Kōkua Hawai'i Foundation initiatives that provide hands-on learning experiences to engage the senses and make lasting impressions on children's minds.



The HI-5 Recycling Program is committed to increasing recycling awareness, waste diversion, and resource conservation. The program places a five-cent deposit on each beverage container as an incentive to encourage people to recycle their bottles and cans for deposit refunds. Recycling bottles and cans helps to prevent litter and reduce waste. Over 600 million beverage containers are recycled every year. That means over 500 containers recycled for every person in Hawai'i every year.

Mahalo!

By reducing what we consume, reusing goods we already have, and recycling materials like bottles and cans, our efforts can positively impact the environment. We thank you for allowing us to share our ideas and our story with your students. We hope you will have fun together as you explore new ways to better care for our environment through the lessons included in this guide. Mahalo for allowing us to share this message with you!

Synopsis



Kai has a pressing problem with trash. He wakes up one fateful morning with one whole week's worth of trash attached to him! His best friend, Desiree, discovers him in his predicament and listens to his adventurous tale of how he came to wake up burdened by waste. But is it all waste? Desiree has an idea of who to ask for help to solve this dilemma, so she starts Kai off on his journey. He travels to meet experts on reducing, reusing and recycling, and along the way Kai discovers how these three ideas can decrease the trash around him, and perhaps around you as well.

Kai's first stop is to meet Desiree's Tutu to learn more about what exactly reducing, reusing and recycling are. She also teaches Kai about how our islands were long ago, before humans came to live here and changed the land. Next, she sends him out to talk with Lani at the transfer station. Here he learns more about how garbage doesn't really go away and how it's important to change his perspective about what garbage is and what is still useful. Then, Lani sends Kai to meet Professor Marcella who teaches environmental science at the University and is an amazing artist. She helps Kai figure out what it means to be a smart consumer who can make careful and informed choices. From there, Kai visits Hanna, an organic farmer, who helps him find out more about recycling food and how people can help nature regenerate by composting food scraps. The last piece of the puzzle lies with Marcel, Marcella's twin brother, at the recycling center. Marcel explains how materials can be sorted for recycling - there is even some money to be made with the HI-5 Beverage Container Program!

When Kai finally returns to Lani at the transfer station, he has a lighter load to carry and has learned to conserve the resources of his island home. What a great way to live happily ever after!

Key Words

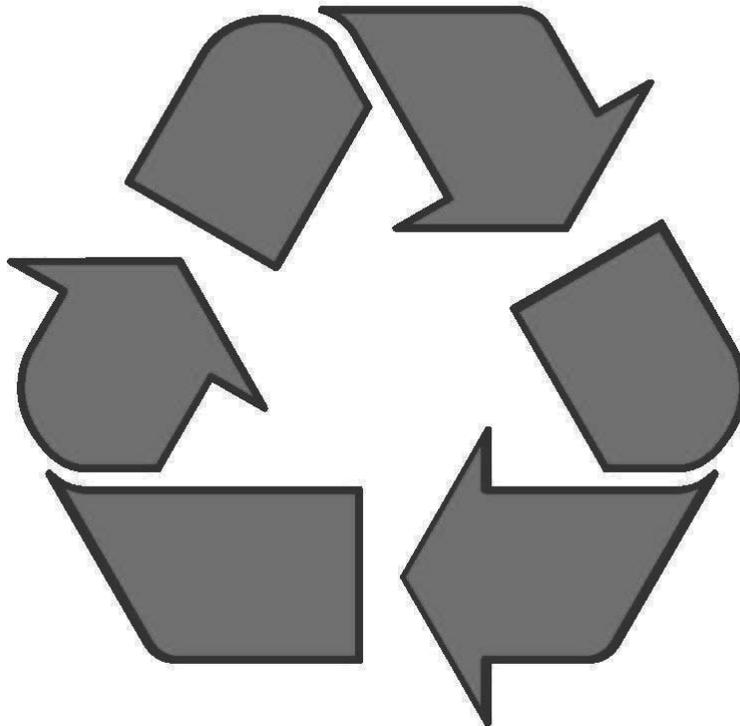
The following are some suggested words for this topic that will help build vocabulary and concepts with students. The first three (Reduce, Reuse, Recycle) are the foundation of this curriculum, while the rest support the lessons and ideas presented throughout the guide and the play. Choose a good time to introduce them and discuss them with the children so they can understand and use them in their work and their world. Have they heard any new words or terms in any of the lessons? Have them research and explain those as well. Feel free to expand on this vocabulary as you and your students practice these lessons.

Reduce:	To decrease the size, amount, or number of something
Reuse:	To use again, especially after salvaging or special treatment or processing
Recycle:	To treat or process used items into raw materials and make them into new products



Aluminum:	A lightweight, silvery-white metal used to make a wide variety of products from soda cans to frying pans to airplane parts
Bimetal:	An item made from two different kinds of metals, like a steel can with an aluminum top
Biodegradable:	Able to decay (through the actions of living organisms)
Compost:	A mixture of various decaying organic materials used for fertilizing soil
Consumer:	A person who consumes: takes and eats, uses, and buys things
Debris:	The remains of something that has been destroyed or broken up
Decomposition:	The natural process of decay
Disposable:	An item that can be discarded or destroyed after use
Environment:	A habitat that supports living organisms
Garbage:	Discarded items, but specifically animal or vegetable matter from kitchen waste
Glass:	A hard, transparent or translucent material that can be formed into items like bottles, windows, eyeglasses, etc.
Interact:	The process when two or more things affect one another
Interdependent:	When two or more things rely on each other
Landfill:	An area of land that is filled in or layered with waste and trash
Litter:	Loose trash that is strewn or scattered about; see “Trash”
Man-Made:	Produced by people
Natural:	Existing in or formed by nature
Natural Resource:	A material found in nature that is useful
Non-Biodegradable:	Unable to readily decay
Non-Renewable:	A material or resource that cannot be replaced after it has been used like petroleum oil, which is used to make plastic and gas for cars
Organic:	Food grown or raised without synthetic fertilizers, pesticides or hormones

Plastic:	A substance chemically manufactured from petroleum oil that can be molded when soft and then it hardens for use
Pollution:	The introduction of substances or products into an environment creating a negative impact
Polystyrene:	A type of plastic used often to make packaging and food containers, and as an insulator in refrigerators and air conditioners; also known as Styrofoam
Property:	A characteristic or feature of a material or object
Pulp:	A ground-up, soft, mass of wet wood fiber or cloth fiber used in making paper
Redeem:	To return an item that has a deposit value (like empty beverage bottles and cans) to receive a deposit refund. Eligible bottles and cans will say “HI-5”
Redemption Center:	A place where people bring empty deposit bottles and cans to redeem them for a refund
Renewable Resource:	Any natural resource that can be replenished over time; ex: solar energy, wind, trees
Rubbish:	See “trash”
Solid Waste:	All things thrown away by people
Trash:	Anything considered useless or worthless and discarded



‘ŌPALA is the Hawaiian word for trash or garbage.

Educational Resources

Please use the following resources to expand upon the ideas presented in this Educational Curriculum Guide, should you wish to further explore these concepts.



WEBSITES:

Algalita Marine Research Foundation: Find out about K-12 educational programs aimed at protecting the marine environment from plastic pollution.

www.algalita.org/education

The Green House: Bring “The Green House” to your O’ahu classroom for a workshop on composting, gardening, ecofootprints, and more.

www.thegreenhousehawaii.com

The Green Schools Initiative: Read how to make our schools greener and healthier places for our kids. Click on “curricula” for teacher resources, including waste audit information.

www.greenschools.net

Kōkua Hawai'i Foundation: Learn about the foundation’s environmental education initiatives, including waste reduction and farm-to-school programs, environmental field trips, and mini-grants to help you purchase educational supplies, workshops, or trainings for your classroom. Kōkua’s 3R’s School Recycling Program provides recycling bins, educational resources and trainings, and, if needed, assistance with recycling pickups.

www.kokuahawaiifoundation.org

Marine Debris Module (or, how marine debris affects the Hawaiian Islands):

Explore a "toolkit" for teachers who want to teach their students about marine debris by looking at its impact on the Northwestern and Main Hawaiian Islands and performing related scientific investigations.

<http://www.hawaiiatolls.org/research/NWHIED2005/resources/MDM/MDM.html>

New American Dream: Learn how to talk with kids about being responsible consumer to protect the environment, enhance quality of life, and promote social justice.

Kids and Commercialism Page: www.newdream.org/kids

Break the Bottled Water Habit: <http://water.newdream.org>

Olomana Gardens: Learn about worm composting, book a workshop, or purchase worms here.

www.olomanagardens.com

Plastics Are Forever: Read about plastic marine debris, find lesson plans and see how your school can participate in research for the program.

<http://plasticsareforever.org>

The Story of Stuff with Annie Leonard: Watch as this 20-minute animation exposes the connections between a huge number of environmental and social issues and calls us together to create a more sustainable and conscious society.

www.thestoryofstuff.com

United States Environmental Protection Agency's Environmental Kids Club: Kids can find new ways to reduce how much garbage they throw away. Maybe even start a recycling program in their school!

www.epa.gov/kids/garbage.htm

Waikiki Worm Company: Bring a "worm workshop" to your O'ahu school and learn how your students can recycle food waste with worms.

www.waikikiworm.com

Waste Free Lunches: It's estimated that an average school-aged child using a disposable lunch generates 67 pounds of waste per school year. Let's make a difference and pack a waste free lunch!

www.wastefreelunches.org

Performing a School Waste Audit: Conduct a waste audit of your classroom, school or home using methods outlined here. Also, check out the great resources listed in the "Reduce, Reuse, Recycle" column.

http://www.recycleworks.org/schools/s_audits.html

Recycling Websites in Hawai'i:

Hawai'i Island: www.recyclehawaii.org

Hawai'i Beverage Container Deposit Program: <http://www.hi5deposit.com/schoolrecycling.html>

Kaua'i: www.kauai.gov/recycling/

Maui County: <http://www.co.maui.hi.us/index.asp?NID=742>

O'ahu: www.opala.org

BOOKS FOR KIDS:

Bailey, Linda. *How Come the Best Clues Are Always in the Garbage*. Albert Whitman & Co., 1992.

Delton, Judy. *Pee Wee Scouts: Trash Bash*. Yearling, 1992.

Fix, Alexandra. *Food (Reduce, Reuse, Recycle)*. Heinemann, 2007.

Other titles in the series: *Energy, Glass, Metal, Paper, Plastic, Water, Wood*

Gibbons, Gail. *Recycle!: A Handbook for Kids*. Brown Little Young Readers, 1996.

Green, Jen. *Why Should I Recycle? Barron's Educational Series*, 2005.

Hartman, Wendy. *All the Magic in the World*. Dutton Children's Books, 1993.

Javna, John. *50 Simple Things Kids Can Do to Save the Earth*. Hyperion, 2008.

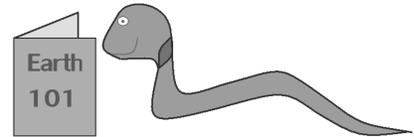
(*The New 50 Simple Things...* by Sophie Javna will be released in 2009.)

Rumford, James. *The Cloudmakers*. Houghton Mifflin Company, 1996.

Showers, Paul. *Where Does the Garbage Go?* Harper Trophy, 1994.

Taback, Simms. *Joseph Had a Little Overcoat*. Viking, 1999.

Turnbull, Stephanie. *Trash and Recycling*. Usborne, 2007.



TEACHING MATERIALS

Appelhof, Mary. *Worms Eat Our Garbage: Classroom activities for a better environment*.

Flowerfield Enterprises, 1993.

Grabowsky, Gail. *50 Simple Things You Can Do to Save Hawai'i*. Bess Press, 2007.

Grant, Tim and Gail Littlejohn. *Teaching Green: The elementary years*. New Society Publishers, 2005. (See "Mathematics & Garbage," pages 122-125.)

Patten, Elizabeth and Kathy Lyons. *Healthy Foods from Healthy Soils: a hands-on resource for teachers*. Tilbury House, 2003.

Topal, Cathy Weisman and Lella Gandini. *Beautiful Stuff: Learning with found materials*. Sterling, 1999.

VIDEO/DVD

Bill Nye, The Science Guy: *Garbage; Pollution Solution*

“DON'T WAIT ‘til it's too late or the trash you create will become your fate. Reduce, reuse, recycle.”
- From the play “The Trash Heap”

Performance Standards: “Trash” Section

Essential Questions:

- How are people interdependent with their environment?
- What impact do our actions have on the world around us and why would this be important in our islands?

State of Hawai‘i Science Performance Standards by Topic: Trash

[*]Lesson 1: What’s In Your Trash?

Grade Levels: K-3

- What story does trash tell?
- How can we change our trash?

[†]Lesson 2: Let’s Sort It Out

Grade Levels: 2-6

- How can the properties of materials help to separate them from a mixture?
- How do models help us understand more about processes?
- How do these experiments help up understand more about what happens to our trash?

*SC.K.1.1 Use senses to make observations

*SC.K.1.2 Ask questions about the world around them

*SC.K.6.1 Classify objects by their attributes (physical properties, materials by which they are made)

*SC.1.1.1 Collect, record, and organize data using simple tools, equipment and techniques safely

*SC.1.1.2 Explain the results of an investigation to an audience using simple data organizers (charts, graphs, pictures)

†SC.2.1.1 Develop predictions based upon observations

†SC.2.1.2 Conduct a simple investigation using a systematic process to safely test a prediction

*†SC.2.2.1 Describe changes that have occurred in society as a result of new technologies

†SC.2.6.1 Identify ways to change the physical properties of objects

†SC.2.7.1 Identify the properties of magnets

*†SC.2.8.2 Identify the limited supply of natural resources and how they can be extended through conservation, reuse and recycling

*†SC.3.1.1 Pose a question and develop a hypothesis based on observations

*†SC.3.1.2 Safely collect and analyze data to answer a question

*†SC.3.2.1 Describe ways technologies have influenced society

†SC.4.1.1 Describe a testable hypothesis and an experimental procedure

†SC.4.1.2 Differentiate between an observation and an inference

†SC.4.2.1 Describe how the use of technology has influenced the environment of Hawai‘i

†SC.5.1.1 Identify the variables in scientific investigations and recognize the importance of controlling variables in scientific experiments

†SC.5.1.2 Formulate and defend conclusions based upon evidence

†SC.5.2.1 Use models and or simulations to represent and investigate features of events and processes in the real world

†SC.6.1.1 Formulate a testable hypothesis that can be answered through a controlled experiment

†SC.6.1.2 Use appropriate tools, equipment and techniques to safely collect, display and analyze data.

†SC.6.2.1 Explain how technology has an impact on society and science

†SC.6.2.2 Explain how needs of society has influenced the development and use of technologies.

†SC.6.6.6 Describe and compare the physical and chemical properties of different substances

Performance Standards: “Reduce” Section

<p>Essential Questions:</p> <ul style="list-style-type: none"> •How are people interdependent with their environment? •What impact do our actions have on the world around us and why would this be important in our islands?
<p>State of Hawai‘i Science Performance Standards by Topic: Reduce</p>
<p><i>[*]Lesson 1: Bag It</i> Grade Levels: K-3</p> <ul style="list-style-type: none"> •What do people want and need in a bag? •How do “disposable” bags change our trash? •How can a bag show people ideas about our community and our trash?
<p><i>[†]Lesson 2: Price of Packaging</i> Grade Levels: 3-6</p> <ul style="list-style-type: none"> •What relationship does packaging have with solid waste and trash? •What impact do our actions have on the world around us and why would this be important in our islands?
<ul style="list-style-type: none"> *SC.K.1.1 Use senses to make observations *SC.K.1.2 Ask questions about the world around them *SC.K.6.1 Classify objects by their attributes (physical properties, materials by which they are made) *SC.1.1.1 Collect, record, and organize data using simple tools, equipment and techniques safely *SC.1.1.2 Explain the results of an investigation to an audience using simple data organizers (charts, graphs, pictures) *SC.2.1.1 Develop predictions based upon observations *SC.2.1.2 Conduct a simple investigation using a systematic process to safely test a prediction *SC.2.2.1 Describe changes that have occurred in society as a result of new technologies *SC.2.8.2 Identify the limited supply of natural resources and how they can be extended through conservation, reuse and recycling *†SC.3.1.1 Pose a question and develop a hypothesis based on observations *†SC.3.1.2 Safely collect and analyze data to answer a question *†SC.3.2.1 Describe ways technologies have influenced society †SC.4.1.1 Describe a testable hypothesis and an experimental procedure †SC.4.1.2 Differentiate between an observation and an inference †SC.4.2.1 Describe how the use of technology has influenced the environment of Hawaii †SC.5.1.1 Identify the variables in scientific investigations and recognize the importance of controlling variables in scientific experiments †SC.5.1.2 Formulate and defend conclusions based upon evidence †SC.5.2.1 Use models and or simulations to represent and investigate features of events and processes in the real world †SC.6.1.1 Formulate a testable hypothesis that can be answered through a controlled experiment †SC.6.1.2 Use appropriate tools, equipment and techniques to safely collect, display and analyze data. †SC.6.2.1 Explain how technology has an impact on society and science †SC.6.2.2 Explain how needs of society has influenced the development and use of technologies.

Performance Standards: “Reuse” Section

Essential Questions:

- How are people interdependent with their environment?
- What impact do our actions have on the world around us and why would this be important in our islands?

State of Hawai‘i Science Performance Standards by Topic: Reuse

[]Lesson 1: Shake Up Your Ideas About Trash (complete this lesson prior to attending the show)*

Grade Levels: K-6

- How does reusing objects from our trash change our garbage?
- How can trash be treasure?

[†]Lesson 2: More Than Enough to Share With You

Grade Levels: 2-6

- How can we change our contributions to solid waste?
- How can we plan our own projects to address the challenge of too much garbage?

[‡]Lesson 3: Old is New Again

Grade Levels: K-6

- What can creative ideas change our trash?
- How can we change what is or is not disposable?

*‡SC.K.1.1 Use senses to make observations

*‡SC.K.1.2 Ask questions about the world around them

*‡SC.K.6.1 Classify objects by their attributes (physical properties, materials by which they are made)

*‡SC.1.1.1 Collect, record, and organize data using simple tools, equipment and techniques safely

*‡SC.1.1.2 Explain the results of an investigation to an audience using simple data organizers (charts, graphs, pictures)

*†‡SC.2.1.1 Develop predictions based upon observations

*†‡SC.2.2.1 Describe changes that have occurred in society as a result of new technologies

*†‡SC.2.8.2 Identify the limited supply of natural resources and how they can be extended through conservation, reuse and recycling

†‡SC.3.1.1 Pose a question and develop a hypothesis based on observations

†‡SC.3.1.2 Safely collect and analyze data to answer a question

†‡SC.3.2.1 Describe ways technologies have influenced society

†SC.4.1.1 Describe a testable hypothesis and an experimental procedure

†SC.4.2.1 Describe how the use of technology has influenced the environment of Hawaii

†SC.5.1.2 Formulate and defend conclusions based upon evidence

†SC.5.2.1 Use models and or simulations to represent and investigate features of events and processes in the real world

†SC.6.1.1 Formulate a testable hypothesis that can be answered through a controlled experiment

†SC.6.1.2 Use appropriate tools, equipment and techniques to safely collect, display and analyze data.

†SC.6.2.1 Explain how technology has an impact on society and science

†SC.6.2.2 Explain how needs of society has influenced the development and use of technologies.

†SC.6.6.6 Describe and compare the physical and chemical properties of different substances.

Performance Standards: “Recycle” Section

<p>Essential Questions:</p> <ul style="list-style-type: none"> •How are people interdependent with their environment? •What impact do our actions have on the world around us and why would this be important in our islands?
<p>State of Hawai‘i Science Performance Standards by Topic: Recycle</p>
<p><i>[*]Lesson 1: Perpetual Paper</i> Grade Levels: K-6</p> <ul style="list-style-type: none"> •What properties of paper help it to be recycled? •How would recycling paper be important in our schools and community?
<p><i>[†]Lesson 2: The Secret Life of Dirt</i> Grade Levels: K-6</p> <ul style="list-style-type: none"> •Why do we need bacteria? Why do they need us? •How does decomposition affect us? •What can people do to participate in the dirt cycle more effectively?
<ul style="list-style-type: none"> *†SC.K.1.1 Use senses to make observations *†SC.K.1.2 Ask questions about the world around them *†SC.K.6.1 Classify objects by their attributes (physical properties, materials by which they are made) *†SC.1.1.1 Collect, record, and organize data using simple tools, equipment and techniques safely *†SC.1.1.2 Explain the results of an investigation to an audience using simple data organizers (charts, graphs, pictures) *†SC.2.1.1 Develop predictions based upon observations *†SC.2.2.1 Describe changes that have occurred in society as a result of new technologies *†SC.2.8.2 Identify the limited supply of natural resources and how they can be extended through conservation, reuse and recycling *†SC.3.1.1 Pose a question and develop a hypothesis based on observations *†SC.3.1.2 Safely collect and analyze data to answer a question *†SC.3.2.1 Describe ways technologies have influenced society *†SC.4.1.1 Describe a testable hypothesis and an experimental procedure *†SC.4.2.1 Describe how the use of technology has influenced the environment of Hawaii *†SC.5.1.2 Formulate and defend conclusions based upon evidence *†SC.5.2.1 Use models and or simulations to represent and investigate features of events and processes in the real world †SC.5.3.2 Describe the interdependent relationships among producers, consumers and decomposers in an ecosystem in terms of the cycles of matter *†SC.6.1.1 Formulate a testable hypothesis that can be answered through a controlled experiment *†SC.6.1.2 Use appropriate tools, equipment and techniques to safely collect, display and analyze data. *†SC.6.2.1 Explain how technology has an impact on society and science *†SC.6.2.2 Explain how needs of society has influenced the development and use of technologies. *SC.6.6.6 Describe and compare the physical and chemical properties of different substances

Trash Overview

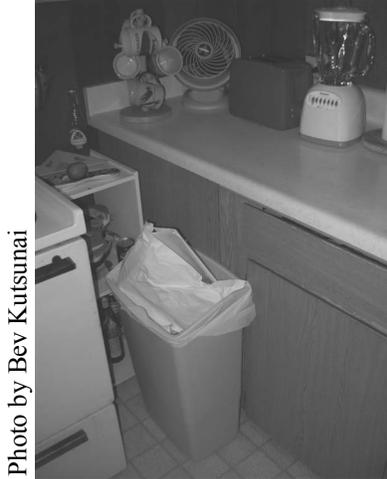


Photo by Bev Kutsunai

Humans have always produced trash. It is the stuff of archaeology—clues to civilizations that no longer exist. How to manage trash has always been a challenge for communities. Technology has changed the types and amounts of trash produced, how people dispose of it and the impact of trash upon our environment. As a result peoples’ values and perceptions of what should be done with trash are also changing.

The terms garbage, refuse and trash are often used together and somewhat interchangeably. However, waste management professionals distinguish “solid waste” and “refuse” as words to describe any variety of materials that are discarded as useless. They use “garbage” to refer to animal or vegetable waste, especially food waste. This often smells as it decomposes. “Trash” then refers to all other discarded items.

Interestingly enough, peoples’ perceptions about their trash are often incorrect. They frequently underestimate how much trash they produce, how much food they eat and how much food they waste. It is estimated that each person in the Hawai‘i generates about 8 pounds of solid waste per day! Much of this can be sorted and separated into materials that can be recovered and used as raw materials through recycling or composting or as energy through incineration.

In these lessons, students will enjoy getting their hands on the materials that make up trash and investigating them in more detail as scientists. Younger learners can observe, compare and classify based upon the characteristics or properties of items that make up trash. Older students can also extend the ideas about challenges of trash from our play by experimenting with processes to separate the many different components of trash. If your students decide to do more work outside the classroom, like organizing a beach clean-up for example, remind them to have adult supervision and be cautious when handling discarded materials. Items, such as soiled diapers, broken bottles, electronic devices, and chemical waste may pose various health and safety risks.

What's In YOUR Trash???

Grades K-3

***Desiree:** Soda cans, popcorn box, old newspapers...dude you are a walking trash heap.
Kai: Don't wait until it's too late or the trash you create will become your fate. Reduce, reuse, recycle.*

Lesson Overview

This activity gives your students the opportunity to investigate what makes up our trash. They will first observe the composition of a trash sample and then sort and classify the items from the trash in different ways. They will explore how they can limit the impact of trash by reducing, reusing and recycling waste materials.

Vocabulary: trash, garbage, solid waste, refuse, reduce, reuse, recycle

Essential Questions

- How can we limit the impact of our trash by reducing, reusing and recycling?
- What can we learn about people and societies through investigating waste?



Photo by Bev Kutsunai

Objectives

Students will:

- Observe what items make up a trash sample.
- Describe the properties of these items.
- Classify the items in different ways.
- Document their observations
- Communicate their ideas and results with others

Time

- A one-hour class session.

Materials

Prior to introducing this lesson to your students, collect a trash sample to bring to class that contains typical items you might throw away. Include key elements that you want students to observe and classify - large and small items, some that can be reused and some that can be recycled and some that show you could have reduced your trash by not using them at all. Include some items made from the following materials:

- *paper* (newspaper, junk mail, paper napkins/paper towels, paper plates, homework...)
- *plastic* (plastic bottles, containers, Ziplocs, bags, silverware, foam meat trays...)
- *metal* (aluminum drink cans, aluminum foil, bottle caps, paperclips...)
- *glass* (small jars, bottle...)
- *food material from plants* (leftover fruits/veggies)
- *food material from animals* (eggshells are easy to rinse ahead of time so they don't smell. Consider packaging leftover food in clear plastic bags for easy student observation.)
- *miscellaneous items* (such as rubber bands, popsicle sticks, pencils/pens, a book, a broken toy that could be fixed, some clothes like worn t-shirts or single socks, and yard clippings....)

Pack your items in a trash bag.

Additional Materials

- a large plastic trash bag cut open or newspapers spread on the floor.
- newspaper
- construction paper folded in half for display signs

Teaching Suggestions *Please adjust the lesson, if needed, to better suit the needs and abilities of your students.*

1. Ask students about what can be found in the trash. What does trash tell about a person? Introduce them to the idea that archaeologists study ancient peoples and their cultures. As part of their research, archaeologists examine people's trash. This provides great evidence and clues to explain how things worked and their importance in society. What story does your trash tell about you? What do you have in common with others?
2. Explain to your students that you have brought a trash sample from home and they will be examining its components to find out more about you and your habits. Ask students to list items that they think they may find in your trash. (What kinds of things do they put in their trash?) Together, agree on a list of 10 items the class predicts will be in your trash.
3. They will be scientists discovering, observing and describing the items in the trash sample. Open the bag and start bringing out specimens for students to observe. Have them describe what types of items they find in the trash.
4. Check the earlier list of predicted items mentioned by the class. Which ones have been found? Mark those. What items were not on their list? Can they figure out what you eat based upon your trash? Do your students eat any of the same things? Can they figure out



Photo by Bev Kutsunai

..... TRASH

what other things you might have at home based upon your trash? Your trash is the evidence - what observations can they make based on what they have found?

5. When the collection is completely displayed, ask students how they could classify the types of trash as they come out of the bag. Select students to help you organize the trash components into groups according to what materials the items are made from (paper, plastic, metal, food, etc.). Continue to add items until you have sorted all the trash.

6. What is another way that students could sort this trash? Have students provide the idea and re-sort the items.

7. Sort the items one more time into groups that could be reused, recycled or reduced (items that need not have been used at all).

8. Give students some trash artifacts on pieces of newspaper for them to examine in pairs or small groups. They should observe and record information about their items on a piece of paper or in their science journal. Younger students should have two items so they can compare. Older students may have several more items.

9. Have students make a display sign about their items using their notes. They may draw and/or write about each item on a folded piece of construction paper to make a sign that will provide information to share what they have observed and what they think about their items.

10. Have students include ideas from the following list:

- a. Properties
- b. Material(s)
- c. Could this item be reused?
- d. Could this item be fixed?
- e. Could this item be recycled?
- f. What information can we learn about the person who threw it away?

11. Direct students to display items with the signs on their desks. Have the class walk around to visit other people's work and learn what their classmates have discovered about the different components of your trash. What new things do they observe?

12. Where would this trash go? Analyzing trash can tell us more about the people and the society that produces the trash. We affect the trash with the products we choose to consume and the decisions we make about disposing of those products. Examining trash can also help us target items that can be pulled from the trash for reuse or recycling.



Photo by Bev Kutsunai

These items (corn cob, lime wedges, eggshells and grape stems) can all be composted.

- 13. Sort the trash components again with the students. This time sort them into groups where items could be composted as well as those that will be taken away as trash. How would this change the amount of trash produced by you?
- 14. What do students think about the amount of trash they produce at home? How could they also reduce that amount? What do students notice about the stories that trash can tell us? What can they do to change the trash and change the story?



Photo by Bev Kutsunai

These items could be recycled. The cans and bottles can be redeemed through the HI-5 program.

Extension Activities (optional)

Trash Watch in the Classroom

As a follow-up activity, place a clipboard near each rubbish can in the classroom. Have everyone record what they throw in the trash. For younger students, have the class make a list (perhaps using pictures) and they can write a tally mark by the item. Items may include paper towels, writing paper, milk cartons, tissues, etc. At the end of the day, there will be a record of the items that have been thrown out in the classroom. Share this record with students and have them classify the types of items thrown away. You can record them in a list, classifying them as the discussion continues. How could the class reduce the amount of trash produced? What can students conclude about how trash tells a story in their classroom? How can they change the story that trash tells about them in school?

If you have access to a scale, you can also weigh the trash. Make sure you use the same container each time and subtract its weight from the total weight of the trash items. For more ideas, we recommend the section “Mathematics & Garbage” (pages 122-125) from “Teaching Green: The Elementary Years” by Tim Grant and Gail Littlejohn.

Trash Watch At Home

Have students write a letter together that will explain to their parents how they want to track what is thrown away in their trash at home for one cycle period between days when the trash is emptied.

They can set up a recording station (just like they did in the classroom) near their trashcan at home and have their families join in to help them log what is thrown in the trash.

After the trash goes out, students can examine their data and classify the different types of items thrown away as they classified your trash in the classroom. How does their trash compare to yours? What is similar and what is different?

What ways do they think their family could change the amount of trash produced at their house? What would their family be willing to try?



Photo by Bev Kutsunai

These items were all containers and packaging materials from common trash. What items could be reused? What items could be recycled? How could you find a way to not have so many packages?

School-wide Trash Watch

Now that you've got a good idea of what you throw away and what can be reused, recycled or even composted, why not share this information with your school? You can start by approaching other classes in your grade and throughout the school to show them how to track their classroom trash just as you have done. Set a time period for tracking trash and then compare results. What did you find out? What patterns did you notice?

How else do schools produce waste? Brainstorm ideas with your students on what other places you can look to track what gets thrown away. Areas to consider might include the cafeteria or front offices. This may require going beyond using tally sheets to obtain a more detailed picture of the waste practices of your school. Have students organize an interview and talk with people that work with school-wide waste daily. Start with the school custodians. On a large scale, what can they tell us about trash at school? What kinds of trash do they notice fills their bags? Are there some areas in school that consistently produce more trash than others? How much trash do they usually pick up and process each day? When does the amount increase or decrease? Have a separate interview with the cafeteria/food service staff. They will be able to explain trash in a different way as their waste will be food waste with paper from napkins and milk cartons. Does your school wash dishes and silverware or use disposable products? How many people are fed each day? How do they keep track of waste after lunch? Does your school also offer breakfast and/or a snack? How much trash results from those activities? For more ideas on how to conduct a school-wide waste watch, visit http://www.recycleworks.org/schools/s_audits.html and www.greenschools.net/CurriculumIdeas2.htm.

Photo courtesy of the Kōkua Hawai'i Foundation



Let's Sort It Out

Grades: 2-6

Kai: Do you think I could throw all this stuff into the landfill?

Lani: Well sure you could, but do you really want to?

Lesson Overview

Waste materials collected for recycling are often mixed together in trash. When we separate them, we can sort materials out for recycling. This activity challenges students to experiment with ways to separate a mini collection of trash - without touching the items. They will separate the items based upon the properties of the materials in the trash to be separated.

Vocabulary: property, material, interact/interaction



Photo by Bev Kutsunai

Essential Questions

- How can the properties of materials help to separate them from a mixture?
- How do models help us understand more about processes?
- How do these experiments help us understand more about what happens to our trash?

Objectives

Students will:

- Observe and compare to find out more about the properties of different materials.
- Experiment with ways to separate items by applying what they know about the properties of the materials.
- Document their observations.
- Communicate their ideas and results with others.

Time

- A-one hour class period

Materials Per group of 2-4 students

- A clear plastic cup for each group (a rinsed and reused one would be best)
- A trash mixture of pieces of different items made from different *materials*.

..... TRASH

(Try to use 2 of each item so students can compare, some can be broken into pieces that will fit in the cup, keeping the pieces large enough to be identified.)

Here are the guidelines for choosing items. (Please test your items prior to the lesson to familiarize yourself with each item's properties.) You will need:

- Things that float, such as:
small pieces of *paper*, like school writing paper, construction paper or even cardboard; *wood*, like toothpicks, popsicle sticks or small sticks from outdoors; *plastic*, like Styrofoam; *wax*
- Things that don't float, such as:
small pieces of a different type of *plastic* like a plastic fork; a *glass* marble
- Things that are magnetic, such as:
steel paper clips or washers; *iron* washers, screws or nails
- Things that are non-magnetic, such as:
small balls of *aluminum* foil, *aluminum* nails, sand or small rocks



A set of equipment including:

- A small tray or re-used plastic paper plate
- A colander (a reused Styrofoam cup with holes in the bottom works well)
- A magnet (small enough to hold, but strong. Most refrigerator magnets would work.)
- A drinking straw for each student working in the team
- A large container (like a clear plastic storage bin or large bucket, for example) half-filled with water for students to test their materials. (Whatever container you choose, make sure that students can see their results, either in their groups or as the whole class.)
- Empty cups to hold successfully separated items
- A small cloth towel or paper towels for spills
- A copy of the "Let's Sort It Out" worksheet (on page 23) for each student

Teaching Suggestions *Please adjust the lesson, if needed, to better suit the needs and abilities of your students.*

1. Review the term **properties** with the students. A property is a word that describes characteristics or features of an object or material. Everything has its own set of unique properties. Basic properties are size, shape, and color. Properties also show what an item can do. Paper clips are attracted to magnets - being magnetic is a property that can help students decide how to separate an item from the mixture. This is a test that waste processors use. Another property is whether items can sink or float in water. Density is an important but complex property. It can be introduced by observing the interaction of items in water - do they sink or do they float?
2. Explain that students will conduct experiments to discover more about the properties of various materials commonly found in trash. Their goal is to find a way to separate the materials so that each material can be recycled - without touching the items.
3. Give each group a cup of materials to investigate. Have them write and draw about what they observe in their cup of trash-mixture either on a piece of paper or in their science journal, if they have one. Do they recognize any items? Why are they in pieces? What are the different items made out of? Each item is made from one or more materials. These materials can be a key to separating the mixture of trash.

..... **TRASH**

4. Review each item from the set of equipment with your students. Show them the tray and ask how this could help them organize their experiment. Brainstorm ideas with them. How could they separate materials using a straw? (ex: blow on items – in and out of water.) What could the cup with holes be used for? (ex: straining small items from larger ones.) How could they use a magnet? (ex: to attract some materials and not others.) What do they need to be careful with while experimenting with the water? (ex: spills.) How could the water help separate items? (ex: what floats and what doesn't.)
5. After setting class guidelines, let your students begin their experiments. Encourage them to work carefully and thoughtfully. They need to find out more about how they can move and separate the different items by using the properties of the objects instead of using their own hands. Students need to track their findings and can use the attached table to organize their results.
6. When they have tested each type of material, they should begin to evaluate their results.

- a) Why would people want a process to separate items that didn't use their hands?
- b) How could pre-sorting trash help the process? (Separating cans and bottles as they get put into trash is a basic change people can make with thought and a little effort and awareness.)
- c) Which methods worked best for which materials?
- d) Which methods didn't work as well?
- e) How did the properties of the items affect the results?
- f) Analyze the steps that were involved. Does the order of the experiment make a difference? Can you separate everything or are some items too difficult?
- g) What else could you try?



7. Summarize the activities by addressing the essential questions together.
 - a) How can the properties of materials help to separate them from a mixture?
 - b) How do models help us understand more about processes?
 - c) How do these experiments help us understand more about what happens to our trash?
8. How did this process help students understand more about what is involved in waste management and recycling? What have we learned and how can that help us be more aware about the way we handle our trash?

Let's Sort It Out

Name _____

Date _____

How can I find ways to separate these items without using my hands?
How do the materials of the items affect my results?

Group Members: _____

Our Results

		Magnetic?	Moves from Blowing Air?	Sinks in Water?	Floats in Water?	Sticks in Strainer?
Object	Material					
marble	glass					

What did you notice as you tested your materials?

Extension Activities (optional)

Visit the Recycling Collection Center Near You

One way to lessen our environmental impact is to reexamine things that we are putting in the garbage. Recyclable materials like plastic soda and water bottles make up 60% of bottle production, but the good thing about that is that they don't have to end up in a landfill. The HI-5 program targets selected bottles for recycling. Ask a student to demonstrate how to tell if the bottle will be accepted for redemption in the HI-5 Program by showing you where the stamp is located.

Drawing courtesy of the Kōkua Hawai'i Foundation



Ask students if they have participated in the program. Where do they go to redeem their bottles? Where do they go to recycle their non-HI-5 containers (shampoo bottles, spaghetti jars, etc.)?

Work as a class to locate the recycling centers in your neighborhood. Are the recycling centers drop-off points? Are they staffed with volunteers, or are they run by a local company? Are they affiliated with the HI-5 program for the State of Hawai'i? What are the hours of operation? What do they tell customers about sorting their trash? See what you and your class can find out together. Check on the internet and in the phone book. Ask people around school. Have the students write up this information in a flyer to send home to their families, inviting them to visit a recycling area nearby.

Have your class find out more by contacting someone in your area who works with recycling, like someone from the HI-5 program or a recycling center. Students could write a list of questions and have a team of students run an interview to get more information. How do they process incoming materials? How do they sort and clean them? How often do they pick up materials and how much material do they receive? What are some of the challenges in this business? What are some of their accomplishments?

Deeper Investigations with Sorted Materials: Metal Cans

Take up a can collection with the class. What types of cans do people have in their trash? Ask students to bring in empty, clean cans that would go in their trash. They can also bring in a full can. What are some of the properties of cans? Since sharp edges can result from opening cans, check all samples and tape the edges as needed.

Which cans interact with a magnet? Which cans do not? Do they know what kinds of metals are used for making cans? The magnetic attraction will be a clue to help them identify the material by the properties of the can. Steel cans (like soup, coffee, or whipped cream cans) are attracted to magnets. Aluminum cans (like soda cans or juice cans) are not. Aluminum cans are one of the great success stories of consumer recycling, while recycling of steel cans isn't quite as popular. Why would this be? How can students find out more about aluminum or steel cans? The websites www.cancentral.com and



Photo by Genny Wilson

Above: a small example of different sized cans made from various metals.

www.eia.doe.gov/kids/energyfacts/saving/recycling/solidwaste.metals.html have great information on the history of cans and the recycling process. For example, did you know that when aluminum cans are collected, they can be re-melted, rolled, re-manufactured, and returned to store shelves in as few as 60 days? That means you could buy the same recycled aluminum can from a store about every 9 weeks or almost 6 times a year! What a great, easy way to reuse resources and reduce stress to the environment.

RECYCLING ALUMINUM saves 95% of the energy required to make an aluminum can from ore and costs about 40% less! Reducing (or even eliminating) aluminum mining would also ease the impact of pollution and other negative influences on the environment.

Deeper Investigations with Sorted Materials: Plastics

Take another look at the plastic collection with the class. They have experimented with small pieces of plastic. What kinds of plastic goes into their trash? Ask students to bring in empty, clean items made from plastic that would go in their trash. They can also bring in plastic containers that are still in use. What are some of the properties of the plastics? How are they the same? How are they different?

Some of the ways plastic is classified is by its interaction with light (especially sunlight), its interaction with heat and cold, and its resistance to impact (how easily it cracks and how rigid or flexible it is). Scientists also classify plastics by how they perform as a barrier to moisture and to oxygen. In 1988 a system of plastic codes based upon properties was developed to assist in recycling efforts for plastics (see table on the next page). See if students can locate the codes on the bottom of their plastic items and sort them. What properties do they notice about each code they find? Sorting plastics has made it easier to recycle them and create new uses for the material. How can students use items made from plastic carefully and wisely? How can understanding more about plastics help them change their trash?



Photo courtesy of the Kōkua Hawai'i Foundation

Students are shown sorting plastic bottles from aluminum cans.

Recycling Symbols	Definition	How Recyclable?	Uses	Recycled Into:
	Polyethylene Terephthalate	Easy to recycle in Hawai'i	Bottles for soda, water, sports drinks, mouthwash, salad dressing, etc.	More drink bottles, tote bags, clothing, carpet and luggage.
	High Density Polyethylene	Easy to recycle in Hawai'i.	Milk jugs, large bottles for juice, shampoo, conditioner, laundry detergent & dish soap.	More bottles for these items in addition to pipes, flower pots, and recycling bins.
	Polyvinyl Chloride (PVC)	Recyclable, but not collected for recycling in Hawai'i.	Some plastic wrap, construction pipes, carpet backing and insulation.	Mud flaps, floor mats, traffic cones, rain gutters, garden hoses, and decking.
	Low Density Polyethylene	Recyclable, but not collected for recycling in Hawai'i.	Frozen food bags, dry cleaning bags, bread bags and squeeze bottles (i.e. honey).	Shipping envelopes, trash cans, trash can liners, furniture and floor tile.
	Polypropylene	Recyclable. Confirm whether your local recycling center accepts type 5 plastic.	Yogurt containers, syrup bottles, straws, tubs for butter, medicine bottles.	Broom bristles, oil funnels, bike racks, automobile battery cases.
	Polystyrene (Styrofoam)	Not collected for recycling in Hawai'i, however some mail centers collect packing peanuts for reuse.	Foamed: take-out boxes or coffee cups. Rigid: CD jackets, plastic cutlery.	Egg cartons, license plate frames, foam packing, thermal insulation.
	Other individual plastics or a combination of several plastics	Type 7 materials not collected for recycling in Hawai'i.	Lining on the inside of food cans, CDs, food and beverage containers, cups and utensils.	Difficult to recycle multiple plastics. Some items, made from plant resources, may be composted.

Check with your local recycling center to determine what kinds of plastic and other materials they accept

Research sources include: <http://www.thedailygreen.com/green-homes/latest/recycling-symbols-plastics-460321>, http://www.twincities.com/ci_9361916?source=most_emailed, <http://www.ides.com/resources/plastic-recycling-codes.asp>, <http://www.care2.com/greenliving/which-plastics-are-safe.html>

Reduce Overview



Photo courtesy of the Kōkua Hawai'i Foundation

Many students are aware that there are serious issues with trash and other related environmental concerns such as litter and pollution. This increasing awareness is encouraging as it translates to greater support of recycling facilities, higher rates of recycling at home, and stronger participation community clean-ups. We have uncovered some of the basics of trash and now it's time to explore how to change our wasteful habits! The abbreviation “**3 R's**” helps people remember the terms **reduce**, **reuse** and **recycle**. This guide seeks to offer specific information about each of these ideas, along with direct experiences that will help define concepts based upon the students' world so that they can practice and apply these ideas at school and extend them to their homes and community.

Reduce means to cut down on the amount of trash that is produced. We consider it the first and most important of the 3 R's. While this can mean sorting items from trash and extending their use by recycling or re-using, it also means decreasing the amount of non-essential goods purchased. It also involves deliberately choosing products that are made from recycled materials, such as recycled paper, or that mention a percentage of recycled materials as content. It can also involve purchasing items that are made from easy to recycle materials such as cardboard egg cartons instead of Styrofoam. Packaging is a significant concern. In Hawai'i we rely on goods shipped to us. These products are packaged using paper, cardboard, and plastic and then transported on wood palates wrapped in more plastic and foam.

In these lessons, students gather information about how much packaging is involved in their lives. Younger learners count the number of bags their family brings home in a week. They will record, classify and compare their results, then experiment in changing habits for a week. Older students will extend the challenge of packaging by investigating packaging styles from the world around them. How can they think “beyond the box” and design some new ways to package items to help us **reduce**?

Bag It!

Grades: K-6

Kai: I can make better choices like my mom who brings her own bag to the grocery store so she doesn't use a plastic bag that gets thrown away. That's smart!

Lesson Overview

Students will consider how many bags their family gets in a week. They will investigate this at home by tallying and classifying bags (paper, plastic, other) that their family collects during a week's time. They will share their results with classmates in a discussion and graph their results. Then, they will repeat this activity but change behaviors by using their own bags for all shopping or other transportation of goods during the following week while documenting the change in their new bag tally. Students will share the essential questions with their families and reflect upon how they can reduce their trash by using reusable bags.

Vocabulary: reuse, consumer, disposable,

Essential Questions

- What do people want in a bag?
- What do people need in a bag?
- How do “disposable” bags change our trash?
- How can a bag show people ideas about our community and our trash?

Objectives

Students will:

- Collect, classify and record data about the bags brought to their home in a week.
- Organize this data into a graph.
- Communicate their ideas and results with others.

Time

- One 45-minute session to discuss and set up the home study of bags (a week at home to collect data)
- One 45-minute session to share results from the home study and to write a letter to parents outlining the reusable bag experiment/homework (another week at home to collect data)
- One 30-minute session to share and compare final results and comments

Materials

- A selection of different types of bags you have received at stores (include plastic and paper, different sizes, colors etc.)
- Teacher's school bag

PLASTIC BAGS: A HISTORY

1957	Plastic sandwich bags are first introduced.
1966	Grocery stores begin offering plastic bags for produce.
1974	Department store retailers switch to plastic merchandise bags.
1977	Supermarkets introduce plastic grocery bags.
1990	Supermarkets begin collecting plastic bags for recycling.
1996	Four out of five grocery bags used are plastic.
Present	Each year an estimated 500 billion to 1 trillion plastic bags are consumed worldwide (see www.reusablebags.com for more information). Consumers are becoming more aware of the negative impacts of “disposable” bags. Many grocers now offer store-branded reusable bags.

- Chart paper for recording key points from discussions
- Student worksheet (included in this lesson on page 33)
- Graph Paper/Chart

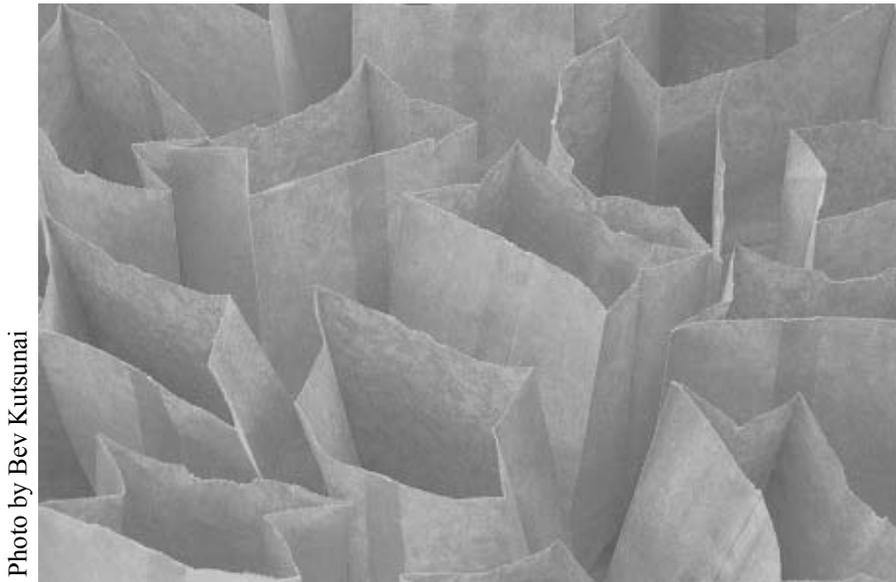


Photo by Bev Kutsunai

Paper bags are recyclable, compostable, biodegradable and made from trees, a renewable resource. The process to make paper bags, however, is not environmentally friendly. Plastic bags are made from oil, a non-renewable resource, are not easily recycled and don't biodegrade. Reusable bags offer a good alternative. For more info visit www.greenfeet.net/newsletter/debate.shtml.

Teaching Suggestions *Please adjust the lesson, if needed, to better suit the needs and abilities of your students.*

1. Show students a pile of work that you had to bring to school today. Ask students how they bring their work to school each day. Many will have backpacks or bags. Have several students share their bags. Show students your teacher bag that you use to carry your work. Bags can really help us.
2. When students go shopping with their parents, do they bring their backpack to carry things? How do they get items from a store to their house? What kinds of things do stores give people to help them carry their purchases? Why would a store give people a bag? As consumers, when people buy goods, they need a way to transport their purchases, so stores give people bags. How is this smart? How is it not?
3. Show your student the collection of bags you have brought to share with them. Explain that you have been saving the bags that you have received and want to share your collection with them. What do your students do with the bags they get from stores? Make a list of 5 things they do with bags. Listen to see if someone mentions throwing the bags away or bringing the bag back to the store for recycling. Many students will mention using the bags in different ways, or keeping the bags without realizing that they are reusing them.
4. What else do they notice about the bags? Start putting bags into groups – paper and plastic - and see if they can follow your idea and finish your sorting.

5. Ask students about the groups they have sorted. List their ideas.
 - a) What are some of the properties of *plastic* bags that make them useful?
 - b) What are some of the properties of *paper* bags that make them useful?
 - c) What other things are important about how paper and plastic bags are different? (ex: what they're made from or whether they biodegrade, etc.)
6. Ask students where your bags came from. How do they know? Many stores use bags as advertising, having consumers promote their business. What if your students were to start a bag collection? How many bags do they think their family gets in a week? Have students make a prediction and write it down. Is this number correct? How would a scientist find out? If students work with their families, they could find out together.
7. Ask students to help you write a letter explaining that the class would like to do a project to see how many bags families get during the week. Send home a tally sheet and have the family mark each time a new bag comes home. Have them sort their bags into groups of paper and plastic. Choose a starting and ending date, including a weekend. (For the kindergarten scientists, the teacher might want to write in the days before reproducing the worksheet.) Also include any questions students might like to ask their families about bags and using bags. Thank them for their help.
8. Demonstrate how to complete the tally sheet. Have students write their prediction on their worksheet before collecting data and complete it at the end of the tracking cycle.
9. As a reminder to students, keep track of how many bags you bring home during the week. Keep your tally on the board and mention your data each day. Give students time to talk about how their totals may be the same or different. Why do they think the numbers aren't always the same? Why do they have different numbers than you do?
10. When the week is completed, have students bring their tally sheet back and share in small groups. What do they notice about their results? Which type of bag was used more, paper or plastic? How many bags did each group have? How many bags did they collect altogether during the week?
11. After students discuss their results, collect the student tally sheets and look at their data. Plan out how you want them to graph their results. Graphs are determined by the data numbers found so it really helps to plan ahead and see what numbers you are working with before you start to work with your students.

Environmental Impacts

Did You Know:

- Hundreds of thousands of sea turtles, whales and other marine mammals die every year from eating discarded plastic bags mistaken for food.

- Plastic bags don't biodegrade, they photodegrade—breaking down into smaller and smaller toxic bits contaminating soil and waterways and entering the food web when animals accidentally ingest.

- Plastic bags are among the 12 items of debris most often found in coastal cleanups, according to the nonprofit Center for Marine Conservation.

(Source: www.ReusableBags.com)

12. Help the children graph their results. For the youngest students, make a class graph of each type of bag and the total number recorded. Older students could make several graphs (pie charts and bar graphs work well). They also may be able to do individual graphs once you demonstrate how to set up the graph. There are computer programs, too, that students can use to graph on the computer (Appleworks and Excel are popular in computer labs).
13. Now that the students have represented their data in a display, have them examine their graph(s).
 - a) How does their data correspond to their prediction?
 - b) What could they do to reduce the number of bags they bring into their home?
 - c) If they carry some of their own bags, how much a difference could they make in their total bags collected?
 - d) What did people do before disposable bags were invented?

For Part 2 of their work, have students carry some of their own reusable bags to use when they go into stores. (Emphasize all stores, not just grocery stores.) Encourage them to brainstorm how to make this easier. For example, they can keep extra bags in the car and other family members can use them as needed.

- a) What kinds of bags do they already have at home that they could use?
- b) Do they have some cloth tote bags or something similar? (They can also reuse paper or plastic bags that they already have at home.)
- c) What kinds of products don't really need to be put into bags at the store? (ex: small items, detergent bottles, etc.)



Photo by Genny Wilson

Here are examples of reusable bags including paper, mesh, cloth, and a hot/cold bag. What others can you think of?

14. Write a short note with the students to explain that the class would now like to complete Part 2 of experiment and use their own bags to transport items during the next week. Pass out another tally sheet and have the students make a new prediction. Send home the note and tally sheet. Have students complete the tallies as they did before. While students are experimenting with this at home, share your own experiences by doing your tallies at school again.

15. When the week is over, have students meet and share in their groups again. What was the difference between the two weeks? What did they find out by trying something new and using their own bags? What did their families think about this experiment? What can they change about the way they get and use bags from stores?

Extension Activities (optional)

Great Graphing

Students can graph the data from their second set of tallies and compare their results from the first and second parts of the activity. Students could also show their work with a different kind of graph, i.e. pie graph, line graph, etc.

Bag Museum

During this experiment your students have discovered some interesting bags. Make a display of students' favorite reusable bags. Have them create a small display sign for their bag with folded construction paper. The sign should have their name and some of the properties of that describe the reusable bag they brought to share. They can also include reasons why they like this bag.

See what kinds of bags other people like too. There are interesting bags online made from lots of different materials with lots of different advantages - even designer bags that are popular with movie star shoppers! Check them out with your students. Good websites to start with include <http://simplygreensolutions.com/catalog/> and www.reusablebags.com but you can find many others by doing a simple online search. How are the various types of reusable bags you discover different from one another or the same?

Alternative Choices

Share with students that there are now bags made from corn. These bags are compostable and biodegradable and are not made of plastic. You can find out more at www.biobagusa.com. Experiment with composting these products alongside plastic ones.

Other products, like cups, plates and cutlery, are also being made out of plant products instead of plastics. The website <http://www.eco-go.net/corn-detail.php> has interesting information on these items. If you can, share some examples with your students. You might want to check your local supermarket or health food store to see what products they carry.



Photo by Genny Wilson

Bag It: Home Project Part 1/ Part 2

Name _____

Date _____

Date Due _____

Tally how many bags your family brings home in a week. Sort them by material - are they made from plastic or paper? Then put a tally mark next to the day of the week the bag comes home. When you are done, add up the tally marks and write a total for each day. Work together and add up each day's total, with a calculator if necessary, to get a grand total of bags that have come to your house. What do you and your family notice as you do this project? Comments may be written on the back of this sheet. Have fun counting!

My Prediction: I think my family will bring home _____ bags during the week.

Day and Date	Tallies for Paper	Tallies for Plastic	Total Bags

Total:

Total:

Total:

The Price of Packaging

Grades 3-6

Tutu: *We have to stop looking at everything around us as something we can just throw away, and we have to start using those three R's, reduce, reuse, recycle. We need to learn how to be more careful about what we buy and ask ourselves if what we buy will be good or bad for the environment.*

Desiree: *Pono.*

Kai: *Pono. I think I get it. I do love our island home and I don't want to see it ruined because of all the stuff I buy or the things I throw away.*

Lesson Overview

The excessive amount of packaging used in products goes into our garbage. Students will examine products and consider alternative packaging options that could help us reduce what ends up in our trash.

PONO is a Hawaiian term that means to do the right thing.

Vocabulary: reduce, consumer, disposable, trash, solid waste, garbage, debris

Essential Questions

- What relationship does packaging have with solid waste and trash?
- What impact do our actions have on the world around us and why would this be important in our islands?

Photo by Bev Kutsunai



Objectives

Students will:

- Compare a variety of packaging styles.
- Examine how different packaging types can affect our trash.
- Document their observations.
- Use their observations to design a new packaging model that will limit waste.
- Communicate their ideas and results with others.

Time

- A one hour class period to examine the different packaging
- A one hour class period to design new packaging models

Materials

- At least 5 samples of a familiar product in different types of packaging. Consider candy, cookies, crackers, cereal, tea, soap or any other product. Whatever you choose, look for items that are relatively inexpensive and easily manipulated by students. You may want to have a selection of different types of items or a wide variety of one item. Try to obtain individually packaged items that are also packed in a larger box or package. Have a similar item in a large quantity that is not individually packaged. Choose what will work best for your classroom and help your students understand the diversity of packaging types. For this lesson, the more layers of packaging, the better!

Teaching Suggestions *Please adjust the lesson, if needed, to better suit the needs and abilities of your students.*

1. Show students a bag of food samples containing different types of packaging. Open the bag, and present your items. Open each container and show the individual packages inside.
 - a) How does packaging make it easy or difficult for each group to study a sample? (For example, can students see, touch or smell a product inside it's packaging to know what they're buying?)
 - b) How does packaging help the product get to Hawai'i or to our homes?
 - c) How many layers of packaging does each sample have? (Ex: cereal can have one layer of packaging or many. You can buy it packaged in just a plastic bag, or it can come in a plastic bag inside a cardboard box. Individual boxes of cereal can have a plastic bag inside a cardboard box which is inside another box holding all the individual cereal boxes and then the whole thing is wrapped in plastic!)
 - d) After we eat the product, where does the packaging go? Can some of it be recycled or reused?



Photo by Genny Wilson

Tea is a good example of a product that can use a few, or multiple layers of packaging.

2. In our islands, we are dependent upon imports (goods shipped in from other places) for most of our food and other items. These products must be packaged for shipment. More packaging is added for transport.
 - a) What have students noticed about packaging in stores?
 - b) How do stores restock their shelves?
 - c) What do stores do with the packing materials?

Items are boxed-up and the boxes are put on shipping pallets and wrapped in plastic for transport. Some items are packaged and put in containers. All of these materials contribute to our trash problem. Students may have noticed bins outside of stores for cardboard and other packaging materials. Some stores have bundlers that strap flattened cardboard boxes for recycling. Developing awareness in students about how packing

materials add to our business impact on trash can give them new dimensions to consider as we look at our challenges with solid waste in the islands.

3. Have your students examine how items they may be purchasing are packaged and then reflect upon how this contributes to our trash. Divide your students into teams and give each team an individual, packaged product. Have them open the packaging and unwrap the product. What do they notice about the packaging materials?
4. Questions for students to consider:
 - a) How many pieces of packaging does their product have?
 - b) What are the materials used in the packaging for their product? (Plastic? Paper? Cardboard? Other?)
 - c) How much of the packaging would be thrown in the trash?
 - d) Can you reuse the packaging after opening the product?
 - e) Can you reuse the packaging materials when the product is gone?
 - f) How easy is it to recycle the packaging materials?
 - g) Which parts of the packaging could have been eliminated?
 - h) How did the packaging help the product be transported to Hawai'i?
 - i) Are there items produced here in Hawai'i that we can buy instead of transporting in this packaging? (ex: local produce, clothes, crafts, etc.)

Buy LOCAL!

Buying local produce at farmers' markets, as well as locally made products has several win-win benefits:

- **It supports our local farmers & craftsmen.**
- **There is no extra cost for shipping.**
- **Fuel isn't used to ship long distances.**
- **Less packaging goes into our trash!**

5. Have each team evaluate their packaging and present their findings to the large group. Discuss the results together.
6. Introduce the economic side to packaging. Large quantities of items are typically cheaper than small, individual packages. Share a large package that you have also brought. Show students how to compare the cost of the two styles of packaging by finding the cost of the product per ounce for each type of packaging. A 16oz tray of cookies, for example, at \$1.99 would mean each ounce of cookies is about twelve cents per ounce. The students can participate in organizing the math problem where \$1.99 is divided by 16. Do the same calculation for an individual pack of cookies. They may need to first figure out the cost per pack, then the cost per ounce. Which one has more packaging?
7. Why would people be willing to pay more for items that they could get at a cheaper price? Convenience is a key factor for many consumers. Individual packaging is also popular in sharing products with groups as it can be more sanitary to have individual packages. What is the hidden cost of all this packaging? It is a contributor to our trash and we pay for it there as well.

8. Ask students how types of packaging could be reduced. What ways could help products be displayed for purchase without using as much packaging? You can mention gum as a great example because an old fashioned gum ball machine stores gum and dispenses it to consumers as they purchase it - with no packaging at all! Have students brainstorm a list of ideas that could limit packaging and help it be more efficient. They can also include ways to help people recycle or reuse the packaging.
9. Give students time to work in teams to design a new way of packaging a product of their choice. Their packaging should keep their product clean and usable for consumers and limit waste. Talk with your class about other criteria, such as packaging that is reusable and/or recyclable. Choose if you would like them to actually use materials to create packaging or create their design ideas visually with posters. You can also arrange to have your students write to the manufacturer of their product suggesting their ideas on ways to package the product in a more environmentally friendly way.
10. Have student groups share their ideas with the class. Discuss how their designs can reflect a perspective that will reduce the amount of solid waste from packaging.
 - a) How can these designs improve our trash situation in Hawai‘i?
 - b) How has technology impacted our solid waste? What can it do to decrease how much waste we produce?
 - c) What can they do as consumers when choosing items in stores? (ex: buy local, look for less wasteful packaging, shop in bulk, look for reusable and recyclable packaging.)

Extension Activities (optional)

Package Hunt

Send students on a packaging hunt at home. Have them find the best and worst examples of packaging as it pertains to waste and bring it to class to share. Display the items and have people vote on which is one would be at the top and which one would be at the bottom of a list of ways to package while thinking about reducing our trash contributions.

Shopping for an Idea

There are examples of excellent packaging contests on the Internet. Some focus on design, some focus on the environment. Many are international. Take a look and see if some would be good to share with your students. Here’s one example of how different people solve similar packaging problems: http://www.treehugger.com/files/2006/04/ecopackaging_co_5.php. Here’s another great idea on how to reuse “packaging” you already have; <http://www.jorrevanast.com/index.php?page=project.php&dir=jar%20tops>.

Reuse Overview



Photo by Bev Kutsunai

Reusable options from a trash sample

Reusing means to save items that would otherwise be thrown out and use them again. This can include using an item again for its original purpose or finding a new function for the item. For instance, returning large water containers to get refilled and making a child’s swing from a used tire are both examples of **reuse**.

Reusing is intimately tied to **reducing** waste. It prevents the reused items from entering the waste stream and reduces the need to purchase new goods. The lesson “Bag It” from the previous section relies on reusable bags. The same is true of water bottles; carrying our own reusable bottles can greatly **reduce** the amount of plastic disposable water bottles used each year (28 million in the U.S.!). **Reusing** is often preferred to **recycling** because it allows an item to be used directly, rather than taking more energy and expense to break the item down into raw materials.

Classrooms are great places to practice **reusing**. Newspapers, magazines, yogurt containers, paper towel and toilet paper rolls, egg cartons etc. can be used in all kinds of art and science projects.

In this section, students will explore creative ways to use things they already have in new ways. They will begin by making an instrument – a musical shaker - from **reusable** items to bring to the show with them. Next they will explore other options for creative arts projects and organize a book exchange to change their trash to someone’s treasure.

Shake Up Your Ideas About Trash

Grade: K-6

Tutu: *Let's see what you have here in your pile of stuff. Aha. This is something we can use. Do you like music?*

Kai: *Music? I love music.*

Tutu: *Well, let's see. We can take this trash and make something special.*

Kai: *That's awesome. I never thought of making new things out of my old stuff. Thanks!*

Lesson Overview

“The Trash Heap” features a magical shaker that helps the main character, Kai, find the right people to teach him new ideas. When you come to see the show, your students will help Kai “shake up his ideas” about trash with their own shaker that they have made by reusing would-be pieces of trash. They will help him find his destination by shaking their instruments during certain parts of the play. In this lesson, students examine their ideas about trash and garbage and make their shakers from reusing a wide variety of materials.

Vocabulary: trash, garbage, solid waste, debris, reuse

Essential Questions

- How does reusing objects from our trash change our waste?
- How can trash become treasure?

Objectives

Students will:

- Examine their preconceptions about trash.
- Compare ideas together as a group in a discussion.
- Make observations about different types of objects from the trash and the materials used to create them.
- Use these objects to design and create a musical instrument to bring to the play “The Trash Heap.”

Photo by Genny Wilson



Sample materials to fill your shaker with.

Timing

- One 15-minute period to introduce the lesson and prepare students to gather reusable items from home
- One 45-minute period to create their instrument, share results, and reflect on the project

Materials (for each student)

- Container: The container can be anything from plastic bottles and cylinders (water bottles, tennis ball cans, food containers like yogurt cups) to metal pie pans, tin containers for nuts or chips, cardboard tubes, or small boxes like cereal boxes or rinsed milk containers. You may want to even brainstorm with your students beforehand and ask them to bring in an object from home to use. Make sure that the container can be well sealed.
- Noise making objects to go inside the containers: Each student will need a handful of material to create sound when they shake it up in the container. These can be a wide variety of materials but need to fit easily inside the containers. We suggest you collect an assortment of common objects that you might otherwise not have a use for. Examples

include mismatched buttons, plastic or metal bottle caps, lone beads, broken crayon pieces, aluminum can pop tops, popsicle sticks, caps from lost pens, confetti from a 3-hole puncher or even old business cards.

- Stapler
- Masking Tape (or other reinforcement tools as appropriate to seal each container)

Teaching Suggestions *Please adjust the lesson, if needed, to better suit the needs and abilities of your students.*

1. Ask students what they think of when they hear the word “trash.” Start a list of their brainstormed ideas (ex: yucky, stinky, not useful, etc.). (For younger students, you may want to do this as a group with chart paper or they may draw pictures. Older students can keep their own list.) Now what do they think when they hear the word “rubbish,” “debris,” “litter,” and “solid waste?” (Keep these ideas in a safe place and come back to them after students have explored the lessons from this guide and watched the show.)

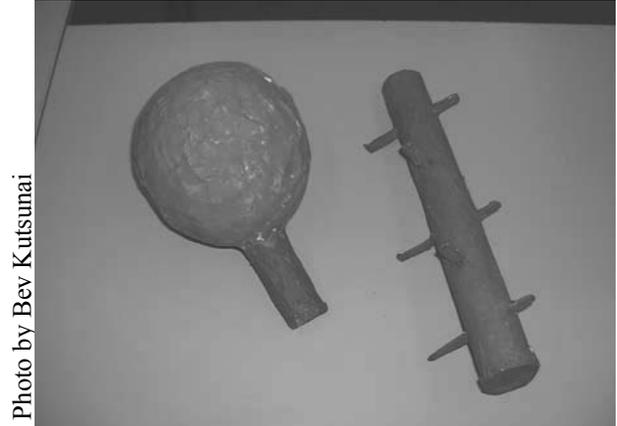


Photo by Bev Kutsunai

Example of unique decorated shakers.

2. Have students pick 3-5 of the most important words from their list and write them on small slips of paper. They will use these later in step 5. These are their ideas about trash today. The show that they are going to see, “The Trash Heap,” will explore misconceptions and facts about trash and garbage while teaching about 3 R’s. After seeing the show, ask your students the same questions again. They may have some new ideas in their future!
3. To participate in the show, students will make a musical instrument - a shaker - before they see the play. They will use their shaker during the show to help Kai on his journey. If you would like students to contribute objects and materials, you should brainstorm ideas with them now (a few days ahead of the scheduled lesson time) so they know what types of materials to look for (see Materials list for suggestions). Send a note to parents explaining what materials you are seeking.
4. After assembling your collection of “found” containers and shaking materials, share them with the students. What are some properties or features of the containers that would make a good shaker? What are some properties of the small objects that will make a good sound when the container is shaken?
5. Students need to plan out their project and design their own shaker, although you can certainly assist them in this process. Have students choose their container. Once they’ve decided, have them put inside their container the slips of paper with those 3-5 words describing their ideas about trash, garbage, debris, litter and solid waste.
6. Their next step will be to choose and add their shaking materials. Will their shaker need extra help to be sealed tightly? Vibration from motion can cause structural challenges, so help them to be successful by providing guidance about how to seal up their container.

They will literally be shaking up their ideas about trash whenever they use their instrument, so they've got to be strong. Remind them to include their name on the shaker in some interesting way so they can keep track of their work.

7. Have students display their shakers on their desks. Give students 10 minutes to visit and explore each other's projects.

8. Reflect on the activity with your students. How does reusing a container and small items to make sound help our challenges with trash? What do the students notice? How can trash be treasure? What other things can they make from reused trash? See the "Sorting Shakers" activity below for more questions and ideas.



Photo by Genny Wilson

You may think to use natural materials to fill your containers, but instead of tapping these resources first, how would it be better to re-purpose items you already have for this project?

9. Have your students keep their shakers in a safe place for later. Remind them that they'll be "shaking up their ideas about trash" at your school's performance of "The Trash Heap."

10. **After the Show:** Ask students to consider their words again. What do they think now when they hear the words "trash" or "garbage?" Review the earlier questions and their earlier responses. What new ideas do they have now? Have students write down these ideas/words and add them to the design on the outside of their shaker.

Extension Activities (optional)

Shaker Fashion

Your students may want to further decorate their shakers. If so, follow the same principals of reusing items to decorate the instruments as they did to create them. Are there leftover buttons, popsicle sticks, etc. that you could glue to the outside? Do you have markers to color them? What else could you reuse?

Shaker Sorting

Have each student classify their shaker, starting with the properties of sound. Is their shaker loud or soft? Does it have a high or low sound? Is there another shaker that sounds like theirs?

Next, have your students sort the containers by the types of material they are made from. Can they find other examples of the same materials? Which container would be best for this project and why? What properties help a container to be reused in a new way?

Have students test their neighbor's instrument. They should listen to one another's shakers and offer ideas on how to improve designs.

What other ways can the containers be sorted that shows the diversity and range of their instruments? By size, shape or color?

More Than Enough to Share With You

Grades: 2-6

Lani: Good to see you with so much less trash! Where did it all go?

Kai: I was able to find homes for lots of the stuff. Some of it is going to be composted, some it I recycled, some of it is going to the thrift store, and I kept some of it for an art project.

Lesson Overview

Students will show how they can make a difference by reusing items they no longer want or need. They will first examine a selection of books and choose to donate them to another classroom. Then they will organize a book exchange for their own classroom to show how they can reduce solid waste at school and at home. If you feel different items, like board games or puzzles, would fit your class' resources better, use those, but be specific and limit the scope of item types so kids can easily measure their success and stay focused on the importance of reusing. (This lesson can easily be adapted for younger students. Offer more guidance and assistance in writing the notes etc.)

Vocabulary: reuse, consumer, solid waste

Essential Questions

- How can we change our contributions to solid waste?
- How can we plan our own project to address the challenge of too much trash?

Objectives

Students will

- Investigate social options for working together to share products.
- Demonstrate the importance of reusing objects by organizing a book exchange.
- Measure book donations (by number and weight) to document the project's reduced impact on our environment.

Timing

- One 45-minute class session
- One 45-minute class session to set up, run and pack up the book exchange
- One 30-minute class reflection

Materials

- A small selection of used children's books you no longer need in your classroom. Make an arrangement with another colleague to receive these books as a donation
- Construction paper
- Poster board
- Markers
- Containers to hold the collected books (reused boxes etc.)

Teaching Suggestions *Please adjust the lesson, if needed, to better suit the needs and abilities of your students*

1. Review the idea with your students of limiting contributions to solid waste by reusing objects. Share a small collection of books that you could "throw away" because your students don't need these specific books anymore and you need to make space for other items in the classroom, for example. Ask the students for ideas about what could be done

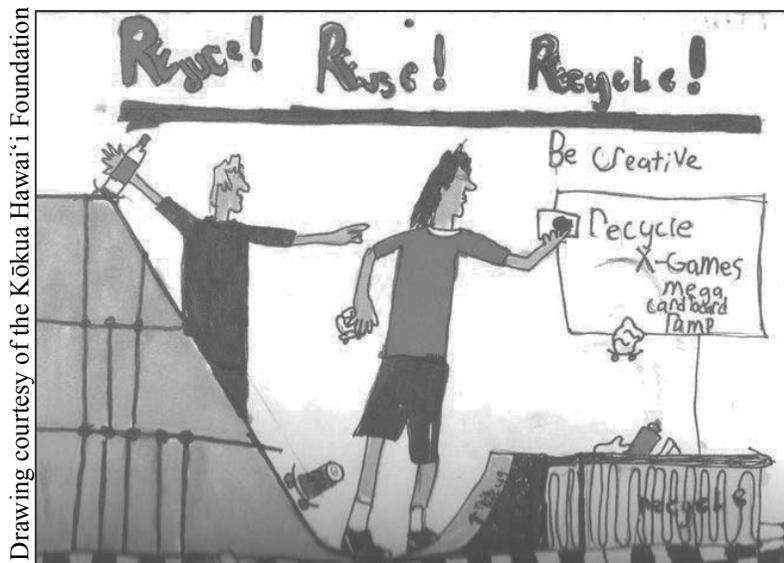
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with them beyond putting them in the trash. They may mention giving them to the library or some organization such as Goodwill or the Salvation Army. Encourage them to think about acting locally. Where could these books go to help others in the school? Mention a classroom that could use some new titles for independent reading.

2. Have students help you write a note to this other class that explains how donating these books demonstrates what they have been learning about reducing contributions to trash and extending the use of materials to lessen our impact on our environment. Ask students for a few tips for their schoolmates on how to help make positive contributions to the environment around them to include in this note.
3. Have a group of students take the books and note to the neighboring classroom.
4. For the next portion of the activity, have students reflect upon how they could increase the materials saved and reused. If there was an exchange instead of a donation, they would double the books that were reused. Have them do another book exchange, but this time have them use books that they no longer need or want from their own personal collections. They will plan the project and exchange books with each other (or with the class that received your donation).
5. Help students organize the plan with key questions:
 - a) Why do they want to do this?
 - b) How will it help each family participating?
 - c) How will it help the environment?
 - d) How can they explain the project to their families?
6. Once the big ideas are clear, students will need to focus on logistics. Where and when will the book exchange happen? Do they want to set a limit of how many items to bring or choose? Do they want to make a record of donations or give tickets to exchange? What if some students don't bring any books? (Let students know that you have some extra books in case some students are unable, for whatever reason, to bring a book to the exchange.) What will happen to the extra books that are not chosen? How will families be told about the book exchange? Where will books be dropped off and stored until the exchange? When will the books be sorted? Are there some books that would not be acceptable (because of topic, style, or condition)?
7. Have teams do jobs to contribute to the success of the book exchange including:
 - ☑ Creating a note for families
 - ☑ Creating posters to advertise the event in the classroom
 - ☑ Sorting the books into categories for the exchange
 - ☑ Counting the books (keep a record of the number of books)
 - ☑ Weighing the books (keep a record of the weight of the books)
 - ☑ Setting up the books before the exchange
 - ☑ Packing up the leftover books after the exchange (weigh and count these too)



8. Give the students time for setting up, running and packing up the exchange.
9. Have an evaluation discussion to share ideas about how the book exchange project went. Give students time to discuss and share their ideas.
 - a. How many books were brought to the exchange?
 - b. How much weight was saved from being thrown away in our trash?
 - c. What parts of their plan went well?
 - d. What could have been smoother?
 - e. Would they want to do this again? Why or why not?
 - f. How is reusing a good idea?
10. Have students summarize what they learned and send it home to share with their families. If books are to be donated elsewhere, make a copy of their notes and send the information along with the books.



Extension Activities (optional)

Beyond the Classroom

Now that students are familiar with the process, they can widen the scope to include more participants and more types of items. Would the class be willing to exchange items with students from a different grade level or a different school? Would a local homeless shelter or other charity have need of any of your items? You can also consider a rummage sale instead of an exchange. Proceeds can support school programs or be donated to a charity the students choose.

Check Out the Library

Take the class to your local public or school library. If students do not have library cards, distribute applications. Show them that borrowing books instead of buying new ones is another great way to reuse.

Old is New Again

Grades: K-6

Kai: *What are you making?*

Marcella: *Well, it's a sculpture made out of found materials.*

Kai: *What are found materials?*

Marcella: *Mostly they are things other people do not want, things they think of as garbage. But when I find them, I see them in a whole new light.*

Lesson Overview

Students will explore creative ways to extend the use of assorted objects in art and craft projects. Cereal boxes are a secret source of thin cardboard for great school projects. Each box gives students two big rectangles to work with once the sides and ends are cut away. In this lesson, students will learn the basics of bookmaking to create their own books using cereal box rectangles as the covers. (Young children just need more assistance and can do more for themselves in a smaller, group situation. Plan accordingly)



Photos by Bev Kutsunai



Vocabulary: reuse, consumer, disposable

Essential Questions

- How can creative ideas change our garbage?
- How can we change our ideas about what is disposable?

Objectives

Students will:

- Identify options for multiple uses of common objects based upon the properties of the materials the objects are made from.
- Work together as a group to brainstorm ideas.
- Document their discoveries and ideas.
- Communicate their ideas with others.
- Create a useful item out of found objects (in this case, a book).

Timing

- A one hour class session
- Additional sessions for further art project work in either large or small groups

Materials

- A selection of assorted cereal boxes to be recycled (at least 1 per group of 2-4 students)
- Blank paper for story pages (optional: you can use your own handmade paper – see “Perpetual Paper” lesson for details)
- Strong Staples or Sturdy Sewing Machine
- Fabric squares measured to fit the book cover (Parents or fabric stores may be able to provide “scraps” that are large enough for this project.)
- White Glue
- Masking Tape (or duct tape, if you prefer)
- Wax Paper (optional)
- Scissors
- “My Book Plan” worksheet for each student (see page 49)

Teaching Suggestions *Please adjust the lesson, if needed, to better suit the needs and abilities of your students*

1. Ask students to save and bring in their cereal boxes from home. Each student will need a box to make a book. Collect the boxes. (You may also want to use them for a health lesson as well - it’s a great time to compare cereals, types and preference, nutrition labels, etc. Doing this will encourage more contributions as students become more interested in the upcoming project.)
2. Have students begin by cutting the front and back rectangles from their box to determine the size of their book. (An adult may want to straighten the cutting of the covers later by using a paper cutter.) Older students can also use a ruler to measure the size of their book (width and height). Scientists prefer to measure in centimeters. Decide how you would like your students to measure and have them record the units of measurement, along with all their information, on their book plan worksheet.
3. Next, direct students to decide how many pages their book will be, including a title page. Add two additional pages to their number for interior cover pages. (These pages will be glued down to the cereal cardboard, holding the book in place.) The pages should be slightly smaller than the cover. If the cover is an unusual size, the pages may need to be cut to size. It is better to have them cut for the students on a paper cutter so they will all be the same size. Their worksheet will help your students plan.
4. An adult will need to assist in binding the pages by stapling or sewing the pages together on a sewing machine. (You may find stapling easier, but stitching makes a very sturdy book. Perhaps a parent helper can join the class for a sewing session - the students will be fascinated.)
5. After the pages are bound, have students tape the center of their two cardboard rectangles together, from the center out, leaving about 2 inches free on the top and the bottom. Masking tape (or duct tape) works well. Students will need a fabric scrap that is as big as both rectangles laid next to each other (like an open book) with an extra margin of about 3 inches all around. Have older students check their original measurements. Are they still the same? Younger students can focus on just adding the extra 3 inches all around. Give them a cut piece of scrap cereal box that is 3 inches long and have it labeled for them so they know which way is 3 inches. They can use this as a guide to measure the fabric around the outside of their book. Measure twice and cut once. Older students

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should also lay the cereal box rectangles on the fabric to double check their measurements. They can see that when they put the first piece of end paper flat onto the rectangle, the edges of the fabric will be underneath the paper.

6. Next, students will glue the fabric to the cereal box rectangle with the “right” side of the fabric facing out, away from the box. White glue works well, but advise students to spread it with a piece of leftover cardboard scrap so there are no thick puddles of glue. Leave the overlapping fabric hanging out and let the book dry.
7. When the fabric is dry, flip the book over and fold in the fabric overlay, just like paper is folded when wrapping a present. Glue these pieces down inside the book, the same way as before, spreading glue along the edges.
8. Put the bound pages in the center of the book, along the spine. Fold down the first and last sheets of paper at the spine, one at a time, on each side, to see how they will fit. Put them to the side and spread glue along the spine of the inside cover of the cereal box. Bring the pages back to the center and put the end papers down into the glue, flattening them with your hand. Wipe up any extra glue that leaks out of the edges. If things get too sticky, slide in a piece of wax paper that is slightly larger than the book. Leave the wax paper there as the book dries, it can be peeled out later. Repeat with the other end paper.
9. Let the book dry. If there is a lot of glue soaking the cereal box, sometimes the book may start to curl as it dries. If this happens, add another piece of wax paper on top and put a heavy book on it to flatten it out as it dries. The wax paper will keep any extra glue from sticking to your heavy book.
10. Students will have a lovely journal when all is done - made in a traditional way of binding books. They can check their hardback library books and will see the similarities. Paperbacks are not made this way, which is one reason they don’t last as long as hardbound books.

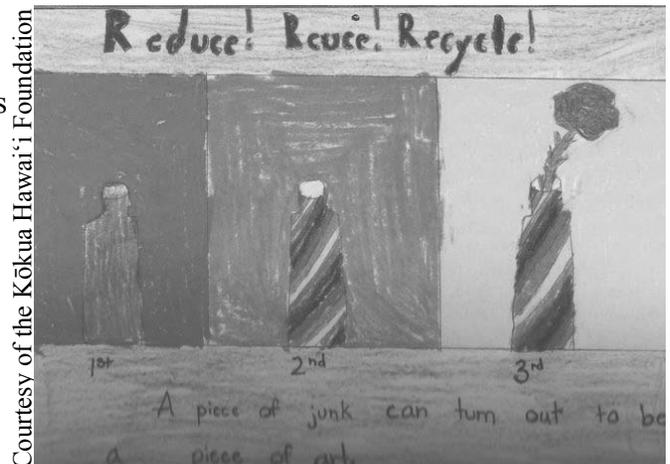
Extension Activities (optional)

3 R’s Book

Have students create works in their books based on Jack Johnson’s “3 R’s” song (lyrics on page 65), “Dirt Made My Lunch” (page 60) or “Decomposition” (page 61) by the Banana Slug String Band.

Glass Vase

Have students bring in a clean, glass bottle to create an interesting vase. You will need to provide magazines (or other sources of art or imagery that they can recycle) or have students bring magazines from home as well. Students should cut or tear out the images they want to use, decide how they would like them arranged, and glue them to their bottle. Popsicle sticks come in handy to press out any bubbles trapped under their pictures. Once their new vase



.....**REUSE**

is completely covered, they should further “seal” their vase. They can either paint on plain glue to cover the vase, or dilute it, if you wish, with one part water to three parts glue. When they’re all done they’ll have created their own piece of “found” art from reused materials.

Litter Lovers

Picking up litter is always a great way for students to take action in their own community. Have them collect litter around the school, or as part of a field trip, and classify the litter that they find. Instruct students not to handle potentially unsafe items, though.

What types of items were commonly found? Did they find plastic bags? How did they affect the environment they were found in? What properties of plastic bags make them common as litter? Sort out the litter materials that you’ve found together. Recycle what you can, separate out items you can use for “found art” projects, and carefully place other items in the trash.

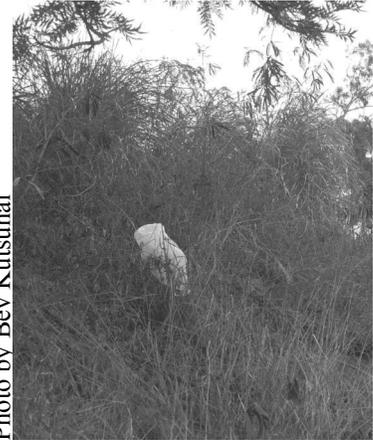


Photo by Bev Kutsunai

Where else could this bag end up?

Art Search

Artists use many “found materials” as part of their work. For future project work, have students make a list of materials to collect and store in a recycled art area in your classroom. Items may include, buttons, fabric scraps, ribbons, trim, beads, sequins, paper clips, rubber bands, scraps of wrapping paper, yarn, string, egg cartons, popsicle sticks, toilet paper rolls, paper towel rolls, corks, bottle caps, berry baskets, socks, nylon stockings, metal screws, nuts-and-bolts, telephone wire, and soda can pop tops. Remember to also include natural items such as shells, twigs, dried leaves or flowers, or old garden seeds. When you are working on specific projects, you can request boxes, milk cartons and larger items. Have the students help you organize materials and they will do a good job putting things back when it is time to clean up.

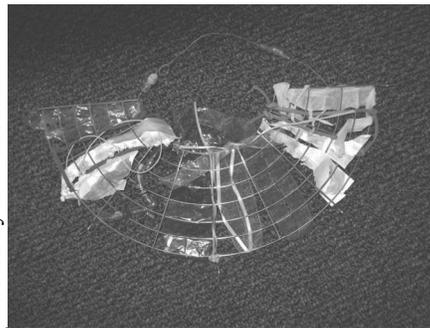
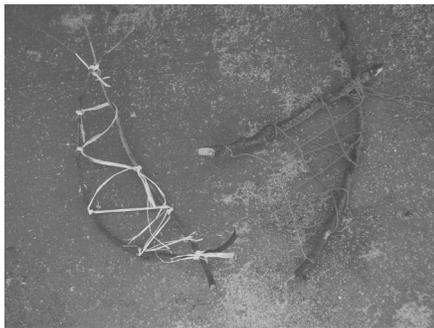


Photo by Bev Kutsunai

Weaving

Weaving is more than just paper strips layered up and over for placemats. Materials from the environment can represent the world of the student - that’s what artists do!

Open your mind to see looms that are reused materials as well. Students can weave independently by reusing berry baskets, in small groups by reusing broken laundry baskets, or as a whole class by using fencing around your school (ask for permission). Students don’t have to take their weaving project home either. It can be part of the classroom décor.



Photos by Bev Kutsunai

Left: Small projects can be made with looms of twigs and sticks tied together with wire and string. *Right:* Recognize a tray from a wok as the loom?

My Book Plan

Name _____

Date _____

I measured my book in _____ (centimeters/cm or inches/in.)

My book will be _____ tall and _____ wide.

My book will have _____ pages + 2 interior cover pages = _____ total pages.

My fabric cover looks like _____

I will use my book for _____

The found objects I used to make my book are _____

Here is an illustration of my finished book:



By making my book, I learned _____

Recycle Overview



Recycling is a process that physically changes something that was used and discarded into a new product. Technology has helped to develop new ways to shred, melt and create new products from used materials that otherwise would be left in our garbage. The EPA has a list of more than 4,500 **recycled-content** products available and the number continues to grow. Many of the products we now use regularly have recycled content. Examples of these include: aluminum cans, carpeting, cereal boxes, egg cartons, glass containers, laundry detergent bottles, motor oil, nails, newspapers, paper towels, and trash bags.

Creating a market that supports purchases of products that are recycled is a key to completing the **recycling process**, or “closing the loop.” When you purchase something that has been made from **recycled** products, you are supporting the recycling process. There are several standard types of labels (including recycled content, pre-consumer material and post-consumer material) that manufacturers use on “recycled” products. Each label indicates a different type of recycling used to create a specific product. For instance:

- **A recycled-content** product is an item that contains recovered materials. Recovered materials are wastes that have been diverted from conventional disposal such as landfills for another use. Recovered materials include both pre-consumer and post-consumer wastes.
- **Pre-consumer materials** are generated by manufacturers and processors, and may consist of scrap, trimmings and other by-products that were never used in the consumer market.
- **Post consumer material** is an end product that has completed its life cycle as a consumer item and would otherwise have been disposed of as a solid waste. Post-consumer materials include recyclables collected in commercial and residential recycling programs, such as office paper, cardboard, aluminum cans, plastics and metals.
- **Recycled content products** may contain some pre-consumer waste, some post-consumer waste, or both. A product does not have to contain 100% recovered material to be considered “recycled,” but clearly the higher the percentage of recycled content, the greater the amount of waste that is diverted from disposal. Always look at the level of post-consumer recycled content in a product.

(Source: <http://www.oregonmetro.gov/index.cfm/go/by.web/id=3369>)

Many communities have **recycling collection centers**, the first step in the recycling process. Just as manufacturing and marketing products are businesses, recycling is also a business and technology is helping to make this business of recycling more viable. Consumer support is also an important part of its continued success as we work together to limit our impact on our planet.

In this section, students will investigate the process by using models to participate in recycling. They will investigate processes for recycling paper and plastic, as well as nature’s process for recycling organic material.

Perpetual Paper

Grades: K-6

Marcella: I get to make really fun art...and it's much better than throwing things in the trash.

Lesson Overview

Students will investigate the age-old process for making paper. They will see how recycling paper can help the growing trash situation in the environment around them. By participating in the process of making paper, they will reflect upon using paper and how it contributes to trash at school.

Vocabulary: recycle, pulp

Essential Questions

- What properties of paper help it to be recycled?
- How would recycling paper be important in our school and community?

Objectives

Students will:

- Observe and compare the properties of different types of paper.
- Observe the interactions of paper and water.
- Observe how properties of paper and water change.
- Document their observations.
- Communicate their ideas and results with others.

Timing

- 30 minutes to prepare materials
- A one hour class session to make the paper and reflect upon the process
- 30 minutes to review and discuss the results with the dried paper

Materials

- Assorted scraps of used paper. Include different textures as well as colors.
- Magnifying glasses
- A slotted spoon
- A sponge
- 16 oz. recycled clear plastic cups (2 per paper samples to be soaked overnight)
- Several sections of newspaper to use as a blotter
- Rolling pins or recycled bottles filled with water or sand
- Dried herbs or pressed flowers (optional decorative addition)

Additional Materials for “*Shaken Paper – A Great Recipe for the *Youngest Scientists*”

***This lesson works well for younger students, pre-K to 2, in groups of 4.**

Each pair of students need to share:

- A clear plastic jar with a tight fitting cap (reusing a wide mouth peanut butter jar is excellent) filled about $\frac{3}{4}$ full of water
- 2 pieces of reused window screen. Wrap tape along the edges of the screen so students don't hurt themselves. (The size of the screen will be the size of the finished paper)
- A basin or tub that will fit under the screens to catch falling water
- Toilet tissue - single ply and cheap works best because it is loosest. One roll can be

shared by groups of students, 4 rolls will be fine for a class

- Wax paper sheets

Additional Materials for “*Recycled Paper - Basic Recipe for the *Elementary Scientists*”

***This lesson works well for older students, grades 3-6, working in teams of 4.**

- A bucket or rubbish can to soak paper pieces overnight
- A paper making screen. You can make your own using empty wooden picture frames with used window screen that has been cut and stapled to fit the openings. The size of the finished paper will be the size of your screen. (Another frame option can be to wrap reclaimed nylon stockings over a used wire coat hanger that’s been bent into a circle or square)
- Flat basins or tubs large enough so the frames can be dipped flat inside of them
- A blender
- Assorted paper pieces - like computer paper, writing paper, newspaper, or construction paper - shredded and torn into 1 inch pieces

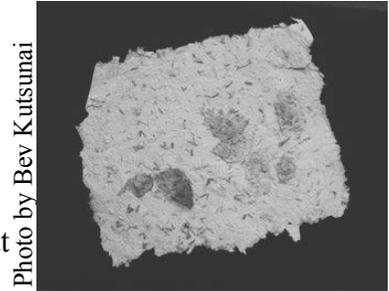


Photo by Bev Kutsuna

Teaching Suggestions *Please adjust the lesson, if needed, to better suit the needs and abilities of your students*

1. Ask students to locate something in the classroom that is made of paper and bring it to the large group. Encourage them to be innovative and find unusual things other people may not notice.
2. Have students sit in a circle and share their items. Encourage them to share something about the properties of their paper sample - words that describe something about its color, size, texture or special features.
3. Share your paper collection. Ask the students for words to describe the properties of the paper pieces in your collection. How could they find out more about a paper sample? Scientists would observe it and do experiments with it. Your students are going to be scientists and they can do these same things to find out more about paper. What tool would help to get a closer look at paper? Scientists use magnifying glasses to help them make detailed observations. Have a student demonstrate how to use a magnifying glass by holding it close to the paper and pulling back until the image is larger, but not too fuzzy. (People that put magnifying glasses next to their eyes don’t see anything!)
4. Have students select a piece of paper and take it back to their desk. They are going to compare their sample with their neighbor’s sample. How are the papers the same? How are they different? What is paper made from? Can they find clues with the magnifying glasses? Pass them out as students are working. Give students time to write and draw about their selected paper sample.
5. Ask students to explain where this paper would go when the class was done with it. Some may mention the trash or landfill. Some may mention recycling paper. People have made paper out of plant fibers by hand for generations around the world. Today we have technology to help us so we can use old paper to make new paper. The key is to loosen the fibers of the paper and then squish them back together again. What did they notice about the fibers in their observations? How could they be loosened?

6. Do any students know how paper is recycled? It is the same way paper is made, by mixing the plant fibers with water. Set up the 16 oz clear cups. In each set of cups, one will be filled with water and one will hold the dry sample of paper being tested. Ask the students to decide with their neighbor which paper samples they would like to test. (Encourage some to include colored samples as well as some that are white.) Rip each sample in half placing one piece in the dry cup, while the other soaks in water.
7. What do students think they will find the next day? Have them work with their neighbor to make a prediction about what will happen to the paper as it soaks in water overnight. They should write several properties of their paper and their prediction on a card and leave it next to the cup. Leave the samples to soak overnight.

Shaken Paper—A Great Recipe for the Youngest Scientists (follow steps 8 & 9, then skip to step 14) (Students in grades 3-6, skip to step 10 and follow the directions from there)

8. Your young, energetic students will work in teams to make paper. Have one student count out 10 squares of toilet paper and stuff it into the plastic jar filled ½ full with water. Put the cap on tightly and shake. Each team member shakes for a minute, then students switch. Shake for about 5 minutes total to break the paper down into very small pieces - this will be paper pulp. What do they notice?
9. Set up a screening station where students will pour their mixture onto the first screen over a container that catches the water. The second screen goes on top. Next, set both screens on a section of newspaper to be blotted. (If you are adding leaves or flowers, lift the top screen, add your materials and close the screen. Blot again, pressing hard.) Use a rolling pin or reused bottle to flatten the pulp on the screen. Roll from the middle of the pulp to press out excess water while it is still on the newspaper blotter. Students can also use a sponge to soak up excess water. Lift the top screen off and replace it with a piece of wax paper there instead. Flip the bottom screen over and help the students pull it off the new paper gently. Some people find it easier to pull the paper off the screen.

Recycled Paper—Basic Recipe for the Elementary Scientists

10. Students will work in teams to make paper. They need to tear the paper to be used for the experiment. The pieces should be about an inch in size and the team will work together to fill a cup. The ratio of paper to water will be about 1 part paper to 2 parts water. Have the student team add their one cup of paper pieces and two cups of water to a bucket or rubbish can. Stir and soak overnight. Remember water weighs 8 pounds a gallon so choose wisely where you leave your pulp to soak!
11. The next day, set up a blending station where you can plug in the blender. (Remember to be careful. Use caution; you are using electricity and working with water!) Skim out about ½ cup of pulp mixture. Add about 2 cups of water from the soaking container. Blend for about 30 seconds. Pause periodically to prevent the blender’s motor from straining. You need lots of water! The mixture should resemble slightly runny oatmeal.



Photo by Bev Kutsunai

12. Also set up a screening station. Fill the basins or tubs with several inches of water. Add the new pulp mixture from the blender. Stir it well. (There should be a flat area nearby for rolling and blotting the new paper.)
13. Plunge the frame into the bin, “scooping” water and pulp into it. As you lift the frame slowly from the water, gently agitate it to evenly distribute the pulp mixture over the screen and aid in draining excess water. Place the screen on the newspaper section to be blotted. Put another section of newspaper on top of that. Use a sponge to blot the edges. Press with hands to squeeze out water. Flip over the frame and carefully remove the bottom section of newspaper. (If you are adding leaves or flowers, do that now by lifting the screen and putting in the leaves/flowers.) Using a rolling pin or reused water bottle, start rolling from the middle of the pulp to press out excess water while it is still on the newspaper blotter. Students can also soak up water with a sponge. Flip the screen over and gently pull it off or pull the paper off the screen if that’s easier.
14. Put the finished recycled paper on a piece of dry newspaper or a drying rack to dry. Have the students write their name on a paper scrap or post-it and put it on their sample.
15. The next day, return to observe the soaking paper samples. What happened? Use a slotted spoon and pull them out so students can compare the wet paper to the dry paper. Also have them compare the soaked paper to the paper they made. What do they notice?
16. When their paper has dried, peel it off and let the students examine it with the magnifying glass. Have them reflect upon the process of making paper. What did they learn about recycling paper? What would factories need to do to make paper and recycle it? What if the paper was thicker? When students use a piece of paper, what will they remember?

Extension Activities (optional)

Discuss the differences in the above methods used to make paper. What are the advantages of one versus the other? What are the disadvantages? Think about the tools and materials used in each experiment to determine similar results. Was one more effective than the other? Why or why not?

Save Me!

Start a paper bin to recycle both colored and white paper in the classroom. Add a measuring tape to the inside of the bin so students can see how much paper they are keeping out of the trash. Wait a week or two and take a measurement. Make a sign that gives the amount of paper that has been contributed. How much paper do the students predict will be added during the next time frame? (Keep the time between measurements standard - if you start with one week, stick with one week.) Remind students to use both sides of each sheet of paper before recycling. Support the recycled paper bins by having special projects where students need to reuse paper from the bins. You can also weigh the paper bins if you have access to a scale.

Paper in History and Folklore

Read **The Cloudmakers** by local author James Rumford, who makes paper for his own books and watercolor paintings. The story is an interpretation of an ancient Chinese legend and an introduction to papermaking. Have students compare their paper making experience with the story.

The Secret Life of Dirt: Adventures in Composting

Grades K-6

***Hanna:** Compost is easy. Instead of throwing away organic waste – food scraps, eggshells, peelings, you can use them to make a natural fertilizer...All the scraps go into a bin together with scraps from your yard, like grass clippings and leaves. It sits together and heats up and eventually, with a little turning from you; it turns back into nutrient-rich dirt. Then you can put it into your garden and it helps new fruits and vegetables grow. That is the natural cycle of our life.*

***Kai:** Incredible! So there is a way to recycle food too.*

Lesson Overview

Students will explore the process of decomposition and its effects upon different materials. They will place assorted objects in containers of dirt and water and observe them over time, then discuss their observations and conclusions.

Vocabulary: decomposition, biodegradable, compost, debris, litter, natural resource, renewable resource

Essential Questions

- Why do we need bacteria? Why do they need us?
- How does decomposition affect us?
- What can people do to participate in the dirt cycle?

Objectives

Students will:

- Explore the process of decomposition in soil.
- Observe the effects of decomposition upon objects made from different materials.
- Compare the rates of decomposition amongst different materials.
- Document their observations.
- Communicate their ideas and results with others.



Photo courtesy of the Kōkua Hawai'i Foundation; Students prepare materials for composting

Timing

- A one-hour class
- Several 15-minute periodic observation times over a month
- A 30-minute wrap up

Materials

- Water in a squeeze or spray bottle
- Dirt or compost
- Containers for the soil. For younger children, reused plastic Ziplocs so they can check on their materials often. For older children, open containers of soil such as small planting containers or recycled jars work well.
- Rulers
- Crayons/pens
- Spoons

.....**RECYCLE**

- An assortment of small objects or pieces of objects made from different materials. Pick some familiar to the children in everyday life to represent what people put in their trash. (Suggestions include: newspaper, cardboard, school writing paper, small pieces of fruits/veggies, leaves or grass, sticks, flowers, cotton ball, piece of cotton fabric, wooden chopstick, small pencil, crayon, aluminum foil, metal and plastic bottle caps, plastic wrap, iron nail, plastic button, eraser, glass marble, etc.)

Teaching Suggestions *Please adjust the lesson, if needed, to better suit the needs and abilities of your students*

1. Ask students what happens to things that fall on the ground. With all the trees and plants that lose their leaves, why aren't we buried in nature's rubbish?

2. Introduce the word "decompose." This is a process where things break down into something simpler. Pull out a leaf of lettuce or other edible plant. We eat lettuce leaves for their vitamins in our salads. If that leaf fell to the ground, its vitamins could go back into the soil and it could be helping a new plant to grow. Decomposition is nature's way of recycling.



Photo by Genny Wilson

3. Ask the students to name some examples of objects they've seen on the ground. Which items would decompose easily and which ones would not? Introduce the terms "biodegradable" and "non-biodegradable."
4. Bring out the collection of objects for the experiment. Have students choose a partner to work with and then an object for them to share. They should make observations about it by writing and drawing. How does the object appear today? They can also measure it and label the details while discussing with their partners. They should include information that describes the object and its properties: color, size, shape, texture, material(s) and any special features including the object's function(s) (what you can use the object for; what job it does). A sample worksheet for logging observations is included on page 58.
5. Students will be putting their object into the dirt and leaving it for four to six weeks to investigate decomposition. Each team should put dirt in their labeled container. They will bury the object in the dirt and give it a squirt of water, then wait and observe what happens.
6. Have students make a prediction about what will happen to their object between now and the end of the experiment. They should record their prediction in words and pictures. Using their recorded observations will help them add details to their prediction.
7. In a week or so, have students check their buried material. Once again, they should refer to their early observations and predictions to compare their ideas with what they observe today. What do they notice? Do they want to adjust or change their prediction? They can do that by adding the date and writing another prediction along with their new observations in their worksheet.

8. Observe the materials periodically for a month to six weeks. When the foods have gone back into the soil, have the students discuss what has happened. How were bacteria helpful? Can we live without them? Encourage them to utilize vocabulary - biodegradable, non-biodegradable, and decomposition. Did all materials decompose? What do they think about that?

Note to Teachers on Children’s Understanding of Composting

Change is an abstract concept. Students need to document their observations over time to begin to understand more about how things change. Make it visible for the students by having them return to their observations and compare what was seen with what they see today. Young students need to know that nothing came and took items away – the reused Ziploc works well for that. Have them open their containers for air circulation every now and then. The bags can be hung up for display since students will want to come and touch their experiment. You may want to have extra bags available in case of leaks. Older students, on the other hand, will enjoy unearthing their experiment and reburying the items.

Extension Activities (optional)

Composting Outdoors

Ask for permission to set up a compost pile at school in a place with access to watering. A simple composting pile can be built using the basic recipe in the chart on this page.

Repeat the layers. Keep the pieces small and the layers tall. The compost will mature faster if you turn it and add more air to the inside portion of the pile. It is important NOT to include any animal products beyond chicken manure as that will attract pests and can be messy. Find more information on composting at www.surfkids.com/composting.htm.

COMPOST RECIPE	
	Water
	Soil
	*Green Stuff (nitrogen)
	†Brown Stuff (carbon)
	Water
	Soil

***“Green Stuff” includes items like chicken manure, fruits and veggies, green leaves and/or green grass.**
†“Brown Stuff” includes brown leaves, brown grass, paper and wood chips.

Dirt Puppet

Recycle worn socks and have kids create a dirt puppet. Brown socks work best but if you don’t already have them on hand, then you can also roll light socks in the Hawaiian red dirt! Stuff the sock with newspaper and glue on decorations like brown yarn, green leaves, sticks, or small pieces of things that you can find in the dirt. Buttons or other items left over from other lessons make good eyes. In the following pages, you’ll find a Dirt Puppet Interview and two songs from the Banana Slug String Band. Students can make their own Dirt Puppet and then practice the interview as a team with a partner. They can also write their own interview or commercial featuring their own Dirt Puppet.

Make a Book and Sing a Song

Students can create illustrations to match the lyrics of either “Dirt Made My Lunch” or “Decomposition” (from the Banana Slug String Band) to create a special book. These songs have a lot of good information in them for kids to use as they help build their ideas about soil and decomposition.

The Secret Life of Dirt: Adventures in Composting

Name _____

Date _____

My Object(s): _____

Illustrate (on the back of your worksheet), describe and/or list properties of your object(s):

WEEK	PREDICTIONS	OBSERVATIONS
1		
2		
3		
4		
5		
6		

Dirt Puppet Interview

by The Banana Slug String Band
www.bananaslugstringband.com

Interviewer: We have a special guest today. Please welcome our friend, Dirt.
Dirt: Hiya, Hiya , Hiya.
Interviewer: Dirt, It's nice that you could be here today. How are you doing?
Dirt: I'm feeling great, but I'm a little thirsty, I could use some rain.
Interviewer: Dirt, do you mind if I ask you a personal question?
Dirt: No, go ahead and ask me anything.
Interviewer: Why are you so important?
Dirt: Well, let me sum it up in one phrase—Dirt made my lunch.
In fact, I make everybody's lunch.
Interviewer: Dirt made my lunch? What are you talking about?
Dirt: OK, take this lettuce growing out of my head.
You eat lettuce and lettuce grows in the dirt. So dirt made your salad.
Interviewer: What about the bread in my sandwich? Does that come from dirt?
Dirt: Yes. Bread is made from grass seeds called wheat.
Interviewer: I get it! Wheat grows in the dirt, wheat makes flour for the bread and so dirt made my sandwich.
Dirt: Now you are thinking.
Interviewer: Wait a minute, I had a milkshake for lunch and I've never seen a milkshake plant.
Dirt: Right....there's no such thing as a milkshake plant, but what are milkshakes made of...?
Interviewer: Milk
Dirt: And where does milk come from?
Interviewer: Cows
Dirt: And what do cows eat?
Interviewer: Grass
Dirt: And grass grows in the
Interviewer: DIRT!
Dirt: So the next time you drink a milkshake, you can thank good old dirt.
Just follow the food chain and you'll find me!
Interviewer: So everything I eat comes from dirt? Bananas?
Dirt: Dirt
Interviewer: Chicken?
Dirt: Eats corn that grows in...dirt.
Interviewer: Guava juice?
Dirt: Dirt. Dirt. Dirt.
Interviewer: Dirt, you are very important. Thank you for joining us today.
Dirt: Anytime, let's have a snack.....



Photo by Bev Kutsumai

Dirt Made My Lunch

by Steve Van Zandt
of The Banana Slug String Band
www.bananaslugstringband.com

Chorus:

*Dirt made my lunch.
Dirt made my lunch.
Thank you Dirt, thanks a bunch.
For my salad, my sandwich
My milk and my munch
Cause Dirt, you made my lunch*

Dirt is a word that we often use
When we're talkin' about the earth underneath our shoes.
It's a place where plants can sink their toes
In a little while a garden grows.

Chorus

A farmer's plow will tickle the ground,
You know the earth has laughed when wheat is found
The grain is taken and flour is ground
For making a sandwich to munch on down.

Chorus

A stubby green beard grows upon the land
Out of the soil, the grass will stand
But under hoof it must bow
For making milk by way of a cow

Chorus



Decomposition Breakdown Blues

by Steve Van Zandt
of The Banana Slug String Band
www.bananaslugstringband.com

Is there waste? Well I don't know.
Cause one thing dies to let another grow.
This circle we see most every day.
The name that we call it is...decay.

Both Photos by Bev Kutsunai



Chorus:

*Well come on all you people, gather round,
Breakdown, listen todecomposition.*

Group 1: munch, munch, munch

Group 2: Decomposition, Decomposition

Group 3: Get Down, Break Down

There are many kinds of bugs,
worms and snails and banana slugs.
They are useful to me and you
They help to make soil renew
Every word I say is true.

Chorus

Decomposition is a useful game.
A tree drops its leaves but they don't stay the same
A bug chews them up and spits them back out
Making soil for a new tree to sprout
That's what I'm talking about...

Chorus

Reflecting on the 3 R's

Grades K-6

Kai: *I am going to really try to do my part to help our islands and our planet.*

Desiree: *Wow, it sounds like you learned a lot today.*

Kai: *I learned so much, and I can't wait to tell you, and my parents, and, well everyone I know. Because really it's pretty easy. Reduce, reuse, recycle.*

Lani: *That's it! You got it.*

Lesson Overview

Students will review the key environmental education elements presented in the Jack Johnson song "The 3 R's." They will relate them to, and reflect upon, the messages in the play, "The Trash Heap." (*"The 3 R's" Adapted from [the composition] "Three is a Magic Number." Music written by B. Dorough. © 2004 America Broadcasting Music. Revised Lyrics written by Jack Johnson.*)

Vocabulary: reduce, reuse, recycle

Essential Questions

- How do the 3 R's relate to each of us in Hawai'i?
- What impact do our actions have on the world around us?

Objectives

Students will:

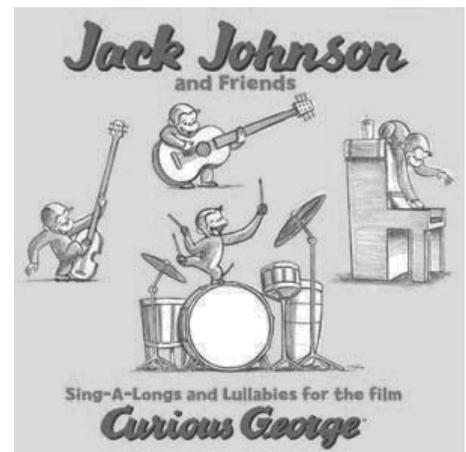
- Identify examples of each of the key concepts: reduce, reuse and recycle.
- Compare examples from the play to examples in their own lives.
- Use these ideas to create a project to share their understanding.
- Communicate their ideas and results with others.

Time

- A one hour class session
- Additional time to create the student projects

Materials

- Lyrics for Jack Johnson's "The 3 R's" song
- Light colored crayons
- Poster board and paints/markers
- Construction Paper
- Blank 8 ½ x 11 paper and black markers
- Chart Paper (if deemed necessary)



Teaching Suggestions *Please adjust the lesson, if needed, to better suit the needs and abilities of your students*

1. Share the lyrics to Jack Johnson's song. Ask students to read through the words with you. For younger students, you may wish to put it on chart paper first, then give them an individual copy after the first reading.
2. Lyrics for songs can give us information. What are the 3 R's? Have students pick three light colors of crayons to highlight parts of the song. (Yellow, pink and orange work

well.) Each “R” will have one color. For example, the word **Reduce** will be colored yellow, etc.

3. Going back into the song, have students read together and highlight the sections of the song that use the 3 R’s. Each time the section is about **reduce** they will use the appropriate color, like yellow. Show them on your own paper or chart. Do it along with them as they read. For the chorus, there will be a visual pattern to highlight the pattern of the words.
4. The next section of the song (*If you’re going to the market to buy some juice; You’ve got to bring your own bags and you learn to **reduce** your waste*) is about **reduce**, so students should highlight the whole section with the color for reduce (yellow, for example).
5. Do the same for **reuse** and **recycle**. At the end of the song, highlight the chorus with all 3 colors.
6. Ask the students to consider the content of the song.
 - a) Which of these words is new to the students?
 - b) Which word have they heard of before?
 - c) What does each word mean?
 - d) How are they important to us in Hawai‘i?
7. Take some time to reflect on what examples were given in the song and compare it to the examples given in the play.
 - a) What example for **reduce** did Jack Johnson use?
 - b) What were some examples of the idea of **reduce** that were in the play?
 - c) What would be some other good examples from the students’ lives?(You may want to write down these examples in a list for students to refer to later when they create their own project based upon the song.)
8. Repeat the same activity for **reuse** and **recycle**.



9. Students will create a project to share their ideas about good examples for the 3 R’s. Choose one of the following options that will work best for your classroom and your students.
 - a) Students can illustrate a class book with black markers. Each student can illustrate one of the words and show examples that demonstrate the definition of the selected word.

- b) Students can choose one of the 3 words and create their own poster illustrating examples of that word in action. These posters may be made with paints or markers on large paper or construction paper and can be displayed in the classroom or around school to help people remember the messages from the play, “The Trash Heap.” These posters could also be made into a Big Book.
10. Share the ideas from your class with another classroom that also attended the play.
- a) What do the other students think about your students’ work?
 - b) What do they think about the messages?
 - c) What could they do to practice the 3 R’s?
11. How does knowing the 3 R’s help us do a better job when we are throwing away trash, debris and garbage?

Additional Resources

A video recording of Jack Johnson’s song “The 3 R’s” is posted at www.kokuahawaii.org/media/videos. The song is also on the CD “Sing-a-longs and Lullabies for the film Curious George.”

Extension Activity (optional)

Have students write a letter about the play, “The Trash Heap.” Have them include an illustration of something that was important to them.

- a) Which section did they like best?
- b) What was something new they learned?
- c) Who are some people with whom they could share the ideas in the play?
- d) What is something they plan to do to help their island environment in Hawai‘i?

Feel free to mail these letters to the Kōkua Hawaii Foundation and/or the Kahilu Theatre Foundation. We would love to hear your students’ ideas!

<u>Kōkua Hawai‘i Foundation</u>	<u>Kahilu Theatre Foundation</u>
P.O. Box 866	P.O. Box 549
Haleiwa, HI 96712	Kamuela, HI 96743



The 3 R's Song

Lyrics by Jack Johnson

The 3 R's - Adapted from [the composition] "Three is a Magic Number"

Music written by B. Dorough

© 2004 America Broadcasting Music

Revised Lyrics written by Jack Johnson

Three, it's a magic number
Yes it is, it's a magic number
Because two times three is six
And three times six is eighteen
And the eighteenth letter in the alphabet is R

We've got three R's we're going to talk about today
We've got to learn to
Reduce, Reuse, Recycle
Reduce, Reuse, Recycle
Reduce, Reuse, Recycle
Reduce, Reuse, Recycle

If you're going to the market to buy some juice
You've got to bring your own bags and you learn to reduce your waste

And if your brother or your sister's got some cool clothes
You could try them on before you buy some more of those
Reuse, we've got to learn to reuse

And if the first two R's don't work out
And if you've got to make some trash
Don't throw it out
Recycle, we've got to learn to recycle,

We've got to learn to
Reduce, Reuse, Recycle
Reduce, Reuse, Recycle
Reduce, Reuse, Recycle
Reduce, Reuse, Recycle

Because three it's a magic number
Yes it is, it's a magic number
3, 3, 3
3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36
33, 30, 27, 24, 21, 18, 15, 12, 9, 6, and
3, it's a magic number

Songs from the play “The Trash Heap”

Grades K-6

The Trash Heap Song

I am stuck, stuck with Rubbish
This rubbish sticks to me

I am stuck, stuck with trash
This trash just sticks to me

I can't peel it off
I can't pull it off

You look like a garbage tree

I am stuck with rubbish
This rubbish sticks to me

(Dialogue)

I am stuck with all this trash
I fell like a trash heap nerd

I am buried in garbage
Are you listening, have you heard?
Word

I can't stomp it off
I can't shake it off

Now you look like a rubbish bird

I am stuck with garbage and garbage sticks to me
You are stuck with garbage and garbage sticks to
you
I am stuck with garbage and garbage sticks to me

The Trash Tango

I welcome you to the school of creation
I am the one with the information
I can tell you kids what you need to know
What you should and should not throw away,
ole?

If to the earth you nice
Before you buy you'll think twice
Reusing the things that you bought
Is something we all should be taught, ok?
Ok!

So let us do the two-time tango
Take two pans make them clang-o
Don't merely throw old things away
Pick them up and start to play

Don't buy the stuff you don't need
Zen you won't be in zis situation
Think twice before you buy what you see
Is it what you want or what you need

So two-time tango is our dance
Do not throw away your chance
To be the artist that you are
Your art supplies are not far away, ole ok?



Photo courtesy of the Kōkua Hawai'i Foundation

The Garden Hoe Down

Banana peels and coffee grounds
Add apple cores and stir it round

Mow your grass put the clippings in
And you have got a compost bin

Add this compost to your dirt
Its full of nitrogen it helps it work

Now it's time to plant your seeds
Carrots, pumpkins, whatever you please

Organic is the way to go
Don't use pesticides to help it grow

Sunshine, rain and time will tell
That you've grown your garden well

Now that you know what to do
Tell your friends and parents too

Everyone can do their part
All you have to do is start

Hi Five Jive

When you drink your beverage -
And here is the key -
Don't throw your can away; just bring it to me

Toss me your can and I will throw you a five
And that's the way you wanna do the high five
jive

High Five
Bring me your cans and your bottles

High Five
Bring your recycling to me
High Five

You could go home with a dollar
And don't cha know that that's the right way to
be

Hey all you cool cats
You know that it's true
Cashing in your high five is the right thing to do.

Toss me your can and I will throw you a five
And that's the way you wanna do the high five
jive

High Five
Bring me your cans and your bottles

High Five
Bring your recycling to me
High Five

You could go home with a dollar
And don't cha know that that's the right way to
be



Drawing courtesy of the Kōkua Hawai'i Foundation

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The Kōkua Hawai'i Foundation



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On behalf of the Kahilu Theatre Foundation and everyone who benefits from the show and this Educational Resource Guide, thank you for your dedication and assistance.

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