Be a Solid Waste Survivor – Take The Community Challenge
Primary

A KENTUCKY ENVIRONMENTAL EDUCATION COUNCIL
PRACTICAL LIVING, SCIENCE, AND SOCIAL STUDIES INTEGRATED UNIT

Standards: Consumerism
Practical Living: PL-E-3.1.5, There are consumer decisions (e.g., reducing, recycling, and reusing) that have positive impacts on the environment.
Practical Living: PL-E-3.3.2, To protect all citizens, there are community guidelines (e.g., school inspectors, trash collections, water treatment, waste treatment, animal control, immunization) that promote healthy living environments in the community.

Standards: Life Science
Science: SC-E- 2.1.2,Earth materials provide many of the resources humans use. The varied materials have different physical and chemical properties, which make them useful in different ways. For example, as building materials (e.g., stone, clay and marble), as sources of fuel (e.g., petroleum and natural gas), or growing the plants we use as food.
Science: SC-E- 3.3.3, All organisms, including humans, cause changes in the environment where they live. Some of these changes are detrimental to the organism or to other organisms, other changes beneficial (e.g., dams built by beavers benefit some aquatic organisms but are detrimental to others).

Standard: Government
Social Studies: SS-E-1.3.3, In order for a democratic form of government to function, citizens must plan an active and responsible role (e.g., participating in the election process, obeying the law).
Standard: Economics
Social Studies: SS-E-3.1.1, Scarcity requires people to make choices about using goods, services and limited resources.

UNIT OVERVIEW

Lesson	Title and Description of Activities, Essential and Guiding Questions and Standards
#1	**"THE NATURAL SORT" --** Students will sort common school objects appropriately as natural objects or man-made products, then begin to identify the natural resources used to make the different products. **Standard: Science: SC-E-2.1.2** **Essential Question #1:** How do my family and I depend on the resources in our community and our world? **Guiding Questions:** ♦ What is a natural resource? ♦ What is a product?
#2	**"IT FEELS SO NATURAL!" -–** Students will identify natural objects or man-made products by using only their sense of touch. **Standard: Science: SC-E-2.1.2** **Essential Question #1:** How do my family and I depend on the resources in our community and our world? **Guiding Questions:** ♦ What is a natural object? ♦ What is a man-made product?

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Lesson	**Title and Description of Activities, Essential and Guiding Questions and Standards**
#3	**A NATURAL BEGINNING" –-** Students will identify natural resources used to make common products after playing "Trash Bingo". They will also begin to learn the difference between renewable and nonrenewable resources. **Standard: Science: SC-E-2.1.2** **Essential Question #1:** How do my family and I depend on the resources in our community and our world? **Guiding Questions:** ♦ What is a natural resource? ♦ What are renewable and nonrenewable resources?
#4	**"RESOURCE-FUL KENTUCKIANS" –-** Students will learn about Kentucky's natural resources and several products made in Kentucky. They will also discuss ways to conserve natural resources. **Standard: Science: SC-E-2.1.2** **Essential Question #1:** How do my family and I depend on the resources in our community and our world? **Guiding Question:** ♦ What types of resources do I consume?
#5	**"BATTLING 'THWANTS' AND 'THNEEDS'" --** Students will listen to the book, <u>The Lorax,</u> by Dr. Seuss, then discuss the difference between wants and needs. The discussion will lead students to a better understanding of what it takes to survive and what might happen if natural resources are depleted. **Standard: Social Studies: SS-E-3.1.1** **Essential Question #1:** How do my family and I depend on the resources in our community and our world? **Guiding Questions:** ♦ What types of resources do I consume? ♦ What happens when all of the natural resources are consumed? ♦ What is the difference between a want and a need?
#6	**"WHAT A WASTE!" –-** Students will learn the difference between solid waste and litter. They will also begin looking at the amount of waste they and their families make. **Standard: Practical Living: PL-E-3.1.5** **Essential Question #1:** My family and I use resources that create solid waste. How does that affect the environment? **Guiding Questions:** ♦ What is the difference between litter and solid waste? ♦ How much solid waste do my family and I make?
#7	**" LEARNING ABOUT THE 4 R'S" –** Students will begin to learn how to **<u>REDUCE</u>**, **<u>REUSE</u>**, **<u>RECYCLE</u>** and **<u>RESPOND</u>** in a positive way to how they handle solid waste. **Standard: Social Studies: SS-E-3.1.5** **Essential Question #2:** My family and I use resources that create solid waste. How does that affect the environment? **Guiding Questions:** ♦ What choices do my family and I have about how we **<u>reduce</u>**, **<u>reuse</u>**, **<u>recycle</u>** and **<u>respond</u>** to solid waste? ♦ What are the best ways to dispose of our solid waste? (e.g., most cost effective, safest, and healthiest)

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Lesson	**Title and Description of Activities, Essential and Guiding Questions and Standards**
#8	**"HOMEMADE RECYCLED SEED CARDS"** –- Students will learn to reuse newspapers by making recycled paper greeting cards containing wildflower seeds. **Standard: Practical Living: PL-E-3.1.5** **Essential Question #2:** My family and I use resources that create solid waste. How does that affect the environment? **Guiding Question:** ♦ What choices do my family and I have about how we **reduce**, **reuse**, **recycle** and **respond** to solid waste?
#9	**"LUSCIOUS LAYERED LANDFILLS" --** Students will learn about the different layers of landfills and their functions by constructing an edible model. **Standard: Practical Living: PL-E-3.3.2** **Essential Question #2:** My family and I use resources that create solid waste. How does that affect the environment? **Guiding Questions:** ♦ What are the best ways to dispose of our solid waste? (e.g., most cost effective, safest, healthiest) ♦ What is a sanitary landfill?
#10	**"ONCE UPON A LANDFILL" –-** Students will investigate how landfills looked long ago by interviewing older people about how they handled solid waste. **Standard: Practical Living: PL-E-3.3.2** **Essential Question #2:** My family and I use resources that create solid waste. How does that affect the environment? **Guiding Questions:** ♦ What are the best ways to dispose of our solid waste? (e.g., most cost effective, safest, healthiest)
#11	**"GARBAGE / TRASH / WASTE"** –- Students will make a list of synonyms for solid waste, make a Venn diagram to compare the synonyms and discuss organic and inorganic kinds of waste. **Standard: Science: SC-E-2.1.2** **Essential Question #3:** How can I affect the way my family, school, and community use resources and properly dispose of solid waste? **Guiding Questions:** ♦ What is organic waste? ♦ What is inorganic waste?
#12	**"POTATO TRAPS"** – Students will make "potato traps" and learn how insects aid in the decomposition process. They will also learn the importance of composting, both naturally in nature and at home. **Standard: Science: SC-E-3.3.3** **Essential Question #3:** How can I affect the way my family, school, and community use resources and properly dispose of solid waste? **Guiding Questions:** ♦ How do insects help speed up the decomposition process? ♦ Why should my family and I compost?

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Lesson	**Title and Description of Activities, Essential and Guiding Questions and Standards**
#13	**"BUTTON BRIGADE"** –- Students will create a plan to organize the classes at school to do a school-based service learning project that will help promote proper waste disposal. **Standard: Social Studies: SS-E-1.3.3** **Essential Question #3:** How can I affect the way my family, school, and community use resources and properly dispose of solid waste? **Guiding Questions:** ♦ Can one person, or a small group of people, really make a difference in changing recycling attitudes in our community?
#14	**"PLANNING FOR OUR FUTURE"** –- Students will develop a family solid waste action plan to take home and present to their parents and other family members. **Standard: Social Studies: SS-E-1.3.3** **Essential Question #3:** How can I affect the way my family, school, and community use resources and properly dispose of solid waste? **Guiding Questions:** ♦ What can I do to encourage family members to **reduce**, **reuse**, **recycle**, and **respond** to solid waste disposal problems?
#15	**"TEACHING OUR FAMILIES ABOUT SOLID WASTE – A CULMINATING PERFORMANCE TASK"** –- In this final activity that ties the unit together, students will make a "resource vest." The vest will be used as an aid to teach family members about solid waste issues. Each family will then be asked to help students keep a calendar on which they will record family efforts to **reduce, reuse**, and **recycle**, thereby **responding** to the solid waste disposal problem.

INTEGRATION

Language Arts

- Read the Lorax, Dr. Seuss. Write a letter to the Once-ler suggesting how to make "thneeds" without using all of the Truffula Trees.
- Write couplets to the environment on recycled brown grocery bags. Use twine to hang them in trees as a tribute to mother nature.
- Keep a "Writing Journal" to show what you learn about solid waste.

Technology

- Keep databases of solid waste items
- Design spreadsheets about solid waste
- Use the Internet to research solid waste information

Arts and Humanities

- Sing "This Land is Your Land". Discuss lyrics that describe ecosystems.
- Write songs about solid waste, using familiar tunes. Create dances to go with the songs.
- Make recycled sculptures
- Make collages of recycled items

Integration*, continued*

Math

- Weigh and graph solid waste
- After collecting solid waste from the school grounds, lay it end to end and measure the length. Have each class do this, add the total for each class.

Science

- Conduct inquiry investigations on decomposition (e.g., Does a banana peel rot more quickly in air, water, soil, etc.?).

Social Studies

- Look at atlases to identify the location of natural resources. Focus on continent identification, reading legends, map skills.
- Share **A River Ran Wild**, by Lynne Cherry. Discuss the Nashua people and/or the industrial revolution and their relationship to the environment.
- Talk to older acquaintances about how they dealt with solid waste when they were young.

The Natural Sort

Standard

Science: SC-E-2.1.2, Earth materials provide many of the resources humans use. The varied materials have different physical and chemical properties, which make them useful in different ways. For example, as building materials (e.g. stone, clay, and marble), as sources of fuel (e.g. petroleum and natural gas), or growing the plants we use as food.

Activity Description

Students will sort common school objects appropriately as natural objects or man-made products, then begin to identify the natural resources used to make the different products.

Materials

Two signs labeled "natural objects" and "man-made products"
Two empty tables
Common school objects for students to sort

Length of Lesson

Approximately thirty minutes

Vocabulary Words

Natural Resource: a raw material or energy supplied by nature (e.g., water, minerals, or plants). Petroleum is a natural resource used to make plastic and many other products, and sunlight is a natural resource used to power lights and heat homes.
Natural Object: an item not made by man or machine.
Product: an item manufactured, or made, by hand or by industry for consumers to buy and use.

Essential Question

How do my family and I depend on the resources in our community and our world?

Guiding Questions

What is a natural resource?
What is a product?

Skills Used

Communication
Problem Solving
Observation and Classification

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Activity

Step 1: This activity begins the "Solid Waste Survivor" unit with students discovering that natural resources are the raw materials used to make the products that they use each day. Before beginning this activity, make two signs: one with the words "NATURAL OBJECTS" written on it, and the other with the word "PRODUCTS" written on it.

This activity can take place at two tables in the classroom, or on the floor. Place the "NATURAL OBJECTS" sign in one area, and the "PRODUCTS" sign close to it. Also, have a collection of objects found in the classroom in a container for the students to sort.

Product	Natural Object
Chalk	Rock
Paper	Tree
Glass	Soil
Tape	Class pet
Pencil	Petroleum
Scissors	Water
Book	Leaves

The Natural Sort, *continued*

Step 2: Explain to students that they will be sorting objects into two categories, natural objects and products. Ask students if, by looking at the types of objects in the collection, they can explain the difference between natural objects and man-made products (Refer to the **Teacher Fact Sheets** found at the beginning of this publication for more background information about "Products" and "Natural Resources".)

Step 3: Call on students to take turns selecting objects from the container to place by the appropriate signs. As students take turns sorting the objects, ask them to explain if people and/or machines made the objects, or if the objects are just a natural part of the environment. Explain the term "natural resources" to students by saying that they are materials people can "harvest" or take from the Earth. Introduce students to the idea of natural resources being used by people to make the products we use by asking if anybody knows the natural resources used to make specific products from the collection.

Step 4: Ask students to search the classroom for products not made from natural resources. Help students understand that everything we use has its start as a natural resource.

Science Extension

Divide students into teams and take them on a scavenger hunt outside the building to look for natural objects and man-made products. Each team should take along pencils and a science journal or a clipboard and paper to record findings. Explain that the recorder for each team is responsible, with the help of teammates, for making two columns on the paper, and labeling one column with the words "natural objects" and the other column as "man-made products". Give the students a specified amount of time to search for different items. At the end of that time, gather the students in a group to discuss the findings. Graph the results of the scavenger hunt.

Assessment

Ask students to tear or cut pictures from magazines and catalogues showing a variety of products and natural objects. Give students choices of making a poster, creating a booklet, or making a brochure explaining the differences between man-made products and natural objects. Explain that they will be using the collected pictures to illustrate their work.

Literature Connections

The following books contain information about products made from natural resources.

1. The Reason for a Flower, by Ruth Heller

2. What is a Plant, by Bobbie Kalman (The Science of Living Things Series)

3. A New Coat for Anna, by Harriet Ziefert

It Feels So Natural!

Standard

Science: SC-E-2.1.2, Earth materials provide many of the resources humans use. The varied materials have different physical and chemical properties, which make them useful in different ways. For example, as building materials (e.g. stone, clay, and marble), as sources of fuel (e.g. petroleum and natural gas), or growing the plants we use as food.

Activity Description

Students will identify natural objects and man-made products by using only their sense of touch.

Materials

A class collection of natural objects and man-made products
Small plastic containers (large enough to hold each object)
Clean laundered tube socks (enough to hold containers)
Permanent marker
Pencil and paper for each student to use to record guesses

Length of Lesson

30 – 60 minutes (depending on the depth of the lesson)

Vocabulary Words

Natural Object: an item not made by man or machine.
Product: an item manufactured, or made, by hand or by industry for consumers to buy and use.

Essential Question

How do my family and I depend on the resources in our community and our world?

Guiding Questions

What is a natural object?
What is a man-made product?

Skills Used

Communication
Problem Solving
Classification
Writing

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Activity

Step 1: Before class time, gather a collection of natural and man-made objects. Each object needs to be small enough to fit inside the "feely sock". Step 2 gives directions on how to make "feely socks".

Step 2: Reuse clean plastic icing, margarine, cheese or small ice cream containers to put down into the toes of old laundered tube socks. Use a dark-colored permanent marker to number each "feely sock". As each item is placed inside a sock, record the number of the sock and the item placed inside that sock. Also, record whether the item is natural or man-made. This will become the answer key to use during the activity.

Natural	**Man-made**
Rock	Dishes
Stick	Clothing
Tree	Jewelry
Water	Soap
Grass	Eraser
Clouds	Glue bottle
Shell	Pencil
Leaf	Jewelry
Egg	Scissors
Soil	Crayon

It Feels So Natural! ***continued***

Step 3: Remind students about sorting the different items in the activity "The Natural Sort". Ask students if they remember the difference between a natural object and a man-made product. Ask students if they were able to find any products in the classroom that were not made from natural resources. Remind students that man-made products begin as natural resources that have been harvested, or taken, from the Earth.

Step 4: Challenge the students to use only their sense of touch to try to guess what the common object is inside each sock. The students will also need to decide whether the object hidden inside each sock is a natural or manmade object. Students will need to record the number of the sock, along with the name of the object and the word "natural" or "man-made" beside each number. Depending on the grade level of the students, this activity can be completed in a large group setting, in small groups, or individually in a learning center.

This is an example of what a student answer sheet might look like as guesses are being recorded. (Younger students could draw pictures of their guesses and write N.O. for natural object and M.P. for man-made products, if working individually.)

Rachel W.

1. Rock	Natural Object
2. Eraser	Manmade Product
3.	
4.	
5.	
6. Leaf	Natural Object
7.	
8.	
9. Marker	Manmade Product
10.	
11.	

Assessment

Each student's recording sheet can be used as an assessment tool to check for understanding of natural objects versus man-made products. For assessment purposes, do not use the recording sheet to check for correct responses as to what is inside the "feely socks". Instead, check to see if the student wrote the terms "natural" or "man-made" beside appropriate corresponding objects.

Extensions

1. Give students a copy of the list of objects found in the "feely socks" if they are having trouble guessing the objects by simply using their sense of touch. For younger students, pictures of the objects could be used as an aid to help in the identification process.
2. After checking students' answers for accuracy, call on one person at a time to orally describe, for the rest of the class, the object inside the "feely sock". Model for the students by giving examples of products that are made from the object if it is a natural object. If the object is a man-made product, encourage students to tell the natural resources used to make the product, along with other clues about the product.

A Natural Beginning

Adapted from "Tracing Trash Back to Its Roots", from Quest for Less, an EPA Publication

Standard

Science: SC-E-2.1.2, Earth materials provide many of the resources humans use. The varied materials have different physical and chemical properties, which make them useful in different ways. For example, as building materials (e.g. stone, clay, and marble), as sources of fuel (e.g. petroleum and natural gas), or growing the plants we use as food.

Activity Description

Students will identify natural resources used to make common products after playing "Trash Bingo." They will also begin to learn the difference between renewable and nonrenewable resources.

Materials

Copies of bingo cards for each student
Pencil for each upper primary student
Small circles or beans for each early primary student
Chart paper and markers for teacher

Length of Lesson

Approximately one hour

Vocabulary Words

Natural Resources: raw materials or energy supplied by nature (e.g., water, minerals, or plants) Trees are a natural resource used to make paper and water is a natural resource used to generate electricity to power homes and businesses.
Renewable Resource: naturally occurring raw material that, when properly used and managed, can be restored or replenished.
Nonrenewable Resource: a raw material that can be depleted faster than it naturally regenerates (e.g., petroleum, metals, etc.)

Essential Question

How do my family and I depend on the resources in our community and our world?

Guiding Questions

What is a natural resource?
What are renewable and nonrenewable resources?

Skills Used

Communication
Problem Solving

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Activity

Step 1: Remind students that people need natural resources in order to manufacture man-made products. (Refer to "The Natural Sort" and "It Feels So Natural" activities.) Explain that during this lesson, students will get to play "Trash Bingo" as they learn more about the natural resources used to make products they use. Also, explain to students that they will learn about renewable and nonrenewable resources. (Refer to **Teacher Fact Sheets** about "Natural Resources" for background information.)

Step 2: List the five following categories of natural resources on a piece of chart paper: **animals, fossil fuels, metals, plants/trees and sand.** Discuss with the students some examples of products that are made from these natural resources. List each product example under the appropriate heading. Brainstorm with the students to develop a more complete list of things that are made from these natural resources. Remind students that all man-made products begin as natural resources!

A Natural Beginning, *continued*

Step 3: Explain the rules for bingo, and hand out the bingo cards designed for older primary students found on the next page.

For early primary students, custom-make class sets of bingo cards for this lesson by visiting the following website and downloading a free shareware copy of "BingoMaker": "**http://www.5star shareware.com/Homehob/Greeting-Cards/bingo-cards.html**". *(Please refer to the example given on the next page of how to enter information onto the table when using "BingoMaker" shareware.)*

Step 4: For upper primary students, select words from the product list created on the chart paper (or the suggested list in the sidebar on this page) and call out one word at a time. Instruct students to find the category, or categories, that each item belongs in on their bingo card and write the name of the product inside the appropriate box or boxes. There may be more than one natural resource for each product (for example, a pair of tennis shoes might fill three categories: plant, fossil fuel and metal).

For early primary students, call out the category, along with a corresponding product. (A "call card" will be printed along with the class set of bingo cards when using "BingoMaker" shareware.) Instruct students to cover the appropriate space if the product appears on their bingo cards.

Step 5: The first student to fill the card wins. Use the **T-R-A-S-H** letters as free spaces. Be sure to check each student's bingo card to see if all answers are correct!

Step 6: After the bingo game, or in a separate block of time, instruct each upper primary student to circle the items that are made from renewable resources. Lead students into a discussion of which resources are renewable and which are nonrenewable. Explain to students that both renewable and nonrenewable resources need to be managed appropriately or they could be depleted. Explain to students that during the "Solid Waste Survivor" unit, they will be learning ways to conserve natural resources.

Common Products

Aluminum can	Grocery bag
Aluminum lawn chair	Hamburger
Apple core	Leather jacket
Bicycle tire	Jeans
Bologna sandwich	Milk jug
Book	Mirror
Nylon shoelace	Bread
Cereal box	Sandwich bag
Cotton shirt	Soda bottle
Egg shells	Window
Glass bottle of juice	Wool hat
Water bottle	Wire
Cheese	Glass vase
Lunch box	Backpack

Assessment

Journal Activity

Give students the following information:

We have been learning about products and some of the natural resources used to make those products by playing bingo.

Think about a favorite toy or game you have at home. Write a history of that toy or game, tracing it back to the natural resource or resources used to make that toy or game. Were the resources used to make the toy or game renewable or nonrenewable? Why?

A Natural Beginning, *continued*

Extensions

3. Ask students what happens if we keep using more and more natural resources. How can we stop using so many natural resources? How can we use more renewable resources than nonrenewable resources?
4. Ask students to bring one of their favorite "things" from home to share with the class. Have each students be prepared to tell where the item came from, including the resources used in producing it, and how it came to be in their house. What will happen to the item when it is old, broken, or no longer needed?

*This is an example of how to enter information to make early primary bingo cards using "BingoMaker" shareware.

	Column 1	Column 2	Column 3	Column 4	Column 5
Heading	**METALS**	**FOSSIL FUELS**	**ANIMALS**	**SAND**	**PLANTS/TREES**
1	Aluminum Can	Milk Jug	Hamburger	**S**	Cotton Shirt
2	Bicycle	**R**	Egg Shells	Window	Book
3	Fork	Sandwich Bag	Chicken	Glass Juice Bottle	**H**
4	**T**	Plastic Chair	Wool Hat	Mirror	Cereal Box
5	Wire	Bicycle Tire	**A**	Glass Pickle Jar	Apple Core

Student Handout

Name: _____

Trash Bingo

Animals	Fossil Fuels	Metals	S	Sand
Plants/Trees	Metals	Metals	Sand	Fossil Fuels
Fossil Fuels	R	A	Plants/Trees	Sand
T	Animals	Sand	Plants/Trees	H
Plants/Trees	Fossil Fuels	Fossil Fuels	Metals	Metals

T	Animals	Metals	Fossil Fuels	Fossil Fuels
Sand	Plants/Trees	A	Metals	Sand
Animals	Metals	Metals	Fossil Fuels	Plants/Trees
Plants/Trees	Sand	Sand	S	Plants/Trees
Fossil Fuels	R	Plants/Trees	Fossil Fuels	H

Trash Bingo

Name: _____

Resource-ful Kentuckians

Standard

Science: SC-E-2.1.2, Earth materials provide many of the resources humans use. The varied materials have different physical and chemical properties, which make them useful in different ways. For example, as building materials (e.g., stone, clay and marble), as sources of fuel (e.g., petroleum and natural gas), or growing the plants we use as food.

Activity Description

Students will learn about Kentucky's natural resources and several products made in Kentucky. They will also discuss ways to conserve natural resources.

Materials

Ale 8 soda
Paper
Packaged muffin or bread
Bag of apples
Leather (belt, shoe, etc.)
Wooden baseball bat
Plastic milk jug
Cotton T-shirt
Can of corn
Cheese
Glass bottle of syrup
Plastic bottle of ketchup

Length of Lesson

Approximately one hour

Vocabulary Words

Renewable Resource; naturally occurring raw material that, when properly used and managed, can be restored or replenished (e.g., wood, leather).
Nonrenewable Resource; a raw material that can be depleted faster than it naturally regenerates (e.g., petroleum, metals, etc.)
Raw materials: still in their natural or original state.
Consumption; the amount of any product or resource (material or energy) used in a given time by a given number of people.
Scarcity; limited supply of a resource or product.

Essential Question

How do my family and I depend on the resources in our community and our world?

Guiding Question

What types of resources do I consume?

Skills Used

Communication and Problem Solving
Research and Writing
Observation and Classification

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Activity

Step 1: Introduce, or review, the concept of natural resources with students by asking the following questions: Can people make natural resources? Are natural resources things we can use? Where do we have to go to find natural resources? Are they necessary for human life?

Step 2: Remind students that natural resources are the raw materials used to make products that we can buy at local stores – even at school.

Kentucky Natural Resources

Cattle
Natural Gas
Apples
Titanium
Corn
Limestone
Fish
Barite
Coal
Petroleum
Iron Ore
Soybeans
Tomatoes
Wheat

Resource-ful Kentuckians, *continued*

Step 3: Display all of the products from the "Materials Needed" list. Explain to students that the products on display were made in Kentucky. Ask students to identify what natural resources they think were used to make each of the products. List those natural resources on the chalkboard or on a chart. Help students with this step if they are not sure, or have research materials on hand for students to use to find background information on raw materials. The following web sites offer extensive information on Kentucky natural resources and products:

- **http://www.atasteofkentucky.com/prideofky_products.asp?ID=6343**
- **http://www.louisville.edu/~easchn01/kentucky/1envi.html**
- **http://www.kyagr.com/buyky/index.htm**

Step 3: Ask students to look back over the list of natural resources used to make the products and list the resources as renewable or nonrenewable. Review the meaning of these two terms, if necessary.

Step 4: Focus students' attention to the nonrenewable resource list. Ask students what they think might happen to these resources if producers and consumers continue to consume them so quickly. Encourage students to discuss ways to conserve different natural resources.

Step 5: Share the picture book, The Garbage Monster, by Joni Sensal, with students. Encourage students to discuss what they think is happening in the pictures. (The book describes how a girl deals with a garbage monster by recycling him.)

Step 6: Instruct students to draw or paint pictures to show how they can conserve natural resources. Use the pictures to create a bulletin board display.

Homework Assignment

Have students take the list of natural resources generated during the brainstorming session home and discuss with their families the resources they consider most important. Rank the resources from most important to least important. Ask students to bring back the lists made by their families and share the top five with their classmates. Analyze the results with students.
NOTE: Explain that each family has different priorities if the top five list of resources vary among students.

Assessment

Ask students to select a favorite natural resource. Write about why it is a favorite. Explain whether it is renewable or nonrenewable. If it is nonrenewable, explain what might be done to conserve it.

Extensions

1. Give students opportunities to explore the web sites listed in this lesson to learn more about Kentucky's natural resources and products.

2. Invite speakers from local industries to visit and talk about the processes used to manufacture goods from start to finish.

3. Visit a local industry to watch a product as it is made.

Battling "Thwants" and "Thneeds"

Adapted from "Dr. Seuss and Resource Use", from Quest for Less, an EPA Publication

Standard

Social Studies: SS-E-3.1.1, Scarcity requires people to make choices about using goods, services, and limited resources.

Activity Description

Students will listen to the book, The Lorax, by Dr. Seuss, then discuss the difference between wants and needs. The discussion will lead students to a better understanding of what it takes to survive and what might happen if natural resources are depleted.

Materials

One copy of the book, The Lorax, by Dr. Seuss

Length of Lesson

Approximately one hour on two different days

Vocabulary Words

Consumption: the amount of any product or resource (e.g., material or energy) used in a given time by a given number of consumers.
Scarcity: limited supply of a resource or product.
Natural Resource: raw material or energy supplied by nature.
Ecosystem: a system made up of a community of living plants and animals. When one part of an ecosystem is disturbed, it affects the entire ecosystem.
Pollution: the contamination of soil, water, or air by discharging or discarding potentially harmful objects or substances.

Essential Question

How do my family and I depend on the resources in our community and our world?

Guiding Questions

What types of resources do I consume?
What happens when all of the natural resources are consumed?
What is the difference between a want and a need?

Skills Used

Communication
Problem Solving
Listening

****

Activity

Step 1: If necessary, introduce and discuss the concepts of natural resources and product consumption with students (refer to the **Teacher Fact Sheets** found at the beginning of this publication). Review the vocabulary words for this lesson. Point out that as population increases, so does the consumption of more and more products and natural resources. All of this is hard on the environment. (This would be a good time to review the difference between renewable and nonrenewable resources.)

Essential	Necessary	Luxury
Food	Phone	Bike
Clothing	Stove	Pool
Shelter	Car	Toys
Water	Books	Boat
Medicine	Paper	CD's

Battling "Thwants" and "Thneeds", continued

Step 2: This activity can take place either inside the building, or in a quiet spot outside. It is important to create an atmosphere free from distractions before attempting to read this story. Once the students are settled and ready to listen, read the book, The Lorax, by Dr. Seuss. Explain before starting the story that this book, like many of the other Dr. Seuss books, has "pretend" words, but some of the pretend words in this book contain real words.

Step 3: After reading the story, discuss what the Once-ler did to cause problems for the Truffula tree forest and its residents. (Factories were built, the air and water were polluted, animals moved away, all of the Truffula trees were cut down, and the ecosystem was destroyed.) Ask the students why they think the Once-ler's face is never shown (maybe because the Once-ler is ashamed of what his actions caused in this ecosystem). Discuss why the students think the Once-ler felt the need to use all of the Truffula trees, instead of listening to the Lorax (greed for money, desire to create jobs for his relatives). Ask for suggestions of things the Once-ler could have done instead of destroying all of the Truffula trees (replanted, looked for ways to recycle thneeds, or looked for other products to produce using different resources). This lesson can be controversial so make sure students understand that most people in business and industry are responsible and this is a story to help them understand what can happen when people are not responsible.

Step 5: Ask students to go home and retell The Lorax to their parents. As a family, talk about things they need in order to live a comfortable life.

Day Two

Step 1: Ask students to name the different products they use during the course of a day (e.g., toothbrush, shoes, CDs, bike, clothing, . . .). Make a list of these items on chart paper or the chalkboard.

Step 2: Instruct students to categorize the listed words as "essential for survival", "necessary for living in today's society" or a "luxury".

Step 3: After the new categories have been completed, ask students if they are surprised at the number of products we really need as compared to the number of products that are luxuries (or wants). Remind students that all manmade products require raw materials for production and create "waste" when they are no longer useful.

Assessment

Journal Activity

Say to students:

1. Think of a few of your most important needs.
2. Make a list of at least three of those needs. How can you and your family consume fewer natural resources while still using those needed products?
3. What could happen if people continue to consume more and more resources?

Extensions

1. Have students rewrite a new ending for The Lorax so the Truffula tree forest and all of the animals inhabiting the forest are saved. This writing project can be done individually, or in small groups. (Groups of students may wish to act our their new endings for the rest of the class.)
2. Ask students to think about and explain what the Lorax's message "UNLESS someone like you cares a whole awful lot, nothing is going to get better. It's not," means (answers should include the need for future generations to protect and care for the Earth).
3. Students can draw pictures to illustrate their favorite part of the story, The Lorax.

Be a Solid Waste Survivor – Take the Community Challenge
Primary

What a Waste!

Standard

Practical Living: PL-E-3.1.5, There are consumer decisions (e.g., reducing, recycling, reusing) that have positive impacts on the environment.

Activity Description

Students will learn the difference between solid waste and litter. They will also begin looking at the amount of waste they and their families make.

Materials

A variety of individually wrapped snacks and packaged foods

Length of Lesson

Approximately one hour

Vocabulary Words

Solid waste: material that has been discarded because it has worn out, is used up, or is no longer needed, such as packaging, newspapers and broken appliances.
Litter: waste materials carelessly discarded in an inappropriate place.

Essential Question

My family and I use resources that create solid waste. How does that affect the environment?

Guiding Questions

What is the difference between litter and solid waste?
How much solid waste do my family and I make?

Skills Used

Writing
Problem Solving
Organizing Data
Graphing
Computation

****

Activity

Step 1: Show the students a variety of individually wrapped snacks. Ask students if the packaging of the snacks is useful. (They should respond that it keeps the snacks from getting old and dirty.) Explain that cereal boxes, plastic jugs and other materials that things are boxed, or stored, in are used to protect the food. Ask students what happens to the wraps or containers once the food is eaten or becomes old? Explain that once something no longer has any use, it is thrown away and becomes SOLID WASTE. Also, explain that improperly discarded solid waste is called LITTER.

Dinner Containers

Soup – metal can with label
Hamburger – plastic tray and clear plastic wrap
Ketchup – plastic bottle, lid, paper label
Apple sauce – glass jar, metal top, paper label
Carrots – plastic bag
Ice cream – plastic or cardboard container
Milk – plastic jug with lid or waxed cardboard carton

What a Waste! *continued*

Step 2: Ask students to list everything they ate at home for dinner on the previous night, or the last night they ate at home. Stress that they need to be as accurate as possible, including "extras" like ketchup, butter, or salt.

Step 3: While students are listing their food items, the teacher should make a list of food items on the chalkboard, or overhead projector similar to the information shared in the box labeled "Dinner Containers" on the previous page. Share this list with the students and explain that each student will write beside the food items they ate at home the materials used to make the containers each food item was in when purchased at the store. Some students may need to see visual examples of some food containers. Others may need to hear several examples, similar to those listed by the teacher.

Step 4: Once the students finish listing the materials used to make the food containers, ask each student to count the total number of containers used in his or her household on the previous evening. Add the total number of containers used by the entire class. Multiply this number by 365 to obtain a rough estimate of the total number of containers used in one year. Ask students to estimate how much of the classroom would be filled with that many containers.

Step 5: Remind students that toys, shoes, furniture, and many other things we purchase also come in packaging of some sort. Ask students to think about the amount of solid waste created by those types of items.

Step 6: Share with students that on the average, each person in the United States throws away over four pounds of solid waste each day. Help students multiply four pounds by the number of people in their family to obtain an estimate of the amount of waste produced by each family each day. Then multiply that number by 365 days to obtain the amount of waste thrown away each year. Add the yearly total for each student to obtain the approximate poundage of waste produced each year by families represented by the entire class. **WHAT A WASTE!**

Assessment

1. Ask students to make posters to show others the difference between littering and disposing of solid waste in an appropriate manner.
2. Hang finished posters around the building and community after they are completed.

Extensions

1. Take students on a "litter" walk around the school property to pick up litter. Stress with the students to use precaution and ask an adult to help if they find broken glass or sharp objects.
2. Ask students to begin thinking of ways to reduce the amount of solid waste thrown away both at home and at school.
3. Ask students to calculate how many days it would take them to accumulate solid waste equal to their weight if they used a rate of four pounds per day.

Learning About the 4 R's

Standard

Practical Living: PL-E-3.1.5, There are consumer decisions (e.g., reducing, recycling, reusing) that have positive impacts on the environment.

Activity Description

Students will begin to learn how to **REDUCE, REUSE, RECYCLE and RESPOND** in a positive way to how they handle solid waste.

Materials

A large box labeled "Classroom Trash Collection Box"
A large tarp or old sheet to lay week-old trash on for sorting
Four smaller boxes labeled "Paper", "Glass", "Plastic", "Metal"

Length of Lesson

Approximately one hour on the fifth day of the activity

Vocabulary Words

Reduce: to decrease the amount of waste, either by using wiser purchasing habits or by reusing or recycling more items.
Reuse: a type of SOURCE REDUCTION activity involving the use of a product or container for the same purpose or a different purpose.
Recycle: to collect, sort, process, and convert materials that would have been thrown away into raw materials used to make the same or new products.
Respond: in this context, the act of reconsidering waste-producing activities and expressing preferences for less waste.
Municipal Solid Waste (MSW): waste collected from homes, institutions (e.g., schools or hospitals), commercial establishments (e.g., businesses and restaurants), and some industries, and taken to sanitary landfills. Also known as garbage, trash, refuse or debris.

Essential Question

My family and I use resources that create solid waste. How does that affect the environment?

Guiding Questions

What choices do my family and I have about how we **reduce, reuse, recycle and respond** to solid waste?
What are the best ways to dispose of our solid waste? (e.g. most cost effective, safest, and healthiest)

Skills Used

Categorizing
Problem Solving

****

Activity

Step 1: Introduce this lesson by telling students that, as a class, everybody will be throwing all **DRY** trash into the large box marked "Classroom Trash Collection Box" for an entire school week. Emphasize that all **WET** trash, or uneaten food, should be thrown into the regular trashcan. Explain that students need to rinse all bottles and cans.

Recyclable Materials

- Aluminum and steel cans
- Cardboard
- Newspapers and magazines
- Glass jars or bottles
- Plastic containers
- Other materials recycled in your community

Learning About the 4 R's, *continued*

Day 7

Step 1: In one week, spread a tarp or sheet on the floor. Dump the box of trash collected in the "Classroom Trash Collection Box" onto the large tarp or sheet.

Step 2: Ask students to gather around the trash so they can help count the pieces of trash that were thrown away during the previous week.

Step 3: After the pieces of trash have been counted, and the number has been recorded, explain that there is an easy way to **reduce** (decrease) the amount of trash that was placed in the collection box. Show students the four boxes marked "Paper", "Glass", "Plastic", and "Metals". Tell students to take a good look, once again, at the trash. As each piece of trash is held up, ask students if the trash might be placed in one of the four smaller boxes, or if it can be **reused** in the classroom or at home. Any trash not fitting into one of these categories should be put back in the collection box.

Step 4: After all of the trash has been resorted, count the pieces remaining in the "Classroom Trash Collection Box". Compare the previous number of pieces of trash with the number after the items are sorted. Ask students if the number has decreased significantly. Explain.

Step 5: Divide the students into cooperative working groups and have each group come up with at least five ways to reduce the amount of waste that goes into the "Classroom Trash Collection Box". Discuss the different ideas with the entire class. (Emphasize **reducing and reusing** by suggesting such things as using plastic containers rather than plastic wrap in lunch boxes, using lunch boxes instead of lunch bags, bringing juice in a thermos instead of purchasing juice boxes, etc.)

Reading and Writing Connection

Read the book, **Recycle!** by Gail Gibbons to students. Then give students the following directions for a writing assignment:

Write about what you might be able to do differently at home that will help reduce the amount of trash you and your family collect each week for the garbage truck to take to the landfill.

Step 6: Ask students for suggestions of what to do with the sorted trash items. If the school has a recycling program in place, explain to students that this sorted classroom trash can be recycled along with other items in the building. Show students where the recycling containers are located in the building so they will begin using the containers for personal trash, when needed. If there is not an active recycling program within the school, but there is one in the community, tell students that the sorted trash items will be taken to the community's recycling center.

Step 7: Explain to students that the items being taken to the recycling center need to be sorted because the different categories of recyclable waste will be compacted at the local recycling center. Then the compacted waste will be sent to industries where the materials can be reprocessed and turned back into raw materials that can be used to make new products. Explain that by reusing and recycling waste, students and industry are saving natural resources, reducing the amount of waste being buried at sanitary landfills, and saving on energy and material costs to produce the recycled goods, or products.

Learning About the 4 R's, *continued*

Step 8: Leave the four small boxes labeled "Paper", "Glass", "Plastic", and "Metals" sitting in the room, but do not make it a point to encourage students to use the box to recycle any of their solid waste. Model for the students by throwing recyclable items in the appropriate boxes throughout the week.

Day 14

Step 1: Wait one more week and gather students to count the pieces of trash in the "Classroom Trash Collection Box" a second time. Compare the number of pieces of trash with the amount counted previous week. Hopefully, there will be a drastic reduction in the amount of trash thrown in the collection box. Discuss the progress made with class members. Ask students what caused the reduction of solid waste generated by classmates. Call on individual students to explain what they personally did to help reduce the amount of waste entering the municipal solid waste system. List the different strategies used to reduce waste on the chalkboard or a classroom chart.

Step 2: Continue classroom recycling throughout the school year. Also, encourage students to reuse as much of the recycled trash as possible by doing such things as using both sides of paper or keeping colored paper scraps and any other appropriate items for classroom art projects.

Assessment

1. Ask students to name some examples of recyclable items.
2. Have students explain why it is important to sort recyclable items.
3. Ask students to explain another way to reduce the amount of solid waste entering the municipal solid waste stream.

Extensions

1. Invite the local solid waste coordinator to visit the classroom and talk about how recycling is handled in the community.
2. Ask students to graph or chart the results of the trash disposal project.
3. Encourage students to share information learned at school about **reducing, reusing, recycling and responding** with family members.
4. With the help of students, write a classroom recycling pledge, possibly something like this:
   "I will respond to the solid waste problem by reducing, reusing and recycling my trash every day."
   Post the pledge in the classroom and recite it with students every morning.

Handmade Recycled Seed Cards

Adapted from "Handmade Recycled Paper Planters", from Quest for Less, an EPA Publication

Standard

Practical Living: PL-E-3.1.5, There are consumer decisions (e.g., reducing, recycling, and reusing) that have positive impacts on the environment.

Activity Description

Students will learn to reuse newspapers by making recycled paper greeting cards containing wildflower seeds.

Materials

Large stack of newspapers
Scissors
Three to five 2-gallon buckets
Water
Hand lenses
Egg Beaters
Wildflower seeds
Old, but clean, pantyhose
Old wire hangers
Food coloring (optional)

Length of Lesson

Approximately two to three hours spread out over three days

Vocabulary Words

Recycle: to collect, sort, process, and convert materials that would have been thrown away into raw materials used to make the same or new products.
Fibers: long, thick-walled cells that give strength and support to plant tissue. Wood and cloth fibers are used to make paper.
Pulp: a mixture of fibrous material such as wood, rags, and paper, ground up and moistened to be used in making paper products.
Virgin Materials: raw materials that have not yet been used

Essential Question

My family and I use resources that create solid waste. How does that affect the environment?

Guiding Question

What choices do my family and I have about how we **reduce**, **reuse**, **recycle** and **respond** to changing our habits on how to deal with solid waste?

Skills Used

Motor Skills
Listening and Following Directions

****

Activity

Step 1: Introduce the concepts of recycling and decomposition to students. Explain that making items from recyclable materials, rather than virgin materials benefits the environment by saving natural resources. (Refer to the **Teacher Fact Sheets** found at the beginning of this publication.)

Step 2: Discuss with students how paper is made. Explain that most paper is made from only trees, while other paper is made from a combination of trees and old newspaper or used office paper. A small amount of paper is even made from cotton, papyrus or rags. Discuss how using recycled paper helps conserve our forests. Help students explore the environmental implications of this.

Step 3: Set out newspapers and have each student cut up two full pages of newspaper into ½ to 1-inch square pieces. Demonstrate for students.

Handmade Recycled Seed Cards- *continued*

Step 4: Ask a few student volunteers to fill the buckets 1/3 full with paper and the remaining 2/3 with water (1 part paper to two parts water). Let this mixture sit overnight. By the next day, the newspaper fibers will be soft and ready to pulp (break down fibers).

Step 5: Give each student a wire hanger and one leg of an old pantyhose. Ask the students to reshape the hanger into the shape of a circle. Once this is done, ask them to stretch the pantyhose over the circular part of the hanger. Secure the pantyhose by tying with string. This "pantyhose screen" will be used on the next day to hold the paper pulp as it dries.

Day 2

Step 1: On the second day, have students take turns pulping the fibers with the hand beater until the paper and water look like mush. Explain that the pulping process breaks down the fibers into a form that can be bonded together again to make recycled paper. Have students look at the pulp with a hand lens to see the loose wood fibers. (A small amount of food coloring added to the pulp will give it color, if desired. This is also the time to add wildflower seeds.)

Step 6: Give each student a "pantyhose screen" made on the previous day. Instruct each student to scoop out about one cup of the pulp and spread it out onto the screen, in a rectangular shape, as thin as possible without leaving holes. Using a rolling pin on top of a stack of newspapers helps flatten the paper.

Step 7: Let the pulp dry completely over the next two days. While the drying is taking place, students can be composing the verse for the cards they will be making.

Day 3

Step 1: Pull the dried, recycled paper from the screens. Use scissors to cut the paper into the desired shape for the greeting card. Give students time to finish writing the composed verse on the greeting card. Include directions for planting the cards before sending them home with students.

Step 2: Before sending the completed cards home with the students, discuss how the card will decompose in the soil and the seeds will germinate and grow.

Assessment

Ask students to explain, in writing, how making new paper from old newspapers benefits the environment. Encourage students to include different things in the environment that are affected in a positive way when recycling takes place.

Extensions

1. Read the book, From Tree to Paper, by Wendy Davis.
2. Help students diagram and label all of the steps that occur in making paper from recycled materials, versus making paper from only virgin materials.
3. Encourage students to discuss what else they can do to reduce the number of trees being cut down to make paper.
4. Visit the following web site (http://www/kinderart.com/seasons) for art project ideas that encourage the reuse of plastic milk jugs.

Writing Connection

Ask students to write a story about the journey of the wildflower seeds from their first days on the card to when they take roots in the ground outside. Remind students that they can write the story as a nonfiction feature article, or as a fictitious literary story.

Luscious Layered Landfills

Adapted from Quest for Less, an EPA Publication

Standard

Practical Living: PL-E-3.3.2, To protect all citizens, there are community guidelines (e.g. school inspections, trash collection, water treatment, waste treatment, animal control, immunization) that promote healthy living environments in the community.

Activity Description

Students will learn about the different layers of landfills and their functions by constructing an edible model.

Materials

One 8-ounce pliable clear plastic cup per student
Five chocolate sandwich cookies per student
One 8-ounce box of raisins per student
One fruit rollup per student
Two graham crackers per student
Two red licorice sticks per student
One package of birthday candles
One pack of matches
One scoop of chocolate ice cream (or pudding) per student
Two tablespoons of whipped cream per student
One plastic knife per student
One plastic fork per student
One handful (per student) of a variety of small chewable candies
One copy of "Anatomy of a Landfill" handout per student

Length of Lesson

Approximately one hour

Vocabulary Words

Sanitary landfill: a specially engineered site for disposing of solid waste on land, constructed so that it will reduce hazard to public health and safety.
Clay Liner: absorbs any leachate (or liquid) that escapes the plastic liner of a landfill.
Plastic liner: prevents leachate from escaping into the ground.
Leachate: natural byproduct of decomposing garbage.
Leachate collection pipes: used in landfills to collect leachate.
Methane: a colorless, odorless, flammable, gaseous hydrocarbon that is a product of the anaerobic decomposition of organic matter; can be burned as a fuel.
Decompose: the process by which a substance is broken down into its basic elements.

Essential Question

My family and I use resources that create solid waste. How does that affect the environment?

Guiding Questions

What are the best ways to dispose of our solid waste?
What is a sanitary landfill?

Skills Used

Observation and Classification
Motor Skills
Listening and Communication

Luscious Layered Landfills, *continued*

Activity

Check for food allergies before teaching this lesson!

Step 1: Refer to the **Teacher Fact Sheets** found at the beginning of this publication for background information on landfills. Explain the purpose of a landfill to students and explain that they will construct their own model landfills in class. Copy and distribute the "Anatomy of a Landfill" handout for each student. Using the handout, go over each layer's name and function with students.

Step 2: Distribute a cup and five chocolate sandwich cookies to each student. Explain that the cup represents an excavated hole in the ground.

Step 3: Have students carefully "unscrew" two of their cookies so that one half has white cream and the other is bare. Students should have two cookie halves with white cream and two cookie halves without cream. Crush the bare cookie halves into small pieces and put them into the cup. Explain that the crushed cookies represent a layer of soil that is placed in the bottom of real landfills.

Step 4: Next, have students take the cookie halves with white cream and break them up into two or three pieces. Direct students to place the pieces in the cup with the white cream face up. These pieces represent a layer of clay that is put on top of the soil in real landfills.

Step 5: Have students use the plastic knife to cut their fruit rollups to roughly fit the size of the top of the cup. Slide the rollup into place (will push up on sides) on top of the cookies to represent a plastic liner. Plastic liners prevent leachate from escaping from a landfill into the ground. Leachate is liquid created when trash decomposes (decays).

Step 6: Have students crush and add their graham crackers to represent a sand layer. This layer is used to prevent liquids in landfills from seeping out into the water table.

Journal Activity

Ask students to list some common items they throw away. What types of items do they think pioneers threw away 200 years ago? Ask students to predict what types of items will be thrown away in the future.

Step 7: Next, have students place raisins on top to represent a layer of pebbles. Like the sand layer, pebbles provide further protection against leachate leaks.

Step 8: Have students rip the licorice sticks in half and bite, or cut, off both ends to represent leachate pipes. Stick "pipes" into the pebble layer. These pipes collect any leachate that collects on top of the liners.

Step 9: Ask students to sprinkle the candies on top of the raisins. The candies represent pieces of garbage. Ask students to think about what happens when a landfill or "cup" is filled up with trash or "candies". How can they reduce the amount of trash that is sent to the landfill? (Refer to **Teacher Fact Sheet** located at the beginning of this publication for more information on recycling, if needed.)

Step 10: Give each student a scoop of ice cream on top of the candies. Then, have students add one more layer of candies on top of the ice cream. The ice cream layer represents the seepage created from rain seeping through the garbage. Explain that in a real landfill, more layers of garbage or "candies" are placed on the landfill each day, so that liquid from the decomposition of the trash is continually created.

Luscious Layered Landfills, *continued*

Step 11: Direct students to "unscrew" their two remaining cookies and crush another layer of the bare cookie halves, without the cream, on top of the candies and ice cream to represent soil again. (Students can eat the other cream-covered cookie halves.) This layer reduces the amount of rainwater that reaches the garbage.

Step 12: Each student should use a layer of whipped cream to "cap" the landfill or cover it. Explain that a plastic cap is used on real landfills to prevent odor, insect and rodent problems.

Step 13: In front of the class, stick a candle deep into your own edible "landfill" and light it. Explain that the candle represents the methane gas recovery system, which draws methane gas from the decomposing garbage. The flame represents energy that can be generated by burning the captured methane gas.

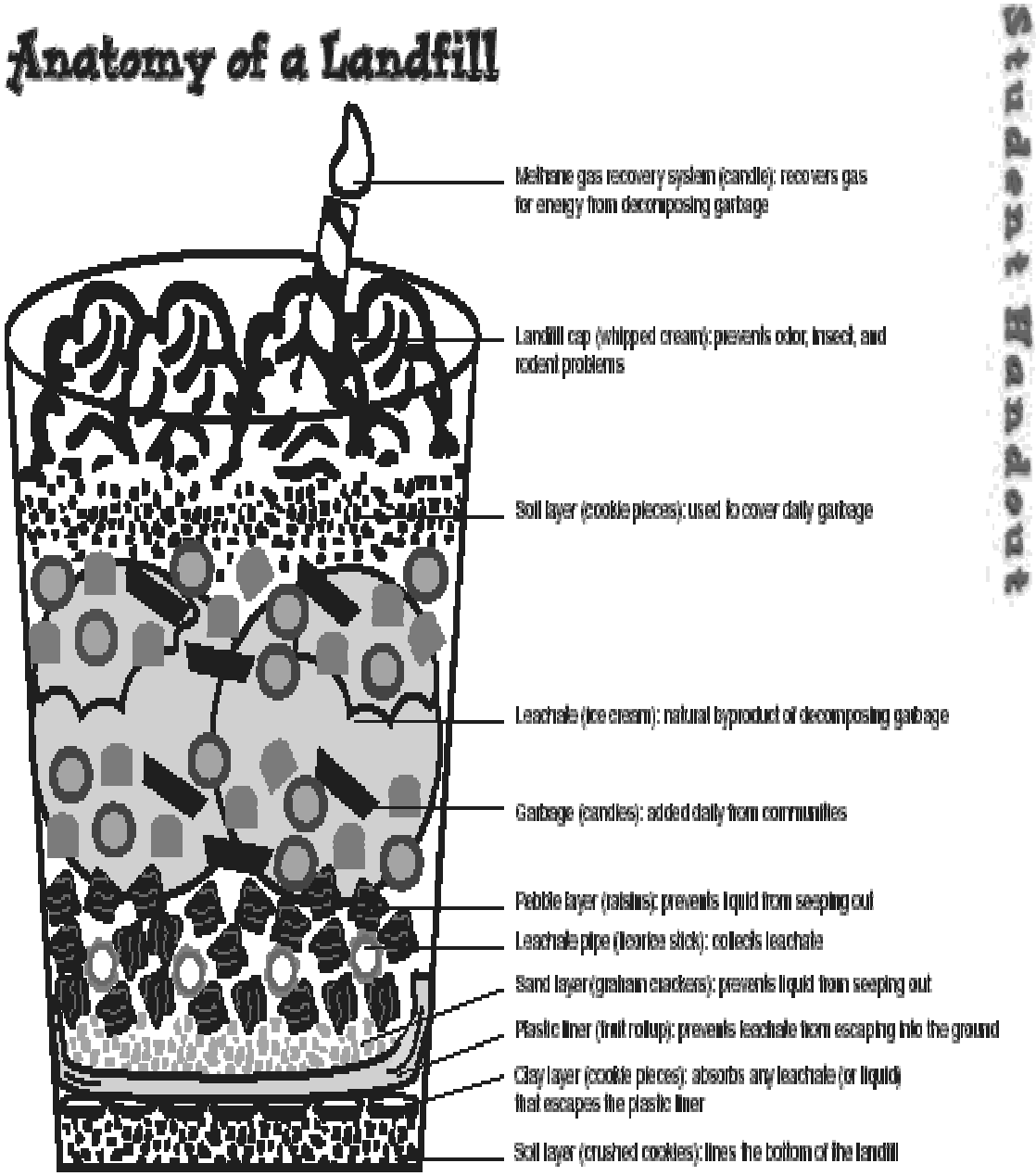
Step 14: Have students eat their landfills as a snack. When they get to the bottom of the cup, ask students to notice whether their cookie or "soil" layer is dry, or whether the ice cream or "leachate" leaked past the many layers and the fruit roll-up liner to soak the cookies. Remind students that if they built their landfill correctly, the cookies will be dry. In a real landfill, the soil remains protected from leachate.

Assessment

1. Ask students to explain, either verbally or in writing, why landfills are important to our environment.
2. As a review, ask students to include ways people can reduce the amount of trash sent to landfills.

Extensions

1. Before enjoying the luscious layered landfill as a snack, team students up in pairs to review the purpose of all of the different layers in landfills. (Remind them that they may use the handout for reference, if needed.)
2. Have students conduct a survey of friends and family asking them where their garbage goes. Have them record peoples' responses and determine whether they are well informed. In class, discuss the survey results.
3. Contact the local Solid Waste Coordinator for videos or materials to share with students about local solid waste management.
4. Visit the following web site to see pictures of a California landfill from the 1920's up to the present: "http://www.lalc.k12.ca.us/uclasp/ISSUES/landfills/landfills.html"


Anatomy of a Landfill
Student Handout
Methane gas recovery system (candle): recovers gas for energy from decomposing garbage
Landfill cap (whipped cream): prevents odor, insect, and rodent problems
Soil layer (cookie pieces): used to cover daily garbage
Leachate (ice cream): natural byproduct of decomposing garbage
Garbage (candies): added daily from communities
Pebble layer (raisins): prevents liquid from seeping out
Leachate pipe (licorice stick): collects leachate
Sand layer (graham crackers): prevents liquid from seeping out
Plastic liner (fruit rollup): prevents leachate from escaping into the ground
Clay layer (cookie pieces): absorbs any leachate (or liquid) that escapes the plastic liner
Soil layer (crushed cookies): lines the bottom of the landfill

Be a Solid Waste Survivor – Take the Community Challenge
Primary

Once Upon a Landfill

Standard

Practical Living: PL-E-3.3.2, To protect all citizens, there are community guidelines (e.g. school inspections, trash collection, water treatment, waste treatment, animal control, immunization) that promote healthy living environments in the community.

Activity Description

Students will investigate how landfills looked long ago by interviewing older people about how they handled solid waste.

Materials

A list of interview questions (to be developed in class)
Note to Parents

Length of Lesson

Approximately 30 minutes on first day and one hour another day

Vocabulary Words

Sanitary Landfill: a specially engineered site for disposing of solid waste on land, constructed so that it will reduce hazard to public health and safety.
Dump: a site where waste is disposed of in an unmanaged, uncovered area.
Municipal Solid Waste Stream: waste collected in a community from homes, small institutions, businesses and industry for disposal in a local sanitary landfill.

Essential Question

My family and I use resources that create solid waste. How does that affect the environment?

Guiding Question

What are the best ways to dispose of our solid waste? (E.g. most cost effective, safest, healthiest)

Skills Used

Communication
Writing

****

Activity

Step 1: Before starting this lesson, find the following web site and bookmark it to share the photos with students: **"http://www.lalc.k12.ca.us/uclasp/ISSUES/landfills/landfills.html"** (Click onto "Lopez Canyon Landfill Virtual Field Trip" to view sanitary landfill photos.) This site also contains some pictures of older landfills to share later in this lesson, after the interviews have taken place.

Step 2: Ask students what happens to solid waste once they put it in garbage cans. Help students understand that once trash is thrown into a garbage can, and picked up by a garbage truck, it enters the municipal solid waste stream (MSW) and has to be taken to a sanitary landfill. Also explain that there are federal and state laws so the solid waste coordinator of the landfill knows exactly how the landfill has to be managed to keep it from becoming a health hazard.

Interview Questions

1. When were you born?
2. When you were little, what types of trash did you and your family have?
3. Did garbage trucks come to your house to pick up your trash when you were little?
4. Where did you put your trash?
5. Were there any sanitary landfills like we have today when you were little?
6. Has the type and amount of waste, or trash, changed since you were little? How?

Once Upon a Landfill, *continued*

Step 3: Explain to students that in order to learn more about how landfills looked many years ago, each student will be interviewing an older person (either a family member or another elderly person in the community). So each student collects the same type of information, explain that everybody will be using the same set of interview questions.

Step 4: Ask students to think about what information they would like to learn about landfills from long ago. Brainstorm to develop a list of questions, similar to those on the previous page.

Step 5: Explain that students need to ask their parents for advice on whom to interview. (Suggest grandparents, neighbors, or friends of the family.) Tell students that the older the person they interview, the more interesting the answers from the interview will probably be.

Step 6: Type the interview questions, leaving room for students to write the answers directly under each question. Make enough copies so each student has one to take home.

Step 7: Set a reasonable deadline for students to return the completed assignment. Send the interview questions and a note explaining the assignment to parents home with each student.

Step 8: After all students have completed and returned the homework assignment, gather all students to discuss the results. Explain the difference between the terms "sanitary landfill" and "dump". Show pictures of the two, if available.

Step 9: Create a "landfill timeline" so students can see how trash accumulation and disposal has changed over the years. Leave room on the timeline for students to add their own illustrations and information about how they think landfills might look in the future. Ask students what they think might happen to the landfills we have right now.

Assessment

1. Ask students to write a comparison of how trash disposal has changed in the past 50 – 100 years in the United States.
2. Encourage students to include in their comparison paper which type of trash disposal they think is best for the environment. Why?

Note to Parents

We have been studying about how important it is to dispose of our solid waste appropriately in sanitary landfills. We are also interested in learning about how people who were born at least fifty years ago, or longer, disposed of their trash.

As a class, we came up with a list of questions to ask an elderly relative or friend. We would appreciate your help in assisting your child in contacting an acquaintance to interview. We hope this assignment will help our students better understand some of the changes that have taken place in our country during the last century.

If possible, we would like your child to complete the interview and return the answers to the questions by _____.

Thank you so much for helping your child complete this homework assignment!

Extensions

1. Share analyzed data that has been collected with other students in school in an effort to educate others about changes in our society and proper trash disposal.
2. Publish results of survey and share with parents through the classroom or PTA newsletter.
3. Debate the question: "Is change good or bad?"

Be a Solid Waste Survivor – Take the Community Challenge
Primary

Garbage / Trash / Waste

Standard

Science:SC-E-2.1.2, Earth materials provide many of the resources humans use. The varied materials have different physical and chemical properties, which make them useful in different ways. For example, as building materials (e.g. stone, clay, and marble), as sources of fuel (e.g. petroleum and natural gas), or growing the plants we use as food.

Activity Description

Students will make a list of synonyms for solid waste, make a Venn diagram to compare the synonyms and discuss organic and inorganic kinds of waste.

Materials

Chart paper
Markers
Dictionary
Thesaurus

Length of Lesson

Approximately one hour

Vocabulary Words

Organic Waste: waste composed of living or once-living matter; (e.g. leaves) more broadly, composed of chemical compounds principally based on the element carbon.
Inorganic Waste: waste not composed of once-living material (e.g. minerals); generally, composed of chemical compounds not principally based on the element carbon.
Synonyms: words with similar, or the same, meanings.

Essential Question

How can I affect the way my family, school, and community use resources and properly dispose of solid waste?

Guiding Questions

What is organic waste?
What is inorganic waste?

Skills Used

Communication
Writing

****

Activity

Step 1: Explain to students that there are many words in the English language that mean the same thing, or almost the same thing. We call these words synonyms. Tell the students that they will be brainstorming to think of synonyms for the word "waste", but that they need to understand there are two different types of waste: organic and inorganic. Explain the difference, giving examples, if necessary. Then ask for synonyms. (Use the thesaurus if students have trouble.)

Trash Synonyms

Garbage	Refuse
Debris	Junk
Clippings	Rubbish
Droppings	Waste
Sweepings	Litter

Garbage / Trash / Waste, *continued*

Step 2: Write the synonyms on a piece of chart paper, or on the chalkboard. Ask students to use the synonyms in sentences, in order to check for comprehension.

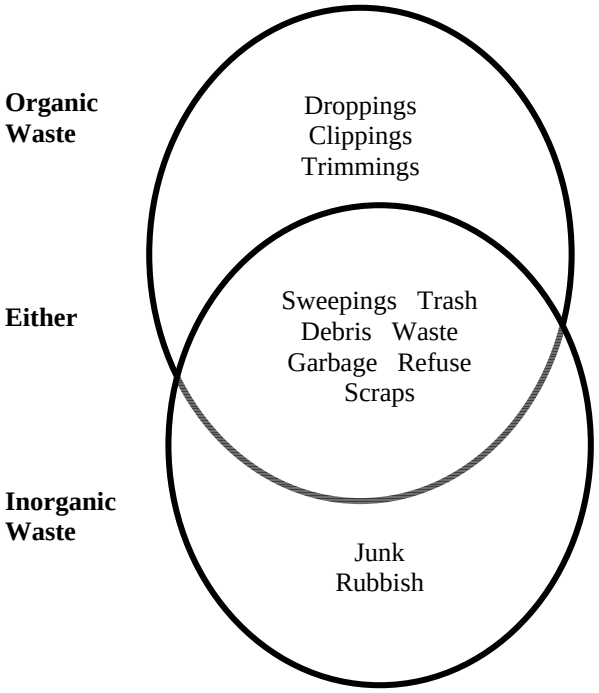
Step 3: Explain to students that a Venn diagram is a type of graph that shows a comparison between two or more things. Explain that, as a class, they will construct a Venn diagram that will show which synonyms for waste usually refer to "organic waste", and which synonyms usually refer to "inorganic waste". Explain the difference between the two terms. Draw the Venn diagram on chart paper or the chalkboard.

Step 4: Call on students, again, to use each synonym in a sentence. After each sentence, ask students to decide whether the word is talking about organic or inorganic waste. Place the synonym appropriately inside the diagram. Have a dictionary for reference if there is a disagreement about where to place the word.

Assessment

1. Prepare a list of ten different types of waste (e.g. grass clippings, old refrigerator, paper, food scraps, plastic wrap).
2. Ask students to number a paper one through ten.
3. Explain to students that as a word from the list is read, each student should write "I" for inorganic waste or "O" for organic waste next to the corresponding number on their paper.
4. Check the work together in class so students who do not yet understand the concepts will get another chance for review.

Waste Venn Diagram



1. Ask students to write down everything they threw away in the lunchroom. Label each waste item as organic or inorganic.
2. Sit in a circle and point to a student. The student should be ready to call out the name of an item. Explain that the remaining students will stick their thumb up in front of them if the item is "organic". Instruct students to put their thumb down in front of them if the item is "inorganic".

Potato Traps

Standard

Science: SC-E-3.3.3, All organisms, including humans, cause changes in the environment where they live. Some of these changes are detrimental to the organism or to other organisms, other changes are beneficial (e.g. dams built by beavers benefit some aquatic organisms but are detrimental to others).

Activity Description

Students will make "potato traps" and learn how insects aid in the decomposition process. They will also learn the importance of composting, both naturally in nature and at home.

Materials

Large uncooked potato
Two rubber bands and hand trowels for each student
Metal knife for teacher and plastic knives for students
Spoon for each student
Straw, tape and paper to make a "flag"
Science journals, pencils and **Compost Critters**, by Bianca Lavies
Clear plastic container and hand lens for each student

Length of Lesson

Thirty minutes to one hour on at least three different days

Vocabulary Words

Organic: from a living or once-living organism (e.g. plant, animal, person or bacteria).
Inorganic: not composed of once-living material (e.g. rocks or minerals).
Decompose: to decay or rot.
Millipede: Insect that helps decompose organic materials.
Fungi: a major group of organisms that absorb their nutrients from dead or living organisms. Mushrooms, yeast, toadstools, rusts, molds, and mildews are all fungi.

Essential Question

How can I affect the way my family, school, and community use resources and properly dispose of solid waste?

Guiding Questions

How do insects help speed up the decomposition process?
Why should my family and I compost?

Skills Used

Communication/Observation
Motor Skills
Data Collection and Analysis

****

Activity

Step 1: Explain to students that in this activity they will be building a potato trap that will be placed outside. The purpose of the trap is to capture insects that help organic materials decompose naturally in the outdoor environment. This type of decomposition is nature's way of recycling, because the rich soil-like product contains organisms that are good for the soil.

Discuss with students the plants and animals, such as snails, slugs, beetles, millipedes, earthworms, fungi, pill bugs, mushrooms and lichen that perform nature's recycling work. (Read the book, **Compost Critters**, by Bianca Lavies, and refer to **Teacher Fact Sheets** for information on composting.)

Potato Traps, *continued*

Step 2: Give each student a potato that has been cut in half lengthwise, by an adult. Also, give each student a spoon. Instruct students to use the spoon to scoop out most of the inner portion of the potato. Show an example.

Step 3: Next, instruct students to rubber band the two halves of the potato back together, then use a plastic knife to cut a hole about the size of a dime in each end of the potato. This gives insects an entrance into the potato.

Step 4: Instruct students to take a straw, small piece of paper and tape. Tell students to write their name on the piece of paper. Tape the piece of paper to the top of the straw. Students will use the flag to mark the location of their potato trap.

Step 5: Take the students outside with their potato traps, flags and hand trowels. Show students areas of the school property where their potato traps should remain undisturbed.

Step 6: Have each student use a trowel to scoop up a small amount of soil. (This area should be deep enough so the potato trap door is level with the surface of the ground.)

Step 7: Tell students to place the potato trap into the shallow hole. Poke the straw through the potato and into the soil to hold the potato in place, and to mark each student's potato trap.

Step 8: Check the potato traps every two days to record the kinds and numbers of critters in the traps. Have students record the changes taking place both inside and outside the potato traps. When checking the potato traps, have each student take along a hand lens, science journal, pencil and a clear plastic container. The containers make it easier for students to observe and count the critters before releasing them to their natural environment. It would be a great resource tool to have an animal encyclopedia on hand, or a copy of the book, **Compost Critters,** so students can locate their critters and record the names accurately in their journals. (Students may need rubber gloves to wear as they check on the decomposing potato traps.)

Step 9: Once back in the classroom, ask students to share what they found in the potato traps. Give students ideas of how they might organize their data so it will be easier to manage each day. Check to see if students understand that as decomposition takes place, the resulting compost material will be reused in the soil.

Step 10: Discuss why it is so important that nature recycle its dead plants and animals. Relate this back to why it is so important for people to recycle, also. Explain that we can compost yard clippings and some food scraps in compost bins rather than putting these items in garbage bags to be sent to landfills. This is one type of "source reduction", or decrease of solid waste being sent into the municipal solid waste stream. The resulting material is also very good to use in land-scaping at home.

Assessment

Pose the following question to your students:

We have been learning about animals and other organisms in nature that help decompose organic materials. What do you think will be left of your potato trap once the decomposition process has been completed? Why? (Answer: rubber bands, straw and tape because it takes them much, much longer to decompose, if they ever do.)

Extensions

1. Start a school-composting project.
2. Take a nature walk and look for signs of natural composting.
3. Study nature's recyclers in the winter by collecting some leaf litter, bringing it inside, and warming it with a lamp. Dormant recyclers, such as millipedes, ants, spiders and worms will come to life under the heat.

Be a Solid Waste Survivor – Take the Community Challenge
Primary

Button Brigade

Standard

Social Studies: SS-E-1.3.3, In order for a democratic form of government to function, citizens must plan an active and responsible role (e.g. participating in the election process, obeying the law).

Activity Description

Students will create a plan to organize the classes at school to do a school-based service-learning project that will help promote proper waste disposal.

Materials

A badge making tool (if one is available) and appropriate supplies
Student designed "Button Brigade" laminated badges, if badge making tool is not available or is too expensive to use
Chart paper and markers (or chalkboard)

Length of Lesson

Approximately one hour on two to three different days

Essential Question

How can I affect the way my family, school, and community use resources and properly dispose of solid waste?

Guiding Question

Can one person, or a small group of people, really make a difference in changing recycling attitudes in our community?

Skills Used

Communication
Organization
Problem Solving

****

Activity

Step 1: Ask students to share some of the things they have learned during the "Solid Waste Survivor" unit. Chart the volunteered information. (If necessary, drop hints to help students remember some of the lessons and concepts taught.)

Step 2: Ask students the guiding question: "Can one person, or a small group of people, really make a difference in changing recycling attitudes in our community?" Debate this within the class.

Step 3: Ask students to brainstorm about things they can do to help promote proper waste disposal at school. List the different ideas on chart paper or a chalkboard. Visit the following Environmental Protection Agency Internet site for other service-learning project ideas:
http://www.epa.gov/epaoswer/general/educate/svclearn.htm

Possible Ideas for Our School-Based Service-Learning Project

1. Biweekly or monthly trash pick-up on school property
2. School recycling program
3. Write and perform infomercials to present regularly at assemblies or on news programs at school.
4. Talk to friends in different classes about the importance of reducing, reusing, recycling and responding to the solid waste problem by creating less waste.
5. Develop a school compost pile and either sell or give away the compost to local farmers or gardeners, or use at school.

Button Brigade, *continued*

Step 4: After listing the ideas for service-learning projects, look back over each project, one at a time. Discuss pros and cons of each idea with students. Make sure the project you and your students decide to undertake is one that is feasible, will meet with success, and will make a difference at your school. Try to choose a project that can eventually involve all students attending your school in a meaningful way.

Step 5: With students' help, write a specific action plan on how the service-learning project will be implemented, and who will be involved in overseeing the project. Check with the school principal to make sure the selected service project meets with his or her approval. The plan may need to be taken before the Site Based Council of the school to receive consensus from this group before proceeding any further.

Step 6: Once the project has been approved, explain to students that they will need to design a nametag for students who are actively involved in the service project, to wear when working on the project. These nametags should be durable so they can be passed from class to class. The nametags should be simple, but should identify the group wearing them as "Planet Survivors", "Recycling Rangers", or some similar "Environmental Hero". Give students a few days to come up with a nametag design, so they are not rushed and will have time to think about a catchy phrase or school logo.

Step 7: Once the badge designs have been submitted, select judges to decide on the winning design.

Step 8: If the school owns a badge making kit, durable badges can be easily made, sporting the winning design. If not, the design can be copied onto tag board or colored construction paper, then cut out and laminated. Punch two holes at the top of the nametag. Then string yarn through the holes so the nametag can be worn around the neck, or pin with a large safety pin. A minimum of 30 badges should be made, so there will be an adequate supply to pass from class to class.

Step 9: Present, in detail, the service-learning plan at a faculty meeting. Explain that in order for the project to be totally successful, it should involve every teacher and student. Explain the commitment level needed from teachers. (Since the service project has already been planned and organized by the students in your class, it should not be too time consuming for other teachers.) Ask for a show of hands from teachers who are willing to volunteer themselves and their students to help implement the project. Write down names so you and your students can schedule the other classes into the school year, as needed.

Assessment

The assessment for this lesson should include an evaluation by students and teachers as to the effectiveness of the implemented service-learning plan. This should take place periodically and should be ongoing so that the project remains a primary focus for everyone involved.

Extensions

1. Involve parents in the service-learning project as volunteers to help get the project started and to help maintain it (along with students), so it becomes a total school and community project.
2. If the service-learning project is a success, contact The Environmental Protection Agency on the Internet at "http://www.epa.gov/osw/" to let them know about your project.
3. Contact local newspapers and television stations and invite them to visit the school and interview students involved in the service-learning project.

Be a Solid Waste Survivor – Take the Community Challenge
Primary

Planning for Our Future

Standard

Social Studies: SS-E-1.3.3, In order for a democratic form of government to function, citizens must plan an active and responsible role (e.g. participating in the election process, obeying the law).

Activity Description

Students will develop a family solid waste action plan to take home and present to their parents and other family members.

Materials

Paper, pencil and crayons or markers
Local recycling center recycling guidelines (if available)
Overhead projector and overhead markers (for day 2)
Transparency of community map (for day 2)
Copy of community map for each student (for day 2)

Length of Lesson

Approximately one hour on first day and 30 minutes the next day

Essential Question

How can I affect the way my family, school, and community use resources and properly dispose of solid waste?

Guiding Question

What can I do to encourage family members to **reduce, reuse, recycle, and respond** to solid waste disposal problems?

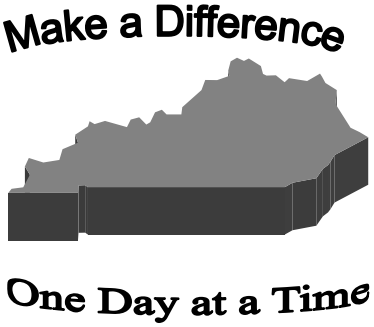
Skills Used

Communication
Writing and Drawing
Problem Solving

****

Activity

Step 1: Remind students that they have been working hard throughout this unit to learn about things they can do to help keep the Earth healthy for future generations. Tell students that it is now up to each one of them to spread the word about the **"Four R's" (REDUCING, REUSING, RECYCLING, and RESPONDING**). Explain that in this lesson students will think about, and write, a family solid waste action plan. The plan will include ways family members will implement the "**Four R's**" at home.



Step 2: Remind students that each of their families are probably **reducing, reusing, and recycling** solid waste in different ways at home. Home action plans need to be tailored to meet the individual needs of each family.

Planning for Our Future, *continued*

Step 3: Ask students to write, or draw, what they will encourage family members to do at home. If the local recycling center has published guidelines on recycling, give each student a copy of these guidelines to use when writing the action plan, so information about how to prepare items for recycling can be accurately included. Remind students that it is up to each of them to sell their action plan to family members. Also, remind students that if some family members do not choose to participate in a family solid waste disposal plan, not to become discouraged. Remind students that, even individually, they can make a difference, as long as they each keep practicing what they have learned during this unit.

Step 4: If there are students who say that their families are already **reducing, reusing and recycling**, encourage them to write a plan showing specifically what they are already doing at home. When it is completed, ask students to suggest other activities the family might be able to do.

Step 5: Once the family action plans have reached the publishing stage of the writing process, encourage students to add colorful illustrations showing family members caring for the Earth by **reducing, reusing, recycling and responding!**

Day 2

Step 6: Locate a neighborhood or community map at **http://www.mapquest.com/**, or from the local Chamber of Commerce. Make a copy of the map for each student and a transparency of the map to use on the overhead projector.

Step 7: Have students use bright markers or yellow crayons to highlight the streets where they live. Use the transparency and overhead projector to show students the streets they need to mark. Talk about the impact they will have on their community just by having good solid waste habits in their own homes!

Step 8: The completed family action plan, community map and "Resource Vest" (the unit's culminating activity) should be sent home at the same time.

Assessment

The assessment for this lesson will be the completed family action plan. Give each student the following criteria at the beginning of this lesson.

Your Family Action Plan should contain the following information:

1. **What will you and your family do to reduce the amount of solid waste you are currently putting in your trashcans for weekly garbage pick-up?**
2. **How will you and your family reuse some of the containers and products you are currently throwing into trashcans?**
3. **What solid waste items will you and your family recycle? (Remember that this also includes composting.)**
4. **Will you and your family positively respond to the solid waste dilemma by reconsidering waste-producing activities and by expressing preferences for less waste?**
5. **Can you think of one other relative or friend you can talk to about the benefits of appropriate solid waste disposal?**

Extensions

1. Follow this lesson up with periodic reports from students about how the home action plan is working.
2. Praise students for their efforts to teach others about proper solid waste disposal.

Teaching Our Families About Solid Waste

A Culminating Performance Task

Standards

- **Practical Living: PL-E-3.1.5**
- **Practical Living: PL-E-3.3.2**
- **Science: SC-E-2.1.2**
- **Science: SC-E-3.3.3**
- **Social Studies: SS-E-1.3.3**
- **Social Studies: SS-E-3.1.1**

Activity Description

In this final activity that ties the unit together, students will make a "resource vest." The vest will be used as an aid to teach family members about solid waste issues. Each family will then be asked to help students keep a calendar on which they will record family efforts to **reduce**, **reuse**, and **recycle**, thereby **responding** to the solid waste disposal problem.

Materials

Brown paper grocery bag
Scissors and tape
Crayons, markers or pencils
Copies of calendar for each student (at the end of this lesson)

Length of Lesson

Approximately one to two hours

Essential Questions

- **How do my family and I depend on the resources in our community and our world?**
- **My family and I use resources that create solid waste. How does that affect the environment?**
- **How can I affect the way my family, school, and community use resources and properly dispose of solid waste?**

Guiding Question

What can I do to encourage family members to **reduce, reuse, recycle, and respond** to solid waste disposal problems?

Skills Used

Organization and Communication
Writing and Drawing
Problem Solving
Motor Skills

****

Activity

Step 1: Contact a local grocery store and ask for a donation of a class set of brown grocery bags for this final activity.

Step 2: Remind students that they have been learning many things about natural resources, natural objects and products, organic and inorganic materials, composting, and the proper disposal of solid waste in sanitary landfills during this "Solid Waste Survivor" unit. (If you have completed the "Button Brigade" lesson, refer to the charted concepts students shared at that time. If this lesson was skipped, spend a few minutes reviewing concepts that were covered during this "Solid Waste Survivor" unit.)

"Teaching Our Families about Solid Waste" – A Culminating Performance Task, *continued*

Step 3: Assist students as they cut holes for their heads in the bottom of the bag, armholes in each side and a slit down the front. (Even young students can cut the holes and front slit independently if an adult traces the lines for the circles and slit onto the paper bag.) If the bags have an advertisement on the outside, turn the bag inside out. The grocery bag vests might also need to be reinforced around the neckline with tape so they do not tear.

Step 4: Once the vests have been cut and turned inside out, explain to students that it is now their turn to be teachers. Explain that they will turn the paper vest into a teaching tool to help them teach family members about solid waste and its proper disposal. Instruct students to think about the many things they have learned during the "Solid Waste Survivor" unit. (A list of the vocabulary words from the different lessons would help students remember some of the topics that were covered.) Instruct students to use the back of the vest to share information about REDUCING. The front left and right sides will be used for REUSING and RECYCLING. (The idea is for students to come up with more ideas for reducing than for the other two solid waste disposal solutions.) Explain that students should use pencils, first, to write their ideas and sketch the pictures. Once the preliminary work has been completed in pencil, encourage students to use washable markers, or crayons to help make the resource vests more colorful. Tell students that they can make illustrations, write words and phrases, make lists, etc. on the vest, to represent solid waste ideas they have learned. (Move among students during this activity and offer individual encouragement.)

Step 5: As students finish their resource vests, have "feely socks" and environmental books available for students. Also, go to the following Environmental Protection Agency web site (**http://www.epa.gov/epaoswer/osw/kids.htm**) for games students can play as they wait for classmates to complete the assigned task.

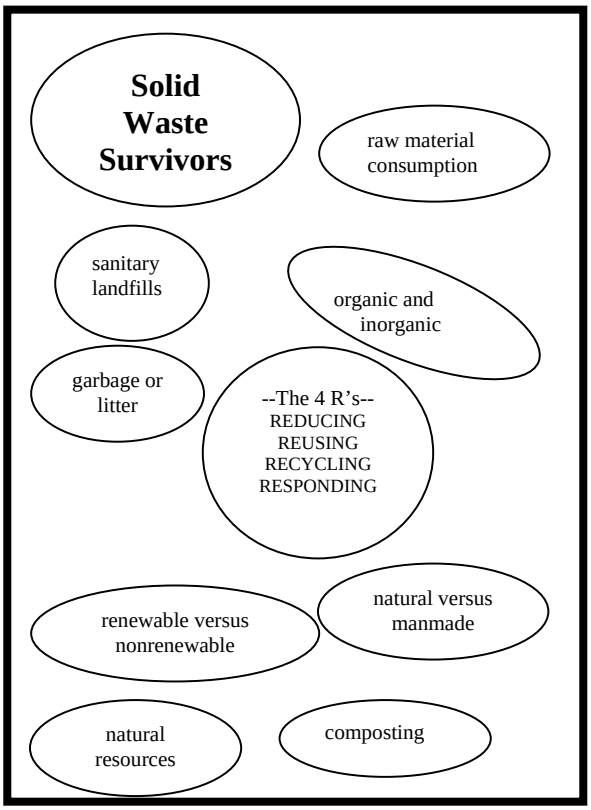
Assessment

Refer to the "Culminating Activity Scoring Guide" found at the end of this lesson.

Step 6: Once the vests have been completed, pair students up together to practice explaining the information on their vests. Once each student has practiced sharing the information on the vest with a classmate, take turns allowing each student to share the information on the vest with the entire class. (This is giving students two different opportunities to practice what they will say to family members once the vest is sent home.)

Step 7: Ask students to take the vest home and, while wearing the vest, explain what they have learned to family members. The drawings and words act as prompts that students can use to remember the concepts they have learned. If the lesson, "Planning for Our Future" has been taught, also send the family solid waste action plan home with the resource vest.

Step 8: Ask students and families to find ways to **REDUCE**, **REUSE**, **RECYCLE** and **RESPOND** to the solid waste disposal problems every day, and to write those actions on a calendar for one week. (See the calendar at the end of this lesson.) Calendars should be returned on a predetermined date and serve as part of the assessment.





Solid Waste Survivor Calendar

Dear Family,

Each day, I will try to do something to say I am a solid waste survivor and a friend of the environment. For one week, please help me keep a record of what I do. Everyday, I want to put either a picture, a sentence, a list or a conversation bubble in each box below to help me explain what I have done that day to help improve the way we deal with solid waste. Please help me remember to include all of the ways we reduce, reuse and recycle solid waste at home each day. I want to thank you very much for helping me!

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday

Name_____ Please return to school on the following date:_____

Be a Solid Waste Survivor – Take the Community Challenge
Primary

Assessment Rubric for Primary Unit Culminating Project "Teaching Our Families about Solid Waste"

4	**The student has an extensive understanding of the concepts of reducing, reusing and recycling and illustrates this on the resource vest by including 4 or more concepts on recycling and reusing and 5 or more on reducing. The student shows that he or she understands the concepts illustrated on the vest by giving elaborate details and sophisticated support for each concept. Included in the description is the idea that solid waste is a problem in our society.** **The student monitors and improves his or her family's solid waste disposal habits by recording at least 7 activities that reduce, reuse or recycle the family's solid waste. Activities are from all 3 categories and no activity is repeated.**
3	**The student has an appropriate understanding of the concepts of reduce, reuse and recycle and illustrates this on the vest by including 3 or more concepts on recycling and reusing and 4 or more on reducing. The student orally explains the concepts on the vest by giving details and providing support for each concept. There may be occasional inaccuracies but these do not interfere with conceptual understanding.** **The student monitors and improves his or her family's solid waste disposal habits by recording at least 7 activities that reduce, reuse and recycle the family's solid waste. Activities are from all 3 categories.**
2	**The student has limited understanding of the concepts reduce, reuse and recycle. He or she includes 2 or more concepts on reusing and recycling on the vest and 3 or more on reducing. The student orally explains the vest by giving relevant details for all examples and provides support for at least 3.** **The student monitors and improves their family's solid waste disposal habits by recording at least 7 activities that reduce, reuse and recycle the family's solid waste. At least 2 activities are from different categories.**
1	**The student begins to understand the concepts of reduce, reuse and recycle and includes 2 or more examples for each concept on his or her vest. The student begins to orally explain the vest by giving relevant details about each of their examples.** **The student monitors and improves his family's solid waste reduction habits by recording at least 4 activities that reduce, reuse or recycle the family's solid waste.**
Notes	