Be A Solid Waste Survivor – Take The Consumer Challenge
Intermediate

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

Standards: Consumerism
Practical Living: PL-E –3.1.2, Products and services are compared and evaluated based on price, quality, and features.
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 inspections, trash collections, water treatment, waste treatment, animal control, immunization) that promote healthy living environments in the community.

Standards: Earth and 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 are beneficial (e.g., dams built by beavers benefit some aquatic organisms but are detrimental to others).

Standards: Economics
Social Studies: SS-E-3.1.1, Scarcity requires people to make choices about using goods, services and limited resources.
Social Studies: SS-E-3.1.3, Every time a choice is made, an opportunity cost is incurred. Opportunity cost refers to what is given up when an economic choice is made.
Social Studies: SS-E-3.4.1, Producers create goods and services; consumers make economic choices about which ones to purchase.

UNIT OVERVIEW	
Lesson	**Title and Description of Activities, Essential and Guiding Questions and Standards**
#1	"**THE BUCK STOPS HERE"** -- Students will design "Enviro-Bucks" to be earned during this intermediate "Solid Waste Survivor" unit. Students will also learn what the saying "The buck stops here" means as it relates to taking responsibility for one's actions. **Standard: Social Studies: SS-E-3.1.3** **Essential Question #2:** How do my choices about what I buy and use affect the environment? **Guiding Question:** ♦ As a consumer, what can I do to help the environment?

UNIT OVERVIEW	
Lesson	**Title and Description of Activities, Essential and Guiding Questions and Standards**
#2	**"RESEARCHING RESOURCES" –** Students will research resources used to make a favorite item they own, investigating their sources, uses and availability. They will present conclusions to the class and identify on a world map where to find the natural resources. **Standard: Science: SC-E-2.1.2** **Essential Question #1:** Where do the things I use come from and what happens to them when I am through using them? **Guiding Questions:** ♦ What natural resources are needed to make the things I use, and are those resources renewable or nonrenewable?
#3	**"SOMETHING FISHY IS GOING ON HERE" –-** Students will understand that some resources become depleted when they are used faster than they can be replenished. **Standard: Science: SC-E-3.3.3** **Standard: Social Studies: ss-E-3.1.1** **Essential Question #2:** How do my choices about what I buy and use affect the environment? **Guiding Questions:** ♦ What is an environmental cost? ♦ As a consumer, what can I do to help the environment?
#4	**"DESKTOP LANDFILLS" –-** Students will learn about the amount of waste that they produce as they build a desktop landfill in a gallon milk container. **Standard: Practical Living: PL-E-3.1.5** **Essential Question #1:** Where do the things I use come from and what happens to them when I am through with them? **Guiding Questions:** ♦ When I am through with the things I use, what happens to them?
#5	**"THE EVOLUTION OF TRASH" --** Students will learn from participating in this skit that as population and the use of synthetic materials increased, so did solid waste disposal problems. **Standard: Practical Living: PL-E-3.1.5** **Essential Question #2:** How do my choices about what I buy and use affect the environment? **Guiding Question:** ♦ As a consumer, what can I do to help the environment? ♦ How can I generate the least amount of solid waste?
#6	**"A TRASHY PIZZA BULLETIN BOARD" –-** Students will create a "trashy pizza" bulletin board as they learn about the amount and types of waste generated in the United States over a one-year period. **Standard: Practical Living: PL-E-3.3.2** **Essential Question #1:** Where do the things I use come from and what happens to them when I am through with them? **Guiding Questions:** ♦ When I am through with the things I use, what happens to them?

UNIT OVERVIEW	
Lesson	**Title and Description of Activities, Essential and Guiding Questions and Standards**
#7	**"FOLLOW THE SOLID WASTE TRAIL" –** Students will investigate and learn about the importance of purchasing reusable and recyclable products by building a compost and landfill model. **Standards: Practical Living: PL-E-3.3.2 and PL-E-3.1.5** **Essential Question #1:** Where do the things I use come from and what happens to them when I am through with them? **Guiding Questions:** ♦ When I am through with the things I use, what happens to them?
#8	**"PREFERABLE PICNIC PLANNING"** – Students will plan an ecological picnic. They will evaluate products usually taken on a picnic and plan for the least amount of solid waste disposal. **Standard: Practical Living: PL-E-3.1.5** **Standard: Social Studies: SS-E-3.1.3** **Essential Question #3:** What process should I use to evaluate the choices I make as a consumer in order to reduce the amount of solid waste I produce? **Guiding Questions:** ♦ How can I identify and apply criteria to making my decisions on what to buy? (E.g., cost, media and peer pressure, convenience, environmental impact, health and safety)
#9	**"INSPECTING PRODUCTS" --** Students will compare and evaluate products as they begin to learn techniques to make them wiser environmental consumers. **Standard: Practical Living: PL-E-3.1.2** **Standard: Social Studies: SS-E-3.4.1** **Essential Question #3:** What process should I use to evaluate the choices I make as a consumer in order to reduce the amount of solid waste I produce? **Guiding Questions:** ♦ How can I identify and apply criteria to make my decisions on what to buy? (E.g., cost, convenience, media and peer pressure, environmental impact, health and safety).
#10	**"MAKING WISE BUYS" –-** Students will research and evaluate school supplies and determine which products are the most environmentally preferable to buy. **Standard: Practical Living: PL-E-3.1.2** **Standard: Social Studies: SS-E-3.4.1** **Essential Question #3:** What process should I use to evaluate the choices I make as a consumer in order to reduce the amount of solid waste I produce? **Guiding Questions:** ♦ How can I identify and apply criteria to making my decisions on what to buy? (E.g., cost, media and peer pressure, convenience, environmental impact, health and safety)
#11	**"THE ULTIMATE ENVIRO-FRIENDLY PRODUCT – A CULMINATING PERFORMANCE TASK" –** Students will design and mass-produce an environmentally preferable product made from reusable solid waste. The product will be evaluated based on its durability, the use of recycled materials, its usefulness and if it is environmentally friendly. An assessment rubric is included at the end of this activity. **Standards: Practical Living: PL-E-3.1.2, PL-E-3.1.5, PL-E-3.2.2** **Standards: Science: SC-E-2.1.2, SC-E-3.3.3** **Standards: Social Studies: SS-E-3.1.1, SS-E-3.1.3, SS-E-3.4.1** ♦ How do I make the best choices about what to buy?

UNIT OVERVIEW	
Lesson	**Title and Description of Activities, Essential and Guiding Questions and Standards**
#12	**"Marketing Enviro-Products" – Students will prepare their ultimate enviro-products to sell at the Enviro-Market by creating advertisement slogans, commercials and posters.** **Standard: Practical Living: PL-E-3.1.2** **Standard: Social Studies: SS-E-3.4.1** **Essential Question #3:** What process should I use to evaluate the choices I makes as a consumer in order to reduce the amount of solid waste I produce? **Guiding Questions:** ♦ How do I make the best choices about what to buy?
#13	**"THE ENVIRO-MARKET – A CULMINATING EVENT"** – In this final activity students will sell their enviro-products made from recyclable items. The enviro-products will be priced according to how environmentally preferable they are. For example, items that are harmful to the environment will cost much more than items that are environmentally friendly. **Standard: Practical Living: PL-E-3.1.2** **Standard: Social Studies: SS-E-3.4.1** **Essential Question #3**: What process should I use to evaluate the choices I make as a consumer in order to reduce the amount of solid waste I produce? **Guiding Questions**: ♦ How do I make the best choices about what to buy?

INTEGRATION

Language Arts

- Write a paper about how your life would be different if plastic had never been invented
- Write a story about a homeless man or woman living at the dump. Could he or she survive on what the rest of us throw away?

Social Studies

- Invite a panel of people 70 and older to your classroom. Hold a panel discussion in which you ask them how their families dealt with solid waste when they were children. Ask if they remember the depression and WWII. Was dealing with solid waste different during those times?
- Go to the grocery store with a grandparent or other relative or friend over 70 years of age. Look at various items and talk about how those items were used and packaged when they were children. (For example, candy, milk, cheese, eggs, flour, and vegetables). Report to the class on how things were different when these older people were children.

INTEGRATION

Integration, *continued*

Math

- Find a way to weigh all the trash your class produces in the classroom each day. Keep records and get an average for each week. Make a set of graphs and charts to illustrate your findings.
- Do pie charts to show what percentage of glass, paper and plastic is reused or recycled in the U.S. each year.

Arts and Humanities

- Make a toy for a younger child using recycled materials. Make sure the toy is safe.
- Write and perform a skit in which a person your age feels pressured to buy something he/she does not need and cannot afford. What are some of the ways he/she might feel pressured (media/peers) and how might he/she feel.

Technology

- Interview someone from a local company or from the Kentucky Department of Waste Management about how companies use computers to track raw materials and solid waste in order to be both earth-friendly and cost effective.
- Go to www.epa.gov and explore the kids' page on solid waste.

Be a Solid Waste Survivor – Take the Consumer Challenge
Intermediate

The Buck Stops Here!

Standard

Social Studies: SS-E-3.1.3, Every time a choice is made, an opportunity cost is incurred. Opportunity cost refers to what is given up when an economic choice is made.

Activity Description

Students will design "Enviro-Bucks" to be distributed during this intermediate "Solid Waste Survivor" unit. Students will also learn what the saying "The buck stops here" means as it relates to taking responsibility for one's actions.

Materials

Paper, crayons, markers and pencil
Computer (optional)

Length of Lesson

Approximately one hour

Vocabulary Words

Consumer: one who buys products or services.
Environment: the external conditions that influence the development and survival of an organism or population; usually refers to air, water, land plants, and animals.

Essential Question

How do my choices about what I buy and use affect the environment?

Guiding Question

As a consumer, what can I do to help the environment?

Skills Used

Creativity
Problem Solving

****

Activity

Step 1: Write the phrase "The Buck Stops Here" on the chalkboard. Ask students if they have ever heard that saying used by adults, or in stories. Ask students to think about that saying and share what they think it means. If students have difficulty understanding what it means, explain to students that this phrase means that everybody must accept responsibility for their actions, rather than trying to blame others for problems they create.

Ask students if they have ever earned money, or had money given to them as a gift. Ask students if they have ever spent money to buy a toy, game, clothing, etc. Explain to students that when people buy things (or services) they become consumers.

Explain to students that during this "Solid Waste Survivor" unit, they will be studying and learning about how, as consumers, they make choices in their daily lives that affect the Earth and it's inhabitants. Explain that some of those choices include things they want to buy, and how they deal with the solid waste, or trash, left over from the packaging of the product they purchase, or the product when it loses it's usefulness.

The Buck Stops Here, *continued*

Step 2: Ask students to think of the first thing that comes to mind when they hear the word environment. Encourage students to share ideas with classmates. Help students understand that the environment includes everything around them.

Step 3: Tell students that during this unit they will be learning about the many positive things they can do, as consumers, to keep the environment safe for themselves and future generations. (E.g., **reduce the amount of solid waste each person throws away, reuse as many products or product containers as possible, and recycle.**) Explain to students that as they are learning these positive things, they will be able to earn a special type of money for their efforts, called Enviro-Bucks (a nickname for environmental money). Give students some examples of how they will be able to earn Enviro-Bucks. (E.g., completing assigned work on environmental topics in a timely manner, working cooperatively on group projects dealing with environmental studies, reusing and recycling solid waste (trash) appropriately at school, doing environmental acts of kindness like picking up trash, recycling, etc.)

(SKIP STEPS 4 - 6, IF YOU PLAN TO USE THE SAMPLE SHEET OF ENVIRO-BUCKS LOCATED AT THE END OF THIS LESSON.)

Step 4: Explain that students will have an opportunity to design the Enviro-Bucks for use during this unit of study. Show students an 8½ by 11- inch sheet of white copy paper. (Paper that is clean on only one side works fine, plus it shows students, by example, how to reuse a potential solid waste product.) Explain that eight Enviro-Bucks should fit on one sheet of 8 ½ by 11 inch paper, and be the same size. Also explain that the Enviro-Bucks should contain pictures and words that will identify them as "environmental money". Tell students that they can work individually, or in small groups, to design the Enviro-Bucks. Set a time limit for students to complete their design (Give as a homework assignment, if students want to work with computer graphics on a home computer.)

Journal Activity

Costs to the Environment

Tell students that the choices we make as consumers each day when we buy products and dispose of solid waste carry environmental costs. Explain that those costs add up as people around the world make unwise choices about how they treat the environment.

Ask students to think and write about some different choices that people might make that costs the environment its health and safety.

Step 5: Once the Enviro-Buck designs are completed, give each designer an opportunity to explain the graphics and logo to the entire class. Put the designs on display so students can look closely at each design.

Step 6: In order to select one design to copy and prepare for distribution, give students the opportunity to vote for one Enviro-Buck design. Number each submitted design, then ask students to complete a secret ballot by listing only one number on a piece of paper. Tally the votes, and announce the winning design.

Step 7: Add a different numerical value to the Enviro-Bucks by writing numbers on the winning sample, or copy the Enviro-Bucks onto different colors of paper, with each color worth a specific value. (See the last page of this unit.)

The Buck Stops Here! *Continued*

Step 8: Remind students that they will be paid Enviro-Bucks during this unit of study. Explain that students will need to save the Enviro-Bucks until the end of the unit. At that time, they will have a special event where they will be able to spend their Enviro-Bucks. (Students will get to develop environmentally friendly products from recycled materials to sell to each other during an "Envir-O-Market" activity. Explain that each item at the "market" will cost a certain amount of Enviro-Bucks. Remind students that as they receive the Enviro-Bucks it will be their responsibility to keep their environmental money in a safe place so it is not lost.

Enviro-Bucks
General Information

Earn Enviro-Bucks:

- 1 Enviro-Buck for staying on task during environmental lessons.
- 1 Enviro-Buck for cooperating during environmental group activities
- 1 Enviro Buck for performing environmental "acts of kindness"
- 1 Enviro-Buck for turning in completed environmental assignments
  (BONUSES UP TO 5 ENVIRO-BUCKS FOR EXCEPTIONAL WORK ON ASSIGNMENTS)
- Smaller denominations of Enviro-Bucks may be traded in at designated times for larger bills.

(These rates and conditions may be adjusted.)

Assessment

Ask students to rephrase the saying "The buck stops here" in terms that will help them explain it to friends their own age. Instruct students to use an environmental scenario as they rephrase the saying. (E.g., "I am responsible for separating recyclable items at home, instead of throwing them in the trash can or expecting others to do it for me." Display the new phrases on a "RESPONSIBILITY" bulletin board.

Extensions

1. Encourage students to start journal entries of suggested ideas for doing "environmental acts of kindness"
2. Take a walk outside with clipboards, paper and pencils. Find a quiet spot to sit and sketch Enviro-Buck ideas.
3. Read Heron Street (a book that shows the environmental impact made on a wetlands area when a housing development was built), by Ann Turner, and discuss the "environmental costs" depicted in that story, plus the need for new homes and places to live.

INVEST IN A BRIGHT FUTURE 1 Buck EARN ENVIRO-BUCKS TODAY	INVEST IN A BRIGHT FUTURE 1 Buck EARN ENVIRO-BUCKS TODAY
INVEST IN A BRIGHT FUTURE 1 Buck EARN ENVIRO-BUCKS TODAY	INVEST IN A BRIGHT FUTURE 1 Buck EARN ENVIRO-BUCKS TODAY
INVEST IN A BRIGHT FUTURE 5 Bucks EARN ENVIRO-BUCKS TODAY	INVEST IN A BRIGHT FUTURE 5 Bucks EARN ENVIRO-BUCKS TODAY
INVEST IN A BRIGHT FUTURE 10 Bucks EARN ENVIRO-BUCKS TODAY	INVEST IN A BRIGHT FUTURE 20 Bucks EARN ENVIRO-BUCKS TODAY

Researching Resources

Adapted from "Sources of Resources", 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 research resources used to make a favorite item they own, investigating their sources, uses and availability. They will present conclusions to the class and identify on a world map where to find the natural resources.

Materials

Wool sweater	Plastic milk jug	Pushpins
Paper	Cotton T-shirt	Scissors
Rubber boot or raincoat	Metal can of food	Paper labels or tags
Scissors	Dairy product	Markers
Leather product	Glass bottle	World map
Computer diskette	Wooden toy	Research tools

Length of Lesson

Approximately one hour, in two class sessions, depending on research tools

Vocabulary Words

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.)
Raw materials: still in their natural or original state.
Consumption; the amount of any 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

Where do the things I use come from and what happens to them when I am through using them?

Guiding Questions

What natural resources are needed to make the things I use, and are those resources renewable or nonrenewable?

Skills Used

Research and Writing
Observation and Classification
Communication and Problem Solving

****

Activity

Step 1: Display all of the materials from the "Materials Needed" list above except for the last six items. Discuss the concept of natural resources with the students and ask them to identify what raw materials were used to make each of the objects on display. List student answers on the board , or on a chart. Use the list to define and explain the key vocabulary words. (Refer to the **Teacher Fact Sheets** at the beginning of this publication for background information on "Products" and "Natural Resources".)

Researching Resources, *continued*

Step 2: Discuss, as a class, the following questions and concepts to help students better understand the concept of natural resources.

- Can people make natural resources?
- Are natural resources things we can use?
- Are natural resources necessary for life?
- As population increases, the natural resources in that area may become scarce. People will have to change their daily living habits in order to conserve their resources.
- Natural resources are living parts of the physical environment (including air, sun, wind, rain, plants, animals, etc.).

Step 3: Brainstorm with students to identify other well-known resources such as those listed under "Valuable Natural Resources". Try to come up with at least as many resources as there are students in the class. Add these resources to the other list.

Step 4: Explain that students will have the opportunity to find out more about different natural resources in this activity, by using research tools. Display the books and encyclopedias, or schedule to take students to the media center for research time.

Valuable Natural Resources

Aluminum	Nickel
Natural Gas	Chromium
Coal	Petroleum
Cobalt	Platinum
Corn	Silver
Diamonds	Tin
Fish	Wheat
Water	Wool
Gold	Zinc

Homework Assignment

Instruct students to check different products at home. Make a list of companies that manufactured the products and countries where the products were manufactured.

Upon returning the work to school, compile a master list of the different products checked and countries where the products were manufactured.

Compare data to see which country was represented the most in this informal survey.

Discuss findings.

Step 5: Ask students to think of one or two items they have purchased recently that they really like; such as, a toy, a music CD, food at a restaurant, or a video game. Explain to students that they will research their favorite product to try and find out what natural resources were needed to make that item and in what part of the world those resources are found.

Step 6: Call on students, one at a time, so each might name his or her favorite item chosen to research. On a chart, or on the chalkboard, write each student's name and the item selected to research, so there will be a variety of different products.

Step 7: Encourage students to create a timeline showing their product's beginning, and the processes it had to go through in order to make it to their home. (See the bottom of the next page for an example.)

Step 8: Give each student a copy of a world map. On that map, each student should identify where the natural resources that were used in their special item originated and where the item was manufactured or distributed.

Researching Resources, *continued*

Step 9: Display a large map of the world in the front of the classroom. Have students write the name of the resource(s) used to make their favorite item on several small pieces of paper or labels.

Step 10: Have students take turns presenting information about their favorite product to the class, discussing their research conclusions. Students should begin their presentation by telling the class which favorite item they researched, what raw materials, or resources are used to make that item. Also, ask where the resources are most typically found.

Step 11: Students should pin the paper that labels their resource on the map in the appropriate regions. Also, students should discuss whether the resource is renewable or nonrenewable. Discuss the availability of the natural resource at this time, also, if the information was located.

Step 12: Before concluding this activity, lead students toward a better understanding of the reality that many of our resources are non renewable, and are becoming scarce. The consumption rate is too high, because of the demands consumers place on companies to produce more products for them to buy. This is harming the environment.

Assessment

Ask students to list some of the natural resources they use frequently. Are the resources renewable or nonrenewable? Ask students to write about what they would do if the world supply of those resources became depleted.

Pose the question: "Who is responsible for the depletion of natural resources?"

Extensions

1. Research natural resources from selected countries around the world, or from different states in the United States. Make a comparison chart of the different resources to compare the availability.
2. Visit the following web sites to research resources in the state of Kentucky on the Internet: **http://www.louisville.edu/~easchn01/kentucky/1envi.html**

The Life of a French Fry (Sample Product Time-Line)

It starts as a potato growing in ground. → The potato is harvested and sent to a potato processing plant. → At the potato processing plant, potatoes are washed, peeled, sliced and pre-cooked by machines. → French Fries are quickly frozen, then packaged in a plastic bag. → Frozen French Fries are sent to food distribution centers where they are bought by different companies, like McDonald's or Kroger. → The product is bought for immediate consumption (like at the drive-up window at Burger King) or to be taken home and cooked.

Yum! Yum!

Something Fishy is Going on Here

Standards

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).

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

Activity Description

Students will understand that some resources become depleted when they are used faster than they can be replenished.

Materials

Paper and pencil
Internet accesses
Copy of story "Got Fish?" from Teachers' PET Term Paper, Summer 2001 Issue

Length of Lesson

Approximately one hour

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.
Consumption: the amount of any resource (material or energy) used in a given time by a given number of people.
Scarcity: limited supply of a resource or product.
Environmental Cost: harm done to the environment when consumers and producers make unwise choices about how they use natural resources and dispose of waste.

Essential Question

How do my choices about what I buy and use affect the environment?

Guiding Questions

What is an environmental cost?
As a consumer, what can I do to help the environment?

Skills Used

Reading
Communication and Problem Solving

****

Activity

Step 1: Introduce this activity by telling students that they will be discussing a global problem and trying to come up with some solutions to the problem. Remind students that products begin as natural resources and that people cannot "make" natural resources.

Teacher Information

Copies of "Popular Planet Press", a newsletter for students in grades 3-6, published by ZPG Population Education Program, can be ordered by calling 1-800-767-1956. The newsletter is published three times each year. An annual classroom subscription of 30 copies costs $7. Single copies of the newsletter are free.

Something Fishy is Going on Here, *continued*

Step 2: Explain to students that they will be reading an article called "Got Fish?" together in class. Pass out copies of "Got Fish?" to each student. Before reading the article, go over the "Fish Phrases" (vocabulary words) with students. This should help make the article easier to understand.

Step 3: The article can be read through silently at first, then out loud in a large group, or in smaller groups, depending on teacher choice.

Step 4: Once the article has been read, call on different students to retell the problem facing the fishing industry. Discuss the implications of a depleted fish supply. What will happen to the cost of fish as the supply continues to dwindle? (Discuss supply and demand.) What is the environmental cost in this scenario? (The balance of the ocean ecosystem would be thrown off with the depletion of whole species of fish.)

Step 5: Ask students to think about, and discuss, any solutions that might help the fishing industry.

Step 6: Encourage students to go online to visit the "Center for Marine Conservation" web site to learn about activities taking place to help protect ocean life. The Internet address is www.cmc-ocean.org/.

Step 7: Remind students that Earth's resources are becoming depleted because of the number of people in our world and because many times people do not think about the consequences of purchasing so many disposable and unnecessary products. Explain to students that as they continue learning about their roles as consumers during this unit, they will talk about how to become wiser consumers.

Assessment

Ask students to make a list of other renewable resources that are in danger of depletion because of overuse.

After listing some renewable resources, ask students to select one of the resources and think about some things that consumers can do to conserve that resource so it does not become depleted so quickly. Instruct students to discuss the environmental cost if the resource was depleted?

Extensions

1. Visit the Monterey Bay Aquarium's Seafood Watch web site to learn more about which fish they feel are okay for consumers to purchase in grocery stores and restaurants. The Internet address for the Monterey Bay Aquarium's Seafood Watch is: "www.mbayaq.org." Encourage students visiting that web site to keep other classmates updated on the findings.
2. Encourage students to think of ways to reuse some of the trash generated in the classroom in order to keep from having to buy more products, thus using more resources.

Summer 2001

Teachers' PET Term Paper

Population Education Training

Got Fish?

Population, Competition, and the Global Fishing Crisis

A Rich Tradition

Fishing is an ancient and universal human practice. People have depended on fish for sustenance and income throughout history, and harvesting from the Earth's waters, whether with nets, hooks, spears, or bare hands, is a ubiquitous part of human society.

Diverse cultures around the world base their diets on seafood. In fact, fish and shellfish make up at least a sixth of the total animal protein consumed on Earth.[1] One billion people, primarily in developing nations, depend on fish for their major source of protein.[2]

Nations have built their economies on the trade that meets this demand, and the continued health of the marine ecosystem is vital to their stability and growth. Of the estimated 51 million fishers in the world, 95% are from developing countries.[3] Here in the United States, commercial and recreational fishing contributes $152 billion to the economy and provides approximately two million jobs.[4]

Where Fish Come From

World fish production comes from three sources: the **marine catch**, the **inland catch**, and **aquaculture**. In recent years there has been a significant shift in the proportions contributed by each of these sources. In 1994, the marine catch--always the mainstay of the fishing industry--provided fully 75% of total production, with the other two sources combined offering the remaining 25%. By 1999, the amounts contributed by each source was closer to 67% and 33%, respectively.[5] Some of this difference is due to the commercial success of aquaculture which, ironically, can cause varying degrees of damage to wild fish populations, as their habitat is appropriated for farming.

But wild marine species remain the backbone of world fish supply, and so many have reached such dangerously low levels that fisheries around the world are in crisis. Marine biodiversity has been compromised to such an extent that 70% of the world's commercially important fish stocks are **fully fished**, **overfished**, or **depleted**.[6] Some species have even been driven to commercial, and almost biological, extinction. The drop in the size and diversity of fish populations jeopardizes the fishing industry, threatening the future of fishers' livelihood and national economies alike.

Where Fish Go

Fish stocks are shrinking partly because demand for this resource is so great. Each year we take more fish from the seas and the supply dwindles as fewer and fewer are left to reproduce. The decrease is also a result of the deterioration of the marine environment, particularly in shallow waters near shores. Fish and shellfish use **estuaries** as spawning grounds. But rising levels of water pollution and destruction of coastal ecosystems make it increasingly difficult for these creatures to find healthy spaces in which they can successfully reproduce.

Rapid human population growth is at the root of both problems. It heightens demand, for as our numbers increase, so does our collective appetite for fish. The industry's drive to satisfy rising need spurs competition and technological advances that continually improve our ability to find and capture fish. Now there are so many people fishing so aggressively that we're exceeding nature's ability to replenish once-abundant stocks. Irresponsible fishing also wastes a vast amount of fish--some 27 million metric tons of **bycatch** is brought in with the commercial catch every year.[7]

Degeneration of marine habitat is also a direct result of human population growth. Forty percent of the world's people live within 100 kilometers of a coastline[8], and much of the sewage, trash, industrial pollution, and agricultural run-off produced by these populations finds its way into nearby coastal waters. Inland communities also contribute to ocean contamination, as rivers carry the same pollutants from landlocked population centers out to sea. Approximately 44% of the estuaries in the United States currently suffer from pollution and habitat degradation.[9] *(Continued on p. 2)*

Fish Phrases

Marine catch: fish captured in coastal waters and on the high seas.[10]
Inland catch: fish caught from lakes and rivers.[11]
Aquaculture: fish farming (conducted in inland and marine settings).[12]
Fully fished: much-targetted by fishers but still stable.[13]
Overexploited: fished enough to be endangered.[14]
Depleted: fish population has crashed.[15]
By-catch: unintentionally caught fish, seabirds, marine mammals, etc.[16]
Estuary: a water passage where rivers and tidal currents merge.[17]

Resources

Fishing Information

NEWSLETTER: Popular Planet Press

The most recent issue of our newsletter for kids in grades 3-6 also focuses on fishing. The cover story offers an age-appropriate description of the marine food chain and how people affect it. Inside are fun games and word puzzles, ideas for how kids can help protect fish and their habitat, and information on selected resources and organizations they can look to for more information. *To obtain a free single copy of this issue, please call 1-800-767-1956. An annual 3-issue subscription for classroom sets of 30 is available for $7. Please address checks to the ZPG Population Education Program. Subscriptions for one or two copies are available for free.*

WEBSITE: Center for Marine Conservation

Wondering what you can do to help restore ocean health? If you're one of the 2.4 billion people who live within a couple of hours of a coastline, getting involved may be easier than you think. On Saturday, September 15, 2001, the Center for Marine Conservation will sponsor their annual International Coastal Cleanup effort. Over 500,000 people will work to pull trash from our waterways. If you've been looking for a fun and rewarding field trip for your classes next semester, this could be it. Find out more online at: www.cmc-ocean.org/cleanupbro/about.php3.

BOOK: Cod

Who can resist a book that plugs itself as the "biography of the fish that changed the world"? Author Mark Kurlansky has managed to compile an encyclopedic and entertaining treatment of how this humble groundfish became one of the hottest commodities of the medieval marketplace, and went on to play a major role in shaping a millenium of Western history. This book would make an excellent supplement for secondary level social studies, geography, economics, or environmental studies classes. *Cod, 1997, by Mark Kurlansky, is published by Penguin Books and is available online and at bookstores around the country for $13.00.*

WEBSITE: The Monterey Bay Aquarium s Seafood Watch

Ever pondered the power of your plate? The choices you make about the seafood you choose at supermarkets and restaurants are an opportunity to support sustainable, responsible fishing practices--so make informed decisions! The Monterey Bay Aquarium has synthesized information from reputable sources to make it easy for you. Updated regularly, this guide includes a key to relevant terminology, and categorizes popular types of seafood as "Best Choices", "Proceed with Caution", and "Avoid." Ratings are a function of three factors: abundance of the wild population, level of bycatch, and environmental impact associated with the fishing or farming practices involved in production. Go to www.mbayaq.org and search for "seafood chart." Then enjoy your selections with a clear conscience. Bon Appetit!

Got Fish? Ctd.

What to Do Now

There is a lack of meaningful consensus among nations about fishing rights and practices. Most could do more to limit their contribution to the problem of overfishing. But thus far, rather than discourage detrimental methods among their fleets, governments worldwide have tended to support the status quo through financial backing and lenient regulations.[19] Even if international standards on good practices were to be established, enforcement would be highly problematic. The practical difficulties inherent in attempting to monitor the actions of all fishers are considerable--especially those of the 49 million or so small-scale operators who represent 98% of the industry. It seems inevitable that this predicament should have surfaced sooner or later, in light of such swift proliferation in human numbers. The "tragedy of the commons" has struck again, and it is clear that this vital natural resource cannot withstand these population pressures much longer.

Finding and implementing viable solutions to this problem will be one of the great challenges of this century. The future of the fishing industry and the stocks on which it depends hinges on our ability to recognize and respect the natural laws that determine the size of the supply. We must curb our consumption and protect marine environments if we hope to restore this depleted resource and preserve a way of life followed by fishing families for generations. Stabilizing the size of our population will make it much more possible to reach both of these important goals.

Sources: [1, 2, 3, 8, 18 & 19] World Resources Institute website, www.wri.org/coastlines.html. [4] American Oceans website, www.americanoceans.org/fish/what.html. [5] Food and Agriculture Organization of the United Nations, www.fao.org/fi/default.asp. [6] Greenpeace website, www.greenpeace.org/~oceans/...overfishing/itcant-goonforever.html. [7 & 16] World Wildlife Fund website, www.worldwildlife.org. [9] American Oceans Campaign. Splash. Vol. 12, No. 1, Spring 2001. [10, 11, 12] Environmental News Network website, www.enn.com/vdo/industry/fisheries/index.asp. [13, 14, 15] Monterey Bay Aquarium website, www.mbayaq.org/efc/efc_oc/seafood_chart.html. [17] Webster's Seventh New Collegiate Dictionary, 1976.

ZPG 1400 16th Street, NW, Suite 320 Washington, DC 20036 1-800-Pop-1956 FAX(202)332-2302 e-mail: PopEd@zpg.org

Desktop Landfills

Adapted from "Weigh Your Weight", 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 about the amount of waste that they produce as they build a desktop landfill in a gallon milk container.

Materials

One gallon milk jug or carton per student
Dry waste items collected throughout the week
Scale and permanent marker

Length of Lesson

Approximately one to two hours at the end of a five-day period

Vocabulary Words

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.
Reduce: to decrease the amount of waste, either by using wiser purchasing habits or by reusing or recycling more items.
Respond: in this context, the act of reconsidering waste-producing activities and expressing preferences for less waste.
Sanitary Landfill: a site where waste is managed in order to prevent or minimize health, safety and environmental impacts.

Essential Question

Where do the things I use come from and what happens to them when I am through with them?

Guiding Questions

When I am through with the things I use, what happens to them?

Skills Used

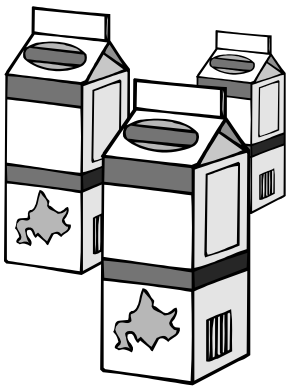
Problem Solving
Communication

****

Activity

Step 1: Before beginning this activity, collect a class set of clean gallon milk jugs or cartons. Use a sharp knife to cut the top of the jug so it can be opened and closed as items are added to it.

Step 2: Give students a milk container and instruct them to write their name on the container they receive, using a permanent marker. Ask students to leave the container sitting close to their work area in the room.



Desk top Landfill, *continued*

Step 3: Explain that solid waste becomes trash once we throw it away. The trash thrown away at home and school enters the "municipal solid waste stream", because it is picked up by a garbage collection company and transported to a local landfill.

Tell students that they will be collecting all of their DRY trash items for the next week while at school and storing the trash items in the milk container. They WILL NOT be adding WET items or food scraps to their collection because this would encourage the materials to begin to decompose.

Explain that the purpose of this activity is to help students become aware of the solid waste they produce, and to encourage them to begin to think seriously about how they might reduce the amount of that waste. Remind students to rinse any containers or plastic cutlery before placing those types of items in their "desk top landfills".

NOTE: If your school has an active recycling program in place, do not allow students to recycle during this activity. The idea is for students to think of ways to REDUCE the amount of waste they are responsible for producing, rather than relying on recycling to help them. Charge students an Enviro-Bucks dumping fee if they have to put solid waste items into another student's landfill.

Day 5

Step 1: Ask students to predict the weight of their desktop landfills after collecting items for five class days. Use scales to weigh the trash individually, then add the individual totals together to calculate a class total.

Step 2: Spread trash items out onto a large tarp or sheet. Give students gloves to wear as they begin to separate the trash items into different categories (glass, metal, paper, plastic, reusable, and miscellaneous). Once the trash has been separated, draw students' attention to the "miscellaneous" pile. Gather that pile of trash and weigh it separately from the rest. Compare that weight to the total weight of the trash. Explain that by recycling, the amount of waste entering the municipal solid waste stream can be reduced drastically.

Assessment

Ask students to write about why they think they generate so much trash. Have students include ways they developed to use less trash throughout the week, due to the size of their landfill. Pose the following question: If the amount of waste homeowners could discard was limited, what steps do you think they might begin to use to reduce the amount of solid waste they produced?

Step 3: Write the national average of waste generated on the board: 4.3 pounds per person per day.

Ask students to calculate the following:

- How much waste did each student in this class generate per day on average? Is this higher or lower than the national average? If lower, is it because of the limited size of the collection container? (Remind students that they also generated trash away from school that was not collected and weighed.)
- If each person in your community (population) throws away 4.3 pounds of garbage each day, how many total pounds of garbage are thrown away each day just in your community?
- How many tons is this? (Help students understand the concept of a ton being 2,000 pounds by comparing one ton to a 4-door compact car.)

Extensions

1. Contact a state or municipal solid waste manager to find out about your community's trash generation rate. How does it compare to other communities in your county or state? Discuss the results and reasons behind them with students.
2. Have students generate ideas on how they can reduce the amount of waste entering the municipal solid waste stream.

The Evolution of Trash

A Skit Adapted from "The Throwaway Three" by Fay Bradley

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 from participating in this skit that as population and the use of synthetic materials increased, so did solid waste disposal problems.

Materials

Refer to "Prop List" found at the beginning of the skit
A time line showing the progression of the skit
A copy of the skit for each student (found after lesson plan)
Dictionaries for students to use to define words, if needed

Length of Lesson

One to three hours, depending on how the skit is used

Vocabulary Words

There will be some terms used in the skit that will probably need to be defined. Have dictionaries available for students to use if they come upon words they do not understand as they read the skit to themselves.

Essential Question

How do my choices about what I buy and use affect the environment?

Guiding Questions

As a consumer, what can I do to help the environment?
How can I generate the least amount of solid waste?

Skills Used

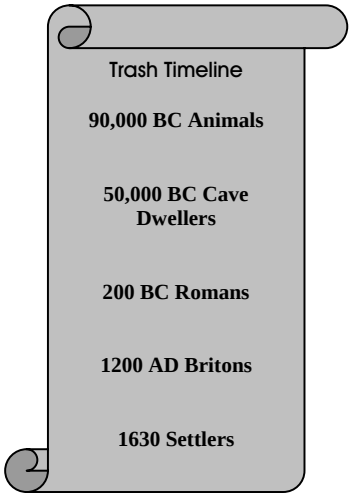
Reading
Communication
Assimilation of information

****

Activity

Step 1: Introduce students to the play, "The Evolution of Trash" by telling them that they will be performing a short skit that attempts to explain how solid waste disposal has evolved, in a comical (yet serious) sort of way. Explain that while the skit is fictitious literary writing, parts of it are based on historical truths.

Step 2: After assigning speaking parts for the play, give students about fifteen minutes, or so, to mark their reading parts, silently read through the skit, and look up any unknown words in the dictionary. Encourage students to ask questions if they do not understand any part of the skit.



"The Evolution of Trash", *continued*

Step 3: After students have had an adequate amount of time to read through the skit, and mark the part they will be reading out loud, instruct students to prepare for the first oral reading. Ask the narrator to begin the skit, with other students prepared to read when appropriate. After the first oral reading, ask students if there is any part of this skit they still do not understand. Clarify any unknown phrases, or encourage students to look up unknown words in the dictionary.

Step 4: Encourage student input on the level of "professionalism" they would like to aim for with this "production". (Skip this step if class time is limited.) Extensions could be included to make this lesson one that also combines cultural diversity and change over time, if students become eager about researching the different historical periods mentioned in the skit.

Step 5: If class time is limited, then read the play a few times. Discuss how people from different centuries and different cultures have dealt with solid waste disposal over the centuries, then put the skit on without using props or costumes. Help students arrive at an understanding of how the industrial revolution and wars increased the production of goods, not only in the United States, but around the world. Remind students, also, that as population increases, so does the need for more products. Along with the disposal of what is left over after people are through using any given product, comes an increase in the problems people who operate community waste disposal systems have to manage and deal with on a daily basis.

Assessment

After reading and discussing the skit, "The Evolution of Trash", ask students to write what they feel has been the most prevalent cause of solid waste problems in our country's history. Remind students that they need to include at least two or three reasons supporting their position.

Extensions

1. Encourage students to research different groups of people portrayed in "The Evolution of Trash" skit to see if any information about solid waste disposal habits over the centuries can be found.
2. Invite parents or other classes of students to watch the performance.
3. Challenge students to add other historical periods to the play and write a rhyme telling how that group of people disposed of their solid waste.

"The Evolution of Trash"

A Skit adapted from "The Throwaway Three" by Fay Bradley

(Originally published by the Atlanta Clean City Commission in "Lessons from Litter". Reprinted in EPA Let's Reduce and Recycle: Curriculum for Solid Waste Awareness)

PROP LIST:

Monkey masks
Banana peel
Orange peel
Skins (animal print material)
Roman helmet
Bag of trash
Sack of trash
Pilgrim hat
Quilt
Coonskin hat
Leather harness or belts
Engineer's cap
Three sweaters: one handmade, two machine made
Lab coat
Nylon stockings
Plastic bags and containers
Perma-pressed shirt
TV dinner
Small broken appliance
Toy car
Four Native American headbands
Aluminum cola can
Clear bottle
Flower

Actors and Actresses / Extras:

Speaker 1: Narrator_____
Speaker 2: Monkey_____
Speaker 3: Cave Dweller_____
Speaker 4: Roman_____
Speaker 5: Briton_____
Speaker 6: Settler_____
Speaker 7: Colonist_____
Speaker 8: 1st Industrialist_____
Speaker 9: 1st Scientist_____
Speaker 10: 2nd Industrialist_____
Speaker 11: 2nd Scientist_____
Speaker 12: 3rd Industrialist_____
Speaker 13: 3rd Scientist_____
Speaker 14: 4th Industrialist_____
Speaker 15: 4th Scientist _____
Speaker 16: 5th Industrialist_____
Speaker 17: 1st Native American_____
Speaker 18:2nd Native American_____
Speaker 19: 3rd Native American_____
Speaker 20:4th Native American_____
Speaker 21: 6th Industrialist_____
Speaker 22: 5th Scientist_____
Speaker 23: 7th Industrialist_____

(Any extra students could be Co-Directors or Prop-Engineers)

The original skit has been adapted to involve more students. Some of the wording used in the original skit has also been updated to include common terms we now use.

This skit is written in rhyme and tries to illustrate how trash has changed over the past 90,000 years. The main theme is that one way to solve the solid waste accumulation problem is to recycle.

Each character should hold a sign showing the period of history he/she represents. This will help make it easier for the audience to follow the story line, if you choose to perform in front of an audience.

Any "trash" props should be thrown into the center of the stage. As the skit progresses, the pile of trash grows larger and larger.

The Evolution of Trash

Speaker 1: Narrator:
Sit back and relax, for this story will be
About animals, humans and garbage throughout history.
Now they are all very nice, just like you and me,
Who all have a problem, as you will soon see.
What shall they do with their garbage and trash?

All:
Why, throw it! Or bury it! Or burn it to ash!

Speaker 2: Monkey
(90,000 BC)
(Props: monkey masks, fruit peels)
I represent animals, living up in a tree.
I get rid of my garbage quite easily!
It's organic so I can just lay it around
It just decomposes right into the ground.

Speaker 3: Cave Dweller
50,000 BC
(Props: Skins)
I am a Cave Dweller who lives on the ground.
What do I do with old stuff all around?
Why bury it, like bones, in the muck and the mire.
Or burn it with leftover skins in the fire.

All:
Yes, throw it, or bury it, or burn it to ash!
That's how we *always* get rid of our trash!

Speaker 4: Roman
200 BC
(Props: Roman Helmet, bag of trash)
I am a Roman who lives in the town.
Our laws won't allow me to just throw it down.
I have to drag it away for a mile,
And then I can dump it, forget it, and smile!

Speaker 5: Briton
1200 AD
(Props: Sack of trash)
I am a Briton, wary and quick.
Down on our street it can get pretty thick,
When housewives above want to pitch out their goo,
They just heave it out here and yell "Gardy-loo!"
It will stay in the alleys until the next rain,
Or until our fair London should burn down again.

All:
Oh, what do we do with our garbage and trash:
We throw it, or bury it, or burn it to ash!

Speaker 6: Settler
1630
(Props: Pilgrim hat & quilt)
I'm a New World settler. I came without much,
Oh, a rifle, an axle, a few tools and such.
But everything else I must make with my hands.
So I don't throw out much—I use all I can.
Cloth scraps become quilts; I reuse my bent nails.
It will be a long time 'fore the next trade ship sails.

"**The Evolution of Trash",** *continued*

Speaker 7: Colonist 1700 (Props: coonskin hat, leather harness or belts)	I am a colonist; now life's not so tough. We have trade between cities that brings lots of stuff. And some things are made by our town folk today. I could buy a new harness, throw this old one away. We have pigs and hogs running loose in our street, If I toss it out there, they'll eat it up neat! Or I might bury it right over there. Or I could burn it; no one would care. You see, the New World is the same as the Old! We trash makers come from a time-honored mold**.**
All:	**What do we still do with our garbage and trash?** **Right! Throw it or bury it or burn it to ash!**
Speaker 8: 1st Industrialist 1890 (Props: Engineer's cap, three sweaters: - one handmade and two machine made)	I'm the industrialist and now on the scene, I mass-produce goods with my trusty machine. This sweater, handmade, took a week, even more, But now in one hour, I can make forty-four! I make things so cheaply, you can now afford two, And throw out twice as much as you used to do.
Speaker 9: 1st Scientist 1950 (Props: Lab coat)	I am the scientist in the new post-war age. We've learned a few tricks while the war shortage raged. When we couldn't get natural stuff to process We invented synthetics to replace the rest.
Speaker 10: 2nd Industrialist (Props: Nylon stockings, plastic bags and containers)	Rayons and nylons, acrylics and plastics, For furniture and clothing and even elastics! Discard your old woolens and silks and your cotton; Real wooden toys and washboards are forgotten**.**
Speaker 11: 2nd Scientist (Props: Perma-pressed shirt)	Our new stuff will last till forever, you see Even when it's worn out to you and to me. Permanent pressed, pre-sized and pre-shrunk, When dingy and old, it's still permanent "junk".
All:	**Now what do we do with our garbage or trash?** **We throw it, or bury it, or burn it to ash!**
Speaker 12: 3rd Industrialist (Props: Plastic bag, TV dinner)	We make instant menus that come in a pack. You just boil the food in its own plastic sack. Or heat our TV dinner in its tinfoil tray It's quick; you don't wash it; just throw it away!
Speaker 13: 3rd Scientist (Props: Broken appliance)	We make lots of TVs and clothes dryers, too. Don't ask for a trade-in; you're kidding, aren't you?
Speaker 14: 4th Industrialist (Props: Toy car)	Our new cars all change with each model year, Don't try to repair them, the cost is much too dear. Besides, who wants to drive a broken-down car? It's more fun to drive shiny new ones, by far!

"**The Evolution of Trash",** *continued*

Speaker 15: 4th Scientist
It's the New Think, the NEW that America craves.
So throw out all the old stuff, away to their graves.

Speaker 16: 5th Industrialist
So what if there are more of us buying more goods?
So what if they don't decompose as they should?

Speaker 17:
1st Native American
(Props: Headband)
Now wait just a minute! You cannot fail
To include me in your historic trash tale.
We Natives lived simply, on prairies, in woods,
We made no high trash piles, or mass-produced goods.

Speaker 18:
2nd Native American
(Props: Headband)
Let me be your critic, show you where you stand;
And tell you just how you're defiling our land.
Your new-fangled goods will not rot away.
When you throw them all down they remain where they lay.

Speaker 19:
3rd Native American
(Props: Headband)
Then you say you will bury them deep in the ground:
All your urban trash will make quite a mound!
So then you would burn it, in smoldering masses,
And pollute our air with smoky, harmful gases!

Speaker 20:
4th Native American
(Props: Headband)
Oh, all of your answers have faults everywhere:
You'll ruin the water, the land or the air.
What's more your resources – your minerals, your ore –
Get smaller each year than the year just before.
And what's more – this old Earth's not making any more!

Speaker 21: 6th Industrialist
(Props: Cola cans)
You're right. Our resources are shrinking away,
While our garbage problem grows bigger each day.
We're always converting resources to refuse
Instead of recycling them all for reuse!

(Throw out cola can)

Speaker 22: 5th Scientist
Oh, stop it! Don't drop it! We'll think of a way
To make food for cows that's much better than hay.
Don't burn it, return it– we'll make something new,
A vase for your mother, a spyglass for you.
Don't bury it, carry it – back to the mill.
We'll make a new blanket to ward off the chill.

(Pick up old quilt and wrap around shoulders.)

Speaker 23: 7th Industrialist
It's time to progress past the Disposal Age
Make REUSING and RECYCLING the popular rage!
We'll have to give up old solutions for trash
And all realize that it's pure balderdash – to just

All
Throw it, or bury it, or burn it to ash!

THE END

A Trashy Pizza Bulletin Board

Adapted from Waste in Place, "Garbage Pizza", a "Keep America Beautiful" publication

Standard

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

Activity Description

Students will create a "trashy pizza" bulletin board as they learn about the amount and types of waste generated in the United States over a one-year period.

Materials

For pizza dough: red bulletin board paper and brown paper bags
For Pizza sauce and toppings: glue, stapler, push pins, waste items from following categories – paper, yard waste, wood, metals, glass, food waste, plastics, and other waste (e.g., rubber, leather, textiles, inorganic waste

Length of Lesson

Approximately one hour each on two different days

Vocabulary Words

Municipal Solid Waste (MSW): waste collected from homes, institutions (e.g., school or hospitals), commercial establishments (businesses and restaurants), and some industries, and taken to sanitary landfills. It is also known as garbage, trash, or refuse.

Essential Question

Where do the things I use come from and what happens to them when I am through with them?

Guiding Question

When I am through with the things I use, what happens to them?

Skills Used

Creativity
Organization and Classification

****

Activity

Step 1: On the day before teaching this lesson, prepare the crust for the "trashy" pizza. Use the Municipal Solid Waste by Weight pie chart template (in sidebar) as guide to enlarge on red bulletin board paper for crust. Section off the crust into slices to represent the different percentages of waste products. Label each slice with the percentage and type of waste it represents. Use twisted, torn strips from large brown paper bags around the outside of the circle for a 3-D crust. Hang the "sliced pizza crust on a bulletin board.

A Trashy Pizza Bulletin Board, *continued*

Step 2: Also, on the day before the lesson is to be taught, ask students to define the words "garbage" and "trash". Remind students that another term for garbage and trash is "municipal solid waste".

Step 3: Brainstorm with students to generate a list of waste items thrown away at home or school. Use the following categories: paper, yard waste, metals, glass, plastics, wood, food wastes, and other. Write student responses on a chart or chalkboard. Ask students if the items listed on the board could be found in a community's municipal solid waste.

Step 4: Tell students that they will be taking home a note explaining to their parents that they will need to bring some **clean trash items** (like the ones listed on the chalkboard) to school on the following day. Explain that the items will be used in a class bulletin board project. (Either prepare a copy of the "Note to Parents", or ask students to write the note in "Homework Journals".)

Dear Parents,

Tomorrow we plan to use clean trash that students bring from home and turn it into a "Trashy Pizza Bulletin Board". We will be learning about the amount of solid waste collected each year in the Municipal Solid Waste System in the United States.

Please help your child locate some clean trash items that would fit into the following categories: paper, yard waste, metals, glass, plastics, wood, food wastes, and "other".

Thank you for helping us make this "trash" project a success!

Day 2

Step 1: Ask students to look at the "pizza graph" hanging on the bulletin board. Explain to students that they will be pretending that all the waste thrown away in the United States through the municipal solid waste network will fit into the pizza circle. Explain that the pizza has already been "sliced" to represent the different categories of trash that were listed on the previous day in class. Reinforce the fact that the biggest slice, marked "paper" means that more paper is discarded through MSW than any other trash item. Ask students why it is important to know the amount and kinds of waste thrown away. Explain that by knowing this information, communities can plan reusing and recycling programs (yard waste composting, telephone book recycling, school and business recycling programs) to help reduce the amount of waste thrown away, while planning better waste handling options.

Step 2: Explain that the class is going to make a "Trashy Pizza" bulletin board, using the clean trash that students brought to school. Separate the clean trash into the appropriate categories. Ask students to work cooperatively and form relay lines to pass the different trash items over to the bulletin board so they can be tacked or stapled onto the appropriate pizza slices.

Step 3: Once the trashy pizza bulletin board is completed, make student copies of the "Trashy Pizza Solid Waste Math" sheet located at the end of this lesson. Instruct students to answer the questions by using the municipal solid waste graph generated by the Environmental Protection Agency for the year 1998.

A Trashy Pizza Bulletin Board, *continued*

Step 4: Check student work by referring to the following answers:

1. Paper and Cardboard; Yard Trimmings; Plastics; Food Scraps; Metal; Rubber, Leather and Textiles; Glass; Wood; and Other)
2. 220.2 million tons
3. 135.8 million tons
4. 50.65 million tons
5. 33.75 million tons

Step 5: Encourage students to think of ways to inform other students and the community about the importance of reusing and recycling solid waste. Encourage them to include the message that by reusing and reducing solid waste the sanitary landfills would end up with significantly smaller amount of solid waste to have to manage.

Assessment

Instruct students to write a "Letter to the Editor" of a local newspaper persuading members of the community to reduce the amount of solid waste sent to landfills by recycling and reusing waste items in homes and businesses. Remind students to include facts to support the need for reducing waste.

Extensions

- If a bulletin board is available in a prominent place in your school, you may wish to duplicate this activity on that bulletin board so the information can be shared with the entire school population.
- Plan a classroom recycling project to reduce the amount of waste thrown away each day. If there is not a school wide recycling program in place, investigate starting one.
- Research steps involved in building a compost bin by looking in books or visiting an Internet search tool such as "Google.com/". Send information home by students and encourage them to begin a composting project at home. Investigate starting a composting project at school if there is not one in place.
- Visit the following web site to view art created by 4^{th} and 5^{th} grade students reusing trash: http://www.northcoast.com/~fishhelp/gallery_f/sunset/jones/index.html.

Trashy Pizza Solid Waste Math

Name_____ Date_____

The graph shown on this page depicts an estimate of the amount of solid waste taken to landfills in the United States in 1998. Use the Municipal Solid Waste Composition graph to answer the questions in your math journal, or on another sheet of paper.

1. Order the types of solid waste that entered the municipal solid waste stream in the United States in 1998 from largest to smallest.

2. Add the total tonnage of solid waste represented on the graph to calculate the total amount of solid waste that entered the municipal solid waste stream in the United States in 1998.

3. If all the paper and cardboard, glass, plastic, and metals had been recycled, how many tons of solid waste could have been kept from entering the municipal solid waste stream in the United States in 1998?

4. If all of the yard trimmings and half of the food scraps had been composted, how many tons of solid waste could have been kept from entering the municipal solid waste stream in the United States in 1998?

5. If there had been 100 percent participation in recycling and composting programs in the United States in 1998, how many tons of solid waste would have been taken to landfills? How much less is this amount than the amount calculated in problem number 2?

Follow the Solid Waste Trail

Adapted from "Bio-Bottles", from Waste a Hidden Resource in Kentucky

Standards

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

Practical Living PL-E-3.1.5, Environmental issues (e.g., pollution) should be considered when making consumer decisions (e.g., recycling, reducing, reusing)

Activity Description

Students will investigate and learn about the importance of purchasing reusable and recyclable products by building a compost and landfill model.

Materials

Trash left over from "Trashy Pizza" lesson, if still available
Tape and permanent markers
Scissors or utility knife to cut plastic bottles
Soil
Device for making holes in plastic bottle (hole puncher)
Two clean 2-liter plastic bottles per student
Copies of "Bio-Bottles" for each student

Length of Lesson

Two class periods (30-60 minutes) plus 2 or 3 months to observe

Vocabulary Words

Sanitary Landfill: a site where solid waste is managed in order to prevent or minimize health, safety and environmental impacts.
Composting: the controlled biological decomposition of organic material under aerobic (with oxygen as in a composting bin) or anaerobic (without oxygen as in a landfill) conditions.
Biodegradable: a term describing an **organic** substance or material (e.g., paper, grass clippings, food scraps) that can decompose into basic components by bacteria or sunlight.
Non-biodegradable: an **inorganic** substance or material that cannot decompose.

Essential Question

Where do the things I use come from and what happens to them when I am through with them?

Guiding Question

When I am through with the things I use, what happens to them?

Skills Used

Reading and Following Directions
Conducting a Scientific Investigation
Organizing Data and Reporting Results

****

Follow the Solid Waste Trail, *continued*

Activity

Step 1: Explain to students that nothing is wasted in nature, because all natural waste is biodegradable, which means it can decompose so it can be fed back into the system. (For more background information, refer to **Teacher Fact Sheets**, "composting" section, located at the front of this publication.) Explain to students that if we (humans) would copy what takes place in the natural environment, then the amount of waste sent to landfills could be drastically reduced. We would also produce a valuable resource that could be used in flowerbeds and yards (composted material).

Step 2: Explain to students that during this lesson they will investigate the decomposition of biodegradable and non-biodegradable materials in a composting bin as compared to a landfill. Write biodegradable and non-biodegradable on a chalkboard or chart. Explain the definitions of each. Ask students to think of examples of materials or products for each category. Encourage students to think of items in several categories, such as food items, yard waste, plastic, glass, rubber products, clothing, etc. List the examples.

Step 3: Ask students to select and gather several items from each category that they have available at home. Ask students to bring the items to school the following day. Either prepare a note to be sent home, or have students write the note in "Homework Journals". *If you would prefer, use items left from "Trashy Pizza" lesson.*

Step 4: Divide students into teams of four students each. Give each team copies of the student page "Bio-Bottles" (included at end of this lesson), and the materials to make four bottles per team. Ask teams to complete the instructions for the two Bio-Bottle models. (Since it takes two 2-liter bottles to make one Bio-Bottle, each team will end up with two compost bottles and two landfill bottles.) Remind students to label each model as "Compost" or "Landfill", using permanent markers.

Step 5: Ask each team to predict the outcome of the investigation. For example: What can we expect to see happening inside the different models? Will biodegradables decompose? How long will it take? Will all compost models decompose at the same rate? Why or why not? What factors are different in

Step 5, (continued):the bottles? (number of air holes and microorganisms, which need air and moisture to live)

Step 6: Ask each team to prepare a chart for recording observations: changes in composition, color, size of mass, etc., each week for a period of time (e.g., two or three months). Help teams develop a format if they have trouble completing this step.

Step 7: At the end of this investigation (Use teacher discretion on when to end.) have each team compare results between their Bio-Bottles, then between Bio-Bottles from other teams. Ask students to observe the sealed landfill bottles. What conclusions can they draw about the practice of burying biodegradables in a sealed, sanitary landfill? As consumers, what should you do with your waste products? **(REDUCE, REUSE, RECYCLE! AND RESPOND TO SOLID WASTE DISPOSAL IN A POSITIVE MANNER)**

Assessment

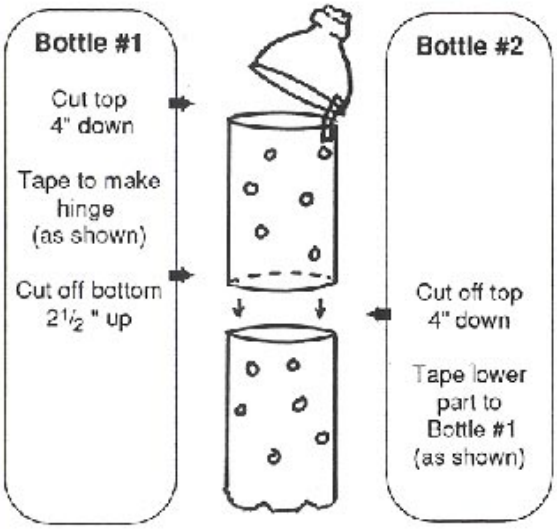
Give each team the opportunity to assess themselves, as a team, by completing a group paper describing what they learned from conducting this investigation, and how their consumer habits have changed.

Extensions

- Present "Luscious Layered Landfill" activity from primary "Solid Waste Survivor" unit for a tasty "visual" landfill lesson.
- Make posters or infomercials to share with school and community about the importance of buying reusable and recyclable products so landfills will not fill up so quickly.
- Have students investigate landfill information and issues on the WebQuest Internet Site: http://www.lalc.k12.ca.us/uclasp/ISSUES/landfills/solid1.html

Bio-Bottles

BOTTLE A



1. Make air holes in Bottle A. Ask teacher for hole-maker and assistance.

2. Alternate layers of ½ inch **loose** soil and 3 inches of **small pieces** of biodegradable material and nonbiodegradable material. Make loose soil the first and last layers.

3. Once a week,
   - measure ¼ cup water and sprinkle (like rain!) over the contents of bottle.
   - Gently stir contents.

Simulated Compost

Loose soil (containing micro-organisms)

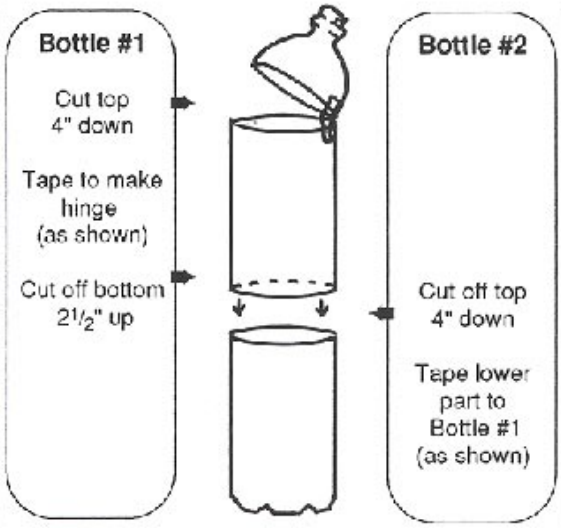
Biodegradable material

Nonbio-degradable material

Air

Moisture

BOTTLE B



1. Alternate layers of ½ inch **well-packed** soil and 3 inches of **small pieces** of **well-packed** biodegradable material and nonbio-degradable material. Make **packed** soil the first and last layers.

2. Place bottle in coolest part of the room.

3. Once a week,
   - measure ¼ cup water and sprinkle (like rain!) over the contents of bottle.
   - **Do not disturb contents.**

Simulated Sanitary Landfill

Well-packed soil

Well-packed biodegrad-able material

Well-packed nonbiodegrad-able material

Moisture

Bio-Bottles Biodegradable Versus Nonbiodegradable

Objectives:
Students will do the following:

1. Investigate differences in decomposition between biodegradables and nonbiodegradables.

2. Prepare a chart to record observations.

3. Draw conclusions about disposal of biodegradable materials and products.

Subjects:
Social Studies and Science

Time:
2 class periods, plus 2 or 3 months of observation

Materials:
Cellophane tape, scissors, markers, soil, device for making holes in plastic bottle (warm ice pick, hole puncher, knife blade, or other device); each student brings two clean 2-liter plastic bottles and one item per instructions in Section A; student page (included)

Vocabulary:

biodegradable *a term describing a substance or material that can be broken down into simpler compounds by microorganisms*

nonbiodegradable *not capable of being broken down by microorganisms*

Background

In nature, there is no waste. Everything is fed back into the system. Unlike nature, we try to dispose of as much solid waste as possible, including biodegradables. But if we would try to imitate nature by feeding biodegradables back into the system, we would not only reduce the amount of waste hauled to the landfill, but we would also gain a valuable resource!

Procedure

Help students investigate the decomposition of biodegradable materials and nonbiodegradable materials.

A. As a class, write a definition for ***biodegradable*** and ***nonbiodegradable***.

1. Have the class list examples of materials or products for each category. Encourage students to list items in several categories, such as food items, yard waste, and manufactured products, etc.

2. Ask students to select and gather several readily-available items from each category. (Suggestions: carrots, leaves or grass, newspaper)

B. Make Bio-Bottles for investigating differences in decomposition for biodegradables and nonbiodegradables.

1. Divide the class into teams of four students each. Give each team a copy of the student page "Bio-Bottles" (included) and the materials to make two bottles. Ask them to complete the instructions for the two comparisons.

2. Ask each team to predict the outcome of the investigation, for example: *How long will it take for the biodegradables to decompose? Will they all take the same length of time? Will the size of an item affect the rate of decomposition? Why? How?*

3. *Will biodegradables in bottles #1 and #3 decompose the same? Why or why not? What factors are different in the two bottles? (air and microorganisms, which need air and moisture to live)*

C. Have each team prepare a chart for recording observations: changes in composition, color, size of mass, etc., each week for a period of time (e.g., two or three months).

1. At the end of the period of investigation, have each team compare results between their own two bottles.

2. Have all teams compare their Bottles A. Compare Bottles B. *Were results consistent? If not, what might account for the differences?*

3. *If the sealed containers simulate sealed landfills, what conclusion can you draw about the practice of burying biodegradables in a sealed, sanitary landfill?*

4. *How would you design the investigation differently?*

5. *What else could you investigate about biodegradables and nonbiodegradables? How would you reconfigure the bottles to investigate other differences between biodegradables and nonbiodegradables?*

6. Prepare an educational display and share with other classes.

Preferable Picnic Planning

Standards

Social Studies: SS-E-3.1.3, Every time a choice is made, an opportunity cost is incurred. **Opportunity cost** refers to what is given up when an economic choice is made.

Practical Living PL-E-3.1.5, Environmental issues (e.g., pollution) should be considered when making consumer decisions (e.g., recycling, reducing, reusing)

Activity Description

Students will plan an ecological picnic. They will evaluate the products that will be used at the picnic and plan for the least amount of solid waste disposal.

Materials

Lunch
Durable or reusable plates, silverware, cups, napkins, etc.
Garbage can and a container for recyclable items
Food waste container, if your school composts large scale

Length of Lesson

30 minutes first day and one hour second day

Vocabulary Words

Source Reduction: the reuse of products or materials in order to reduce the amount of municipal solid waste.
Durable: products that can be used more than once and can withstand long use, wear, and decay.
Disposable: products that can be or are usually thrown away after one use or a limited amount of time (e.g., paper plates and cups).

Essential Question

How do I evaluate the choices I make as a consumer in order to reduce the amount of solid waste I produce?

Guiding Question

How can I identify and apply criteria to making my decisions?
(e.g., cost, media and peer pressure, convenience, environmental impact, health and safety)

Skills Used

Communication and Problem Solving
Observation and Classification

****

Activity

Step 1: Prior to the day of this lesson, select a picnic location, preferably outside, with an inside area as a back-up plan in case of bad weather. Locate and label three containers for recyclable items, garbage and food scraps (that can be composted). Check with the cafeteria manager to see if a bag lunch can be provided for students who forget or are unable to bring lunches from home. Prepare note to parents about the picnic.

Preferable Picnic Planning, *continued*

Step 2: Explain to students that they are going to help plan a picnic so they can learn how to create less garbage, recycle more, and compost their leftover food items. Introduce the concepts of durable, disposable and source reduction to the class. (Refer to Teacher Fact Sheets, under "Source Reduction" for background information.)

Step 3: Ask students to help compile a list of items that people usually bring to a picnic (e.g., paper plates, plastic utensils, paper napkins, chips, canned or bottled drinks, etc.). Write the items on the chalkboard. Once the list is completed, go back over each item and try to substitute a different item to use in place of the disposable items. Examples might include cloth napkins for paper napkins and silverware for plastic utensils. Also, talk about the importance of buying in bulk, since this will decrease the amount of packaging to throw away at the end of the picnic. For example, large bags of chips are preferable to small individual bags and large jars of juice are preferable to individual juice boxes.

Step 4: Send a note home to parents explaining the picnic. Tell parents that students are trying to keep waste to a minimum so the lunch items need to be placed in reusable containers or contain only a small amount of extra packaging, if possible. Parents could be invited to help as volunteers, or to just enjoy a school lunch with their children. (Refer to sample note on this page.) Encourage students to explain to parents what they have learned about source reduction when they take the picnic note home.

PICNIC / PICNIC / PICNIC / PICNIC / PICNIC

Dear Parents,

We are planning an "environmentally friendly" picnic. The picnic will be taking place this Wednesday at 11:30 A.M. We have an outside spot picked out for our picnic if the weather is nice, and an inside spot located if the weather does not cooperate.

As we continue to learn about ways to be solid waste survivors at school, we are developing strategies to use to help us reduce the amount of solid waste we put in trashcans. Your child will be using some of these strategies as he or she helps pack the lunch to bring to school for this picnic.

Please encourage your child to find reusable containers to pack lunch items in so we do not have a significant amount of garbage at the end of our picnic.

We would like to invite you to join us for our picnic, if you are free on the day we have the picnic scheduled. If you can picnic with us, please send a return note to let us know to expect you. It will work nicely if you can plan to meet us by the office at 11:30 A.M. after you sign in and obtain a visitors' badge.

We hope many of you will be able to attend the picnic. It should be lots of fun!

Sincerely,

Day 2

Step 1: On the day of the picnic, draw a table on the chalkboard, or a piece of chart paper, similar to the one on the following page. Tell students that at the end of the picnic, they will be weighing any trash, food scraps, or recyclable items that are thrown away. (Show the students the three containers that will be used for any solid waste items.)

Step 2: Ask students to predict how many pounds of solid waste they think will be left over in each of the containers at the end of the picnic. Record the guesses of each student in the FIRST row.

Step 3: Weigh each of the containers and record that weight in the THIRD row of the table.

Step 4: Go to the picnic site and have fun! Take the three containers along so students will be able to separate any solid waste items left over at the end of the meal.

Preferable Picnic Planning, *continued*

Step 5: As students (and parents) finish eating, instruct them to separate any solid waste items that need to be disposed of into the appropriate containers. Have students look at the garbage and discuss ways the amount could have been reduced.

Step 6: Return to the classroom with the students and the three containers of solid waste items to be recycled, disposed of or composted. Weigh the three containers and write the amount in row TWO on the table. Subtract the amount in row THREE (the empty containers) from the amount in row TWO (the containers holding solid waste) to calculate the weight of each of the three types of solid waste. Record the total weight in row FOUR. Discuss how close the predictions were to the real totals. Ask students to think about, and discuss, what would happen if the whole school, or even everybody in America, practiced source reduction as they did for the picnic!

Assessment

Journal

Tell students to think about a disposable item they or their family use regularly. Are there other things that could be used that would create less waste? Would they, or their family, be willing to switch products or change their lifestyles to produce less waste and have less impact on the environment?

Ask students to reflect on why people use disposable items even if they know they make more garbage.

Extensions

1. Collect and weigh leftover lunch garbage on an unannounced day, using the same method as in this lesson. Compare and discuss results.
2. Make fun lunch bags out of old jeans or shorts. Cut off the legs, sew the bottom of the bag just under the pockets, and tie thick ribbon onto the belt loops for handles. Decorate the bag with fabric paint and a variety of other craft items.

Environmentally Friendly Picnic Trash Table

	Recyclables	Food Scraps	Trash	Total
GUESSES				
Actual Weight (with container)				
Subtract Weight of Empty Container				
Total of Each				

Inspecting Products

Standards

Social Studies: SS-E-3.4.1, Producers create goods and services; consumers make economic choices about which ones to purchase.

Practical Living: PL-E-3.1.2, Products and services are compared and evaluated based on price, quality, and features.

Activity Description

Students will learn about common marketing techniques and how companies use those techniques to try to persuade consumers to purchase their products. They will also evaluate advertisements, and compare and evaluate similar products.

Materials

Copies of "Product Inspection Guide" for students
Transparency of "Product Inspection Guide" for teacher
Samples of popular product advertisements from magazines
Overhead projector and markers
Class set of "Common Marketing Techniques" at end of this lesson
Two similar products made by different companies

Length of Lesson

Approximately one hour on three different days

Vocabulary Words

Environmentally Preferred Product: an item that has a reduced negative effect on human health and the environment when compared to other products that serve the same purpose. (E.g., products that contain recycled content require less energy or create less waste)
Packaging: a cover, wrapper, container, or "stuffing" in a package designed to store, transport, display, and protect a product and/or attract consumers so they will purchase the item.
Marketing Techniques: techniques used to inform, influence, or persuade consumers to purchase products or services.
Consumer Demand: the persuasive power the buyer has over the manufacturers by choosing to buy certain products more then others.
Durable: products that can be used more than once and can withstand long use, wear and decay.

Essential Question

What process should I use to evaluate the choices I make as a consumer in order to reduce the amount of solid waste I produce?

Guiding Question

How can I identify and apply criteria to making my decisions? (E.g., cost, media and peer pressure, convenience, environmental impact, health and safety.)

Skills Used

Communication and Problem Solving
Writing
Observing, Comparing and Classifying

****

Inspecting Products, *continued*

Activity

Step 1: Explain to students the difference between a producer (one who makes products) and a consumer (one who buys, or uses, the products). Tell students that this lesson is going to focus on teaching each of them how to become wiser consumers so they can make better-informed choices that will help them protect the environment.

Step 2: Explain to students that manufacturers sometimes use special "gimmicks", or strategies, to try to persuade consumers to purchase their products. Ask students if they know of any special techniques used in advertisements or television commercials. Distribute copies of "Common Marketing Techniques" to all students. Read one strategy at a time, then discuss the technique. Show students several advertisements from magazines. Instruct students to match the advertisements with the appropriate marketing technique used.

Step 3: Call on students to give examples of well-known products, whose companies use the different marketing techniques in advertisements for the product. Encourage students to think about each technique carefully, and try to analyze why they think companies pay advertising firms to create and develop the different types of advertisements. Help students understand that consumer demand is what drives companies to "stretch the truth" many times.

Step 4: Continue with this activity until all students have had an opportunity to actively participate. Keep reminding students that they must learn to distinguish fact from fiction when shopping, or when watching or reading advertisements about popular products. Ask students if they can offer any advice on what they might be able to do to become wiser consumers, now they have been introduced to the common marketing techniques used by companies. (Answers should include to do more research, ask people who own the product, check out product rating reports, etc.) Encourage students to take home the copy of "Common Marketing Techniques" to share with parents. Instruct students to watch television commercials at home with other family members and observe closely to try to find any of the specific techniques being used. Ask students to make brief notes beside each technique they see used so they will remember the product's name to share with the class on the following day.

Day 2

Step 1: Briefly review the activity from the previous day. Encourage students to share any advertisements they watched on television at home the night before with classmates.

Step 2: Ask students if they have ever bought a product after seeing an advertisement or commercial, then been disappointed because the product was not what they expected it to be. Tell students that, in order to be wise consumers, they need to examine products closely, and establish certain criteria, or guidelines, to help them purchase more dependable, better products. Show students a copy of the "Product Inspection Guide" that is found at the end of this lesson. Explain how this guide could help consumers focus on specific aspects of different products when making comparisons. (Make a transparency of the "Product Inspection Guide" and use it on an overhead projector. This will help students see the form clearly as two products are being compared in Step 4.)

Step 3: Show students two of the same type of items, made by different companies. (E.g., shoes, toy cars, hardback books, dishtowels, or clothing). With help from students, examine the two items closely. Complete the "Product Inspection Guide" on the overhead projector as the comparison is being made.

Step 4: Tell students they will have a chance to be "Product Detectives". Explain that they will each receive a copy of the "Product Inspection Guide" to take home with them. They will ask parents to take them to a store so they can choose two similar products made by two different companies to compare. Assign a reasonable date for the assignment to be parents to take them to a store so they can choose two similar products made by two different companies to compare. Assign a reasonable date for the assignment to be returned to school. (Remember to be sensitive to any students who are unable to visit a store to complete this assignment. Provide some products for them to investigate at school. Be available to help if needed.)

Inpecting Products, *continued*

Day 3

Step 1: Once homework assignments are completed and returned, ask students to report on their findings.

Step 2: Encourage students to remember to always be wise consumers, and think about buying products made from recycled materials, products that can be reused or recycled, and products that will last a long time.

Extensions

1. Bring in a variety of magazines and catalogues that contain advertisements for students to analyze. Can they find different advertising techniques being used several times in different ads?
2. Ask students to watch television commercials and list different techniques used to try to "hook" the consumer into buying a certain product.
3. Remind students that they can prevent their belongings from entering the waste stream so quickly by taking care of them and buying durable products.
4. Make copies of Consumer Reports and Zillions available for students to read.

Assessment

Ask students to write a "How to Be a Wise Consumer" article, describing steps they will use in the future when preparing to purchase a product.

Remind students to think about the common marketing techniques and the criteria listed on the "Product Investigation Guide", that they used during the lesson, "Investigating Products". (This might help them remember some of the things they looked for when comparing the two different products.)

Encourage students to include environmental criteria, as well, to remember when shopping for products.

Common Marketing Techniques

- **Bandwagon Appeal**: Advertisers use this appeal to convince people that everyone is using their product and that he or she should too. These ads say, "jump on the bandwagon and have a good time."
- **Brand Loyalty Appeal**: Advertisers use this appeal to convince consumers that their brand is better than the rest.
- **False Image Appeal**: Advertisers use false or misleading information (models or professional athletes) to convince a person that he or she will have a specific image if they buy a specific product or service.
- **Glittering Generality**: Advertisers include a general statement that is exaggerated appeal. Mostly the ads are designed to appeal to people with specific concerns. (E.g., "clears up all acne")
- **Humor Appeal**: This appeal uses a catchy slogan, jingle, or cartoon.
- **Progress Appeal**: Advertisers use this appeal when they introduce a product that is new and improved. It implies that their product is one step ahead of the rest.
- **Reward Appeal**: This type of advertising appeal offers a special prize, gift, or coupon when a specific product or service is purchased.
- **Scientific Evidence**: This type of advertisement includes the results of surveys, or laboratory tests. The advertisement is designed to make people feel that they are making the right choice.
- **Sex Appeal**: Advertisers use this appeal to convince the consumer that people will find him or her irresistible if he or she uses their specific product.
- **Testimonial Appeal**: Advertisers focus on a famous person who gives a statement about a specific product or service.

Product Inspection Guide

Name:_____ Date_____

Name of Product #1:_____ Manufactured by:_____

Name of Product #2:_____ Manufactured by:_____

Cost and What I Get **Product #1**	What I Like About It	What I Don't Like About It	What Resources Were Used? (Virgin or Recycled Materials)
Product #2			

Will it Last a Long Time **Product #1**	Can it be reused? How? (Or will it become Waste?)	Rate the Packaging	Is It Environmentally Friendly? Was Excessive Packaging Used?
Product #2			

Directions to Student: Take this form to a store and use it to compare two similar products manufactured by two different companies. Remember to be a good Environmental Detective and inspect the products very closely. Remember to read all labeling very carefully, including the very small print. Use the back of this paper if you need more room. Return your completed inspection guide to school by _____.
(Date)

Making Wise Buys

Adapted from "Let's Go Eco-Shopping!" from Quest for Less, an EPA Publication

Standard

Social Studies: SS-E-3.4.1, Producers create goods and services; consumers make economic choices about which ones to purchase.

Practical Living: PL-E-3.1.2, Products and services are compared and evaluated based on price, quality, and features.

Activity Description

Students will research and evaluate school supplies and determine which products are the most ecologically friendly.

Materials

Copies of "Product Inspection Guide" for students
Transparency of "Product Inspection Guide" for teacher
Overhead projector and markers
Five home products with environmental claims on packaging
Five or six packaged school products from book store with environmental claims

Length of Lesson

Approximately one to two hours

Vocabulary Words

Environmentally Preferrable Products: products that have a reduced effect on human health and the environment when compared to other products that serve the same purpose. For example, products that contain recycled content, use less packaging, are reusable or recyclable, and require less energy or create less waste during production and manufacture are preferable.
Post-consumer Recycled Content: materials recovered through recycling programs, that are used to make new products.

Essential Question

Where do the things I use come from and what happens to them when I am through with them?

Guiding Questions

How do my decisions as a consumer have consequences for other organisms, including humans, in our environment?

Skills Used

Problem solving
Communication
Research
Observing and classification

****

Activity

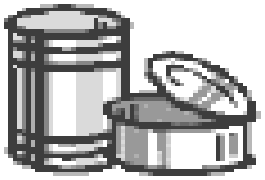
Step 1: Set out the five products brought in from home with environmental claims on the labeling. List their claims on the chalkboard and discuss with students. (Refer to **Teacher Fact Sheets** titled **Recycling** at the front of this publication for more information.)

Laundry Detergent Environmental Attribute Claims

- 100% post-consumer recycled paperboard used in box
- 100% post-consumer recycled plastic used in scoop

Making Wise Buys, *continued*

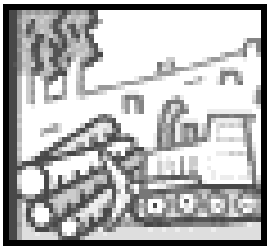
Step 2: Discuss practices used in product manufacturing industries with students after reading background information in "Products" section of **Teacher Fact Sheets**. Discuss how important it is for manufacturers to change their practices. For example, McDonald's reduced its napkin size by one inch in 1999. This prevented 12 million pounds of paper from being thrown away. Since 1977, the soft drink industry has reduced the weight of the 2-liter plastic bottles from 68 to 51 grams each. That has kept 250 million pounds of plastic per year out of the municipal solid waste stream. (Source, EPA, 1996, 1999)



Step 3: Divide students into groups of four or five. Explain that they are going to be checking different school supplies for environmental claims (e.g., binders with recovered-content plastic coating, pencils with recovered-content wood, spiral notebooks with post-consumer content}. Give each group a copy of the Product Inspection worksheet. Ask students to fill a sheet out on each product, then compare their research findings after all products have been investigated. Ask each group to pick one brand that they think represents the most environmentally preferred product.

Step 4: When all groups have prepared their report, ask each group to take turns making class presentations. Group members should all be prepared to defend the product the team has selected by telling specifically what it is about the product that makes it environmentally preferable. During each presentation, offer time for group discussion and feedback from other students.

Check out this Recycled-Content Product Database:
http://www.greenbiz.com/frame/1.cfm?targetsite=http://www.ciwmb.ca.gov/RCP



The Ultimate Enviro-Product Design

A Culminating Performance Task

Standards

- **Practical Living: PL-E-3.1.2**
- **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-3.1.1**
- **Social Studies: SS-E-3.1.3**
- **Social Studies: SS-E-3.4.1**

Activity Description

Students will design and mass-produce an environmentally preferable product made from reusable solid waste. The product will be evaluated based on its durability, the use of recycled materials, its usefulness and if it is environmentally friendly. (Teachers may wish to do this in small groups).

Materials

A note to parents explaining the project
A collection of containers and "junk" that could be reused

Length of Lesson

About one hour on two different days

Essential Questions

- **How do my family and I depend on the resources in our community and our world?**
- **How do my choices about what I buy and use affect the environment?**
- **What process should I use to evaluate the choices I make as a consumer in order to reduce the amount of solid waste I produce?**

Guiding Question

- What natural resources are needed to make the things I use, and are those resources renewable or nonrenewable?
- When I am through with the things I use, what happens to them?
- As a consumer, what can I do to help the environment?
- What is an environmental cost?
- What is the difference between wants and needs?
- How can I identify and apply criteria to making my decisions? (E.g., cost, media and peer pressure, convenience, environmental impact, health and safety)

Skills Used

Creativity and Problem Solving
Writing and Communication

****

Activity

Step 1: Although this activity is the culminating performance task for this unit, students need to be told about it **at least** one week in advance, and maybe even earlier. They will need time to think of a product to make to sell at the Enviro-Market, and time to save materials to reuse.

The Ultimate Enviro-Product Design, *continued*

NOTE: It is recommended that the written explanation of the design of the Enviro-Product be done in class, with the manufacturing process taking place at home. It is fine for students to discuss product ideas with family members, because this is a way to get more people to think and talk about source reduction, and the reuse of solid waste items, instead of throwing them away.

Step 2: Review the concepts covered in this unit by asking students to take out their learning journals and jot down five to ten ideas that stand out most in their minds from the "Solid Waste Survivor" unit of study. Give students about five minutes to complete this initial activity, then call on students to share their ideas. Write the ideas on the chalkboard or chart paper as students share them.

Step 3: If not covered in Step 2, remind students that solid waste becomes trash once we throw it away, and it enters the municipal solid waste stream, and has to be disposed of in a sanitary landfill. Emphasize that many of the items that end up in landfills each day could be reused or recycled. Tell students that they will have an opportunity to reuse solid waste items to make an ultimate environmentally friendly product to sell to classmates at the class Enviro-Market.

Step 4: Explain to students that each enviro-product made to sell at the Enviro-Market will be priced according to how environmentally friendly the product is. Classmates will then have an opportunity to buy each other's products with the Enviro-Bucks earned during this "Solid Waste Survivor" unit.
Explain that each student will receive a set of guidelines to use when designing the ultimate enviro-friendly product. Tell students that it is very important that they follow the design specifications because their final grade will depend on how well they follow the guidelines. Tell students that their product might cost too much for other students to buy if it is not made from recycled materials, or is not environmentally friendly.

Step 5: Tell students that they will be taking a note home explaining the ultimate enviro-product activity to their parents. Explain that the note will also give parents information about how they can help by beginning to save items that might be useful when making the product. Tell students that there are even some web sites listed in the note that they may wish to visit, because there are some great ways to reuse solid waste items listed at the sites. (Personally check these web sites to make sure they are still active before including them in the letter at the end of this unit.)

Step 6: Send home a parent note and rubric sheet that is found at the end of this activity. Encourage students to begin thinking about their product, rather than waiting until right before it is due back at school, since they will have to mass-produce the product.

Product Design Day – One Week Later

Step 1: Ask students to take out their writing journals and a pencil. Explain that they have had at least one week to think about a design for their ultimate environmentally friendly product. Instruct students to draw a picture of the product they plan to manufacture and sell at the Enviro-Market. Instruct students to include a detailed list of the materials used to make their product, how the product is to be used, if it is durable, and if they will be able to make a class set of the product. (Refer to the design rubric at the bottom of the parent note, located at the end of this activity.

Step 2: Assign a date for the class set of the ultimate enviro-products to be brought to school. This deadline should be set a day or two before the Enviro-Market date so there is time to evaluate and price each product.

Step 3: Assessment for this activity will take place when the enviro-products are brought to school.

Dear Parents,

We are about to prepare for the final activity of our "Solid Waste Survivor" unit of study. You can help your son or daughter at home by saving containers, scraps of ribbon or yarn, Popsicle sticks, cardboard, or any other type of solid waste items that might be reused to create an environmentally friendly product. The product needs to be something that can be mass-produced so it can be sold to classmates in our "Enviro-Market" on _____. I hope that by sending this note home at this early date, you will have enough time to save a variety of containers and other items that will be helpful.

Your child will be asked to write a description of what the environmentally friendly product is, the materials used to make the product and why it is good for the environment in class on _____ _____. I have included a design rubric with this letter, so your child will know specifically how his or her product will be graded.

There are some Internet web sites listed below that you may wish to visit with your child to search for ideas of environmentally friendly products to make from recycled materials. Craft magazines or books may also have some useful ideas.

- http://familycrafts.about.com/library/trcrafts/blmilktrt.htm?once=true&
- http://www.thefrugallife.com/milk1.htm
- http://www.geocities.com/Athens/Forum/8424/20uses/index.html

I hope you and your child have fun thinking about ideas for the ultimate enviro-product made from recycled materials.

Once again, thank you so much for the home support needed to make our school projects such a success!

Sincerely,

Design Rubric for Intermediate Unit Culminating Project
"Designing the Ultimate Enviro-Friendly Product"

1. The product has been made completely from recycled items.
2. The product will benefit instead of harming the environment. (Student must be able to explain the benefits in writing as part of the design plan.)
3. The product is durable and will last for a long time.
4. The product will be used by others instead of becoming municipal solid waste.
5. The product can be mass-produced in order to have enough for each of my classmates.

Marketing Enviro-Products

Standard

Practical Living: PL-E-3.1.2, Products and services are compared and evaluated based on price, quality, and features.
Social Studies: SS-E-3.4.1, Producers create goods and services, consumers make economic choices about which ones to purchase.

Activity Description

Students will prepare their ultimate enviro-products to sell at the Enviro-Market by creating advertisement slogans, commercials, jingles and posters

Materials

A variety of colors and sizes of paper
Pencils, markers or poster-paint
Magazines and newspapers to use for advertisement ideas
Tape player and cassettes for recording songs, if needed

Length of Lesson

About two hours

Vocabulary Words

Marketing Techniques: techniques used to inform, influence, or persuade consumers to purchase products or services.

Essential Question

What process should I use to evaluate the choices I make as a consumer in order to reduce the amount of solid waste I produce?

Guiding Question

How do I make the best choices about what to buy?

Skills Used

Creative Writing
Artistic Design

****

Activity

NOTE: This activity should be presented after "Inspecting Products" and "The Ultimate Enviro-Product" lessons. This activity will reinforce the advertising strategies that were introduced in earlier activities.

Step 1: Once students have developed the design for their "Enviro-Product" and are nearing the end of production, explain that it is time to prepare to market the product. Tell students that during this activity, they will use the marketing techniques they were introduced to in the "Inspecting Products" lesson. Review the different techniques with students. (For definitions of the marketing techniques, refer to the "Inspecting Products" activity in this unit.)

Common Marketing Techniques

- **Bandwagon Appeal**
- **Brand Loyalty Appeal**
- **False Image Appeal**
- **Glittering Generality**
- **Humor Appeal**
- **Progress Appeal**
- **Reward Appeal**
- **Scientific Evidence**
- **Sex Appeal**
- **Testimonial Appeal**

Marketing Enviro-Products, *continued*

Step 2: Remind students of the different products and advertisements they analyzed earlier in this unit, if those activities were taught. Ask students to jot down some ideas they think would be strong selling points for the product they have designed to sell at the class Enviro-Market. Explain that one of the best "hooks" that will attract consumers is a catchy name for their product. Encourage students to try to think of several names so they have a variety from which to choose the final name. Also, encourage students to stress the environmentally friendly attributes of their product. Remind students to include the concepts of **REDUCE, REUSE and RECYCLE** in their advertisement and marketing strategies, if possible. (Have newspapers and magazines available for students to use as resources for advertisement ideas, if needed.)

Step 3: Tell students that they will not have the advantages of advertising their Enviro-Product on television, radio or in magazines. They will be able to create posters, banners, handouts, slogans, jingles, or any other strategy they can think of to help get other students interested in purchasing their product at the Enviro-Market.

Step 4: Give students an opportunity to peer conference and share some of their advertising ideas with each other, once the pre-planning stage is completed. Encourage students to offer positive feedback on the strong points of the advertising ideas, as well as suggestions of ways to make the advertisements more powerful selling tools.

Step 5: Have a variety of art supplies available for students to use, once they decide on some advertising designs. Also, encourage students to try to develop some jingles to go with their enviro-products by reminding students of some of the more popular products that are easily identifiable because of the songs. Have tape players and blank cassettes available for students to record their advertising jingles, if needed. Give students in-class time to create their advertising materials, if possible.

Step 6: If there are any available display cases in your school building, or counter space in your classroom, let students set up product displays with some of their created advertising materials prior to Enviro-Market Day. Store the remaining advertising materials created by the students in a secure location until the day of the Enviro-Market activity. (Also, remind students to gather and organize their Enviro-Bucks so they will be ready to purchase products at the Enviro-Market!)

Assessment

Ask students to personally evaluate how effective they think their advertisement campaign is going to be to help sell their enviro-product. Instruct students to include the common marketing techniques they included to help sell their product.

Extensions for the Teacher

1. If you have not already done so, begin soliciting Parent Volunteers to help supervise Enviro-Market Day. Parents can be invaluable assistants to students who might need help setting up their displays. Parents can also help sell products while the product inventors (students) go shopping.
2. Set a date for the Enviro-Market activity, and invite news media to cover the event.

The Enviro-Market – A Culminating Event

Standard

Practical Living: PL-E-3.1.2, Products and services are compared and evaluated based on price, quality, and features.

Social Studies: SS-E-3.4.1, Producers create goods and services, consumers make economic choices about which ones to purchase.

Activity Description

In this final activity students will sell their enviro-products made from recyclable items. The enviro-products will be priced according to how environmentally preferable they are. For example, items that are harmful to the environment will cost much more than items that are environmentally friendly.

Materials

Student products that have been mass-produced
Student advertisements
Collected Enviro-Bucks

Length of Lesson

About two hours

Essential Question

What process should I use to evaluate the choices I make as a consumer in order to reduce the amount of solid waste I produce?

Guiding Question

How do I make the best choices about what to buy?

Skills Used

Math Skills
Communication and Problem Solving

****

Activity

Step 1: Prior to the scheduled day of the Enviro-Market, decide if there will be enough classroom space for the market, or if it will need to be set up in the cafeteria, or another area of the building. Set a time and date for The Enviro-Market. You can conduct this activity without parents in attendance, or parents can be invited to attend the event.

Step 2: Send a note home to let parents know when their child's collection of enviro-products needs to be sent, or brought, to school. If parents are invited to the activity, include that invitation in this note.

Checklist of Things to Do to Prepare for Enviro-Market Day

- ✓ **Check on student products**
- ✓ **Check on student advertisements**
- ✓ **Set up a display in building**
- ✓ **Set a date and time**
- ✓ **Secure a room and Parent Volunteers**
- ✓ **Send home note**
- ✓ **Purchase balloons and streamers to hang**

The Enviro-Market – A Culminating Event, *continued*

Step 3: At least one day prior to this activity, after the rubrics have been completed on each student's product, assign environmental prices for the enviro-products. Remember to price those products that do not fit the specifications listed in box four on the rubric increasingly higher. This will help students better understand the importance of weighing environmental costs before purchasing certain products. Once the products have been priced, write out the prices on a piece of large chart paper. Also, make small copies so students can have the correct prices posted at each "booth" while the market is taking place.

Step 4: If the classroom is being used for the Enviro-Market setting, enlist the aid of students to begin setting up displays and organizing products on the morning of the activity. If the cafeteria is being used, when it is okay to do so, allow students to help relocate the advertisements and products so the displays can be organized. Parent Volunteers are a wonderful human resource to have available!

Step 5: Once all products and advertisements are in place, remind students to organize their Enviro-Bucks, and prepare to begin the Enviro-Market activity. Give each group about a thirty-second "commercial spot" before the market officially "opens" in order to try to encourage classmates to buy products from their "store".

Step 6: After the short commercials are completed, discuss some "common courtesy rules" with students. Once the rules have been explained, if Parent Volunteers are on hand to help sell the merchandise, students may begin shopping. If parents have not been invited to help, then schedule students in shifts to shop at the different Enviro-Market stores. Remind students that because the products were mass-produced, there will be enough products for everybody to purchase, as long as there are Enviro-Bucks to spend. Scarcity should not be a problem, if all students followed directions!

Step 7: At the end of this activity, remind students to help clean the area. Donate any leftover products to classrooms throughout the building or send them home by students to give to relatives. Remind students to share information about this activity with family members when they get home.

Assessment / Reflection

Once the Enviro-Market activity is completed, or on the following day, ask students to evaluate the "Solid Waste Survivor" unit. Encourage students to include things they liked about the unit, as well as things they did not like.

Instruct students to think about their buying habits. Ask students to describe any strategies learned in this unit that they are now doing to help the environment.

Be a Solid Waste Survivor – Take the Consumer Challenge
Intermediate

Assessment Rubric for Intermediate Unit Culminating Project "Designing the Ultimate Enviro-Product"

4	♦ **The product has been made completely from recycled items.** ♦ **The product will benefit instead of harming the environment.** ♦ **The product is durable and will last for a long time.** ♦ **The product is something others will use, rather than becoming MSW.** ♦ **The product can be mass-produced.** ♦ **The student clearly explains the product design and gives at least three supporting statements as to why the product is environmentally friendly.**
3	♦ **The product has been made mostly from recycled items.** ♦ **The product will benefit instead of harming the environment.** ♦ **The product is durable and will last for a long time.** ♦ **The product is something others will use, rather than becoming MSW.** ♦ **The product can be mass-produced.** ♦ **The student clearly explains the product design and gives at least two supporting statements as to why the product is environmentally friendly.**
2	♦ **The product has been made from at least one recycled item.** ♦ **The product will benefit instead of harming the environment.** ♦ **The product is somewhat durable.** ♦ **The product is something others might use.** ♦ **The product can be mass-produced.** ♦ **The student explains the product design and gives at least one supporting statement as to why the product is environmentally friendly.**
1	♦ **The product has been made from at least one recycled item.** ♦ **The product might benefit instead of harming the environment.** ♦ **The product is not durable.** ♦ **The product is something others might use.** ♦ **The product can be mass-produced.** ♦ **The student vaguely explains the product design and gives at least one supporting statement as to why the product is environmentally friendly.**
Notes	