Count on Recycling

Focus:
Recycling can make a difference locally and globally

Focus Questions:
How much of a difference can an individual make when they recycle?

Learning Objectives:
Students will learn about the "recycle Loop" and the importance of recycling.

Students will record how much they recycle in a week and convert that data into "energy credits."

Students will use the "energy credits" they earned to "buy" needed energy services to live for a day.

Grade Level:

4 - 6 (Science, Math)

Materials:
Recycle data collection sheet
Boxes at home for students to put their recyclables in

Audio Visual Materials

Teaching Time
2 –3 class periods of 45 – 55 minutes

Seating Arrangement
Flexible

Maximum Number of Students
Flexible

Key Words
Recycle
Energy
Watt
Reuse
Reduce

Background Information
Recycling is a series of activities that includes collecting recyclable materials that would otherwise be considered waste, sorting and processing recyclables into raw materials such as fibers, and manufacturing raw materials into new products.

Benefits of recycling:
Less waste in landfills (dumps)
Reduced use of raw materials (trees for paper, oil for plastic, etc.)
Less use of energy to manufacture from raw materials
Summary- It is good for the environment and each individual can make a difference.

Recycling Process

Step1) Consumers (you and me) collect and process materials
Step 2) Manufacturers use the recycled products in their products
Step 3) Consumers purchase materials that were manufactured using recycled products
Example:
Step 1) I buy a newspaper. After reading the paper I send it to be recycled. The newspaper is prepared (separated and cleaned) so it can be used again.
Step 2) A cereal box company uses the recycled newspaper to make the cereal box.
Step 3) I buy the cereal in the box that was made with recycled paper. Step 1 again) The process begins again when I recycle the cereal box.

Step 1. Collection and Processing
Collecting recyclables varies from community to community- check with your community what method is used (pick-up, drop-off, buy-back, or deposit/refund.) Recyclables are sent to a materials recovery facility to be sorted and prepared into useable material for manufacturing.

Step 2. Manufacturing
Once cleaned and separated, the recyclables are ready to undergo the second part of the recycling loop. Common household items that contain recycled materials include newspapers and paper towels; aluminum, plastic, and glass soft drink containers; steel cans; and plastic laundry detergent bottles. Recycled materials also are used in innovative applications such as recovered glass in roadway asphalt (glassphalt) or recovered plastic in carpeting, park benches, and pedestrian bridges.

Step 3. Purchasing Recycled Products
Purchasing recycled products completes the recycling loop.

Recycling Facts and Figures (from the EPA recycling web site- http://www.epa.gov/msw/recycle.htm)

* In 1999, recycling and composting activities prevented about 64 million tons of material from ending up in landfills and incinerators. Today, this country recycles 32 percent of its waste, a rate that has almost doubled during the past 15 years.

* While recycling has grown in general, recycling of specific materials has grown even more drastically: 50 percent of all paper, 34 percent of all plastic soft drink bottles, 45 percent of all aluminum beer and soft drink cans, 63 percent of all steel packaging, and 67 percent of all major appliances are now recycled.

* Twenty years ago, only one curbside recycling program existed in the United States, which collected several materials at the curb. By 2005, almost 9,000 curbside programs had sprouted up across the nation. As of 2005, about 500 materials recovery facilities had been established to process the collected materials.

Preparation

Print a "Count on Recycling" data sheet for each student.

Find out how recycling is done in your community- pick-up, drop-off, buy-out, deposit/refund.

Collect items that are recyclable and not-recyclable in your community. (example- your community may not recycle non-corregated cardboard or certain types of plastic)

Learning Procedure

Introduction:

Depending on how many recyclable and non-recyclables you have available, have the students separate them into recycleable and non-recycleable piles. If they have done this in smaller groups, have them report back to the class.

Lesson:

Activity A: The basics of recycling and taking inventory.
Using the background information lead a discussion on the Why recycle?, What is recycling?, What is the recycle process (loop)?.

Why recycle?
Less waste in landfills (dumps)
Reduced use of raw materials (trees for paper, oil for plastic, etc.)
Less use of energy to manufacture from raw materials
Summary- It is good for the environment and each individual can make a difference.

What is recycling?
Recycling is a series of activities that includes collecting recyclable materials that would otherwise be considered waste, sorting and processing recyclables into raw materials such as fibers, and manufacturing raw materials into new products.

What is the recycle process (loop)?

Step1) Consumers (you and me) collect and process materials
Step 2) Manufacturers use the recycled products in their products
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Step 3. Purchasing Recycled Products
Purchasing recycled products completes the recycling loop.

Find out how recycling is done in your community and review it with your students.

Distribute to each student a “Count on Recycling” data sheet.
Explain to the students that for a set period of time (the sheet can collect up to 7 days of data) they will keep track of what and how much they recycle.

** tell the students to actually make sure the students actually recycle the items- each community is different on how this can be done.

Activity B: Cashing In
On the "Count on Recycling" data sheet students will total the number of items recycled for each category (aluminum cans, glass jars, plastic bottles).

Explain the energy value or "credit" for each recycled item (these are on the "Count on Recycling" data sheet):
Example: for each aluminum can that is recycled it saves enough energy to run a 100 watt light bulb for 20 hours

On the "Count on Recycling" data sheet, students will convert their "energy credits" they have earned into "real" energy that could be used during their daily routine. Students should convert all 3 types of recycled material (aluminum, glass, and plastic) into the 3 different energy options (car miles, TV/Computer minutes, and light bulb hours)- however, you may have them due only selected ones.

After converting their energy credits, students answer the questions at the bottom of the "Count on Recycling" data sheet.

Split the students into smaller groups and have them brainstorm on how they could improve recycling in their community. Each group reports back to the whole class.

The Bridge Connection
http://www.vims.edu/bridge/pollution.html

Connections to Other Subjects
English/Language Arts

Evaluation
1. Formative Evaluation: Evaluate the grup work in progress and the related presentation.
2. Summative Evaluation: grading of the math problems on the "Count on Recycling" data sheet

Extension
Develop a recycling awareness campaign for your school or community.
If your school does not recycle- start a recycling program at your school.
Conduct the inventory and "cashing in" activities for the classroom or school to emphasize what a difference could be made.
Visit the EPA Recycle City web site: http://www.epa.gov/recyclecity/

Resources

National Science Education Standards

Content Standard F (grades K-4): Science in Personal and Social Perspectives
- Types of resources

Content Standard F (5 – 8): Science in Personal and Social Perspectives
- Populations, resources, and environments

National Math Standards

Grades 3 – 5
- Number and Operations Standard
- Measurement Standard
- Problem Solving Standard
- Communication Standard
- Connections Standard
- Representation Standard

Grades 6 – 8
- Number and Operations Standard
- Measurement Standard
- Problem Solving Standard
- Communication Standard
- Connections Standard
- Representation Standard

Acknowledgement

This lesson was developed for NOAA National Marine Sanctuary Program by staff at the Florida Keys National Marine Sanctuary.