Title: Green Packaging
Grades: 5
Subjects: Social Studies, Science, Economics, Language Arts
Time: 50 minutes

Objectives:
- Identify and describe how manufacturer's action in regards to waste management can affect change and improve the environment.
- Identify and describe the life cycle of consumer products.
- Collect, record, organize, interpret and analyze data using a variety of graphic representations and draw logical conclusions.
- Communicate their ideas in writing and inform readers about their actions to reduce waste.

Standards:
Geography Standard 18: Understand global development and environmental issues.
- Benchmark # 2: Know ways in which resources can be managed and why it is important to do so (e.g., conservation practices, recycling non-renewable resources).

Technology Standard 4: Understand the nature of technological design.
- Benchmark # 5: Know constraints that must be considered when designing a solution to a problem (e.g., cost materials, safety, scientific laws, environmental impact, time, space, etc).

Technology Standard 6: Understand the nature and uses of different forms of technology.
- Benchmark # 6: Know that manufacturing processes include designing the product, gathering natural and/or synthetic resources, and final production.

Science Standard 12: Understand the nature of scientific inquiry.
- Benchmark # 3: Plans and conducts simple investigations.

Economics Standard 2: Understand characteristics of different economic systems, institutions and economic advantages.
- Benchmark # 4: Know households (i.e., individuals or family units), as consumers, buy goods and services from businesses.

Language Arts Standard 1: Use the general skills and strategies of the writing process.
- Benchmark # 12: Write letters.
- Language Arts Standard 8: Use listening and speaking strategies for different purposes.
- Benchmark # 3: Respond to questions and comments (e.g., gives reasons in support of opinions).

Materials:
- "Sample Data Collection Worksheet" provided below
- "Data Collection Worksheet" provided below
- Pencils
- Empty Plastic Drink Bottle
- Brown paper lunch bags full of trash (one per work group)

Overview: Waste is part of everyday life. As we go about our daily tasks we create waste. The average US citizen generates approximately one ton of trash annually, but seldom gives it any thought once they throw it away. This trash goes into the waste stream where it is collected and hopefully, disposed of in a manner that least impacts the environment.

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Packaging materials are a major contributor to the waste stream. Packaging materials are used to protect the product from the environment, reducing the risk of damage and contamination. Packaging is also used to safely and efficiently transport the product from the manufacturer to the consumer, as well as to provide customers with product information and usage instructions, some of which are required by law.

Packaging, to a large extent, was developed in response to social and economic changes that affect consumers. The trend towards urbanization in the last century, created longer distances between food producers in rural areas and the consumers that lived in the cities, resulting in a greater demand for packaging. Other contributing factors were the increase in working families and smaller family units, resulting in greater use of microwaves, freezers and products of convenience. As these factors illustrate, to achieve a change towards more sustainable products, it is not just the packaging that needs to be addressed, but also lifestyle changes and consumption habits.

Source reduction is, by far, the most preferred method of solid waste management. It uses fewer resources, less energy and is economical. Unfortunately, it is also the most difficult concept to communicate to consumers. For manufacturers, source reduction means looking at and reducing the waste they generate during production, and the materials they use in packaging products. For individuals, it means reevaluating current practices, learning to do more with less, using what already exists responsibly, and recognizing the difference between needs, wants and what is ultimately best for the environment and the future of mankind.

Kid's Speak: Trash takes up space, uses valuable resources and harms the environment. People make a lot of trash. Every day they throw it away without even thinking about where it will go or what will happen to it. People need to understand the consequences of making all that trash, make better choices so the amount of trash they make is reduced, and have a plan to properly dispose of the trash they do make.

Not all trash needs to go in the garbage. There are other things that can be done. Some of it can be reused it in a different way, some of it can be recycled so it can be made into something else, and some of it, like scraps of food, leaves and grass clippings, can be composted and added to the garden. But there are also things that people can do so there isn't as much trash. They can use fewer items that make trash. Instead of using plastic sandwich bags to put snacks in, they can use a reusable container. Instead of a plastic drink bottle, they can use a reusable water bottle. Instead of paper napkins and plastic utensils, they can use cloth napkins and washable forks and spoons. There are lots of things that people can do to make less trash. They just have to think about the choices they have and try to make the best ones for the environment.

Eco-Fact: One person's daily cup of coffee served in a disposable cup with a plastic lid generates approximately 22.75 pounds of trash annually.

Procedures:
Note: The Data Collection worksheet and disposable plastic bottle from the previous lessons will be helpful in conducting the following activity.

Before Conducting the Lesson:

- Ask students if they have heard the term "shopping green"? Explain that shopping green refers to purchasing products that are specifically designed to have a minimum impact on the environment. "Shopping green" means buying products that use resources wisely and efficiently.

- Take out the disposable plastic bottle. Ask students if they feel buying drinks that come in disposable plastic bottles is an example of "shopping green". Explain to students that every product has a life cycle, or stages it goes through, which typically include: a) materials extraction and processing, b) manufacturing, c) packaging and distribution, d) product use, and e) disposal

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of the product. In the case of the plastic bottle the product would be the drink, the bottle part of the packaging. Additional packaging might include a cover to the bottle, a label, and if sold in multiple perhaps something that holds the bottles together. But packaging is only one piece of the puzzle. Other things to consider include the raw materials, the energy, water and land used to make the product and packaging, and the wastes that were created at each stage.

- Have the students take out the Data Collection worksheet. Review with the students the various ways in which they have managed their waste so far. Explain to students that, from a consumer standpoint, the only two stages of a product's life cycle that they have control over is product use and disposal. In previous lessons they learned how to dispose of waste products effectively. In this lesson they will recognize that manufacturers need to improve their performance in the other stages of a product's life cycle.

- Explain to students that packaging is a major contributor to household waste. For a product to be considered a "green product" manufacturers need to keep packaging to a minimum and use materials that can be recycled. Explain to students that while plastics can be recycled, they are divided into seven types of plastic. Plastics with the numbers 1, 2 and 3 in the circular recycling symbol are usually recycled in most communities. Plastics 4-7 are often times not recycled. Therefore, products that are packaged in plastics other than 1, 2, and 3 may not be good consumer choices.

- Pack a lunch bag for each group using the empty containers and packaging materials from single serving products. Each bag should have a different variation of products. Be sure to wash out all containers, lids, etc. before packing the lunch bags, and try to use products that have a variety of packaging materials, some of which are recyclable and some of which are not. Lunch bags might include: Lunch #1: Waste from a "lunchable", a plastic drink container and cover, a plastic cup and top from a fruit cup, a disposable spoon, container from a single serving of carrot sticks with dressing, a chip bag, and a wrapper from a granola bar. Lunch #2: Single serve cup from microwaveable pasta, a fork, a juice box container, wrapping from string cheese, bag from veggie sticks, a pudding cup and lid with disposable spoon, box from some dried fruit, a cupcake wrapper and cardboard bottom.

Conducting the Lesson:

- The students will be given the task of analyzing the amount and kind of waste typically generated in packed lunches. Divide students into small groups. Provide each group with a pre-packed brown paper lunch bag.

- Students will study the packaging used in their lunch bags, sort and classify it, identify which are recyclable and which needs to be disposed of in the trash. Students will consider the following questions during their analysis:

    - Does the packaging seem excessive for any of the products?
    - Are some products packaged in more than one type of packaging?
    - Are any packaging materials recyclable?
    - If any materials are plastics, are they the plastics typically recycled (1-3)?
    - What are the advantages/disadvantages of the packaging materials used with each product?

- Students will brainstorm ideas of how they can encourage manufacturers to improve their manufacturing and packaging processes (e.g., campaign for the purchase of "green products" purchased for use at home and at school).

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After Conducting the Lesson:

- Students will write up a waste analysis, addressing the questions listed above and any other important points that they uncovered in the analysis of their lunch waste.

- Students will select a product they feel has an excessive amount of unnecessary packaging and write a letter to the manufacturer explaining their findings, how they feel about the product and recommendations for new packaging.

- Students will review their Data Collection Worksheet. Students will write the word REDUCE in the last column, and try to find a way to reduce the amount of waste the generated. Have them look at various items of waste and write a suggestion in the table for how that waste could be eliminate or reduced.

Adaptation: Have parents donate single packaged servings of snacks. Have a snack shop for morning snack and let each student pick a snack. Challenge students to think of alternatives to the snack, suggesting something else that is similar, but has less or no waste (e.g., fresh fruit instead of canned fruit).

Extensions:
Have students create a graphic organizer to show how their trash has been reduced from Day 1 to Day 3. Read aloud the story “The Adventures of a Plastic Bottle: A Story About Recycling” by Alison Inches and discuss the implications.

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Sample Data Collection Worksheet

waste items	disposable	recyclable
empty pudding cup		x
16 oz. water bottle		x
banana peel		C
snack size chip bag	x	
sandwich bag	x	
brown paper bag		x
candy wrapper	x	
paper napkin	x	
two envelopes		x
broken pen	x	
used tissue	x	
dead leaves from a desk plant		C
total number	**6 remain in trash**	**6 removed from trash**

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