Title: Is Bigger Always Better?
Grades: 5
Subjects: Social Studies, Language Arts
Time: 50 minutes

Objectives:
- Identify and describe how an individual's action in regards to bulk buying can affect change and improve the environment.
- Explain the need to understand the cost of a product in relation to the number of servings it provides.
- Collect, record, organize, interpret and analyze data and draw logical conclusions.
- Communicate their ideas in writing and inform readers about their conclusion on buying in bulk to improve the environment.

Standards:
Geography Standard 16: Understand the changes that occur in the meaning, use, distribution and importance of resources.
- Benchmark # 5: Know advantages and disadvantages of recycling and reusing different types of materials.

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).

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.

Mathematics Standard 3: Use basic and advanced procedures while performing the processes of computation.
- Benchmark # 1: Multiply and divide whole numbers.
- Benchmark # 8: Solve real-world problems involving number operations (e.g., computations with dollars and cents).

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:
- Data Collection Worksheet from previous lesson
- Disposable plastic drink bottle from previous lesson
- "Juice Data Collection" Worksheet provided
- Pencils
- Large plastic juice bottle with cap and seal
- Box of single serve drink packets, empty packet included
- Empty can of juice concentrate, with cover and seal
- Empty container of powder juice mix, with measuring cup, cover and seal
- Scales, one per 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

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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.

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.

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: In 2009 a single 14-watt mini spiral light bulb costs approximately $4, while a pack of four costs approximately $7.

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:

- Review the information on the Data Collection sheet for the previous lesson where students learned about the impact packaging has on the environment. Students may have discovered that they can make a difference by buying items in large quantities and placing single servings in reusable containers; and that in doing so they create considerably less waste than when using single serve packages. Explain that in today's lesson they are going to look at the various options available for juice packaging and evaluate which is the best choice for a conscious shopper, backing up theory and opinion with factual support.

- Introduce the term "buying in bulk". Discuss how some people shop at warehouse clubs rather than, or including, grocery stores. Also address making wise purchases, knowing prices and servings per product in order to get the most value per dollar.

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- Display the empty disposable water bottle used in previous lessons. Explain to students that the price of a single bottle of water purchased from a vending machine or convenience store is more costly than one taken from a case purchased at a bulk buying facility. Provide students with current price comparisons for your general geographical area. Have them determine the price per serving of the case compared to the price of the single bottle of water. What is the savings? What additional waste is generated by the case versus the single water bottle? Is any of the waste recyclable? Overall, discuss which option students feel is the better from both a financial and environmental standpoint.

Conducting the Lesson:

- Divide the students into small groups. Give each group a juice data collection worksheet provided below and the waste from one of the juice drink products listed below:
    - Large plastic juice bottle with cap and seal
    - Box of single serve drink packets, empty packet included
    - Empty can of juice concentrate, with cover and seal
    - Empty container of powder juice mix, with measuring cup, cover and seal
- Students will examine the product waste. Students will list the name of the product on the data collection worksheet. Students will locate the price and the number of eight ounces servings per container and record that information in the appropriate column of the data collection worksheet.
- Students will use the data to find the price per serving and record the findings in the appropriate column of the data collection worksheet.
- Using a scale, students will measure the total weight of the waste from the product and record it in the appropriate column of the data collection worksheet. Then they will sort and classify the waste as disposable and recyclable, measure the weight of waste in each category and record that data. Once students have finished weighing the product waste they will return it to the front of the class.
- Groups will repeat Steps 1-4 three more times until they have collected the data for all four products.
- Students will analyze and compare the data collected. Students will form responses to the following questions:
    - Which product provides the most servings while creating the least amount of waste?
    - Which product creates the least amount of waste? How many times would you have to purchase it to have the same amount of servings as the other products?
    - Was the largest product the most cost effective? How did the waste it created compare to the smaller size products? Was the waste it created mostly recyclable or disposable?
    - What are the pros and cons of using each product from the viewpoint of a consumer?
    - What are the pros and cons of using each product from the viewpoint of an environmentalist concerned with waste management?

After Conducting the Lesson:

- Students will write a consumer review comparing and contrasting the products for an environmentally conscious consumer who is interested in buying smartly in order to reduce waste consumption, but is also budget conscious. Students will identify the product they would recommend and justify their rationale. Students will rate the products from best choice to worst based on the given criteria.

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- (**Note**: The America's Test Kitchen magazine is an excellent resource for food reviews. Students could use this magazine as a reference and model their own product reviews.)

Adaptations:

- For a more hands on approach, students in each group could make up one of the products and measure out the eight ounce servings per product. The class could compile their data into a class chart and respond to the questions in a discussion format.

Extensions:

- Students can condense and organize some of the data collected in a graphic representation (e.g., a line graph that shows the number of servings per product compared to a line graph that shows the weight of waste per product).
- Brandimage has created an alternative to the plastic drink bottles, the 360 paper water bottle. http://greenupgrader.com/4689/360-paper-bottle-by-brandimage/ Have students review and write an editorial on their thoughts about this product. Do they think it's an effective solution to the waste management problems associated with plastic bottles? What are pros and cons of using this as an alternative packaging for on-the-go drinks?

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