WHAT'S IN YOUR LUNCH?

TEACHER'S PAGES

OVERVIEW:
Students examine the contents of their lunches to analyze product packaging, and to distinguish between renewable and nonrenewable resources. In addition, students write a plan to reduce the amount of trash they throw away.

ESTIMATED TIME:
2 classes

KEY S.O.L. OBJECTIVES:
Science
• Life Science (LS.12)
• Earth Science (E5.7)
• Resources (6.11)

Language Arts
• Oral Language (6.1, 7.1)
• Research (7.10)
• Writing (6.8, 7.8, 8.5)

MATERIALS:
Part I:
• Lunch Lineup graphic organizer (student pages)
• remnants of student lunches (or pre-made lunches)

Part II:
• Earth's Resources diagram (teacher's pages)

VOCABULARY:
biodegradable, decomposition, fossil fuel, inorganic, minerals, natural resources, nonrenewable, nonrecyclable, organic, raw materials, recyclable, renewable resource, source reduction, synthetic materials

A close look at their lunches can help students understand the enormous complexity of the solid waste dilemma.
BACKGROUND:
A close look at their lunches can help students understand the enormous complexity of the solid waste dilemma. Americans have become a throwaway society; an increasing amount of products are made to be thrown away after only one or two uses. In fact, it is often cheaper to replace some items than it is to fix them! We demand convenience from manufacturers and they provide us with products that are pre-cut, pre-shredded, individually wrapped, and bite-sized. The creation of smaller, individually wrapped packages for everything from juices to potato chips meets our need for convenience. The additional packaging of these products adds to the volume of solid waste in our solid waste stream. More solid waste in our landfills and incinerators taxes our use of land and creates environmental hazards when the dangerous chemicals from incinerators or landfill leachates are released into our soil, air, and water.

As consumers, our product choices have a direct effect on the depletion of our natural resources. For example, for packaging alone (cans, bottles, cartons, etc.) the U.S. uses 50% of its paper, 75% of its glass, 40% of its aluminum and 30% of its plastics. Non-renewable resources like fossil fuels and minerals, which are used to make plastics, aluminum, and glass, take millions of years to form and cannot be replaced. Meanwhile, renewable resources like trees, which are used to make paper products, are being consumed faster than they can be replaced. Excessive packaging contributes to the volume of trash created, which taxes our land and eventually the Chesapeake Bay through air water and ground pollution.

In this activity, students are challenged to examine their contribution to the waste stream and the effect of overusing our renewable and non-renewable resources.

TEACHER PROCEDURE:
Preparation prior to activity:
1. Ask your students to save their entire lunches after they have eaten, especially packaging. Students who buy lunch from the cafeteria should include the trays provided with their lunches. You may have to ask special permission to remove reusable trays from the cafeteria. If students are not allowed to take their finished lunches out of the cafeteria, see if it's possible to do Part 1 of the activity in the lunchroom after lunch has been served.

ii. OR create your own lunch remnants to use as demonstration. Make several lunches with a variety of products, including: small plastic baggies, wrappers from store bought individually packaged snacks, paper bags, plastic or metal lunch boxes, empty soda cans, empty juice boxes with the straw and wrapper, thermos, snack or sandwich size Tupperware, small glass juice bottles, plastic cutlery, metal cutlery, aluminum foil, paper napkins, cloth napkins, wax paper etc.

PART I
1. Divide the class into cooperative groups of 3-5 students.

2. After they have eaten, have each group of students place all the contents of their lunches onto their desks. Be sure to emphasize that students are to save all packaging materials.

3. Have them list their lunch contents in Step 1. (EXAMPLE: 1 apple, 2 napkins, 1 straw, 1 juice bottle, 1 plastic wrapper, and 1 Styrofoam tray).

4. After students have listed the contents of their lunches, ask them to categorize the contents into five piles: recyclable, nonrecyclable, reusable, reducible and organic. To eliminate confusion, facilitate a discussion about the differences between each category. For example, a recyclable or nonrecyclable item could also be reused and/or reduced! Below is a sample of the typical definitions for each category.

a) Recyclable: the item can be remanufactured to create a whole new product (an aluminum soda can)
b) Nonrecyclable: the item cannot be reused or remanufactured and must go into a landfill (styrofoam cup)

c) Organic: the item will naturally decompose (break down) over time if it is put in a compost pile (an apple)

d) Reusable: the item can be re-used at least one more time for the same or another purpose (a plastic bottle)

e) Reducible: you could use less of this item in the future (napkins)

5. Finally, have them record the contents of each pile into their Lunch Lineup graphic organizer. Since some items can fit into more than one category, have groups decide which category is BEST for the item (for example, which option uses least energy). Students should be prepared to explain why they chose to put each item in a particular category.

TEACHING OPTIONS:
- Modify the activity by allowing students to measure the actual mass of the item using digital balances, and record the averages (means).
- Provide visual learners with index cards folded in half to make “tent cards” for each category in their lunch.

PART II

1. Distribute a copy of the Earth’s Resources diagram to each group (or make a transparency of the diagram to use on an overhead projector).

2. Review the diagram with students.

3. Allow students to complete the Earth Resources chart in their student pages. This chart asks students to determine if an item from their Lunch Lineup graphic organizer is renewable or nonrenewable. It may be helpful if you post several examples on the board to help students as they complete their chart. For example, hold up a soda can and ask students what the can is made from (aluminum). Then, ask students how aluminum is made (by processing bauxite—a mineral). Finally, ask students if they think minerals are renewable or nonrenewable raw materials (nonrenewable).

4. Finally, discuss the difference between a limited nonrenewable resource (such as fossil fuels or minerals) and an unlimited nonrenewable resource (such as sand, which is used to make glass). NOTE: If necessary do a mini-lesson on fossil fuels and minerals prior to beginning this part of the activity.

PART III

In this part, students create, write out, share and implement a group strategy to reduce the amount of trash they produce. This section is written as a cooperative group activity utilizing the Think-Pair-Share teaching strategies (see Appendix A). You could also facilitate a class discussion about this topic.

1. Tell students they will present a plan to reduce the amount of trash they throw away. They will need to agree on and develop a realistic plan for their class that will clearly reduce solid waste.

2. You may want to use the following guidelines for the students’ presentation, or you may want to create your own guidelines:
   a) everyone in the group must agree on and be able to comply with the plan
   b) the written plan must outline a step by step process for reduction
   c) the plan must define the group’s goal for reduction
   d) the plan must define a specific time period to achieve the goal (reduce amount in one week or one month)
   e) the plan must explain how the goal will be measured for success (create a chart or
graph to record trash contents over a specified time period.

3. Have students actually implement their plans for at least two weeks.

**JOURNAL ENTRY:**

Write a persuasive letter to a manufacturer persuading them that its product uses excessive packaging. Be sure to recommend alternative packaging options for the product in your letter.

**EXTENSIONS:**

- Set up a contest where the groups (or other classes) compete. Have them weigh their trash each day and record the result on a class bulletin board. At the end of the two weeks present an award to the group with the greatest trash reduction.

- Have students investigate local attitudes towards recycling. Does the community recycle? What are the pros and cons of recycling? How could students start a recycling program in their home or school?

- Allow students to bring in products from home that they consider to be excessively packaged or ones that they consider to be well packaged. Have them explain to the class why they chose that item. Finally, considering what they have learned, ask them to decide if the packaging would affect their consumer choices of particular products in the future.

- Ask students to continue to reduce solid waste at home over a specified time period. Ask them to graph their results. Then have them prepare an assembly program for the school (or parents on parents' night) to challenge others to reduce their trash.

- See Section V: From Words to Action to do the Zero Waste Lunch or Creating Compost action project with your class.

**RESOURCES:**

- Contact the Environmental Protection Agency (215-566-5120 or www.epa.gov/region03) to order materials on solid waste. The EPA has several publications available at no cost including “The Adventures of the Garbage Gremlin,” “Don’t Trash It! Super Fun” (for students), and “The Solid Waste Dilemma: An Agenda for Action” (for teachers).

- Contact the Office of Solid Waste, U.S. Environmental Protection Agency (401 M Street, Washington, DC 20460) or the Resource Conservation and Recovery Act (RCRA) hotline at 800-424-9346 for additional publications on solid waste and recycling.

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WHAT'S IN YOUR LUNCH?

INTRODUCTION:
How much trash do you throw away each day? The average American throws away four (4) pounds of trash each day! Is everything you throw away really trash? Do you ever throw anything away that you could re-use, recycle, or compost instead of simply throwing it in the trash? Often food comes wrapped in several packages. For example, a few ounces of raisins may be packaged in a small box and then wrapped in plastic. Those raisins have two different types of packaging that will simply be thrown in the trash. Could they be packaged differently so that there is less to throw away?

We demand convenience from manufacturers and they provide us with products that are pre-cut, pre-shredded, individually wrapped, and bite-sized. The creation of smaller, individually wrapped packages for everything from juices to potato chips meets our need for convenience. However, the additional packaging of these products adds to the volume of solid waste that we produce! In the end, too much packaging contributes to the volume of trash created, which taxes our land and eventually the Chesapeake Bay through air, land, and water pollution.

In this activity you will examine and classify the contents of your lunch to learn how consumer product choices affect the amount of trash that we throw away. Also, you will identify the raw material source of the items in your lunch to determine if your trash comes from a renewable or nonrenewable resource. Finally, you will create a plan to reduce the amount of trash you create.

MATERIALS:
Part I:
• leftover lunch stuff
• Lunch Lineup graphic organizer

Part II:
• Earth's Resources diagram

VOCABULARY:
biodegradable, decomposition, fossil fuel, inorganic, minerals, natural resources, nonrecyclable, nonrenewable, organic, raw materials, recyclable, renewable resource, source reduction, synthetic materials
PROCEDURE:

Part 1:
1. After you eat your lunch, work with your group to put the contents of your lunch left-overs onto your desk. Examine everything in your lunch including the packaging and containers. List the contents of your lunch below (EXAMPLE: 1 apple, 2 napkins, 1 straw, 1 juice bottle, 1 plastic wrapper, 2 plastic bags, 1 Styrofoam tray, and 1 lunch box).

2. Packaging is a big part of what we throw away. Identify the packaging in your lunch. How many pieces of packaging were used for each item? Write the number of packaging items next to the items listed in 1.

3. Think about other products that have lots of packaging. Brainstorm to create a list of the pros and cons of extra packaging.

<table>
<thead>
<tr>
<th>PROS</th>
<th>CONS</th>
</tr>
</thead>
</table>
4. Look at the list of your lunch leftovers in step 1. Create a pile for each category listed below:

- **Recyclable**: The item can be re-manufactured to create a whole new product.
- **Nonrecyclable**: The item cannot be re-used or re-manufactured and must go into a landfill.
- **Organic**: The item will naturally decompose over time if it is put in a compost pile.
- **Reusable**: The item can be re-used at least one more time for the same or another purpose.
- **Reducible**: You could use less of this item in the future.

**NOTE**: If you are unsure of where an item should go, discuss it with your group members to help you decide. Some items may fit into more than one category (i.e., a plastic spoon is both nonrecyclable and reusable).

5. Write the contents of each pile into the *Lunch Lineup* graphic organizer on the next page.
Lunch Lineup

- Recyclable
- Nonrecyclable
- Organic
- Reusable
- Reducible
Part II:
All manufactured products are made from raw materials—materials occurring naturally in the environment, such as trees, sand, minerals, or fuels. Raw materials are categorized as either nonrenewable or renewable. Nonrenewable raw materials such as fossil fuels and minerals are created naturally over thousands of years and occur in a limited supply. Renewable resources such as plants and animals can be abundant depending on how we use and care for them.

1. Your group will review the Earth’s Resources diagram with your teacher. Trace one object from the chart to its original source—the Earth’s raw material.

2. Think about each item in your Lunch Lineup graphic organizer from Part II. How is each item manufactured? What was its raw material source?

3. Work with your group to trace the path of each item in your lunch to its raw material. EXAMPLE: a napkin is made of paper, which comes from trees. Trees are a renewable resource.

4. Record the production path of each lunch item from your Lunch Lineup graphic organizer to the Earth Resources chart below. If an item is renewable or nonrenewable, be sure to place a check mark (√) in the appropriate column below.

**EARTH RESOURCES CHART**

<table>
<thead>
<tr>
<th>FINAL PRODUCT</th>
<th>MADE FROM</th>
<th>RAW MATERIAL</th>
<th>RENEWABLE</th>
<th>NON-RENEWABLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Napkin</td>
<td>Paper</td>
<td>Trees</td>
<td>√</td>
<td></td>
</tr>
</tbody>
</table>

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5. Fossil fuels and minerals are nonrenewable resources. Fossil fuels, like petroleum, are used in making all types of plastics and even the gasoline our cars need to run. Minerals, like copper and tin, are manufactured into all types of metal products. It is estimated that in just 50 years the minerals copper, lead, mercury, nickel, tin and zinc will run out! Think about all the products you use that are made from minerals or fossil fuels, then list several ways your life would change if we used all of our nonrenewable resources faster than they can build up.

6. Plants and animals are renewable resources. But, some animals are already extinct or endangered, like the American shad, whose numbers have been so greatly reduced that in some areas fishermen are prohibited from catching them. Similarly, some plants – like trees – need to grow for many years before they are big enough to be cut down and used. Think about the products you use that are made from plants and animals, then list several ways your life might change if we use all of our renewable resources faster than they can grow back.
Part III:
Your group will create, write, present, and fulfill a plan to reduce the amount of trash you produce.

1. First your group will need to do the following:
   a. Individually brainstorm a plan to reduce the amount of trash that you produce. Then, write down your ideas. Share your ideas with others in the group.
   b. Discuss all of the brainstorming ideas each person has written down.
   c. As a group, narrow down the ideas to two or three reasonable and realistic plans.
   d. Decide on one idea, as a group. Make sure that everyone in the group is involved with selecting the plan. If you cannot agree on one plan, take a vote to make the final decision.

2. Now your group will need to write out the specific details of the plan using the following guidelines. Write your plan on a separate piece of paper:
   - What is the specific amount by which your group wants to reduce trash?
   - How much time will it take to achieve your goal?
   - What actions will your group need to take to achieve your goal?
   - How will you measure the success of your plan?

3. Prepare a quick presentation for your class, outlining the specifics of your plan.

4. At the beginning of the next school week, begin to fulfill your plan. Be sure to record the results, so that you can measure your success. When your plan is completed, answer questions 5 and 6.

5. How did your plan work? Use the space below to evaluate the success of your plan. Explain why your plan was (or was not) a success.

________________________________________________________________________

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________________________________________________________________________
6. How will your plan’s success or failure affect the Bay? Use the space below for your answer.