

Food Recycling

Lesson Summary: (Lesson adapted from Bottle Biology)

This lesson introduces the concept of recycling food waste by composting. Students investigate food waste in their school and the nation, and gain awareness of recycling food waste as a better way to care for the earth. Students will be able to differentiate between the kinds of foods that can and cannot be recycled. As an activity, the class will make their own decomposition columns to use and observe in the classroom.

Objectives:

Students will be able to:

- Differentiate between the kinds of foods that can and cannot be recycled.
- Identify ways to help reduce food waste.
- Make their own decomposition columns, observe the decomposition process and record the results over a period of time.

Time Required:

40 minutes

Background Information:

Reducing Wasted Food Basics:

Most people don't realize how much food they throw away every day — from uneaten leftovers to spoiled produce. About 95 percent of the food we throw away ends up in landfills or combustion facilities. In 2013, we disposed more than 35 million tons of food waste. Once in the landfills, food breaks down to produce methane, a potent greenhouse gas which contributes to climate change.

Benefits of Reducing Wasted Food:

1. Saves money from buying less food.
2. Reduces methane emissions from landfills and lowers your carbon footprint.
3. Conserves energy and resources, preventing pollution involved in the growing, manufacturing, transporting, and selling food (not to mention hauling the food waste and then landfilling it).
4. Supports your community by providing donated untouched food that would have otherwise gone to waste to those who might not have a steady food supply.

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Ways to Reduce Wasted Food:

1. Shop your refrigerator first! Cook or eat what you already have at home before buying more.
2. Plan your menu before you go shopping and buy only those things on your menu.
3. Buy only what you realistically need and will use. Buying in bulk only saves money if you are able to use the food before it spoils.
4. If safe and healthy, use the edible parts of food that you normally do not eat. For example, stale bread can be used to make croutons, beet tops can be sautéed for a delicious side dish, and vegetable scraps can be made into stock.
5. Find out how to store fruits and vegetables so they stay fresh longer inside or outside your refrigerator.
6. Freeze, preserve, or can surplus fruits and vegetables - especially abundant seasonal produce.
7. Compost food scraps rather than throwing them away.
8. Nutritious, safe, and untouched food can be donated to food banks to help those in need.
9. At restaurants, order only what you can finish by asking about portion sizes and be aware of side dishes included with entrees. Take home the leftovers and keep them for your next meal.
10. At all-you-can-eat buffets, take only what you can eat.

What is Composting? - Composting is nature's process of recycling decomposed organic materials into a rich soil known as compost. Anything that was once living will decompose. Basically, backyard composting is an acceleration of the same process nature uses. By composting your organic waste you are returning nutrients back into the soil in order for the cycle of life to continue. Finished compost looks like soil—dark brown, crumbly and smells like a forest floor.

Types of composting:

1. Backyard/ Food Waste composting - If you have a yard and a balance of browns (fallen leaves or straw) and greens (grass clippings and food scraps), you have all you need to make compost.
2. Worm composting (vermicomposting) - If you have a tiny yard or live in an apartment or have an abundance of food scraps, this type of composting is for you.
3. Grass Recycling - If you have grass clippings and don't want to use them in a compost pile, you can leave them on the lawn to decompose. Read about grass recycling for tips, techniques and benefits.

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You can compost:

- Vegetable and fruit scraps, rinds and peels
- Coffee grounds and filters
- Tea leaves and tea bags
- Egg shells
- Nut shells
- Plant trimmings
- Grass and leaves

Do not compost: (these items should go into the garbage)

- Butter, cheese or dairy products
- Meats or bones
- Gravies or sauces
- Pet feces

Materials:

- Pictures of items you can and cannot compost
- Paper lunch bags – one labeled compost; one labeled recycle; one labeled garbage
- Three 2- liters soda bottles
- One bottle cap
- Scissors or utility knife
- Various ingredients listed in the plan for filling the decomposition column
- Observation notebook
- Ruler
- Thermometer

Procedure:

1. Today we are going to talk about food waste. Putting food waste into the landfills is hurting our environment and we can make a difference by composting or recycling our food waste.
 - a. Give some statistics from the background information above.
 - b. Explain briefly what composting means and how we use it.
2. Now we are going to play the food waste sorting game. Each group or pair of students will get photos of different items and three bags, labeled either recycle, compost or garbage. Your goal is to sort the pile of photos into one of the three bags depending on what you think can be done with it.

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3. After students have sorted the photos, review which items can and cannot be recycled as well as which ones need to go into the garbage.
 - a. **Answer key**
 - i. Recycle: cardboard cereal box, soda can, cardboard boxes, and newspapers.
 - ii. Compost: veggies, coffee grounds and the filter, apple core/ fruit, leaves, grass clippings, banana peel, egg shells and nut shells.
 - iii. Garbage: milk (carton could be recycled), butter, chicken meat and bones, steak, gravy, cheese.
4. Now we are going to build our own decomposition investigation column so we can put some of our food waste into it and observe what happens. Follow the directions at this site: http://www.bottlebiology.org/investigations/decomp_build.html.
 - a. First students will fill their decomposition columns.
 - b. **Choosing ingredients:** decomposition column ingredients can include leaves, grass and plant clippings, kitchen scraps, newspapers and soil. If you are interested in how fast things decay, try building two identical columns, but fill them with leaves from two different species of trees. Try adding fertilizer to your column, or water from a pond or river. How do you suppose differences in temperature, light or moisture will affect the decomposition process?
 - c. **The time it takes:** You'll begin to see mold and other evidence of decomposition within the first few days after filling your column.
 - i. Two or three months is plenty of time to see soft organic material such as leaves, fruits, vegetables and grain products decompose dramatically. (The term organic applies to something that is derived directly from a living organism.) Bark, newspapers and wood chips all take longer to decompose, though they still undergo interesting changes in two to three months.
 - d. **How wet?** Keep your column moist in order to observe more rapid decomposition. Avoid flooding your column or it will become waterlogged. This can create an anaerobic environment, or one completely lacking oxygen, in which certain microbes create particularly vigorous odors.
 - e. **Using your nose:** Odor is a by-product of decomposition, and can tell you a lot about the materials in your columns. Odors may be strong at first, but can mellow and become musty with time. Classrooms full of odorous decomposition columns, however, have been known to try the patience of colleagues and building supervisors. The strongest odors arise from animal products such as meat and dairy products. Grapefruit rinds and grass cuttings can also produce strong odors. Why is this so? If you use food scraps, mix in plant matter such as

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leaves, twigs and dried grass to temper odors. Layering soil on top of the contents also lessens the odor.

1. How do you think this will affect decomposition? Keep holes small so fruit flies stay inside.
 - ii. If your classroom fruit fly population booms anyway, make a fruit fly trap.
http://www.bottlebiology.org/investigations/fruit_fly_trap.html.
5. Students will observe their decomposition columns over time. Keeping track in a notebook, students should describe the color, texture, smell and shape of everything they put in the bottle. Weigh everything before it goes into the column.
6. Schedule column checks for at least once a week to record changes. Note changes in the column contents height, color, shape, texture and odor. Hold a ruler next to the column to record changes in the height of the contents. Insert a thermometer from the top of the column to determine temperature changes.
 - a. Can you figure out the rate of change?
 - b. You can also test the pH of the leachate (the solution that drips through the column).
7. Take note of any critters – flies, beetles, slugs, millipedes or snails.

Assessment:

1. Observation notebooks
 - a. What happens to your waste when you throw it in the garbage? Is it reused or recycled?
 - b. What are some advantages of composting and recycling waste instead of throwing it in the garbage?
 - c. How do you think the results of this experiment will affect your consumption habits?
 - d. How do you think the results of this experiment will affect how you dispose of your waste?
 - e. How does composting affect the size of your ecological footprint?
2. Students could write a story about what is happening in their columns

Supporting Materials:

Observation notebook

References/Resources:

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<http://www2.epa.gov/recycle/reducing-wasted-food-basics>

<http://www.bottlebiology.org/>