

# Lesson 13:

## From Waste to Resource



### Time Allotted

60 Minutes

### Target Audience

Grades 5-8 

### Objectives

- Students will identify decomposition and observe how it leads to compost
- Students will link composting to the plant cycle
- Students will use the waste cycle to create a valuable garden resource

### Materials

- Empty water or soda bottles, including bottle caps, two per student (Note: To save time, cut the upper half of the bottle until it is almost removed. Students can then access the inside of the bottle for filling, but still close it later.)
- Scissors
- Spray bottle filled with water
- Soil from a garden or lawn, enough to fill one bottle per student. It is recommended that you consult someone at your local garden supply store to procure soil.

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### Summary

Students learn that food waste, through composting, can be transformed into a valuable resource by observing the decomposition process in their own decomposition chambers.

### Background

Food waste is a major issue in the United States — 32 million tons of food are thrown into the garbage each year. This amounts to 14% of all trash, and represents the largest component of garbage reaching landfills. In addition to increasing our overall garbage production, food waste can have large economic and environmental impacts.

Food waste impacts people economically. Individuals, families, and businesses spend large amounts of money on food, and much of this food ends up in the trash. Making wise food purchases and avoiding needless waste helps save money. Food waste also impacts the environment. When food decomposes in landfills, it emits methane, a powerful greenhouse gas that contributes to global warming. Landfills account for 20% of all human-produced methane. Reducing food waste reduces the environmental impact of landfills.

An easy and effective way to reduce food waste is through composting. Compost is produced when food waste and other organic materials such as yard waste and manure decompose. In the act of decomposition, tiny bacteria and fungi break down the waste and form humus, a dark brown, soil-like material. This material, also known as compost, can be added to the garden's soil to improve structure by adding valuable nutrients that help plants grow. By creating your own nutrient rich compost, you reduce the need for purchasing fertilizers or pesticides, which can harm us and contaminate local rivers, lakes and groundwater.

### Method

On the board, or a large piece of paper, create a Waste KWL (Know - Want to know - Learned) chart.

#### 1. Ask: What is food waste?

- Discuss with students their reactions to this food waste. Add their reactions to the Waste KWL chart.
- Explain to students that approximately 14% of the country's garbage is food scraps, which amounts to 32 million tons per year. Use the image at the top of the New York Times article, "One Country's Table Scraps, Another Country's Meal," to prompt discussion about wasting food. Have the students brainstorm possible negative effects of wasting food.

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## Materials (cont.)

Depending on where you live, and what your existing soil is like (clay heavy, sandy, rocky, or even unusable due to contamination), the garden soil or combination of soils you will need may vary (see Soil 101 in appendix for further resources).

- Small pieces of food (one per student)
- Small pieces of trash (one per student)
- Small pieces of “brown matter” (dead leaves, sticks, newspaper)
- Soil collected from the garden
- New York Times article and image, “One Country’s Table Scraps, Another Country’s Meal,” [http://www.nytimes.com/2008/05/18/weekinreview/18martin.html?\\_r=2&pagewanted=1&ref=dining&oref=slogin](http://www.nytimes.com/2008/05/18/weekinreview/18martin.html?_r=2&pagewanted=1&ref=dining&oref=slogin).

### 2. Ask: How do we reduce food waste?

- Ask if anyone has heard of composting. Composting is the act of breaking down food into healthy soil that can later be used to help plants grow and reduce food waste.
- Ask for a volunteer to draw a plant’s life cycle on the board. Guide the student so that the final diagram includes some variation of the following diagram:  
seed sprout full-grown plant  
dead decomposing plant soil seed
- Explain decomposition if students are not familiar with the concept. Tiny bacteria and fungi act quickly to break down dead plants, transforming them into nutrient-rich soil that will help other plants grow.
- Remind students that most of the foods we eat come from plants. Consequently, the foods we eat decompose in the same way that plants do.

### 3. Help students create their own decomposition chambers.

- Give each student two empty bottles with the tops cut almost off. Tell them that one bottle will be for decomposing food waste, and the other for decomposing a trash item of their choice (small enough to fit in the bottle).
- Have students fill each bottle halfway with soil from the garden. Tell them that this soil from the garden, as opposed to store-bought potting soil, already contains decomposers such as bacteria, fungi, and possibly worms. Students can add “brown matter” of their choice.
- Spray water in each bottle until the soil is moist. Replace the lid.
- Display bottles where students can access them. Tell students to observe the bottles over the next month for signs of decomposition. Examples of decomposition include mold, color change, and strong odors. Tell them to notice which items are decomposing more quickly. Most likely, food items will be breaking down rapidly.
- Have students write down their observations individually or as a class regarding the appearance of the bottles’ contents to track the decomposition process.

## Extensions

- Have the students keep a tally of how much food is thrown away in their households for one week. Ask them to come up with ways their family could reduce the amount of food waste.

## Younger Audience Adaptation

For a younger audience, draw the plant life cycle on the board. Have students recall the turning leaves of fall. When the dead leaves fall and are then covered with snow in winter, do we see them again, in the same place, looking the same in the spring? How do those leaves look different? During the winter, those leaves are decomposing, or being eaten by tiny bacteria and fungi. They are turned into soil filled with nutrients that help new plants grow.

## Sources

"Wastes—Resource Conservation." US Environmental Protection Agency. 2012. Web. 14 Mar. 2012. <http://www.epa.gov/osw/conserve>

Shreeves, Robin. "Compost vs. Landfill: Does it Really Make a Difference?" *Sustainablog*. N.p., 2 Dec. 2008. Web. 14 Mar. 2012. <http://blog.sustainablog.org/2008/12/compost-vs-landfill-does-it-really-make-a-difference/>