



It All Adds Up¹

Chart your lunchroom's food waste

Recommended Grades: 3–6

- ♦ Math
- ♦ Science

Goals

Take part in a “gloves-on” project that shows us concretely how much waste is generated and where it goes.

Key Points

- ♦ There really is no “away” when we toss out our trash; all garbage stays on earth and has to be dealt with in some way.
- ♦ Each U.S. citizen produces about 3–5 pounds (1.4–2.3 kgs) of trash every day. In 1960 it was 2.7 lbs (1.2 kgs) per person.² Why has the amount increased?
- ♦ A food waste inventory raises awareness of how much trash we make and can help us to create less of it.

Background

What do you know about your trash and the journey it takes once you're done with it? A waste inventory can help identify how much and what kinds of trash are produced by the classroom, the school, or at home. According to the United States Department of Agriculture Economic Research Service in 1997, “If 5 percent of consumer, retail, and food service discards were recovered, savings from landfill costs alone would be about 50 million dollars annually.” Recovering only 5 percent of losses

from these sources “could represent the equivalent of a day's food for each of 4 million people.”³ Since food waste is one of the largest component groups in the U.S. waste stream and it is the least likely to be recycled (currently we recycle just 2.6 percent of our food residuals), it would make sense to increase our efforts. Although the numbers of serious food waste reducers are small, the successes are inspiring. Food waste reduction programs in homes, schools, colleges, prisons, municipalities, and food markets are reporting a reduction of 50 to 100 percent of their food discards. This translates into a 33 to 85 percent savings in solid waste costs.⁴

What You'll Need

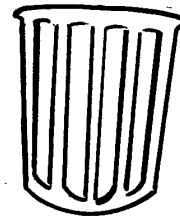
Inventory sheet (include collection dates, location, number of people included, and total weight); scale; rubber gloves; trash bags or pre-weighed plastic containers for collection; aprons or old shirts for protection; eye protection; Take Out the Trash Experiments handouts on page 137; and a large wall graph for data (optional). *Safety Tip:* Organize the waste audit to reduce as much direct contact with garbage as possible as trash may contain sharp objects or other hazards. Use protective clothing, gloves, and eye protection at all times. Most high school chemistry labs have eye-protection gear.

¹ Adapted with permission from *Pathways to a Sustainable Future* by the Chewonki Foundation/Maine Waste Management Agency, 1999.

² EPA, “Municipal Solid Waste in the United States: 2000 Facts and Figures”; Executive Summary, USDA.

³ *Food Review*, vol. 20, no. 1, 1997.

⁴ “Don't Throw Away That Food!” EPA, September 1998, #EPA530F-98023.





Getting Ready

To minimize the amount of food waste students must handle, do some careful planning ahead of time. Discuss plans for the food waste audit with the principal, custodian, and food service personnel (have food trimmings from the kitchen included along with the leftovers, for instance). In cooperation with school nutrition service colleagues, develop a workable strategy, schedule, and work duty list. (Optional: Ask other classrooms to participate by collecting their food wastes each day of the audit.) It may help to prepare the school community by:

- ◆ Arranging time for students to speak to other classes about the project;
- ◆ Making posters that explain or illustrate why you want to collect the food waste and how students and teachers might help;
- ◆ Writing a letter to parents explaining the project and how it will be done—perhaps asking for old shirts or aprons, large plastic containers and/or volunteers;
- ◆ Explaining what food collection containers will look like (line with plastic bags to make disposal easier); where the weigh station will be located; and where the waste goes after weighing.

What to Do

Begin by asking questions about where food is discarded in their communities: “What do you do with it when you are through with it?” “What does it mean to throw something away—where IS away?” Offer examples as needed (dumpster → trash hauler → regional incinerator, landfill, farmer, etc.). Ask: If the school waste goes in the dumpster, where does the dumpster go? If it goes to a transfer station, then where does it go after that? Record their answers for types of food waste and places where it is thrown away. Ask: Is all of it waste or could any part be used?

Ask “How much do you estimate that you each throw away daily? Make a list and try to estimate the weight. Indicate that the class will conduct a

food waste check (or audit) of the classroom (or whatever place you find best for your group) to see how accurate their estimates are.

Next, have students (wearing protective clothing, eyewear, and gloves) collect food waste over one day and weigh it all, subtracting out the weight of any containers. Pull out any non-food waste of appreciable weight. Weigh as soon as possible after discarding to diminish the “yuck” factor.

Continue this daily audit for two to five days; the longer you do it, the more accurate the numbers will be. Make classroom graphs; calculate the amount of food waste generated. (You might also calculate what weight or percentage might be compostable.) Figures you could calculate from your available numbers: waste generated per student, per classroom, per school—daily, weekly, monthly, and annually. Contrast the weights they derive with their own weight or that of comparable known objects—for example the average refrigerator weighs about 200 lbs (90 kgs); a sedan car weighs 2,000 lbs (900 kgs); an African elephant averages 11,000 lbs (5,000 kgs)—in fact, one elephant ear alone weighs almost 100 lbs (45 kgs)!

Classroom Conversations

Leave plenty of time to discuss your findings and make conclusions. Ask students how they feel about the activity and the results—are they surprised about the weight results? Did all this food have to be discarded? What other options might there be? What could students do to reduce the amount of their personal food waste? (See A Worm’s Eye View of Composting on page 147 and the Taking Out the Trash handout for ideas.)

Want to Do More?

- ◆ Brainstorm a list of food waste generators (home kitchens, school cafeterias, businesses, restaurants, hospitals, etc.). Try to conduct audits from the waste generators on the list. Encourage students to do waste audits at home. Have students



When explaining the concept of not wasting food, we should encourage children to take only as much as they know they can eat. We should not advocate membership in the “Clean Plate Club” (finishing their meal just for the sake of “saving” food) nor require that a clean plate will qualify them for dessert; these practices can be counter-productive.



devise an easy-to-use form that they can explain to their parents.

- ◆ Explore the history of garbage disposal before modern landfills and incinerators. What did farmers do with food waste? What does the class know about specific waste disposal options locally: where does that local food waste really go? Do any places compost their waste? What is a modern landfill or an incinerator like? Use various methods to find out the answers: research, field trip, guest speaker, video, interviews, etc.
- ◆ Conduct a similar audit for food packaging waste—what is recycled, what is thrown “away”—and look at ways to reduce the waste.
- ◆ Survey local grocery stores, restaurants, food processing plants, farms, farmer’s markets, and produce wholesalers to learn what they do with their food waste. Find out if they donate edible food (overstocked or discontinued items, blemished produce, day-old bread, surplus perishable food), to shelters and/or food pantries.

Action

Show what you know! Bring the results of your audit to your school and municipal community—choose the medium you think would be most effective for your audience: letter or speech, video, music, photographs, illustrations, or a skit. If you implement any waste reduction measures as a class or school, do another audit later to gauge the project’s success and promote this information as well. One idea might be to work with your school lunch program to use reusable cafeteria trays and utensils, and to reduce their use of individual packaged products. Write a letter to your local legislator about your results—include an explanation of any steps you took to reduce food waste and if those measures were effective. Write up a short article for your local newspaper. If you’re doing a classroom portfolio of **HEALTHY FOODS FROM HEALTHY SOILS** projects, include the article that you’ve written. (Or put together a newsletter, which could be called “Knowledge to Go: Here’s What We Know!”.)

Lesson Links

Lunch at the Dump
What Worms Want

Farm to Table
Recycled Art

Literature Links

Garbage by Robert Maass
Where Does Garbage Go? by Paul Showers
Garbage by Eleanor Hall
Uncle Willie and the Soup Kitchen by DyAnne DiSalvo-Ryan
Kinder Spirits: Children Helping Children in the Fight Against Hunger by Vicki Hubbard and Nancy Killion
Feeding the World by Janine Amos
Trash Attack: Garbage, and What We Can Do about It by Steve Beinicke and Candace Savage
Cartons, Cans, and Orange Peels: Where Does Your Garbage Go? by Joanna Foster
The Throwaway Generation by Jill Wheeler

Resources

- ◆ Consult with administration, custodian, and food service personnel to advise them of your plan and enlist their support.
- ◆ A local solid waste director will be able to provide you with waste stream information pertinent to your district. S/he may also be willing to visit the class and discuss garbage issues for your area.
- ◆ A local historian or librarian may be able to describe waste disposal methods your region used before modern times. Compare modern and old-fashioned ways of disposing or re-using our discarded trash.
- ◆ Environmental Protection Agency: www.epa.gov/teachers/ for teacher resources concerning food waste: projects, community service ideas, and children’s activities.
- ◆ *Stuff: The Secret Lives of Everyday Things* by John C. Ryan and Alan Thein Durning, Northwest Environment Watch, 1997. “If you don’t know your stuff, you don’t know your world.” Life-cycle analyses (where stuff comes from, what it does, and where it goes) for common everyday items. The publisher will provide this book to teachers for free, or you can read it on the web at www.northwestwatch.org “Reading it on a desktop computer for an hour takes one-fourth to one-tenth as much energy (depending on your



computer and its source of electricity) as went into producing each paper book, which is good. But reading it on your computer produces no revenue whatsoever for Northwest Environment Watch, which is bad.”

- ◆ For an example of one state’s waste reduction campaign, including school ideas, see Minnesota’s “Reduce Waste” program: www.moea.state.mn.us/campaign
- ◆ *Pathways to a Sustainable Future* (1999) by the Chewonki Foundation for more ways to explore waste management issues with your students.

Benchmarks

The Nature of Science: 1B—Scientific Inquiry, p. 11

Grades 3-5

“Investigations can focus on physical, biological, and social questions.”

The Nature of Mathematics: 2A—Patterns and Relationships, p. 27

Grades 3-5

“Mathematics is the study of many kinds of patterns, including numbers and shapes and operations on them. Sometimes patterns are studied because they help to explain how the world works or how to solve practical problems, sometimes because they are interesting in themselves.”

The Living Environment: 5E—Flow of Matter and Energy, p. 119

Grades 3-5

Background: “Students should begin to notice that substances may change form and move from place to place, but they never appear out of nowhere and never just disappear. Questions should encourage students to consider where substances come from and where they go. . . .”

Human Society: 7C—Social Change, p. 163

Background: “What is sought here is an understanding of what kinds of internal and external factors foster social change or influence character.”

Grades 3-5

“Changes in social arrangements happen because some rules do not work or new people are involved or outside circumstances change.”

Grades 6-8

Background: “Students can be helped to see that cultural patterns change because of technological innovations, scientific discoveries, and population changes.”

The Designed World: 8B—Materials and Manufacturing, p. 188

K-2

Background: “It is not too early for children to begin to wonder what happens to something after it has been thrown away. They can monitor the amount of waste that people produce or take part in community recycling projects.”

Grades 3-5

“Discarded products contribute to the problem of waste disposal. . . . Materials differ widely in the ease with which they can be recycled.”

The Mathematical World: 9A—Numbers, p. 212

Grades 3-5

Background: “. . . if students are to learn about the meaning of numbers and to use them properly, much of what they do must be based on solving problems in which the answers matter and the numbers used are measured quantities.”

“When people care about what is being counted or measured, it is important for them to say what the units are. . . .”

The Mathematical World: 9C—Shapes, p. 223

Grades 3-5

“Graphical display of numbers may make it possible to spot patterns that are not otherwise obvious, such as comparative size and trends.”

Habits of Mind: 12A—Values and Attitudes, p. 286

Grades 3-5

Background : “Students should be required to keep written records in bound notebooks of what they did, what data they collected, and what they think the data mean. . . . The thrust of the science experience is still to learn how to answer interesting questions about the world that can be answered empirically.”

“Keep records of their investigations and observations and not change the records later.”

Grades 6-8

“Know why it is important in science to keep honest, clear, and accurate records.”