



**UNIT 3:
FOOD AND POWER**

L.33

**FOOD
WASTE**

Note to Teachers

Scientists, farmers, and scholars have spilled a lot of ink over the need to feed 7.5 billion people and more in the future. Industrialized countries have, generally, two to three times more calories available to them than their population needs, and across the world a huge amount of food gets wasted. Scholars who study food waste suggest that we could feed the world's population with what we currently produce, if we could dramatically reduce waste. Today's lesson will explore where and how food waste becomes a problem, and what we can do to solve it.

Goals *In this lesson, students will*

- learn that food waste is a serious problem that occurs at every stage of the food system.
- understand that activists and entrepreneurs are taking action to eliminate food waste, in order to save billions of dollars and address hunger.

Objectives

- Students will study a range of materials from different media that illustrate some aspect of the food waste problem.
- Students will complete a rubric to help them process this material and use a series of questions to synthesize it.

Materials

- Three computers with Internet access
- Handouts ("Danish Supermarket" and "Food Waste Exploration")
- A set of food waste images



FOOD WASTE

Please use this margin to notate how to best adapt this curriculum to your students.

Optional Homework

HOMEWORK: excerpts from “How Ugly Fruits and Vegetables Can Help Solve World Hunger” (National Geographic Magazine, March 2016)

Instructions

Part I: Classroom Setup

If possible, assign excerpts from Elizabeth Royte’s “How Ugly Fruits and Vegetables Can Help Solve World Hunger” as homework for this class.

For this class meeting, please set up five stations:

STATION 1: Food Waste images from the National Geographic articles “How Ugly Fruits and Vegetables Can Help Solve World Hunger” (March 2016) and “One Third of Food is Lost or Wasted” (14 October 2014)

STATION 2: Interactive Foodwaste graphic: <http://www.nationalgeographic.com/magazine/2016/03/global-food-waste-statistics/>
(This graphic can be difficult for students to understand, so you may decide to model the observation and analysis you want with this graphic, or station yourself here to help the students. The graphic contains fantastic information so is worth the work it will require for students to understand it.)

STATION 3: Tristram Stuart “The Beauty of Ugly Food” National Geographic Live (15 minutes), <https://www.youtube.com/watch?v=FHN2bIEKF5g>
Minutes 4:55 (“I’d like to bring your attention to the word ‘trimmed’”) to 9:00 (The video is 15 minutes and they would have time to watch through the end if you give them ten minutes. These four minutes, though, are essential.)

STATION 4: “Danish Supermarket Selling Expired Foods Opens Second Branch” (The Guardian, 27 November 2016)

STATION 5: “The next food movement? Maybe garbage-to-plate dining.” <http://www.pbs.org/newshour/bb/next-food-movement-maybe-garbage-plate-dining/>

Part II: Getting Your Students Started

1. Open the class meeting by asking students where they notice food waste in the course of their daily lives.

As they respond get a sense of what types of food waste they notice and where.

Do they notice food waste at home? (Food that molds in the back of the refrigerator, leftovers?)

Do they see food waste at the school cafeteria?

Do they see markets or restaurants put food waste out for trash pickup?

Let students know that they will be setting their own food waste observations into a larger context.

2. Distribute the accompanying handout, or have each student open their journal to two facing empty pages, or a divide a sheet of lined paper in half vertically.

If students are using the journal or loose leaf, ask students to label their pages in the following way:



FOOD WASTE

FOOD WASTE

HOW DO WE KNOW THAT FOOD WASTE IS A PROBLEM?

HOW CAN WE SOLVE THE PROBLEM OF FOOD WASTE?

SOURCE Specific evidence provided by the source

SOURCE Specific evidence provided by the source

3. Give students 10 minutes at each station, encouraging them to explore each set of documents as thoroughly as they can. Students should use the documents at each station to search for evidence that speaks to one or both of the questions at the top of their handout.
4. When students have completed the circuit of the five stations, give the students 10 minutes to look over what they have written down, and then to write out the most compelling answers they can to each of these questions. Challenge students to draft answers that take all of their evidence into account!
5. Open the floor for discussion. Ask students to share what they have learned.
6. Once you have had a chance to check their comprehension and their ability to answer these questions, broaden the conversation:

Students may enjoy responding to a question such as “What most surprised you?”

They may also enjoy—toward the end of the conversation—thinking about their own habits and those of their family, and how they might alter them to minimize food waste.

Part III: Cooking Lab: Carrot Pancakes with ricotta and carrot-top pesto

Most home (and restaurant) kitchens throw a good deal of food away. Avoiding food waste in our own homes is relatively easy. Avoiding buying too much at once, paying careful attention to perishable foods and leftovers, and using all parts of edible foods are all readily available approaches to reducing food waste at home.

As home cooks, we always want to ask whether foods we throw away can be eaten. We have already seen that chicken skin, bones and organs make nutritious and delicious chicken stock—so that we can use virtually the whole animal. Other food cultures, especially East Asian cuisines, make use of the feet and heads as well.

We should take the same care with produce. Do a little research to find out if you can eat the leaves, roots, stem or other part of a food you already enjoy. For example, while you should not eat rhubarb leaves, the leaves of beets are delicious and packed with nutrients.

So today’s exercise is one of using what we might otherwise throw away. We will begin with ricotta cheese, which produces whey as a by-product. The whey will substitute for milk in our pancakes, which will be flavored with carrots. The greens from the carrots will make a pesto.

(Consider making the ricotta at the beginning of class, so that it can drain while you discuss food waste)



FOOD WASTE

HOMEMADE RICOTTA CHEESE

3 students

This recipe should be made alongside the carrot pancakes and carrot top pesto. This is for a class of 16, but only three students would work on this recipe while the rest work on the pancakes and pesto.

Equipment List

- Induction burner
- Pot with lid
- Sieve
- Cheesecloth
- Deep bowl
- Mixing spoon
- 2 cup liquid measure
- 1 teaspoon
- 1 tablespoon
- Juicer
- Serving bowl
- Serving spoon

Food Items

- Milk
- Heavy cream
- Salt
- Lemon juice

CARROT TOP PESTO

3 students

This recipe should be made alongside the carrot pancakes and homemade ricotta. This is for a class of 16 but only three students would work on this recipe while the others work on the pancakes and ricotta.

Equipment List

- Food Processor or blender
- 3 cutting boards
- 3 knives
- grater
- $\frac{1}{4}$ teaspoon
- 1 cup wet measure
- $\frac{1}{4}$ cup dry measure

Food Items

- 4 cups carrot tops
- $\frac{3}{4}$ cup extra-virgin olive oil
- 1 small garlic clove
- $\frac{1}{4}$ teaspoon salt, plus more to taste
- Ground black pepper, to taste
- $\frac{1}{4}$ cup finely grated parmesan cheese
- $\frac{1}{4}$ cup walnuts or pine nuts

CARROT PANCAKES

YIELD: 10 pancakes

This recipe should be doubled for a class of 16. It should also be made alongside the carrot top pesto using the tops of the carrots in this recipe, as well as the ricotta cheese. 10 students should be making this recipe while the other 6 are making the pesto and ricotta cheese.

Equipment List

- Medium mixing bowl
- 1 whisk
- 1 griddle
- Paper towels
- Spoon/measuring cup to pour batter
- Thin spatula
- 2 plates, one for the cooked pancakes and one to cover and keep warm
- 10 cutting boards
- 10 graters
- 10 peelers
- 2 cup wet measure
- 1 cup dry measure
- 1 tablespoon
- 1 teaspoon
- $\frac{1}{2}$ teaspoon

Food Items

- 1 cup whey, reserved from homemade ricotta
- 2 Tablespoons butter, melted
- 1 large egg
- 1 cup whole wheat flour
- 2 Tablespoons sugar
- 2 teaspoons baking powder
- $\frac{1}{2}$ teaspoon salt
- $\frac{1}{4}$ teaspoon baking soda
- 1 cup shredded carrots with carrot tops set aside (about 3-5 medium carrots)
- Vegetable oil, for frying



FOOD WASTE

HOMEMADE RICOTTA CHEESE

YIELD: 2 cups

*Adapted from Barefoot Contessa,
How Easy is That? by Ina Garten, 2010*

Ingredients

- 4 cups whole milk
- 2 cups heavy cream
- 1 teaspoon kosher salt
- 3 tablespoons lemon juice

Directions

1. Set a large sieve over a deep bowl. Dampen four layers of cheesecloth with water and line the sieve with the cheesecloth.
2. Pour the milk and cream into a pot and stir in the salt. Bring to a full boil over medium heat, stirring occasionally.
3. Turn the heat off and stir in the lemon juice. Allow the mixture to stand still for 1 minute until it curdles. It will separate into thick parts (the curds) and milky parts (the whey).
4. Carefully pour the mixture into the cheesecloth-lined sieve and allow it to drain into the bowl at room temperature for 20-25 minutes. The longer you let the mixture drain, the thicker the ricotta will be. Set aside and save the whey (the liquid that has drained into the bowl).
5. Transfer the ricotta to a serving bowl and discard the cheesecloth. Use immediately, or cover with plastic wrap and refrigerate. The ricotta will keep refrigerated for 4-5 days.

CARROT TOP PESTO

YIELD: about 1 cup

Ingredients

- 4 cups carrot tops, leaves and stems, roughly chopped
- $\frac{3}{4}$ cup extra-virgin olive oil, plus more if needed for thinning
- 1 small garlic clove, chopped
- $\frac{1}{4}$ teaspoon salt, plus more to taste
- Ground black pepper, to taste
- $\frac{1}{4}$ cup finely grated parmesan cheese
- $\frac{1}{4}$ cup walnuts or pine nuts (optional)

Directions

1. In a blender or food processor, combine the carrot tops, oil, garlic, salt and cheese. Blend until finely chopped.
2. If using, add the nuts and pulse until finely chopped.
3. Taste and adjust seasoning by adding more salt, pepper, garlic or Parmesan. If pesto is too thick, add more oil, a tablespoon at a time.
4. Use immediately or cover and refrigerate for up to two days.



FOOD WASTE

CARROT PANCAKES

YIELD: 10 pancakes

Ingredients

- 1 cup whey, reserved from homemade ricotta
- 2 Tablespoons butter, melted
- 1 large egg
- 1 cup whole wheat flour
- 2 Tablespoons sugar
- 2 teaspoons baking powder
- ½ teaspoon salt
- ¼ teaspoon baking soda
- 1 cup shredded carrots with carrot tops set aside (about 3-5 medium carrots)
- Vegetable oil, for frying

Directions

1. In a medium-sized bowl, whisk together the whey, butter and egg. Add the flour, sugar, baking powder, salt and baking soda and whisk until just moistened (do not over mix, a few small lumps are fine). Add shredded carrots and stir until mixed evenly.
2. Heat large skillet or griddle. Fold a sheet or paper towel in half and moisten it with oil; carefully rub skillet or griddle with oiled paper towel.
3. For each pancake, spoon 2-3 tablespoons of batter onto skillet. Use back of spoon to spread batter into a round about 4 inches in diameter. You should be able to fit 2-3 pancakes in a large skillet.
4. Cook until the surfaces of the pancakes have some bubbles and a few have burst, about 1-2 minutes. Flip carefully with a thin spatula, and cook until browned on the underside, about 1-2 minutes.
5. Transfer to a plate and cover to keep warm, continue cooking the rest of the batter.
6. Top finished pancakes each with a dollop of ricotta and carrot top pesto.



FOOD WASTE

Agence France-Presse in Copenhagen, Sunday 27 November 2016
<https://www.theguardian.com/environment/2016/nov/27/food-waste-denmark-buy-expired-produce-copenhagen-wefood>



After its success in Copenhagen's Amager district, Wefood supermarket is branching out.

Photograph: Soren Bidstrup/AFP/Getty Images

Danish Supermarket Selling Expired Food Opens Second Branch

Wefood in Copenhagen has proved a huge success as food waste becomes hot topic worldwide

It may be past its sell-by date, but for many Danes it's a tasty proposition: surplus food being sold in a Copenhagen supermarket has proved so popular that a second store has been opened.

After launching in the district of Amager earlier this year, the Wefood project attracted a long queue as it opened a second branch in the trendy neighbourhood of Nørrebro, this month.

"It's awesome that instead of throwing things out they are choosing to sell it for money. You support a good cause," said Signe Skovgaard Sørensen, a student, after picking up a bottle of upscale olive oil for 20 kroner (£2.28). . .

Selling expired food is legal in Denmark as long as it is clearly advertised and there is no immediate danger to consuming it. "We look, we smell, we feel the product and see if it's still consumable," project leader Bassel Hmeidan said.

All products are donated by producers, import and export companies and local supermarkets, and are collected by Wefood's staff, all of whom are volunteers. The store's profit goes to charity.

Prices are about half of what they would be elsewhere, but even its biggest fans would struggle to do their weekly shop here. The products available depend on what is available from donors, resulting in an eclectic mix that changes from day to day. . .

Food waste has become a hot topic in recent years, with initiatives ranging from a French ban last year on destroying unsold food, to a global network of cafes serving dishes with ingredients destined for the scrapheap.

British-based The Real Junk Food Project opened the country's first food waste supermarket in a warehouse near Leeds in September. With a greater focus than its Danish peer on feeding the poor, the UK project urges customers to simply "pay as they feel".

A UN panel said earlier this month that supermarkets' preference for perfect-looking produce and the use of arbitrary "best before" labels caused massive food waste that, if reversed, could feed the world's hungry.

Nearly 1.3bn tonnes of food are wasted every year, more than enough to sustain the 1 billion people suffering from hunger globally, the UN Food and Agriculture Organisation said.



FOOD WASTE

ELIZABETH ROYTE
from
HOW 'UGLY' FRUITS AND
VEGETABLES CAN HELP
SOLVE WORLD HUNGER

National Geographic Magazine, March 2016.



- Use the space below to note key ideas, themes, or surprising takeaways from the reading.



Writer and Activist Tristram Stuart with Colombian bananas deemed too short, too long, and too curved for European export. Photo: Brian Finke

Across cultures, food waste goes against the moral grain. After all, nearly 800 million people worldwide suffer from hunger. But according to the Food and Agriculture Organization of the United Nations, we squander enough food—globally, 2.9 trillion pounds a year—to feed every one of them more than twice over. Where's all that food—about a third of the planet's production—going? In developing nations much is lost postharvest for lack of adequate storage facilities, good roads, and refrigeration. In comparison, developed nations waste more food farther down the supply chain, when retailers order, serve, or display too much and when consumers ignore leftovers in the back of the fridge or toss perishables before they've expired.

Wasting food takes an environmental toll as well. Producing food that no one eats—whether sausages or snickerdoodles—also squanders the water, fertilizer, pesticides, seeds, fuel, and land needed to grow it. The quantities aren't trivial. Globally a year's production of uneaten food guzzles as much water as the entire annual flow of the Volga, Europe's most voluminous river. Growing the 133 billion pounds of food that retailers and consumers discard in the United States annually slurps the equivalent of more than 70 times the amount of oil lost in the Gulf of Mexico's Deepwater Horizon disaster, according to American Wasteland author Jonathan Bloom. These staggering numbers don't even include the losses



FOOD WASTE

from farms, fishing vessels, and slaughterhouses. If food waste were a country, it would be the third largest producer of greenhouse gases in the world, after China and the U.S. . .

[R]educing food waste has become a matter of international urgency. Some U.S. schools, where children dump up to 40 percent of their lunches into the trash, are setting up sharing tables, letting students serve themselves portions they know they'll eat, allotting more time for lunch, and scheduling it after recess—all proven methods of boosting consumption. Countless businesses, such as grocery stores, restaurants, and cafeterias, have stepped forward to combat waste by quantifying how much edible food isn't consumed, optimizing their purchasing, shrinking portion sizes, and beefing up efforts to move excess to charities. [British writer and activist Tristram] Stuart himself has made a specialty of investigating conditions farther up the supply chain, where supermarket standards and ordering practices lead to massive, but mostly hidden, dumps of edible food.

[Outside of Lima, Peru, w]e drive 200 miles south, past tall sand dunes and wind-eroded ridges. All is ochre and dust until we reach valleys suddenly verdant with irrigated farmland—a consequence of foreign investment, favorable trade agreements, cheap labor, a warm climate, and a once bountiful aquifer. In the Ica Region, Stuart interviews a farmer who annually abandons in his fields millions of stalks of asparagus too thin or too curved or with bud tips slightly too open to export. Next a producer tells him that he dumps more than a thousand tons of infinitesimally imperfect Minneola tangelos and a hundred tons of grapefruit a year into a sandpit behind his packhouse.

Grade standards—industry driven and voluntary—were devised long ago to provide growers and buyers with a common language for evaluating produce and mediating disputes. They also can help reduce food waste. If growers can sort their asparagus or tangelos into established grades, they stand a better chance of finding markets for their “seconds.” Supermarkets have always been free to set their own standards, of course, but in recent years upscale grocers have started running their produce departments like beauty pageants, responding to customers, they say, who expect only platonically ideal produce: apples round and shiny, asparagus straight and tightly budded. . .

With governments fretting over how to feed more than nine billion people by 2050, a dominant narrative calls for increasing global food production by 70 to 100 percent. But agriculture already represents one of the greatest threats to planetary health. It is responsible for 70 percent of the planet's freshwater withdrawals, 80 percent of the world's tropical and subtropical deforestation, and 30 to 35 percent of human-caused greenhouse gas emissions. As the population grows and emerging economies develop a taste for meat and dairy products, which require huge inputs of grain and other resources for relatively little caloric gain, this toll will worsen. But converting more wildlands to farm fields may not be necessary, some experts say. If we slash waste, change our diet to eat less meat and dairy, divert fewer food crops to biofuels, and boost yields on underperforming acres, we may be able to feed more than nine billion people a healthy diet without trashing more rain forests, plowing up more prairies, or wiping out more wetlands.



L.33

Rubric: FOOD WASTE EXPLORATION



FOOD WASTE

HOW DO WE KNOW THAT FOOD WASTE IS A PROBLEM?		HOW CAN WE SOLVE THE PROBLEM OF FOOD WASTE?	
SOURCE	Specific evidence Provided by the Source	SOURCE	Specific evidence Provided by the Source



FOOD WASTE



Every year some six billion pounds of U.S. fruits and vegetables go unharvested or unsold, often for aesthetic reasons. Photo: Brian Finke



In California's Salinas Valley growers annually trash thousands of tons of fresh greens that lack sufficient shelf life for a cross-country journey. Photo: Brian Finke



Thirty percent of the mandarin crop in Huaral, Peru, won't meet exacting export standards. Most of the rejects will be eaten locally. Globally 46 percent of fruits and vegetables never make it from farm to fork. Photo: Brian Finke



Workers sort bags of lunchroom waste from New York City schools during an audit of a composting program launched in 2012. The city collects food scraps from more than 360 schools and is testing residential collection of organic waste. Large establishments will be required to compost starting in July 2015. Several cities and states have similar requirements planned or in place. Photo: Jake Naughton/The New York Times/Redux



FOOD WASTE



Unsold tomatoes fill a Dumpster at a farmers market in Asheville, North Carolina, even though community kitchens collect some of the castoffs from vendors five days a week. About 26 percent of fresh tomatoes in the United States never make it into consumer hands. Photo: Tim Hussin



Spills, spoilage, table scraps, and other losses from the typical American family of four add up to 1,160 pounds of uneaten food annually. The Waldt family of New Jersey, avid gardeners and composters, are surrounded by groceries representing the 1.2 million calories the average family leaves uneaten every year—more than enough to feed another mouth. The food was later donated to a nonprofit. Photo: Robert Clark/National Geographic Creative

Every day, 5.4 million freshly laid eggs are collected on conveyors across Granja Mantiqueira's three facilities in Brazil. Latin America sees more than 30 billion pounds of eggs and milk lost or wasted annually during production, packaging, and distribution. Consumers in the region leave more than five billion additional pounds uneaten. Photo: George Steinmetz/National Geographic Creative



At a banquet hall in Shanghai, overflowing seafood plates represent just one of 13 courses. Weddings, where abundance is the hallmark of a good host, are among the worst sources of food waste in China, and uneaten food from all cafeterias and restaurants has increased along with urban incomes. An estimated 18 billion pounds of protein are wasted annually in China. Photo: George Steinmetz/National Geographic Creative



A refrigerator spilling over with carryout containers (left) makes it hard to keep track of food before it spoils. Using local vegetables (right) while they are still fresh requires careful meal planning and proper storage. Bacteria that cause foodborne illness are less likely to grow on food kept cooler than 40° Fahrenheit.”

