Lesson 6.3: Food Waste Audit in Our Room

Unit: Unit 6, From Farm to Table (Food Systems and Production) **Topic:** 6.1 Where Food Comes From **Grade:** 6 to 8 (written at grade 7; see Differentiation for the grade 6 support and grade 8 stretch) **Days:** 1 class period of 40 minutes (the data collection starts two days earlier; see Setup notes) **Room:** Either (classroom or FACS lab; the sorting table needs a wipeable surface)

Standards

- NYS module line: NYS FSP 3. Current Issues Related to Food in Global Societies a) Describe factors affecting the food supply, including but not limited to geography, climate, economics, transportation systems, farming methods, energy, population density, political systems, natural disasters, and food waste
- NYS module line: NYS FSP 4. Future of Food in a Global Society a) Understand the components of sustainable food systems
- CTE theme line: CTE SUS 1. Resources e) Investigate practices that promote stewardship of environmental resources
- CTE theme line: CTE SUS 2. Environmental Management c) Describe ways individuals can adjust behaviors to minimize the impact of their choices on the environment
- NYS FACS Learning Standard 3 (Intermediate), Key Idea: Students will understand and be able to manage personal resources of talent, time, energy, and money and make effective decisions in order to balance their obligations to work, family, and self.; Performance Indicator B: Students understand the resources available to them, make informed decisions about the use of those resources, and know some ways to expand resources.
- CDOS Standard 3a Universal Foundation Skills: Basic Skills
- National FCS 3.0: 8.5.13 Build sustainability into food work, from menu planning and buying through preparation, service, storage, recycling, and waste.
- National FCS 3.0: 3.4.3 Try out different ways to save energy and cut waste.

(FSP 3. a) names food waste in the line itself, which is why this lesson sits under it. The CDOS Basic Skills line is cited for the math: “apply a combination of mathematical operations to solve problems in oral or written form.” Full text in Sources.)

Enduring understanding and essential question

Big idea: About a third of the food grown in this country never gets eaten. Waste is not one big villain. It happens in small amounts at every step, including ours, and small amounts add up when you multiply by a year. **Essential question:** How much food does this class throw away in a year, and which part of it did not have to happen?

Objectives

By the end of this lesson, students will be able to:

1. (Low: understand) Name the four places food waste happens (farm, store, home, cafeteria or kitchen) and give one example of waste at each.
2. (Mid: apply) Using the class's own two days of data, calculate waste per person per day, then scale it to a school year using multiplication, and show the work.
3. (High: create) Write three specific changes this class could make to cut its own waste, each naming who does what and when.

Vocabulary

Tier 2 (general academic): audit, average, scale up, estimate, tally Tier 3 (FACS): food waste, food loss, compost, edible, trimmings, spoilage, best-by date, use-by date. See the unit vocabulary list (Vocabulary 06.md) for Turkish, Portuguese, and Spanish.

Materials and setup

- Handout 06.03 - Waste Audit Data Sheet and Scale Up.md, one per student
- One kitchen scale that reads grams and ounces (a $12 to $15 one-time purchase; the tally version below needs no scale)
- Two large clear bins or two lined buckets labeled EDIBLE and NOT EDIBLE, plus gloves for two students, plus a wipeable table cover
- The two days of collected data (see Setup notes), written on chart paper before class
- Calculators, one per pair
- Slides: Slides 06.03 - Food Waste Audit in Our Room
- Setup notes: the audit has to be set up two class days ahead. I tell students the day before: "Starting tomorrow, for two days, every scrap from this room goes in the bin on the counter, not in the trash. I will tell you why on Thursday." Option A, the kitchen audit: after each lab or food lesson, the Station Manager weighs the station's scraps and writes the number on the chart. Option B, the lunch audit: with the cafeteria's permission, a team of four students tallies discarded items at one lunch table or one tray-return line for two days, counting whole items only (unopened milk, untouched apple, half a sandwich). Option C, the no-collection version: use the class's own honest recall on day one plus the sample data printed on the handout. Allergy check: nobody touches food with bare hands, the bins stay closed between classes, gloves for the two sorters, and the bins go out at the end of the period. Nothing is tasted. *[Sal: get the cafeteria manager's okay a week ahead if you run the lunch version. Ask for a tray-return spot, not the kitchen.]*

Pre-assessment

Two questions in the do now: the guess ("how many pounds a year?") and the source guess ("where does most of it happen?"). Both get compared to the real numbers in Step 1, so the whole class sees its own starting point.

Do now and hook (Time: 5 min)

On the board: “Guess: how many pounds of food does one American throw away in a year? Then guess where most food waste happens: on the farm, at the store, at home, or in restaurants and cafeterias.”

Debrief: take five guesses for the pounds, low to high, and write the range on the board. Then the hook: uncover the two bins from our own room. “This is two days from this room. Today we weigh it, do the math, and find out what our own number is. Then you decide what to do about it.”

Procedure

Step	Teacher will	Students will	Time
1. Direct instruction: the four places waste happens	Show the four places with one example each: on the farm, a crop left in the field because the price dropped or the shape was wrong; at the store, produce pulled for looks and food pulled at a best-by date; at home, the largest share, food bought and forgotten; in cafeterias, whole items thrown away unopened. Give the real numbers from the slide and compare them to the board guesses. Say the honest part: about a third of food grown is never eaten, and homes are the single biggest piece in this country.	Fill the four boxes on the data sheet with the place, the example, and the share. Circle which place surprised them.	8 min
2. Learning activity: the audit sort and weigh	Hand gloves to two sorters per bin. Run the sort: every item	Two sorters per bin work the sort while the rest record.	10 min

	goes to EDIBLE (could have been eaten by somebody) or NOT EDIBLE (peels, cores, bones, coffee grounds). Weigh each bin and write both numbers on the chart. For the tally version, count items instead.	Everyone writes the two weights (or two counts) and the number of students the bins came from on the data sheet.	
3. The math: per person, per year	Walk the three calculations on the board, then release pairs: waste per person per day equals total divided by the number of people; multiply by 180 school days for a school year; multiply by the number of students in the building for a whole-school estimate. Circulate and check the units on every sheet.	In pairs, do all three calculations with the calculator, show the work, and label every answer with its unit (grams, ounces, or pounds). Convert the year figure to pounds.	10 min
4. Three changes	Give the task: “Three changes this class could make. Each one names who does what and when. ‘Waste less’ is not a change. ‘The Station Manager puts unopened leftovers in the labeled bin for the next class’ is a change.” Collect one from each pair on the board and ask the class to vote for the three most	Write three changes on the data sheet. One reporter per pair reads their strongest one. Vote.	5 min

	doable.		

Questions to ask

Monitor understanding:

- Is a banana peel edible waste or not edible waste? What about the last spoon of yogurt in the cup?
- Your per-person number is in grams. What is it in ounces?
- Why did we divide before we multiplied?

Deepen learning:

- Our not-edible pile is mostly peels and cores. Is that waste, or is that just what food comes wrapped in?
- Homes waste more than restaurants do. Why would that be, when a restaurant handles more food?
- Every pound in that bin took water, fuel, and somebody's work to get here. Which step on our wall path did the most work for food nobody ate?
- One of your three changes costs nothing and one of them costs something. Which is which, and which would actually last past next week?

Check for understanding

Circulating during Step 3 with the unit check: point at one answer on each pair's sheet and ask "grams or ounces?" A pair that can name the unit and say why they divided is done. A pair that multiplied by 180 before dividing by the class size gets redirected with one question, not a correction.

Closure (Time: 2 min)

One sentence on the exit card: "Our class wastes about ___ pounds a year, and the one change I will actually do is ___." Two students read a line. Sort into "got it" and "needs more." Post the class number on the wall path at the "leftovers and waste" step, which is where Lesson 6.1 left a blank.

Differentiation and supports

- ELL: the four places are shown as four photos on the slide; the data sheet has the calculation set up as a fill-in frame with the operation printed ("total ___ divided by people ___ equals ___ per person"); the words waste, compost, peel, spoiled, and leftover are on the vocabulary card in Turkish, Portuguese, and Spanish (see Vocabulary 06.md).
- IEP and 504 (general): calculators for everybody, not just students with a math accommodation; the data sheet prints the three calculations already labeled with their units so the student fills numbers, not formats; a student who cannot handle the sort records instead; sensory note: the bins smell, so they open on the far table by the window, and any student can move seats without asking.

- Grade 6 support: the sample data on the handout page 3 is already rounded to friendly numbers; grade 6 students do the per-person and per-year steps only, skipping the whole-school scale-up, and write two changes instead of three.
- Grade 8 stretch: convert the class's yearly pounds into a dollar figure using an average food cost per pound from the last store circular, then estimate the dollars for the whole school and write one sentence on what that money could buy for the FACS room.
- UDL checkpoint used: multiple means of representation (the real bins plus the numbers plus the photos) and multiple means of action and expression (a student can report the finding as a number, a drawing of the two bins, or a spoken sentence).
- No-weighing version: use tally counts instead of weight. Count items in each bin, or count whole discarded items at the lunch line, and use "items per person per day" as the unit all the way through. Every calculation works the same way; the handout prints both columns. For a class with no bins at all, use the sample data set on the handout and say clearly that it is sample data, not ours.

Assessment

Objective	Standards met	Learning task	Assessment (formative or summative; tool)
1. Name the four places and an example of each	FSP 3. a); SUS 1. e)	Four boxes on the data sheet, Step 1	Formative; data sheet checked for four places with a real example each
2. Calculate waste per person and scale it to a year	FSP 3. a); Std 3 PI B; CDOS 3a Basic Skills	The three calculations, Step 3	Formative; work shown with correct units; scored complete, partial, or missing for daily work. Assessed summatively on the Food Systems Quiz, items 5 and 6 (waste math with numbers given)
3. Write three specific changes	FSP 4. a); SUS 2. c); National FCS 8.5.13, 3.4.3	The three changes and the class vote, Step 4	Formative; each change names who, what, and when. The winning three go on the wall and get checked in Lesson 6.5

Homework

None. Optional: look in one refrigerator at home and find one thing that is going to be thrown out this week. Bring the item's name and one reason it did not get eaten.

Connections

Math: this is a real measurement, averaging, and scaling problem with the class's own data, and it is worth telling the math teacher the numbers so both classes use the same set. Science: decomposition and composting connect to the life science unit, and Lesson 6.5 starts the compost sort. Cafeteria: the cafeteria manager is the partner who makes the lunch version possible, and what they get back is a student report they can use. *[Sal: the three changes are worth typing up and handing to the cafeteria manager and the principal with the class's number on top. That is a five-minute document that makes the class look serious.]*

Sources

- NYS Middle Level CTE FACS Content Module 06, Food Systems and Production (nyctecenter.org, June 2018), lines 3. a) and 4. a). Copy in 02 Standards/NYS Module PDFs/.
- NYS Middle Level CTE Theme Module 06, Sustainability, lines 1. e) and 2. c). Same folder. The Sustainability module's own Agricultural Education illustrative activity is a cafeteria food waste audit, which is where this lesson's shape comes from.
- NYS Learning Standards for Health, Physical Education, and Family and Consumer Sciences (1996), Standard 3, Intermediate, FACS strand, Performance Indicator B. Wording per 02 Standards/STANDARDS SOURCES - web research.md, section 2. *[Sal: confirm against the NYSED PDF.]*
- CDOS Intermediate Standard 3a Universal Foundation Skills, Basic Skills: "Students listen to and read the ideas of others and analyze what they hear and read; acquire and use information from a variety of sources; and apply a combination of mathematical operations to solve problems in oral or written form." Same file, section 3.
- National Standards for Family and Consumer Sciences Education 3.0 (LEAD FCS Education, 2018), competencies 8.5.13 and 3.4.3.
- National waste share figures on the slide are from the USDA and EPA public estimates, rounded. *[Sal: pull the current figure the week you teach it; the number moves and students will look it up on their phones.]*

Teacher notes

- The setup is the hard part, not the lesson. Tell students two days ahead and put the bin where they cannot miss it. Without real data this lesson is a worksheet.
- If time runs short, cut the whole-school scale-up and keep per person and per year.
- Common mistake: students count the not-edible pile as the shameful pile. It is not. Peels and cores were never going to be eaten. Keep the two bins separate so the argument stays honest.

- The bins go out at the end of the period, every time. Do not leave food in the room overnight. That is a Unit 1 safety rule and it still applies.
- Handle this without blame. The class number is a class number, not a list of who wasted what. If one lab's scraps are much larger, say so as a design problem: "that recipe makes more trim than the other one," not "that station was wasteful."
- *[Sal: your $40 family project already had students pricing food. Pull one price from that project into the grade 8 stretch so the dollar figure uses their own number.]*