Module 9: The Value Within Our Food

Goals and Objectives:

Students will explore the value of food and the ramifications of food loss and waste, particularly regarding consumer-based responsibility. Students will learn of the global burden of food loss and waste and how it interrelates to the food supply chain. Students will brainstorm preventative solutions of all scales at each step of the food supply chain, as well as what they themselves can do to make a difference. Students will discover the hidden resources that are discarded as waste and will engage in critical thinking regarding the essential inputs required for food production and the extent of loss resulting from food waste. To help students apply their knowledge, this lesson concludes with an activity for students to reflect on messaging strategies and design their own poster to guide consumer behavior.

Time: 1 hour 15 minutes

Optional additional activities: 60 minutes

Materials:

- [ ] Module 9 Teacher Print Kit
- [ ] Module 9 Student Handouts
- [ ] Scissors
- [ ] Whiteboard and markers (or large sheet of paper and markers)
- [ ] Pens OR pencils
- [ ] Printer Paper
- [ ] Tape OR 24 magnets
- [ ] 5 clear jars OR cups
- [ ] Multicolor Pom Poms of Assorted Sizes

Optional:

- [ ] post-It notes
- [ ] Projector
- [ ] Technology to play a video

Teacher Background:

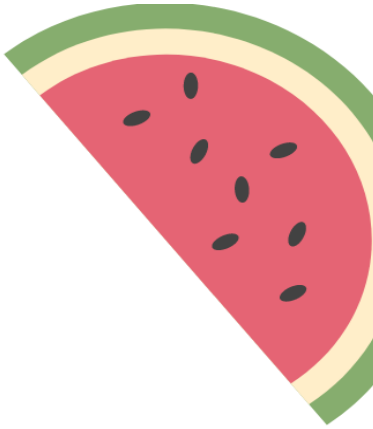
Everything from biodiversity loss, economic inequities, emerging infectious diseases, and intensification of climate-related disasters have been driven by unsustainable and wasteful food systems. From the production to processing to packaging, the food chain requires substantial demands of resources and energy. When food is wasted, all the resources—water, fertilizer, energy, and labor—and the environmental costs—greenhouse gas emissions, soil erosion, and water pollution— are also wasted. Worldwide, 1.3 billion tons of food is tossed out every year, including 45 trillion gallons of water, which translates to 25% of our total freshwater supply.[1] These 1.3 billion tons of food wastage is enough to feed every hungry person in the world more than twice over. To be exact, it would only take recovering 25% of our food that is currently lost or wasted to end world hunger.[2]

The United States is the leading country in food waste, with approximately 40% of edible and nutritive food produced never eaten. The average American household tosses out 25% of purchased food from spoilage, over-prepping, over-purchasing, as well as misinformation on date labeling.[3] Within that 40% of food never eaten, the amount of energy that is lost is enough to power more than 50 million homes. Additionally, the greenhouse gas emissions stemming from unconsumed food equates to the emissions of 37 million cars, or more than 42 coal-fired power plants. This impact accounts for approximately 10% of global greenhouse gas emissions.[4]

The environmental footprint of food loss and waste in the United States alone encompasses an area of agricultural land equivalent to the combined size of California and New York, which is approximately 140 million acres. This represents nearly 30% of the agricultural land dedicated to producing food that ultimately goes unconsumed.[5]

However, there are great differences between where and how food is lost between low-income and high-income countries. In low-income countries, 40% of the food that is grown is lost from environmental consequences and inadequate resources. Inadequate refrigeration storage poses a risk to crops, making them susceptible to pests and diseases. Additionally, transportation timelines and access to markets are hindered by limited road infrastructure.[6] Furthermore, the shifting climate has led to a significant rise in extreme weather events, causing widespread crop destruction and hindering harvesting opportunities. However, there is also an economic factor at play.
Many small farms cannot afford high labor costs, making it financially challenging to harvest the crops they have cultivated. Moreover, if market prices are low, the labor investment required to gather the crops may not be worthwhile.[7]

All efforts to recover food loss, specifically in low-income countries, will have secondary impacts on reducing malnutrition, hunger, poverty, carbon emissions, and water shortages.



Opening Discussion:

Ask your students the following questions to generate discussion on this topic and get the lesson started.

- *The United States wastes about 1/3 of their total edible food. Why do we think that the U.S. tosses out so much food?*
    - *In terms of food waste, do you think that we differ from other countries?*
- *Why do you think wasting food is so common?*
- *What resources are in our food that we are also throwing away?*
- *What are some benefits to reducing our food waste?*

Activity #1: Food Waste vs. Food Loss

Time: 30 minutes

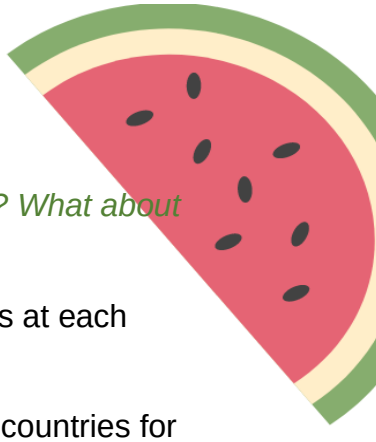
Materials:

- ☐ Teacher Print Kit
  - ☐ Includes: Answer Key – Food Waste (page 1-2)
- ☐ Student Handouts
  - ☐ Includes: Food Waste versus Food Loss (page 1, print 1 for every 2-3 students)
  - ☐ Includes: Food Supply Chain Cards (Cut out; page 2)
  - ☐ Includes: Food Loss and Food Waste Cards (Cut out; page 4-7)
- ☐ Scissors
- ☐ Whiteboard or large piece of paper with markers
- ☐ Tape or 24 Magnets

Prep: Cut out the Food Supply Chain Cards (page 2) and the Food Loss and Waste Cards (pages 4-7) from the Student Handouts.

Lesson:

1. Hand out the Food Supply Chain Cards (page 2) and the Food Loss and Waste Cards (pages 4-7), giving only one card to each student.
2. On the whiteboard or large piece of paper, create a T-chart with one side labelled as “food waste” and the other side labelled as “food loss.”
3. Ask your students; Does anyone want to share what they know about food waste versus food loss?
4. Display or handout the “What is Food Waste and How does it differ from Food Loss?” on page 1 of the Student Handouts to review the definitions. As a class, hypothesize where food loss and food waste are represented on the food supply chain.
5. Start with the Food Supply Chain Cards, having each student take their turn to place the card under either the “food waste” or “food loss” categories, using either magnets or tape. Ask each student to explain why they are placing their card under the chosen category. (Make sure that each of the cards has room in between for the placement of the Food Loss and Waste Cards.)
6. Now ask the students with the Food Loss and Waste Cards to place their card, one at a time, near the part of the food chain they think it belongs to. Ask each student to explain why they are placing the card there.
7. Check the answers via the Answer Key on pages 1-2 in the Teacher Print Kit.
8. Looking at the T-chart, discuss:



- *Where do you think food waste is most prevalent in the world? What about food loss?*
    - *Why do we think this is?*
- Brainstorm solutions together for reducing food waste and loss at each step of the food supply chain.
    - Examples:
        - **Production:** Increase investment in developing countries for lowering post-harvest losses, increase crop protection, expand markets
        - **Storage:** Improving storage to maintain freshness and protect food from pests, improve safe and hygienic food handling practice.
        - **Processing and Packaging:** Increasing quality of protective material, reduce portion sizes, re-design date labels.
        - **Distribution and Marketing:** Improve transportation infrastructure, increase educational awareness on food date labeling and proper storage practices, redistribute unsold food via donating.
        - **Consumption:** Purchase and use ‘ugly’ foods, save and eat leftovers, plan meals, prepare a shopping list, increase public awareness on food waste.

Activity #2: Discovering the True Costs

Time: 30 minutes

Materials:

- ☐ Teacher Print Kit
  - ☐ Includes: Answer Key (page 3)
- ☐ Student Handouts
  - ☐ Includes: The Hidden Waste Worksheets (pages 10-19)
  - ☐ Includes: Figure Legend (page 20). Print 1 copy for every 2-3 students.
- ☐ Scissors
- ☐ Pens/pencils
- ☐ Multicolor Pom Poms of Assorted Sizes →

- ☐ Scotch tape OR post-It notes
- ☐ 5 clear jars OR cups

Optional:

- ☐ Projector
- ☐ Student Handouts: “How Much Goes into Our Food?” (pages 8-9)

Prep: Print out one copy of each of the Hidden Waste Worksheets (pages 10-19) in the Student Handouts, as well as the Figure Legend (page 20).

Lesson:

1. Place your students into 5 groups, with at least 2 in each group. (If you have a small number of students, you may choose to not use one of the worksheets and make 4 different groups).

2. Set up 5 jars, labelled with either scotch tape or a post-It for each food item: Bread, Beef, Cheese, Milk, Chocolate. Place the jars either at the front of the room, or in front of each group.

3. Give each group at least 6 small purple pompoms, 8 large purple pompoms, 3 small blue pompoms, 12 large blue pompoms, 4 small yellow pompoms, 26 large yellow pompoms, 2 small green pompoms, and 18 large green pompoms. Please note that the colors for each category – carbon dioxide, water, energy, and land – do not have to be these exact colors.

4. Explain that, *as a group, you have all been assigned a different food item. Together, you will place the amount of each resource you believe it takes to produce that food item in the appropriate jar. Make sure to work as a team, brainstorming how much goes into each food, from the farm to the table.* Give each group around 10-15 minutes to decide their resources and ask them to record their guesses on the Hidden Waste Worksheets.
    - **Optional:** Hand each group a copy of "How Much Goes into Our Food?" on pages 8-9 from the Student Handouts. Students may use these graphs for a better estimation of how much resources their assigned food item takes.

5. Have the class come back together into one large group. Collect all the jars and place them all together on a table. Ask the class, *what other resources have we not added to the jar?* Write down each mentioned resource on a piece of paper and add it to the respective jar.
    - Examples: Labor/Work, Fertilizer, feed, capital, soil, packaging, processing, plastics, transportation, storage, etc.

6. Reveal the correct number of resources for each food item (Answer Key on page 3 in the Teacher's Print Kit) as you discuss the contents of each jar. Add more pompoms to the jar if the current amount is not accurate to the food item. Have students record the accurate number for them to compare with their predicted value.

7. Discuss as a class, *what other components—not necessarily visible resources—are also wasted when we toss aside edible food?*
    - Examples: environmental degradation (soil erosion, air pollution, rising temperatures), labor rights and treatment, global trade, etc.

Connecting to the Garden

Time: 15 minutes

Materials:

- ☐ Student Handout
  - ☐ The Food Waste Pyramid (page 21). Print 1 copy to every 2-3 students.
- ☐ Teacher Print Kit
  - ☐ Includes: The Food Waste Pyramid (page 4).

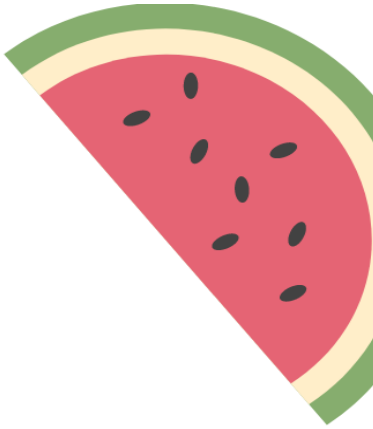
Lesson:

1. Optional: Start with the class watching *food wastage footprint*. *Make sure to pay attention to the solutions throughout the video.*

2. Pass out one copy of the "Food Waste Pyramid" to every 2-3 students. Go through each of the stages together. If the class has watched the video, ask *what solutions did we hear throughout the video, and what stage would they belong to on the pyramid?*
   a. Reference page 4 of the Teacher Print Kit for the solutions and correlating pyramid section.

3. Walk through the garden and ask students to identify what scraps or produce they see that might belong on the pyramid.
   a. Example: Students may see some "ugly" or bruised produce. To reduce the chance that the produce will go straight to the landfill, students may suggest reducing the selling price, donating the produce to a food pantry, or repurposing it for animal feed. These examples would belong on the prevention side of the pyramid.
   b. Example: Students may see crops that have been broken or damaged from extreme weather, or maybe contaminated via insects. They identify this as food loss and may propose solutions like creating a greenhouse or investing in storage technology.

4. Wrap up the activity by asking students, *what are some solutions for preventing food loss and waste in our garden?*



Optional Activity #3: Messaging the Value

Time: 40 minutes

Materials:

- ☐ Student Handout
  - ☐ Includes: Food Facts! (page 22). Print 1 copy for every 2-3 students.
- ☐ Blank notebook paper OR poster paper
- ☐ Pens, colored pencils AND/OR markers

Optional:
- ☐ Projector

Lesson:

1. Pass out blank paper to each student. If poster paper is available, give one poster to a group of 2-3 students.

2. Give one copy of “Food Facts!” on page 22 of the Student Handout to every 2-3 students, as an information source. (You may also project the handout instead of printing it out.)

3. Ask each group to think of how they would like to convey what they have learned to their school and classmates. *How would you communicate the value of food? What messages might be most impactful to your classmates?* Students are not limited to designing a poster exclusively on consumer behavior or waste. Throughout the module, we have discussed food loss, the food supply chain, and disparities between countries.

4. Give the class 30 minutes to work on their poster. If your students are in groups, ask each group to briefly present their poster and messaging strategy.

5. If allowed, hang the posters around the classroom or school. You may want to end this lesson by reflecting on current student food waste and consumption behavior at school. Ask the class to reflect on the wastefulness or sustainability of school lunches.

    - *How much of the cafeteria food is packaged in plastic and/or processed?*
    - *Do many students finish their tray? How often do you witness food being tossed out? What are some reasons for this and solutions?*

Optional Activity #4: Exploring Our Plate

Time: 20 minutes; 10 minutes of class time, 10 minutes of out-of-class work

Materials:

- ☐ Pens/pencils
- ☐ Student Handout
  - ☐ Exploring Our Plate Worksheet (Page 24). Print 1 copy for every student.

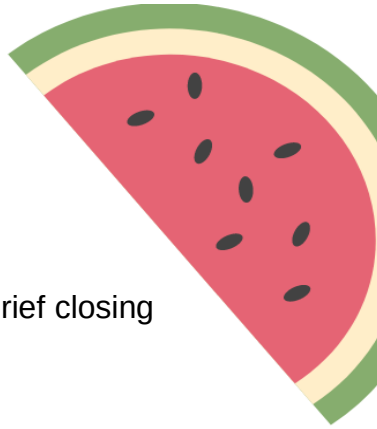
Lesson:

1. Pass out the “Exploring Our Plate” activity sheet to each student. In the activity, students will complete the activity sheet during their lunch time.

2. Read aloud the three worksheet questions: *How many food items were wrapped in plastic packaging? How much food was left on your plate? How much of your meal came from other countries?* Explain that plastic packaging could include saran wrap, a carton, a plastic bag, etc.

3. Prompt students to think about where their food came from. If their food was produced by a large company, ask students to explore if these companies have human rights, anti-discrimination, or equitable policies and practices. *Remember that food items are not simply nutrition, or edible items. Food carries the air, water, land, and energy that created it. Food also carries the labor and treatment of humans, the environmental degradation, the transportation, storage, and all the steps it took from harvesting to your plate.*

4. After completion of the activity, open the floor for students to reflect and comment on their experience. *What have you learned? How will your experience impact your eating behaviors?*

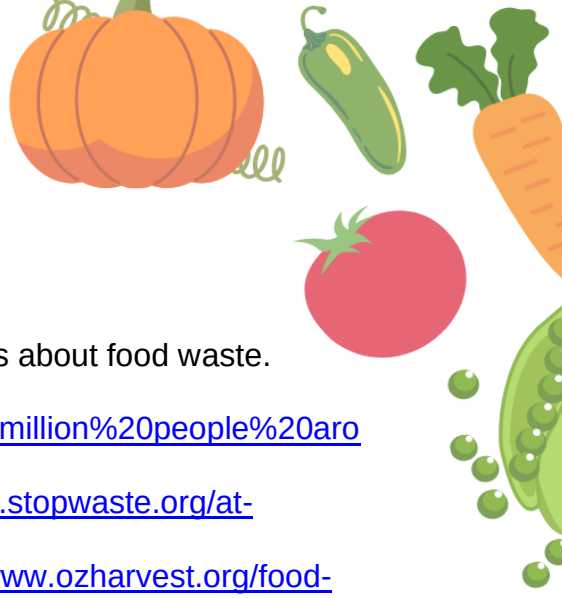


Closing Discussion:

You may wish to help the students connect the dots in this lesson using a brief closing comment, such as the one below.

Lastly, discuss the following.

- *What makes you throw away food? What can you to do reduce your food waste?*
- *How does the global food chain and food system relate to food waste and sustainability?*
- *How is food waste related to climate change and our environment?*
- *What do you think are some misconceptions about food waste and sustainability? How should we address these?*
- *Why is there a difference in food waste between countries? In what ways is this political?*
- *How can food waste be a human rights issue?*
    a. Example: When we purchase food, we are giving money to support the producers. Our supermarkets are filled with food from large corporations, some with unjust worker's rights and discrimination cases. When we throw away that food, we are also disregarding the labor efforts, and treatment of the labor force.



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Connecting to the Garden

Food and Agriculture Organization of the United Nations. (2013, September 11). *Food wastage footprint* [Video]. Youtube. https://www.youtube.com/watch?v=IoCVrkcaH6Q

Optional Activity #4: Exploring Our Plate

Adapted from “Every plate tells a story,” by World’s Largest Lesson. https://worldslargestlesson.globalgoals.org/resource/plate-pioneerz-every-plate-tells-a-story/.