



Plan, Shop, Chop!

Food Waste Sustainability Lesson Plan

Outline: *This food waste lesson plan guides students through a meal planning simulation that highlights the impacts of wasted food including loss of natural resources, human labor, and money, landfill space, and greenhouse gas production. Students plan and shop for a meal then calculate and discuss the impact when an average of 40% of food is wasted in the United States.*

Grades: 9th -12th

Time: 45-60 minutes

ProStart connections: Chapters 13 (newer edition) and 9 (older edition)

Essential questions: What is the impact of wasted food? What can students and culinary professionals do to take action?

Learning objectives:

1. Students will understand the connection between food production and resource use (land and habitat, water, fuel, human labor, and time).
2. Students will understand the connection between food production, landfills, and climate change.
3. Students will have specific recommendations for home and work to prevent wasted food.

Lesson materials:

- Natural resource posters (3)
- Tiles or chips (to represent natural resources)
- Student planning worksheets
- Student calculations worksheets
- Clipboards or writing surfaces (ex. cardboard)
- Plastic containers (to hold resource chips)
- Small trash can or clear container (for collecting materials)
- Fake money (ex. cut green paper)
- Plan, Shop, Chop! PowerPoint
- Calculators (*optional*)
- Food waste hierarchy activity page (*optional*)
- Banana supply chain activity cards (*optional*)

Helpful vocabulary: natural resource, nonrenewable, fossil fuel, greenhouse gas, composting,

Introduction and Simulation (~20 min)

- (Before students arrive) Place natural resource posters (3) around the room with containers of resource chips in front of each. Gather a set of materials for each group: clipboard, worksheets (2), money, and container.
- Break students into small groups (no more than 4 students) and let them know they will be working together to plan and shop for their own meal. Hand out materials.

- Allow students time to complete the planning worksheet (with colors) by selecting up to four food items in whole number units and calculating the cost. Encourage them to be creative and choose their favorite foods to feed the group.
- Have groups fill out the upper part of the second worksheet with a description of their meal, total cost, and list of food items and units in the table. Collect the money spent from each group and set aside for later.
- Inform students they will now go “shopping” for some of the natural resources needed to produce the food items they chose. Students move around the room to visit each natural resource poster (land, water, and fuel) and collect the required number of chips for each item. Remind students to account for number of units (for example, if students are using two units of an item, they take twice as many chips as is listed on the poster) and to record all chips taken in the table. **Let students know that the “fuel” category includes both production inputs (for example, machinery and transportation) and outputs (for example, methane gas from cattle digestion) and is thus actually a measure of total greenhouse gas emissions, not just fossil fuel use.**
- Once all groups have returned to their tables, begin a class discussion about the process. Possible discussion questions include: How did the process of collecting resources go for your group? Why did you pick the foods you picked? Was there anything unexpected? Which foods appeared to use the most and least resources? Why might that be? How are natural resources used in producing food? Some answers include chemicals and fertilizers as well as fuel and energy for irrigation and machinery, transportation, refrigeration, and processing.

Wasted Food (~15 min)

- Introduce the strawberry video and ask students to keep track while they watch of all the natural resources being used throughout the process.
- After the video, discuss with students: Can you relate to this video? What did you think was interesting about the video? What natural resources were used? Which of those resources were non-renewable (limited amount available on Earth)? What percentage of food is wasted in the United States? Allow students to guess and fill in the blank for worksheet question 2 with the correct answer (40%).
- Let groups calculate what percent of their natural resources were wasted, separate this number of chips from their piles, and dump them in a central “trash” container.
- Share and discuss the slides around food waste, offering background information.
- View and discuss the slides with information about how much food and resources are wasted and ask students where they think waste occurs. Note that in high-income countries like the United States, most food loss occurs at retail and consumer levels (such as food thrown out in hotel buffets), rather than in storage, transport, and processing (such as lack of refrigeration for fresh milk). Also observe that the most commonly wasted foods are fruits, vegetables, and seafood. Connect to the industry with slide information about the food wasted in restaurants.
- Prompt students to consider what else (beyond natural resources) is wasted, and move on to worksheet question 3 to calculate the money lost. Have groups report out 40% of their

spending, then count this amount from what you collected and throw it in the “trash” with the natural resource chips. Discuss the cost of waste in restaurants and brainstorm other costs this money could be spent on when running a restaurant. Note that this also represents consumer losses to those students in their households.

- *Whether or not you discuss with your class, it's important for teachers to recognize that many households experience food insecurity, particularly in Oregon, and that many students in our communities and schools face the opposite reality. This can be a sensitive subject for people.*
- Ask students why else (beyond natural resources and money) food waste matters, and discuss landfills and climate change. Food is the most common item in trash and rots in landfills to release methane gas, a strong contributor to climate change. Not only does agricultural production contribute to greenhouse emissions (including fossil fuel use and cattle farming), so does food waste. Food waste is such a large contributor to global climate change that Project Drawdown ranked “Reducing Food Waste” as #3 in a list of the 80 most important actions needed to combat global climate change (see www.drawdown.org).

Solutions and wrap-up (~10 min)

- Debrief and discuss with students: Why not waste food? What did you find surprising or interesting about the activity? What might you have done differently when meal planning?
- What are some strategies culinary professionals can use to reduce food waste? Highlight these strategies.
- (Optional) pass out the food waste hierarchy activity and ask students to rank the seven actions from most to least desirable.

Optional Extensions

- Include reading and activities from ProStart Chapters 13 (newer edition) and 9 (older edition) about repurposing food, composting, organics, and energy and water conservation. Sections like “Following through on sustainable products”, “What the industry can do”, and knowledge checks and chapter activities can reinforce student behaviors and learning.
- Allow groups to complete the banana supply chain activity (~20 min) by passing a set of cards (9) to each group so students can first put the steps in order then read and identify all the natural resources used to produce a banana.
- Discuss and research the connection between food waste and wildlife, highlighting highly impactful crops like palm oil and soy.
- Share information with students about the ZooQuest summer volunteer program.

This lesson was modified December 2018 by Metro staff, Portland, OR.