Hands-On Activity A: Cafeteria Waste Audit

Teacher Guide (pages 1-2) & Rubric (pages 3-7), for Module 2 HOA A

Overview: This hands-on audit is a key part of Module 2, tying together concepts from Lessons A, B, and C in a practical way. In **Lesson A**, students learned about linear vs. circular food systems and different waste pathways. This activity makes those concepts tangible by revealing how our own cafeteria handles food waste (largely a one-way *linear* path to the trash now, but ripe for improvement towards a circular model). It also highlights the types of waste generated in a school cafeteria and encourages students to think about where that "waste" really goes. In **Lesson B**, the focus is on behavior change and system levers (like choice architecture and education). During the audit, students directly encounter the *human factors* behind waste, the reasons why food is thrown out, which sets the stage for discussing behavioral nudges and cafeteria interventions. Encourage students to recognize, for example, how a simple change in presentation or scheduling (like recess before lunch) can dramatically reduce waste, or how giving foods creative names can increase uptake. In **Lesson C**, students explore strategies for reducing waste and closing resource loops. The audit provides baseline data that can lead into Lesson C's discussions: What combination of strategies (from reducing portions to composting leftovers) will create a more sustainable, closed-loop system on campus? Students might even use the audit data to calculate potential climate impacts or savings (connecting to the "carbon math", e.g., estimating how much methane emissions could be avoided if the audited waste were composted rather than landfilled) (sustainableamerica.org).

Implementation Notes:

- **Timing:** Ideally, conduct the audit **after Lesson A** (to ground abstract concepts in a real-world problem) and revisit the findings during Lessons B and C when brainstorming solutions. The audit itself takes one lunch period (~30 minutes of data collection) plus class time for prep and analysis.

- **Preparation:** Coordinate with school administration and cafeteria staff well in advance. Ensure you have permissions for students to handle food waste and be in the cafeteria during lunch (consider any food safety regulations). If possible, involve the school's nutrition director or principal; it shows support, and they'll be interested in the results.

- **Student Roles:** This activity is student-led. Your role is to facilitate, help them organize their roles, but let them do the talking and sorting during the audit. It can be chaotic, but it's a fantastic learning opportunity for leadership and teamwork. Review safety and roles beforehand in class. Perhaps practice interviewing by role-playing scenarios ("What if a student says they're in a hurry?" etc.).

- **During the Audit:** Oversee for safety and data accuracy. Prompt interviewers to ask follow-up questions if answers are too vague. Ensure separators are consistent in what goes in each bucket. Keep things moving, but also be ready to pause if a teachable moment arises (e.g., a *huge* pile of unopened food, that's a great visual to discuss later!). Take photos of the process or results if your school allows; these can be powerful in presentations or reports (just ensure student identities are protected or you have permissions).

- **After the Audit, Debrief:** Back in the classroom, guide students through the analysis. Have them calculate totals and perhaps percentages (math integration). Facilitate a discussion using the guiding questions. Encourage students to think about root causes: *Why* are we seeing these waste patterns?

Which causes can we address through **behavior changes** (student choices, awareness, cafeteria environment tweaks) and which through **system changes** (policy, new equipment, scheduling)? This discussion foreshadows Lesson B's content on nudges and Lesson C's on system solutions, so draw those connections explicitly.

- **Connecting to Broader Context:** Remind students that this is not just a one-off exercise; it aligns with real-world sustainability goals. For example, the United States has a national goal to **halve food waste by 2030**, with schools playing a key role in this effort. The data they collected contributes to understanding and solving a piece of a global challenge. If possible, compare their findings with other schools' data (the WWF Food Waste Warriors database or other case studies; worldwildlife.org) to show that their experience fits into a bigger picture.

- **Next Steps:** Encourage them to turn their findings into action. Perhaps as a class or club project, they can pilot one of the solutions they suggested (like implementing a "Share Table" program or doing a second audit after changes are made). This reinforces the idea of **iterative improvement**, using data to drive change, then measuring again. It's also an opportunity for student leadership: they can present their results and recommendations to school administrators or at a school assembly, advocating for improvements. This empowers them and demonstrates **systems thinking in action**; they identified a problem, analyzed it in the context of the larger system, and proposed changes that loop resources back into productive use.

Credit: This activity is adapted from *"A Guide to Conducting Student Food Waste Audits: A Resource for Schools"* (USDA, EPA, Univ. of Arkansas, 2017) (epa.gov). The adaptation incorporates updated concepts from the Sustainable Agri-Food Systems curriculum (Module 2) to connect the audit with circular economy principles and current best practices in food waste reduction.

Rubric for assessment

Use the **Data Collection Worksheet** and students' participation to assess understanding. The worksheet responses will show both their observational skills and conceptual grasp. The rubric below provides criteria for evaluating their performance. You may assign point values (for example, 4 = Exemplary, 3 = Proficient, 2 = Developing, 1 = Beginning) for each category, for a total of up to 20 points. This can be used as a formative assessment or part of a lab/activity grade.

Grading Rubric (Short Version)

Use this quick-reference table to evaluate short-response, short-essay, and design-based answers. See page 4 for the detailed rubric.

Criteria	Exemplary (4 pts)	Proficient (3 pts)	Developing (2 pts)	Beginning (1 pt)
Data Collection & Accuracy (Food Waste Log and Feedback Log)	The food waste log is fully completed, including starting/ending weights, net waste, and detailed notes. The student feedback log is thorough, recording multiple reasons and themes.	Most data recorded; logs generally complete with minor omissions; feedback log includes reasons and some themes.	Incomplete data; logs missing details; feedback log vague or only partially filled in.	Minimal data recorded; logs largely blank or disorganized; feedback log missing or incorrect.
Guiding Questions (Waste Patterns, Reasons, Solutions)	Insightful, accurate answers with strong connections to food systems concepts; multiple factors and solutions explained clearly.	Answers accurate with some explanation; at least one factor or solution addressed per question.	Limited or vague answers; some misconceptions; only partial responses given.	Very minimal or incorrect answers; little evidence of understanding.
Reflection & Analysis (Findings, Impacts, Recommendations)	Strong synthesis of results; clearly explains environmental, economic, and community impacts of waste; well-reasoned recommendations supported with evidence.	General synthesis of results; explains impacts of waste; recommendations present but less detailed.	Basic or incomplete synthesis; vague explanation of impacts; weak or unsupported recommendations.	Reflection missing or very minimal; no clear understanding of food waste impacts or solutions.

Systems Thinking & Environmental Connections	Demonstrates clear systems thinking; links food waste to environmental impacts (methane, climate change), budgets, nutrition, and sustainable practices.	Shows some systems thinking; links food waste to at least two impacts (environmental, economic, or social).	Limited systems thinking; makes one basic connection between food waste and impact.	No evidence of systems thinking; no connections to broader impacts.
Communication & Presentation (Clarity, Organization, Effort)	Work is neat, well-organized, and easy to follow; data tables complete; answers clearly written; high effort evident.	Work is organized and mostly complete; tables filled in; answers readable; good effort shown.	Work somewhat disorganized or incomplete; some missing labels or unclear explanations.	Work messy, incomplete, or very hard to follow; minimal effort shown.

1. Data Collection & Accuracy (Food Waste Log and Feedback Log)

- *Exemplary (4 pts):* Food Waste Log is **fully completed** with all starting and ending weights recorded accurately, net waste calculated correctly for each category, and detailed notes on the waste (e.g., notes about appearance or unopened items). The Student Feedback Log is **thorough**, capturing multiple specific reasons for waste in each category and noting clear themes. Data is neatly organized and clearly labeled.

- *Proficient (3 pts):* Food Waste Log is mostly complete, with most weights recorded (maybe one or two minor omissions). Calculations of net waste are mostly correct. The Feedback Log includes reasons for most categories and identifies some common themes. Although minor details might be missing, the overall data quality is good.

- *Developing (2 pts):* Data collection is **incomplete**, some categories are missing weights or not calculated correctly. Logs may be missing details (e.g., a few notes in the notes column). The Feedback Log provides only vague reasons or covers only a few items; patterns/themes are not clearly identified. The organization may be disorganized, making it hard to interpret the data.

- *Beginning (1 pt):* Very little useful data recorded. Logs are largely blank or highly disorganized/inaccurate. Important categories were not measured, and student feedback is missing or incorrect. Shows minimal effort in data collection, resulting in an unclear picture of the waste.

2. Guiding Questions (Waste Patterns, Reasons, Solutions)

- *Exemplary (4 pts):* Answers to the guiding questions are **insightful and comprehensive**. Students identify the correct category with the highest waste and provide a thoughtful explanation for why. They clearly summarize common reasons for waste, supported by examples from their data. They notice if there were unopened items and discuss what that implies. Solutions offered for reducing waste are creative, specific, and directly tied to the observed problems (for example, they might say, “Many unopened milks were wasted, we suggest a share table or educating about the milk requirement”). Responses show strong connections to food system concepts discussed in class (like noting a linear vs. circular issue, or referencing the need for behavior change).

- *Proficient (3 pts):* Answers address each question accurately, with at least one reason or factor noted for each. Students correctly identify the highest-waste category and give a plausible reason. They list a

couple of common student reasons for waste and note obvious patterns. They mention unopened items if applicable. At least one solution is provided for each problem area, although explanations may be brief. Answers show a solid understanding, though they may not elaborate on connections to broader concepts.

- *Developing (2 pts):* Answers are **partial or vague**. For example, students might identify a waste category but not really explore why it's high. They list one or two reasons students gave, but miss major themes that were apparent in the data. They might overlook unopened items or fail to realize their significance. Solutions suggested may be very general ("we should waste less food") or not clearly tied to the causes identified. There may be some misconceptions or missing pieces (e.g., thinking one factor is the sole cause without evidence).

- *Beginning (1 pt):* Responses show minimal understanding. Students might misidentify the largest waste category or provide reasons that don't align with the data. Little to no reasoning is provided; answers could be one-word or off-base. Few or no solutions are suggested, or solutions have no clear connection to the problem (indicating a lack of understanding of the issues).

3. Reflection & Analysis (Findings, Impacts, Recommendations)

- *Exemplary (4 pts):* Reflection is **thoughtful and well-developed**. The summary of findings is clear and highlights key insights (not just "we wasted X lbs" but also what that means). Students clearly articulate the environmental impacts (e.g. *"Food waste in landfills produces methane, contributing to climate change"* sustainableamerica.org), the economic impacts (wasted food = wasted money for the school), and community/social impacts (like the ethical issue of food waste when some people are hungry, or the loss of nutrition). They provide **well-reasoned recommendations**, at least two, with details on how to implement them and how they would help. These recommendations are supported by data from their audit or examples from class (e.g. *"We observed many whole apples wasted, so one recommendation is to start cutting fruits into slices to make them easier to eat, which studies show can significantly reduce fruit waste."*). There is a clear connection between their analysis and the recommended solutions.

- *Proficient (3 pts):* Reflection covers the basics. The summary recaps the main findings. Some impacts of waste are mentioned, at least two of the three (environmental, financial, or community) are addressed correctly. For instance, they may note environmental impact (trash in landfills, attracting pests, etc.) and budget impact (money spent on food that wasn't eaten). Recommendations are given (two as required), and they are sensible and relevant to the findings, though perhaps not deeply detailed. Support or reasoning for recommendations is present but may not be extensive. Overall shows understanding, though depth of insight may be moderate.

- *Developing (2 pts):* Reflection is **basic and may miss key points**. The findings summary might be very short or just numerical without interpretation. Discussion of impacts might be shallow, e.g. only saying "it's bad for the environment" without explanation, or missing one of the major areas (enviro/budget/community). Recommendations are either only one given, or two given but they are somewhat superficial (e.g. "tell people not to waste food" without a concrete plan) and not clearly derived from the data. Little evidence or reasoning is used to back up the suggestions.

- *Beginning (1 pt):* Little to no meaningful reflection. Students might not provide a real summary of findings or demonstrate any takeaway from the activity. Impacts of waste are misunderstood or not mentioned at all. (For example, they might say "it doesn't really matter" or give incorrect information.) Recommendations, if any, are impractical or unrelated to what was observed. The response lacks evidence of learning from the activity.

4. Systems Thinking & Environmental Connections

- *Exemplary (4 pts):* Student work shows **clear systems thinking**. They make connections between the cafeteria waste and larger environmental and social systems. For example, they link food waste to its contribution to methane emissions and climate change sustainableamerica.org, mention how reducing waste could benefit the school (budget, cleanliness) *and* the community (perhaps donating unused food to those in need). They might note how one change can have ripple effects (like how composting cafeteria waste could improve soil for the school garden, tying into nutrient cycling). The best responses will explicitly mention concepts like circular economy or closing the loop, demonstrating that students see the **broader context** of this cafeteria audit.

- *Proficient (3 pts):* There is some evidence of systems thinking. Students make at least a couple of broader connections, for instance, noting an environmental issue (like "wasting food is wasting the water and energy used to produce it") or a social connection ("wasted cafeteria food could have helped someone"). They address at least two different perspectives (environmental, economic, or social). The understanding may not be deeply elaborated, but it's clear they see more than one dimension of the issue.

- *Developing (2 pts):* Limited systems perspective. Students might stick very close to the cafeteria context and not mention broader impacts. They may see one connection (often an obvious one like "it costs money"), but miss others (like climate or social justice aspects). Their thinking is somewhat siloed, focusing only on the immediate problem without recognizing how it connects outward to bigger systems.

- *Beginning (1 pt):* **No evidence of systems thinking.** Students treat the problem in isolation. For example, they only talk about the cafeteria and do not acknowledge any wider consequences or stakeholders. They might say nothing about environment or community at all, suggesting a very narrow understanding of the activity's significance.

5. Communication & Presentation (Clarity, Organization, Effort)

- *Exemplary (4 pts):* The submitted work is **clear, well-organized, and shows a high level of effort**. Data tables are complete, neatly presented (easy to read), and possibly even enhanced (students might have added a graph or color-coding on their own). Written answers are articulate, using full sentences and correct terminology from the module (e.g. using terms like "food waste," "landfill," "compost," "circular system" appropriately). The flow of their reflection or analysis is logical and easy to follow. There are few to no errors in writing. It looks like they took pride in their work.

- *Proficient (3 pts):* The work is generally well-organized and readable. Tables are mostly filled out, though there might be one or two small gaps or minor formatting issues. Answers are written in complete sentences and can be understood, with a few grammatical or spelling mistakes, but nothing that impedes comprehension. The effort is solid; they met all requirements adequately. The presentation could be polished a bit more, but it's definitely above the acceptable level.

- *Developing (2 pts):* The work **shows some disorganization or lack of completeness**. For example, parts of the log or questions might be unanswered or hard to read. There might not be clear labels on some data, or the handwriting/format makes it tricky to interpret without effort. The writing might be rough (fragments or run-on sentences, some misuse of terms), which occasionally causes confusion about its meaning. It appears the student(s) rushed through some sections.

- *Beginning (1 pt):* The work is very poorly organized or largely incomplete. Data tables might be mostly blank or numbers written without labels/units. Answers might be so short or ill-expressed that it's hard to know what they mean. The presentation is haphazard, with messy handwriting, scratch work, or entire sections missing. It shows minimal effort and makes it difficult for the teacher to follow the student's thought process.

Teacher Assessment Tips: When using this rubric, it can highlight phrases that match the student's work to decide the score. For instance, if a student's reflection clearly "explains environmental, economic, and community impacts" but their recommendations are a bit thin, you might judge that as **Proficient** in the Reflection category. Use the rubric not just for grading but as feedback: share with students where they excelled (e.g., "Great job connecting to climate impacts!") and where they could improve (e.g., "Add more detail on your solutions next time"). This activity integrates scientific inquiry, data analysis, and systems thinking; a strong performance will show strengths in all those areas. Also, consider effort and growth: even if the data had some issues, if their analysis demonstrates insight, acknowledge that.

Lastly, remind students (and yourself) that the goal of this activity is not just to collect data for a grade, but to spark changes in our school. An exemplary project isn't one that just looks good on paper; it's one that inspires action and deeper understanding. 💡 Discussing the rubric criteria with the class beforehand can clarify expectations and get students aiming not just for points, but for making a difference in their cafeteria and community.

(This teacher guide and rubric have been developed in alignment with the USDA/EPA 2017 ***Student Food Waste Audit*** *guide epa.gov and enhanced with concepts from Module 2 to emphasize circular economy thinking and student-driven action.)*