NYC Public Schools' Cafeteria Enhancement Experience Model: Waste Audit Report

Packaging and Food Waste, Food Consumption, and Waste Diversion



OCTOBER 2026

TABLE OF CONTENTS

EXECUTIVE SUMMARY 1

BACKGROUND 4

STUDY DESIGN 6

KEY FINDING 1 8
School-Procured Packaging and Foodware Account for More Than 70% of Cafeteria Waste by Volume

KEY FINDING 2 10
CEE Cafeterias Generate 86% More Disposable Packaging and Foodware Items than Traditional Cafeterias

KEY FINDING 3 11
Amount of Single-Use Plastic Remains Substantially Higher in CEE Schools

KEY FINDING 4 12
CEE Elementary School Cafeterias Generate More Waste than Middle and High School CEE and Traditional Elementary Cafeterias

KEY FINDING 5 14
Contamination Reflects Sorting Complexity Rather Than Student Behavior

KEY FINDING 6 17
CEE Schools Generated More Food Waste than Mindful Choice Meals Schools, but Less than Traditional Cafeterias

KEY FINDING 7 19
CEE Produced Food Consumption Comparable to Traditional Cafeterias, While Mindful Choice Meals Achieved the Highest Food Consumption

SUMMARY OF KEY FINDINGS 20
Comparing CEE, Mindful Choice Meals, and Traditional Cafeterias

RECOMMENDATION 1 21
Reduce Waste Through Packaging and Service Design Improvements in Existing CEE Schools

RECOMMENDATION 2 23
Grow the Hybrid Service Model for Future Elementary School Expansion

NEXT STEPS 24

CONCLUSION 25

APPENDIX 26
A. Waste Audit Methodology
B. Silent Audit Analysis by School

REFERENCES 32

EXECUTIVE SUMMARY

Modernizing School Cafeterias with a Grab-and-Go Serving Style

The NYC Public Schools (NYCPS) Cafeteria Enhancement Experience (CEE) model was developed to modernize school cafeterias by replacing traditional full-service cafeterias with brighter, more welcoming dining spaces, updated furniture, and a grab-and-go style meal service with individually packaged meal items. Designed to encourage greater school meal participation by creating a less institutional dining experience, the CEE model has expanded rapidly across the city.



A CEE cafeteria at I.S. 318 with round tables, diner-style booths, and high-top seating.

Evaluating Waste Diversion in CEE Schools

As CEE has expanded, the NYC Department of Sanitation (DSNY) has observed an increase in packaging waste and persistent challenges with waste stream contamination in these schools. To better understand these issues, Cafeteria Culture conducted waste characterization audits at three schools with CEE model during Spring 2026. CEE findings were compared with Cafeteria Culture's previous audit data under two conditions: traditional cafeterias with regular service, and traditional cafeterias implementing the USDA's Offer vs. Serve guidelines through Mindful Choice Meals (MCM), Cafeteria Culture's food waste prevention initiative.



EXECUTIVE SUMMARY

Packaging Drives Waste Generation and Contamination

The audits found that packaging and foodware accounted for more than 70% of total cafeteria waste by volume (excluding milk cartons). Compared with traditional cafeterias, CEE schools generated 86% more disposable items, including single-use plastics and compostables such as compostable utensils and trays, as well as substantially more single-use plastic items. This increased the overall volume of cafeteria waste and added complexity to waste sorting. The findings suggest that the increased number and variety of disposable materials in CEE schools contribute both to greater waste generation and to higher contamination rates, making effective waste diversion more challenging regardless of student effort.

Waste Sorting Education

While OFNS oversees school meal service, education related to waste sorting falls outside its responsibilities. The NYCPS Office of Energy and Sustainability (OES) has dedicated significant effort and resources to supporting proper waste sorting, including standardized cafeteria waste stations, dedicated specialists, educational resources, and direct support to schools. These efforts are further supported by student green teams, school staff, and NYCPS partner organizations.

Despite these collective efforts, the number and variety of packaging and foodware items in CEE cafeterias can make proper sorting challenging, particularly within the limited time available during each lunch period. Simplifying the materials entering the waste stream could complement sorting education efforts and make sorting easier for students and schools to manage.



EXECUTIVE SUMMARY

Serving Model Influences Food Waste and Food Consumption

Compared with traditional service cafeterias, CEE schools demonstrated progress in reducing food waste while maintaining similar levels of food consumption. Traditional serving style cafeterias implementing Cafeteria Culture's MCM program achieved even lower food waste and higher food consumption, suggesting that meaningful student interaction and involvement in meal selection can further improve food outcomes without increasing disposable materials.

Recommendations for Existing CEE Schools and Elementary School Expansion

1. Reduce waste in existing CEE schools by offering fewer menu items, reducing individually packaged components, and standardizing packaging and foodware to reduce material complexity.
2. Adopt a hybrid service model for future elementary school CEE expansion that combines renovated cafeterias with traditional serving style and age-appropriate opportunities for students to self-select foods.

Prioritizing the Mealtime Experience While Reducing Waste

Overall, this study concludes that the greatest opportunity to reduce waste and increase food consumption lies in simplifying meal service, reducing unnecessary disposable materials, and strengthening meaningful student interaction with the serving process while leveraging the modern, welcoming environments created through CEE. As the CEE model continues to evolve, improvements should prioritize the role of school mealtime as part of the educational environment where students develop lifelong relationships with food.



BACKGROUND

About Cafeteria Culture

Cafeteria Culture is an NYC-based nonprofit that has partnered with NYCPS since 2012 to reduce cafeteria waste and improve school meal programs through student-centered environmental education and operational improvements in cafeterias. Using its EPA-certified waste audit methodology, Cafeteria Culture measures food and packaging waste, waste contamination, and student food consumption.

In partnership with the NYCPS Office of Food and Nutrition Services (OFNS), Cafeteria Culture has developed and implemented cafeteria waste reduction initiatives including **Plastic Free Lunch Day (PFLD) and Mindful Choice Meals (MCM).**

About Mindful Choice Meals

MCM is Cafeteria Culture's food waste prevention program that creates more meaningful interactions between students and cafeteria staff, helping students to select the foods they intend to eat while meeting the existing USDA Offer vs. Serve guidelines. MCM pilots have **reduced cafeteria food waste by up to 50% and increased student meal consumption by 23%** per student**.**



Students explore school lunch choices and meal components as part of the Mindful Choice Meals (MCM) program.

The Growth and Vision Behind the Cafeteria Enhancement Experience Model

The NYCPS CEE model was developed to modernize cafeterias and increase school meal participation, particularly in middle and high schools. Championed by Community Food Advocates (CFA) in partnership with NYCPS students, CEE combines welcoming, renovated dining spaces with grab-and-go service, self-service stations, and expanded menu choices.

- CFA reports that CEE has increased school lunch participation by up to 30% in participating high schools.[1]
- As of August 2026, **281 school buildings** - representing **21.3% of NYCPS** and serving about **34.6% of all school lunches citywide** - had adopted the CEE model, with expansion into elementary schools now under active consideration.[2]

1. Community Food Advocates. (2023). Cafeteria Redesign. Community Food Advocates. Retrieved August 14, 2026, from https://www.foodadvocates.org/cafeteria-redesign
2. NYC Department of Education. (2026). School Kitchens Dashboard. Retrieved August 14, 2026, from https://experience.arcgis.com/experience/2c9dcc1de1e04155a14657db25ee10c9; Schaefer, M. (2026). Review of Schools' Food Donation and Composting Efforts [Report]. New York City Comptroller, 1-50. https://comptroller.nyc.gov/wp-content/uploads/documents/MH25-077S.pdf

BACKGROUND

Why This Matters

As the CEE model has expanded, concerns have emerged regarding increased packaging waste and waste stream contamination. CEE cafeterias use a greater number and variety of disposable materials, making waste sorting more complex and reducing diversion effectiveness. At the same time, the planned expansion into elementary schools highlights the importance of age-appropriate meal service and opportunities for meaningful interaction between students and cafeteria staff. Together, these challenges raise an important question: While improving downstream sorting behavior is an important part of sustainability education, is reducing material complexity at the source a more fundamental solution to waste prevention?

Purpose of This Study

To understand the waste impacts of the CEE model, Cafeteria Culture conducted waste characterization audits at three CEE schools with different grade levels and service models. The audits examined waste generation, material composition, contamination, food waste, food consumption, and cafeteria operations.

As schools seek to promote healthy eating habits, student agency, and positive relationships with food, it is important to understand how cafeteria design, procurement decisions, and service models affect waste outcomes and the overall school meal experience before further CEE expansion occurs.

The findings are intended to inform practical improvements to meal service, packaging and foodware, waste diversion, and future implementation of the CEE model, with an emphasis on reducing waste at the source through simpler service design and fewer disposable materials.



STUDY DESIGN

Overview

This study was designed to evaluate waste generation, contamination, and operational practices within NYCPS's CEE model. During Spring 2026, Cafeteria Culture conducted three CEE school audits using two complementary approaches to examine cafeteria waste and food consumption.

Two Silent Audits

- Evaluated packaging and foodware, material composition, waste stream contamination, and diversion performance.
- Waste from each disposal stream was sorted, counted, weighed, and measured by volume after lunch.
- Captured cafeteria-wide waste generation and sorting outcomes under normal operating conditions without student interaction or intervention.



I.S. 318 students sorting food waste during a waste audit.

One Full Waste Audit

- Evaluated food waste, food consumption, untouched food, and packaging use by grade level.
- Individual meal components were weighed before and after lunch to measure food served, consumed, wasted, and left untouched by grade level.
- Allowed for closer examination of CEE waste and food consumption patterns among elementary students.



At NEST+m, a student's tray is weighed.

Together, the audits provide insight into how meal service design, the number and variety of disposable materials, and cafeteria operations influence waste generation and diversion outcomes in CEE schools.

See Appendix A on page 26 for details of the waste audit methodology.

STUDY DESIGN

Pilot School Selection Process

School recruitment was conducted in collaboration with the NYCPS Office of Energy and Sustainability (OES) and through Cafeteria Culture's existing network of schools. Over the course of the project, Cafeteria Culture conducted preliminary observations at six CEE schools to assess cafeteria operations, waste infrastructure, meal counts, and site feasibility.

Schools were selected based on their willingness to participate, operational feasibility, and their interest in student leadership and future sustainability initiatives. The three schools were selected to represent different grade configurations, meal volumes, and cafeteria conditions within the CEE model.

Figure 1. Study Schools Included in the CEE Waste Audit

School Characteristics	K071 Juan Morel Campos Secondary School	I.S. 318 Eugenio Maria de Hostos	New Explorations Into Science, Technology & Math (NEST+m)
Grade	6-12	6-8	K-12
Neighborhood	Williamsburg	Williamsburg	Lower East Side
Borough	Brooklyn	Brooklyn	Manhattan
Enrollment	503	1,030	1,617
Approx. School Lunch Count	**300**	**650**	**500**
Audit Type	Silent	Silent	Full
Date	May 1, 2026	May 21, 2026	April 27, 2026

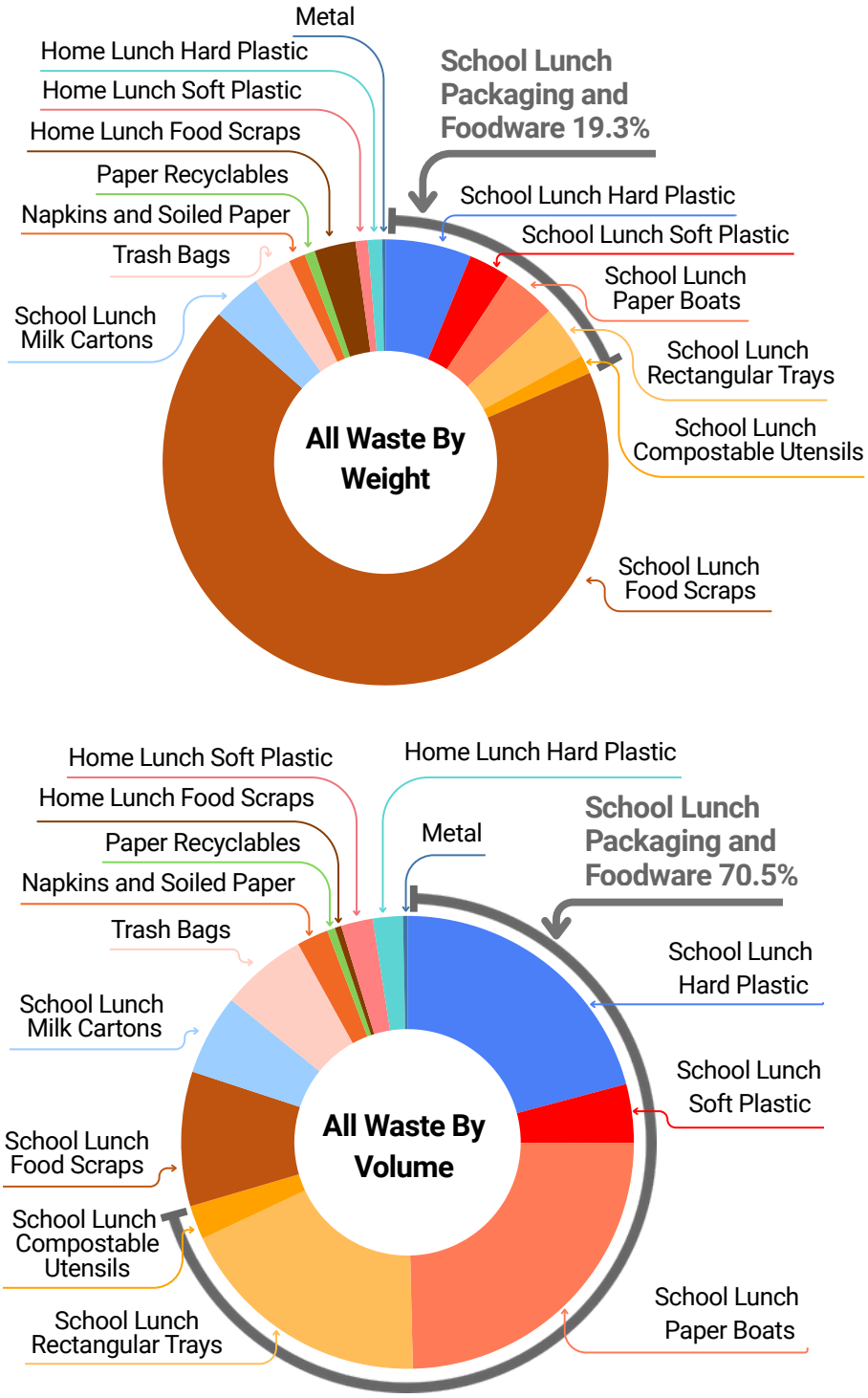


KEY FINDING 1

School-Procured Packaging and Foodware Account for More Than 70% of Cafeteria Waste by Volume

While food scraps account for the greatest proportion of waste by **weight**, disposable packaging and food service items dominate the waste stream by **volume**.

Figure 2. Waste Characterization by Weight and Volume



By weight, school lunch food scraps represented **68.1% of all cafeteria waste**, reflecting the high density of food materials. In contrast, plastic packaging, paper boats, trays, milk cartons, compostable utensils, and other disposable items individually contributed relatively small percentages by weight. Liquid milk was excluded from all weight calculations.

However, evaluating waste by **volume** presents a very different picture. School-procured packaging and food service items – including paper boats, trays, plastic packaging, and compostable foodware, excluding milk cartons – accounted for **70.5% of the total waste volume**. While much of this packaging and foodware was compostable or recyclable, these lightweight materials still occupied substantial space in the waste stream. Food scraps from school lunches were only **9.6% of total waste volume**.

KEY FINDING 1

School-Procured Packaging and Foodware Account for More Than 70% of Cafeteria Waste by Volume

Understanding the Volume and Diversion Potential

These findings illustrate that packaging materials place a disproportionate burden on waste collection, storage, and transportation. They fill waste bins more quickly, increase the frequency of bag changes during lunch periods, and create more material for custodial staff and DSNY to collect and transport.

At the same time, across the three audited schools, **only 12.7% of the total amount discarded was true trash, while 57.8% was compostable and 28.8% was recyclable.** These findings demonstrate the high diversion potential of the cafeteria waste stream when materials are sorted correctly.

Packaging Complexity Drives Diversion Challenges

Realizing this diversion potential, however, requires students to correctly identify and sort a wide variety of materials. Each additional packaging or foodware item increases the number of sorting decisions required and creates further opportunities for contamination. Reducing the number and variety of disposable materials entering the cafeteria could make proper sorting easier and improve diversion outcomes, while complementing existing student education and sorting infrastructure.



Waste from the NEST+m Full Waste Audit sorted by material type for volume measurement. This image highlights the contrast between the large volume of school food packaging and foodware (red central outline) and the comparatively small volume of food scraps (brown right outline).

KEY FINDING 2

CEE Cafeterias Generate 86% More Disposable Packaging and Foodware Items than Traditional Cafeterias

Across audited CEE schools, students generated an average of **4.61 disposable items per lunch**, including single-use plastics, compostable utensils and foodware, and food packaging, compared with **2.48 items per lunch** in traditional regular-service cafeterias. This represents **86% more disposable items** per student in CEE schools. Milk cartons are excluded from both counts.

The increase in disposable items is driven largely by the grab-and-go meal format, which includes more individually packaged meal components than in traditional cafeterias. These changes reflect OFNS's efforts to create a more engaging dining experience by offering lunches in similar formats to what students recognize from outside of school. Although some of the packaging materials like compostables are intended to support diversion goals, the resulting increase in material complexity creates sorting challenges and contributes to contamination across waste streams.

Figure 3. Average Number of School Lunch Disposable Items per Student

Measure	CEE Schools	Traditional Cafeterias
Disposable Items per Student	4.61	2.48
Single-Use Plastics per Student	3.16	0.91

Compostable utensils are excluded from the single-use plastic count. Milk cartons are excluded both from the single-use plastic count and the disposable items count. Students bringing lunch from home are not included.



KEY FINDING 3

Amount of Single-Use Plastic Remains Substantially Higher in CEE Schools

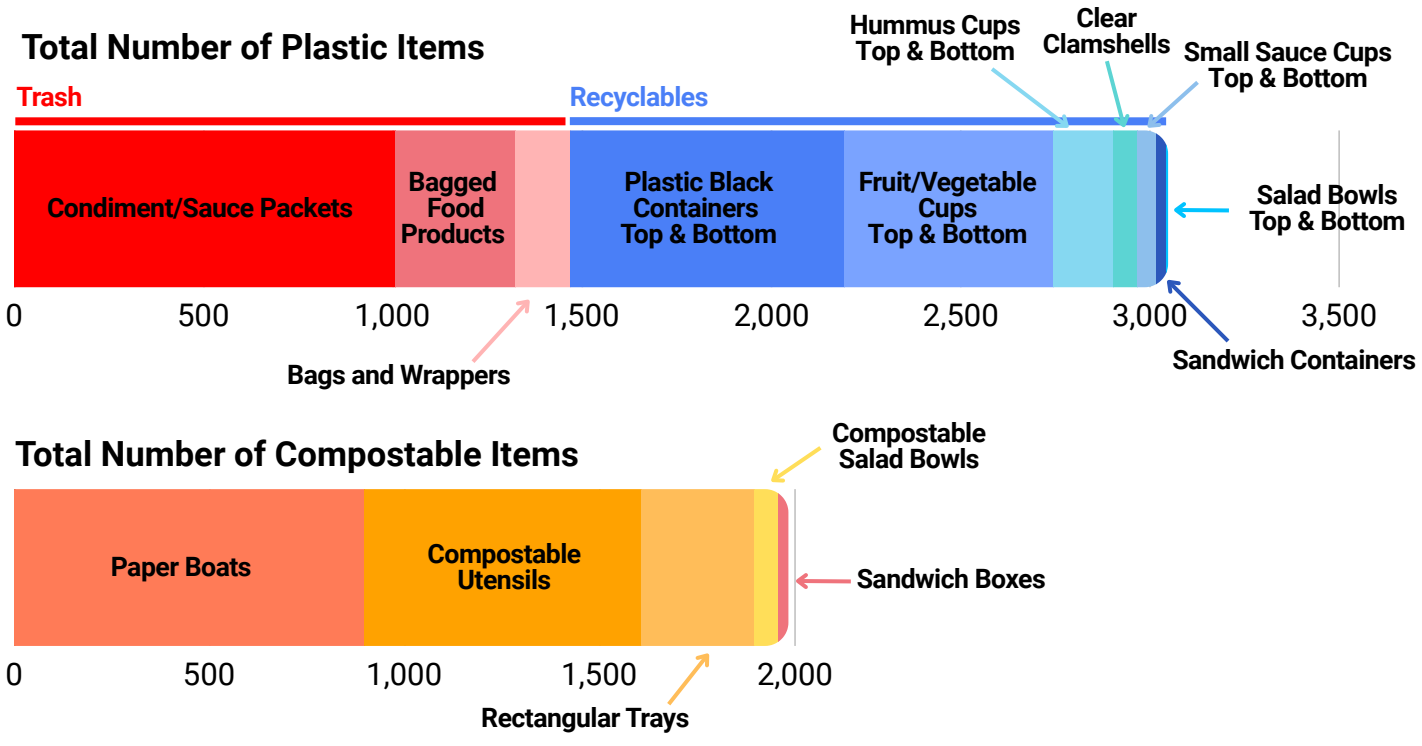
Students in CEE schools generated an average of **3.16 single-use plastic items per lunch**, compared to **0.91 single-use plastic items per lunch** in traditional service cafeterias (excluding compostable utensils and milk cartons).

The audits documented a wide variety of plastic packaging and foodware used in school meals, including entrée containers, fruit and vegetable cups, condiment packets, salad bowls, hummus cups, sauce cups, sandwich containers, bags and wrappers, and other individually packaged items.

NYCPS OFNS has recently directed School Food Service Managers to use paper boats whenever possible in place of black plastic entrée containers. This represents an important step toward reducing single-use plastics within the CEE model. However, Figure 4 illustrates that black plastic entrée containers are only one of many kinds of plastic items entering cafeterias. While replacing these containers will reduce plastic waste, **additional opportunities remain to simplify meal packaging** by reducing the number and variety of plastic components associated with each meal.

Figure 4. Number of Plastic vs Compostable Disposable Items from School Lunch

Total from 3 CEE Schools, Excluding Food Waste, Milk Cartons, and Metal

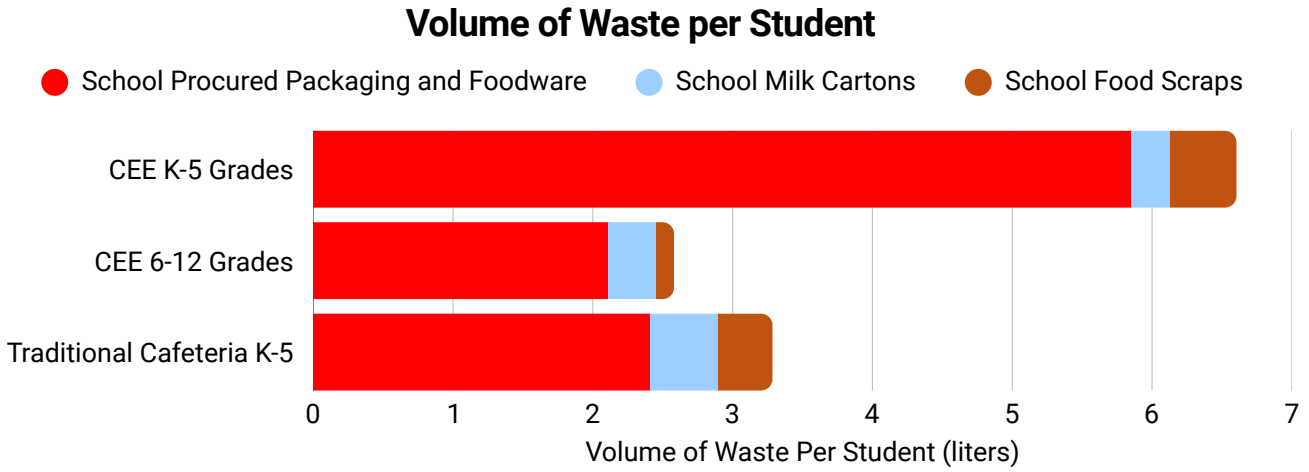


KEY FINDING 4

CEE Elementary School Cafeterias Generate More Waste than Middle and High School CEE and Traditional Elementary Cafeterias

Our audits identified that different grade levels generate significantly different amounts of waste within the CEE model. **K-5 students in CEE schools generated substantially more waste per student by volume** than CEE middle and high school students. CEE K-5 students also generated considerably more waste than the traditional K-5 cafeteria. A similar pattern was observed when waste was measured by weight. These findings suggest that the waste impacts observed in CEE middle and high schools may not translate directly to elementary settings and should be considered as CEE expands to younger grades.

Figure 5. Waste per Student Comparison Between K-5 vs 6-12 Grades and CEE vs Traditional Cafeterias



"Traditional Cafeteria" volume data was estimated from waste weight and number counts from a cafeteria waste audit at a non-MCM K-5 NYC Public School. Data do not include waste from home lunch or napkins from school lunch.



KEY FINDING 4 *CEE Elementary School Cafeterias Generate More Waste than Middle and High School CEE and Traditional Elementary Cafeterias*

Elementary Service Design Influences Waste Volume

CEE elementary students generated approximately **2.5 times as much waste by volume** per student as CEE middle and high school students, and about **twice the volume of traditional K-5 cafeterias**. Much of this difference came from school-provided packaging and foodware, including the large compostable trays used at NEST+m to help younger students carry multiple meal components. This highlights how service design changes that become necessary for younger students in CEE cafeterias can substantially increase cafeteria waste volume.



Different meal carrying needs of elementary school students (left) and middle and high school students (right).

Considerations for Elementary Expansion

These findings reinforce the importance of adapting CEE service design to the needs of elementary students rather than simply extending the middle and high school model to younger grades. Elementary students have different needs for carrying meals, selecting food, opening packages, eating within limited time, and navigating waste stations.

OFNS has already begun moving in this direction by introducing a hybrid CEE model for elementary schools that combines elements of traditional meal service with the enhanced CEE environment. While this model was not observed as part of our audits, it represents a promising direction for addressing the needs identified in this report. Continued testing of simplified packaging, fewer individually packaged components, and hybrid service approaches could help maintain the welcoming CEE environment and expanded food choices while reducing excess waste.

KEY FINDING 5

Contamination Reflects Sorting Complexity Rather Than Student Behavior

All waste streams at both CEE silent audit schools were contaminated, indicating **significant challenges with sorting** the numerous disposable items in CEE lunches.

Figure 6. Contamination Rates by Waste Stream (Weight-Based)

Contamination	Trash Bin	Recycling Bin	Compost Bin
Correctly Sorted	9.58%	11.03%	81.60%
Contaminated	**90.42%**	**88.97%**	**18.40%**

Contamination rates represent the average across I.S. 318 and K071. Paper recyclables are included in the compostable category.

Compost contamination rates measured by weight may underestimate the impact of packaging materials because food scraps are significantly heavier (see Key Finding 1 on page 8). This pattern was observed at both CEE silently audit schools.



Final waste audit photo at I.S. 318, with the contents of each waste bin (trash, recycling, and compost) separated into the correct waste stream, showing significant waste contamination in each bin. Correctly sorted waste is outlined in green, and contamination is outlined in red.

KEY FINDING 5 *Contamination Reflects Sorting Complexity Rather Than Student Behavior*

High Contamination Rates in Trash and Recycling Bins

Trash and recycling contamination was extremely high at both schools, with **only 7-15% of materials correctly sorted**. These findings indicate that most recyclable and compostable materials were sorted into the wrong waste streams. By comparison, contamination rates in compost bins appeared lower, but those values were influenced by the greater weight of food scraps, which diluted contamination when measured by weight. See Appendix B, page 29 for additional details.

Student Effort Alone Cannot Overcome Material Complexity

The audits suggest that students are not simply sorting food waste and packaging into separate streams. Rather, they are being asked to navigate a complex disposal system involving food scraps, compostable foodware, recyclable containers, plastic packaging, utensils, and other materials. As the number and variety of materials increases, contamination becomes more likely regardless of student effort.



Examples of excessive disposables in single meals – some students have 12 disposable items.

Reducing Material Complexity to Improve Diversion

Accurate sorting is difficult to sustain without continual monitoring or staff consistently correcting sorting errors. If meals contained only compostable foodware and food scraps, students could simply place everything into a single organics bin, greatly simplifying disposal while improving diversion outcomes.



Design Considerations for Elementary School Expansion

At NEST+m, elementary students use large compostable trays to carry multiple meal components from the service line to their tables and to the waste stations. The trays help them to transport their meals, as many would have difficulty carrying several individual items without them. However, the trays also create operational challenges because they occupy considerable space despite being lightweight. Students are instructed to stack the trays beside the waste stations, but many are still discarded in the compost bins, requiring cafeteria staff to remove and restack them by hand.

Trash Bin at NEST+m | **Compost Bin at NEST+m** | **Recycling Bin at NEST+m**



Just a few rectangular trays occupy a significant amount of space in waste bins.

As the CEE model expands into elementary schools, future service models should consider **alternative ways to support younger students** while reducing waste volume and minimizing additional staff handling.

As shown below, NEST+m elementary students attempted to follow sorting instructions but often struggled to identify and separate materials into the appropriate waste streams.



KEY FINDING 6

CEE Schools Generated More Food Waste than Mindful Choice Meals Schools, but Less than Traditional Cafeterias

Figure 7. Average School Food Waste per Student

All measurements are in ounces.

Grade Group	CEE Schools	Traditional Cafeterias with MCM Program	Traditional Cafeterias
K-2	5.83 oz	5.62 oz	7.07 oz
3-5	3.93 oz	4.09 oz	6.31 oz
6-8	**5.16 oz**	**3.82 oz**	6.47 oz
K-8 Average	**4.97 oz**	**4.69 oz**	**6.62 oz**

Home lunches are excluded.

While food waste in CEE schools was lower than in traditional cafeterias, **CEE schools generated 6% more food waste per student** than schools implementing MCM. The difference was most pronounced among Sixth to Eighth grades, where food waste in CEE schools exceeded MCM levels by 35%.

High school food waste at NEST+m averaged 3.38 oz per student. As comparable data from traditional full-service high school cafeterias were not available, this value is presented for reference only.



KEY FINDING 6

CEE Schools Generated More Food Waste than Mindful Choice Meals Schools, but Less than Traditional Cafeterias

Figure 8. Percentage of Untouched Food Waste Items by Number of Portions

Grade Group	CEE Schools	Traditional Cafeterias with MCM Program	Traditional Cafeterias
K-8 Average	34.8%	22.3%	47.0%

Percentages are calculated as the number of completely untouched food portions divided by the total number of portions served for school lunch. Home lunches are excluded.

Measuring untouched food by **number of portions** helps reduce differences caused by menu composition. Because individual food items vary substantially in weight, food waste measured by weight can fluctuate depending on the menu served. Counting the share of portions left completely untouched provides a more consistent indicator of how often students select food but do not eat it.

At NEST+m, **34.8% of food portions served to K-8 students remained completely untouched**, compared with a K-8 average of 22.3% in schools implementing MCM and 47.0% under traditional cafeteria baseline conditions. Because untouched portions represent foods that students accepted but never ate, untouched food serves as a valuable behavioral indicator of how well a meal service helps students select foods that they intend to consume.

While CEE provides students with greater choice through self-service meal selection, the findings suggest that meaningful interaction during meal selection may reduce untouched food by helping students make more intentional food choices.



At NEST+m, only a side salad was consumed while the main entrée remained untouched.



At PS/MS 46 during MCM Day in a traditional cafeteria, most of the meal was consumed with no untouched food items.

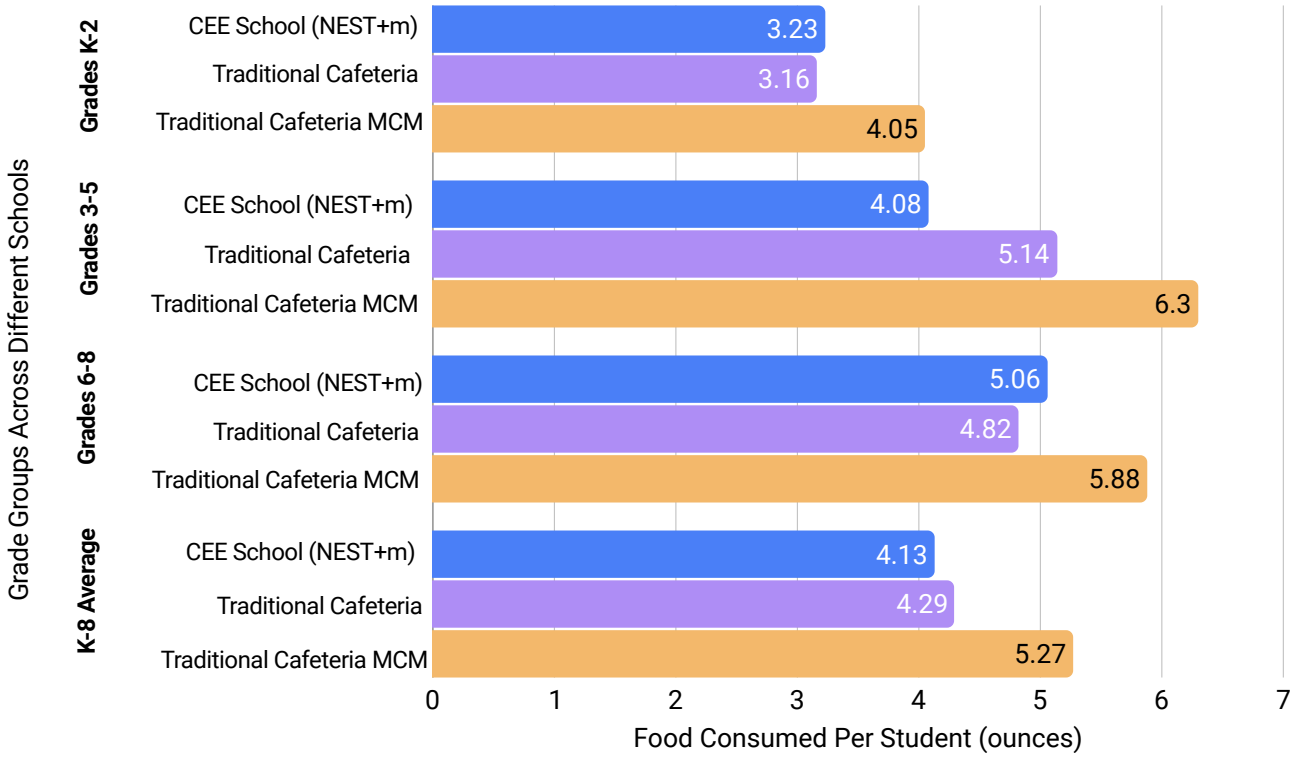
KEY FINDING 7

CEE Produced Food Consumption Comparable to Traditional Cafeterias, While Mindful Choice Meals Achieved the Highest Food Consumption

Food consumption measurements indicate that the CEE service model produced **similar overall food consumption rates to traditional cafeterias**, but did not achieve the consistently higher food consumption observed in schools implementing MCM, where students **consumed approximately 28% more food than with CEE**.

A key distinction between CEE and MCM is the role of student choice. MCM incorporates the USDA's Offer Versus Serve practices, pre-meal nutrition education, and opportunities for informed choice in the serving line. Because this study included only one full consumption audit within a CEE school, additional evaluation across multiple CEE sites is warranted. Nevertheless, the consistency of the MCM findings across multiple schools and grade levels suggests that **increasing student agency through meal choice may be a more effective strategy for improving food consumption than changes in packaging or cafeteria interior design alone**.

Figure 9. Amount of Food Consumed Per Student by Grade Group



SUMMARY OF KEY FINDINGS

Comparing CEE, Mindful Choice Meals, and Traditional Cafeterias

This study compared CEE schools with Cafeteria Culture's previous audits of traditional serving style cafeterias and schools implementing MCM. Our staff measured food consumption, food waste, and disposable materials in each meal. We did not compare school meal participation rates because pre-conversion participation data were not available for the audited CEE schools.

Figure 10. Comparison of CEE, MCM, and Traditional Cafeterias

	CEE Schools	Traditional Cafeterias with MCM Program	Traditional Cafeterias
Number of Disposables per Student	4.41	2.35	2.61
Food Waste per Student (ounces)	4.97 oz	4.69 oz	6.62 oz
Percentage of Untouched Food Waste Items	34.8%	22.3%	47.0%
Food Consumption per Student (ounces)	4.13 oz	5.28 oz	4.29 oz

All values represent K–8 averages based on school lunches served; home lunches are excluded.

Audited CEE schools generated less food waste and fewer untouched food items while maintaining similar overall food consumption when compared to traditional cafeterias. However, these improvements were accompanied by a substantial increase in disposable materials, particularly for elementary school students (see Figure 5 on page 12). Schools implementing MCM had the lowest food waste, fewest untouched food items, highest food consumption, and fewest disposable materials.

Overall, the findings suggest that the next evolution of CEE can bring sustainability and the student mealtime experience more closely together. Simpler meal service and greater interaction around food selection could reduce waste while helping students to make more intentional choices.

RECOMMENDATION 1

Reduce Waste Through Packaging and Service Design Improvements in Existing CEE Schools

The findings indicate that reducing the number and variety of disposable materials offers the greatest opportunity to reduce waste within existing CEE schools. This can be achieved by simplifying both packaging and meal service, including by offering fewer menu items at each meal.

During this study, staff observed I.S. 318 offering **10 entrée choices, 13 side items, 6 fruit options, 4 sandwich varieties, and a separate salad bar – a total of 33 different food items** during a single lunch period. While menu variety is intended to encourage participation, a large number of individually packaged meal components substantially increases waste generation, sorting complexity, and operational demands. A more streamlined menu, with additional items rotated across different days, could maintain variety over time while reducing the number of items and packaging materials offered during each meal.

Simplifying the materials and meal service within existing CEE cafeterias would make waste sorting easier for students, reduce contamination across waste streams, and improve the efficiency of DSNY's organics and recycling collection programs. The following recommendations identify practical improvements that can be implemented without changes to existing cafeteria infrastructure.



Examples of food items offered at I.S. 318.

Recommended improvements include:

- Reduce the number of menu options offered at a single meal while maintaining compliance with USDA meal requirements.
- Reduce the number and variety of disposable materials in each meal.
- Move from black plastic entrée containers to paper- or fiber-based alternatives.
- Replace individually packaged hummus packs with hummus served on paper boats alongside crackers. During the audit, only 12% of hummus cups were opened, and 93% of the hummus was discarded.
- Discontinue individually packaged plastic salad containers and instead offer freshly prepared salads at the salad bar using paper boats. Across the three audited schools, only three pre-packaged salad containers were selected, suggesting very low demand for this menu item.
- Package sandwiches in cardboard boxes instead of plastic containers or plastic wrap whenever feasible. K071 has already adopted this approach, demonstrating that it can be successfully implemented within the current CEE model.
- Eliminate pre-packaged fruit cups by allowing students to select cut fruit onto paper boats at the serving line.
- Replace condiment packets with squeeze bottles or pump dispensers whenever feasible. Condiment packets accounted for 35% of all single-use plastic items by item count, the largest single category of plastic waste identified.
- Simplify meal packaging so fewer sorting decisions are required of students.











These improvements would retain CEE's grab-and-go service, student choice, self-service options, and welcoming renovated spaces while simplifying packaging and meal service.

RECOMMENDATION 2

Grow the Hybrid Service Model for Future Elementary School Expansion

As CEE expands into additional elementary schools, OFNS has already begun adapting the model through a hybrid approach that combines elements of traditional steam table service with CEE improvements. This hybrid model was not included in the CEE waste audits conducted for this report, and further assessment is needed to evaluate its impacts on waste generation, food consumption, and the student mealtime experience. The approach, however, aligns with our findings that elementary students have different needs for carrying meals, selecting food, and navigating meal service and waste sorting.

Building on OFNS's hybrid approach in future elementary schools could include:

- Hot entrées served by kitchen staff from steam tables.
- Student self selection of fruits, vegetables, and other appropriate side items.
- Round compostable trays and simplified foodware in place of multiple individually packaged components.
- CEE furnishings and renovated dining spaces that create a welcoming and renovated cafeteria environment.

This approach could support student agency and meaningful interaction with cafeteria staff while reducing unnecessary packaging and simplifying waste sorting. It could also give students more time to select and enjoy their food, supporting a positive overall mealtime experience.



NEXT STEPS

This study provides an initial assessment of the environmental impacts of the CEE model. The following actions are recommended to further evaluate and improve it:

Immediate Pilot Opportunities

- Pilot packaging and menu modifications at selected CEE schools to reduce the number and variety of disposable foodware and packaging materials.
- Test the packaging and service improvements identified in this report, including replacing plastic containers with paper alternatives, reducing the number of individually packaged items, and expanding self-service options for non-packaged foods such as cut fruit, salads, and condiments.
- Evaluate whether simplifying menu presentation and packaging reduces waste stream contamination while maintaining food quality and student participation.
- Pilot Plastic Free Lunch Day (PFLD) in selected CEE schools to test lower-waste alternatives to plastic packaging and foodware.

Follow-Up Waste Audits

- Conduct follow-up waste audits after service design changes are implemented to measure changes in packaging waste, contamination rates, food waste, and food consumption.
- Conduct additional full waste audits at elementary CEE schools serving different student populations and demographics to better understand how the CEE model performs across diverse school settings.

Student Engagement

- Establish student teams at participating CEE schools to document cafeteria operations, collect student feedback, and identify practical opportunities to reduce waste and improve meal service.
- Create opportunities for students to share their experiences and recommendations directly with school leadership and NYCPS as future cafeteria improvements are considered.

By combining pilot projects with continued evaluation and student engagement, NYCPS can build on the success of the CEE model while reducing waste, improving the student mealtime experience, and sustaining strong participation in school lunch.

CONCLUSION

The CEE model redesigned cafeterias to create welcoming social spaces and a more modern meal service. As CEE continues to expand, it presents an opportunity to further refine how meals are packaged, served, and experienced by students.

This study demonstrates that cafeteria design extends beyond the physical environment. The format of meal service and materials used in each meal influence waste generation, food consumption, and how students interact with school meals. The findings suggest that reducing the number and variety of disposable materials, while providing students with greater involvement in selecting the foods they will eat, can improve both environmental outcomes and meal consumption.

As NYCPS considers the future of the CEE model, particularly for elementary schools, there is an opportunity to build upon the strengths of the existing renovations with thoughtful refinements to packaging, foodware, and meal service styles. A hybrid approach can offer the welcoming cafeteria environments intended through CEE while simplifying the waste stream, supporting waste diversion, and creating age-appropriate opportunities for students to participate in meal selection.

Ultimately, the cafeteria is more than a place where food is served – it is part of the educational environment where students develop lifelong relationships with food. By continuing to refine the CEE model through evidence-based improvements, NYCPS can create cafeterias that support environmental sustainability, operational efficiency, and healthy eating habits for all students.



APPENDIX

A. Waste Audit Methodology

Silent Audits (K071 Juan Morel Campos Secondary School and I.S. 318 Eugenio Maria de Hostos)

During Lunch Service

- One observer was stationed at the serving line to count the number of meals taken.
- One observer was stationed at each waste-sorting station to count the number of students disposing of materials.
- Observers documented cafeteria layout, waste station configuration, sorting behaviors, and custodial practices.
- All waste bags were pre-labeled before lunch service using a standardized identification system (e.g., TA1 = Trash, Station A, Bag 1; OA1 = Organics, Station A, Bag 1; RA1 = Recycling, Station A, Bag 1).

Waste Collection

- At the conclusion of each lunch period, Cafeteria Culture staff collected all labeled bags from each waste stream.
- Bags remained separated by stream (Trash, Organics, Recycling) and by collection location.



Recording the number of students discarding waste during a waste audit.



Labeled bags collected for weighing and sorting.



Separating food and plastic waste by type by waste stream.

Waste Characterization

- Each bag was weighed before sorting.
- Bags from the same waste streams were then combined for analysis.
- Materials were sorted by item, i.e Paper Boats, Plastic Cups, Sandwich Wrappers, Milk Cartons, etc. by each waste stream.
- Food waste was sorted by item to determine which food items were more or less wasted.
- Materials were recorded according to the waste bin in which they were originally disposed to identify contamination amounts and patterns.
- Sorted items were counted, weighed, and photographed.
- Contamination rates and material composition were calculated for each stream.

Blue Tarp

- All the sorted items were placed on a blue tarp and arranged by waste stream within the waste stream (trash in trash, compost in recycling, etc.) for the final photographs to visualize how much and what kind of disposables were in which stream, and to identify contamination.
- To estimate the approximate volume of each item type, sorted materials were placed loosely into standardized boxes and bags by individual item type (e.g., paper boats) without stacking or compressing the materials.



Materials were sorted by item by waste stream.



Weighing condiment packets after categorizing and counting everything.



Final photo after arranging each waste stream on the blue tarp to visualize the data.

Full Waste Audit (NEST+m)

Student Meal Documentation

- Each participating student's meal received a numbered sticker for tracking.
- All meal components for each student were individually weighed and photographed before consumption. Milk cartons and utensils were not weighed but were included in photos.

Consumption Assessment

- At the conclusion of lunch, the remaining food and serviceware associated with each student were weighed and photographed.
- Students were asked to distinguish which food items were partially eaten and which remained completely untouched.
- Small pink tabs were used to identify untouched food items for separate analysis.

Sorting and Analysis

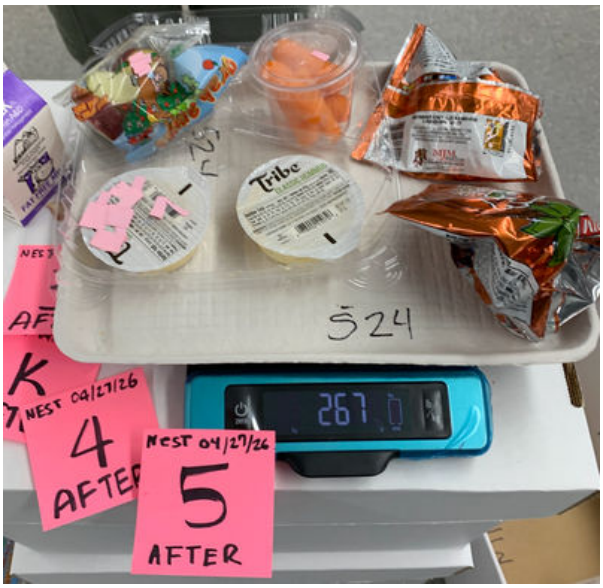
- All trays, packaging, food waste, and remaining materials were transported to a designated sorting area.
- Materials were sorted:
  - By Grade Group (K-2, 3-5, 6-8, and 9-12),
  - By Food Item, by Untouched or Partially Eaten, and
  - By Packaging Item.



Staff putting a number sticker on student's paper boat to track food consumption.



Weighing and photographing a student's meal before eating.



Student's plate at the end of the lunch period photographed and weighed for a consumption assessment.

Full Waste Audit (NEST+m) continued

- Sorted materials were counted, weighed and photographed.
- Measurements included:
  - Food Served, Food Consumed, and Food Wasted by Grade Group and Per Student,
  - Untouched Food vs Partially Eaten percentage by number of portions,
  - Number and types of Single-Use Plastic Items per student, and
  - Number and types of Compostable Serviceware and Other Packaging Materials.

Blue Tarp

- Items were grouped together by Home Lunch Plastics, School Lunch Plastics, Compostable Foodware, and Food Waste to visualize the amount and type of items in each category.
- For the full audit, food waste was grouped by untouched and partially eaten to see the ratio in each category.
- To estimate the approximate volume of each item type, sorted materials were placed loosely into standardized boxes and bags by individual item type (e.g., paper boats) without stacking or compressing the materials.



Food waste in the sorting area separated by untouched and partially eaten items.



Setting up for a blue tarp photo to visualize the data from the entire school.

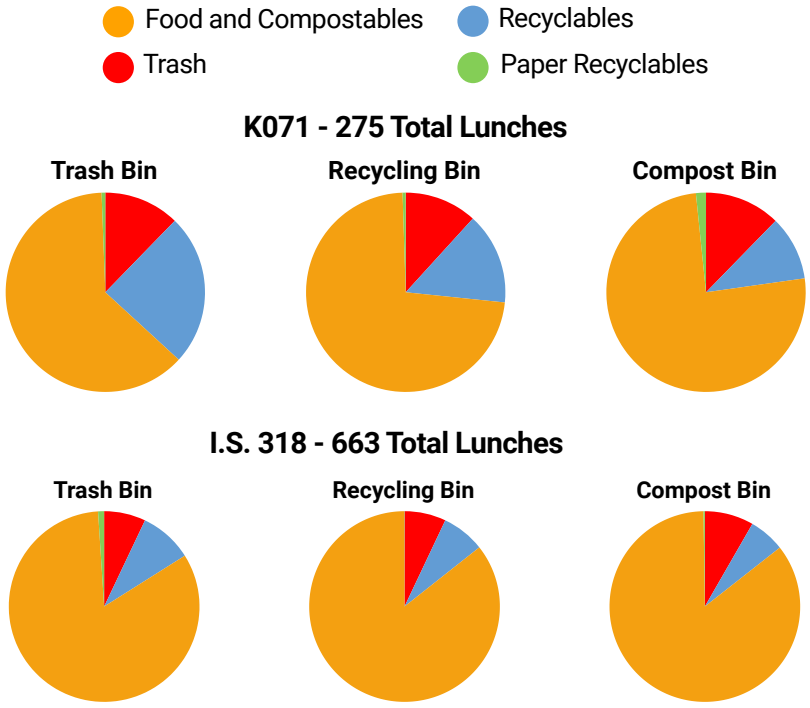


All the items were placed in boxes and bags for the volume measurement.

B. Silent Audit Analysis by School

While the Silent Audit schools (K071 and I.S. 318) operated under different operational conditions, both demonstrated common challenges related to packaging complexity, waste sorting, and diversion. These school-specific analyses provide additional context for the key findings summarized in the main report.

Figure 11. Composition of Waste Streams by Weight at K071 and I.S. 318



At K071, food and compostable materials accounted for **74.4% of the compost bin** by weight, while **recyclables and trash made up the remaining 25.6%**.

At I.S. 318, food and compostable materials represented **85.4% of the compost bin**, resulting in a lower measured contamination rate. However, this does not necessarily indicate better sorting performance.

I.S. 318 generated substantially more food waste overall, and the heavier food scraps reduced the significance of the measured contamination rate by weight.

By contrast, contamination levels in trash and recycling bins were extremely high at both schools. K071's trash and recycling bins contained **only 12.2% and 14.8% correctly sorted material**, respectively, while I.S. 318's bins contained **only 7.0% and 7.3% correctly sorted material**. These results indicate that **most recyclable and compostable materials were being discarded into the wrong streams**.

Operational Differences Between Schools

K071 and I.S. 318's cafeterias operated under different conditions that influenced waste generation and diversion. K071 offered fewer menu items and had already adopted several waste reduction practices, including serving sandwiches in cardboard boxes without plastic wrap.

I.S. 318 Faced Additional Operational Challenges

Approximately 380 6th grade students were served in a 25-minute lunch period. Lunch began at 10:30 a.m., which may have contributed to higher food waste because some students were not yet hungry. Students went directly to recess after lunch, leaving less time and attention for proper waste sorting. These operational differences help explain some of the variation observed between the schools.

Aligning Bin Capacity with Waste Generation

The schools also used different waste station configurations (Figure 12). K071 allocated more bins to compost and recycling, while I.S. 318 devoted more bins to trash. Excluding the large trays used only at NEST+m, approximately 75% of cafeteria waste by weight and 40% by volume consisted of compostable materials. Future waste station designs may benefit from increasing compost bin capacity to better match the waste generated during lunch and support organics diversion.



K071: Each of the 3 stations had 2 compost bins and 1 recycling bin; only one station included a trash bin.



I.S. 318: Each of the 4 stations had 2 trash bins and 1 compost bin; only one station included a recycling bin.

Figure 12. Number of Waste Bins at Cafeteria Sorting Stations by School

School	Trash Bins	Recycling Bins	Compost Bins
I.S. 318	6	1	4
K071	1	3	6

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