

# SCHOOL CAFETERIA WASTE REDUCTION INTERVENTIONS FOR CLIMATE SMART FOOD SERVICE



OCTOBER 2024



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# Executive Summary

Cafeteria Culture's ground-breaking project leveraged classroom curriculum, student-led campaigns, waste audits, and video to dramatically reduce **single-use plastics (SUPs)** and **food waste** in a NYC public school cafeteria. The team implemented a series of innovative, cost-effective waste reduction interventions, centering student leadership and student voices in our **School Cafeteria Waste Reduction Interventions for Climate Smart School Food Service** project at PS 15 Patrick F. Daly Magnet School of the Arts Elementary School from January 2022 to December 2023.

**Key Findings** from extensive pre-intervention (baseline) waste audits and careful observations include:

- 65% of the plastic waste from school lunches came from plastic food packaging, and 35% from disposable foodware excluding milk cartons and trays.
- On average, each student used 5.7 plastic items.
- Approximately 32% of packaged items, including utensil packets and excluding milk cartons were unopened.
- Adults at the service line were pre-plating and often over-plating food items, resulting in unwanted food on students' plates.
- 45% of food waste was completely untouched (not including food waste from the kitchen).



These key findings shaped our three interventions:

1. **Plastic Free Lunch Day (PFLD)** intervention to target food packaging
2. **Reusables Intervention** to target foodware (utensils and cups)
3. **Mindful Choice Meals (MCM)** intervention to target food waste (post-served plate waste)

Previous studies on plastic and food waste in schools have largely examined these issues in isolation. Our interventions, however, explored the connection between the two, demonstrating that **a reduction in plastic packaging correlates with a decrease in food waste and vice versa**:

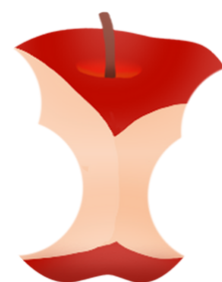
- MCM reduced food waste by 50% per student and reduced plastic waste by 51% per student, and
- Reusables + PFLD reduced 99% of plastic waste, 14% of food waste, and increased students' food consumption by 26% per student.<sup>1</sup>

Recognizing the interdependence of these two factors is crucial for designing effective, scalable interventions.

In keeping with our teaching and community engagement philosophy, we amplified the voices of students and school stakeholders throughout the program. Together with students and staff, the CafCu team co-designed interventions tailored to the community's needs. We were honored to collaborate with PS 15's diverse student body, including students of varying abilities, to develop student-driven solutions.

We conducted extensive baseline and day-of intervention waste audits to assess the efficacy of our interventions. This critical data informs procurement, menu planning, and procedural decisions for NYC Public Schools, leading to plastic and food waste reduction at the source — thus reducing costs.

The success of these interventions brings the largest school district in the country one step closer to Climate Smart School Food Service and creates a scalable model of student-led, real-world solutions for other schools and school districts to replicate nationwide.



1. See details in the Notable Findings from All Interventions section on page 20.

# Key Achievements



## Plastic Free Lunch Day: Scaled Across NYC Schools

Started at PS 15 with CafCu students as a one-day intervention, PFLD scaled to **750 NYC public elementary schools**, reaching an estimated **400,000 students** monthly. 16 NYC PFLDs to date have eliminated about **13.2 million plastic items** from the waste stream.

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## Plastic Free Lunch Day: Scaled Nationwide

With the invaluable Urban School Food Alliance partnership, PFLD has been transformed into a national biannual event, open to any school that wants to participate. To date, **more than 3,000 schools in 36 states** and the District of Columbia have participated in a PFLD event and the number of participating schools grows with each event.

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## Reusables: Four-Week Intervention at PS 15

The Reusables Intervention – which introduced reusable cups, utensils, and a satellite dishwashing service – combined with PFLD led to a **99% reduction in plastic waste** (excluding milk cartons and trays), a **14% reduction in food waste** and a **26% increase in food consumption** per student.

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## Mindful Choice Meals: One-Day Intervention at PS 15

This plate waste intervention led to a **50% reduction in food waste** weight per student and a **46% increase in the amount of food weight consumed** per student by following the USDA's Offer vs Serve provision to reduce unwanted food. MCM prevents adults' overplating, and encourages students to make their own choices.

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# Background


US school cafeterias serve 7.1 billion meals and generate billions of single-use plastics as well as 530,000 tons of food waste annually.<sup>2</sup> These two waste streams create public health and environmental problems that disproportionately burden urban and rural low-wealth communities, create unnecessary procurement and waste disposal costs, and add to the plastic and climate crises.

Plastic waste from packaging and foodware has no effective waste management solution, with over 90% of plastic waste destined for landfills, incinerators, or lost to the environment.<sup>3</sup> Plastic generates greenhouse gas emissions (GHGs) during production, use, and disposal — a major climate problem.

Food waste is also a climate problem, responsible for 8-10% of global GHGs, not including food production emissions.<sup>4</sup>

Further, school food waste is a vital lost nutrition opportunity. In the US, National School Lunch Program meals are the most nutritious food source for school-aged children and often the primary food source for food-insecure students.<sup>5</sup>

Students who lack consistent access to nutritious meals are at a greater risk of poor physical and mental health, nutritional deficiencies, and academic challenges.<sup>6</sup> Addressing school food waste presents an opportunity to ensure that students are consuming nutritious meals.



2. School Nutrition Association, [“School Meal Statistics,”](#) School Nutrition Association, 2024.; Jessica Heiges et al., [“Evaluating Food Packaging Waste in Schools: A Systematic Literature Review,”](#) International Journal of Environmental Research and Public Health 19, no. 9 (May 5, 2022): 5607.; World Wildlife Foundation, [“Food Waste Warriors: A Deep Dive into Food Waste in US Schools,”](#) (2019).

3. Roland Geyer, Jenna R. Jambeck, and Kara Lavender Law, [“Production, Use, and Fate of All Plastics Ever Made,”](#) Science Advances 3, no. 7 (July 19, 2017).

4. Niina Sundin et al., [“From Plate to Waste: Composition of School Meal Waste and Associated Carbon Footprint and Nutrient Loss,”](#) Resources, Conservation and Recycling 206 (July 2024).

5. Food and Nutrition Service, [“Lunches Consumed from School Are the Most Nutritious,”](#) Food and Nutrition Service U.S. Department of Agriculture, June 2021.; Sarah Forrestal et al., [“Associations among Food Security, School Meal Participation, and Students’ Diet Quality in the First School Nutrition and Meal Cost Study,”](#) Nutrients 13, no. 2 (January 22, 2021): 307.; Matthew P Rabbitt et al., [“Household Food Security in the United States in 2022,”](#) USDA Economic Research Service, October 2023.

6. Catheryn A. Orihuela et al., [“Associations of Household Food Insecurity with Academic Outcomes in Early Adolescents,”](#) Journal of School Health 93, no. 10 (June 25, 2023): 883-90.



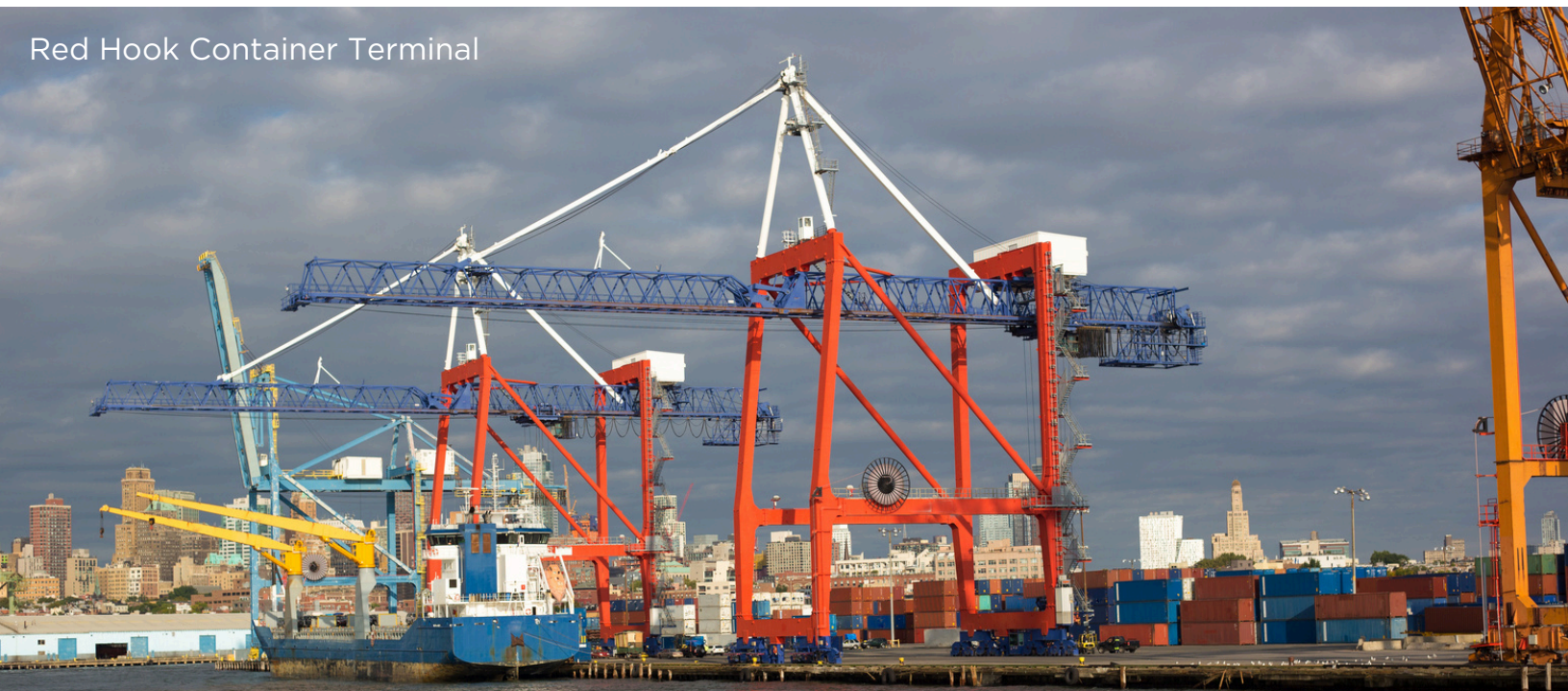
We identified three distinct upstream opportunities to interrupt plastics and food waste typically generated by school cafeterias. Under a grant from the Environmental Protection Agency (EPA) and with the collaboration of NYC Public Schools, we developed and tested three waste interventions in NYC's PS 15, Pre-K to Fifth Grade elementary school.<sup>7</sup>

PS 15 serves a socio-economically diverse student body, with a large population of differently-abled students. It is located in Red Hook, Brooklyn, home to NYC's second largest public housing complex.

Red Hook is an isolated waterfront neighborhood located in a flood zone with a historical and present industrial and warehousing sector, heavy diesel truck traffic, and little green space.<sup>8</sup>

Like other frontline communities, Red Hook experiences combined inequitable generational exposures to a polluted environment and risky geography that places residents at disproportionate prospect of pollution-related disease and extreme climate events like flooding and heat.<sup>9</sup>

Red Hook Container Terminal



7. New York City Department of Education, "2021-22 School Performance Dashboard," School Performance Dashboard, 2022; New York State Education Department, "PS 15 Patrick F Daly Enrollment (2022 - 23)," New York State Education Department, 2023.

8. Kaveh Waddell, Aliya Uteuova, and Andrew Witherspoon, "[Noise, Pollution, Danger: How Amazon Warehouses Upended a Sleepy New York Neighborhood](#)," The Guardian, May 16, 2023; Jaclyn Jeffrey-Wilensky, "[More than 1000 e-Commerce Trucks Rumble Through Red Hook Each Day, Damaging the Air Quality](#)," Gothamist (May 16, 2023); Hilary Howard and Jade Daskow, "[How 5 N.Y.C. Neighborhoods Are Struggling with Climate Change](#)," The New York Times, May 12, 2024.

9. Yanelli Nunez et al., "Trends in Air Pollution Emissions in the Contiguous United States from 1970 to 2010: An Environmental Justice Analysis," Nature Communications 15 (January 17, 2024); Red Hook Initiative, "[Red Hook Community Health](#)," Red Hook Initiative, October 2018; Abdulrahman Jbaily et al., "[Air Pollution Exposure Disparities across US Population and Income Groups](#)," Nature 601, no. 7892 (January 12, 2022): 228-33; Sharon Udasin and Saul Elbein, "[Hurricane Sandy Survivors Try to Hold onto Their Homes Nearly 10 Years Later](#)," The Hill, June 23, 2021.



Frontline communities like Red Hook are also often left out of decision-making processes, yet their lived experience offers essential perspectives on industrial and environmental hazards, as well as climate policy.

Centering PS 15's student voices in this project was key to addressing the challenges facing their community as they took the lead in co-designing and implementing these waste interventions.

#### About Cafeteria Culture

Cafeteria Culture (CafCu), founded as Styrofoam Out of Schools, is a national environmental education nonprofit that centers school cafeterias as robust student action hubs to address food waste, plastic pollution, and other climate issues.

Based in NYC, CafCu works creatively with youth to design and implement pilot projects that are replicated and scaled nationally. Pilot project schools serve predominantly lower-income public housing communities and communities of color.

CafCu uses accessible educational media (science, civics, video production, and the arts) to enable youth agency and invite their urgently needed environmental justice leadership.

Among its many accomplishments, CafCu catalyzed the elimination of styrofoam trays from NYC's public schools in 2015, produced the award-winning film *Microplastic Madness* in 2019, initiated the PFLD movement in 2022, and is currently developing and testing scalable cafeteria solutions to reduce plastic and food waste.





# Project Overview

CafCu designed these interventions to be rapidly scaled up through our free toolkits across school districts nationwide, reducing cafeteria plastic and food waste.

## Project Components:

- Three low-cost source reduction interventions:
  - **Plastic Free Lunch Day**  
Established, implemented, and assessed a scaled model of NY Citywide PFLD,
  - **Reusables Intervention**  
Piloted a four-week reusable foodware (cups and utensils) intervention at PS 15, and
  - **Mindful Choice Meals**  
Piloted a one-day food waste reduction intervention at PS 15.
- Nine waste audits: five baseline and four day-of intervention audits,
- Classroom lessons and student outreach campaigns,
- Photo and video documentation, and
- Toolkit production.

## Intervention Operations at PS 15

- Worked with one or two lead classes in six- to eight-week residency per intervention,
- Facilitated students to collect their own data and iterate their own solutions,
- Supported student-led outreach and trainings for peers, teachers, administration, and custodial and School Food Staff,
- Communicated with adult stakeholders to ensure the smooth operation of each intervention,
- Facilitated students to carry out each intervention,
- Conducted day-of waste audits to determine efficacy, and
- Collected qualitative data through video interviews.

The Office of Food and Nutrition Services (OFNS) and the Office of Energy and Sustainability (OES) in NYC Public Schools facilitated the necessary support to implement each intervention.



# Plastic Waste Reduction

## Plastic Free Lunch Day Scaled Across NYC

### Overview

CafCu led the process for NYC Public Schools to implement the first New York Citywide PFLD in May 2022. PFLD started as a one-day intervention by Fifth Graders at PS 15 in CafCu's program where lunch is served without any plastic packaging; foodware (utensils and cups) is offered by request only. PFLD now occurs monthly across 750 NYC elementary schools, which includes 400,000 students and School Food Staff following the PFLD menu.

In order to scale PFLD to citywide, OFNS and OES partnered with the CafCu team to institutionalize PFLD-specific menu and procedure modifications. CafCu created preparation, training, and messaging materials for School Food Staff and Managers, and the entire NYC public school population.

For the PFLD intervention, CafCu measured the SUP reduction rates both with and without student outreach at PS 15. With student outreach in the school community and reminders to School Food Staff, PS 15 reached a 93% reduction in school lunch SUP items on the first NY Citywide PFLD.

Without outreach or any reminders to the School Food Staff after PFLD became a monthly routine, the school still achieved a 71% reduction in SUP items compared to a normal lunch day. Most of the remaining 29% of plastic waste was foodware and foodware-related items (cups, utensils, and utensil wrappers).

Today, we continue to work with OFNS and OES on PFLD promotion and work with OFNS to expand the PFLD menu and frequency.





### PFLD-Specific Menu and Service Protocols Established

On PFLD on May 16, 2022, participating cafeterias offered a handheld menu in the serving line, requiring no utensils.

Menu and service revisions included:

- No food in plastic packaging,
- Sandwiches were not individually wrapped (instead entire trays were covered in aluminum foil),
- No individual condiment packets were offered,
- Salad bars served vegetables cut for dipping,
- Salad dressing was served in reusable bottles, and
- Water cups and utensils were offered by request only.

### Key NYC Public Schools Partners

Our NYC Public Schools partners for the NY Citywide PFLD implementation and creation of training materials included the following people:

- Stephen O'Brien, Director of Strategic Partnerships of OFNS,
- Meredith McDermott, Chief Sustainability and Decarbonization Officer of OES,
- PS 15's School Food Manager, Cook in Charge, School Food Staff, OFNS Director of Menu Management, and OFNS District 15 Supervisor, and
- PS 15's Principal, School Staff, Custodians, Teachers, and Students.





## Plastic Free Lunch Day Scaled Across NYC (continued)

Culturally Relevant Messaging

When creating messaging for home lunch students for PFLD, CafCu took care not to shame students for bringing plastic.<sup>10</sup> There are limited options for fresh produce and sustainably packaged products in Red Hook, where PS 15 is located, and the neighborhood is classified as a food desert.<sup>11</sup> Focusing on the collective action for systemic change as opposed to individual and inaccessible food options, the CafCu team encouraged students to participate in school lunch on PFLD to reduce their plastic waste. Messaging with the tagline “Eat School Lunch to Go Plastic Free” supported the feeling of a team effort and increased participation in school lunch.

PFLD's Efficacy without Outreach

After PFLD became a monthly routine, CafCu and the students paused schoolwide outreach and did not provide reminders to the School Food Staff. As a result, a waste audit revealed that some of the PFLD practices were not consistently implemented. Most of the plastic waste items consisted of foodware and foodware-related items (cups, utensils, and utensil wrappers). However, the still-significant 71% reduction in SUPs in school lunches supports that menu modifications are an effective initiative and make a notable reduction in plastic waste in school cafeterias.

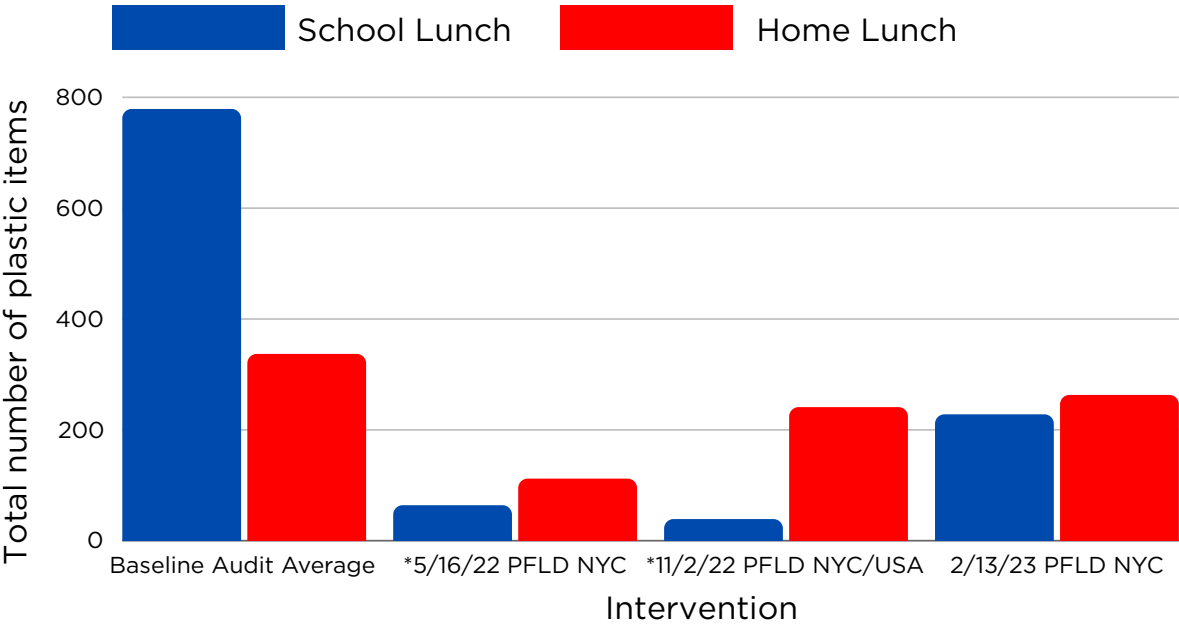
10. Derek M. Griffith et al., “Cultural Sensitivity and Cultural Tailoring: Lessons Learned and Refinements after Two Decades of Incorporating Culture in Health Communication Research,” Annual Review of Public Health 45, no. 1 (May 20, 2024): 195–212.; Public Health Communications Collaborative, “Strategies for Developing Culturally Driven Public Health Communications,” Public Health Communications Collaborative, September 2023.

11. Saara Nafici, “Added Value Farms,” The Center for the Humanities, October 3, 2018.

Plastic Free Lunch Day Scaled Across NYC (continued)

This graph shows the impact of PFLD as a one-time and monthly intervention, with and without outreach.

**FIGURE 1. TOTAL NUMBER OF PLASTIC ITEMS** \* Indicates that outreach was done



Note: Plastic count includes compostable plastic utensils, and does not include milk cartons, trays, and PPE (such as gloves and masks).

Compared to the baseline audit, each PFLD significantly reduced the SUPs in school lunch. Outreach and training for the first national PFLD on 11/2/22 led to the most significant reductions in SUPs from school lunches. Home lunch plastic decreased by 67% on the first 5/16/22 PFLD NYC, then by 28% on 11/2/22, and finally decreased by 22% on 2/13/23.

**FIGURE 2. NUMBER OF PLASTIC ITEMS PER STUDENT**

Intervention	School Lunch Number of Plastic Items Per Student	Home Lunch Number of Plastic Items Per Student
Baseline Average	5.7	2.28
5/16/22 PFLD NYC	0.41	1.11
11/2/22 PFLD NYC/USA	0.20	1.85
2/13/23 PFLD NYC (no outreach)	1.68	1.98

Note: The per-student numbers for school lunch were calculated based on students who ate school lunch only, while the per-student numbers for home lunch were calculated based on students who brought home lunch only.

Students used an average of 5.72 plastic items each during the baseline audits. On PFLD, this number dropped significantly to 0.41 on 5/16/22, 0.2 on 11/2/22, and 1.68 on 2/13/23. Although home lunch plastic items decreased during the first PFLD in NYC, the reduction was less significant on 11/2/22 and 2/13/23.

# Plastic Free Lunch Day Scaled Nationwide

## Overview

Collectively, US schools procure billions of plastic packaging and foodware items each year and discard a staggering amount of plastic waste. PFLD provides schools with an entry point to reduce the large volume of procurement of single-use plastics.

In November 2022, the Urban School Food Alliance (representing 19 of the largest school districts in the country) partnered with us to throw its left behind PFLD.<sup>12</sup> As a result, Los Angeles, San Diego, Miami-Dade, Baltimore, Philadelphia, New York, and other large districts joined in seeking to reduce plastic packaging and foodware.<sup>13</sup>

Since its inception, the program has grown to over 3,000 schools in 36 states plus the District of Columbia. It is conducted twice a year, in November and April, with some districts conducting more frequent PFLDs.



Dallas Independent School District



San Diego Unified School District



Baltimore City Public Schools

12. Brittany Frew, "Urban School Food Alliance and Cafeteria Culture Announce Plastic Free Lunch Day USA Partnership," Urban School Food Alliance, October 3, 2022.

13. Click here to see a [map of all schools participating in PFLD globally](#).



# Reusables Intervention

## Overview

Our four-week Reusables Intervention addressed cups and utensils — the remaining plastic waste not eliminated by PFLD. The Reusables Intervention also tested the feasibility of using an offsite dishwashing service for the first time in NYC public schools, most of whom do not have dishwashers on site.

Using stainless steel cups and utensils:

- Reduced school lunch SUPs by 99%, from 781 items on a regular lunch day to just 10 SUPs during the Reusables Intervention + PFLD (excluding milk cartons and trays),
- Reduced food waste by 14% per student,
- Increased food consumption by 27% per student, and
- Saw a 14% total loss rate for utensils and 9% for cups.

## Operations

- Purchased 600 stainless steel cups (using a subsidy from PlasticFreeRestaurants) and 800 utensils: spoons and forks combined.
- Placed reusables in the usual locations for their SUP versions.
- Placed used reusable foodware collection bins next to the existing waste sorting station.
- School Staff placed dirty foodware collection bins in the designated location in the kitchen for pickup.
- CupZero provided the dishwashing service for this pilot. They picked up used foodware and delivered clean foodware to a separate location outside of the kitchen.
- Deliveries occurred 5 days a week for the first week and decreased in frequency as safety protocols evolved.



### Safety Assurance

To ensure compliance with food safety standards, Stephen O'Brien enlisted the support of the OFNS Director of Food Safety and Quality Assurance and a Food Safety Supervisor to refine and approve the plan for pickup and storage of reusables.

### Student Participation

Students in the lead class receiving our classroom lessons participated in the following activities:

- Created an informational video,
- Delivered morning announcements,
- Discussed reusables placement and collection procedure with School Food Staff, and
- Shared short presentations with their school community (principal, staff, and other students) to celebrate plastic reduction data.

### Student Reactions

Students commented that they felt special to be able to use the metal cups and utensils — like they were in a restaurant. A few students were skeptical at first about whether the reusables would be washed properly, but when reminded about eating in a restaurant, they relaxed. Students loved that the cups got cold with the cold water in them. Because the materials were distinctly different in feel from the usual single-use items, their collection and separation were seamless.

### Lessons Learned

- Stainless steel cups get stuck together when stacked for serving, causing students to touch more than one cup to separate them.
- Some utensils ended up in trash bins at the furthest table from the sorting bins.

### Feasibility for Replication

Due to the limited duration of the intervention, we couldn't fully evaluate the feasibility of replicating the reusables and satellite washing service model in NYC public schools. The frequency of deliveries varied each week as we tested different protocols for storing dirty utensils and cups, and other changes throughout the intervention duration prevented us from establishing a consistent routine.

We plan to conduct another Reusables Intervention in another school over a longer period to assess its future feasibility and scalability.





# Food Waste Reduction

## Mindful Choice Meals

### Overview

Our waste audits revealed that 45% of cafeteria food waste was untouched and untasted by students. This untouched food resulted from adults overplating in the serving line, producing unwanted food on students' plates that was discarded. Mindful Choice Meals (MCM) focuses on reducing this untouched food waste by educating students and staff about the USDA regulation, Offer versus Serve (OVS). Providing students and staff with OVS educational workshops clarified for adults and students that items such as milk or protein, for example, are not required components of a complete meal.

We partnered with PS 15 students to create MCM to allow students to make their own choices when selecting a complete meal under the USDA's guidelines.<sup>14</sup> With Principal and staff support, School Food Staff not pre-plating in the food service line, and students making their own choices, **untouched food waste was reduced by 64%**. In addition, **total food waste was reduced by 50%** per student, and students ate an average of **46% more food by weight**.



Photo of food waste from one of our baseline audits

### Causes of Overplating in the Service Line

CafCu has observed that School Food Staff and adults assisting in the service line often pre-plate and overplate students' meals primarily due to:

- Overcompensating for OVS rules to avoid regulation violations,
- Time constraints in the serving line, and
- Uncertainty or misunderstanding OVS regulations.

14. A meal is only fully reimbursable — meaning the USDA will cover its subsidy — if it contains three out of the five required food components, one of which must be a fruit or a vegetable. These components include meats/meat alternates, grains, fruits, vegetables, and liquid milk. An example of a fully reimbursable meal could be a hamburger on a whole grain bun and corn, or corn, green beans, grapes, and milk.; United States Department of Agriculture Food and Nutrition Services, "[Offer Versus Serve \(OVS\) Tip Sheet for School Food Service Managers](#)," USDA FNS, 2019.

### Communication Gaps Identified

After observing the cafeteria service line, students noticed there was very little communication between students and the School Food Staff, resulting in unwanted items on students' plates.

### Student Outreach and Education Efforts

In response, students took the lead in outreach and education efforts around the school. Students encouraged their peers to communicate their preferences during lunch by taking the following steps:

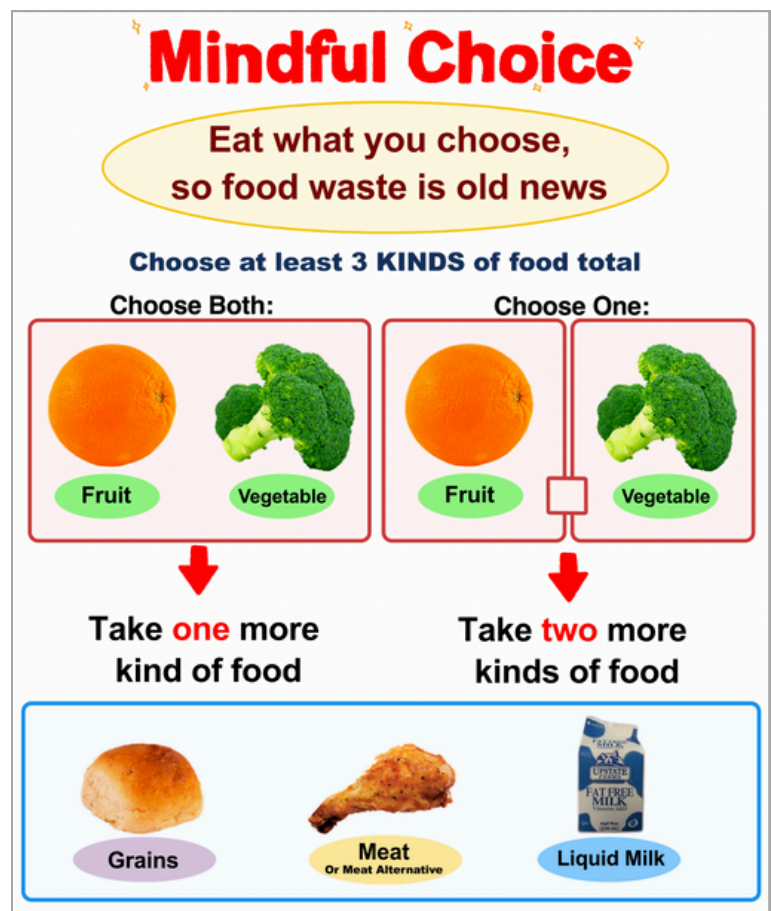
- Helped develop a mini-curriculum for teachers on the OVS requirements,
- Created posters to raise awareness,
- Made morning announcements to inform peers about the OVS rules and the daily menu, and
- Led their peers to practice making food choices in classrooms.



### Educating Adults About OVS

To address the problem of overplating and to prepare for MCM, CafCu led a training session for all PS 15 Aides and Paraprofessionals who monitor lunch during school and afterschool programs. During the training, participants were surprised by the amount of untouched food waste, much of it resulting from pre-plating and over-serving. Many adults were unaware that:

1. Students are only required to take three components,
2. Milk is not mandatory, and
3. Meat or a meat substitute is not mandatory.





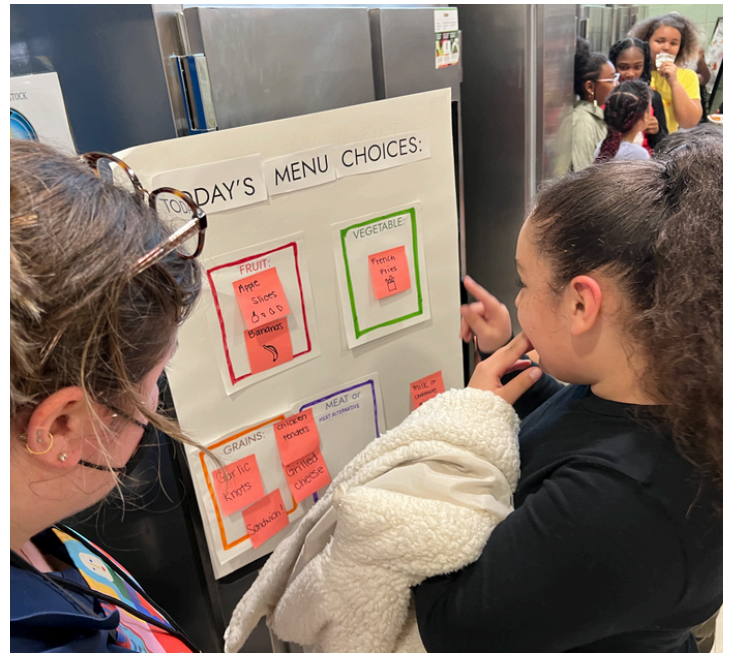
### Day-Of Changes Made for Mindful Choice Meals

Besides the school-wide training and outreach, specific aspects of the serving line were changed for MCM with the permission of the District Supervisor of OFNS.

1. **Fruit and milk were placed at the beginning of the service line.**

Previously, milk was placed at the end of the service line. This change made it easier for School Food Staff to determine how many more items students needed to meet the USDA regulations, minimizing overplating.

2. We placed a **menu choice board** at the entrance of the service line that reinforced what students learned in the classroom about the USDA's five food components. CafCu's cafeteria assistance crew members reviewed the menu with students before they entered the service line so that they were ready to ask for what they wanted.



Menu choice board in the cafeteria during MCM.

3. CafCu asked the **School Food Staff in the serving line not to pre-plate more than one item per plate.**

School Food and School Staff who were assisting at the service line initially expressed concerns that it would slow down the service. However, because students were ready to make their choices going into the line, there were almost no delays in the service.



Pre-plated meals before MCM.



Only one item pre-plated during MCM.

## Results

- Kindergarten, First, and Second Grades combined saw:
  - The greatest reduction in untouched food waste at 82%,
  - The greatest increase in food consumption at 83%, and
  - The percentage of food wasted from the originally served amount decreased from 70% in the baseline to 38% on MCM.
- Untouched food waste was reduced across all grades (K-5) by 64%, while students' food consumption increased by 46%.
- Both the number of students asking for their preferred items and the frequency of School Food Staff asking about students' choices doubled during MCM.
- Additional communication in the serving line did not compromise students' time eating.

These reductions were achieved through student agency, not austerity or scarcity.



**"I felt like I was in a restaurant!"**  
**Kai, Fourth Grade**



**"I got to choose what I wanted to eat. Now it feels like I can do anything!"**  
**Madai, Fourth Grade**



A Second Grader proudly reported  
"I ate everything today!"

## Lessons Learned and Next Steps

- Need dedicated training for School Food Staff to stress pre-plating only one item in the serving line. Constant reminders were needed for the School Food Staff not to overplate.
- Need to identify new ways to communicate the daily lunch menu with classrooms for various school settings by piloting MCM in more schools.
- Need to collect data separately for each intervention component (serving line changes/School Food Staff training, and student/staff education) to determine the most effective path to institutionalize changes.

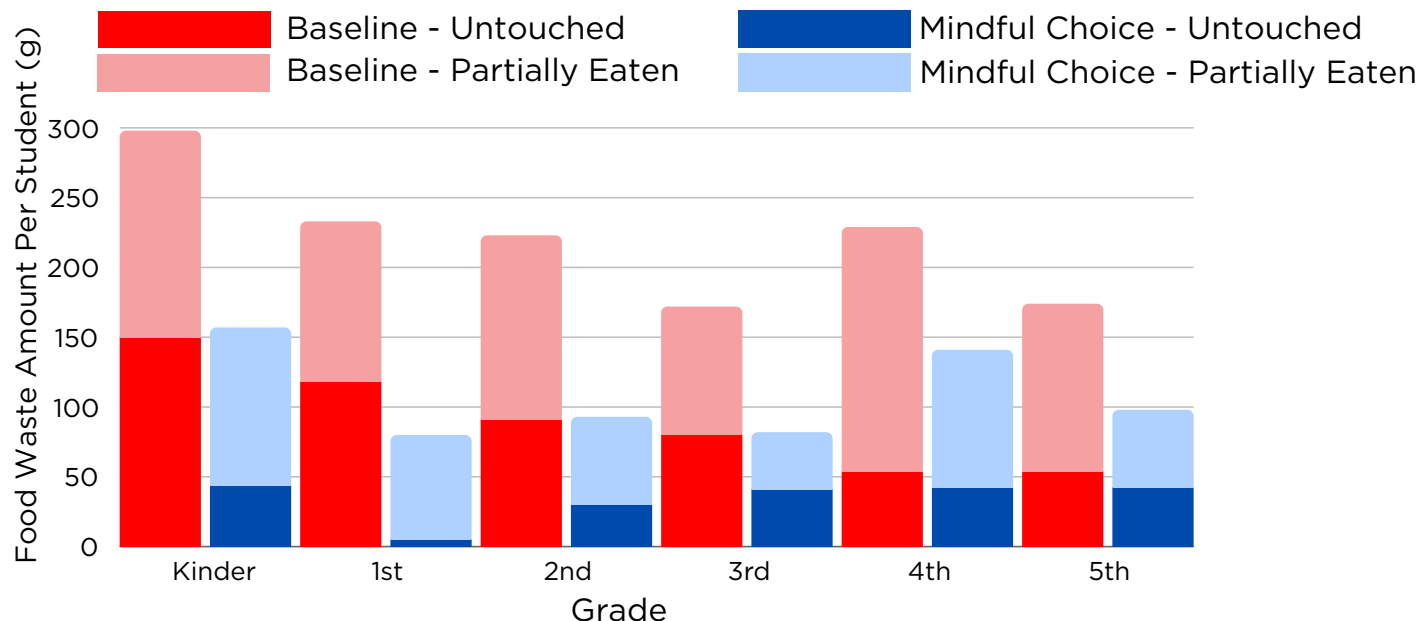


# Notable Findings from All Interventions

## MCM Was Especially Effective for Lower Grades

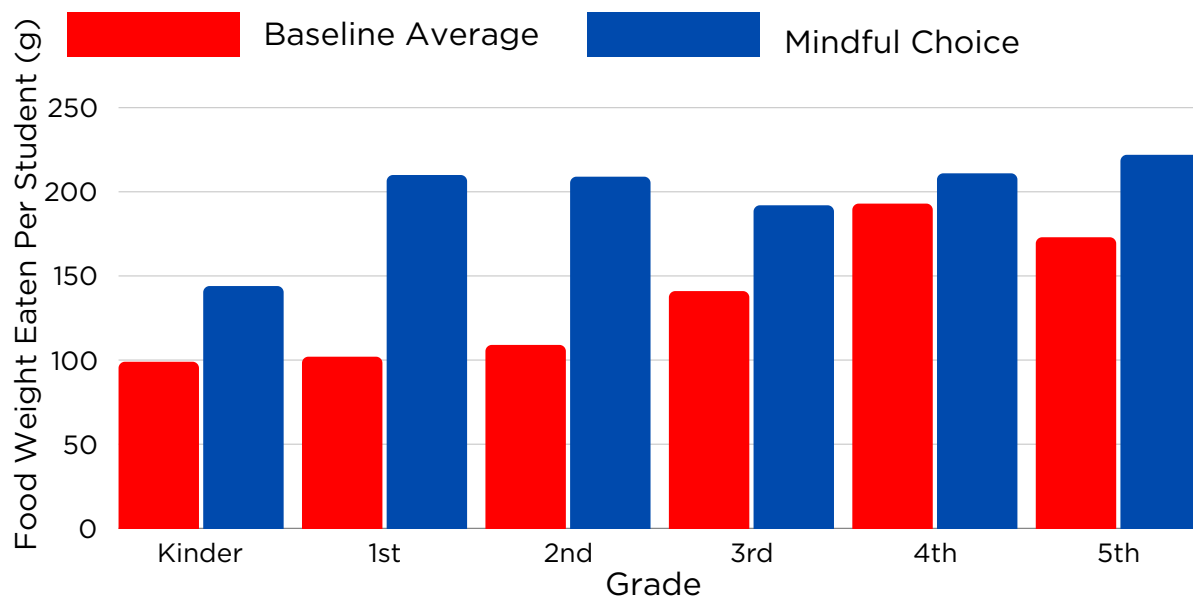
When participating in MCM, lower grades consistently had the biggest decreases in food waste, and the biggest increase in food consumption.

**FIGURE 3. FOOD WASTE AMOUNT PER STUDENT BY GRADE BASELINE VS MCM**



This graph compares the average amount of food waste per student from the baseline to MCM. **K-2 combined had impressive reductions of 82% in untouched food waste and 57% in total food waste.** In comparison, Fourth and Fifth Graders saw a 23% reduction in untouched food waste and a 35% reduction in total food waste.

**FIGURE 4. FOOD WEIGHT EATEN PER STUDENT BY GRADE BASELINE VS MCM**

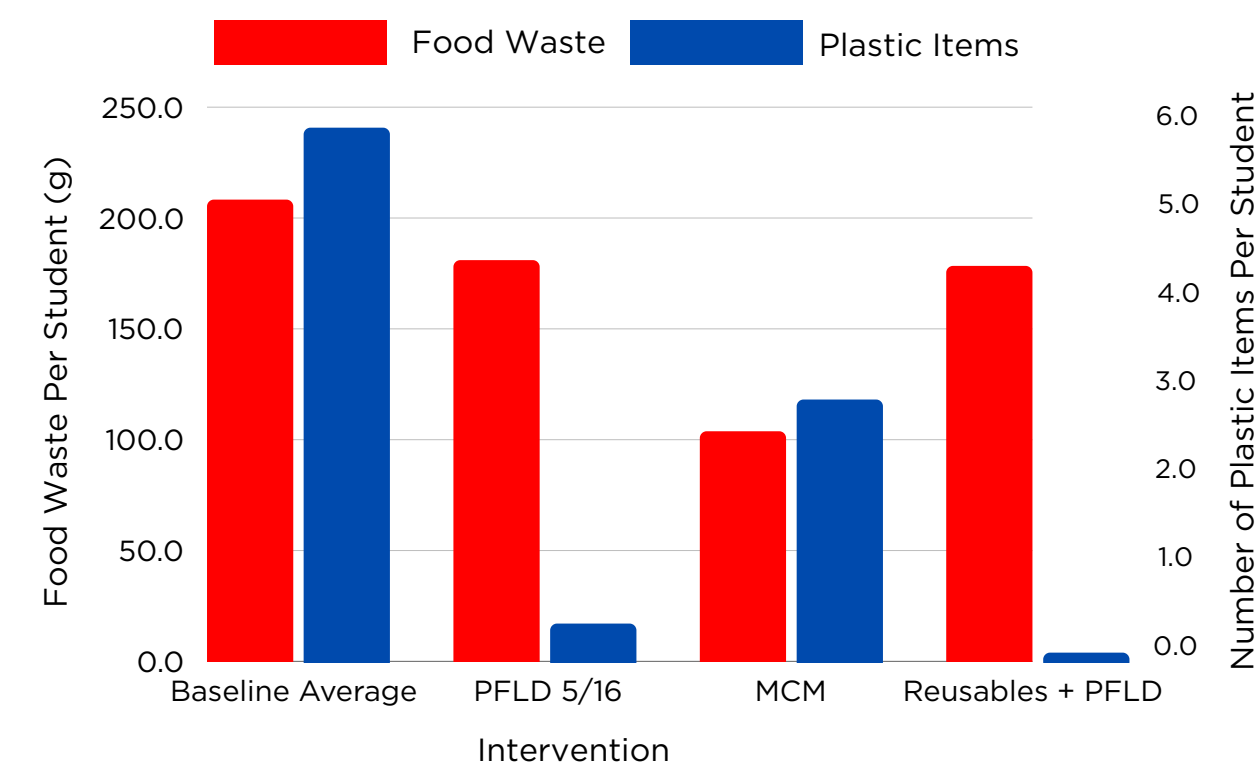


The graph above shows that the average amount of food consumed increased across all Kindergarten to Fifth Grade with the Mindful Choice Meals (MCM) initiative. For K-2 combined, **the consumed amount rose by 83%, with notable increases of 107% for First Grade and 97% for Second Grade.** In comparison, Fourth and Fifth Graders saw an average increase of 18%.

Linking Single-Use Plastic Reduction to Decreased Food Waste

The results from our waste reduction interventions clearly demonstrated the link between plastic waste and food waste. On both PFLD and Reusables + PFLD days, plastic waste was reduced by over 95%, and food waste decreased by 14% compared to the baseline. During MCM, without any direct plastic reduction measures, there was still a 51% reduction in plastic waste (from an average of 5.7 items per student at baseline to 2.8 items on MCM), while food waste was reduced by 50%.

FIGURE 5. PFLD AND REUSABLES' IMPACT ON FOOD WASTE



Reduced Rate of Unopened Plastic Packaged Items During MCM

During MCM, the percentage of unopened plastic-packaged items decreased to 17%, compared to the baseline average of 32%. This suggests that when fewer packaged items are served, a greater proportion is opened and consumed.

FIGURE 6. RATE OF UNOPENED PLASTIC PACKAGED ITEMS

Intervention	Rate of Unopened Plastic Packaged Items (Including utensil packets, excluding milk cartons)
Baseline Average	32%
MCM 4/4/23	17%



### Kindergarten Students Generate Significantly More Waste

Throughout all of our interventions, Kindergarteners stood out as the group consistently generating the most waste — 30% more food waste and 32% more plastic waste compared to the First and Second Grade average, and 88% more food waste than the Third to Fifth Grade average on baseline audits. Even on MCM day, Kindergarten students produced 80% more food waste per student than the average of First and Second Grades.

While previous studies indicated that lower-grade students generate more food waste in the cafeteria, our results highlight that Kindergarteners, in particular, generate significantly more.<sup>15</sup> This suggests that Kindergarten students may require more focused strategies to effectively reduce both food and plastic waste. Serving them smaller portions (since current USDA regulations allot the same portion size to Kindergarteners and Fifth Graders) and allowing meals to be served in the classroom instead of the cafeteria could help reduce this waste.

**FIGURE 7. KINDERGARTEN FOOD AND PLASTIC WASTE**

Grade	Baseline Food Waste Per Student (g)	Baseline Number of Plastic Waste Items Per Student	MCM Food Waste Per Student (g)
Kindergarten	299.6	7.0	158.1
First and Second Grade Average	229.9	5.4	87.6
Third to Fifth Grade Average	159.0	5.3	94.2

### PFLD Cost Savings

Using NYC Public Schools' cafeteria cost data (i.e. the price of one roll of plastic wrap used in the cafeteria) CafCu calculated the average amount of expected cost savings based on a typical PFLD. The total one-day materials cost savings from PFLD adaptations per 100,000 servings is over \$8,000.<sup>16</sup>

15. Shahrbanou F. Niaki et al., "Younger Elementary School Students Waste More School Lunch Foods than Older Elementary School Students," *Journal of the Academy of Nutrition and Dietetics* 117, no. 1 (December 20, 2016): 95-101.

16. CafCu published a report of school cafeteria's average cost savings from a PFLD menu designed in collaboration with NYC Public Schools and PS 15 School Food Staff.

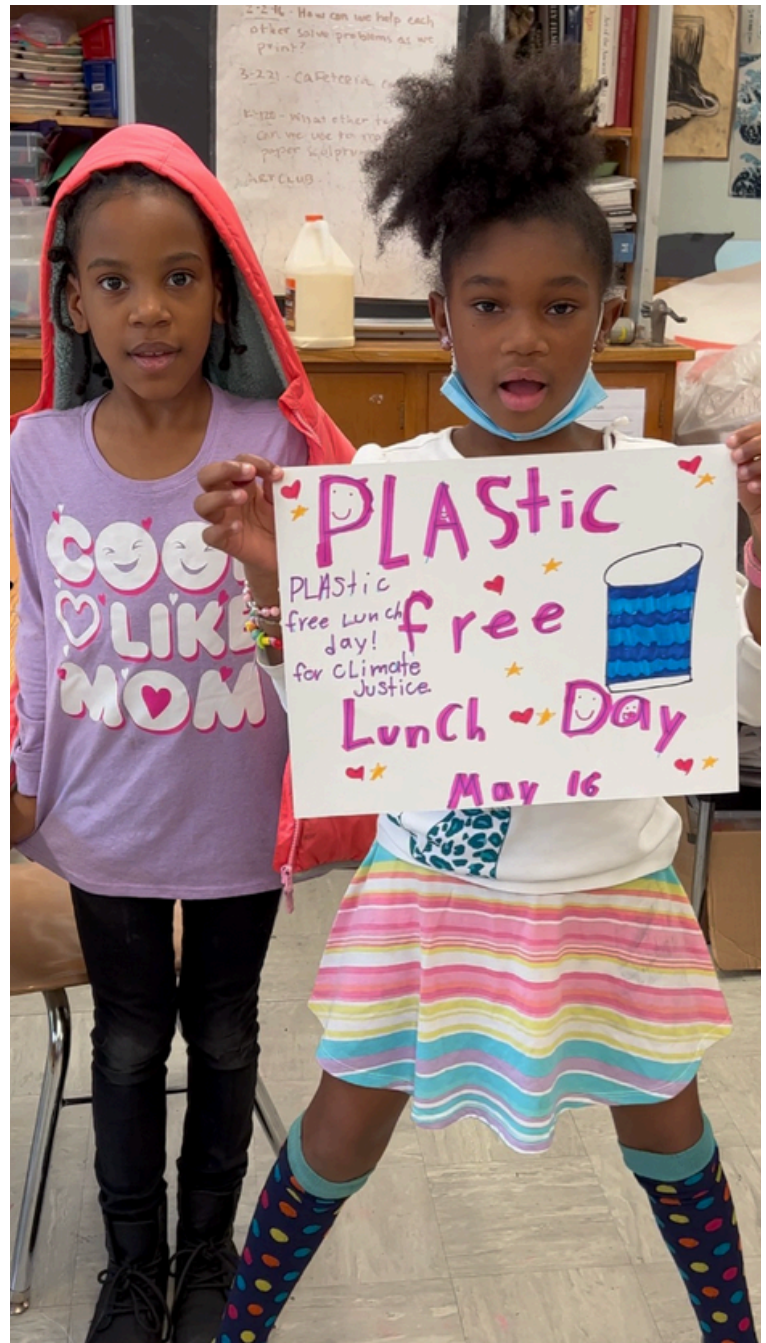
# Classroom Engagement and Outreach

## Classroom Sessions

Each intervention involved a semester-long partnership between CafCu and one or two classes. CafCu staff met weekly with Fourth Grade General Education and Third to Fifth Grade ACES classes at PS 15, which included students with special needs and intellectual disabilities combined with General Education students. Living in a frontline community, PS 15 students are consistently exposed to pollutants from nearby industry and brownfield sites, which makes climate and environmental justice education especially critical for them.<sup>17</sup>

Classroom sessions covered plastic pollution, environmental justice, waste audits, video creation, and advocacy skills. Students led hands-on waste audits, reinforcing the importance of data collection and analysis in their projects, then took on leadership roles, devised solutions, and saw the impact of their advocacy work.

Principal Cavanagh commented that the partnership between CafCu and PS 15 gives their students opportunities **“to understand that they have a lot of power, and with power comes responsibility...they’re going out and trying to make the world a better place.”**



17. New York City Department of City Planning, “[Existing Conditions and Brownfields Analysis Red Hook, Brooklyn](#),” New York City Department of City Planning, September 2014.



# Waste Audits

## Overview

We conducted our waste audits using our Quality Assurance Project Plan (QAPP) which we developed and had certified by the EPA to ensure data credibility within the scope of our grant.<sup>18</sup> Before the first official audit at PS 15, CafCu staff held a practice audit to train additional waste audit crew members.

## Methodology

CafCu performed nine waste audits throughout the project: five baseline and four day-of intervention audits. Each waste audit was carried out by the CafCu team, students, and an additional adult assistance crew.

CafCu's waste audits aimed to:

- Measure the connection between pre-packaged and wasted food,
- Reduce plastic and food waste, and
- Measure the effectiveness of each intervention.



Students sorting waste during an audit.

To run each audit, staff set up:

- 2 plate weighing stations with scales,
- 1 table to sort school lunch waste,
- 1 table to sort home lunch waste,
  - each table used individual cardboard trays to sort into, and
- 1 milk bucket for liquid waste.<sup>19</sup>

During each waste audit:

- Each plate was given a number tag and weighed before and after eating,
- Students sorted their own lunch onto individual cardboard trays,
- Plastic items were separated by opened and unopened by item by grade,
- Food waste was separated by untouched and partially eaten by item by grade, and
- Each category of plastic and food waste was counted, weighed, and photographed.



Each plate was weighed and photographed.

18. Environmental Protection Agency, "Quality Assurance Toolkit," EPA, June 3, 2023.

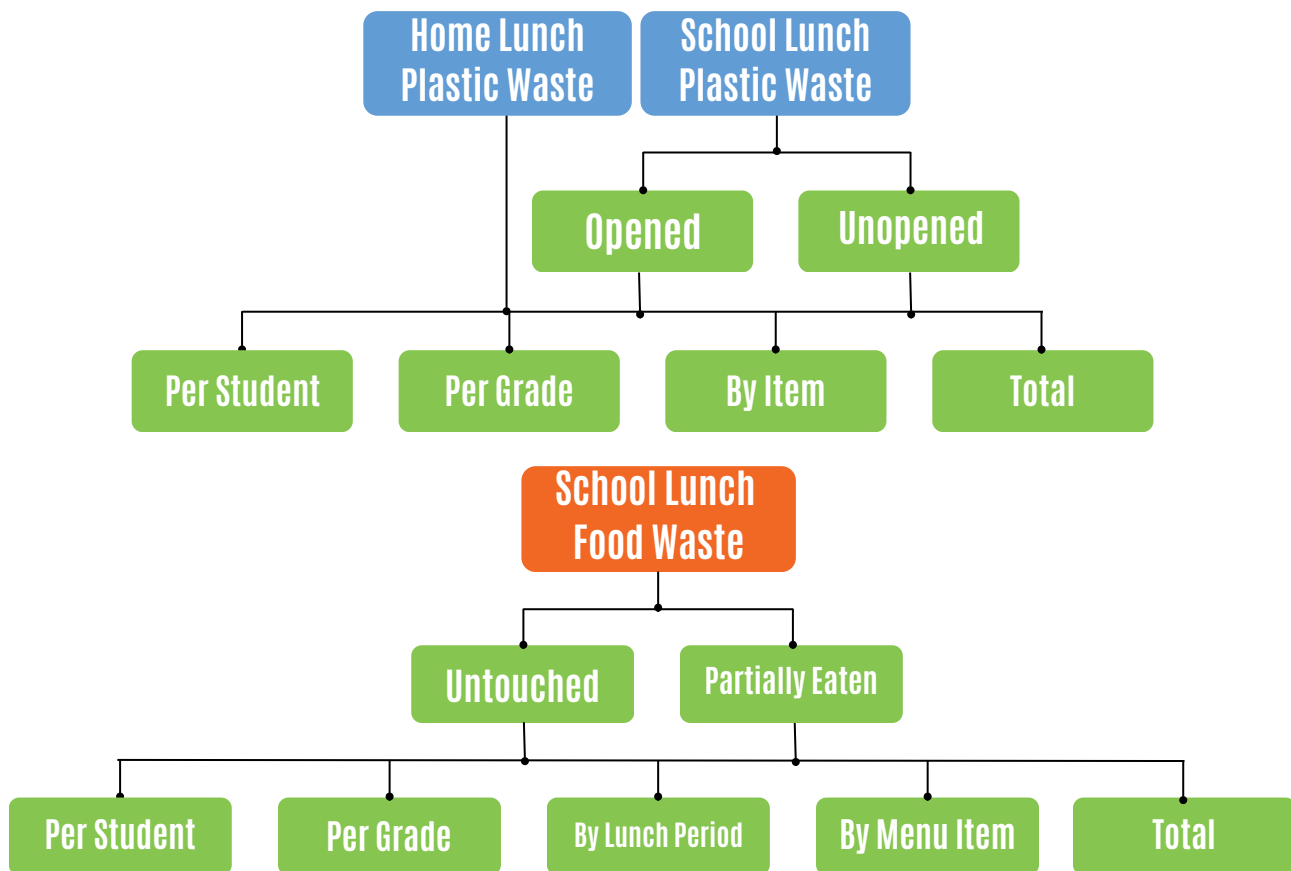
19. In this report, we will not be discussing the milk waste as it was not our primary focus during our interventions.

After all lunch periods:

- Each category from all grades was combined,
- Each category was weighed, counted, and photographed, and
- All plastic and food waste was placed on a blue tarp for a final photo.



**FIGURE 8. DATA COLLECTED DURING WASTE AUDITS**





# Photo and Video Documentation

CafCu documented the project through video and photo recordings. This documentation was essential for capturing the progress of food and plastic waste reduction efforts.

Photo documentation played a role in recording waste audit procedures, ensuring they were consistent and replicable while supporting both quantitative and qualitative data collection. Photos also provided a visual record of the volume and types of waste, contributing to the accuracy and repeatability of the audits.

Video documentation serves as a critical educational tool. CafCu created videos designed to help students, teachers, and staff at other schools implement PFLD and waste reduction initiatives.<sup>20</sup>

These videos shared on CafCu's YouTube channel — which has 36 million views and 79K subscribers — allowed CafCu to expand the reach of the students' work. Centering our students makes the work relatable and inspiring for other schools and school districts to replicate the efforts.

Students also took on roles in the filmmaking process, acting as subjects, filmmakers, or even directors. They gained valuable skills, learning to use video cameras, conduct peer interviews, and speak on camera. These experiences boosted their technological literacy, creative communication, storytelling, advocacy skills, and confidence.



20. See Appendix E. PFLD Videos to view the videos.

# Toolkit and Other Deliverables

## Toolkit Development

The CafCu team developed and shared an **Outreach and Training Toolkit** for NYC and nationwide PFLD, offering resources and guidance to help schools implement effective waste reduction initiatives. The toolkits model effective student-led climate action while significantly reducing waste.

As MCM evolves, we continue to update our toolkits with new resources.

## Targeted Outreach

- OES shared PFLD info with NYC Public Schools School Sustainability Coordinators,
- OFNS distributed training videos and the **Get Ready NYC!** video to School Food Supervisors, Managers, and Head Cooks,
- CafCu trained Wellness in the Schools (WITS) Chefs and provided the PFLD toolkit to include in their NYC School Food Staff training, and
- CafCu shared the **PFLD USA** video on our YouTube Channel for a national audience.

## Toolkit Categories

1. **Outreach Materials:** Various templates for others to advocate for and promote PFLD in their elementary, middle, high school, and college campuses.
2. **Promotion Materials:** Messaging templates and Easy Start Guides in English and Spanish for schoolwide morning announcements, letters to send home, general PFLD overview information, and flyers.
3. **Lesson Plans and Activities:** Ranging from an independent Single-Use Plastic Search for younger students to a full waste audit guide, activities are all framed by discussion slides and include accompanying math lessons to make use of CafCu's lesson plans as seamless and accessible as possible for teachers and students. In collaboration with our students, CafCu created videos and a **Life-Cycle of Plastic** board game to offer multiple levels for others to engage with the problem and come up with solutions.
4. **Resources for School Food Staff:** Menu preparation videos, a sample PFLD menu, information about cost savings, and resources about the health impacts of plastic.<sup>21</sup>



21. To see a full list of and links to all outreach and promotion materials and lesson plans and activities, go to Appendix F. PFLD Outreach Materials and Appendix G. PFLD Teaching Materials.



# Next Steps and Achievable Goals

## Scaling Our Interventions

We've identified the most effective and replicable paths to scale our waste reduction initiatives. Success relies on tailoring interventions for each stakeholder — School Food Staff, OFNS, administrators, custodians, teachers, and students — ensuring interventions are practical and adaptable at every level.

Challenges include longstanding vendor contracts at OFNS for single-use plastic packaging, menu requirements reliant on pre-packaged goods, and staffing shortages within School Food teams. Overcoming these obstacles to scale our interventions will require continued advocacy and collaboration.

## CafCu Efforts in Progress

- Working with school districts across the country through USFA to implement PFLD more frequently,
- Communicating with contracted school food service providers (such as Aramark, Chartwells, and Sodexo) to share best practices for reducing plastic in school lunches across the country,
- Scaling MCM to reduce food waste by increasing its frequency and/or scope and combining it with PFLD, and
- Collaborating with USDA to establish and share MCM as a best practice to encourage school districts to replicate the initiative.

## CafCu Recommendations for USDA

- Clarify the messaging around OVS to reduce confusion around what is legally required to serve a reimbursable meal and to make the rules and communications easier to understand for school communities,
- Contextualize the requirements of OVS as a climate action,
- Share the data about increased consumption through best practices of OVS (such as MCM),
- Consider reducing the portion size for Kindergarteners, who are currently being served the same amount as Fifth Graders, and
- Encourage school districts to serve lunch to Kindergarten students in the classroom using a family-style approach, similar to Pre-K practices.

## CafCu Future Plans

- Build on the data found in the baseline breakfast waste audit to create a full breakfast waste intervention and workshop, and
- Expand the Reusables Intervention by completing another intervention and set of workshops in a different school cafeteria and/or in a classroom family-style lunch setting in 3K and Pre-K with reusable cups, utensils, and plates.



# Conclusion

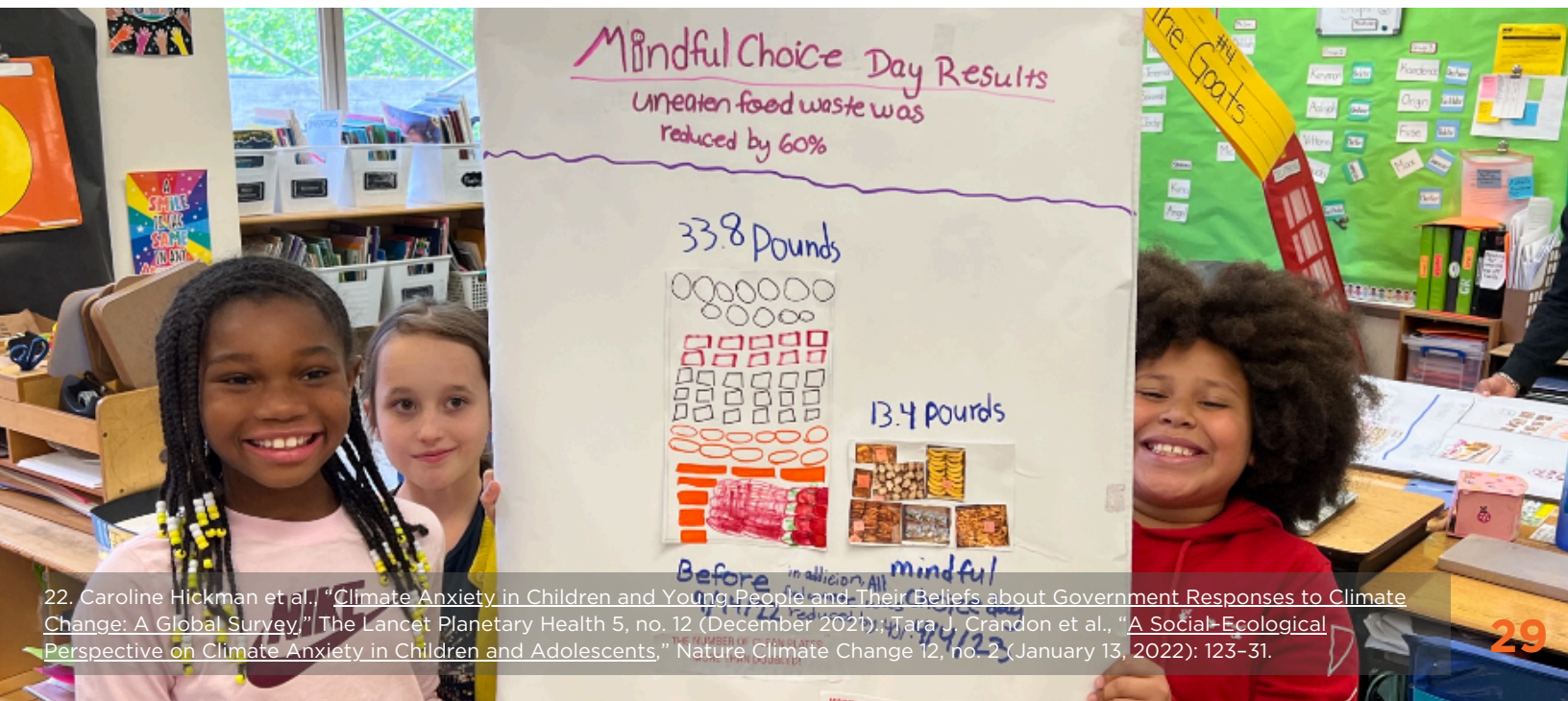
Through this project, we saw that positioning school cafeterias as hubs for climate action and education helps students to view themselves as environmental stewards. Their work reducing food and plastic waste has led to improvements in environmental justice and public health in their own communities. As students continue to impact their communities, they are not only generating tangible environmental benefits but also easing their climate anxiety, giving them a sense of agency in addressing global challenges.<sup>22</sup>

Scaling Plastic Free Lunch Day (PFLD) has taught us that while student leadership and peer-to-peer messaging are at the core of successful expansion, it also requires other key elements including institutional collaboration, strong partnerships, effective toolkits, and ongoing outreach until the initiative takes on a life of its own.

This experience has provided invaluable lessons as we look to scale Mindful Choice Meals (MCM), which will require further development to ensure that all these components are robust and effective.

Working with NYC Public Schools, the largest school district in the country with over 1 million students, presents both challenges and an incredible opportunity to lead systemic change in schools nationwide. We are excited to continue collaborating with OFNS and OES as we push forward together to make impactful changes.

We are grateful to PS 15 and their fantastic students for driving NYC Public Schools toward becoming a leader in climate-smart, sustainable school food service.



22. Caroline Hickman et al., "Climate Anxiety in Children and Young People and Their Beliefs about Government Responses to Climate Change: A Global Survey," *The Lancet Planetary Health* 5, no. 12 (December 2021): 1014-25; Tara J. Crandon et al., "A Social-Ecological Perspective on Climate Anxiety in Children and Adolescents," *Nature Climate Change* 12, no. 2 (January 13, 2022): 123-31.



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**Stephanie Knight**, Supervising School Aide

**PS 15 School Food Staff, Custodial Staff, School Staff, Teachers, and Students**

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**Report Design** Tova Salzinger, **Drawings** Daniel Ramos, and **Photos** Atsuko Quirk

# References

Crandon, Tara J., James G. Scott, Fiona J. Charlson, and Hannah J. Thomas. "A Social-Ecological Perspective on Climate Anxiety in Children and Adolescents." *Nature Climate Change* 12, no. 2 (January 13, 2022): 123–31. <https://doi.org/10.1038/s41558-021-01251-y>.

Environmental Protection Agency. "Quality Assurance Toolkit." EPA, June 3, 2023. <https://www.epa.gov/participatory-science/frequently-asked-questions-quality-assurance-project-plans#:~:text=The%20QAPP%20documents%20the%20project,collect%20and%20use%20environmental%20data>.

Elbein, Sharon Udasin and Saul. "Hurricane Sandy Survivors Try to Hold onto Their Homes Nearly 10 Years Later." *The Hill*, June 23, 2021. <https://thehill.com/policy/equilibrium-sustainability/559829-hurricane-sandy-survivors-try-to-hold-onto-their-homes/>.

Food and Nutrition Service. "Lunches Consumed from School Are the Most Nutritious." Food and Nutrition Service U.S. Department of Agriculture, June 2021. <https://www.fns.usda.gov/infographic/lunches-consumed-schools-most-nutritious>.

Forrestal, Sarah, Elizabeth Potamites, Joanne Guthrie, and Nora Paxton. "Associations among Food Security, School Meal Participation, and Students' Diet Quality in the First School Nutrition and Meal Cost Study." *Nutrients* 13, no. 2 (January 22, 2021): 307. <https://doi.org/10.3390/nu13020307>.

Frew, Brittany. "Urban School Food Alliance and Cafeteria Culture Announce Plastic Free Lunch Day USA Partnership." Urban School Food Alliance, October 3, 2022. <https://urbanschoolfoodalliance.org/plastic-free-lunch-day-partnership/>.

Geyer, Roland, Jenna R. Jambeck, and Kara Lavender Law. "Production, Use, and Fate of All Plastics Ever Made." *Science Advances* 3, no. 7 (July 19, 2017). <https://doi.org/10.1126/sciadv.1700782>.

Griffith, Derek M., Caroline R. Efid, Monica L. Baskin, Monica Webb Hooper, Rachel E. Davis, and Ken Resnicow. "Cultural Sensitivity and Cultural Tailoring: Lessons Learned and Refinements after Two Decades of Incorporating Culture in Health Communication Research." *Annual Review of Public Health* 45, no. 1 (May 20, 2024): 195–212. <https://doi.org/10.1146/annurev-publhealth-060722-031158>.

Heiges, Jessica, Danielle L. Lee, Laura Vollmer, Kate Wobbekind, Hannah R. Thompson, Wendi Gosliner, Kristine A. Madsen, Kate O'Neill, and Lorrene D. Ritchie. "Evaluating Food Packaging Waste in Schools: A Systematic Literature Review." *International Journal of Environmental Research and Public Health* 19, no. 9 (May 5, 2022): 5607. <https://doi.org/10.3390/ijerph19095607>.



Hickman, Caroline, Elizabeth Marks, Panu Pihkala, Susan Clayton, R Eric Lewandowski, Elouise E Mayall, Britt Wray, Catriona Mellor, and Lise van Susteren. "Climate Anxiety in Children and Young People and Their Beliefs about Government Responses to Climate Change: A Global Survey." *The Lancet Planetary Health* 5, no. 12 (December 2021). [https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196\(21\)00278-3/fulltext](https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(21)00278-3/fulltext).

Howard, Hilary, and Jade Duskow. "How 5 N.Y.C. Neighborhoods Are Struggling with Climate Change." *The New York Times*, May 12, 2024. <https://www.nytimes.com/2024/05/12/nyregion/nyc-neighborhoods-climate-change.html>.

Jbaily, Abdulrahman, Xiaodan Zhou, Jie Liu, Ting-Hwan Lee, Leila Kamareddine, Stéphane Verguet, and Francesca Dominici. "Air Pollution Exposure Disparities across US Population and Income Groups." *Nature* 601, no. 7892 (January 12, 2022): 228–33. <https://doi.org/10.1038/s41586-021-04190-y>.

Nafici, Saara. "Added Value Farms." *The Center for the Humanities*, October 3, 2018. <https://archive.centerforthehumanities.org/programming/food>.

New York City Department of City Planning. "Existing Conditions and Brownfields Analysis Red Hook, Brooklyn." New York City Department of City Planning, September 2014. <https://www.nyc.gov:443/assets/oer/downloads/pdf/red-hook-brooklyn.pdf>.

New York City Department of Education. "2021-22 School Performance Dashboard." *School Performance Dashboard*, 2022. [https://tools.nycenet.edu/dashboard/#dbn=15K015&report\\_type=EMS&view=City](https://tools.nycenet.edu/dashboard/#dbn=15K015&report_type=EMS&view=City).

New York State Education Department. "PS 15 Patrick F Daly Enrollment (2022 - 23)." New York State Education Department, 2023. <https://data.nysed.gov/enrollment.php?year=2023&instid=800000045194>.

Niaki, Shahrbanou F., Carolyn E. Moore, Tzu-An Chen, and Karen Weber Cullen. "Younger Elementary School Students Waste More School Lunch Foods than Older Elementary School Students." *Journal of the Academy of Nutrition and Dietetics* 117, no. 1 (December 20, 2016): 95–101. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5183504/>.

Nunez, Yanelli, Jaime Benavides, Misbath Daouda, Lucas R.F. Henneman, Randall V. Martin, Erin E. McDuffie, Jeff Goldsmith, Joan A. Casey, and Marianthi-Anna Kioumourtzoglou. "Trends in Air Pollution Emissions in the Contiguous United States from 1970 to 2010: An Environmental Justice Analysis." *Nature Communications* 15 (January 17, 2024). <https://doi.org/10.1289/isee.2022.p-0783>.

Orihuela, Catheryn A., Callista Cox, Retta Evans, and Sylvie Mrug. “Associations of Household Food Insecurity with Academic Outcomes in Early Adolescents.” *Journal of School Health* 93, no. 10 (June 25, 2023): 883–90. <https://doi.org/10.1111/josh.13358>.

Public Health Communications Collaborative. “Strategies for Developing Culturally Driven Public Health Communications.” Public Health Communications Collaborative, September 2023. [https://publichealthcollaborative.org/wp-content/uploads/2023/09/PHCC\\_Strategies\\_Developing-Culturally-Driven-Public-Health-Communications.pdf](https://publichealthcollaborative.org/wp-content/uploads/2023/09/PHCC_Strategies_Developing-Culturally-Driven-Public-Health-Communications.pdf).

Rabbitt, Matthew P, Laura J Hales, Michael P Burke, and Alisha Coleman-Jensen. “Household Food Security in the United States in 2022.” USDA Economic Research Service, October 2023. <https://www.ers.usda.gov/webdocs/publications/107703/err-325.pdf?v=3248.2>.

Red Hook Initiative. “Red Hook Community Health.” Red Hook Initiative, October 2018. [https://rhicenter.org/wp-content/uploads/2023/01/redhook\\_chnaa\\_oct2018\\_report\\_english.pdf](https://rhicenter.org/wp-content/uploads/2023/01/redhook_chnaa_oct2018_report_english.pdf).

School Nutrition Association. “School Meal Statistics.” School Nutrition Association, 2024. <https://schoolnutrition.org/about-school-meals/school-meal-statistics/>.

Sundin, Niina, Runa Halvarsson, Silvia Scherhauser, Felicitas Schneider, and Mattias Eriksson. “From Plate to Waste: Composition of School Meal Waste and Associated Carbon Footprint and Nutrient Loss.” *Resources, Conservation and Recycling* 206 (July 2024). <https://doi.org/10.1016/j.resconrec.2024.107656>.

United States Department of Agriculture Food and Nutrition Services. “Offer Versus Serve (OVS) Tip Sheet for School Food Service Managers.” USDA FNS, 2019. <https://fns-prod.azureedge.us/sites/default/files/resource-files/OVS%20Lunch%20tip%20sheet.pdf>.

Waddell, Kaveh, Aliya Uteuova, and Andrew Witherspoon. “Noise, Pollution, Danger: How Amazon Warehouses Upended a Sleepy New York Neighborhood.” *The Guardian*, May 16, 2023. <https://www.theguardian.com/us-news/2023/may/16/amazon-warehouse-traffic-noise-brooklyn-red-hook>.

World Wildlife Foundation. “Food Waste Warriors.” World Wildlife Fund, 2019. [https://c402277.ssl.cf1.rackcdn.com/publications/1271/files/original/FoodWasteWarrior\\_CS\\_121819.pdf?1576689275](https://c402277.ssl.cf1.rackcdn.com/publications/1271/files/original/FoodWasteWarrior_CS_121819.pdf?1576689275).



## Appendix A. Feedback and Challenges

### Student and Parent Feedback

During our programs, students reported feeling better about their lunch, more free, and like they were in a restaurant when making their own choices and using reusable utensils. Principal Cavanagh shared that parents of students who participated in leading the projects were proud and thankful that their children were getting this leadership experience.

### Principal Feedback



### **Principal Cavanagh at PS 15**

emphasized that she saw students of all ages taking ownership of their advocacy.

Students talked with their families, who then talked with other community members, and this had a ripple effect in changing the community consciousness around waste. Working with CafCu allowed students to more deeply understand environmental science, and also for students to see themselves as citizen scientists and activists.

### Teacher Feedback

A Fourth Grade teacher mentioned that students in their classroom had improved their waste sorting. Teachers reported to Principal Cavanagh that they enjoyed having students “flip the script” and take on leadership positions to teach School Staff and teachers about PFLD and MCM.

### School Food Staff, OFNS, and NYC Public Schools Feedback

#### The **Cook in Charge at PS 15**

emphasized that she expected PFLD to become a daily occurrence in the next year. After the Reusables Intervention, School Food Staff mentioned that it had been difficult to use reusables every day because they only had one person who knew the setup steps. Training for all School Food Staff would make using reusables smoother in the future.





**Stephen O'Brien, Director of Strategic Partnerships and Policy, OFNS, NYC Public Schools** said he found it amazing that staff produced the PFLD menu without much oversight or hands-on training, enabled by CafCu's communications.



**Meredith McDermott, Chief Sustainability and Decarbonization Officer, OES, NYC Public Schools** stated that PFLD's reduction of SUPs led to less contamination of waste streams. She hopes to have PFLD become a daily initiative soon.

### CupZero Feedback

CupZero strongly recommends just one pickup/delivery per week to make the dishwashing service cost-effective and more efficient when scaling the Reusables Intervention.

### Nationwide Feedback

**Director of Food and Nutrition Services at San Diego USD** initially proposed PFLD at 10 schools, but School Food Staff were so excited by the mission that they decided to implement it across 200+ schools in 2022.

**Executive Director, Food and Child Nutrition Services at Dallas ISD** met with vendors at a food show weeks before their first PFLD in 2022 and made clear that they wanted to shift to buying goods packaged in plastic alternatives.

### Challenges

The biggest challenges during this project were operating within the constraints of NYC Public Schools, the Department of Health, and the public school system.

Coordination and communication with the School Food Staff without needing a significant time commitment or retraining represented some of the largest gains, but also challenges.

Conducting waste audits came with many challenges. All weighing and counting had to be done within a limited time. Maintaining consistency in our methods was difficult in the rapidly changing conditions of the cafeteria.



# Appendix B. Recommendations for NYC Public Schools Office of Food and Nutrition Services

After conducting our interventions and subsequent audits in our project, CafCu offers the following recommendations for OFNS to consider implementing city-wide.

## Plastic Waste

- Weekly PFLD — Offering a **plastic-free menu one set day per week** will create consistency and better support for School Food Staff and students.
- **Completely eliminate SUP-wrapped menu items** in the K-8 on-site menu.
- Until all SUP-wrapped menu items can be eliminated, limit to **one packaged menu item per day** (excluding milk cartons).
- Offer utensils without wrappers every day.
- Serve sandwiches in bulk and unwrapped every day.
- Pilot reusable dishware in classroom family-style lunch, in the service line, and for some elements of breakfast.
- Install water fountains with water bottle filling stations in every school cafeteria to discourage the distribution of single-use water cups or students purchasing bottled water.



## Food Waste

- OVS training by OFNS should emphasize actionable methods to facilitate student choice and reduce food waste while satisfying USDA requirements.
- Thoroughly train School Food Staff in OVS materials and emphasize that milk and protein are not required components of a complete/reimbursable meal.
- OFNS should communicate with Principals and District Supervisors that School Food Staff will pre-plate no more than two menu items (and ideally only one menu item) per tray to better facilitate student choice and reduce food waste.
  - Potentially include annually in the Principals' Guide.
- Mandate daily menu announcements for Kindergarten-Second Grades and strongly recommend for Third-Fifth Grades.
- Establish a clear protocol for Kindergarten to Second Grade teachers to review the menu with students daily, incorporating practice time and strategies to help them make informed menu choices.
- Create a dry erase Menu Choice Board for every day that lists each food item and its color-coded, corresponding USDA component using pictures and words. Place the Menu Choice Board at the beginning of the service line for students to finalize their menu choices.
- OFNS will provide educational materials for Principals and School Staff that clarify the requirements of OVS in the context of climate action and facilitate increased student consumption. Potentially, with a flyer for each classroom to start to widely disseminate the information.
- OFNS will share CafCu's MCM classroom lessons and activities to equip teachers to follow OVS and help students learn about and practice making good food choices. The lessons will connect how food choice and reducing waste can be a form of climate action.
- Consider offering lunch in the classroom for Kindergarten students using the same OVS rules with familiar adults serving their meals and integrating the OVS concept into the service so they are prepared to make the choices as they graduate.
- All possible fruits should be served cut and without packaging. Based on years of studies, fruits that are difficult or messy to eat are the most untouched.

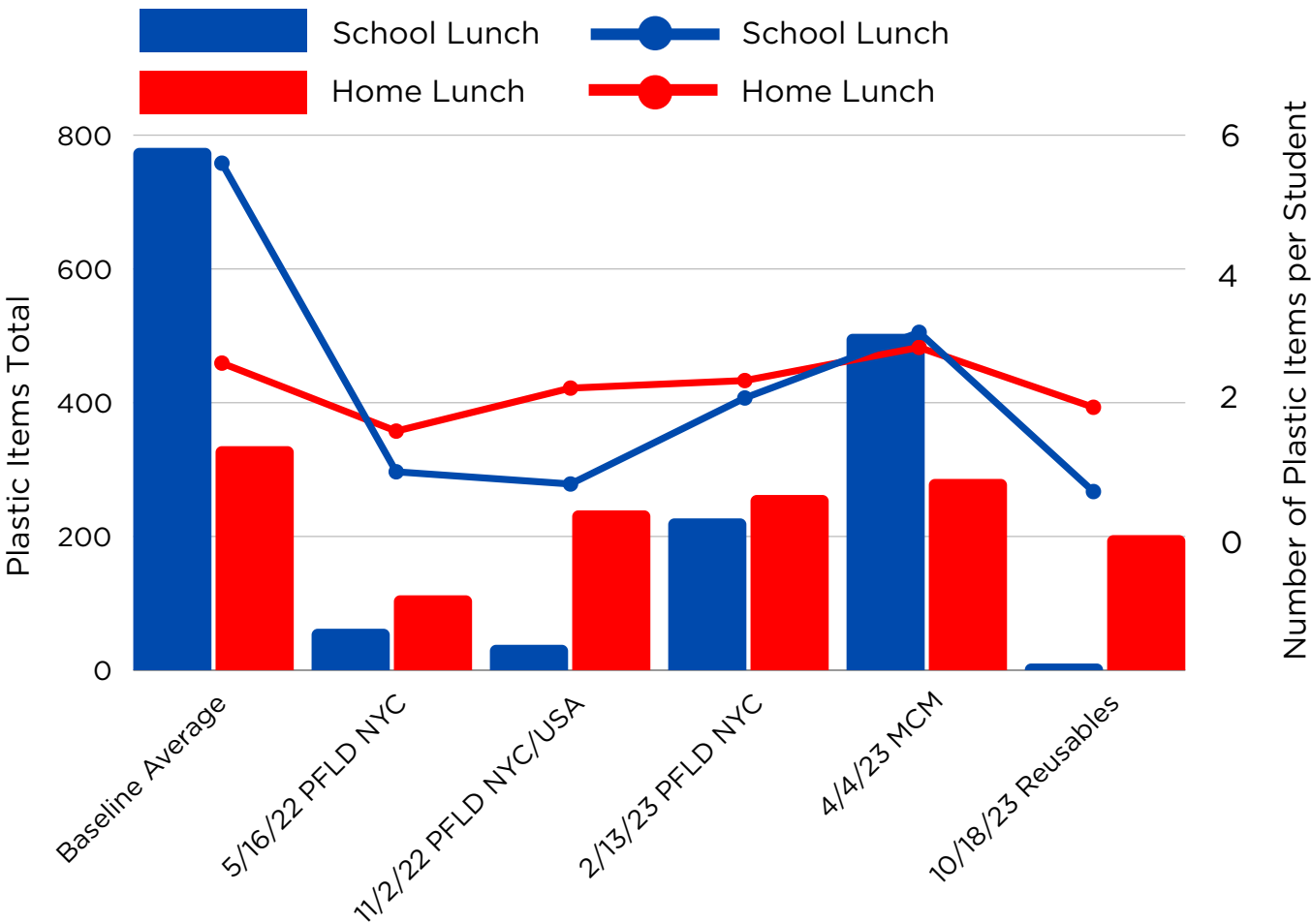




# Appendix C. Additional Plastic Waste Data

PFLD targeted plastic packaging and the Reusables Intervention targeted SUP cups and utensils. Together, these interventions achieved a 99% reduction in plastic waste. The data below show the overall impact of all interventions, delving deeper into MCM’s impact not only on reducing food waste but also the number of plastic items by 51% compared to the baseline average.

FIGURE 9. TOTAL AND PER STUDENT AMOUNT OF PLASTIC ITEMS BY INTERVENTIONS #1-4



This figure shows the impact of each intervention on plastic waste, showing the total number (bar graph) and the average number of plastic items per student (line graph). The reduction percentage is compared to the baseline average.

PFLD 11/2/22, accompanied by significant student outreach, led to a 95% and 97% decrease in total and per-student plastic waste from school lunch. PFLD 2/13/23 was a monthly PFLD with no CafCu outreach, still leading to a significant school lunch plastic reduction of 71% for total and individual plastic waste. MCM reduced total and per-student plastic items by 51% for school lunch and 36% for home lunch, respectively, not on a PFLD. Home lunch plastic reduction on the total amount was mostly due to the higher participation for school lunch on intervention days. The per student number of plastic items from home lunch hovered around two for all interventions.

### One in Three Packaged Items Were Left Unopened

Approximately one in three packaged items were left unopened, meaning that when students were given three packaged items, only two were typically used or eaten. This practice contributes to unnecessary food and plastic waste. Avoiding serving multiple packaged items on the same day is a consideration for future menu planning to reduce food and plastic waste simultaneously.

**FIGURE 10. UNOPENED PACKAGING BY ITEM FROM SCHOOL LUNCH, BASELINE AVERAGE (9/14/22 AND 10/4/22)**

Packaging Type	Unopened Rate
Hummus Cup	78%
Condiment Packets	53%
Applesauce	44%
Utensil Packets	27%
Pineapple Cups	22%
Dressing Cups	20%
Bagged Muffins	13%
Plastic Wrapped Sandwiches	11%
Pretzel Bag	10%
<b>Average for all openable packaged items</b> (excluding milk cartons)	<b>32%</b>

The second highest number of unopened items were condiment packets. These packets, along with dressing cups, could easily be switched to bulk and served in reusable squeeze bottles. 27% of utensil packets were left unopened. Offering utensils unwrapped is another key avenue for reducing plastic waste every day.





### Home Lunch Plastic

37% of plastic waste from home lunches came from snack wrappers. Parents at PS 15, often working multiple jobs, face limited snack options at nearby bodegas. Recognizing this, CafCu tailored its messaging to encourage students to opt for school lunch as a climate action. Reducing plastic waste from home-packed (often store bought) lunches remains a challenge in underserved communities with restricted access to healthier and less wasteful choices.

**FIGURE 11. NUMBER OF HOME LUNCH PLASTIC AND PERCENTAGE BY ITEM (BASELINE AVERAGE [9/14, 10/4], 2/13, AND 4/4 COMBINED)**

Item	Total Count	Item Percentage Relative to Total Home Lunch Plastic
Chip Bag	232	19.1%
Other Snack Bags and Wrappers	219	18.0%
Straw	119	9.8%
Juice Pouch	102	8.4%
Other Soft Plastic	96	7.9%
Drink Bottle	67	5.5%
Straw Wrapper	65	5.3%
Other Hard Plastic	59	4.8%
Zip Bag	51	4.2%
Juice Box	43	3.5%
Plastic Bag	40	3.3%
Lunchable Bottom	38	3.1%
Lunchable Top	28	2.3%
Fruit Cup Bottom	27	2.2%
Utensil	16	1.3%
Yogurt Bottom	15	1.2%
<b>Total</b>	<b>1,218</b>	<b>100%</b>



### Baseline Breakfast Audit

To expand our SUP reduction efforts, the CafCu team completed our first breakfast baseline waste audit to understand the whole school day's waste. We found that the breakfast service used significantly more SUP items than lunch. We plan to create and test breakfast waste interventions in the future.

**FIGURE 12. SCHOOL BREAKFAST PLASTIC PACKAGING WASTE VS LUNCH PLASTIC WASTE PER STUDENT**

Waste Audit	Total Number of School Breakfast Plastic Items	Number of Students Eating Breakfast	*Average Number of School Breakfast Plastic Items per Student
Classroom Breakfast	317	35	9.06
Cafeteria Breakfast	372	53	7.02
<b>Total Breakfast</b>	689	88	<b>7.83</b>
Baseline Average Number of Plastic Items per Student <b>Lunch</b>			<b>5.72</b>

Note: The average number of plastic items per student was calculated only with students eating school breakfast. The plastic count does not include milk cartons, trays, and PPEs (masks and gloves).

CafCu found an average of 7.83 plastic items were used per student during the breakfast waste audit, higher than the lunch average of 5.72. The breakfast delivered to the classroom is more highly packaged than lunch for transport and because the School Food Staff prepares it the day before. As a result, each student eating breakfast in the classroom had an average of 9.06 plastic waste items, compared to an average of 7.02 plastic items per student in the cafeteria.



Breakfast in the cafeteria.



Grab'n Go breakfast offered in the hallway.

## Appendix D. Additional Food Waste Data

First and Second Grades' Food Waste Significantly Decreased During MCM  
Broken down by grade, we measured the percentage of food wasted compared to the initial amount of food served. In the two baseline audits, Kindergarten, First, and Second Graders had the highest percentage of overall food wasted. However, during the MCM intervention, First and Second Graders reduced their wasted food to levels similar to older grades. Kindergarten students improved, but still wasted over 50% of their food served during MCM.

**FIGURE 13. PERCENTAGE OF FOOD WASTED FROM THE FOOD SERVED BY GRADE**

Grade	9/14/22 Baseline	10/4/22 Baseline	4/4/23 MCM
Kindergarten	<b>80.3%</b>	64.7%	52.7%
First	<b>70.8%</b>	64.4%	31.1%
Second	60.0%	<b>72.2%</b>	30.4%
Third	47.2%	58.3%	30.4%
Fourth	34.7%	57.3%	30.7%
Fifth	29.6%	50.2%	31.5%
<b>Total</b>	56.1%	60.6%	<b>34.9%</b>

Kindergarten, First, and Second Grade students wasted between 60-80% of the food served to them in the baseline waste audit. During MCM, Kindergarten students wasted 52.7% of their food, and all other grades ate about 70% of the food served, wasting only about 30%. First and Second Grade saw the highest reduction in the percentage of wasted food from about 60% to 70% on baselines to about 30% during MCM.



Photos of plates after eating - from left: Kindergarten, First and Second Grade during a baseline audit.



### Highest Food Consumption Increase in First and Second Grades

While reducing food waste, the MCM initiative also led to an average increase of 46% in food consumed per student as they were able to choose what they would like to eat. First and Second Grade students consumed an average of 107% and 94% more on MCM compared to the baseline amount of food that they were eating.

**FIGURE 14. FOOD CONSUMED PER STUDENT BY GRADE FROM SCHOOL LUNCH**

Grade	Baseline Average Amount Consumed per Student (g)	4/4 MCM Amount Consumed (g)	4/4 MCM Increased Percentage Consumed
Kinder	98.6	144.1	46%
First	101.3	209.6	107%
Second	107.8	208.2	94%
Third	142.0	192.8	36%
Fourth	191.7	210.4	10%
Fifth	172.9	222.5	29%
<b>Total</b>	135.1	197.1	46%

Kindergarten students showed a 46% increase in food consumption. Although the increase was smaller for Third, Fourth, and Fifth Graders, it still indicated that food consumption improved across all grades during the MCM intervention. Comparing averages, First and Second Graders originally consumed 43% less than Fourth and Fifth Graders during the baseline. However, during MCM, this gap narrowed significantly, with First and Second Graders eating only 3% less than Fourth and Fifth Graders.



Photos of First and Second Graders' plates after eating on MCM day.

### Food Wasted by Menu

The data shows the percentage of food wasted by each menu item served to students, ranked from most to least. This waste is influenced not only by the popularity of the menu items but also by how easy they are to eat. For instance, whole apples can be challenging for younger students. This suggests that when planning menus, both the selection of food items and how they are served are equally important.

**FIGURE 15. PERCENT OF FOOD WASTED VS SERVED BY MENU**  
(9/14/22, 10/4/22, AND 2/13/23)

Date Served	Item	Percent Wasted vs Served
10/4 Baseline	Hummus	93%
9/14 Baseline	Apple (Whole)	85%
10/4 Baseline	Beans	74%
9/14 Baseline	Fish Sandwich	72%
10/4 Baseline	Quesadilla	67%
9/14 Baseline	Salad Dressing Cup	64%
9/14 Baseline	Turkey Burger	64%
2/13 PFDL NYC	Broccoli/Cauliflower	64%
9/14 Baseline	Fries	60%
10/4 Baseline	Applesauce	59%
10/4 Baseline	Salsa	58%
10/4 Baseline, 2/13 PFDL NYC	Sandwiches	57%
2/13 PFDL NYC	Pizza	56%
9/14 Baseline	Condiment Packet	47%
9/14 Baseline	Muffin	38%
9/14 Baseline	Pineapple Cup	29%
2/13 PFDL NYC	Banana	28%
2/13 PFDL NYC	Orange (Sliced)	25%
10/4 Baseline	Pretzel	23%



Communication Improved in the Service Line During MCM

CafCu collected data on interactions between students, School Food Staff, and School Staff at the service line on a regular day and during MCM. Thanks to the outreach and training led by our students, communication at the service line significantly improved during MCM. Many students confidently requested what they wanted, the School Food Staff pre-plated only one item, and then asked students for their preferences. This enhanced communication played a crucial role in reducing untouched food waste and increasing food consumption among students.

FIGURE 16. COMMUNICATION BETWEEN STUDENTS AND SCHOOL FOOD/SCHOOL STAFF

Communication Type	Number of Students that Interacted (Baseline)	Number of Students that Interacted (MCM)
Student Asks Kitchen Staff a Food Question	28	49
Kitchen Staff Asks Student a Food Question and Student Answers	24	59
School Staff Asks a Food Question	8	13
Subtotal of Food-Related Communication	60	121
Only Greeting or Unrelated to Food	13	25
No Interaction	93	36

Food-related communication between students, School Food, and School Staff doubled as a result of MCM, from 60 to 121 interactions. Non-food-related communication also significantly increased from 13 to 25 instances, and non-interaction decreased from 93 to just 36.





### School Lunch Participation Increased on Intervention Days

At PS 15, the school lunch participation rate (the number of students eating school lunch out of all students in the cafeteria) is typically around 50%. However, during two PFLDs and the MCM initiative, when students conducted outreach within the school, participation rose to 67% and 71%. During the Reusables Intervention, there was also an increase to about 60%. The CafCu team strongly emphasized the importance of choosing school lunch, as many students' home-packed meals often consist of chips, cookies, and other less nutritious snack foods compared to school meals.

**FIGURE 17. SCHOOL LUNCH PARTICIPATION RATES**

Date	Intervention	Percent of School Lunch Participation
9/14 and 10/4	Baseline Average	50.8%
5/16/2022	<b>PFLD NYC</b>	<b>67.1%</b>
11/2/2022	<b>PFLD NYC/USA</b>	<b>71.7%</b>
2/13/2023	Monthly PFLD	52.3%
4/4/2023	<b>MCM</b>	<b>67.0%</b>
10/18/2023	Reusables	60.1%
<b>Total</b>	<b>All Interventions</b>	<b>58.7%</b>



# Appendix E. PFLD Videos

Click the underlined text to play each video!



## [Plastic Free Lunch Day USA - Join us!](#)

This video was released after the first nationwide PFLD to celebrate and explain its accomplishments.



## [Plastic Free Lunch Day - Get Ready, NYC Schools!](#)

The “why” of PFLD, sent by OFNS to School Food Supervisors, Sustainability Coordinators, and Principals.



## [Plastic Free Lunch Day - Menu Preparation and Tips for Kitchen Staff](#)

The “how” of PFLD, a training video for School Food Staff sent by OFNS to all School Food Managers and Head Cooks.



## [Plastic Free Lunch Day USA](#)

A video explaining PFLD adapted from the May 2022 NYC PFLD promotional video that was shared with schools nationwide through the USFA.

# Appendix F. PFLD Outreach Materials

## Promotion and Outreach

- [PFLD Overview Flyer ENGLISH](#) (what? why? QR code + free movie sign up)
- [PFLD Overview Flyer SPANISH](#)
- [Pack a Zero Waste HOME LUNCH Flyer](#)

## Announcements, Letter Templates, Messaging

- [Morning Announcements Template](#) (for 5 days leading up to PFLD)
- [Letter Template to Families Everywhere](#) (copy and adapt)
- [Letter Template SPANISH to Families Everywhere](#) (copiar y adaptar)
- [NYC Letter Template to Families for Monthly Plastic Free Lunch Days, Established Nov 2, 2022!](#) (copy and adapt)
- [NYC Letter SPANISH Template to Families for Monthly Plastic Free Lunch Days](#) (copiar y adaptar)

## Social Media

- [Creative Messaging Tip Sheet for Students and Teachers](#)
- [Social Media — Templates and Ready to go Graphics](#)
- [Social Media Kit](#) (copy suggested posts)
- [Photo and Video Tip Sheet and Shot Examples](#) → Share with us to help build momentum for the next PFLD!
- [USFA Member PFLD Press Release Template](#) (copy, adapt, and add your logo)
- [All District PFLD Press Release Template](#) (copy, adapt, and add your logo)



Creatively working with youth to achieve equitable zero waste, climate smart school communities, and a plastic-free biosphere.

### Plastic Free Lunch Day

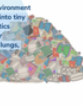
#### MORNING ANNOUNCEMENTS

- ★ Make morning announcements to get your whole school excited and on board!
- ★ Use our template announcements below OR create your own!
- ★ Make a plan! Use a COUNT DOWN during the week before Plastic Free Lunch Day to share facts and data. One of the most powerful ways students can make big, hyper-local change is collecting and sharing their own data about their own school!
- ★ Include different students each day for maximum involvement.
- ★ Encourage students to eat school food on Plastic Free Lunch Day to REDUCE PLASTIC!
- ★ Encourage students who bring lunch from home to pack food in reusable containers!
- ★ Encourage teachers and staff to try to go plastic-free TOO if they bring home lunch!
- ★ Everybody can join in the action and support students on this day!
- ★ Students can SHARE their OWN Cafeteria Plastic DATA: (See [www.plastic-free-lunch.org](http://www.plastic-free-lunch.org)) Collect and count the water cups your school uses for all the lunch periods! Any BEFORE and AFTER data helps to engage students and set plastic reduction goals!
- ★ Have students make classroom visits!


See Morning Announcements on the next pages and make your plan!

#### Why Plastic Free Lunch Day?

- School cafeterias serve over 7 billion meals per year
- School meals are loaded with single-use plastics
- Less than 1% of plastic is recycled
- Most plastic ends up in a landfill or the environment
- Plastic does not biodegrade. It fragments into tiny pieces called microplastics, then nanoplastics
- Microplastics are in our oceans, soil and air!
- Scientists have found microplastics in our lungs, liver, digestive tract, and blood.
- We are all eating and breathing plastic.



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### Join Cafeteria Culture for Plastic Free Lunch Day

#### Quick tips for a waste-free HOME LUNCH!

Join the Plastic Free Lunch Day CLIMATE ACTION! Pack your food in reusable containers! Most lunch packaging is SINGLE-USE, which is landfilled, lost as litter, or incinerated. Recyclable packaging is often contaminated with food and cannot be processed. Reduce food waste! Save your leftover food in your reusable containers for later! If packing for a child, ask them to bring leftovers home so you can adjust portion size!

#### How to pack a ZERO WASTE lunch

##### Rethink your Packaging

- Pack lunch in a REUSABLE lunch box or bag
- Pack food in REUSABLE containers
- Pack a REUSABLE water bottle or cup
- Bring a REUSABLE CLOTH napkin or bandana
- Pack a REUSABLE water bottle or cup

##### Instead of single-serving packaged foods like:

- Individual Yogurt
- Snack Bar
- String Cheese
- Squeezable Fruit
- Drinks with Straws
- "Ziploc" Bags & Plastic Wrap

##### Try a reusable option!

- Yogurt, fruit, & honey in a container
- Leftovers, sandwich, fruit, cheese, crackers
- Portion from larger bag into a container
- Granola, dried fruit, nut butters, nuts
- Slice cheese off the whole block
- Whole fruit or cut into slices
- Reusable water bottle with water or juice
- ANY reusable container!

#### WHY pack a ZERO WASTE lunch?

- Landfills pollute the ground, air, and nearby communities. Incinerators pollute the air and disproportionately harm lower-income communities, often communities of color.
- Cafeterias generate the most waste in a school building (by weight).
- Reducing cafeteria lunch waste is a positive action for students to participate in every day!
- Climate Action can be a positive antidote for Climate Anxiety!
- Reduce tax dollars spent on hauling trash!

Adapted from materials produced by Benjamin Franklin Magnet Elementary School in Glendale, CA

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### DATA COLLECTION for Single-Use Plastic Survey














Collect DATA for one lunch, one lunch period, or ALL lunch periods

Date: \_\_\_\_\_ Lunch Period: \_\_\_\_\_

School Name: \_\_\_\_\_ School Borough: \_\_\_\_\_

How many TOTAL LUNCHES? (SCHOOL LUNCH & HOME LUNCH) \_\_\_\_\_

School Menu:

Drink Containers	Food Containers, Toppings & Lids	Bags & Plastic Wrap	Packets, Wrappers, Utensils, & Straws
 milk carton  juice box  plastic cup  plastic bottle  juice pouch	 food container  soft plastic cup  hard plastic lid  wax paper  sandwich	 chip bag  plastic chip bag  plastic bag  plastic bag  Ziploc bag	 packet  wrapper  straw  plastic spoon  plastic knife
# school lunch			
# home lunch			
# school lunch			
# home lunch			
# school lunch			
# home lunch			

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## Easy Start

- One-Page PFLD [Step by Step Guide for K-12 Schools and Teachers](#)

If your school is not yet planning a plastic-free action day:

- [Student Sample Letter to Principal or School Food Director](#) to request a Plastic Free Lunch Day (if your school is not yet planning anything).
- [How to Drive Change In Your Cafeteria - A Guide for High School Students](#), adapted from the work of Gauri Rastogi, high school senior and CafCu Youth Advocate and intern, based on her years of advocating to eliminate styrofoam trays from her school district in Michigan.
- [Step by Step College Guide and Survey](#), Plastic Free Lunch Day and plastic free action ideas for every day!

Movies to inspire everyone!

Show in the classroom, cafeteria, assembly, after school, or club!

- [Plastic Free Lunch Day — Get Ready USA](#) video promo (3 minutes)



- [Microplastic Madness](#) (76 minutes; can be shown in 2, 3, or 5 parts) — Free for schools that lead a plastic free action year-round.
  - Inspire your students to take plastic-free action with Cafeteria Culture's award winning, student-led movie. This uplifting and informative real life story shows how students started the first Plastic Free Lunch Day. It is sure to spark a lively discussion. **Spanish-Subtitled Version available.**
  - [Watch the trailer!](#)



# Appendix G. PFLD Teaching Materials

## Lessons and Activities

Measure your plastic use and impact!

- **Single-use Plastic Search** (easy)
  - Individual student activity for lunch period with lesson plan. Students collect data from school, home, or store-bought lunch to gain an understanding of the plastic pollution problem. Complete with teacher notes and **Single-Use Plastic SEARCH Worksheet**
- **Cafeteria Plastic Survey** (requires planning)
  - How to lead a waste audit activity for a class, small group, Green Team, or club, COLLECT before and after DATA to inform others and support your actions. Design and test SOLUTIONS to reduce SUP. (**Data Collection Sheet for Cafeteria Plastic SURVEY**)
    - All of the above in one PDF, **Step by Step in a Packet for K-12** including a guide, letter, and surveys
- Overview Slides: **Why Plastic Free Lunch Day? The Problem with Plastic**  
Plastic Free Lunch Day introduction; slides, with notes; adaptable for K-12

## Math Lessons

- **What Can We Eliminate?** Plastic-free curriculum for Grades 3-7
- **Data Analysis - Grades 8-12 in 3 parts** - slides - (# 1. Algebra I; #2. Geometry Part 1; #3. Geometry Part 2)

## Games

- **Life-Cycle of Plastic** — a board game for 2-4 players, ages 10+; download and print out the PDF with game directions, cards, and the board! All you need are 4 bottle caps.
  - Play the online version here → **in English** and **in Spanish!**

