



## School Meal Waste and Consumption

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This report shall review strategies for increasing consumption of school meals in the Commonwealth to reduce school meal waste with a focus on the National School Lunch Program (NSLP). In addition, this report presents findings from a 2024 Massachusetts School Nutrition Directors survey and provide recommendations to minimize food waste pursuant to the [Fiscal Year \(FY2024\) Budget, Outside Section 84](#).

January 2025

This document was prepared by the  
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Russell D. Johnston  
Acting Commissioner

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January 2025

Dear Members of the House and Senate Committees on Ways and Means, and the Executive Office for Administration and Finance:

I am pleased to submit this report to the Executive Office of Administration and Finance and to the House and Senate Committees on Ways and Means, *School Meal Waste and Consumption*, pursuant to the Fiscal Year 24 Budget, Outside Section 84. This report, authored in collaboration with state food system partners, identifies strategies for increasing school meal consumption as the primary way of addressing food waste while simultaneously centering the long-term health and wellbeing of students in Massachusetts. A preliminary review of school food waste research and anecdotal surveying of Massachusetts School Nutrition Directors has elevated the following recommendations to addressing food waste:

- Offering guidance and incentivizing schools to provide adequate meal duration and strategic meal scheduling;
- Investing in culinary professional development for school nutrition professionals and structures for ensure job security and upper mobility in the field of school nutrition;
- Elevating resources, best practices and funding to support feedback collection that elevates student preferences;
- Offering resources and waste management coordination support to school districts seeking to implement waste diversion programs.

If you have any questions, feel free to contact me or Jessica Leitz, Director, Director of External Partnerships at [jessica.leitz@mass.gov](mailto:jessica.leitz@mass.gov) to facilitate and coordinate this work are appreciative of the Legislature's commitment to the students of the Commonwealth.

Sincerely,

A handwritten signature in blue ink that reads "Russell Johnston". The signature is fluid and cursive, with the first name "Russell" and last name "Johnston" clearly legible.

Russell D. Johnston  
Acting Commissioner of Elementary and Secondary Education

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## Introduction

The Department of Elementary and Secondary Education respectfully submits this Report pursuant to the FY2024 Budget, Outside Section 84, which reads:

*(a) Notwithstanding any general or special law to the contrary, the department of elementary and secondary education shall analyze and report on practices related to school meals. The report shall include a review of food purchasing practices and consumption of school meals in K-12 public schools in the commonwealth, including recommendations for strategies to minimize food waste.*

*(b) The report shall include, but not be limited to: (i) the quantity and cost of food purchased by each school district, including: (A) total foods purchased for school meals; (B) total foods served to students for school meals; and (C) total foods purchased but not served to students; (ii) school practices, categorized by school district, to prevent food that students did not consume, including, but not limited to, fruit or pre-packaged foods, from being discarded; and (iii) practices of other states to reduce school meal waste.*

*(c) The report shall include recommendations from the department to reduce food waste at public schools, including, but not limited to, the feasibility and effectiveness of: (i) increasing input from students, faculty, parents and guardians regarding nutritious meals that appeal to students; (ii) using offer-versus-serve models of meal selection at all grade levels; (iii) presenting meals and items on school menus to students in an appealing manner; (iv) allowing students to keep a breakfast or lunch item for consumption later in the day; (v) utilizing a shared table or food pantry in each school to offer excess food to school or community members; and (vi) increasing composting at each school.*

*(d) Not later than July 31, 2024, the department shall file its report and recommendations with the clerks of the house of representatives and the senate, the house and senate committees on ways and means and the joint committee on education.*

A combination of the FY2023 General Appropriations Act and a subsequent supplemental budget appropriated a total of \$175 million to support universal free school meals for students enrolled in public, private and residential schools participating in the federal National School Lunch and School Breakfast Programs. At the signing of the FY24 budget, Massachusetts became the eighth state to make universal free school meals permanent<sup>1</sup>.

The permanent adoption of universal free school meals builds from nationwide waivers available during the COVID-19 pandemic, which allowed for schools to offer meals to all students at no charge. This practice was extended by Massachusetts in school year 2022-2023 given how beneficial school meals for all was for both students and School Food Authorities (SFAs). Now, the continued funding has sustained the financial health of school nutrition programs, spurred growth in the purchasing of local food, maintained a high standard of nutritional quality for breakfast and lunch, kept stigma out of the cafeteria, eradicated student meal debt, and allowed

for all students in the Commonwealth to be nourished and ready to learn. The benefits of school meals to society are supported by robust evidence - school meals are nutritious, linked to stronger educational outcomes, and reduce rates of food insecurity, poverty, and health disparities.<sup>ii</sup>

While expanding access to school meals has led to concerns of food waste, there is an opportunity to implement food waste strategies which also increase student consumption of school meals. This approach will minimize waste and maximize quality.<sup>iii</sup>

## Background: Nutrition Standards and School Meal Regulations

The Massachusetts Department of Elementary and Secondary Education (DESE)'s Office for Food and Nutrition Programs (FNP) works closely with over 800 school districts, center-based and family child care programs, adult day health programs, Summer Eats community organizations, United States Department of Agriculture (USDA) Foods storage and distribution vendors, food banks, and anti-hunger organizations across the Commonwealth to administer eight Federal Child Nutrition Programs and four Food Distribution Programs federally funded by the USDA's Food and Nutrition Service. During SY22-23, over 97.5 million lunches were served by operators of the National School Lunch Program alone.

The cornerstone of these Federal Child Nutrition Programs are the USDA's nutrition standards guided by the [Dietary Guidelines for Americans](#) (DGA) developed and released by the USDA and United States Department of Health and Human Services every five years reflecting the current body of nutrition science available. The USDA's nutrition standards for Child Nutrition Programs provide the foundation for children to receive nourishing, healthy meals that meet nutritional needs, promote health, and prevent disease.

Nutrition [standards](#) for school meals outline expectations around sodium, calories, sugar, and unhealthy fat as well as set a meal pattern ensuring that children have access to a balance of fruits, vegetables, low-fat or fat-free milk, whole grains, and lean proteins.<sup>iv</sup>

In accordance with meal pattern requirements, [school lunches](#) must offer the following food components: fruits, vegetables, whole grain-rich grains, meats (or a meat alternates) and fluid milk. The quantity and, in the case of vegetables, the type, of each food component is outlined by the [USDA meal pattern](#) and is dependent on grade level.

The USDA's Food and Nutrition Service has a provision which outlines two service models for school meal service that clarify what students must take in order to have a reimbursable meal, while allowing varying levels of choice and flexibility to students. The "serve only" model requires school nutrition programs to offer, and each student to take, all five required food components at the appropriate quantity. Alternatively, the "offer-versus-serve" model allows school nutrition programs to offer each student all five of the required food components at the appropriate quantity, but students are only required to take three food components (at the

appropriate quantity). One of these three food components must be a fruit or vegetable. The offer-versus-serve model aims to “reduce food waste in school meal programs while permitting students to decline foods they do not intend to eat”<sup>v</sup>.

## Food Cost and Quantity of Massachusetts School Meals

[Fiscal Year \(FY2024\) Budget, Outside Section 84](#) outlines the desired quantification of the following data points: the quantity and cost of food purchased by each school district, including: (A) total foods purchased for school meals; (B) total foods served to students for school meals; and (C) total foods purchased but not served to students.

As described in detail below, DESE’s Office for Food and Nutrition Programs (FNP) has worked collaboratively with experts in the field including [Project Bread](#) and [Massachusetts’ The Green Team](#) to review best practices and develop comprehensive recommendations for future data collection. Additionally, in March 2024, FNP conducted an optional, anonymous “Food Waste Management and School Meal Consumption Strategies” survey with a random selection of SFAs across the state diverse in enrollment, school type (public, private or charter), geographic location, and density (See Appendix A). Approximately 28 percent of all SFAs in Massachusetts responded to the survey, which are self-reported reflections on the state of food waste and school meal consumption during the 2023-2024 school year by School Nutrition Directors. Lastly, FNP conducted informational interviews with seven SFAs that responded to a call for information regarding investments in food waste diversion in February and March 2024. Each of these efforts has informed FNP final recommendations.

- A. *Quantifying total foods purchased for school meals:* several conventional benchmarks<sup>vi</sup> can be utilized to approximate food cost at the SFA and state level. However, in practice, food cost can vary widely based on a school nutrition program’s budget, staffing structure, food preparation model, kitchen equipment, service model and scale of program. To accurately provide total food cost at the SFA and state level, funding would be required to (a) conduct an analysis of school nutrition programs’ fourth quarter profit and loss statement and (b) interview School Nutrition Directors, Business Managers, Procurement Managers, and Industry Professionals to contextualize food purchasing decision points and cost trends.

One piece of aggregated food cost data available at the state level is the value of the USDA Foods Entitlement Program utilized by SFAs each year. On average, USDA Foods comprise about 15-20 percent of the food that makes up school lunches<sup>vii</sup>. In Massachusetts, the USDA Foods Entitlement Program provides food commodities to schools through three programs: Brown Box, Processing (or Diversion) and DoD Fresh. In SY22-23, SFAs utilized the following quantity of USDA Foods totaling approximately \$31 million listed below. If USDA Foods is taken to comprise 20 percent of the total food cost for SFAs across the Commonwealth, total food cost at the state level can be estimated at \$155 million.

- Brown Box (may include dried, canned or frozen fruits and vegetables, proteins or grains) - approximately 6.8 million pounds of food valued at \$13.5 million.
- Processing/Diversion (may include fruit, meats, fish, cheese, peanut butter and oil) – approximately 4.7 million pounds of food valued at \$6.1 million.
- DoD FRESH (domestic raw fruits and vegetables) – total value of food is \$11.8 million (approximately number of pounds is unknown).

B. *Total foods served to students for school meals:* in SY22-23, 97.5 million lunches were claimed by operators of the NSLP in Massachusetts. As mentioned previously, school nutrition programs may utilize a variety of service models when offering school meals which makes it difficult to estimate the total “foods” by cost or weight that have been served to students without conducting an analysis of food production records. Moreover, to truly understand the total foods *consumed* by students, a plate waste study would be required. A plate waste study or “audit” is a technique used to assess how much of, and what kinds of foods are being wasted in a meal setting. A plate waste study has not been conducted at the state level in Massachusetts.

It is important to understand that plate waste studies typically entail extensive planning and resources. For example, for data collection, staff or volunteers are often placed at waste audit stations in the cafeteria and may interview students and help them separate different unfinished meal components into buckets – diverting it from trash bins to be weighed and analyzed. Alternatively, some plate waste studies use photos to document student lunch trays before and after they eat their meal to visually analyze the plate waste.<sup>1</sup>

C. *Total foods purchased but not served to students:* in the Massachusetts “Food Waste Management and School Meal Consumption Strategies” survey, respondents self-reported that an average of 24 school lunches and/or school lunch components per day across all lunch service locations in a given SFA were prepared by school nutrition professionals, offered during school lunch service but discarded by school nutrition professionals because they were not taken by students participating in school lunch. For context, the daily participation of a single SFA, averaging the 2022-2023 school year daily lunch participation of all SFAs in the Commonwealth is about 900 lunches per day. Additionally, 71 percent of SFA survey respondents ranked their school nutrition team’s mastery of managing back-of-house inventory as above average to high, reporting that staff ensure food ingredients were rarely left unused or discard. 16.5 percent of SFA survey respondents ranked their mastery of managing back-of-house inventory as average, 4 percent of SFA survey respondents ranked their mastery as below average and 3.5 percent of respondents identified that they had low mastery of back-of-house inventory management.

Ultimately, while targeted plate waste studies throughout the Commonwealth and further school nutrition data analysis could provide a baseline on food cost (A), food served (B) and food

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unserved (C), anecdotal reflections shared by school nutrition professionals suggest that an important intervention point for preventing food waste is at the point of consumption, when student make a choice as to what food(s) they will consume and at what quantity. Most Massachusetts SFA survey respondents reported that inventory management and overproduction account for a limited amount of overall school meal food waste, whereas food components that students have taken from the service line but do not eat and instead disposed of account for a much greater proportion of school meal food waste. For this reason, while more research can be conducted to quantify food waste in Massachusetts, in comparison to national benchmarks, the remainder of this report focuses on short term, evidence-based interventions that can support increasing school meal consumption, particularly at lunch, to prevent food waste.

## National School Meal Waste Research and Best Practices for Reduction

In April 2019, the USDA FNS released findings from the a [School Nutrition and Meal Cost Study](#) (SNMCS) -- the first nationally representative comprehensive assessment of the NSLP and SBP that simultaneously examined the cost of producing school meals and the nutritional quality of those meals. This national report included data on plate waste which was collected during the SY14-15 through observing plate waste in over 6,000 school lunches in 154 schools across the 48 contiguous States and the District of Columbia. One significant finding was that, despite concerns that raising nutritional requirements would increase food waste, the quantity of food waste remained primarily unchanged after the passage of the Healthy, Hunger-Free Kids Act of 2010.<sup>viii</sup>

With regard to food groups, SNMCS found that students who participated in NSLP were *more* likely than students that did not participate to consume milk, vegetables, fruit or fruit juices and whole grain-rich bread products. Moreover, these NSLP participants were *less* likely to consume desserts, snack, and beverages other than milk or fruit juice. Lunches consumed by NSLP participants were lower in calories, total fat, saturated fat, and sodium compared to lunches consumed by matched nonparticipants.

Nationally, as reported in the USDA’s SY 14-15 study, plate waste was higher in elementary schools than in middle or high schools. On average, 25 percent of the calories and nutrients available in elementary school lunches were wasted, while 12 to 15 percent of calories were wasted in middle and high schools. Plate waste at lunch across all school types varied by major food group (Figure 1). Thirty-one percent of vegetables, 29 percent of milk, 26 percent of fruit and fruit juice, and 23 percent of separate grains/breads were discarded from lunch trays. Plate waste was lower for combination entrées (16 percent) and lowest

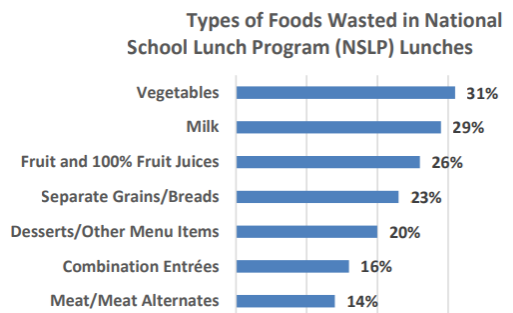


Figure 1: USDA Food and Nutrition Service’s School Nutrition and Meal Cost Study conducted during the 2014-2015 school year with school across the United States

for meat/meat alternates (14 percent). The use of the “offer-versus-serve” option was associated with significantly lower levels of plate waste among elementary schools. Among elementary schools, the use of “over-versus-serve” at lunch was associated with significantly lower percentages of waste for calories (26 percent versus 32 percent) and fruits and vegetables (24 percent versus 35 percent). Notably, “over-versus-serve” is mandatory in high schools, but optional for elementary and middle schools.

According to the USDA, “*the best way to tackle food waste is to make sure students consume what they take.*”<sup>ix</sup> As outlined by the USDA, strategies for increasing school meal consumption include:

- Implementing [offer-versus-serve \(OVS\)](#) – Allows students to decline some components of a reimbursable meal as a way of providing choice and reducing waste;
- [Marketing meals](#) – Highlight new foods on the menus and serving lines;
- Extending lunch from 20 to 30 minutes – to allow students adequate time to consume their meals;
- [Saving food items](#) – Allowing students who may not have time to finish their meal during the designated lunch period to save certain meal components for later in the day. For food safety reasons, this practice should be limited to food items that do not require cooling or heating.
- Serving “Grab & Go Meals” for students who want to get through the line faster so that they have more time to eat;
- Providing pre-sliced fruits and vegetables for more convenient consumption.

Similarly, in a systematic literature review<sup>x</sup> of school meal consumption initiatives and policies - the following practices were consistently associated with improved meal consumption – with notable overlap in the USDA recommendations. These include:

- offering students choices within each meal component (particularly fruits and vegetables);
- enhancing the palatability/cultural appropriateness of meals;
- offering pre-sliced fruit;
- incentivizing students to taste fruits and vegetables with rewards;
- providing more time to eat lunch with longer lunch periods;
- implementing recess before lunch;
- limiting access to competitive foods.<sup>2</sup>

In addition to best practices around increasing school meal consumption, food waste reduction and waste diversion strategies can be implemented by school nutrition professionals prior to lunch service through:

- attentive procurement practices and food ordering;
- proper management of inventory;
- strong culinary and food safety skills that increase the edible portion of fruits and vegetables, elevate flavor and reduce the need for discarding unsafe or unpalatable food;

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<sup>2</sup> “[Competitive foods](#)” is a term that includes a wide range of foods that do not qualify as reimbursable meals under the National School Lunch Program or the School Breakfast Program. Such foods can often be obtained from a la carte cafeteria sales, vending machines, and school stores.

- accurate meal preparation including (a) the use of record keeping to project the amount of students likely to select a meal as well as (b) correct portioning of meals;
- the proper handling and food safe storage of leftover, unused food components for future use;
- composting of food scraps in the kitchen during meal preparation (as well as recycling) to divert these items from landfills.

Based on the anecdotes provided in our Massachusetts' Food Waste Management and School Meal Consumption Strategies survey, SFAs reported current implementation of a number of these strategies including the active use of production records to limit over production and the safe repurposing of leftover food components for future consumption. Similarly, as reported by School Nutrition Directors, a primary barrier for reducing food waste is building a reimbursable school meal that students can reasonably consume within the assigned school meal duration - specifically, encouraging consumption of the required fruit and/or vegetable meal components. Additionally, other primary barriers SFAs experienced when working to address food waste concerns, included staffing, funding, knowledge, and administrative support.

After the meal service period, school policy should consider allowing students the opportunity to save certain meal components that do not require cooling or heating for consumption later in the day. Additionally, students, teachers, school administrators and school nutrition professionals alike can consider utilizing a share table or food pantry in each school to offer excess food to school or community members. Lastly, schools and districts can consider their capacity to implement composting across some or all grade levels to divert food waste into more sustainable waste management streams or other agricultural endeavors.

## Massachusetts School Meal Consumption Strategies

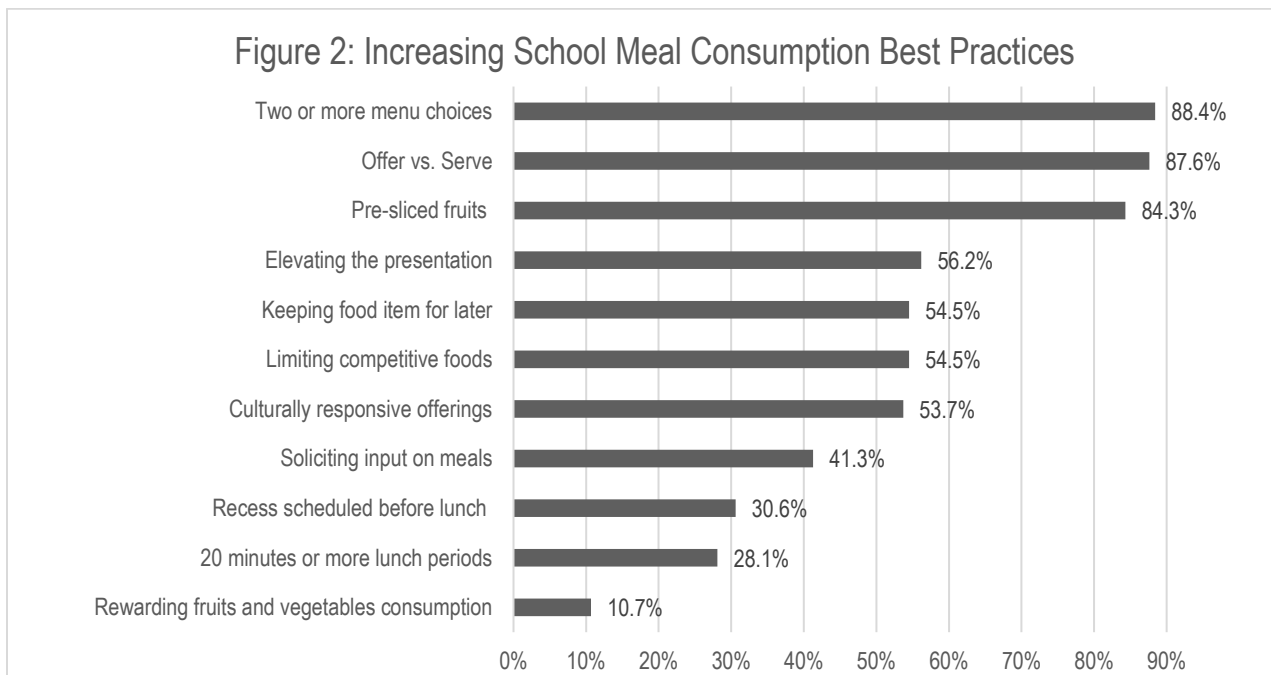
Utilizing best practices for increasing school meal consumption as a foundation, FNP explored current implementation of these strategies by Massachusetts SFAs through surveying approximately 120 SFAs and conducting informational interviews with seven.

Out of the 11 strategies outlined in this report and illustrated in Figure 2, seven out of the 11 meal consumption strategies are being implemented by over 50 percent of SFAs surveyed.

The highest implementation rate is offering food choice on the service line through two or more menu choices (88 percent of SFAs), followed by utilizing the offer-versus-serve service model (also 88 percent of SFAs) and providing students with the option of pre-sliced fruit (84 percent of SFAs).

Among the strategies least implemented by Massachusetts SFAs is rewarding students who consumed fruits and vegetables from the service line (11 percent of SFAs). Additionally, seven percent of respondents provided anecdotal feedback in the survey that ensuring students specifically consume fruits and vegetables from their lunch tray is one of their primary challenges in increasing consumption.

Additionally, structuring meal service to support increased consumption by (a) increasing lunch periods to 20 minutes or more (28 percent of SFAs) and (b) intentionally scheduling lunch after recess when student have expended excess energy and may perceive greater hunger cues (31 percent of SFAs) represent areas for growth in increasing school meal consumption in which school administrators can play a supporting role. During an informational interview with one small SFA in Central Massachusetts, the respondent reported that the scheduling of recess before lunch resulted in a notable increase in consumption during the lunch period. One study found that moving recess before lunch increased consumption of fruits and vegetables per child by 54 percent and increased the fraction of children eating at least one serving of fruits or vegetables by 45 percent. <sup>xi</sup>



Percentage of SFA Survey Respondents Reporting Engagement with each School Meal Consumption Best Practice Strategy

## Massachusetts School Meal Post-Consumer Waste Diversion Strategies

In addition to exploring the implementation of strategies that would increase school meal consumption, FNP explored the current implementation and reported impacts of two primary waste diversion strategies (a) utilizing a share table or food pantry in school to create a consumption pathway for unwanted food components and (b) overseeing a composting program for food waste after meal consumption in the cafeteria during which students and staff composted unwanted food waste.

## *Share Tables*

Of the SFAs surveyed, approximately 44 percent are utilizing a share table in some capacity for specific grade levels and meal services or throughout their entire program. Share tables allow excess food at the end of lunch waves to be redistributed through the main office, school nurse, or in-school food pantry.<sup>xii</sup> When students and staff are unable to utilize these items, eight SFAs highlighted that they have forged relationships with food rescue organizations as well as organizations fighting food insecurity in their communities with whom they donate leftover food that can no longer be repurposed and served.

Some anecdotal barriers to implementing a share table identified by School Nutrition Directors include training staff and students on proper engagement and developing a partnership with a community organization willing to receive food donations. One notable challenge for SFAs seeking support in executing share tables is also the limited capacities of local Boards of Health tasked with providing the food safety guidance pivotal to executing these programs. For reference, SFAs are expected to work with Local Board of Health to ensure compliance of food safety codes when implementing many post-consumer waste diversion programs including on-site composting and share tables.<sup>xiii</sup>

## *Composting*

Of the SFAs surveyed, approximately 27 percent have adopted a composting program. Moreover, all of the seven schools and districts with whom informational interviews were conducted observed a reduction in waste management cost associated with the shift to composting. For a sense of impact, one anonymous SFA shared:

*...after compiling six months of data for our compost & recycling program from September 2023 to February 2024, [our SFA was] able to divert 28,052 lbs of food waste from our kitchens and cafeterias...our compost and recycling program contributed to a large cost reduction of waste management. So far, for the period of 9 months (Jul 2023-Feb 2024), we were able to save \$33,000 [in waste management costs] compared to last year. Solid waste cost was down \$52,000 where the cost of recycling went up \$12,000, but overall saving with composting cost is \$33,000.*

Of the seven SFAs with whom FNP conducted informational interviews, three paid for composting services out of their food service budget where waste management cost would not otherwise be incurred by the food service budget (in other words, composting is a new expense that results in no off-setting cost savings because waste management fees are managed outside of the food service budget). Some school nutrition programs have taken on this cost out of a sense of obligation to improving the impacts of their program, while others are committed to responding to school community advocacy around waste. Two SFAs interviewees explained that their composting programs have arisen from necessity – for one small rural school there is no public waste hauling available, while in one larger urban district, the threat of substantial price increases in a new waste management contract have city officials exploring diversion options.

While anecdotal cost saving has been observed in the implementation of composting efforts, executing these programs can require staffing, compost vendor management and/or equipment investments that would need to be accounted for before an assessment of overall operational cost reduction can be determined. As aforementioned, waste management is often overseen and funded at the school district or municipal level. As a result, in some cases, cost savings that results from switching from landfill hauling fees to composting cannot be tracked by school nutrition programs and the cost savings of these programs is not returned to school nutrition programs to reinvest in these efforts. Despite this, all School Nutrition Directors interviewed shared that composting was something they cared about on a personal level or was valuable to them to implement because of the strong community and administrative support and connections these efforts garnered. For one small SFA, food waste is hauled by a local composting company and returned to the school for integration into their school garden soil. For another SFA interviewed, their composting efforts started in partnership with a local pig farmer who utilized these discarded food scrapes as feed for his livestock.

Despite the potential financial benefit and community connection fostered by composting programs, barriers still remain in supporting SFAs seeking to implement this food waste diversion strategy. For instance, two of the seven SFAs interviewed that represent urban districts serving between 4,000 and 8,000 students employ full-time sustainability or waste management personnel at the school district or municipal level to coordinate composting efforts. Moreover, composting programs are beginning to face new challenges with their compost haulers who are requiring certified paper products free of per- and polyfluoroalkyl substances (PFAS) to haul cafeteria compost inclusive of packaging – adding an extra layer of cost and procurement to ensure these paper products can be secured by traditional school nutrition vendors.

The need for financial resources was continually identified as a barrier to investing in composting efforts. One SFA reported the use of [Sustainable Materials Recovery Program](#) [Recycling Dividends Program](#) funds to cover costs, while two other SFAs were supporting their efforts through private donors and grant funding including the [Donald D. Johnson Operational and Cost Efficiency Award](#) and [EPA Climate Pollution Reduction Grants](#). Setting a baseline for understanding school food waste quantity and critical intervention points can be an important first step in setting a post-consumer waste diversion plan. One available resource to SFAs is Center for EcoTechnology’s [Food Waste Tracking Guide](#) that can be utilized to conduct a self-assessment on wasted food locations and quantities to guide future decision making without the need to conduct a full plate waste study.

## Ways that DESE will Promote Best Practices

Level of Change	Interventions & Next Steps
District-Level Structural Changes	<input checked="" type="checkbox"/> School Meals for All <input type="checkbox"/> School Meal Structure (Seat Time/Schedule) <input type="checkbox"/> Competitive Foods  <i>DESE Next Steps:</i>

	Support school districts in leveraging school wellness policies to outline seat time, meal scheduling and competitive foods goals; Collect baseline seat time and meal scheduling data.
School Nutrition Program Operations	<input type="checkbox"/> Staff Investment <input type="checkbox"/> Student Engagement/Feedback  <i>DESE Next Steps:</i> Elevate and amplify culinary and student engagement training opportunities (i.e. The John C. Stalker Institute’s Culinary Resources Inspiring School Professionals and Chef Coaching Program as well as Project Bread Community Nutrition Services’ School Food Fellowship). Renew training efforts around meal service and point of service models.
Waste Diversion	<input type="checkbox"/> Share Tables <input type="checkbox"/> Composting  <i>DESE Next Steps:</i> Spotlight waste diversion resources, case studies and funding opportunities from the Massachusetts Green SWoRD and DEP The Green Team in school nutrition communication. Schedule quarterly touchpoints with waste diversion stakeholders to collaborate on shared goals.

Food waste is inevitable in large-scale meal settings like schools, but prioritizing food waste reduction strategies that increase school meal consumption is an important choice we must make to ensure students receive the highest benefit possible from nutritious school meals.<sup>xiv</sup> The following evidence-based recommendations are driven by the feedback received from school nutrition professionals in our surveying efforts, as well as based in a larger [recommendation brief developed by Project Bread](#).

The greatest area for growth is at the district administration, school nutrition operations, and waste diversion level. Moreover, in reviewing FNP’s internal resources and external partnerships, the following recommendations represent areas in which FNP can readily participate in intervention and where further support at the state and legislative level can be leveraged.

*District-Level Structural Changes*

**School Meal Structure:** Students need adequate time to sit and eat (seat time) and can benefit from thoughtful school day planning that leverages expended energy and hunger cues. However, adjusting school meal structure and duration will require partnering with school committees and administration.

- **Meal Duration.** When students have at least 20-30 minutes for lunch - consumption increases, nutritional intake improves, and waste is reduced.<sup>xv</sup> Offering at least 20 minutes of seat time is supported by the CDC and the School Nutrition Association (SNA).<sup>xvi xvii</sup>
- **Scheduling Meals.** The timing of when students access and eat school meals impacts consumption.
  - *Lunch* periods that start at 12pm or later produce less waste - as students find it to be a more appropriate time to eat.<sup>xviii</sup>

*Lunch after recess* is associated with increased consumption, as students may be less rushed, and they may expend more energy before lunch.<sup>xix xx xxi</sup> After Montana implemented recess-before-lunch policies they noticed improved consumption and cafeteria and classroom behavior.<sup>xxii</sup>

**Competitive Foods:** Many schools offer unsubsidized food items which compete with reimbursable meals. Competitive food policies are often made at the local, school wellness policy level. Research on districts which limit access to competitive foods were found to be cost-neutral and led to increases in school meal participation.<sup>xxiii</sup> Moreover, in the wake of universal free school meals SFAs may need to further consider whether their budgets require competitive food sales and if so, how to balance these sales with the preparation of high-quality, nutritious reimbursable school meals.

### *School Nutrition Program Operations*

**Staff Investment:** Across all workplaces, employees are more likely to stay in their role and engaged if their organization invests in them.<sup>xxiv</sup> Having engaged school nutrition professionals is instrumental to cost efficiency and program quality.<sup>xxv</sup> Staff stability allows students to build relationships with staff, which may help with students' perception of school meals as well as staff ability to gauge student preference.<sup>xxvi</sup> Thus, supporting school nutrition job satisfaction and elevated professionalism can include:

- *Training & Professional Development:* While annual training is required, hands-on, targeted culinary professional development that supports the specific goals and student preferences of individual SFAs better supports staff. Potential training areas of focus include using new equipment and preparation methods, planning and preparing more culturally connected foods and hosting student engagement activities, such as surveys and taste tests to introduce new foods, recipes, and traditions while seeking student feedback.<sup>xxvii</sup> Some districts have partnered with local community colleges and technical schools to help their staff strengthen their culinary skills and further relationship building could be done to further these efforts.<sup>xxviii</sup>
- *Compensation and Benefits:* School nutrition professionals are essential to school and student success, yet low compensation and part-time staffing structures create challenges for employee recruitment and retention. Part-time schedules for school nutrition professionals often means they are ineligible for benefits such as health insurance and retirement plans, layering cost burdens for individuals and their families. Moreover, as school nutrition programs grow financially with greater student participation, other administrative barriers related to the structure through which districts cover the cost of employee hiring and fringe benefits can leave School Nutrition Directors without a means to further invest in compensation or growing their team size to meet increased demand.

**Student Engagement:** When students and families are connected, informed, and empowered in the school meal environment, their consumption increases.<sup>xxix</sup> Buy-in from all stakeholders is important, thus engagement can extend to parents and caregivers, additional school staff, and other community members.<sup>xxx</sup> Moreover, prioritizing family engagement as it pertains to school

meals has the added benefit of driving culturally relevant menu offerings, as is the case for Lowell Public Schools' [Tasting History Project](#).

- *Customization* gives students the ability to tailor school meals to fit their needs and preferences. Such approaches include salad bars and other “build your-own” or spice/flavor-stations. For example, schools with bowl stations, which allow students to choose their toppings over a bed of rice or greens.
- *Taste Tests* increase interactions and familiarity with school nutrition professionals and new foods. Repeated experiences among peers can also help a student’s willingness to accept new foods.<sup>xxxix</sup>
- *Collecting Feedback* through surveys, suggestion boxes, and after taste tests or engagement events can incorporate students’ critical perspectives and help inform school nutrition professionals on ways to enhance food offerings. When students have a voice in school meals, they are more likely to participate.<sup>xxxix</sup>
- *Food Literacy Education*, such as through school gardens or field trips may increase students’ familiarity, understanding, and connectedness to their food options. Research highlights that such activities can influence students’ attitudes and increase consumption of fruits and vegetables.<sup>xxxix xxxxi</sup> Including food waste education in food literacy efforts has the additional benefit of “spillover effects” in getting students to talk about wasted food at home and educate their families.<sup>xxxix</sup> Examples of such curriculum ideas and resources include: [CT DEEP](#), [MassDEP’s The Green Team](#), [Rutgers: NJ Leaves No Bite Behind](#), [Cornell University](#), [WWF Food Waste Warriors](#), [K12 Food Rescue](#), and [Central Vermont](#).<sup>xxxix</sup>

### *Post-Consumer Diversion*

By prioritizing pre-consumer approaches that increase consumption as described above, there is less post-consumer waste to divert. However, as an extension of the classroom, cafeterias are learning environments where students are encouraged to experiment with their preferences to cultivate life-long healthy eating habits that support the whole child. When students try new foods for the first time or add another fruit or vegetable to their tray that is only partially consumed, FNP celebrates this new exposure or additional consumption of fruits and vegetables though these learning environments inevitably results in food waste. With this in mind, further investment and knowledge sharing in the following diversion strategies can help address the inevitable waste generated in a learning environment. Of note, post-consumer waste diversion requires the active coordination of multiple stakeholders including an SFA’s local Board of Health which provides guidance around food safety code compliance for many post-consumer waste diversion programs including on-site composting and the implementation of share tables:

**Share Stations:** Some schools operate share tables where students may leave unopened packaged food at stations to be consumed by other students if they would like additional servings.<sup>xxxix</sup> Similar to offer-versus-serve service model, this may allow students to spare what they do not intend to eat.

**Composting** is an impactful way to divert food waste but requires investment of staff time and school resources. To manage a successful food scraps diversion program, it can be important to

start by (1) evaluating current waste operations and hauler options through resources such as CET’s [Food Waste Tracking Guide](#); (2) access the SFAs current method of waste collection to identify the best process for integration; and (3) develop program monitoring for cleanliness and contamination.<sup>xxxviii</sup> From here, implementation may require materials such as bins, custodial support, student education and additional staffing in the cafeteria. To coordinate these varying efforts, SFAs might consider implementing a School Waste Reduction and Diversion Policy as a component of their School Wellness Policy, with [template language](#) available through the Massachusetts Green SWoRD. We believe that such investments are best made after other best practices shared in this brief. DESE FNP may also have a role to play in providing guidance to school district seeking cost sharing best practices when considering the financial implications of integrating composting into district waste management efforts so that any resulting savings in shared across all relevant entities including School Nutrition Programs and district or municipal waste management departments.

## Conclusion

In its first year as a permanently funded program, Universal Free School Meals is continuing to see high participation in both lunch and breakfast, eradicating stigma around income eligibility in the cafeteria and providing valuable investments in school nutrition programs that focus on sustaining and elevating the nutritional quality of meals. We are only at the beginning of understanding the ways in which permanent stability in the offering of free school meals can address food insecurity and health disparities as well as concerns around growing absenteeism, student belonging and academic performance.

While the recommendations outlined in this report do not represent new innovations in food waste reduction, they center the whole child, their experience as a learner in the cafeteria and in the desire to invest in strategies that center increasing consumption. DESE’s Office for Food and Nutrition Programs is committed to assessing the role we can play in moving forward the recommendations outlined in this report.<sup>xxxix</sup>

As a learning environment, the cafeteria provides real life opportunities for socio-emotional learning, life skills, and practical nutrition decisions/choices. This environment should garner intentionality and be provided the guidance to leverage maximum benefits from the meal program. Intervention at the state level sets up an equitable opportunity for all students to have the tools they need to develop lifelong healthy habits in the cafeteria and complements the Office for Food and Nutrition Programs efforts in providing professional development opportunities, resources and guidance in addressing change at the School Nutrition Program Operations and Waste Diversion level.

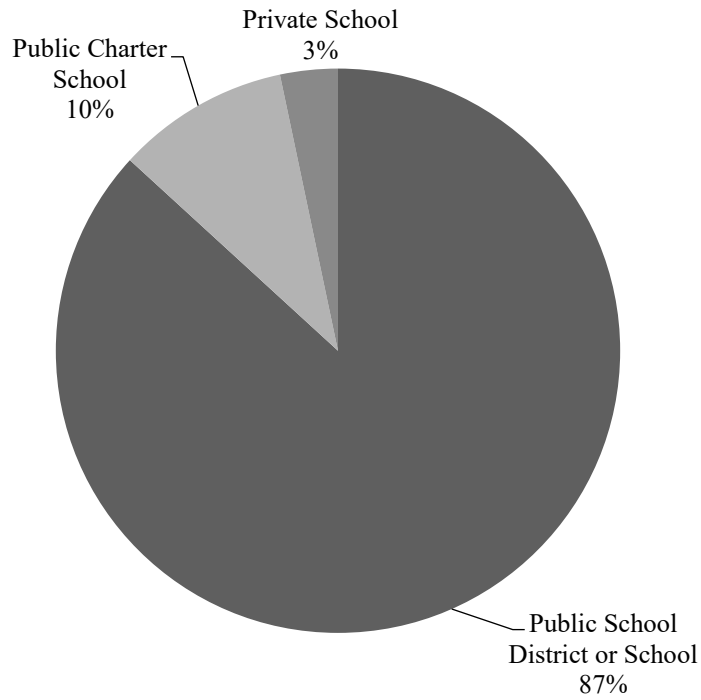
## Appendix A:

Food Waste Management and School Meal Consumption Strategies

**Conducted:** March 25, 2024 – April 22, 2024

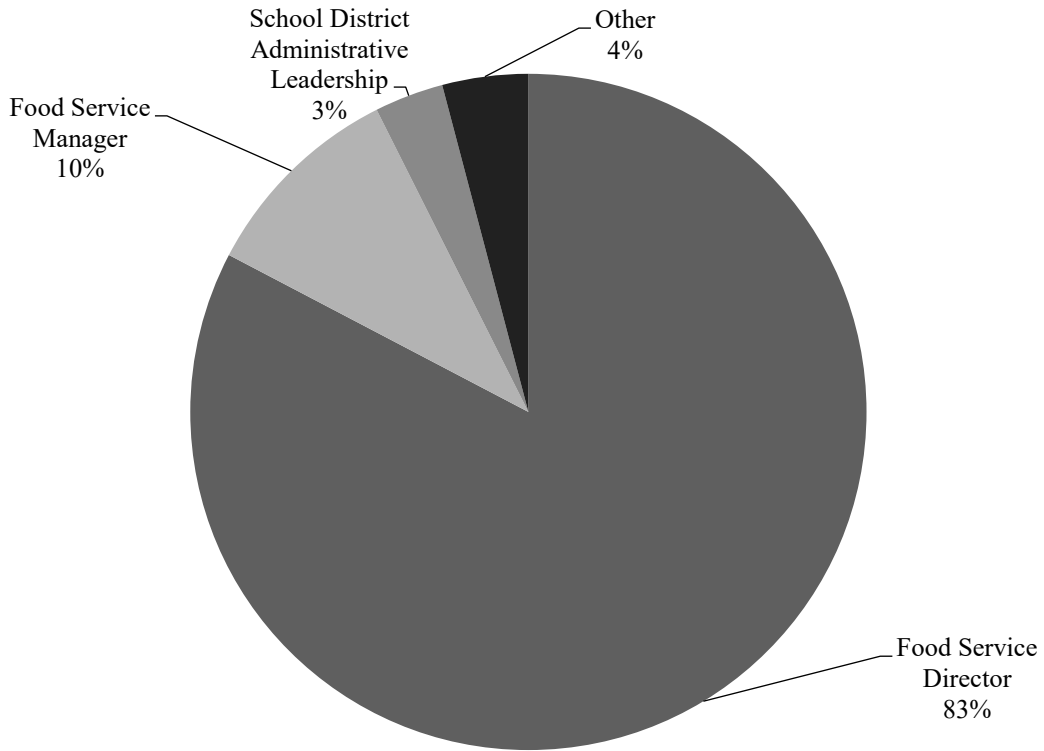
**Executed by:** Massachusetts Department of Elementary and Secondary Education’s Office for Food and Nutrition Programs

**1. Please choose the option that best describes where you work:**



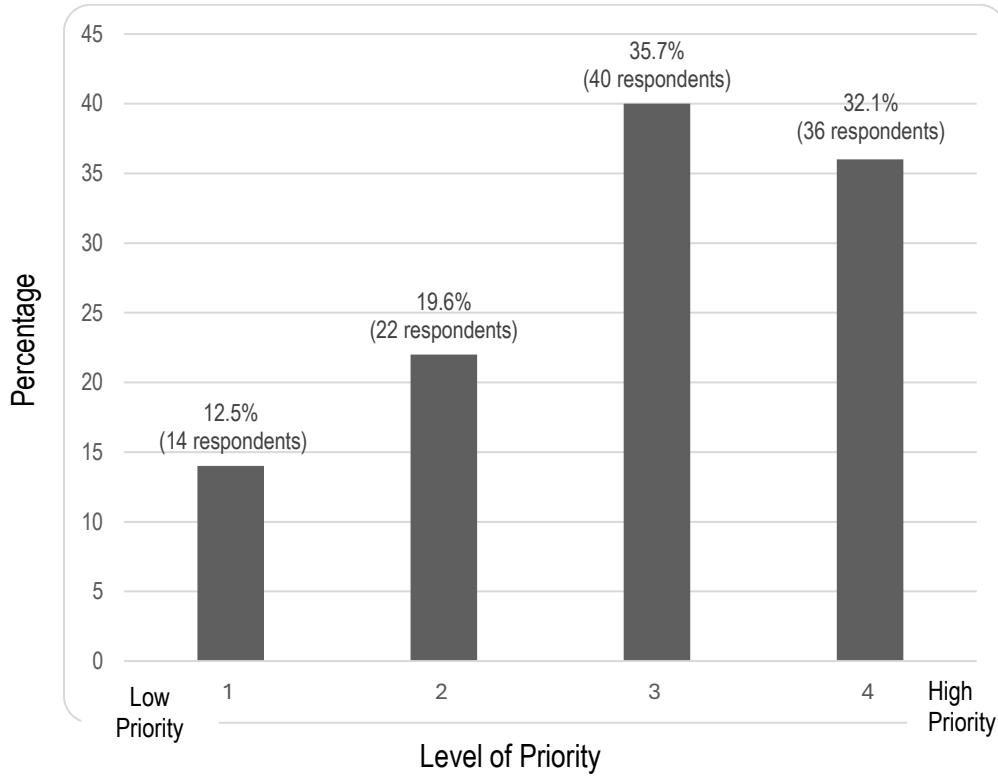
	<b>Percent</b>	<b>Total Respondents</b>
<b>Public School District or School</b>	86.6%	105
<b>Public Charter School</b>	9.9%	12
<b>Private School</b>	3.3%	4
	Totals:	121

**2. Please choose the option that best describes your role in School Nutrition?**

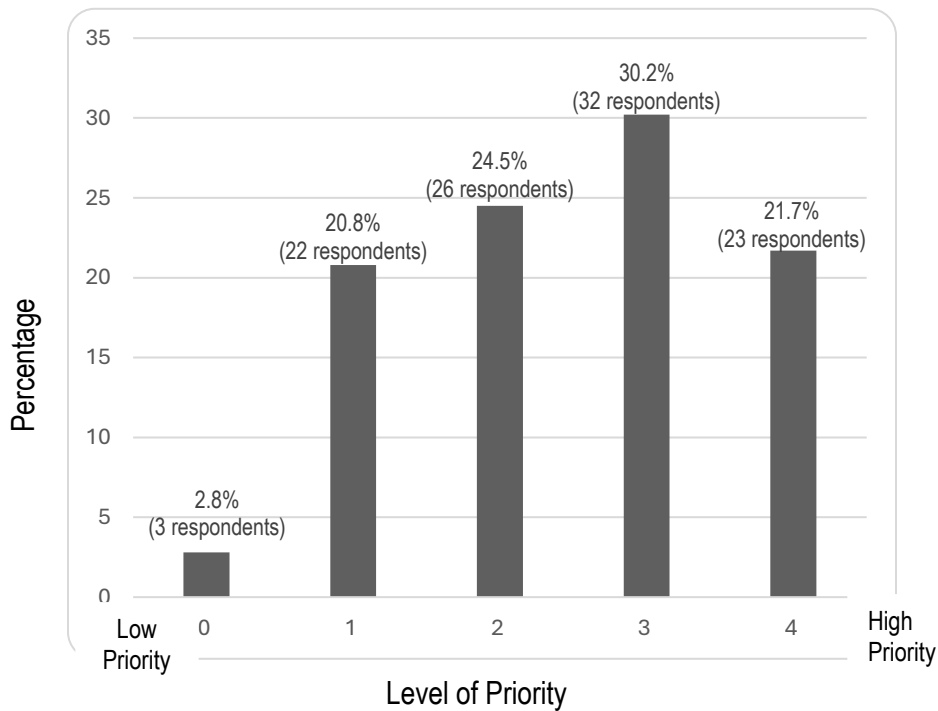


	<b>Percent</b>	<b>Total Respondents</b>
<b>Food Service Director</b>	82.6%	100
<b>Food Service Manager</b>	9.9%	12
<b>School District Administrative Leadership</b>	3.3%	4
<b>Other</b>	4.1%	5
	<b>Totals:</b>	121

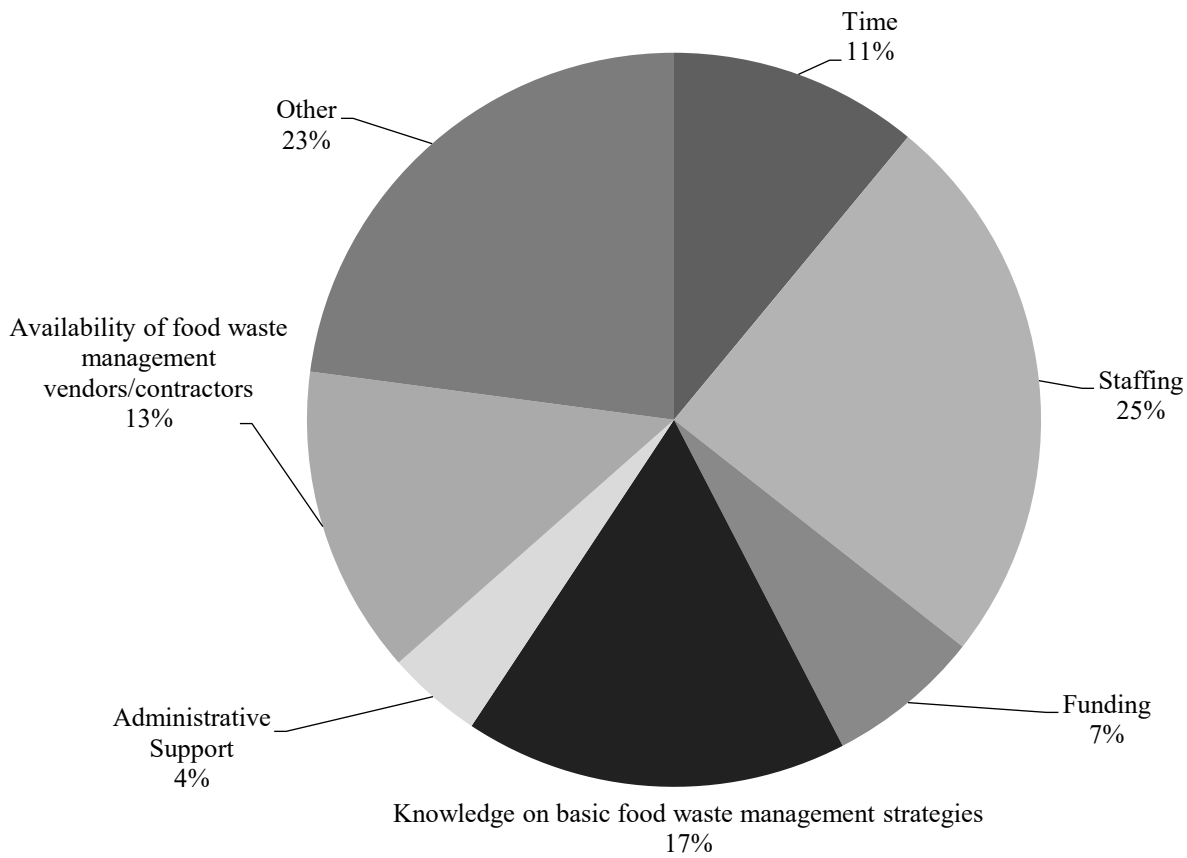
**3. Is food waste management a priority for your school nutrition department?**



**4. Is food waste management a priority for your school/district's administrative leadership?**

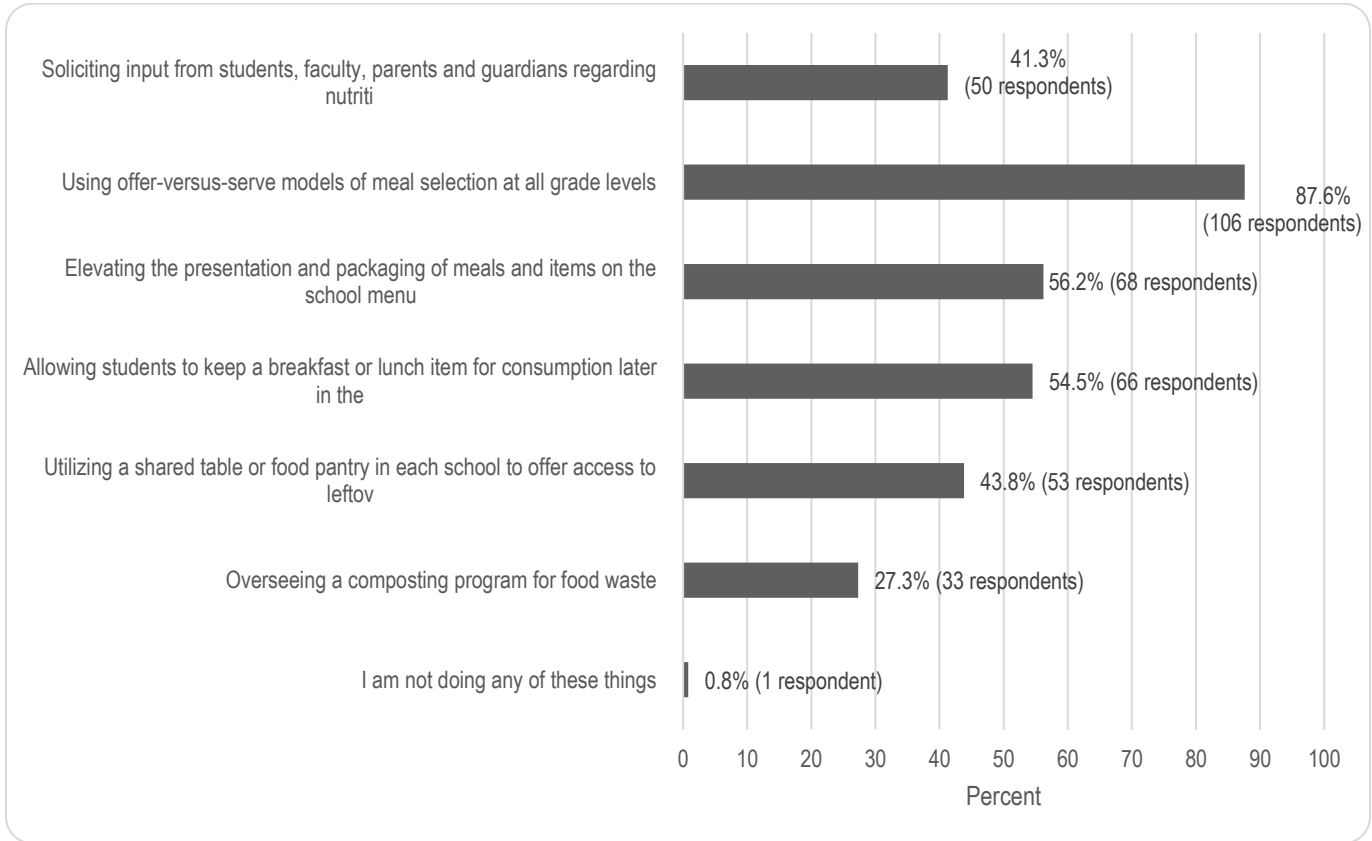


**5.What is the primary barrier you experience in addressing food waste concerns:**



	Percent	Total Respondents
<b>Staffing</b>	24.6%	29
<b>Other</b>	22.9%	27
<b>Knowledge on Basic Food Waste Management Strategies</b>	16.9%	20
<b>Availability of Food Waste Management Vendors/Contractors</b>	13.6%	16
<b>Time</b>	11%	13
<b>Funding</b>	6.8%	8
<b>Administrative Support</b>	4.2%	5
	Totals:	118

**6. At this time, what food waste management strategies is your school nutrition department engaged in? (Check all that apply)**



	Percent	Total Respondents
<b>Using offer-versus-serve models of meal selection at all grade levels</b>	87.6%	106
<b>Elevating the presentation and packaging of meals and items on the school menu</b>	56.2%	68
<b>Allowing students to keep a breakfast or lunch item for consumption later in the day</b>	54.5%	66
<b>Utilizing a shared table or food pantry in each school to offer access to leftover food to students, school or community members</b>	43.8%	53
<b>Soliciting input from students, faculty, parents, and guardians regarding nutritious meals that appeal to students</b>	41.3%	50
<b>Overseeing a composting program for food waste</b>	27.3%	33
<b>I am not doing any of these things</b>	0.8%	1

**6 (a).** [Conditional Question] **In responding, “I am not doing any of these things.” Please answer:**

**Of these food waste management strategies, which do you anticipate would be the most manageable to implement in the upcoming school year?**

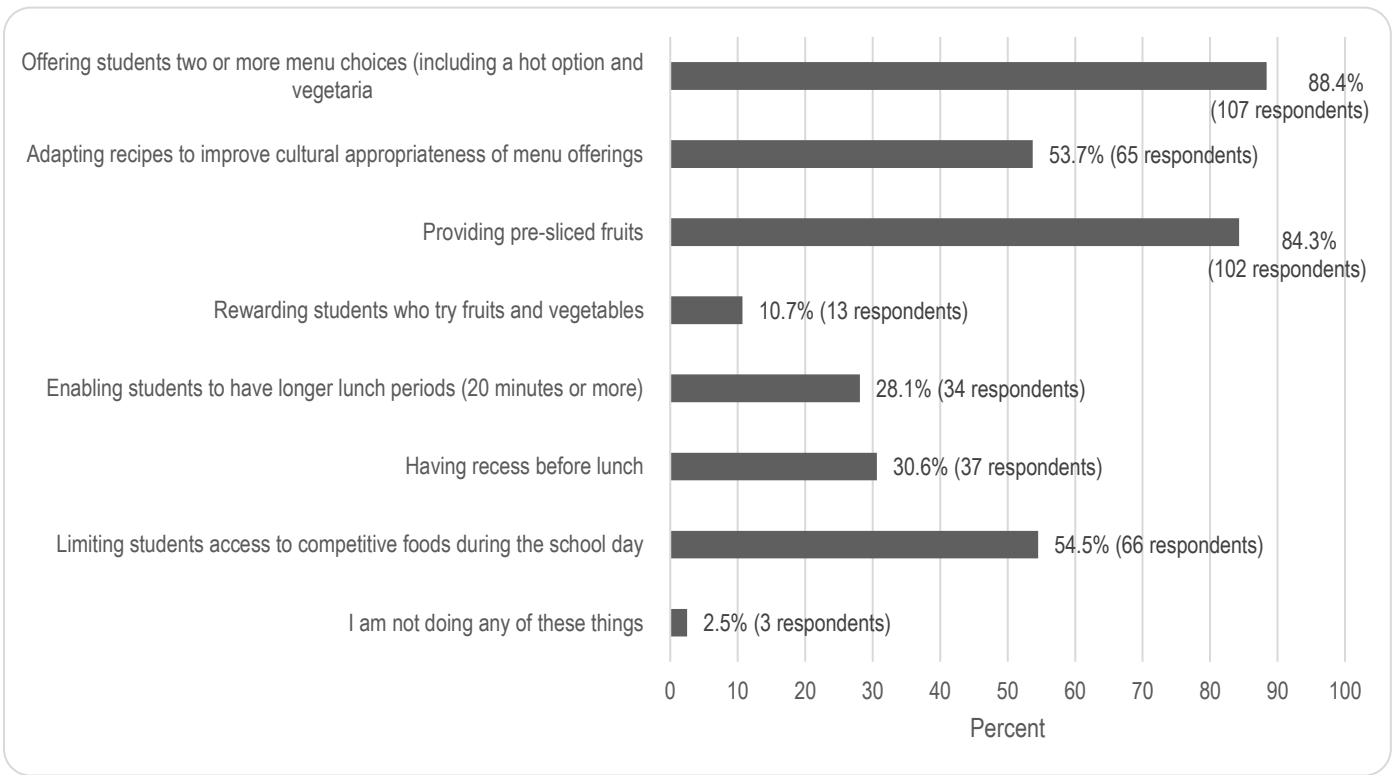
- Utilizing a shared table or food pantry in each school to offer access to leftover food to students, school or community members. (Feedback from one respondent)

**6 (b). [Conditional Question] In responding, “I am not doing any of these things.” Please answer:**

**Of these food waste management strategies, which do you anticipate would be the least manageable to implement in the upcoming school year?**

- Overseeing a composting program for food waste. (Feedback from one respondent)

**7. Does your school nutrition department and/or school administration engage in any of the following school meal consumption strategies? (Check all that apply)**



	Percent	Total Respondents
<b>Offering students two or more menu choices (including a hot option and vegetarian/vegan option)</b>	88.4%	107
<b>Adapting recipes to improve cultural appropriateness of menu offerings</b>	53.7%	65
<b>Providing pre-sliced fruits</b>	84.3%	102
<b>Rewarding students who try fruits and vegetables</b>	10.7%	13
<b>Enabling students to have longer lunch periods (20 minutes or more)</b>	28.1%	34
<b>Having recess before lunch</b>	30.6%	37
<b>Limiting students access to competitive foods during the school day</b>	54.5%	66
<b>I am not doing any of these things</b>	2.5%	3

**8. On a monthly basis, approximately how many lunches would you estimate are not served/taken by students and must be discarded (across all points of service in your SFA, if applicable)?**

**Total Responses:** 101 responses

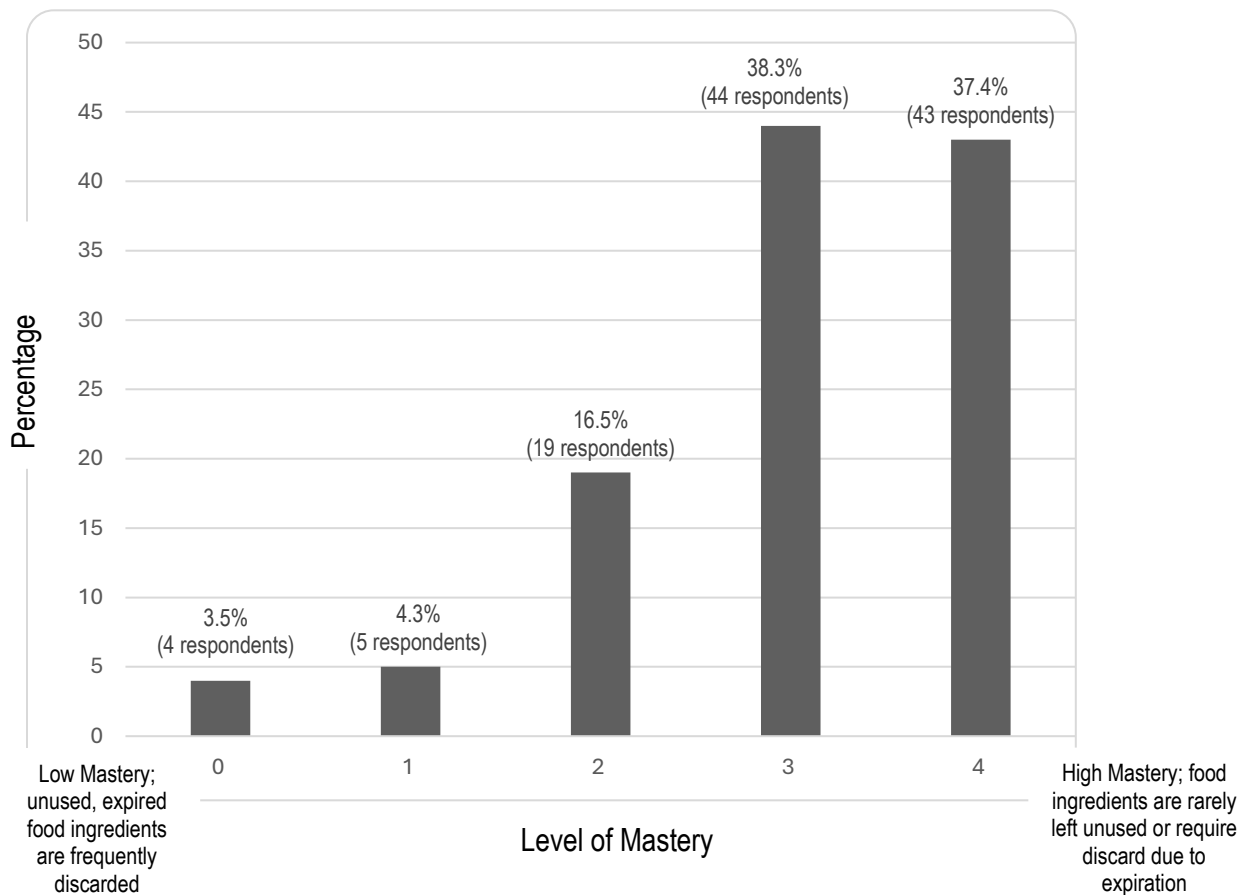
**Average Response:** 473 meals and/or meal components (removing the highest and lowest response)

**Lowest Responses:** 0 meal and/or meal components

**Highest Response:** 75,000 meals and/or meal components (*note: based on the context of the surveyor's additional responses, we anticipate this question was misinterpreted when provided the answer here. This response was removed when calculating the final average shared in this survey*).

**Median Response:** 200 meals and/or meal components

**9. How would you rank your school nutrition team's mastery in managing back-of-house inventory (specifically food products)?**



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