

Plate Waste Study

Background

According to national standards, approximately 12% of the food served in the National School Lunch Program (NSLP) goes uneaten. The most common causes of plate waste are lack of student appetite, taste of food, presentation, quality and type of food served. Scheduling constraints are also a factor. In order to reduce the surge of students into the cafeteria, some schools schedule lunch starting as early as 10:30am or as late as 1:30pm⁽¹⁾.

General nationwide trends for plate waste are as follows:

- Girls tend to waste more food than boys
- Younger children waste a higher percentage of food than older children
- Salad, vegetables and fruit are the most wasted food items

Some solutions to reduce plate waste include adding more self-serve food choices, tailoring food choices to local cultural norms and ingredients, modifying lunch schedules, adjusting serving size and improving access by offering universal free meals.

Today 8 US states offer universal free meals: California, Colorado, Maine, Massachusetts, Michigan, Minnesota, New Mexico and Vermont. Universal free meal programs have proven to reduce stigma, improve school attendance and decrease administrative burden. Instead of spending time on managing applications and debt associated with reduced cost meals, food service management teams use their time to focus on menu and food quality. All these factors together, have proven that universal free school lunch programs lead to increased academic performance, and thus improved quality of life outcomes⁽²⁾.

The Kettering City School offers free and reduced-price meals combined with an Offer vs Serve (OVS) cafeteria food delivery method. OVS enables students to proactively and independently select the food they eat, within certain boundaries. For example, an OVS lunch menu would include a main entrée, and then two or three choices of vegetables and fruits⁽³⁾. The guidelines for OVS fit within the National School Lunch program (NSLP) and the School Breakfast Program (SBP).

Purpose

Gain hands-on experience conducting a plate waste study. Observe the benefits of Offer vs Serve cafeteria style meal service. If possible, determine if there are observed differences in plate waste based on gender, type of food served, and time of day served.

Methods

The study was conducted at the Kettering School District Orchard Park Elementary School using a three-point visual estimation method on Friday, September 13, 2024.

The plan was discussed with the District Food Service Director, Mary Lynne Bierman for guidance and input.

Prior to the day the data was collected, the team researched plate waste studies, and the school menu. A spreadsheet was developed to tally food waste, and a team of three observers were stationed by the trash cans during the meal period to collect data.

Site survey at Oak Park elementary school:

- Meet the kitchen manager & staff: Kelly and Jane
- Understand if any menu changes occurred
- Understand the lunch schedule
- Understand the flow of tray and waste disposal
- Develop a plan for how to collect the data
- Decide where to stand to collect the plate waste
- Know which grades and age ranges come into the cafeteria

The menu of the day was:

- Three Cheese Garlic Bread OR a PB&J Sandwich
- Green Beans
- Fresh Grapes
- Assorted Fruits: apple slices, whole apples, raisins
- Assorted Vegetables: Broccoli or carrots
- Milk: Plain or Chocolate

Using the three-point estimation method, each food item was evaluated into one of three categories:

- Food 100% consumed
- More than 50% food consumed but less than 100%
- Less than 50% of food consumed.

A visual survey was conducted across three different lunch periods: Kindergarten, 1st and 2nd grade; approximately 44 trays were evaluated.

Milk was evaluated differently. It was evaluated against a two-point scale:

- Opened - then it was counted as 100%
- Unopened – then it was counted as less than 50%.

The study team recognized this would create bias in the milk study results, however general observation was that the milk was well consumed, and the results showed less than 10% of the milk cartons were unopened.

Waste Results

Key global observations about food waste were that the school was on average at or below general national standards, with minimal plate waste. The students enjoyed their meal, and the observers heard zero negative comments about the quality or taste of the food.

Additional metrics about the plate waste are as follows:

1. The most consumed item was milk with only 9% wasted at 50% or more, however there was bias in how the food was measured – two-point scale.
2. The second most consumed food were the grapes and green beans, with only 17% wasted at 50% or more. This was surprising, as the reviewers expected the entrée to be the most wasted. Both the grapes and green beans were very popular across all grades surveyed.
3. The most wasted food was the fruit.
4. The entrée was consumed on average at least 50%.

These results reflect the positive impact of offer vs. serve, the professional presentation of the food, the quality and taste of the food and the value of proactive choices the children can make regarding their lunch choices.

Food Item	MILK		Cheese Garlic Bread			Fresh Grapes			Assorted Fruit			Green Beans			Assorted Vegetables		
	Unopened	Consumed	Less 50%	More 50%	100% Consumed	Less 50%	More 50%	100% Consumed	Less 50%	More 50%	100% Consumed	Less 50%	More 50%	100% Consumed	Less 50%	More 50%	100% Consumed
Count Totals	4	40	4	17	21	5	4	20	6	3	3	4	10	9	5	6	13
Total Consumed	44		42			29			12			23			24		
Percent 50% or more Wasted	9%		10%			17%			50%			17%			21%		

In addition to visualizing the food waste, and informal survey of the students was conducted to ask subjectively “what did they like most?” about their lunch. Of 10 children surveyed, over half responded positively about the Cheese Garlic Bread, the salad and the ranch dressing. Some of the feedback verbatim is as follows:

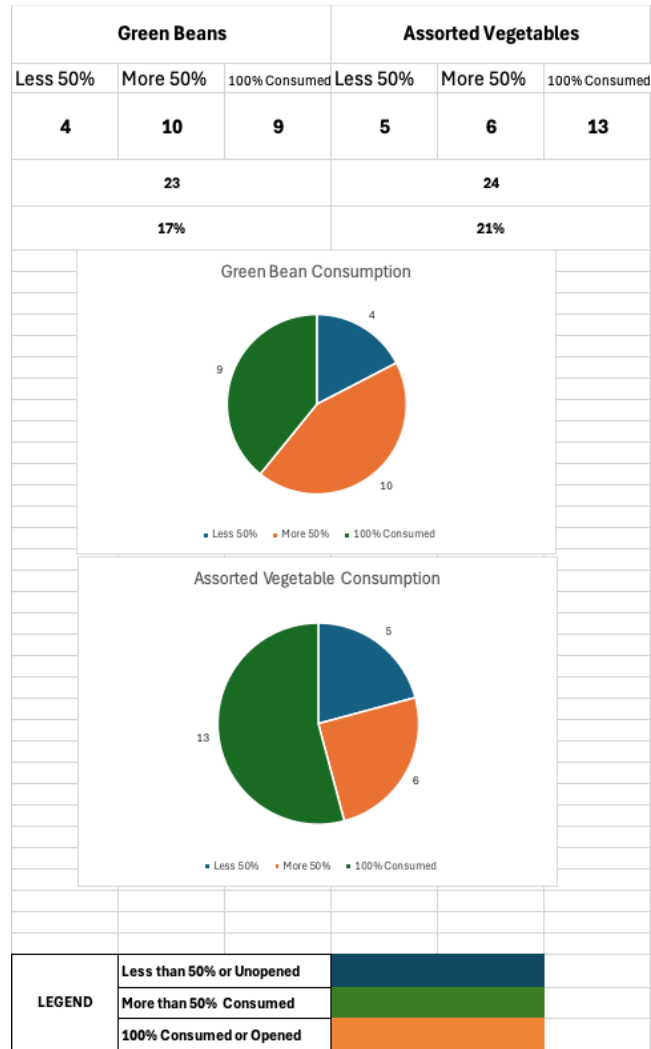
- “....this bread is better than my grandmother makes”
- “..we are eating cheese GARLIC bread, not cheese bread”
- “...I really like this bread”

The entrée, grapes and green beans received the most subjective feedback, and overall, the cheese garlic bread seemed to be a very popular entrée. Additionally, the bread is a popular entrée with the kitchen staff because it does not require special condiments, or side items, is easy to serve, creating less kitchen mess than other food items.

Raw Data and Results Graphs

The pie graphs below provide a simple visual representation of the food consumption, with bronco orange indicating food that was consumed at 100%.





Study Limitations

The sample size was relatively small, and as stated above, the milk consumption was not precisely measured. It is important to note that some of the informal comments provided insight into why less food was consumed. In general, the students did not appear to be rushed, seemed hungry, and did like the taste of the food.

The study only looked at the primary entrée, and did not evaluate the PB&J sandwiches, or the yogurt fun meal, which combined represent about 25-40% of the food served that day.

The food was not precisely weighed, and that would be a method to collect even more specific data.

The informal survey methods were a good test case for how to survey the children for the Theme meal but are subjective.

Conclusion & Future Research

The Kettering School District Food and Nutrition Service does an exceptional job providing high quality, diverse, fresh food to students. The cafeteria team takes significant pride in their work, serving a wide collection of fresh food, presented in an attractive manner. Based on the data collected, there was no significant finding or issue with plate waste that was outside of what was to be expected. In fact, the opposite was true in some cases, specifically the positive consumption of green beans.

Significant research has been done to evaluate and reduce plate waste in the secondary school system. If needed, there are additional proven solutions that could be considered to further reduce plate waste:

- Schedule recess before lunch in elementary schools (increase appetite)
- Offer universal free lunch (address food insecurity)
- Tailor serving sizes (this would be very complex to implement in a school setting)
- Develop more precise and measurable plate waste data and divide the data up by grade level and gender.

References

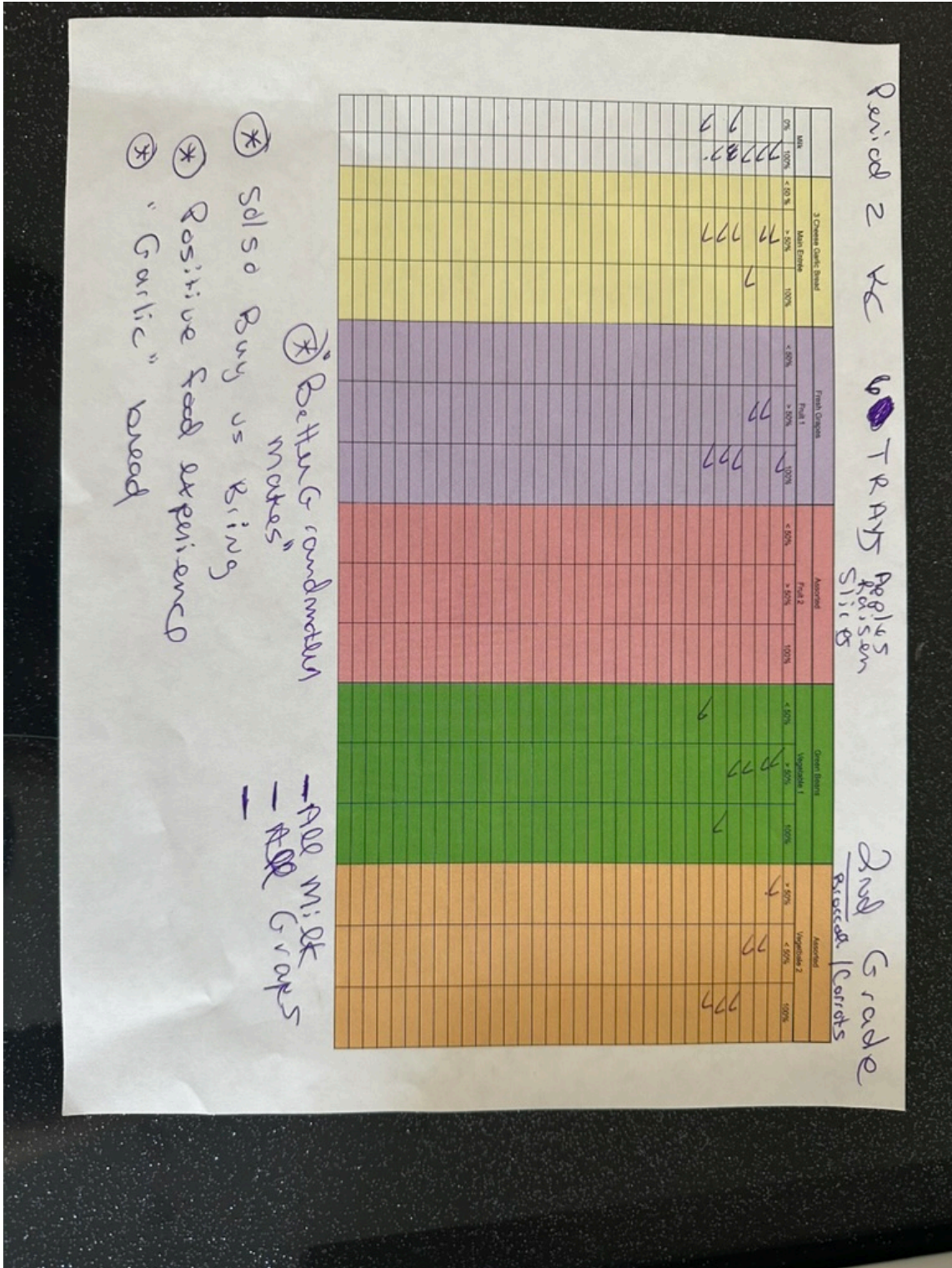
1. Plate Waste in School Nutrition Programs: Economic Research Service Final Report to Congress, retrieved September 12, 2024 from https://www.ers.usda.gov/webdocs/publications/43131/31216_efan02009.pdf?v=6696.6
2. Universal School Meals: Issue Brief, retrieved September 12, 2024 from <https://campaignforchildren.org/resource/issue-brief-universal-school-meals/#:~:text=A%20healthy%2C%20balanced%20diet%20consistent,among%20t he%20now%20healthier%20students>
3. Interview with Mary Lynne Bierman, Food Service Director, Kettering Public Schools, conducted September 12, 2024.
4. Plate Waste Studies, retrieved September 12, 2024 from <https://gfs.com/en-us/ideas/plate-waste-studies/>

Data Collected

A table of the compiled data is as follows:

		3 Cheese Garlic Bread			Fresh Grapes			Assorted			Green Beans			Assorted		
Milk		Main Entrée			Fruit 1			Fruit 2			Vegetable 1			Vegetable 2		
0.00	100%	< 50 %	> 50%	100%	< 50%	> 50%	100%	< 50%	> 50%	100%	< 50%	> 50%	100%	< 50%	> 50%	100%
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4	40	4	17	21	5	4	20	6	3	3	4	10	9	5	6	13

In total there were 9 collection sheets – 3 per grade group, used by 3 reviewers. Below is an example of the form that was used to collect raw data.



Pictures



