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# Full Plates, Unfamiliar Taste; Properly Meeting the Nutrition Standards, and Educating Children Further on the Importance of Healthy Eating

Andrea Ahearn

Merrimack College, ahearnar@merrimack.edu

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Running head: FULL PLATES, UNFAMILIAR TASTE

Andrea Ahearn

Full Plates, Unfamiliar Taste;  
Properly Meeting the Nutrition Standards, and Educating Children  
Further on the Importance of Healthy Eating

May 2019

Merrimack College

MERRIMACK COLLEGE

CAPSTONE PAPER SIGNATURE PAGE

CAPSTONE SUBMITTED IN PARTIAL FULFILLMENT  
OF THE REQUIREMENTS FOR THE DEGREE

MASTER OF EDUCATION

IN

COMMUNITY ENGAGEMENT

CAPSTONE TITLE: Full Plates, Unfamiliar Taste; Properly Meeting the Nutrition Standards, and Educating Children Further on the Importance of Healthy Eating

AUTHOR: Andrea Rae Kathleen Ahearn

THE CAPSTONE PAPER HAS BEEN ACCEPTED BY THE COMMUNITY ENGAGEMENT PROGRAM IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF EDUCATION IN COMMUNITY ENGAGEMENT.

Audrey Falk, Ed.D.  5/10/19


DIRECTOR, COMMUNITY  
ENGAGEMENT

SIGNATURE

DATE

Sean McCarthy, M.Ed

INSTRUCTOR, CAPSTONE  
COURSE

 5/10/19

SIGNATURE

DATE

### Acknowledgements

I would like to thank my incredible parents and family for their love and support this year. Over the course of this year, my family always had strong words of encouragement that kept me going. I would like to thank my best friends for their backing during this year of graduate school; I am so grateful to have these four best friends by my side. I am also blessed to have met new friends in the Community Engagement program; we have created new bonds that will last far beyond this program.

I would like to thank my fellowship site supervisor, Dr. Ana Silva for this incredible year. When my hours were beyond my site requirement, she always encouraged taking time for myself, which was so appreciated and needed during this extensive year. I would like to thank Dr. Sean McCarthy for all of the time he took reading and rereading our capstone papers. He was encouraging and patient with all of us; I don't believe our capstone class could have made it through this year without his support. Finally, I would like to thank Merrimack College for the opportunity to spend four incredible years here as an undergraduate student, followed by another year working toward this Master's degree.

### Abstract

School nutrition standards for school lunches have changed considerably over the years, and while the foods are meeting the needed nutritional requirements, they're not appealing or kid-friendly for young children. While there are successes within the updated standards, there are still flaws found from current services that are offered within schools, competitive foods, such as vending machine snacks, being one of the main issues. Competitive foods are overloaded with fats, carbohydrates and high levels of added sugar. These are the foods that students turn toward when they elect to not eat the nutrient rich foods that are served in the cafeteria. Children avoid cafeteria meals due to lack of familiarity with the choices or disliking the options altogether. A diet lacking in nutrient rich foods has an impact on student academic performance, as well as a potential decline in one's health.

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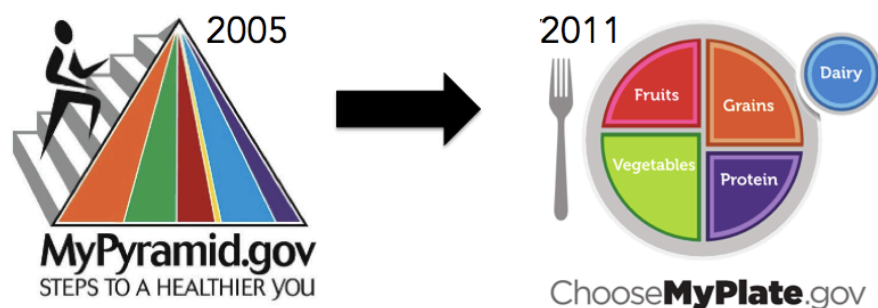
### **Introduction**

Implementing a strong, balanced diet at an early age allows for the child to understand the proper foods needed to fuel their growing bodies. This is much more easily said than done considering many families in the United States today may not have the means to provide nutrient dense foods to their children inside of their homes (Bhattacharya et al., 2004). Families may not have the capability to provide nutrient dense meals, but they also may not have the time either. “Parents shape the home environment in which many food choices are made and employ a variety of intentional or unintentional practices that may contribute to their child's intake, such as modeling, setting routines and establishing rules” (Vaughn et al., 2015 as cited in Watts et al., 2016). The school day only goes so long and what a child is able to eat at home cannot be controlled; families may opt for sugar filled snacks, refined grains and foods with solid unhealthy fats because these are more cost effective compared to the prices of fruits and vegetables. A child’s dietary intake can directly impact his or her success academically and socially. Glewwe, Jacoby and King (2001) further examine the importance of nutrient dense foods, and the impact that a lack in these foods can have on both a child’s physical development, and their academic development. Watts and colleagues (2016) explain the pertinence for family meals to enrich the child’s diet with fruits and vegetables. Families may not have the time or ability to have proper meals, but with the help of the School Breakfast Program (SBP) and National School Lunch Program (NSLP), schools can take the first step to present students with the foods that are needed for breakfast and dinner.

Nutrition standards for school lunches have changed drastically over the years pertaining to the amount of salt added to meals, the serving requirements for fruits/vegetables, and which grains can be provided daily (“USDA: Child Nutrition Programs,” 2018). While the foods

served are meeting the needed nutritional requirements, are the meals appealing in the eyes of young children? Since 2005, more focus has shifted toward creating standards that put balanced, nutrient dense foods on the plates of school lunches; with this being said, more work has also been put into reconstructing the United States Department of Agriculture (USDA) Food Guides (MyPyramid, MyPlate, etc.). In 2005, MyPyramid had a new look that followed the updated Dietary Guidelines for Americans; this took the place of the 1992 Food Guide Pyramid. Five years later, in 2010 the Dietary Guidelines for Americans were updated again, which later would introduce MyPlate in 2011. Updates in the 2010 Dietary Guidelines included, increasing the daily intake of dark green vegetables (broccoli, spinach, etc.) and consuming seafood as a protein source opposed to red meats (“USDA: Dietary Guidelines for Americans,” 2010). Figure 1.1 displays the design change that was created; the new plate was a “different shape to help grab consumers’ attention with a new visual cue” (“A Brief History of USDA Food Guides,” 2011). Adequately transforming the school nutrition standards can work toward eliminating future prevalent health issues in growing children. Research by Rampersaud and colleagues (2005), as well Haapala and colleagues (2017) shows that without the proper foods being consumed, children may face possible growth deficiencies. A lack in proper nutrition can also present the risk of children potentially falling behind in school.

**Figure 1.1**



Adapted from: A Brief History of USDA Food Guides



Since 2010, the standards have changed allowing for more flexibility in what can be served. The USDA adjusted the 2010 standards, which requires grains to be 51% whole grains, larger servings of fruits and vegetables and finally the sodium levels had a reduction target over a ten-year period; the sodium reduction target timeline can be found on page 18 of this policy analysis. USDA Secretary, and former Georgia Governor, Sonny Perdue commented in a statement, “Schools want to offer food that students actually want to eat; it doesn’t do any good to serve nutritious meals if they wind up in the trash can,” (Sonde, 2019, p. 1). The new standards allow for more variety, but it’s important to understand that children are picky eaters, and need meals that they recognize. With the foods being offered, children may not choose to eat what is served because there is only so much that can be done to retrain a pallet. If children are accustomed to consuming sweets and high fat, greasy foods then steamed vegetables and bland lean meats will not be appealing. School programs are providing foods that are set and required by the USDA guidelines, but a lot of this food is going to waste without being touched (Sonde, 2019). “The changes made to what is being served at lunch had some negative backlash. While no one can deny the importance of better eating for growing minds (or the enthusiasm of First Lady Michelle Obama), critics claim the program has produced unpalatable foods that lead to food waste, smaller earnings for school lunch programs, and even more kids going without lunch” (Rude, 2016). Instead, school kitchen staff should be making an effort to take popular dishes and learn the proper way to modify these items, while still meeting the standards. This will create more attraction toward healthy eating in the eyes of young children.

There are many simple substitutes that can be implemented to allow for a meal that children will enjoy eating, without providing a dish that is full of fats, sodium and simple carbohydrates (white breads, white pastas). Macaroni and cheese is a dish that can easily be

reworked to swap in healthier ingredients. Instead of the basic white flour pasta, the kitchen can make the swap for whole grain pasta. Instead of dousing the pasta with heavy cheese, the chef can use a portioned out amount of cheese, and mix nutritional yeast into the recipe to give the powerful cheesy taste that children enjoy eating. Nutritional yeast is an ingredient that is dairy-free, normally gluten free and can add additional protein to the meal, as well as other vitamins and minerals. This ingredient provides the dish with many benefits that include, lowering cholesterol, and giving a boost to the immune system. Teaching children at a young age about how critical it is to fuel their body with healthy choices trains not only their mind, but also their own dietary pallet.

In the school systems, there is a lack in the requirements for nutrition/health based content in the curriculum. “We have to educate the kids about healthy eating; if a kid wasn’t reading at grade level we would work harder to get them to read at grade level, but with food we’ve somehow abdicated that part of their education,” says Ann Cooper, the Food Service Director at the Boulder Valley School District located in Colorado (Murphy, 2015). Children are falling between the cracks, and schools make the effort to reach out and help those children. What about the children that are weighing in at an unhealthy weight for their age and height? Where is the action toward fixing this problem?

#### **Data Analysis:**

“Nutrition education will enhance the overall framework of a Health-Promoting School if it is integrated into other school health components, such as physical activity and health promotion for staff, as well as in the school health education component” (World Health Organization, 1998, p. 20). Serving nutrient dense foods is just as important as it is to educate about these foods. Properly educating on the right foods may eliminate the amount of food

waste that is seen in schools. In a study conducted by Cohen, Richardson, Parker, Catalano and Rimm (2014) the change in nutrition standards in 2012 (see Figure 1.2) were reviewed to enquire if the new meals would cause for less food waste among school cafeterias. Over a two-year span, starting in the fall of 2011, Cohen and colleagues (2014) measured plate waste among four schools in Massachusetts. This study had 864 student participants ranging from grades third through eighth that provided active consent to partake.

**Figure 1.2**

**Table 1**  
Comparison of previous versus current school lunch standards<sup>a</sup>

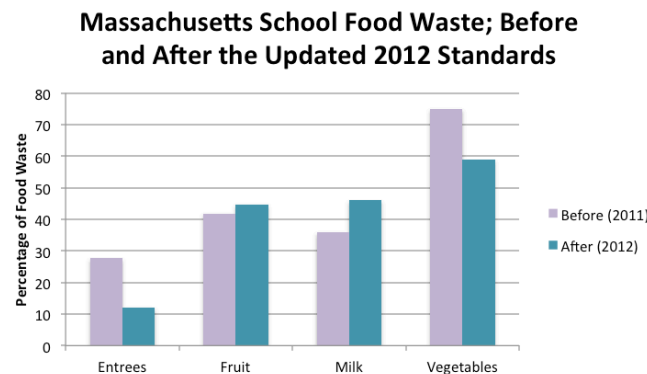
Food group	Previous requirements K-12	Current requirements k-12
Fruit and vegetables	0.5–0.75 cup of fruit and vegetables combined per day	0.75–1 cup of vegetables plus 0.5–1 cup of fruit per day <sup>b</sup>
Vegetables	No specifications as to type of vegetable subgroup	Weekly requirement for (1) dark green; (2) red/orange; (3) beans/peas (legumes); (4) starchy; (5) other (as defined in 2010 Dietary Guidelines)
Whole grains	No requirement	At least half of the grains must be whole grain rich as of July 1, 2012. Beginning July 1, 2014, all grains must be whole grain rich.
Milk	1 cup; variety of fat contents allowed; flavor not restricted	1 cup; must be fat free (unflavored/flavored) or 1% low fat (unflavored) <sup>c</sup>
<b>Nutrient standards</b>		
Calories	Minimum only (based on grade)	Minimum and maximum (based on grade)
Sodium	No requirement	Limits (based on grade), with the target levels decreasing through the 2022–2023 school year
Saturated fats	<10% of total calories	<10% of total calories
Trans fats	No requirement	0 grams per serving <sup>d</sup>

<sup>a</sup>Adapted from “Comparison of Previous and Current Regulatory Requirements under Final Rule “Nutrition Standards in the National School Lunch and School Breakfast Programs.”  
<sup>b</sup>While students must be offered 0.75–1 cup of vegetables and 0.5–1 cup of fruits per day (versus previous requirements that allowed students to be offered a combined total of 0.5–0.75 cup fruit and vegetables), students are allowed to select only 0.5 cup of fruits or vegetables (previous requirements allowed students to select only 0.125 cup of fruits or vegetables).  
<sup>c</sup>This is a U.S. Department of Agriculture (USDA) requirement. The participating district’s decision to remove all flavored milk (including fat-free options) exceeded the USDA requirements.  
<sup>d</sup>Products with less than 0.5 grams per serving count as 0.

Source: Cohen et al., 2014

According to Cohen and Colleagues (2014), before the new standards were put in place, data collected showed that 27.1% of entrees, 36% of milk, 75.1% of vegetables and 44.8% of fruits went to waste (Cohen et al., 2014). After the 2012 updated standards were put in effect, 12.1% of the entrees, 46.1% of milk products, 58.9% of vegetables, and 41.9% of fruit were wasted (Cohen et al., 2014).

**Figure 1.3**



The data shown in Figure 1.3 paints a clear picture of the food that was wasted over a two-year span among four Massachusetts schools before and after the implementation of the new USDA school nutrition standards. While there was a decrease in the amount of wasted entrees and vegetables after the new standards were put in place, there was still a great deal of food being tossed once the day ended.

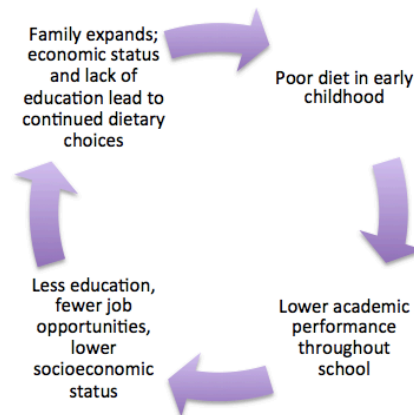
To combat school food waste, an Indiana school district is putting a new initiative in place to make sure children have meals at school and at home (Robinson, 2019). Elkhart schools in Indiana are partnering with Cultivate, a nonprofit that rescues unused food and prepares frozen meals. Natalie Bickle with student services commented that, “At Elkhart Community Schools, we were wasting a lot of food; and there was nothing to do with the food. So they came to the school three times a week and rescued the food” (Robinsons, 2019). With the assistance of Cultivate, on Fridays Elkhart Schools are able to provide twenty students with backpacks filled with eight frozen meals. This school is moving in the right direction for providing children with nutrient dense meals at school and at home.

If a child is not consuming the proper food items at school and at home, then their academic success may decline (Asigbee et al., 2018). A lack in proper nutrition may begin at the child’s home, where the foods being served are not balanced, thus they learn to grow up eating the wrong choices. This poor diet at an early age can influence how he or she is performing academically (Asigbee et al., 2018). When a child is eating foods and drinking beverages that are higher in added sugars and simple carbs (white breads, white pasta), their energy levels are going to spike, and crash not too long after. If a child’s academic success declines earlier in life, down the road this can create a deficit on their resume, where the education section could be filled with diplomas and degrees that further their education; we may not even see a high school diploma at

all. This cycle (see Figure 1.4) can be broken if children at a young age are educated on the importance of eating nutrient dense foods and how it can impact their future.

**Figure 1.4**

Cyclical Relationship Between Poor Nutrition and Education Outcomes

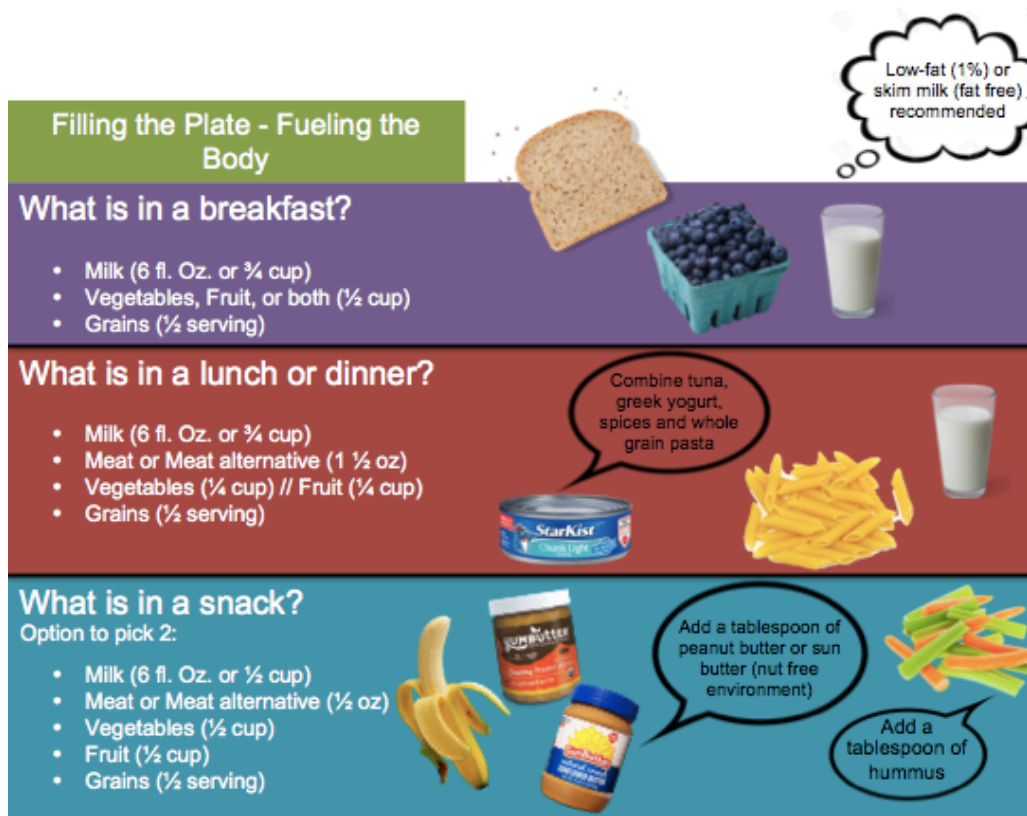


Adapted from: Better Academic Performance – Is Nutrition the Missing Link?

To break the cycle in Figure 1.4, it's important that the meals served are foods that students want to be eating. Creating dishes that are appealing to children will not only minimize the amount of food waste, but also fuel the mind and bodies of students eating these school lunches. The USDA Food and Nutrition Service website provides a variety of graphics that illustrate balanced meals and nutrition education. Figure 1.5 below exhibits meal and snack ideas that are kid-friendly, and easy to put together in a time crunch. According to The Dietary Guidelines for Americans (2010), breakfast is one of the most important meals of the day for children and adults. In Figure 1.5, breakfast consists of a serving of fruit and a slice of whole grain toast (a whole grain waffle can also be in place of toast), a nut or seed butter can be added to this, or a healthy jam. Placing fruits into a saucepan and allowing for the fruit to become a liquid can easily make jam without the added sugars that can be found in many store brands. Once this step is complete, honey can be added to the mix, as well as chia seeds, which add a healthy source of fiber. This is an easy breakfast, with a source of fruit to help meet daily

micronutrients, vitamin D from the milk and a complex carb. Lunch is a simple tuna salad recipe, with a side of fruit and milk. A normal tuna salad recipe is made with heavy mayonnaise, in this recipe greek yogurt will act as the mayonnaise, and whole grain pasta will also be added to the tuna mix to add a complex carb to the dish, a ½ serving of grains is recommended for lunch (“USDA Food and Nutrition Services, 2019). Finally, snacks throughout the day are quite simple to create that are clean and healthy to provide the energy children need to focus throughout the day. If vegetables are not desired, adding hummus may make this dish more flavorsome, and appealing for young children. Cheese is another filling snack that can be plated with a side of fruit. Eating clean and healthy can be made simple when taking into account portion size and keeping an eye out for preservatives and additives.

**Figure 1.5**



Adapted from: USDA Food and Nutrition Service

### **Literature Review**

Within the last decade, the USDA has made progress toward strengthening the meals that are provided to children in their early elementary years by implementing new standards that require proper portion sizes, and the needed nutrient dense foods to influence growth and development. “A healthy diet is particularly important for children, as they require the optimal nutrient intake to meet the basic demands of growth and development” (Asigbee et al., 2018, p.408). Regular clean eating can support a child’s ability to focus in class, academic success, and can eliminate the crash that can be experienced when foods with added sugars are consumed. Within this literature review, programs in place to assist in living a healthy lifestyle for children and families will be explored, as well as how the health of growing children can be impacted when nutrient dense foods are not consumed. This literature review will also include how outside vending sources are counteracting the work being done to better the foods being served under the current standards.

### **History of Nutrition Standards**

According to Richards (1910) in her *Report on the Penny Lunch Experiment* published in *Journal of Home Economics*, she describes the city of Boston where 2,000 students were provided lunches that cost one to two cents per meal. Teachers in the school system created luncheons that provided meals that fostered healthy growing bodies, mentally and physically. The teachers saw that when students were fueled with nutrient rich foods, they were more attentive and alert during the school lessons. “The food selected has been chosen with care in regard to cheapness and to a high percentage of nutritive value” (Richards, 1910, p. 650). The penny lunch experiment of 1910 served a variety of dishes to the students; but only two dishes will be described in this history portion of the literature review. The first meal consisted of corn

meal mush, with milk, sugar and crackers; the second consisted of oatmeal and dates, with milk, sugar, and crackers. As seen in this report, sugar was a staple in many meals, as well as compound carbs that provide very little nutritive value. “Sugar is one of the least expensive as well as the cleanest of foods and is used freely in our lunches” (Richards, 1910, p. 650).

Nutrition standards in schools have come a long way in the last century. Offering these reduced price meals was just the start to the long running movement toward nutrition standards in schools.

**School lunch program implementation: 1929-1941.** The programs put in place by these teachers in Boston provided the students with foods that at the time were considered nutritious, and nourishing for the body. Although the meals were by no means clean, these luncheons were on the right track toward developing a healthy eating mindset within the students. With the success of this program, more schools across the country began to provide these types of meals, but still not at the federal level (Rude, 2016). It wasn't until the Great Depression (1929-1939) that the federal government put effort into developing school nutrition programs. As time passed, program development occurred and starting in 1941, every state in the country had a school lunch program in place (Rude, 2016). Even with the success of this program in place, this was not a permanent mandate within the schools, and when WWII occurred school meals began to diminish in the schools and the government knew something needed to be done to ensure that children would still be provided with these meals.

**School lunch efforts in 1946.** This realization in America resulted in the National School Lunch Act of 1946 signed by Harry Truman, which is now known today as the National School Lunch Program. The 1946 National School Lunch Act provided new standards to schools that consisted of a two-part plan, with two types of lunch prototypes offered. “Type A lunch was



designed to meet one-third to one-half of the minimum daily nutritional requirements of a child 10 to 12 years of age. By making some adjustments, this meal pattern could be adapted to meet the nutritional requirements for children of all ages. The Type B pattern was devised to provide a supplementary lunch in schools where adequate facilities for the preparation of a Type A lunch could not be provided” (Gunderson, 2017). Figure 1.6 displays the two meal types that qualified for the NSLP that came about in 1946. While the standard does call for fruits and vegetables, it provides the option for canned fruits and vegetables, which is more cost effective, but can have added sugars, and sodium levels that far exceed the daily recommendation. Canned fruit and vegetable products also come with a much longer expiration date due to the preservatives. This was just the start to nutrition standards that would progress.

**Figure 1.6**

Food Group	Type A Serving Size	Type B Serving Size
Milk, whole	1/2 pint	1/2 pint
Fresh or processed meat, poultry, cheese, cooked or canned fish	2 oz.	1 oz
Dry peas or beans, soy beans (cooked)	1/2 cup	1/4 cup
Peanut Butter	4 Tbsp	2 Tbsp
Eggs	1	1/2 egg
Raw, cooked, or canned vegetables or fruits	3/4 cup	1/2 cup
Bread, muffins, or hot bread	1 portion	1 portion
Butter or fortified margarine	2 tsp	1 tsp

Adapted from: Hopkins and Gunther, 2015

**Reagan administration of 1981.** The work that had been done to strengthen the school lunch program, took a step backwards in 1981 when the Reagan Administration made the effort to slash the budget for school lunch programs by \$1.5 billion dollars (Rude, 2016). In the process, lunch portion sizes were shrunk beyond what they should’ve been, leaving standards to barely meet the needed nutritional requirements. The Reagan “administration infamously attempted to classify ketchup as a vegetable as part of its effort to curb school lunch

expenditures” (Crafton, 2014, p. 27). This change in budget did not only produce smaller portions available, but also caused fewer children to have the opportunity to have free or reduced lunches. With the budget being cut drastically this also allowed for even less nutrient dense foods to be provided. The school nutrition standards took a spot in the backseat, and many children fell victim to obesity due to the lack of focus on school nutrition during this period of time (Rude, 2016).

**Healthy, hunger-free-kids act of 2012.** According to the “Let’s Move!” initiative (2010), The Healthy, Hunger-Free Kids Act (HHFKA) was implemented to provide access to nutritious foods to children from low-income homes by plating foods that are nutritiously balanced, and allows the USDA to set nutritional standards for all foods regularly sold in schools during the school day, including vending machines, the “a la carte” lunch lines, and school stores (“Let’s Move! Child Nutrition Reauthorization Healthy, Hunger Free Kids Act,” 2010, p. 1). The Act instated that HHFKA would ensure more local foods are used in schools by establishing local farm to school networks; the efforts of the HHFKA would also work to promote creating school gardens. This Act did not only encourage healthy eating, but also set goals for nutrition promotion, implementing education curriculum around healthy lifestyle topics and fortified physical activity, correlating well with the “Let’s Move!” buzzword (“Let’s Move! Child Nutrition Reauthorization Healthy, Hunger Free Kids Act,” 2010, p. 1). The implementation of gardens into schools, and allowing time to educate young children about the benefits of eating healthy can create a stronger mentality toward wanting to eat nutritiously (Graham and Zidenberg-Cherr, 2005).

**Standards to be effective in school year 2019-2020.** The standards that will be effective in the upcoming 2019-2020 school year will consist of several modifications to the

2018-2019 interim final rule (IFR) put in place by the USDA. This consists of three categories, milk, grains and sodium levels. The italicized items are the changes that will be made in the new school year. Flavored and unflavored, low-fat milk products will be served at breakfast and lunch. *The 2019-2020 school year instates that half of the weekly grains in the National School Lunch Program and School Breakfast Program are whole-grain items; for the remainder of the week, they must be enriched grains.* To create an enriched grain, certain B vitamins (thiamin, riboflavin, niacin, folic acid) and iron are removed and added back after processing, meaning that this is not the purest form compared to a whole grain (“Choose My Plate,” 2017). Regarding sodium in school lunches, in 2012, it was required that schools gradually lower the amount of sodium added to dishes over a ten year period; in the new rule for the 2019-2020 school year, sodium levels will continue to hit target 1 (see Figure 1.7), *with the intention to move toward target 2 in 2024-2025 school year; with this plan in place, the final target will be removed.* The nutrition standards have changed immensely in the last decade, and are continuously being reviewed to ensure that proper meals are served.

**Figure 1.7**

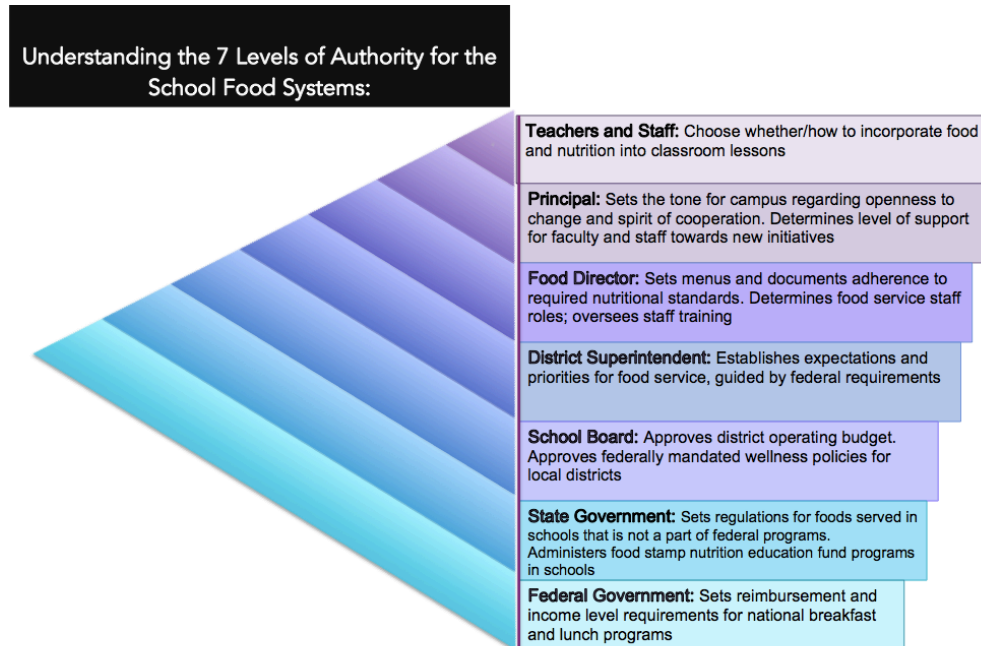
<b>Federal Sodium Reduction Mandates</b>			
<b>Grades</b>	<b>Target 1 (July1, 2014)</b>	<b>Target 2 (July1, 2017)</b>	<b>Final Target (July1, 2022)</b>
<b>Reimbursable School Breakfasts</b>			
K-5:	≤ 540	≤ 485	≤ 430
6-8:	≤ 600	≤ 535	≤ 470
9-12:	≤ 640	≤ 570	≤ 500
<b>Reimbursable School Lunches</b>			
K-5:	≤ 1,230	≤ 935	≤ 640
6-8:	≤ 1,360	≤ 1,035	≤ 710
9-12:	≤ 1,420	≤ 1,080	≤ 740
<b>Competitive Foods (a la carte, vending)</b>			
Entrées: ≤ 480 mg Snacks/Sides: ≤ 230 mg (≤ 200 mg by July, 2016)			

Source: Sodium Targets in the National School Lunch Program

**Educating Staff and Faculty**

A lot of work must go into the implementation of policies in schools; “to be effective, policies must clearly delineate expectations for the many individuals who influence school food environments including district and school-level food service managers, commercial vendors, school administrators, teachers, parents, and students” (Bevans et. al., 2011, p. 428). Within a seven-layer tier for the school food system (see Figure 1.8), there is a lot of work that goes into implementing the proper standards into the school systems.

**Figure 1.8**



Adapted from: Center for Ecoliteracy: Understanding the Levels of Authority for School Food Systems

The district superintendent (tier 4) creates the expectations for food service and proposes the proper budget to ensure that the money is being spent on nutrient dense foods that meet the standards. Once the superintendent clears the budget, the food service director works with the budget to create menus, which will allow the kitchen staff to prep and plan for the coming weeks. The principal is the individual that sets the tone for faculty and staff to understand how to adjust to change within the school system. The principal also takes on the role of providing

the needed support for faculty and staff when new initiatives are put in place. The final tier within this seven-layer pyramid is how the teachers and staff take to the new initiatives based around nutrition. The teachers then can take this information into their classroom lessons, and present it to parents and guardians to ensure that families understand the standards that are actively being changed within the school lunch system. The standards can only go so far without the help of these internal and external sources; it's important to provide these vital members of the school system with the proper training and resources to understand the significance behind suitable nutrition for children that are growing mentally and physically.

### **The Impact of Poor Nutrition: Physically, Mentally and Academically**

“Poor nutrition may impair the rapidly developing brain and cognitive functions, and low-quality diet may also deteriorate children’s academic achievement” (Nyardi et al., 2013 as cited in Haapala et al., 2017, p. 2299). According to Haapala and colleagues (2017) a diet higher in red meats/sausage, and lower in fruits/vegetables is related to poorer cognition in young children. Strong cognitive function at a young age is imperative to thoroughly retaining knowledge, as well as understanding concepts through thought and experience. A study conducted by Haapala, Eloranta, Venäläinen, Jalkanen, Poikkeus, Ahonen, Lindi, and Lakka (2017) examined three different diet styles, with a sample size of 512 elementary school students between the ages of six and eight. Haapala and colleagues (2017) examined reading comprehension, academic achievement and several other factors. The diet regimen that included vegetables, fruits, fish, and allowing for sugar-sweetened beverages, puddings and/or chocolates had a strong association with better reading fluency in first and second graders, as well as a higher reading comprehension level in grades first through third. Within the given diet routine, “these nutrients [vitamin E, vitamin D, polyunsaturated fatty acids, and dietary fiber] may

enhance synaptic plasticity, protect the brain from neuronal damage, support cell proliferation, and improve the prerequisites for academic achievement, such as working memory and inhibition” (Haapala et al., 2017, p. 2306). While this diet included sweets and added sugars, it is important to note that with a balanced diet, these items can be consumed in moderation.

**The importance of breakfast.** Understanding the value of the foods being eaten is just as important as choosing to eat these foods. In 2005, Rampersaud and colleagues evaluated previous literature that examines the relationship between breakfast consumption and how it can impact a child’s nutritional adequacy, his or her body weight, as well as their cognitive and academic performance. There are multiple reasons for children missing breakfast, two of those reasons being a lack of an appetite, and/or no time in the morning before school (Rampersaud et al., 2005). With breakfast kick-starting the day, this meal can give children the boost of energy needed in the morning, as well as the ability to focus for a greater span of time in their classes. In a randomized intervention study, Rampersaud, Pereira, Girard, Adams, and Metz (2005) reviewed cognitive performance associated with breakfast consumption among 569 students between the ages of eleven and thirteen, researchers found that there are aspects of memory that can be positively impacted when a balanced breakfast is consumed. By providing the members in the study with breakfast thirty minutes before testing, the researchers found that this was helpful to recall information. The students that ate at home earlier in the morning also had the same effect, which suggests that the timing of the breakfast consumed could be an imperative factor to academic success and recall ability (Rampersaud et al., 2005). With the School Breakfast Program in place, this can assist in the success of students academically. This study is significant because it strengthens the notion that healthy eating and partaking in breakfast can elevate memory levels and academic success.

**Micronutrient deficiencies.** Along with the benefits of breakfast toward a child's ability to recall information, research has found that breakfast consumers also have better success meeting the daily micronutrient, macronutrient and fiber intake that is recommended for the day (Rampersaud et al., 2005). Micronutrients are only needed in small amounts in the body to allow for proper development, but without these needed nutrients, the body can fail in a devastating way. Among a wide variety of micronutrients, a lack in iron, vitamin A and iodine can cause for micronutrient deficiencies in children if the proper nutrition is not consumed daily.

Micronutrient deficiencies can have substantial long-term risks to a child's health physically and mentally. Such deficiencies can impact a child's mental development leading to stunting, poor cognitive function and poor school performance. A decline in cognitive function and school performance may generate the cycle exhibited on Figure 1.4, located on page 12 in this policy analysis. If the proper meals are prepared through the School Breakfast Program, as well as in the NSLP, then these micronutrient deficiencies will be less prevalent among young children, and academic success of the students will improve.

**Childhood obesity.** Among the concerns for micronutrient deficiencies and academic performance diminishing due to a deficiency in proper nutrition consumption, researchers also present the very clear issue that can also occur with poor nutrition, childhood obesity. In 2018, the Center for Disease Control (CDC) released that one in five children between the ages of six and nineteen, are obese. This early onset obesity can contribute to a variety of health risks for not only the individual, but for their own families in the future. The CDC also describes the immediate and long-term effects on physical, social and emotional health. There are multiple health risks physically that can impair a child's future, such as asthma, bone and joint problems, as well as the risk for type 2 diabetes. Sleep apnea can also occur, which can translate over to

the classroom where a child may lack the ability to concentrate due to exhaustion; work will be put on the back burner and the child may fall behind in his or her academics. “Overweight and obesity were associated with poorer health status, lower emotional functioning, and school-related problems” (Halfon et al., 2013, p. 9). Halfon and colleagues (2013) explains that children suffering from obesity cannot directly express their emotions. When a child internalizes his or her feelings, depression and lower self-esteem can fester within the child, which can have a negative effect in the long run.

### **Educational Campaigns and Programs**

Partaking in physical activity goes hand in hand with eating nutritiously. It is recommended that children participate in moderate to vigorous physical activity for sixty minutes a day (Wiecha et al., 2012); this can be spent during recess, physical education class or allocating time in the classroom agenda to have students get up and move around; there are many ways to implement lesson plans that involve some type of physical activity. In an explanatory ERIC Digest, Olga (2002) describes the important role recess can play in a student’s learning, social development and health. Barros, Silver and Stein (2007) conducted a study on 3<sup>rd</sup> graders ages eight and nine to examine the link between physical activity in recess and classroom behavior. Data showed that one or more daily recess periods of more than 15 minutes resulted in better teacher ratings of student academic behaviors (Barros et al., 2007). Eating nutritiously and taking part in physical activity can also support a child’s academic performance in the classroom, this includes but is not limited to, attending school, organizing materials and actively staying on-task with schoolwork (Sullivan et al., 2017). The relationship that is developed early on in school will stay with the child, and can influence his or her participation in the remaining years of school. Figure 1.4 shown in the data analysis section shows the early problems that can arise



in a child's academic abilities, which can impact the rest of an individual's life regarding their employment and own success. Eating nutrient dense foods and partaking in physical activity is important, but educating children and families on the value to these two daily actions is just as important.

**Out-of-school time.** Schools are taking more time to implement out-of-school time (OST) programs that allows time for homework, healthy snacks and health promotion. "By creating healthy environments, standards can influence the behavior of staff and children in OST, an idea supported by research showing that availability, peers and adult role models influence children's eating habits and physical activity" (Wiecha et al., 2012, p. 573). Adults seen as role models have a big influence on children that they oversee, and by promoting healthy actions and food alternatives, the children may better absorb what is being said.

**Somerville program.** To combat the risk for childhood obesity, it is critical that the standards are revised and accurately demonstrated during school meal preparation. These statistics and effects of obesity should be the main focus for schools and standards to work toward eliminating childhood obesity to the best of their ability. In an academic journal, Bevans and colleagues (2011) describes the implementation of specific nutrition standards in schools, and also the competitive foods that are offsetting the efforts being done to clean up the food options available. Somerville, Massachusetts has taken the obesity epidemic into account, and with the help of the mayor they were able to make progress in slowing the rate of childhood obesity. "Somerville combined a series of school-based interventions with a healthy food labeling program in restaurants, engagement of medical providers, and community infrastructure improvements to support physical activity" (Frieden et al., 2010, p. 360). Since this research in 2010 was collected, Somerville has also created "Shape Up Somerville," which is a program

dedicated to building “healthy, equitable communities in Somerville through interdisciplinary partnerships, programming, and policies related to food systems and active living” (“Shape Up Somerville,” 2019, p. 1). This program is a great resource for children and families that are seeking knowledge on nutrition and healthy eating; the website itself provides different recommended farmers markets and restaurant guides to stay on track. The useful nutrition tips are also paired with physical activity recommendations, such as different local biking or walking routes, as well as a list of fun, active events happening that are great for children and families. This program betters the community and the lives of those living in the community; if more areas could take time to implement a program like this, there could be an even greater decrease in the prevalence of childhood obesity.

### **Flaws in the Standards**

While the standards in place have widely been changed to meet the needs for children that partake in the NSLP, there still are a lot of issues within the schools that are counteracting the standards that are seen in the school system. Competitive foods within the school vending machines are not adequately researched and are negatively offsetting the healthy meals that are served under the USDA standards. There are flaws seen amongst the USDA itself; an eighteen-page document titled *A Guide to Smart Snacks in Schools* holds snack options that go far beyond the daily intake recommendations for sugar in children and even adults. There needs to be more work done within these departments to ensure that the “healthy snacks” are actually healthy.

**Competitive foods.** A sizable flaw impacting the school nutrition standards is the amount of competitive foods that are found in schools across the country. Competitive foods, also known as à la carte is defined as foods that are not on the given menu, these foods are priced separately and found outside of the cafeteria, most likely in a vending machine. Bevans,

Sanchez, Teneralli, and Forrest (2011) examined how children's health is influenced when there is a larger variety of fruits and vegetables available to them, alongside the competitive foods. The options gave students a lot more to choose from, which did impact their choices, but unfortunately due to competitive foods being readily available, research showed that students still gravitated toward these options. "Access to competitive foods may counteract the beneficial effects of nutritious school meals and pose a significant barrier to the establishment of health-promoting school environments" (Bevans et al., 2011, p. 425). Schools do not want to eliminate and/or minimize the wide range of food items offered in the vending machines due to the potential drop in revenue that could occur. "Advocates argue that it is wrong to sell children unhealthy foods in order to subsidize their education" (Wharton, 2008, p. 246). While school nutrition standards have been put in the spotlight, and have been making progress toward bettering the menu, there needs to be more work put into improving the standards toward competitive foods put into schools.

**The A-list.** "In December 2010, Congress enacted the Healthy, Hunger-Free Kids Act of 2010, which requires the development of federal nutrition standards for all competitive foods sold in schools" ("Competitive Foods and Beverages in U.S. Schools: A State Policy Analysis," 2012, p. 1). Since then, the John C. Stalker Institute of Food and Nutrition (JSI) has established the A-List that meets the Massachusetts Nutrition Standards and helps to put the "right" foods into vending machines in schools in the state. The A-List is a sixty-one page detailed chart that alphabetically [by brand] displays the foods and beverages that can be sold. The A-List consists of a wide variety of snacks, but among the sixty-one pages there is a large quantity of snacks that consist of added sugars and saturated fats, which can raise cholesterol levels if too much is consumed in food products. The food items may meet the requirement to fall under 200 calories,

but these items listed are meeting the recommended daily sugar intake for elementary school students in just that one snack. Children of the ages two through eighteen should consume less than six teaspoons of sugar a day, which is roughly twenty-five grams per day. While there are snacks on the A-List that are clean products, there are also a wide variety of snacks that should not be qualifying as a healthy snack. The following provides a detailed review of a product listed that “meets” the Massachusetts Food and Beverage Standards. Listed under frozen desserts, a 3 oz cup of Dippin’ Dots YoDots (Redberry Shertbet) is 130 calories, 2.5 grams of fats, 25 grams of carbohydrates (the nutrition facts on the A-List chart do not include carbohydrates) and 25 grams of sugar, which in that one serving already meets the daily recommended amount of sugar. What the A-List doesn’t tell the readers is that the ingredients that make up each food item. Figure 1.9 displays the nutrition label for the Redberry Sherbet; take a close look at the ingredients list for the processed ingredients children across the country are consuming. This is one of the many unhealthy snacks that can be found on the A-List; this food item is not “clean” in any sense and does not provide any nutritional value.

**Figure 1.9**

Nutrition Facts: Single-Serving		Ingredients:
Serving size <b>1 package (85g)</b>		SKIM MILK SUGAR, CREAM, CORN SYRUP SOLIDS, POWDERED SUGAR, SOYBEAN OIL, CITRIC ACID, COCONUT OIL, RED 40 LAKE, NATURAL AND ARTIFICIAL FLAVORS, MONO & DIGLYCERIDES, SOY LECITHIN, LESS THAN 0.5% OF (LOCUST BEAN GUM, GUAR GUM, CARRAGEENAN, DEXTROSE).
Calories <b>130</b>		
Calories from Fat <b>25</b>		
Amount Serving	Daily Value	
Total Fat <b>2.5g</b>	<b>4%</b>	
Saturated Fat <b>0.5g</b>	<b>3%</b>	
Trans Fat <b>0g</b>		
Cholesterol <b>0mg</b>	<b>0%</b>	
Sodium <b>50mg</b>	<b>2%</b>	
Total Carbohydrates <b>25g</b>	<b>8%</b>	
Dietary Fiber <b>0g</b>	<b>0%</b>	
Sugars <b>25g</b>		
Protein <b>1g</b>		
Vitamin A <b>0%</b>	Vitamin C <b>0%</b>	
Calcium <b>6%</b>	Iron <b>0%</b>	
* Percentage values are based on a 2,000 calorie diet		

Adapted from: Dippin’ Dots Nutrition Facts: Single Serving

This finding shows that the proper care and time isn't placed on successfully researching the foods that should be provided to children. "USDA does not approve individual foods or beverages. Even if a food says, "Smart Snacks approved," you should still evaluate the Nutrition Facts panel and ingredients list" ("USDA: A Guide to Smart Snacks," 2018). The Redberry Sherbet is one of the items that needed further evaluating even if it was approved. These foods are counteracting the hard work that is put into policies like the National School Lunch Program and the School Breakfast Program. Advances have been made to create quality standards, but a lot of work needs to be done to continue to improve the food options readily available for children at school.

**"Smart snacks in schools."** In the 2018-2019 school year, the United States Department of Agriculture released an eighteen-page document titled, *A Guide to Smart Snacks in Schools*, which lays out the specific standards designated for snacks in school settings that are sold during the day, at fundraisers and in vending machines. The "smart snacks" should be under 200 calories, clean food items, with little to no added sugar. Regardless of the standards in place for snacks sold at schools, unhealthy food items can still be found in vending machines across the country, the Redberry Sherbet is a prime example of this. Even with the clearly established knowledge that competitive foods are holding a negative position in schools offsetting the healthy foods provided, schools continue to have the vending machines that carry these food items that are overloaded with carbohydrates and added sugars.

The USDA continues to make progress toward strengthening the meals that are provided to children; the incessant updates ensure that the adequate nutrition is being served. Nutrient dense meals support a child's academic success; and can also eliminate or lessen the risk of a decline in a child's health. These health standards in schools can only go so far though with the

a la carte counteracting the food items being served within the cafeteria. If more attention is placed on competitive foods, then the vending machines can accurately be cleaned up to better fit the standards in place. These vending machine snacks may meet the 200 calorie limit, but the ingredients within the snack making up these calories are not clean or nutrient dense. Shifting from processed snacks to clean ingredient snacks may improve the overall health seen in young children. Consuming healthy foods is just as important as understanding why these foods are needed. Implementing educational programs, similar to “Shape Up Somerville” can promote the importance of nutrition, and the benefits of physical activity. There is a lot that can be done to continue to improve the nutrition standards in schools, but the USDA is moving in the right direction.

### **Recommendations**

With the drive to change nutrition standards in schools and create healthy change in the lives of growing children, many advances have been put into effect among schools and programs, but with anything, more efforts can be done to improve the work in progress. To continue the growing success with the implementation of school lunch standards, there are several recommendations that can contribute to bettering the school systems.

**Avidly reviewing snack ingredients.** The school nutrition standards in place ensure that the foods plated meet the needs for children that are developing mentally and physically. The foods being served may be healthy, but they’re not properly seasoned and plated in a way that is appealing to children. With this being the case, children turn to the vending machine for snacks that are considered “smart snacks,” but do not come close to being nutrient dense or healthy for that matter. School nutrition standards can successfully work if school administrators take time to actively review the ingredients of the foods that are being placed into vending machines.

Smart snacks require a calorie limit of 200 in the snacks being served, but this appears to be the only requirement that is looked at seeing as foods heavy in sugar and carbohydrates are sneaking on to this list. While administrators should be aware of the foods that are being placed in to the vending machines, they also should work to implement nutrition education into the curriculum. Providing children with knowledge around nutrition will allow for the students to understand how to read nutrition labels, and understand what ingredients are clean for their growing bodies. Introducing children to nutrition and wholesome foods at an early age may build a strong understanding for the needed foods in the future, creating for a healthy lifestyle.

**Taste tests.** Children can be reluctant to trying new foods, especially fruits and vegetables that can contribute to their growth and development. Implementing taste tests during classroom lessons or lunchtime in the cafeteria are an innovative way to collectively obtain data from the foods that students do enjoy. “Teachers in schools are powerful contributors in the current educational system, which is focused on academic achievement and meeting academic standards” (Graham and Zidenberg-Cherr, 2005, p. 1797). If time was allotted for teachers to thoroughly cover topics based around nutrition, then more students may see the impact that a healthy diet has on their everyday lives. By establishing a day out of the week for students to have the option to try new foods, this can allow for kitchen staff to understand the foods that would be consumed in lunch meals. A simple, five question survey can be administered to students that asks questions not only about taste, but also texture and appearance at first glance. “Learning about food and watching peers and teachers try new foods can help motivate students to taste foods that they may not have experienced at home or in the cafeteria” (“Action for Healthy Kids; Ohio: Taste Testing in Schools Resource Guide”). By executing these weekly

taste tastes, school cafeterias will be able to plate foods that the majority of students want to eat, and can lessen the number of students gravitating toward competitive foods.

**Gardens.** The final recommendation is for more schools across the country to implement garden projects on school campuses. In California, researchers looked at the effects that an on-campus garden had on students and teachers. The California study conducted by Graham and Zidenberg-Cherr (2005) found that the gardens were well incorporated into the classroom subjects, science, environmental studies, language arts and math as well. “Our garden has provided children the experience of fresh veggies versus fast food, which has made a huge difference in diet, nutrition education, and pride in growing food,” said a California teacher in this 2005 study (Graham and Zidenberg-Cherr, 2005, p. 1798). This is an exciting project that students can be a part of, and also something for the children to be proud of. Taking time to nurture these freshly grown fruits and vegetables can even make the students want to eat these foods because it is something they created on their own. “Schools with gardens have the opportunity to enhance the school meal program by exposing students to fresh produce when it becomes available, possibly leading to changes in dietary habits through students gaining knowledge of the origins of food” (Briggs and Zidenberg, 2002 as cited in Graham and Zidenberg-Cherr, 2005, p. 1799). This type of study is important because it shows the positive influence that nature and healthy eating can have on individuals.

These are just several of the many recommendations that could be made to add to the implementation process of healthy activities and nutrient dense menus in schools. Adequately educating children, families and staff on the importance of a healthy diet will support the work being done to put these standards in motion properly. Taking time to add a garden to a school courtyard will not only benefit the student’s understanding of healthy eating, but will also boost



comprehension in other academic subjects. Strategically incorporating taste tests and garden activities into daily lesson plans allows students to stay engaged and interested in the topic of nutrition. These recommendations put in place could add great value to the school systems and support the actively changing standards.

### **Conclusion**

School Nutrition Standards in the United States have changed a great deal over the years, but the meals are not satisfying the student's taste buds. While all children will not like fruits and vegetables, there are a variety of ways to create meals that are kid-friendly, appealing and nutrient rich. It is important that school administrators and kitchen staff take the time to plan dishes that are high in nutrients, but are familiar to the children. There are simple substitutes that can be made that can allow for a child to eat foods they enjoy, but in a healthier way. Along with actively creating healthier, more appealing meals within the cafeteria, school administrators also need to take a step back and review the competitive foods that are offered. The vending machines in schools across the country are filled with snacks that are 200 calories or less, but are filled with ingredients that defeat the purpose of serving healthy meals in the cafeteria that follow the nutrition standards. School systems need to not only understand the standards and carefully review the a la carte provided, but also create time in the classroom curriculum that educates children on the importance of eating healthy. Educating children at a young age about nutrition can prepare them up for a healthier life, as they grow older. School nutrition standards are moving in the right direction; and with more eyes on this policy, there can be more triumphs made in the implementation of new standards that serve healthier, more kid-friendly meals.

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