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Intervention Approaches and Potential Impacts of Nutrition Education in Youth Ages 3-14

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Nutrition education aimed at increasing fruit and vegetable consumption by youth ages 3-14

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Introduction

As an employee at a nutrition education company local to Kalamazoo called Fresh Food is Fun (FFF), I have had the opportunity to conduct and create a series of nutrition education programs intended to increase excitement and willingness to consume fruit and vegetables (FV) in youth populations. The FFF Interactive Nutrition Programs promote wellness and increase positive associations with fresh food by providing high-energy, joyful experiences to initiate or deepen one’s relationship to fresh food. FFF provides nutrition education programs in an array of settings, ranging from early education centers and schools, to health centers and corporate offices. Over the course of my 3 years working for this company, I have developed nutrition education programs that cater to various age groups to best suit their interests and needs and have recently had the opportunity to implement these programs with their accompanied age groups in school-based settings. In January of 2020 I wrote a two-week nutrition education series catered to preschoolers and conducted the programs in an early education center in Kalamazoo, Michigan. Additionally, my co-worker and I were able to obtain a grant for FFF for the 2019-2020 school year through a non-profit organization called Communities in Schools to provide nutrition-focused afterschool programs to 8 elementary and middle schools in the Kalamazoo Public School System.

Communities in Schools is a unique organization that builds school-based staff partnerships with teachers to identify the challenges students are facing in class or at home and collaborate with community partners to bring outside resources into schools (Communities in Schools, 2020). One major component of this support is by providing afterschool childcare for students whose parents work late hours. Communities in Schools aims to find and build community partnerships with organizations that may provide youth with unique and valuable
experience throughout these afterschool programs. FFF was granted the funds and support by Communities in Schools to provide a 6-week nutrition education program series focused on increasing FV consumption and engagement surrounding nutrition education. These programs have been implemented in 8 different schools, including 3 middle schools and 5 elementary schools. No data has been collected surrounding the impacts of these specific nutrition education courses, however, each course has been developed utilizing evidence-based resources surrounding the importance of taste exposure.

Due to socioeconomic disparities, many youths in the US do not have adequate access to fresh produce (CDC, 2017), and therefore do not consume sufficient amounts of FV. The latter is associated with higher rates of obesity among some youth which is thought to be the root cause of chronic degenerative diseases, such as type II diabetes, hypertension, and cardiovascular disease as the individual gets older. The aim of this project is to employ nutrition education strategies to increase the desire to consume FV among youth. The next step would be to conduct field testing and gather data surrounding the impact on this nutrition education curriculum.

**Literature Review**

Neophobia, food access, and environmental factors play the most significant role in the incidence of childhood obesity (Brown, 2016). Children between the ages of 1 and 5 often have highly selective eating preferences, or neophobia, which may make it difficult to ensure that youth are receiving adequate nutrition (Brown, 2016). Though some studies have indicated that more than 90% of children consumed the recommended intake for FV at 9 months (Spence et al., 2018), The USDA reported that merely 3% of children meet the daily serving of 1 cup of fruits and vegetables each day once they pass their first year of life (USDA, 2019).
Youth may spend the bulk of their day in preschool, daycare, or school, but the family system that surrounds a child’s domestic life plays an even more active role in establishing lasting health behaviors (Scagoloni et al., 2018). Many factors amass to this overall “family health climate”, such as socioeconomic status, race, and education levels (Scagoloni et al., 2018). Data from the CDC indicates that rates of obesity among Hispanics and non-Hispanic blacks are 25.8% and 22% respectively, much higher than the 14.1% reported among non-Hispanic whites. (CDC, 2017). Published data have also shown that the prevalence of obesity among children and adolescents aged 2-19 is lower with increasing level of education of the household head (CDC, 2017). Similarly, family life settings may play a large role in the youth’s health behaviors. A systematic review assessing 88 studies surrounding the factors influencing children’s eating behaviors found that in households which partook in regular family mealtimes adolescents consumed higher rates of fruits, vegetables, and whole grains in comparison with families that did not have regular family mealtimes (Scagoloni et al., 2018). This brings into light the problems with food access and education surrounding adequate nutrition among these populations that government programs have begun to address (CDC, 2017).

Because youth between the ages of 1 and 14 spend a significant amount of time at home, in daycare facilities, or schools, policies have been implemented for low-income households to improve FV accessibility. Approximately 54% of children ages 1 to 2 and 74% of children ages 3 to 5 spend time in an early childcare education program, thus, these environments serve as the primary opportunity for children to receive their daily nutrition (NCES, 2019). The Child and Adult Care Food Program (CACFP) has had a significant impact on the nutrition status of at-risk youth and adults alike. CACFP is a federal program that provides reimbursements for nutritious meals and snacks to eligible children and adults who are enrolled for care at participating
childcare centers, day care homes, and adult care centers (USDA, 2016). Other programs such as The Farmers’ Market Nutrition Program (FMNP), established by Congress in 1992, has also functioned in increasing access to FV amongst WIC eligible participants and their young children (Stallings et al. 2016). FMNP provides eligible participants with additional vouchers at local farmers’ markets to purchase fresh fruits and vegetables (Stallings, Gazmararian, Goodman & Kleinbaum, 2016). These are just two among many programs that have been established to increase FV consumption in young children. However, implementation of more small-scale programs and interventions to increase FV consumption has been enacted in schools and preschools in an effort to determine the most effective means of increasing FV consumption to improve the health status of the youth.

In recent years, more research has been conducted surrounding effective approaches to increase fruit and vegetable consumption in youth. A growing body of research suggests that taste exposure to new FV increases intake among young children (Nekitsing et al., 2018). This repeated taste exposure in youth have shown decreased rates of neophobia, and increased intake of unfamiliar FV (Nekitsing et al., 2018). Results of a new study have shown that when children were provided with a series of unfamiliar vegetables each day at their preschool class for 9 months, as minimal as 10 repeated exposures were enough to increase vegetable consumption by 10g per day amongst youth (Nekitsing et al., 2019). Additionally, this increase in vegetable consumption was measured and maintained 6 months after the intervention period, indicating the lasting impact of taste exposure in young children (Nekitsing et al., 2019).

The most common and accessible form of nutrition intervention can often be found in schools or afterschool programs, as it is where students spend the bulk of their days and can be most effectively reached. One comprehensive school program focused on six major
implementation modes: principal engagement, quality physical education, classroom engagement, active recess, healthy kids club, and student leadership (Centeio et al., 2018). Children's school days were driven by these six factors, with the “healthy kids club” providing education and access specifically to fruit and vegetable consumption (Centeio et al., 2018). Other programs focused on a more hands-on approach in school, such as gardening, cooking classes, and in-class vegetable consumption. One systematic review assessed the outcomes of school run cooking classes, all of which focused on an increased understanding and willingness to consume more FV (Hersch et al., 2014). Of the eight studies reviewed, all resulted in a positive influence on children’s preference, attitudes, and behaviors towards FV consumption (Hersch et al., 2014).

Another intervention provided youth with nutrition education, followed by a snack which consisted of a fruit or vegetable (Myers et al., 2018). This study found that following the intervention period, there was a 25% increase in youth bringing their own FV snack to preschool each day (Myers et al., 2018). Pre-schools and daycares remain an ideal target for nutrition interventions simply due to the substantial amount of time children spend in the school environment, making curriculum-based interventions an effective tool for nutrition education.

Despite youth spending a large portion of their day at school, parental decisions surrounding food choices have a large impact on youth experience with FV, as they are the ones that do the grocery shopping for the family. That being said, one intervention focused specifically on parental education in accordance with packing their children’s lunches. The Healthy Lunch Box initiative consisted of a free 25-minute information session to parents of young children, along with a series of handouts outlining nutritious meals and ways to achieve such meals while on a budget (Mihrshahi et al., 2017). Parents also received information about the possible outcomes of their children not receiving the daily recommended servings of FV,
emphasizing the link between poor FV consumption and the increased risk of chronic disease (Mihrshahi et al., 2017). While these strategies have been shown to increase intake among young children if parents are able to afford the cost of fresh FV, interventions addressing barriers related to cost and accessibility of FV must also be considered.

Programs initiated to address a variety of barriers among parents and daycare facilities have also been successful in improving FV intake. A study conducted by Utter and co-workers focused on the implementation of a “Family Meal Intervention” that would be accessible for low-income families to enjoy five nutritious meals each week for a total of four weeks (Utter et al., 2019). Throughout these mealtimes, food insecurity and approaches to affordable nutritious foods and helpful resources were provided to parents to increase knowledge and access to FV for their children and family (Utter et al., 2019). An at-home cooking class program in Oregon improved low-income parents’ comfortability with cooking vegetables for their children (Izumi et al., 2016). Other studies found that low-income children consumed more vegetables when local vegetables were highlighted on lunch trays at day-care centers and students received interactive nutrition education by visiting local farms (Izumi et al., 2015). Overall, intervention strategies must acknowledge the multitude of determinants that influence the consumption of FV among youth, including parental health literacy levels, food access, and children’s selective eating tendencies.

Despite the array of programs that have been developed to increase FV consumption, disparities pertaining to access to fresh foods and the prevalence of obesity remain. Parents and children from minority and low-income households continue to experience decreased access to fresh produce and higher incidences of obesity and decreased access to fresh produce compared to white and higher-income individuals. Additional research surrounding the social barriers
which hinder enrollment in federal assistance programs is necessary. Moreover, the efficacy of various intervention approaches for increasing FV consumption is an ongoing exploration which requires extended research. The rising rates of childhood obesity should be of the utmost concern. Thus, federal and local governments should be working to promote and implement evidence-based food education programs as a major strategy for increasing health determinants in youth and minimizing the prevalence of childhood obesity in the United States.

Curriculum Development

There is a growing body of evidence-based nutrition education curriculum that can be drawn from when creating and implementing new nutrition education programs for youth. Some of these are outlined in government-funded programs such as SNAP education. SNAP-ed provides a series of nutrition education courses focused on obesity prevention in youth. Their programs utilize lesson plans surrounding evidence-based education materials such as MyPlate, My Family, and Eat Smart, Live Strong. Similarly, Team Nutrition, an initiative developed by the USDA, aims to support the child nutrition programs through training and technical assistance for foodservice, nutrition education for children and their caregivers, and school and community support for healthy eating and physical activity.

The curriculum developed through FFF and implemented in a series of Kalamazoo public schools was based around research indicating that increased taste exposure to FV resulted in the increased willingness to consume FV outside of the intervention period. A series of studies supporting this concept have been published in several nutrition journals such as the Journal of the Academy of Nutrition and Dietetics and The American Journal of Clinical Nutrition, outlining similar intervention approaches that have been implemented in early care facilities and afterschool programs. The taste exposure approach involves repeated encouragement of youth
trying a new fruit or vegetable. Typically, these interventions are implemented for at least 6 weeks, but are most effective when implemented for longer, such as through the entire academic school year. Though the curriculum and lesson plans presented in this study have not yet taken part in field research, they have been created utilizing a series of other evidence-based curriculums.

The main components of the nutrition intervention approach explored in this study were enhanced curriculum approaches and experiential learning approaches. An enhanced curriculum approach goes beyond the basic nutrition education provided by public school systems such as in government-mandated health classes, and instead focuses on specialty nutrition education programs, often provided in a series rather than a singular program (Dudley et al., 2015). Experiential learning approaches focus on creating programs that are interactive and engage students through components like cooking and food preparation, community gardening, or taste exposure (Dudley et al., 2015). The primary element of the experiential learning approach utilized in all interventions explored in this study was that of taste exposure. Taste exposure provides youth with an opportunity to taste a fruit or vegetable at each program, and typically focuses on this component as a major theme for learning in all programs. Instead of simply being taught the importance of eating FV, taste exposure engages participants and encourages them to build their own connections to healthy foods.

The combination of these two approaches constitute programs that elicit student participation and deepen the understanding of the topic discussed through this student engagement (Dudley et al., 2015). However, these implementation approaches may be more effective when altered by age group to best fit the interests and needs of specific youth populations.
Goals & Key Objectives of Nutrition Education Curriculum

This flowchart outlines the major goal when implementing specific types of nutrition education programming, along with the key objectives necessary to reach this goal. Through the utilization of both experiential learning and enhanced curriculum approaches, nutrition education programs can adequately address some of the major barriers preventing youth from consuming FV.

Youth-centered Approaches

Pre-School Aged Youth

Studies have shown that effective implementation of nutrition education programs in pre-school aged youth require consistent and concise interventions (Mikkelsen et al., 2014). The average attention span of a 3-year-old is around 10 minutes, meaning the window for effective
engagement is minimal (Mikkelsen et al., 2014). In order to use this time as efficiently as possible, nutrition educators may want to focus on the taste component of nutrition programming. Taste exposure, such as providing youth with a singular fruit or vegetable to try together, has been shown to increase children’s willingness to try more FV, especially unfamiliar ones, in the future (Mikkelsen et al., 2014). Repeated taste exposure of FV presented in a comfortable and fun manner to preschool-aged youth minimizes the fear often associated with new foods (Mikkelsen et al., 2014).

The key component to focus on when creating and implementing programs for this age group is repeated FV taste exposure in an enticing manner (Nekitsing et al., 2019). Dressing up as characters such as fairies or superheroes may be an effective means of successfully engaging this age group. Ten minutes is enough time to try a new FV with youth and briefly discuss the importance of continuing to eat healthy foods (Nekitsing et al., 2019). Most children of this age don’t have the capacity to understand why eating fruits and vegetables is essential aside from the very basics, but if it can be made into a fun activity, it can become an enjoyable and exciting experience (Mikkelsen et al., 2014). By choosing an intervention that focuses on the what and the how, eating FV and ensuring that youth have access to them, then the why can be discussed when they’ve reached an age that permits the deeper critical thinking skills required to internalize these lessons (Mikkelsen et al., 2014). Refer to Appendix A for an example of a two-week intervention program that has been implemented in pre-school aged youth.

**Elementary & Middle School-Aged Youth**

Elementary-aged youth present an opportunity to dive deeper into the education side of nutrition intervention. At this age, it is important to remain exciting and engaging, but also to challenge and push students to think critically about what they are learning (Didylowksi, 2018).
Incorporating books and worksheets into programming provides an independent opportunity for youth to reflect on what they have learned after each program. Adding in an element of physical activity may permit students to get out excess energy so that they are better able to pay attention during the teaching component of the program (Didylowksi, 2018). Additionally, giving elementary-aged youth more hands-on engagement may be the most effective means of nutrition education (Didylowksi, 2018). This may include letting students chop their own vegetables with child-safe knives, create their own dips like yogurt-based ranch dressing, or participating in the planting and harvesting of school gardens.

Keeping a whimsical component to each program, similar to the approach used with preschool-aged youth, may still be effective in this age group (Didylowksi, 2018). Utilizing costumes or characters can create positive excitement surrounding the consumption of FV and motivate youth to try new foods. At this age, it is also appropriate to gather feedback from youth on their thoughts on programs. This may be in the form of paper surveys, or simply through a share-out style reflection at the end of each program. This permits the nutrition educator to gauge student engagement and satisfaction with programming and make any necessary changes or corrections (Didylowksi, 2018). Refer to Appendix B and C for a lesson plan and worksheet that have been implemented in elementary school-aged youth.

Programs implemented in middle school-aged youth should feature many of the same components utilized in elementary-aged youth nutrition interventions. The major obstacle involved in nutrition education with this age group is retaining youth engagement. The learning capacity of middle school-aged youth is far greater, and thus poses an opportunity to employ more independent activities. When youth are given ownership of the activities they are asked to participate in, there is a greater likelihood of engagement and cooperation. Worksheets may be
used in programs with this age group that expect deeper reflection on what they have learned throughout the program. Additionally, engaging students between the ages of 11 and 14 requires focusing on topics that are relevant to their age. Youth at this age may be less interested in simple tasks like tasting apples, and more interested in activities that allow them to access their creativity, such as through creating their own salsa brands by creating their own recipes, making the salsa, and creating a decorative label to share with friends and family. Refer to Appendix E and F for a lesson plan and worksheet that have been implemented in middle school-aged youth.

**Potential Impacts**

According to the CDC, American students receive less than 8 hours of required nutrition education each school year, far less than the 40 to 50 hours that are indicated to affect behavior change (CDC, 2019). Additionally, as of 2014, only 74.1% of public schools had been providing the required instruction on nutrition and dietary behavior to youth (CDC, 2019). A 2018 CDC report on fruit and vegetable consumption indicators in America suggests that widespread change in dietary behaviors will not be achieved simply through this nutrition education, but rather through a collective approach that addresses the multifaceted needs of different populations and communities (CDC, 2018). This collective approach must aim to not only increase nutrition education surrounding FV, but to also increase accessibility and affordability of healthy foods (CDC, 2018). Nutrition education in youth poses a unique barrier—though elementary and middle school-aged youth may be autonomous in their food choices in school and on their plates at home, they are not the ones choosing to purchase FV at the grocery store. Thus, parent nutrition education and increased support for low-income families to obtain healthful foods is necessary (CDC, 2018).
Implementing nutrition education programs in youth is still important, as many studies have shown their impact on influencing youth’s dietary decisions at school and at home. Implementing nutrition education in the classroom, in farm-to-school programs, school gardens, in the cafeteria, or through afterschool programs may all be effective mediums for improving FV consumption in youth (CDC, 2018). Studies continue to show that repeated taste exposure to FV in school-based settings have been linked to decreased neophobia and increased willingness to consume FV in school (Lakkakula et al., 2010). Indicators show that diets and lifestyle rich in FV intake and physical activity are linked to decreased disease states and positive weight status (CDC, 2018). Thus, the benefits of increased consumption and access to FV in youth populations may directly impact the health status of youth across America (CDC, 2018). The intervention approaches discussed in this study may be effective mediums to increase taste exposure of FV in youth and reap the benefits associated with repeated taste exposure. However, nutrition educators alone will not be successful in tackling the health disparities associated with lacking nutrition in youth. As suggested by the CDC, this issue is multifaceted and will continue to require diverse intervention approaches that meet communities where they’re at (CDC, 2018).

Lesson Plan Rationale

The lesson plans outlined in Appendix A present a two-week series of programs designed for preschool aged youth. Each program involves a simple lesson, but primarily focuses on encouraging youth to try a new fruit or vegetable alongside their classmates. Lesson plans are kept short and concise and are designed to be conducted in 20 minutes or less. By focusing on learning components familiar to pre-school aged youth such as color, texture, and shapes, youth engagement may be increased.
The lesson plan and accompanied worksheet outlined in Appendix B and C called *Apples*, is a program designed for but not limited to elementary-aged youth. This program is meant to be both engaging and exciting for youth, as they have the opportunity to spiralize their own apples and create their own dip. By creating activities that permit youth to work independently and get creative, youth are more inclined to participate. If the budget permits, this lesson plan was designed to allow students to take each type of apple home with them to share with siblings or family in order to increase access to fresh FV at home. The “community engagement” component of the lesson plan addresses a framework utilized by many educators but is not required for successful implementation of nutrition programs. The idea of community engagement or a “classroom contract” is to create a set of ideals with the students that everyone agrees to uphold, such as listening to others when they speak and sharing tools with one another. This contract is most effective when engaging with the same group of youth over an extended period of time and may be a constructive way to correct poor behavior in a classroom setting. Similarly, a game or physical activity element of the program if space permits may also be effective in helping youth behave better and remain engaged throughout the rest of the program by getting out excess energy at the beginning of the program. This is especially applicable when conducting afterschool programs in which youth have already spent 8 hours in school and have minimal interest in other schooltime activities.

The worksheet in Appendix C is meant for the youth to fill out and follow along with the nutrition educator so that they may remain engaged throughout the duration of the program. Additionally, they may take home their finished worksheet to share with others about what they have learned. As a group, the nutrition educator and youth are meant to design a word bank to describe different tastes and textures of fruits. The worksheet addresses the same literary
component by asking children to describe the tastes and textures they notice when trying their apples and to write them down, as well as asks them to rate each apple they try. Worksheets accompanying taste education programs don’t necessarily require components that address students learning in school, such as connections to writing, reading, or math, but may serve as a beneficial addition to their schooltime activities (Mikkelsen et al., 2014). Lastly, a recipe card including the dip they made in the program along with other healthy dips is provided to the children, as seen in Appendix D. The intention of this recipe card is that youth may take home healthy recipes that encourage FV consumption at home.

The lesson plan and accompanying worksheet outlined in Appendix E and F called Food Staples Around the World, is a program designed for but not limited to Middle School aged youth. This program features a guessing game, geography, a discussion about food staples and food culture, as well as a tasting portion where youth get to make their own sticky rice balls and try different Asian snack foods such as seaweed and rice crackers. The major component of this program is not simply trying new foods, but also to engage students in a discussion about agriculture and its differences across the world. Students are first asked to define what a food staple is and are then asked to play a matching game in which they guess which foods are food staples in what countries across the world. Students are prompted to use their own deductive reasoning skills and work alongside their classmates to find the correct answer. The rest of the program focuses on the many different cultural foods eaten across Asia. Students then have the opportunity to make their own sticky rice balls and try snack foods native to Asia such as seaweed and rice crackers. The worksheet provided for this program is meant to be used as a reflection piece and may be ideal to have students share out to the class to assess what youth learned and enjoyed throughout the program.
The opportunity for youth feedback becomes more attainable in elementary and middle school-aged youth. Utilizing a feedback survey, such as the one outlined in Appendix G may be an effective means to assess how nutrition programs have been received in a given population. By creating a survey that is relevant to youth and simple to fill out, there is a greater response rate amongst youth. The use of feedback surveys may not be necessary after each program, especially when working with the same group over an extended period of time. However, conducting these surveys at least once for each population group or program site may serve as an effective tool for reflection and improvement of programs for nutrition educators.

Conclusion

The implementation of nutrition education programs may serve as an effective means to increase exposure and consumption of FV amongst youth. Though there is a large body of research contributing to the widespread understanding of the importance of youth-centered nutrition education, there is no universally effective means of intervention. Instead, nutrition interventions should be catered to the specific populations in which they intended to reach. This study compiles past research and personal experience to present a series of lesson plans focused on increasing FV consumption and to preschool, elementary, and middle school-aged youth. All of these programs have been implemented in Kalamazoo, Michigan public schools, though none have produced research indicating their impacts. The health disparities present in vulnerable populations such as African Americans and other minority groups may be combatted through nutrition education programs, though not through these programs alone. There is a greater need for multifaceted programs that not only address the nutrition education of youth and their caretakers, but also that addresses the access these individuals have to affordable healthful foods. These health disparities will not be diminished by youth nutrition educators alone, but instead
require the involvement of government officials and healthcare professionals in the development of programs that align with the goal of increasing fruit and vegetable consumption across America.
References


Hales, C. M., Carroll, M. D., Fryar, C. D., & Ogden, C. L. (2017). Prevalence


http://dx.doi.org/10.5888/pcd11.140267.


https://doi.org/10.1186/1475-2891-13-56

doi:10.1017/S1368980010000959


NCES (2019). Percentage of children from birth through age 5 and not yet in kindergarten participating in weekly nonparental care and the mean number of hours per week that children spend in current primary weekly nonparental care arrangements with relative, nonrelative, or center-based provider, by child and family characteristics: 2016.
Retrieved from https://nces.ed.gov/nhes/tables/ECPP_HoursPerWeek_Care.asp


Systematic review and meta-analysis of strategies to increase vegetable consumption in preschool children aged 2–5 years. *Appetite, 127*(1), 138-154.


Appendix A

Week 1

Topic: Does color matter?

- How do the same vegetables grow with different bright colors?
  - Discuss the maturity of peppers. Show photos of how a pepper can range from purple to red.
- Each child will receive a veggie bag consisting of red, green, and orange pepper slices. Children will be reminded they do not have to try anything they do not wish to.
  - A blind taste test of the multicolored peppers will be conducted! Each child will have the opportunity to close their eyes and take a bite of each of their 3 peppers one at a time and try to guess which was which!
- Engage the students by asking who thought the peppers tasted the same and who thought the peppers tasted different.
- Thank all children for participating and trying a new vegetable together!

Topic: Apples

- Students will have the opportunity to make their own apple slinkies using a fruit spiralizer. No child will be permitted to use the spiralizer alone, we will all work together.
  - Children will be encouraged to play with their apple slinkies and notice the texture and color of it.
- Children will be provided with a bag of sliced apples and reminded at this time that they do not have to taste anything they do not wish to try.
  - Together, try the apples. Engage the children by asking them the flavors and textures that they notice. Is your apple sour, sweet, crunchy, soft?

Topic: Dried Fruits

- Students will receive a bag of dried apricots, mangos, and cranberries.
- Show the children pictures of what these fresh fruits normally look like and prompt children how/why the dried fruit looks different.
Talk to children about what it means to “dry” fruit— we take the water out!
Have group repeat the word dehydrate and say, “take the water out”. And then repeat hydrate and say, “add the water in”.
Prompt children by asking them if they think the dried fruit will taste the same or different from regular fruit.

- Ask students to make a silly face using the fruits on their plate. When everyone has made their face, investigate together if they will taste the same or different. Children will be reminded at this time that they do not have to try anything they do not wish to try.
- Do you like dried fruit? Do you like one better than the other?
- Lastly, ask students to show what they thought of the taste of the apricots with their thumbs.
- Thank the students for participating and trying new fruits!

**Topic: Cucumbers**

- Fruits and vegetables can be fun for many reasons, one of which is that they can be made into cool shapes!
  - Have the group repeat after you, saying “cool shapes”!
- Create your own “fresh food friend” to share with students by making a face in a cucumber. Cut a chunk of the cucumber out to create a smile and add two eyes using uncooked black-eyed peas. Explain to students that even though our cucumber is our friend, they’re here to support us in eating as many fruits and vegetables as we can to grow stronger and smarter!
- Children will be provided with a veggie bag with several cucumber slices and reminded at this time that they do not have to taste the snack if they don’t wish to.
  - Demonstrate to students the shapes they can bite their cucumber slices into, such as moons, bats, and stars. Show the students how to hold their cucumbers up to the light—are there any cool shapes and patterns in their cucumber? Shout them out!
  - Encourage children to eat their cucumber shape when they’re done.
- Engage the students by asking them what they thought of those cucumbers. Would they try making cool shapes with their fruits and vegetables at home?
- Lastly, thank the students for participating and trying a new vegetable with you!

**Week 2**

**Topic: Which one is crunchier?**

- Students will have the opportunity to explore different vegetables with crunchy textures and decide which vegetable they think is the crunchiest.
- Children will be provided with a veggie bag consisting of sliced carrots, celery, and green beans. Children will be reminded at this time that they do not have to taste the snack if they don’t wish to.
o Ask children to guess which vegetable they think will be the crunchiest when they take a bite.
o Children will have a crunching contest with each vegetable to determine together which vegetable they thought made the loudest crunch.
o Ask students if we can rate the vegetables from crunchiest to softest.
• Lastly, ask the students if they enjoyed the vegetables they tried today or if they had a favorite.
• Thank the children for participating and trying new vegetables today!

**Topic: Pass the plate**

• Together, students will practice sharing food and serving themselves.
  o Sit around the lunch table together; each child will have their own plate in front of them. Three bowls will be placed at the table, each consisting of a different melon, one with watermelon, one with cantaloupe, and the other with honeydew. Each serving bowl will have one set of tongs by which to grab the melon and put on their plates.
  o Before children serve themselves, discuss the importance of sharing, and how much more enjoyable food can be when it is shared with others!
  o Demonstrate how to grab a piece of melon with the tongs and place it on a plate, how to pass the bowl to the next person, and what to say if a child doesn’t want any melon.
  o The group will wait until everyone has filled their plates to eat the fruit together.
• Engage the students by asking them what they thought of the different melons they tried. Thank the students for trying new fruits today!

**Topic: Eat a Rainbow!**

• Together we will discuss the importance of eating a rainbow – by eating an array of brightly colored fruits and vegetables we can ensure we are getting the vitamins we need to grow stronger and smarter!
  o Show children a picture of a rainbow made out of fruits and vegetables and ask them if they would like to make a rainbow of their own on their plates.
  o Children will be provided with a paper plate and several bowls of different colored fruits and vegetables. Students must share these bowls with one another. Students can serve themselves or ask for help getting the different colored fruits and vegetables on their plates.
  o After students have gotten their multicolored fruits and vegetables, they can make their own rainbow on their plate.
  o After they’ve made their rainbows, encourage them to eat their rainbows but ensure that all students are aware that they don’t have to eat anything they don’t wish to.
• Lastly, ask students to rate the fruits and vegetables that they tried today with their thumbs and thank the students for participating!
Topic: Learning to like new things takes practice.

- Learning to like fruits and vegetables can be a lot like learning to ride a bike or learning to walk. We may need training wheels at first or a helping hand, but we keep trying and practicing. Sometimes all we need to do to learn to like fruits and vegetables is to keep practicing, keep taking one little bite.
- Sometimes we may eat ranch or peanut butter with our vegetables until we learn to like them on their own and that’s okay too!
- Eating our fruits and vegetables are important to help us grow bigger and stronger. They help us run faster on the playground and dance and sing our best during circle time. Fruits and vegetables can come in all different forms, some are fresh, some are just juiced, and some even have all the water taken out!
  - Ask children if they would like to share this special snack. Together the group will try a series of dehydrated fruits and vegetables, including apples, bananas, carrots, and kale.
  - Discuss with children how most fruits and vegetables contain a lot of water, that’s what makes them juicy. But if we take all the water out, they become dry and crunchy.
- Ask students what they think of these crunchy dehydrated vegetables.
- Prompt students to think about or share what they have learned over the past two weeks of programs and thank them for participating.
- What was your favorite? Will you try fruits and vegetables at home?
Appendix B

Apples Concise Lesson Plan:

On the board: (5 min)
- Find your group and draw a picture of your favorite fruit on your name tag

Opening: (15 min)
- Share your name and a favorite fruit.
- Tag the fruit game

Community Agreement/Comfort Contract: (5 min)
- Check in
- What is one thing in our contract that you’re going to try to work hard on doing today?

Apple Activity: (10 min, small group work for 3 min, then make sure they’re correct)
- Begin by splitting into groups, each group gets a basket of each of the apples and slips of paper with their names. They have to guess which apple goes with which name.
- As a large group, make sure groups have the matching game correct on their tables.

Word Bank: (5 min)
- As a large group, build a word bank together of words that can be used to describe the taste and texture of foods w/ kids.
  - Taste: sour, sweet, tart, bland, juicy, dry,
  - Texture: crunchy, crispy, soft, mealy, mushy, rough, smooth

Apple Tasting: (30 min)
- Put an apple slicer and cutting board on each table
- Ask groups to slice first apple, and each person taste a slice
- Students will try each apple and fill out the allocated portion of the journal page together.

Dip and Slinky Apples: (20 min)
- Nutritional value of dip
  - Healthy fats (brain) & protein (muscles) in nut butter
  - Probiotics (gut) & protein in the yogurt
- Explain how to make dip, and demonstrate
- Pass out dip supplies
- Let students make their own dip, and a slinky apple

**Reflection: (5 min) - positive and delta**
- What did you like about today?
- What would you like to change for next time?
Appendix C

Name ____________________________

**Apples Galore**

Describe the taste, texture, and appearance of each apple. Then, give the apple a creative name and rate how much you like it!

**#1** I’d call this apple: ___________________  Common name ___________________

<table>
<thead>
<tr>
<th>Describe Taste</th>
<th>Describe Texture</th>
<th>Describe appearance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

What did you think of the apple you tried? Circle the apple you most agree with.

- Not my fave
- I’d try it again
- It was okay
- Pretty good
- Delicious!

**#2** I’d call this apple: ___________________  Common name ___________________

<table>
<thead>
<tr>
<th>Describe Taste</th>
<th>Describe Texture</th>
<th>Describe appearance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

What did you think of the apple you tried? Circle the apple you most agree with.

- Not my fave
- I’d try it again
- It was okay
- Pretty good
- Delicious!
#3 I'd call this apple: __________________ Common name __________________

Describe Taste  |  Describe Texture  |  Describe appearance

What did you think of the apple you tried? Circle the apple you most agree with.

Not my fave  |  I'd try it again  |  It was okay  |  Pretty good  |  Delicious!

#4 I'd call this apple: __________________ Common name __________________

Describe Taste  |  Describe Texture  |  Describe appearance

What did you think of the apple you tried? Circle the apple you most agree with.

Not my fave  |  I'd try it again  |  It was okay  |  Pretty good  |  Delicious!

#5 I'd call this apple: __________________ Common name __________________

Describe Taste  |  Describe Texture  |  Describe appearance

What did you think of the apple you tried? Circle the apple you most agree with.

Not my fave  |  I'd try it again  |  It was okay  |  Pretty good  |  Delicious!
favorite dip recipes
to enjoy with fresh vegetables & fruit

Hommos:

1 16oz can of chickpeas (garbanzo beans) save the liquid 
1/4 cup liquid from can of chickpeas 
1/8 cup tahini 
3–5 tablespoons lemon juice 
1–2 cloves garlic (or more to taste) 
1/2 tsp salt (optional) 
1 tbsp olive oil (for drizzling on top, optional) 
dash of paprika

Blend all ingredients a food processor or blender until smooth. 
Add extra chickpea liquid if it seems too thick. Spread on a plate 
or shallow bowl and sprinkle with paprika. Drizzle with olive oil. 
Enjoy with fresh veggie slices, pita bread, on sandwiches, 
chippers, tortilla chips, on salads and more!

Dilly Yogurt Dip

1 container (16 ounces) Greek yogurt – strained plain yogurt 
1/2–1 teaspoon salt 
1 to 2 garlic cloves, chopped or minced 
1–2 tablespoons chopped fresh dill or mint (or more to taste) 
1 tablespoon extra virgin olive oil 
1/4 teaspoon ground black pepper 
2 teaspoons of lemon juice (about half a lemon)

Combine all ingredients chill for two hours before serving. Garnish with dill or mint. If you have time, 
let the flavors marry overnight. You can also add 1/2 English (seedless) cucumber, not peeled or 
partially peeled, seeded and finely chopped. Enjoy with sliced veggies, pita bread, pita chips, crackers, 
on sandwiches and salads, etc. It is also a great compliment to grilled meats and vegetables.

Nut Butter Yogurt Dip

3/4 cup vanilla yogurt (can substitute dairy free yogurt) 
(or use plain yogurt with 1/2 tsp vanilla and 1–2 tbsp maple syrup, honey or sugar) 
1/2 cup peanut butter (or almond butter, sunflower seed butter, etc.) 
1/2 tsp cinnamon (optional)

Combine all ingredients and enjoy with apples, bananas, carrots, chocolate and more!
Food Staples Concise Lesson Plan

On the board: (5 min)
- Find your group and draw a picture of the food you eat the most.

Opening/Check-in: (5 min)
- Share the food eat the most
- What is one thing in our contract that you’re going to try to work hard on doing today?

Food Staples: (15 min)
- Large Group: Discuss and define “Food Staple”
- Small groups: Match food staples to their country

Countries & Culture: (20 min)
- United States Discussion: Why is corn our food staple?
  - Large group: Corn, No Corn, Maybe corn
  - Get up and move: hold up pictures of different foods, if you think it contains corn
    move to one side of the room, if it doesn’t move to the other.
- Discuss definition of “Culture”
- Asian Countries Discussion/ Handout
  - Different regions of Asian/ size/ many food staples
  - Find counties on the map/ match with food

Snacks vs. Staples: (15 min)
- Discuss snack foods, how many of them have staple foods in them, but are not always healthy for us
- Taste different snack foods from around the globe

Sticky Rice Balls/ Trying different staples: (15 min)
- Make sticky rice balls
- 2 types of seaweed
- Rice crackers

Reflection: (10 min)
• Food staples worksheet
• positive and delta (whoever would like to share)
  o What did you like about today?
  o What would you like to change for next time?

Clean up! (5 min)
Appendix F

Name: ____________________

**Food Staples**

What is a food staple in your life or a food you eat a lot of?

What is one country we discussed & one of their food staples?

What is one food you tried today and enjoyed? Why?

Write down something you learned that surprised you.
Appendix G

Youth Reflection Form

FRESH FOOD REFLECTION

NAME (OPTIONAL):  SCHOOL:  GRADE:

HOW DO YOU FEEL ABOUT TODAY? (CAN PICK MORE THAN 1)
😊HAPPY  😋TASTY  🥰LOVED  😎COOL  😌CALM  😌SURPRISED
😊BLAH  😴SLEEPY  😞ANOYED  😷SICK  😢GRUMPY  😡ANGRY

WHAT WOULD YOU LIKE MORE OF?

WHAT WOULD YOU LIKE LESS OF?