

Increasing knowledge of and promoting positive attitudes towards the consumption of fruit and vegetables among pre-school children, parents, and teachers in three childcares in one city in a Midwestern United States county: A multi-level intervention of teachers, parents, and children

By

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Abstract

Obesity in the United States continues to be a public health issue that is directly related to cardiovascular disease, diabetes, and some cancers. Eating enough fruits and vegetables daily can lead to healthier diets thus lowering the risks of obesity. According to the Centers for Disease Control (CDC), 35.2% of adults in Michigan are obese or overweight, and specifically 40.2% of adults in Genesee County, 41.7% in Saginaw County, 37.5% in Shiawassee County, and 38.3% in Lapeer County, all present higher rates than Michigan's overall rate. According to National Survey of Children's Health 12.7% of 2–5-year-olds, 20.7% of 6–11-year-olds, and 22.2% of 12–19-year-olds are obese nationally. Parents and caregivers who serve and eat fruits and vegetables with their children tend to have a positive impact on their dietary quality with healthier food choices. This intervention is aimed at children, parents, and teachers in pre-schools in Flint, Michigan in the zip codes 48505, 48506 and 48529 to promote knowledge, positive attitudes towards, and consumption of fruit and vegetables. The targeted community has a low consumption rate of fruits and vegetables due to low availability or accessibility, lack of knowledge of preparation, or due to costs. This intervention is multi-level because it includes children, teachers/childcare providers and parents participating together for a goal of more fruit and vegetable intakes. A horticulturist will teach the teachers/providers gardening skills as well as make visits during the growing season with the children. Children's lessons are age-appropriate and intended to be delivered over a 6-week period that include gardening skills, fruit and vegetable education and experiments, farmer's market visits, and use 6 different preschool-aged picture books/activities each week.

The strategies for the providers/teachers are to teach the children in their care about the importance of eating fruits and vegetables, where they come from by growing a garden, cooking and exploring what parts we eat and activities related to healthy behaviors. The strategies for the teachers are professional development workshops so that they feel comfortable about teaching the lessons. Parent strategies are to use what the children learn and incorporate it into their home activities and menus. Activities for parents will be available on the website, blog, weekly Zoom meeting lead by teachers/providers, and parent classroom newsletters. This intervention is unique as it uses preschool-level fruit and vegetable subject books as a basis for each weekly lesson. All the activities in the lessons are centered around the topic of the selected book for that lesson with the expectation that they will promote positive attitudes towards and increase the intake of fruits and vegetables. In addition the inclusion of parent weekly Zoom meetings to educate parents about what their child is learning at childcare so they can either duplicate or enhance it at home.

The design is a pre-post one group quasi-experimental mix-methods design. A mixture of quantitative close-ended and qualitative open-ended questions will be asked of parents and staff. As part of the process evaluation, parents and staff will be asked open- and close-ended questions on how they recommend to improve the program. As part of the outcome evaluation, parents and staff will be asked questions to understand how their knowledge of and attitudes towards the use of fruit and vegetables changed. Children will be asked simple Yes/No questions on how they enjoyed the activities (process evaluation) and how they enjoy growing and consuming fruit and vegetables (outcome evaluation). By having a multi-level intervention, the intention is that

knowledge and behaviors learned through the intervention will be more sustainable over time.

Table of Contents

Intervention.....	10
Statement of Problem/Introduction	15
Public Health Significance	17
Value of the project to Flint.....	19
Literature Review	19
Interventions with Multi Lessons.....	20
Two Year Follow Up Study with Brighter Bites	20
“Read for Nutrition” in Preschool Classrooms	21
Reviews of Several Interventions	23
Systematic Review of Fruit and Vegetable Interventions.....	23
Fruit and Vegetable Consumption of Children 5 and Under.....	24
Interventions Outside the United States	25
Quasi-Randomized Trial in Croatia	25
Home Food Environments	27
Lifestyle Patters Begin in Early Childhood	28
Interventions in Communities with Limited Produce Availability.....	29
Fresh Market Incentive in Lower 9 th Ward, New Orleans	30
Fresh Produce in Comer Stores	30
Hands-on Gardening Intervention with 3–5-Year-Old Children	32
Navajo Gardening for Health	34
Child Cooking Involvement Among Hispanic Youth	36
Responsive Feeding Practice Teacher Training in Tribal Early Care	37
Role Models for Children Eating Behaviors	38
Parents Perception of a Healthy Diet	39
Urban Preschool Teachers’ Nutrition Beliefs	40
Table Review of Literature.....	42
Gaps in the Literature and How to Address the Gaps	45
Summary of Literature Review	46
Methods	47
Propose Summary of Project/Intervention.....	48

Logic Model	49
Program Goal	50
Inputs	50
Activities.....	50
Outputs	54
Short-term Outputs	54
Intermediate Outputs	55
Long-term Outputs	55
Budget.....	55
Focus Group Costs.....	56
Personnel Costs	56
Horticulture Educator.....	56
Non-personnel costs.....	56
Supplies	56
Website and Equipment.....	57
Field Trip Costs	57
Program Materials and Assessments: Summary of Appendices	57
Discussion	62
Summary.....	62
Limitations of the Program	63
Competencies.....	64
Design a population-based policy, program, project, or intervention	64
Select Method to Evaluate Public Health Program.....	65
Develop Goals and Objectives.....	66
Examine factors that impede the process of health education/promotion and influence the process by which people learn.....	67
Recommendations for Future Program and Research.....	68
Recommendations for Quasi-Experimental Studies.....	69
Recommendation for Randomized Controlled Trial	70
Recommendation for Case-Control Study.....	70
Recommendations for All Childcares	71
Teacher/Providers-Implications for Practice	71
Conclusion.....	72

References.....	73
Appendix.....	76
Appendix A: Logic Model Fruit and Vegetable Intervention.....	76
Appendix B Focus Group Outline	80
Appendix C-Budget.....	82
Appendix D: Outline for Provider/Teacher Workshop/Training.....	84
Appendix E: Lesson Series.....	86
Vegetable Lesson-Inspecting Vegetables.....	86
Vegetable Lesson-Planting Vegetable Seeds.....	87
Vegetable Lesson-Cooking	88
Vegetable Soup Lesson-Community Soup.....	89
Visiting a Garden Lesson.....	90
Plant Parts Salad	92
Garden Hats.....	93
Start Planning.....	94
Floating Fruits.....	95
Fruit Investigation.....	96
Making Juice.....	97
Plant Experiment.....	98
Planting Plants.....	99
Plant Diagram.....	100
Farmer’s Market Activity	101
Farmer’s Market Taste Test	102
Farmer’s Market Food Groups.....	103
Appendix F: Garden Storyboards	104
Making a Pot From A Newspaper	104
More Scraps That Can Be Regrown	105
Planting a Seed.....	106
Planting with Kitchen Scraps.....	107
Appendix G Children’s Survey	108
Appendix H Childcare Provider/Teacher Survey (only post).....	111
Appendix I Parent Survey	115

Parent Pre-Post Survey	115
Appendix J: Additional Curriculums.....	118
Appendix K: Farmers Market Family Night Poster	120
Appendix L: Farmers Market Family Night Preparation	121
Appendix M: Farmers Market Visit With Kids.....	122
Appendix N: Classroom Newsletter Example	123
Appendix O: Parent Engagement Ideas	124
Appendix P: Timeline	125

Intervention

Increasing fruit and vegetable consumption among children, 2-5 years of age can lead to better health outcomes as adults (Lwin et al., 2020). Research has shown that interventions need to be sustainable to have a long-term impact on dietary quality, hence impacting obesity. Using nutrition interventions developed with childcare providers and parents' input, as well as feedback from children will be explored. The participants, 3 childcares from the zip codes 48505, 48506 and 48529 in Flint, Michigan, Genesee County will be recruited specifically from the Great Start to Quality website. The zip codes were chosen because of the poverty status of each and their cultural diversity. An initial letter will be sent either by email or US mail introducing the project, intent, expectations, and incentives. Moving forward, phone calls will be made for recruitment and gathering of demographic information. Parents who attend the recruited childcare and their children will be asked to participate as well.

The recruited childcare providers (teachers and assistants) and parents will be asked to participate in separate focus groups, one for parents and one for providers/teacher to help determine best practices for content of lessons, field trip appropriateness, workshops, cultural discussions, and intervention delivery methods. Focus groups will be conducted in person, whatever method best serves the participants. Consent will be obtained from childcare providers, parents for their own participation, as well as their child/children's participation. Qualitative data from the

focus groups will be collected and be deductive coded by common themes and patterns. They will be coded by common foods, recipes, interventions, cultural beliefs, native and local foods and any other commonalities or concerns. Details of focus group methods and outline can be found in Appendix B.

Parents will be invited to a workshop before the program begins explaining the project along with the activities that they can do at home with their child and family. The topics of the workshop will be what to expect during the intervention, how to use the website and zoom, field trips, and other activities. Topics discovered during the focus groups will be added as well as cooking lessons of easy, healthy recipes will be included. Each lesson will include preschool reading level books that promote fruits and vegetables, gardening, farmers markets, or parts of plants will be available for parents to take home. Weekly Zoom meetings will be conducted to inform parents about what is happening at day care as well as extension and replicated activities that can be completed at home. Cooking lessons would also be included in zoom meetings Blogs will also be discussed for their use and frequency of posting (at least twice weekly)

Childcare providers will be trained during at workshops/professional development sessions on how to teach nutrition lessons, gardening, plants and planting, how to cook the recipes that are in the lessons, how to plan and lead parent zoom meetings, and related activities to the children in their care. The goal of the project is to increase fruit and vegetable consumption and gardening among preschool aged children at childcare while using a multi-level (parents, providers/teachers, children), so all training will include this goal. Other topics discovered during the focus groups will be included in addition to a section dedicated to a horticulturist to assist with the garden

activities. Each lesson includes preschool reading level books that promote fruits and vegetables, gardening, farmers markets or parts of plants. Dedicated time will be spent with the web designer to describe how to use the website and develop classroom newsletters from a created template for parents. Additionally, time for developing zoom agendas, possible activities, and blog information posts, will be discussed during the web designer time.

Using children's books as a focus of the lessons will help stimulate ideas for the children and learn about the importance of eating fruits and vegetables and where they come from or are grown. Activities related to the books will include garden activities, taste testing, recipes, vegetable and fruit identification, garden hats, cooking recipes, and parts of the plant (Appendix E). Newsletters will be sent home to parents weekly, outlining what the children accomplished during the week as well as home activities that parents can do with them (Appendix N).

The lessons will be 30-minute, one page lesson plans developed to be simple and easy for teachers/providers to teach and reference (Appendix E). The lesson will include facts, pictures, activities, goals, notes, and supply lists. One intervention studied indicated that reading the same book several times to children can reinforce topics (Elrakaiby et al., 2021), with that in mind, several lessons will use the same book but have a different focus and activities.

Learning styles will be considered and determined either before the workshops or during so that all audiences can learn. The styles will be defined as, kinesthetic using hands-on activities, auditory by lecturing, read/write using text, and visual learners with videos and visuals aids will all be identified using the online learning style quiz, and

incorporated throughout the workshops and program. Consideration will be given to local foods and cultural experiences. Cultural competence as an understanding of honor, history, languages, traditions and childcare practices will be practiced throughout all levels of this project.

Peer-led presentations, and training by nutrition educators will be presented to the participants to ensure that they understand the lessons, and hands-on activities that can be carried out with confidence. A supplemental website fact sheet will be made available to help with questions and alternative ideas for delivery of the lessons and additional questions that may develop throughout the project (Appendix J). Permission has been granted for use of the websites by their owners. Timelines will be shared with parents and teachers/providers in addition on how to obtain and distribute incentives (tokens for Farmers Markets, kitchen gadgets, nutrition books, gift cards etc.).

Since Michigan is a 4-season climate and outdoor gardening is limited from May-October, indoor and outdoor garden education will be taught. A horticulturist will be consulted to teach an hour-long lesson for the teacher/provider training and make visits to the childcares' gardens, at least every other week, during the intervention to assist with the garden season. Assistance will include best gardening practices, how to grow from seeds and food scraps, placement for optimal growth, best watering practices, weed control, and harvesting. Children will be included in the horticulture visits at the same time they visit the providers/teachers.

Two field trips just for the children will be planned during the program. A field trip to a vegetable farm will be planned and a children's day at the Farmers Market. The vegetable farm field trip will include how things are grown, taught by the farms' staff,

and harvested along with each child bringing home a vegetable of their choice. Farmers market each child will be given \$5 in tokens to purchase produce at the market. They will also receive a reusable garden bag that can be used again when they go to the market with their families if they choose. Recipes will be provided after the field trips, that highlight the vegetables they choose and can be made at home.

Education on cost saving ways to shop, plan menus, how to buy fresh produce, and how to use the money/coupon incentives will be part of parent's education either on a blog, zoom meeting or workshops. Extension activities will be sent home weekly in the parents classroom newsletter that teacher/providers will develop, to engage parents in the activities taking place at the childcare and to gain interest to incorporate more fresh produce into their menus. Purchasing tips at farmers markets and local grocery stores will be included on the website for parents' reference.

A farmers market event will be provided to parents, separate from the children's field trip/day at the market, towards the end of the intervention. Parents who attend will receive a \$25 coupon to be used for local produce while at the market. A tour will be provided by educators for parents, a passport activity, cooking demos, food safety tips, recipes and farmers to talk about ways to best use their produce. A passport will be provided and parents can get them stamped by different farmers or stations. After completion they can redeem them for different incentives available. Incentives for completed passports would include cutting boards, measuring cups, vegetable scrub brushes, additional produce, and garden bags.

The website with a blog, Instagram and or Facebook groups, and planned zoom will be available for parents, teacher/providers and children. YouTube/Tik Tok videos or

similar type videos will be developed to help deliver the education or as part of education lesson to showcase to the parents what the children have learned and done during the project. Lessons will be delivered by providers/teachers mainly to the children, although educators and interns can assist if available.

To ensure the different cultures and ethnicities are incorporated in all aspects of the activities. This project will include the competencies: develop goals and objectives of a population-based policy, program, it will evaluate a public health program and examine factors that impede the process of health education/promotion and influence the process by which people learn.

Statement of Problem/Introduction

According to the Centers for Disease Control Americans collectively do not consume enough fruits and vegetables based on the United States Dietary Guidelines. The guidelines are 1.5-2 cups of fruit and 2-3 cups of vegetables, or in simpler terms half of the plate should be filled with fruits and vegetables at every meal (Agriculture, 2020). Eating the recommended fruits and vegetables reduces the risk of chronic diseases, i.e. type 2 diabetes, cardiovascular diseases, obesity and some cancers. Fruits and vegetables contain natural substances, and antioxidants that may help prevent mouth, throat and stomach cancers. Studies also suggest that recommended fruit intakes may also protect against lung cancer (Wyse et al., 2011).

In 2019, 12.3% of adults consumed the recommended fruits and 10% consumed the recommended vegetable amounts. Women consumed more than men, and Hispanic adults consumed more fruits than other races. When adults do not eat the

recommended amount of fruits and vegetables, children, in most cases, do not meet their recommendations (Lange et al., 2021). In a Feeding Infants and Toddlers Study (FITS) conducted in 2016 it was found that 27% of 2–4-year-olds did not consume vegetables of any kind, and when they were consumed fried potatoes was the vegetable consumed (Welker et al., 2018). Children aged 4-8 only consume .8 cups of vegetables and 1.2 cups of fruits daily when the recommendation for their age group is 2 and 1.5 cups respectively. Adolescents aged 9-18 consume about one cup vegetables and fruit each, when the guidelines are 1.5-3 cups of vegetables, and 1.5-2.5 cups of fruits (Lange et al., 2021). Children and adolescents, who do not consume enough nutrient dense foods, are at risk of deficiencies in calcium, potassium and Vitamin D which may lead to health risks of high blood pressure, high cholesterol and impaired glucose tolerance just like adults (Graziose & Ang, 2018).

By introducing interventions to increase fruit and vegetable consumption to children ages 2-5, it can aid in healthier eating patterns as they age. The National School Lunch Program (NSLP) and Child and Adult Care Food Program (CACFP) have adjusted their guidelines to increase fruit and vegetables being served. It has been found that more Individual and community intervention strategies need to be adopted for better health choices that lead to healthier lifestyles and behaviors.

The objective for this project is to increase fruit and vegetable consumption for children under the age of 5 that is sustainable, so they enjoy eating and know the benefits of eating fruits and vegetables. To determine the needs to be addressed focus groups, and surveys with childcare providers, and parents about past interventions that have worked and not worked will be performed. The program is multi-level including

parents throughout the process with the teachers/providers and children. Parents are involved with extension activities offered through a website, Zoom meetings, parents classroom newsletters, and activities. From the data collected, an intervention with hands-on activities, books, pictures, activities centered around fruit and vegetables that include gardening, shopping, modeling, and taste testing will be used. Frequency and longevity of the program and its activities will be determined after input from the collected data, but an initial timeline is 3-6 months. Post surveys will take place after the intervention is completed.

Public Health Significance

Early childhood is a key component of the development of children and how they develop their eating habits. It has been found that children who are obese or overweight as a four-year-old are at a higher risk of being an obese or overweight adult (Earnesty et al., 2022). Healthier lifestyles can lead to healthier well-being and better performance in school for children (Anglia, 2021). It is easier to develop preventative interventions and programs for obesity rather than to reverse it. Thus, offering a variety of fruits and vegetables to children in their early years could lead to choosing more fruits and vegetables in their diet as they grow.

Fruits and vegetables in any form, cooked, canned, fresh, or frozen provide necessary nutrients and vitamins for growth. Fresh fruits are best but are not always available, especially during winter or non-growing seasons and in low socio-economic communities. It is important to note that one needs to consume a variety of fruits and

vegetables to obtain all the benefits (vitamins and minerals) that one needs, eating only a few or the same is not sufficient.

It has been discovered that parents and caregivers feel either intimidated or do not know how to properly prepare some forms of vegetables and simply do not prepare them for their children, and when children are not exposed, they are less likely to try them or eat them as they age (Metcalf et al., 2022). In some cases, a child can be labeled as a picky eater, and stigmas associated with that can carry throughout their life. Attempts with education have been made to improve such practices with little success (Ikemoto et al., 2019).

Interventions such as cooking classes, kitchen tool incentives i.e., crockpots, cutting boards, vegetable choppers etc., easy recipes, gift cards for groceries, food benefits i.e., WIC or SNAP, and food distribution has had some success with various interventions, but sustaining the healthy behaviors and habits after the intervention has not (Metcalf et al., 2022). Factors contributing to this setback include social environment, availability, individual preferences among the children and parents/caregivers, gender, maternal education, and socioeconomic status (cost). Programs offered may not have adequately connected food knowledge with food skills, cultures, or recipes, therefore not improving the parent/caregiver's confidence or value in preparing fruits and vegetables to encourage intakes (Cosco et al., 2022). This observation was found to be true in the target population for this project in zip codes 48505, 48506, 48529 Flint, Michigan (Saxe-Custack et al., 2019).

Value of the project to Flint

The community of interest for this project will be childcare providers in centers, group and home daycares in Flint, Michigan, zip codes 48505, 48506 and 48529. In 2019, 59% of Michigan children under the age of 5 were enrolled in some kind of day care, that also includes staying with relatives ("National Center for Education Statistics Fast Facts Child Care," 2021). That equals to 21-36 hours a week that children are in day care where a significant number of meals and snacks are consumed. Many childcare centers participate in the Child and Adult Care Food Program (CACFP) where in order to receive reimbursements for the food served there are guidelines to follow, but how strictly they are followed is debatable (Earnesty et al., 2022).

Michigan childcare providers in Genesee County, specifically Flint zip codes, 48505, 48506 and 48529, is the community of interest. Since the pandemic started in 2020, CACFP guidelines have been relaxed due to food shortages and availability. Those guidelines have been reinstated, but to what extent is unknown and with that children's health and wellbeing could have suffered. This project will include any childcare provider that oversees preparing and or serving food to children under their care that are under the age of 5. CACFP participants would be welcome as well as those who do not participate.

Literature Review

Fruit and vegetable consumption across the nation, and the world, is a topic of health departments, registered dietitians, nutritionists, physicians and researchers as a way to a healthier lifestyle for all ages. This section details several studies that point to

ways fruit and vegetable consumption can be increased. It features studies that have worked well, for some time, and others that do not and need further development or changed completely. The studies reviewed demonstrate various interventions and methods that aim to increase fruit and vegetable consumption among young children, mainly those in childcare settings. Research has shown that healthier lifestyles should begin developing while a child is young, so that those habits can follow the child throughout their development and into adulthood to decrease chronic diseases. (Wyse et al., 2011)

Interventions with Multi Lessons

In this section there are two intervention studies at childcares where a nutrition education was taught by teachers to the children. One with lessons including the same book over a three-week period and the other a sixteen-week period using education along with product distributions and taste testing for parents. The two studies were chosen to compare the outcomes between a three-week and sixteen-week intervention, and if they were successful in increasing intakes of fruits and vegetables using education, and taste testing.

Two Year Follow Up Study with Brighter Bites

A study in Houston, Texas that was implemented in early childhood centers and early elementary schools, called Brighter Bites was a 16-week intervention that included weekly fresh produce distribution, nutrition education, and weekly recipe tasting (during the distribution) for parents of the students. Recipes and information are available in both English and Spanish. Families could participate for up to 3 years if they were

serving children between the ages of 3-12. Initial outcomes of the study indicated that the intervention was successful, where fruit and vegetable consumption had increased. To determine if the intervention was sustainable a follow-up study was conducted after a 2-year period. Surveys were distributed to participants who completed the pre and post evaluations from the initial intervention, with the intention of them being returned after completion (Marshall et al., 2020).

Sixty-nine percent of the self-reported surveys were returned. It was found that at the two-year follow-up there was an increase, .6 cups, in the intake of vegetables and fruit. More lettuce salads, and fruits and vegetables of all forms including in recipes were consumed. Which indicates that not only was the produce being used but other forms of fruits and vegetables were used as well by the whole family. A limitation of the study was that food intakes were not measured but self-reported by participants who were willing to participate from the pilot study. Not all of the participants from the pilot study were included (Marshall et al., 2020).

“Read for Nutrition” in Preschool Classrooms

Five classrooms in Lincoln, Nebraska piloted a pre/post intervention study called “Read for Nutrition”, where trained teachers read the book called “Monsters Don’t Eat Broccoli” several times to children along with education activities during a three week period. Sixty-nine children participated, where broccoli was the only vegetable measured (Elrakaiby et al., 2021).

Studies have shown that books offer an avenue to increasing a child’s knowledge and understanding of subjects. For this reason a book was used to increase fruit and

vegetable exposure to children. Broccoli was chosen as the vegetable to focus on as it was common to this age group. Teachers were trained in 7 topics on how to teach the program and how to repeatedly read the book to the children (at least 3 per week) during the 3-week period. Research has shown that 5 exposures to a book reading are needed to be effective with preschool children (Elrakaiby et al., 2021).

It was found that children who heard the book 5 times or more had a higher increase in consumption of broccoli than those who heard it less, but the overall intakes of broccoli had increased after the intervention, at least .20 of a cup increase, even though there were no taste test of broccoli only education and reading the book at least 5 times each week. Limitations to this study were that there was not a control group, and they only included one vegetable, broccoli. As with other studies there was not any follow-up data collection to evaluate long-term impacts, as to whether the broccoli consumption endured (Elrakaiby et al., 2021).

From the comparison of the two intervention studies, it was found that both had increases in intakes of fruits and vegetables while having different approaches. The *Brighter Bites*, sixteen-week intervention had an increase of intakes 3 times higher after the program ended than the *Read for Nutrition* program. The results could be due to the length of each program, three weeks versus sixteen weeks, or that the *Brighter Bites* program included more than just the education for the children, i.e. taste tests, produce distributions, and recipes. It was also discovered that using books as a focus in addition to using taste tests and recipes with fruit and vegetable introductions aided in increased consumption.

Reviews of Several Interventions

In this section there are systematic reviews that examined effectiveness's of interventions of fruit and vegetable programs with one looking at only interventions of children under the age of 5. Both reviews had a wide reach and included many different study designs.

Systematic Review of Fruit and Vegetable Interventions

In a systematic review of thirty-two interventions, they examined the effectiveness of fruit and vegetable programs. They wanted to find gaps, likeness and effectiveness in the results. The reviews included controlled trials and prospective evaluation designs after 2011. It excluded reviews of qualitative research, and intervention strategies on population groups with pre-existing diseases, i.e., type 2 diabetes, hypertension or cancer, treatment of eating disorders, strategies defined by a targeted population group, examining intervention mechanisms, i.e., theory-based mechanisms, or effects of intervention were synthesized at the level of individual behavior changes (Wolfenden et al., 2021).

Seven school-based interventions and three child-care interventions were found during the review. Cooking lessons and health education were discovered to be effective in the school-based interventions but only in the short term, long-term sustainability was equivocal. Food policies about fruit and vegetable servings were the most successful. Childcare intervention's most effective strategy was serving fruits and vegetables during childcare hours than parent education delivered after daycare hours.

It was determined that these interventions can be effective in efforts to improve public health nutrition and behaviors (Wolfenden et al., 2021).

Fruit and Vegetable Consumption of Children 5 and Under

Another systematic review study was conducted that included only interventions aiming to increase consumption of fruits and/or vegetables of children 5 years of age or younger. It included seventy-eight trials with 13,746 participants. The trials included forty-eight with child-feeding practice interventions, 15 included parent nutrition education, 14 included preschool policy changes with parent education, and 2 examined child nutrition education, with one having a child-focused mindfulness intervention. It was reported that child-feeding practices may lead to small increases in intakes, but only for short periods of time, less than 12 months. It could not be determined if parent nutrition education is effective, as there was not enough information found. Most of the intervention trials were supported by governmental or charitable funds, four of the trials reported being funded by industries (Hodder et al., 2020).

Six of the trials reported long-term effectiveness, 1 reported cost effectiveness, and 1 included an unintended consequence because of the interventions. The evidence reported for how to increase a child's fruit and/or vegetable consumption was limited. Small increases in consumption by child-feeding practices and multicomponent interventions were found. It was concluded that long term follow-up of at least 12 months after the intervention would be needed as well as more rigorous intervention methods be researched (Hodder et al., 2020).

It was found that in both studies that increases of fruit and vegetable consumption was small or limited after the intervention of direct education but more effective with food policies that were implemented in childcare centers. Long term follow ups were recommended in both, with follow-ups conducted 12 months after the program ends. Parent education was not proven to be effective with increasing intakes but found that many successful interventions are supported by government or charitable funds.

Interventions Outside the United States

In this section it observed 3 studies outside the United States, two in Australia, and one in Croatia that included many participants. One study was a multi-level educational intervention that included students, parents and nutritionists in Croatia. The studies in Australia was a phone survey to determine what fruit and vegetable consumption were and what influenced those behaviors, and lastly one in Melbourne Australia, that was an educational program for parents over a six-month period. These studies were selected to see if there were any correlations between studies completed in the United States compared to other countries.

Quasi-Randomized Trial in Croatia

A three-year school based multicomponent quasi-randomized trial was led in the City of Zagreb, Croatia. It included 23 interactive classroom workshops, 10 cross-curricular activities, 13 homework challenges, educational posters, parent education via a website, and new recipes in the school lunch program. A total of 681 students were introduced with a control group of 300 and 381 in the intervention group. Two hundred

fifty-nine students completed the pre and post questionnaires, where 116 were in the control group and 143 in the intervention group (Ilić et al., 2022).

“Nutri-skolica” meaning Little Nutrition was developed with the aim of increasing fruit and vegetable preferences and consumption for young students. Fourteen classrooms were selected to participate for 3 school years, 2018/2019, 2019/2020, and 2020/2021. The 23 interactive classroom workshops were 45 minutes in length and were taught by nutritionist. They focused on healthy eating, raising awareness of consumptions of fruit and vegetables, linking fruit and vegetables to health benefits and eating seasonal produce. The 10 cross-curricular activities were taught by the classroom teacher and were written to stimulate students to learn about fruits and vegetables through other subjects i.e. math problems with fruits and vegetables, physical activity games with fake fruits or vegetables. The at homework challenges were given so they could be completed with their parents. The focus was on tasting different fruits and/or vegetables at home as it was not possible to do the activity in the classrooms. For each completed task the child received a sticker, once all the stickers were accumulated a bigger incentive was given to the child. There were also posters, made by the students or nutritionists, that depicted acceptance of fruit and vegetable consumption. The website made available to the parents contained healthy messages, blogs, and advice on appropriate child fruit and vegetable consumption. Intakes were assessed by using a semi-quantitative food frequency questionnaire, with 18 questions (Ilić et al., 2022).

It was found that 89% of the children had an increase in fruit and vegetable consumption and that 25% more children met the World Health Organization

recommended daily intake of fruit and vegetables. Both the control and intervention group had increases in consumption, but the intervention group had significantly more. The principal divided the students into the groups, so that could have been a limitation to this study. Another limitation was that the data was analyzed right after the end of the intervention and there was not any long term follow-up. It was difficult to determine what component was more successful as they were not asked about each component in the questionnaire. Lastly, because of the COVID-19 pandemic not all the activities were fully implemented, particularly the recipes in the menus (Ilić et al., 2022).

Home Food Environments

A cross-sectional phone survey was conducted with 396 parents of 3-5 years old children attending 30 different preschools in New South Wales, Australia. Fruit and vegetable consumptions were collected by a Children's Dietary Questionnaire subscale questionnaire. Questions focused on parental role-modeling, accessibility to produce, pressure to eat, family eating policies and mealtime practices, and the home environment (Wyse et al., 2011).

The survey asked parents about the variety and frequency of fruits and vegetables consumed over the past 24 hours and 7 days. It included starchy vegetables, such as potatoes but not chips. Juices were not included. Parents were asked if they consumed the same types of fruits and vegetables as their child. Nineteen common fruits and 24 common vegetables were included in an availability list to determine if they were accessible to the parents so that they could be prepared for meals and snacks. Most of the parents, 99% lived with their child 7 days a week and

74% reported they were responsible for the child's meals and snacks (Wyse et al., 2011).

There was a positive association between the parents' consumption of fruits and vegetables and the child's. Most of the servings were consumed at dinner time. This accentuates that parents play a critical role in their children's diet and healthier habits. Limitations to this study is that it was conducted with well-educated, high-income parents so it is not known if this is true of low socio-economic families. This study also combined fruit and vegetable consumptions, so it is unknown if there were more fruits or vegetables eaten (Wyse et al., 2011).

Lifestyle Patters Begin in Early Childhood

A study with parents in two trials called the Melbourne Infant Feed Activity and Nutrition Trial (InFANT) and InFANT Extend Program where participants were asked a questions about dietary intakes, outdoor time, and screen time when their child was 1.5, 3.5 and 5 years of age. A total of 710 parents participated in the study and were randomly put in a control or intervention group. The intervention group was offered 6, 2-hour sessions by a dietitian over 15 months. The sessions focused on parental knowledge, skills about feeding, diet, physical activity and screen time (Lioret et al., 2020).

It was found that behaviors, whether healthy or unhealthy, begin at the age of 1.5. the behaviors found at 1.5 were also found at 3.5 and 5 years of age. Interventions at a young age could impact future behaviors. A limitation to this study is that even though all groups of maternal education were represented, the majority of the participants were

well-educated older mothers. The data used was self-reported by parents of the children, therefore data could have been misrepresented by social desirability bias. A strong conclusion was that patterned behaviors were discovered and could be targeted for future interventions for healthy behaviors (Lioret et al., 2020).

As it was assumed, other countries have some of the same challenges with fruit and vegetable intakes as the United States (US) and the studies were found to be similar to ones in the US. It was found in two studies parents were involved, one had parents involved in the education where the other determined that more fruit and vegetable servings were consumed at dinner time, and it was assumed that children ate dinner with their parents at that time. The study surveys included food intake occurrence, with the study in Australia diving deeper into asking about mealtime practices and policies. Although it did not include an intervention, outcomes in the Croatia study and Australia both concluded that parent's involvement in mealtime practices lead to higher intakes of young children.

Interventions in Communities with Limited Produce Availability

These 3 interventions were included in low socio-economic areas where access and availability for fruits and vegetables were limited. Different incentives were offered in each with hands-on activities, coupons for buying fresh produce and one including a garden component. The garden intervention was an educational program for children in preschools and the others were incentive purchasing programs for parents, one at a farmers' market and one at local corner stores, where supermarkets were unavailable in the area.

Fresh Market Incentive in Lower 9th Ward, New Orleans

Disparities have been found among low income and race-ethnicity communities and their access to fresh fruits and vegetables. A six-week incentive intervention was conducted in the Lower 9th Ward, New Orleans farmers markets. Thirty-six percent of the residents live below the poverty level compared to 27% overall in New Orleans. Participants were given \$4 coupons, called Veggie Dollars, each week to use to purchase fresh fruits and vegetables (Ferdinand et al., 2017).

Participants were recruited at 5 farmers markets from the Lower 9th Ward, New Orleans with the help of the health department and community centers. Most of the participants were women, and 94% were African American with 53% having children. Participants increased their fruit and vegetable purchases, and 89% indicated that they were eating more of a variety at home since the program began. It was concluded that having the coupon incentives increased fruit and vegetables purchases at farmers markets for low-income communities (Ferdinand et al., 2017).

Limitations to the program was that a pre/post survey was not conducted only a post. Questions were limited and could have responses that were biased to more positive habits and outcomes rather than reflective of the program itself. The program also found that the location of markets is important for low-income communities as transportation can sometimes be an issue (Ferdinand et al., 2017).

Fresh Produce in Corner Stores

Providing fresh fruits and vegetables at corner stores in low-income areas in Washington DC was a pilot program that provided \$5 coupons to purchase fresh fruits

and vegetables. The audience for this program was Supplemental Nutrition Assistance Program (SNAP) shoppers. Five-dollar coupons were provided to participants after they made a \$5 purchase with their SNAP benefits. Seventeen corner stores participated.

Low-income and racially diverse neighborhoods tend to not have access to a supermarket that has fresh produce, but they do tend to have a high number of corner stores, so they were chosen as a way that they could access healthier foods (Snelling et al., 2020).

Before the program could begin the participating stores needed upgrades to accommodate the fresh produce, and technical training to the owners so they could support the sales. Produce was distributed at wholesale prices to the owners so the produce was not marked up greater than 50-80%. Customers were given \$5 coupons for every \$5 spent in the store using their SNAP benefits, one coupon was given per transaction. There was not a limit as to how many transactions they could make. The coupons did have expiration dates and a list of stores for redemption (Snelling et al., 2020).

After 12 months, 44,354 of the 57,989 that were distributed were redeemed, for a total of \$221,770 of fresh produce was purchased. This was a 76.5% redemption rate. All the store owners indicated that customers demand for the produce was high. Ten question post surveys were given to the shoppers. The results revealed that 70% purchased fresh foods, 92.3% felt that it was very important to have multiple fresh foods available and 66% stated that the lower prices would lead to an increase of purchases in the future. Empowering both the store owners and customers lead to the success of the program. Limitations of the study were that it was self-reported of the consumption

of foods and did not account for food waste. This was only conducted in Washington DC so a corner store model may not be successful in other communities (Snelling et al., 2020).

Hands-on Gardening Intervention with 3–5-Year-Old Children

A study in North Carolina was found where gardening was introduced to early childhood students for potential healthy food preferences, specifically fruit and vegetables intakes. This study included hands-on gardening with education, to increase their understanding of fruits and vegetables, and increase consumption during snack tastings. Three specific key questions were examined: Does the garden intervention affect the children's fruit and vegetable identification? Does the garden intervention affect their preference? Does the garden intervention affect their consumption during tasting events? (Cosco et al., 2022)

Fifteen childcare centers were involved in the randomized control study. Three groups were formed with 5 daycares in each group, a total of 543 children aged 3-5 were included. The design of the study was group 1 received a garden intervention in the first year, group 2 had a delayed intervention and was used as a control group in the first year and received the garden intervention in the second year. Group 3 had no garden intervention in the second year but received garden training.

The garden intervention named, Preventing Obesity by Design Garden Component, included 6 raised beds, specific fruit and vegetable plantings, a seasonal planting regime, garden engagement activities and weekly technical assistance. The plantings included cucumbers, green beans, green peppers, tomatoes, yellow squash,

zucchini, blackberries, blueberries, cantaloupe, strawberries and blackberries.

Vegetables were selected due to having a long harvest season and the fruit because they usually produce in their first year of planting. Also included was “The Garden Activity Guide” that included 12 age-appropriate activities delivered by the teacher. The guide included activities around 3 categories, preparing, caring, and harvesting/eating. Each activity was approximately 30 minutes long and was taught up to 7 times a week for 13 weeks (Cosco et al., 2022).

The findings from this study indicated an increase in fruit and vegetable recognition and consumption but not on whether they liked it or not. The increase, per day, in fruit consumption was $\frac{1}{4}$ cup which is a serving for 3–5-year-old, and about $\frac{1}{8}$ cup of vegetables, which equals about half a serving. It was found that garden-based learning offers rewards to the teachers and children that includes STEAM education. (Science, technology, engineering, art, mathematics) (Cosco et al., 2022).

Garden intervention in low socioeconomic communities could provide opportunities to reduce disparities in healthy eating. Adopting garden-based learning could be a convincing force for early childhood healthy nutrition adoptions. It was suggested that longer studies should be conducted to see if the successes transferred to children at home and when attending elementary school.

From these studies it was learned that when fruits and vegetables are available, they are utilized. Gardening can be a low-cost way to obtain fruits and vegetables, but education and resources is key to longitudinal increased fruit and vegetable intakes. Purchasing was increased per the studies although whether they were used was not

thoroughly investigated, as food waste was not accounted for, only self-reporting which can be subject to bias of honesty and introspective ability.

Interventions with Specific Cultures

This section includes 3 studies in different cultures, Navajo, Hispanic and Native American. All were developed specifically for the culture it served or adapted for the culture, as not many studies are specific one culture. All populations were in low socio-economic areas where availability was limited, obesity rates were higher, and fruit and vegetable consumptions were low and at a higher risk for chronic diseases. Some cultures find it difficult to find interventions that include their traditional foods, and recipes, and traditions. Two of the interventions administered surveys and one did observations of fruit and vegetable consumption at lunch time.

Navajo Gardening for Health

Due to limited access to healthy foods and loss of traditional growing and gardening or farming techniques many Navajo rely on food sources with limited options. Childhood obesity among the Navajo Nation is high at 28% obese. They have higher rates compared to other racial or ethnic groups. A pilot gardening project at an elementary school for Navajo children was researched to increase access and consumption of healthy fruits and vegetables (Ornelas et al., 2021).

In the development of the intervention the researchers used an existing school garden program and curriculum called LA Sprouts which included 2, 12-week units on gardening and nutrition. This curriculum was designed to be culturally and age appropriate for Latino students and their families. Lessons followed the growing

seasons and incorporated stewardship of the environment and natural resources, and self-efficacy so students had the ability to take actions to garden on their own. Focus groups were performed with students and parents, so that the content and structure of the curriculum was formed for the Navajo community. Sixty-minute lessons were taught by health interventions staff, with teacher assistance, throughout the school year with at least 2 lessons each month (Ornelas et al., 2021).

Not many interventions have been developed specifically for Navajo children. This study found that building on previous evidence-based interventions can be adapted to meet the needs of Navajo youth. Including traditional growing practices and traditional foods were important to the outcome. School based interventions that draw on cultural strengths and that include healthy foods can be successful for increasing fruit and vegetable consumption and healthier diets (Ornelas et al., 2021).

Lessons did not accommodate for family structures i.e. grandparents raising grandchildren, or other relatives. It also did not accommodate for the different levels of food insecurity i.e. children skipping meals or not able to afford certain foods. Games and snack tasting were well liked by the children and suggested to add more to the lessons in the future. Adding exit interviews or surveys at the end of each lesson could be helpful to determine retention and likes/dislikes. This study was only done at one school so it cannot be assumed that the results are true of all Navajo schools (Ornelas et al., 2021).

Child Cooking Involvement Among Hispanic Youth

Cooking interventions have been associated with improved healthier diets and higher consumption rates of fruits and vegetables, with this in mind an intervention in Texas called Grow! Eat! Go! was conducted. Hispanic children and children in low socioeconomic households are at a greater risk of not meeting the fruit and vegetable guidelines. It is further noted that children typically do not like vegetables because of their sour or bland taste, so exposing them to different ways to try them is important for a healthier diet (Asigbee et al., 2020).

Twenty-eight schools from 4 Texas counties composed of 1,231 students and their parents, were included in the trial pilot and assigned to 4 different groups. The groups were: Coordinated School Health (CSH) which was the control group, CSH with gardening and nutrition education that was Learn! Grow! Eat Go! (LGEG) curriculum, CSH plus physical activity with the Walk Across Texas (WAT) curriculum, and CSH, LGEG plus WAT. The children could participate in the intervention even if the parents did not. It was found that children who prepared food with their families had higher intakes of fruits and vegetables. They also had a willingness to try new fruits and vegetables. It was also found that involving parents in the cooking intervention was important to the results (Asigbee et al., 2020).

Limitations of using a survey to ask about consumption may have lead to an incorrect observation of one's diet behaviors. Response bias related to reporting as eating healthier foods, could have been reported, even though it was noted on the survey to be as honest as possible. It was concluded that home cooking would be a

practical intervention to improve healthy dietary consumption without increasing food costs for families (Asigbee et al., 2020).

Responsive Feeding Practice Teacher Training in Tribal Early Care

A study that looked at teacher-focused interventions in Native American communities at Oklahoma Head Start early childhood centers with a focus on feeding practices. Nine tribal center teachers were randomly assigned to two groups, one focused on feeding practices and the other added a nutrition curriculum. The feeding practice training was 1.5 hours, and the nutrition curriculum training was 3 hours. The nutrition curriculum was taught to the ECE students for 15 weeks. Feeding practice observations were done during the students' lunch time. Feeding practices were used from the Ecological Approach to Family Style Dining Intervention (EAT Family Style Dining). They are defined as behaviors used to influence food consumption. The practices included role and peer modeling, sensory exploration, supporting self-regulation, supporting self-feeding and rewards and praise (Sleet et al., 2020).

To observe the mealtimes a Mealtime Observation in Child Care (MOCC) observation tool was used. Observations were done before the training and once a month after the intervention began. Observations were completed by a trained researcher that was not involved in the teacher training. The observer looked for both verbal and nonverbal teacher interactions. It was found that the teacher practices group had an increase in healthy eating whereas the group who received the addition of nutrition education did not. It also found that peer modeling was more influential than teacher modeling (Sleet et al., 2020).

Strengths to this study were current partners with tribal communities to improve the eating habits of children living on the reservation lead the intervention. Demographics were not collected so teacher participants did not feel as if they were being singled out. A limitation was that not all items on the tool (MOCC) were completed so some baseline and post intervention was not observed. An additional limitation was that teachers may have altered their behavior in the presence of the observer, resulting in higher scores. A concluding thought about this study was that it was better to train teachers on one topic, have them implement it, then go on to another training topic, hold several one topic trainings rather than just one with all the topics (Sleet et al., 2020).

After reviewing the studies, it was discovered that by involving a specific culture in a study, while including their traditions and food, the fruit and vegetable intakes may be higher. Control groups were not included to compare programs with other cultures or a mixture of cultures. All programs were deemed culturally appropriate for their population). They also included an educational component for children that was taught by teachers who were trained by nutrition educators. Cooking lessons that included participation with parents resulted in better behavior outcomes for consumption. All studies indicated that response bias could have been a limitation with both honesty and action bias. Involving family in the intervention assists with intakes as does peer modeling.

Role Models for Children Eating Behaviors

The two studies in this section review how role models influence fruit and vegetable consumptions, and the impression children have on them. One study was a

phone interview that looked at parents' perceptions of what their child ate, the other study looked at teachers' beliefs about health while teaching a nutrition program. Both studies use role modeling as it pertains to increasing fruit and vegetable consumption of children and their perceptions about them.

Parents Perception of a Healthy Diet

Two independent cross-sectional panels of the New Jersey Child Health Study (NJCHS) were examined to determine children's consumption with their parents' perception of eating a healthy diet, that included fruits and vegetables. It included 2229 households within 5 cities within the state of New Jersey. It looked at children between the ages of 3-18 and the reports were based on what parents recorded. The NJCHS was a longitudinal study, data for this study was determined by using random digit phone surveys that had been collected. Forty-seven percent of the children were non-Hispanic black, Hispanic 40%, white/other was 13%, where 68% were households 200% below the Federal Poverty Level (Eliason et al., 2020).

When it came to eating healthy, 58% of the parents felt their children ate healthy, 32% somewhat agreed they were eating healthy, and 14% did not agree that they were eating healthy. More parents 59-68% of younger children thought they were eating healthy compared with parents of older children, pre-adolescence and adolescence, thought they were eating healthy, 44-50%. As it has been found in other studies most children meet or almost meet the recommendations of fruit consumption, they do not consume the vegetable recommendations. It was also found that most parents know

that eating vegetables is part of a healthier diet, they may not know how much they should eat (Eliason et al., 2020).

This study was strong in the fact that it had a large diverse sample and used validated survey questions to evaluate consumption of children's diet, although using parent responses to questions could have had a limitation of social desirability bias. This could have led to over or under reporting of healthy and unhealthy foods. A future study could include children's responses about their consumption. It was found that most parents feel their child are eating healthy, even though they do not consume the recommended amounts of fruits and vegetables (Eliason et al., 2020).

Urban Preschool Teachers' Nutrition Beliefs

In a study of New York City low-income preschools, examined teachers' nutrition beliefs and practices with a training called Eat Well Play Hard in Child Care Settings (EWPHCCS). The training was designed to increase fruit and vegetable and low fat/nonfat dairy consumption as well as lessen screen time. The training for the teachers was taught by registered dieticians and was based on the national nutrition guidelines for young children while using the Social-Ecological Model of Behavior. Six-hundred sixty teachers, assistant teachers and aides that were working in CACFP funded preschools that served at least 1 meal and 1 snack a day participated (Cooper & Contento, 2019).

It has been observed that preschool teachers' beliefs and practices have influence on eating behaviors of the children they teach, although not many focus on nutrition beliefs and practices. This study included a large sample of ethnically diverse teachers.

It was found that teachers believe that they act as substitute parents when assisting students choosing their foods to eat. They also felt confident that they knew what healthy foods were, but lacked skills to promote good nutrition when dealing with children who were food insecure. Although it was indicated that nutritional training was needed it only made a 3% change in the groups that received the training compared to the groups that did not receive the training. It was suggested that teachers eat with their students for better eating habits and to facilitate conversations about their eating behaviors, but teachers found it difficult to do (Cooper & Contento, 2019).

The limitations of the study included not obtaining baseline data about teachers' beliefs around nutrition. A strength of the study was that it was large, that presents a real-life picture of what low-income preschool populations are like. Teachers also had time to practice what they had learned before recording their responses about the training. Although the teachers felt their beliefs about students eating healthy foods important, they felt the food being served was not as healthy as it could be (Cooper & Contento, 2019).

From the review of this section, it was discovered that role modeling whether it be parents or teachers have an effect on a child's health beliefs and intakes around fruits and vegetables and healthy eating. Furthermore, it was found that parents and teachers/providers, in several cases, do not know what healthy eating is and/or how much fruits and vegetables a child needs daily according to the USDA Dietary Guidelines. Similarly it was learned that eating with children increases intakes as well.

Table Review of Literature

Research Question	# of participants	Location	Strategies	Study Design	Results	Conclusion	Limitations
Two-year follow-up of Brighter Bites, a school-based nutrition education and food co-op intervention found to be effective in increasing child intake of F&V (Marshall et al., 2020)	262	Houston, Texas	Determine if food produce boxes and nutrition education has sustainability 2 years after intervention	Two-year quasi-experimental non-randomized	Two years post-intervention, as compared to baseline there was a significant increase in child intake of fruit, vegetables	Potential sustainability of a comprehensive school-based intervention among low-income families	No comparison group, and self-reported surveys and increases of consumption may not be directly related to Brighter Bites intervention
Describe the effects of any intervention strategy targeting fruit and/or vegetable intake in children or adults of any age. (Hodder et al., 2020)	32 interventions	Search engines of MEDLINE, Embase, CINAHL, The Cochrane Library, Scopus and Academic Search Ultimate	Systematic review of 32 interventions, excluded anything before 2011, and ones that included pre-existing conditions	Systematic Review	Effective evidence of teaching about importance of fruits and vegetables	Many effective strategy options are available for policy makers and practitioners interested in improving fruit and/or vegetable intake for their community.	Findings restricted to what was reported in review of their interpretation of the data collected, and reviews were mostly in high income communities
To assess the effectiveness and associated adverse events of interventions designed to increase the consumption of fruit, vegetables among children aged five and under. (Wongprawmas et al., 2022)	78 trials with 13,746 participants	Search engines CENTRALMEDLINE and Embase	Review included interventions of 48 children feeding, 15 with parents education, 14 preschool policy changes, 2 with child nutrition education and 1 with child focused mindfulness	Systematic Review	Limited evidence of interventions of how to increase fruit and vegetable consumption amounts	Long-term follow-up of at least 12 months for future research and should adopt more rigorous methods	Excluded trials of only outcome of increasing fruit and vegetable consumption, trials only of low-income communities
The effects of a garden intervention on identification liking, and consumption of fruits and vegetables among 3–5-year-olds (Cosco et al., 2022)	15 childcares 285 children	North Carolina	Delivered 12 age appropriate activities by teachers with 3 categories, preparing, caring and investigation/eating, was 13 weeks	Randomized control study	Positive effects on identification and more consumption of fruits and vegetables but not on liking	Snacks consumption increased by ¼ cup fruit and 1/8 cup vegetable per day, introducing hands on gardening for low-income children may help in their future diets and health	Asking children about liking the vegetable on a tablet instead of asking them personally could have a different outcome, and attendance
Increase fruit and vegetable consumption using a multi component interventions using workshops, cross-curricular activities, posters, parents education and homework challenges (Ilić et al., 2022) 3.	681 children started, 259 completed	City of Zagreb, Croatia	Included 23-45 minute classroom workshop, 13 homework challenges, educational posters, parent education via a website, and new recipes in lunchroom	Quasi-Randomized Trial	Fruit and vegetable increase in 89% of the children, while 25% reached daily recommendations	Nutri-Skolica had a moderate effect on fruit intakes and a small effect on vegetable intakes of the children in primary schools	Divided into groups by the principal not randomized, no follow-up or long term data collection, difficult to determine what component had better effect, COVID-19 pandemic had effect on activities being fully implemented

To determine whether "Read for Nutrition" program would increase liking and consumption of broccoli in preschool children(Elrakaiby et al., 2021)	5 classroom, 69 children	Lincoln, Nebraska	Trained teachers read the book "Monsters Don't Eat Broccoli" up to 7 times a week for 3 weeks.	Pilot pre-post intervention study	Average total consumption of broccoli increased 35%	Programs like "Read for Nutrition" have the potential to improve preschoolers' vegetable liking and consumption while using repeated book readings	There was a not comparison group, they only targeted one vegetable, and there was not any follow up data collection
To identify the characteristics of the home food environment that are associated with higher fruit and vegetable consumption. (Wyse et al., 2011)	396 parents attending 30 preschools	New South Wales, Australia	Survey was given to parents about child consumption, questions were about last 24 hours and 7 days	Cross sectional phone survey	Positive associations between children's fruit and vegetable consumption and parental intakes	Identified several modifiable characteristics within the home food environment that are associated with fruit and vegetable consumption among preschool children	Unknown if conclusion is true of low socio-economic families, examined combined fruit and , vegetable consumptions not separately
Feasibility of increasing fruit and vegetable purchases and consumption by incentivizing at farmers markets(Ferdinand et al., 2017)	176 participants @5 farmers markets	Lower 9 th Ward, New Orleans	Gave participants \$4 coupons called Veggie Dollars to buy fruit and vegetables	Cross Sectional survey	63% increased purchases of fruits and vegetables, 89% said consumption increased at home	Location of markets was important in low-income communities, coupons for fruits and vegetables increased purchasing and consumption	Only did post survey, questions were limited did not ask anything about positive program outcomes
Pilot testing of a school garden intervention for Navajo children to increase access and consumption of fruits and vegetables(Ornelas et al., 2021)	Elementary school	Southwest Navajo Nation	Gardening lessons over school year developed specifically for Navajo nation, at least 2-60 minutes lessons delivered per month	Pilot-tested	Important to include traditional growing practice and preparation of foods into curriculum. Students enjoyed hands on activities and taste testing	School based intervention that includes cultural strengths and healthy traditional practices can be a good strategy for increasing fruit and vegetable consumption	Only done one school so cannot generalize for all Navajo Nation, need to accommodate for different family living situations, and financial wealth
Improve access to healthy foods by supporting corner stores in stocking and promoting the purchase of produce(Snelling et al., 2020)	17 corner stores 110 surveys completed	Washington DC	\$5 coupon for fresh produce were given to SNAP participants after purchasing \$5 with their SNAP benefits, one per transaction and there was no limit to how many transactions they could have	Pilot-tested	Overall satisfaction by owners and customers, 77% increase in produce consumption.	Program promising with increases in amount of produce purchased.	Only done in Washington DC cannot say it will work in other corner stores, self-reported consumption and no accountability of food waste
Assess if child cooking involvement among Hispanic youth was associated with FV intake, preference and exposure.(Asigbee et al., 2020)	1231 students and their parents	28 low income primarily Hispanic schools in Texas	Students assigned to 4 groups, control, gardening and nutrition, physical activity plus gardening and education, or all interventions together	Cross-sectional	Students involved in family cooking had higher vegetable preference, intake, and exposure.	Involving children in family cooking is associated with higher FV intakes and can improve dietary intakes	Questionnaire asked about foods eaten yesterday which may not be representative of overall intake. Social desirable response bias, where giving a more healthy image of consumption

Parents assumption of what children consume and whether it aligns with dietary guidelines and if their child eats healthy.(Eliason et al., 2020)	2229 households	5 cities in the state New Jersey	Data from two studies of the New Jersey Child Health Study was drawn from random phone surveys to analyze if parents believed their child ate healthy as regards to FV consumption	Cross-sectional	Majority of parents,54% felt their child ate healthy, although vegetable consumption among the children was below recommendations,	Most parents perceptions believe their child is eating healthy, they do not meet the recommendations for fruit and vegetable intakes.	Social desirability bias between actual consumption of the child and parent reporting, did not include all 5 food groups
Identify lifestyle patterns of children at 1.5, 3.5 and 5 years of age, that includes dietary intakes, outdoor time, and screen time.(Lioret et al., 2020)	1056 first time mothers	Australia	Mothers were randomly put into 2 groups, one group received 6, 2-hour dietician delivered services over a 15 month period that focused on parental knowledge skills, infant feeding knowledge, diet, physical activity and screen time	Clustered randomized study	Lifestyle patterns mainly FV intake and screen time are established by 1.5 years of age, and are persistent over the early childhood ages. These patterns are influenced by the mother's education	Healthy and unhealthy lifestyle patterns are developed as early as 1.5 years of age. Future interventions should include maternal education to prevent child unhealthy behaviors	Social desirability bias as to food intake, frequency of screen time and physical activity. Mothers were mainly well education, so cannot generalize for all education levels
Examine Preschool teachers' nutrition related beliefs and practices and explore associations with EWPCCS training. (Cooper & Contento, 2019)	660 Ethnically diverse preschool teachers serving low income children	New York City	Preschool teachers nutrition-related beliefs and practices with taking the EWPCCS training. Two groups of teachers who took the training and those who did not	Casual-comparative based on a cross-sectional	Teachers that received the EWPCCS training had higher beliefs and practices than those who did not taking training.	Providing specific training for preschool teachers/directors had higher beliefs and practices. Should also address food quality and could improve nutrition related attitudes, beliefs and practices as well	Only posttest so did not have baseline data on teachers nutrition beliefs before training. Only examined their beliefs and attitudes with EWPCCS training, not anything else.
Determine the effects of a teacher-focused intervention to increase responsive feeding practices. (Sleet et al., 2020)	9 tribal affiliated ECE programs	Native American community in Oklahoma	Taught all ECE teachers a responsive feeding practice, then half also received a nutrition education component.	Randomized intervention study	Teachers who received the responsive only training had better results than those who got additional nutrition education component	The teacher intervention only program demonstrated improvements in responsive feeding leading to the thought that adding the education component was too much to implement at once.	Not representative of all tribally affiliated programs. Not everything on the tool that was used was compared. Teachers may have altered their behavior in the presence of observers.

Gaps in the Literature and How to Address the Gaps

One gap in literature is studies are that they are not longitudinal, and follow-ups are not done, continuing education is not continued, incentives are not available, so therefore in many cases gains attained in the studies are lost, and participants go back to old habits, or simply the intervention is not long enough to make an impact. Focusing on what the need after the intervention ends, although stated frequently for future research (section of the studies), gaps still remain. The lack of longitudinal research could be attributed to participants losing interest and dropping from interventions, or moving, consequently making it difficult to keep in contact with the participants (Graziose & Ang, 2018).

Another gap was that interventions were not developed to be sustained. Many of the interventions had incentives to participate, but when the program ended the incentives were no longer available, it was hard to determine if the fruit and vegetable consumption remained elevated or increased (Wolfenden et al., 2021). Interventions should consider goals and objectives that could be easily accomplished, so the learned objectives are ensured for the future. For example, nutrition education about fruits and vegetables i.e., gardening and where food comes from, and their importance to healthy lifestyles should be taught earlier to children so they know why they are eating fruits and vegetables, not just because of guidelines (Cosco et al., 2022).

One last gap would be that education is not delivered in a way that can be retained. For example, several topics or lessons are taught to a group of parents so they can increase healthier habits at home. It might be too much information at one time for some to understand and replicate at home, so they give up and do not implement

any new habits or behaviors. Another possible option could be to teach one topic at a time for a couple weeks with activities, including cooking, then move onto another topic. Not all people learn or retain information the same so this could be a better option for interventions for some populations.

Summary of Literature Review

From the literature it was learned that short interventions work, but retention is rare and longitudinal studies have better results, although there are not many studies that include post intervention data collection. Multi-level interventions, including parents and teachers working together, are more successful than just those with just parents or teachers. Cooking together, as role models for children, is important and helps with children trying new fruits and vegetables. Fifty-eight percent of parents think they are feeding their children healthy food but children are not receiving the recommended amount of fruits or vegetables (Eliason et al., 2020). Eating behaviors can begin at the age of 1.5 so exposing them to fruits and vegetables at an early age can impact their eating habits as they grow (Lioret et al., 2020). Finding ways to encourage healthy eating is key to success.

Incentives, such as produce boxes or coupons, given during the initiative assist in increasing fruit and vegetable consumption but when the program and incentives ends, consumption tends to decrease. Programs that take place where the participants live and shop, i.e. corner stores, farmers markets or food distributions, are more successful as many times a supermarket is not accessible to some populations

(Snelling et al., 2020). Ways to extend these programs or extension follow-ups or activities could help in healthier communities.

Daycare providers and teachers believe they act as substitute parents so their beliefs about fruits and vegetables can impact on children's beliefs and habits (Cooper & Contento, 2019). Good teacher training is important to the success of a new program along with a curriculum that can be adapted to the culture of the population, that also includes traditional food practices and recipes (Ornelas et al., 2021). Gardening programs with education on how to use the produce it produces, could reduce healthy food disparities, especially with fruits and vegetables, in low-income areas (Cosco et al., 2022). Teaching one topic at a time can assist with longevity of better consumption, as well as repetitive themes (Elrakaiby et al., 2021). Teachers/providers that eat with their children, acting as role models, contribute to higher consumption and more apt to try new foods (Cooper & Contento, 2019). Exit interviews or long-term follow-ups were thought to be beneficial to administer if the retention goals were met. (Ornelas et al., 2021).

Methods

This section includes the methods of this intervention. It will include teacher/providers, parents and children from 3 childcare in the city of Flint Michigan in the zip codes of 48505, 48506 and 48529, with a goal of improving intakes of fruits and vegetables among the children so they can avoid chronic diseases as they grow into adulthood. Parent participation is vital to the success of the intervention as it was found

through literature in many cases they are key to healthier outcomes of their child's diet and health.

Propose Summary of Project/Intervention

The purpose of this project is to create a multi-level intervention including parents while teacher/providers teach children, using early learning literature, gardening and cooking activities to increase knowledge with fruit and vegetable intakes. Skills learned through the program will assist childcare providers and parents when it comes to feeding the children under their care the required fruits and vegetables according to the USDA Dietary Guidelines. The dietary guideline is also a requirement of a childcare provider who participates in the CACFP program, where vegetable and fruit portions are served with each meal, and a fruit or vegetable is served with each snack.

Determining what methods (i.e., cooking lessons, healthy eating knowledge, taste testing tips, menu creations or nutrition education for providers, parents or children under their care), should be established after focus groups of providers and parents. The lesson series that were developed for the intervention can be adjusted to suit the population of the childcare, as some may not be deemed appropriate or necessary for success of the program and the community. Workshops will be set up for providers/teachers as a whole day training, or over several days, whatever works best and fits within the timeline (see Appendix P). Not all people learn the same way so learning styles will be considered before the training sessions using an online learning style assessment. Lessons will be adjusted and could include one method (example

hands-on), or several (hands-on, visual, auditory or kinesthetic) based on the need and results of the assessment.

Childcare providers can choose to participate whether they are licensed or non-licensed, childcare center staff, home childcare providers or family members taking care of relatives.

Table 1 (below) indicates the children living in poverty by percentage per zip code selected for this intervention. It also includes the Food Security Index for each zip code that is rated on a scale of 0-100, where 100 is the highest. All zip codes indicate children living in poverty is over 50% and have high levels, over 90%, of not having access to good food. Families receiving supplemental income per zip code is displayed with a scale of 0-100, with 100 the highest. Populations per zip code is also indicated by black, white, Hispanic, and other races.

Table 1-U.S. Census-State of Flint Kids

Zip Code	Children Poverty %	Food Insecurity Index	Supplemental Income	Black Population	Population White	Population Hispanic	Pop. Other
48505	61.9	95.1	15.2	84.3	10	2.5	3.2
48506	54.1	90.6	12	10.4	78.3	6.9	4.4
48529	79.3	95.4	8.3	9.5	82.8	3.3	4.4

Logic Model

A logic model is an organized graphical representation way to show how a program will work, using pictures and/or words to describe the sequence of activities. It describes how the activities are correlated to the results that the program is expected to

accomplish. The planned work is the resources or inputs, and activities, the intended results include the outputs, outcomes and the impact. (Kellogg, 2019)

Program Goal

To increase knowledge of, promote positive attitudes towards, and increase fruit and vegetable consumption among preschoolers and their families among three childcares in Flint, Michigan.

Inputs

The inputs for this intervention will be the resources needed for the program/intervention. Educators need to secure time and space for professional development education that work for the teachers/childcare providers. Interns will assist trainers with professional development training, workshops and events i.e. farmers market days. Horticulturists will provide a gardening education segment for the providers/teachers during the workshop/training day, and garden visits throughout the intervention. Space for training and implementation of the project will be provided at the daycare sites. Office supplies, materials, equipment (gardening tools), and technology machines and implementation. Other supplies will be added as it is deemed necessary and appropriate for the success of the program.

Activities

Staff would participate in focus groups led by nutrition educators and participate in workshops to learn about how to teach the lessons in the project. An online learning assessment will be available for providers/teachers to take so that the nutritional

educators will know how to best teach the lessons so all can learn. A horticulturist and web designer would be included to learn about gardening and technology projects. Cooking demonstrations would be included during the workshop at break times to show how to incorporate the produce in the garden into the lessons. Field trips to the farmers market for families and the children would be planned along with a field trip to a vegetable farm. Working with the children to implement the educational gardening program to increase fruit and vegetable consumption among preschoolers and their families is the goal of the intervention. Weekly zoom meetings will be held for parents so they know what is being taught to their child, as well as new recipes introduced, and activities that can be replicated at home that are taught at childcare. Blog information will be entered at least 2 times weekly updating what is going on at childcare and tips on gardening or updating field trip activities.

Parents will participate in a focus group about what they would like to see in an intervention and workshop that will provide information about the lessons being taught, parent newsletters, farmers market day, and incentives provided for participation. The web designer will meet with them as well to demonstrate how to use and understand the website, Zoom meetings and the blog. Participation on the Zoom meetings, held weekly, with the teachers/providers will keep them up to date on what is going on with the program as well as extension activities for them to do at home with their child. Blogs, posted twice weekly, will provide information about what is being taught at the childcare as well as information about field trips or activities happening at childcare so parents will know if special things need to be brought to childcare, i.e bring a carrot to childcare tomorrow, or wear boots on Tuesday because we are working in the garden.

Children activities include the activities included in the lesson plans, attending the farmers market, on their own field trip and with their families, and a field trip to a vegetable farm. They will also receive education on gardening, how to make simple recipes with the produce from the garden and what they purchase on the field trips.

Table 2-Summary of Activities

	Activities	Purpose	Examples
Staff			
	Focus Group	To determine what programs have been done in the past, determine what works and does not work	One focus group meeting before program begins
	Online Learning Assessment	To determine what kind of learning styles work best for the group before teaching lessons	Visual, auditory, read/write or kinesthetic learning styles
	Workshop	To teach lesson series around the books: <ul style="list-style-type: none"> • Growing Vegetables by Lois Ehlert • Community Soup by Alma Fullerton • Plants Feed Me by Lizzy Rockwell • A Fruit is a Suitcase for Seeds by Jena Richards • From Seed to Pant by Gail Gibbons • A Visit to a Farmers Market by Peggy Sissel-Phelan PhD 	One 8 hour training or 8 hours of training spread over several days (1-2 hours per day)
	Horticulturist Visit	To teach garden lessons, help plan garden	Will visit workshop with lessons then every other week during growing season
	Web Designer Visit	<ul style="list-style-type: none"> • To teach about website • Zoom meetings with parents, • How to enter blog information, 	<ul style="list-style-type: none"> • Will visit during workshop • Be available by email or zoom during program

		<ul style="list-style-type: none"> • How to use parent classroom newsletter template 	
	Teach Lesson to Children in their care	<ul style="list-style-type: none"> • Teach lesson series • Cooking Activities/Taste Testing 	One book series weekly that includes activities
	Zoom meetings with parents	Hold zoom meetings for parents to discuss what they have been doing at daycare with program and at home activities that can be done	One time weekly
	Farmers Market Field Trip	Take children to farmers market to spend \$5 tokens and learn about farmers market	One time visit during program
	Vegetable Farm Field Trip	Take children to vegetable farm to see how vegetables are grown and where they come from	One time in beginning of program
	Blog	Enter information into blog about what is happening at school and special instructions about lesson	Twice weekly
Parent			
	Focus Group	To determine needs of parents and children and what programs have been involved in the past, what works and does not work	On focus group meeting before the program begins
	Weekly Zoom Meetings	Attend zoom meetings with staff to learn about what children are learning at day care and extension activities for home	One time weekly
	Blog	Learn about what is happening at childcare with program and any other important information	Twice weekly
	Farmers Market Visit	Farmers Market Visit where each family receives \$25 coupon and incentives for passport participation	Once at end of program
Children			
	Lesson Activities	<ul style="list-style-type: none"> • Learn about fruit and vegetables Garden • Literacy-book reading • Taste tests • Help making recipes 	Weekly, at least 3 times a week

		• Activities In lesson series	
	Vegetable Farm Field Trip	Learn how fruit/vegetables grow Choose vegetable/fruit to take home	Once at beginning of program
	Farmers Market Visit	Learn about farmers market Spend \$5 token on fruit/vegetable to take home	Two times, once with childcare, once with parents
	Horticulturist Visit	Learn about gardening	Once every other week during growing season

Outputs

Outputs are grouped into three categories, short term, intermediate and long-term, in addition to grouped by staff, parents and children. Short-term outcomes would be the knowledge of fruits and vegetables and the importance to a healthy diet.

Intermediate outputs are preference of fruits and vegetables by children and their families along with garden education at the childcares by providers/teachers and the children. Long-term outcomes are gardens that are maintained annually and policies regarding the produce.

Short-term Outputs

Short-term outputs include the increase knowledge of fruits and behaviors about fruits and vegetables that include knowledge among providers/teachers, parents and preschool children. Cooking and garden skills would also be introduced in lessons and workshops as it related to fresh produce that was received during the intervention by nutritionists, and the horticulturist.

Intermediate Outputs

Intermediate outcome would include increased consumption and preference of fruits and vegetables by staff, children and parents. Recipes introduced during intervention as well as gardening skills would also remain steady among childcare providers/teachers, parents and preschool children. Childcare providers would have increase the garden education from the project as well as children and parents. Preference of fruits and vegetables would increase and enjoyed by childcare providers/teachers, parents, and preschool children and included on menus.

Long-term Outputs

Long-term outputs would include policy and rules changes by the childcare staff around providing recipes/menus with more fruits and vegetables either from local farmers or from the development of a yearly garden. Gardens would be maintained by staff and embraced by the children and parents. Intakes would remain the same for children, or increase with parents and provider/teachers continuing to encourage them. Purchasing or growing of additional fruits and vegetables would continue by parents and by the staff at the childcares.

Budget

The components of the budget will include personnel costs, non-personnel costs, equipment, binders, books, and other website development costs. Each budget component was determined by each workshop and activity (Appendix C).

Focus Group Costs

Focus group will be conducted by nutritional educators and dietetic interns, when available. Nutritional educators will be paid \$24 per hour. Interns' time will be considered as part of their internship at no additional costs to the program. Educators work flexible schedules that include nights and weekends, so focus groups could be scheduled during non-typical times. Two focus groups will be held, one for parents and one for teachers/providers. Snacks will be provided for those who attend.

Personnel Costs

Nutritional educator staff will be trained by the program coordinator to train the childcare providers and provide extension activities for parents. They will be trained to teach the lesson plan series with all the supplies. This would also include food tastings, hands-on cooking lessons, and extension activities.

Horticulture Educator

A horticulture educator will be hired to teach beginning garden skills and assist with gardens throughout the intervention and/or growing season. It would include a 1-2 hour education lesson and bi-weekly 1-2 hour visits to the garden. They will be paid \$35 per hour.

Non-personnel costs

Supplies

Supplies would include books, at \$10, lesson series binders for the teacher/providers at \$25 each, and a \$5 incentive (tokens) for the children to spend at

the farmers market that will enhance the teaching of the lessons. Twenty-five-dollar incentives for the farmers market day/visit to each family attending. Lesson plan supplies would also be included at a cost of \$520, with a miscellaneous of \$200 included to pay for unintended supplies.

Website and Equipment

Website development and the maintenance for a 2-year period by a professional website employee would be \$5,000 for a two-year period. It will be a contracted position that would have access to many videos and software that can be used as part of project. Video equipment can be checked out when needed or rented if not available.

Field Trip Costs

Field trip costs and farmers market nights were included in this budget to fund two farmers market tours, one for just the children and one for the families. Transportation is included for the children's field trips only. Each child will receive a \$5 token to purchase produce and families will receive \$25 coupon to purchase produce as well. Garden bags will be given out to the attendees as well as incentives can be earned at the family farmers market night.

Program Materials and Assessments: Summary of Appendices

Appendix A is the logic model that explains the intervention with activities that pertain to staff, children, and parents. It includes the inputs, outputs, along with short-term, intermediate and long-term outcomes separated into staff, children and parent groups. Educational and professional development is also included to outline the specific activities, that include the field trips, lesson plans, garden activities, parent

newsletters and the incentives that are included. This model will be used to guide the program throughout its timeline.

Appendix B is the outline for the focus group for childcare providers/teachers and parents. The outline includes an activity that is intended to help with engaging the participants to take part in the focus group. It explains how the focus groups will be conducted and includes the activities and questions. The format and questions can be arranged in any order to fit the needs of the group.

The budget is included in Appendix C, it is organized by activities within the project, focus group, professional development training, lesson supplies, field trips and farmers market visits. Each cost is entered separately under the activity then totaled by activity. The final projected cost of the program is at the bottom. Other costs are included for incidentals that may arise during the project that were not listed in the original budget. This budget will be used as a reference as expenses occur throughout the project.

Appendix D contains the outline for the training/workshop that will be taught to the childcare providers/teachers. It contains the activities in the lesson plan series. It will be taught as a hands-on workshop with peer led training and time for questions. A horticulturist will lead the garden portion to teach gardening tips and answer any questions that may arise. The web designer will also be present to teach participants about how the website is set up, how to run and participate in Zoom meetings, how to create a classroom newsletter from a created template and other technological components of the project. Food demonstrations will be conducted during breaks, of the recipes that are included in the lessons.

All of lesson plans for the lesson series is included in Appendix E. They are separated by each book, by the same layout, beginning with the book *Growing Vegetable Soup* by Lois Ehlert. The other books that are included are *Community Soup* by Alma Fullerton, *Plants Feed Me* by Lizzy Rockwell, *A Fruit is a Suitcase for Seeds* by Jean Richards, *From Seed to Plant* by Gail Gibbons and *A Visit to the Farmer's Market* by Peggy Sissel-Phelan. All the books are focused on fruits and vegetables, gardening, experimenting, taste tests, and cooking. The lessons are developed to be taught over the time of a week each. They can be taught in any order the teachers feel is appropriate. The lesson s plans are divided into the categories of Supplies, Activity and Goals.

In Appendix F series of storyboards are included that explain how to start plants either by seeds or by food scraps. How to make a pot from a newspaper is included in case the teacher wants to use a biodegradable pot that can be directly planted into the soil. A teacher does not have to use each strategy of the storyboards, they may use whatever is appropriate for their class and what they feel comfortable teaching.

This is a survey for children in Appendix G. It will be administered after the project is finished and contains two sections, process evaluation and outcome evaluation . Since many children in preschool cannot read the childcare providers/teachers will read the questions for them. A happy apple face will be marked for a yes answer and a unhappy apple face will be marked for no answers. The providers/teachers can determine whether it can be administered as a group or individually. Process evaluation questions ask if the child liked the program and its activities, where the outcome evaluation asks about if they liked four particular fruit and vegetables. The outcome

evaluation questions can be changed if the fruits and vegetables are not used in recipes or taste tests during the lessons and replaced with ones that were used. The surveys will be analyzed by nutrition educators that did not take part in the administration of the survey.

Appendix H is the survey for the childcare provider/teachers to complete after the intervention is completed to determine their thoughts on their likes and dislikes of the program, and any suggestions for future programs. This survey will be delivered via a Qualtrics link and is grouped into two evaluations, process evaluation and outcome evaluation. Included are also questions about their role, and years of employment. The data collected from this survey will be analyzed by a nutrition educator who is not involved with any of the survey administration.

The survey for parents, in Appendix I is a pre and post survey that will be administered before the program begins and after completion. The process evaluation part of the survey asks questions about likes and dislikes of the project, recommendations for future projects and how they felt their children benefited. The outcomes evaluation asked about serving sizes, gardening skills, and knowledge of fruits and vegetable consumption. This survey will be delivered via a Qualtrics link for anonymity and will be analyzed by a nutrition educator not involved in its delivery.

A reference guide for additional curriculums is included in Appendix J. It can be used to find additional activities, information and teaching resources that can enhance or complement the intervention. Permission has been granted by each author included in the guide to be used as deemed appropriate by nutrition educators or teachers/providers. The goal of including this guide was if the teacher/provider wanted

to include extra lessons that were included in the original lesson of the program, they could go to one of the curriculums in the guide for additional information or lesson.

The poster and planning summary for the Farmers Market Night where each family will receive \$25 to spend at the market is integrated in Appendix K. A passport activity will be included as one of the activities where families will receive a stamp when they visit planned farmer talks or specific areas of the farmers market. After completing the passport, they will receive a farmers market bag and other incentives.

A Farmers Market with the kids' field trip is a planned activity for the program, separate from the family night at the market, and is explained in Appendix M. Kids will receive a garden bag, and \$5 in tokens to spend at the market. Recipes will be given to the kids to take home to encourage the family to use the produce that the children bought at home.

Appendix N is an example of a classroom newsletter that provider/teachers will learn how to make during their professional development training before the program begins. The intention of the newsletter is to inform parents of what the child is doing while at childcare to keep parents engaged with the project. Appendix O includes many ideas for teachers to keep parents involved.

Appendix P includes a timeline for the project starting with an Internal Review Board, consents, delivering of lessons, gardening planting, and harvesting as well as analyzing the data. The timeline is for a year time period, and can be adjusted as needed.

Discussion

Summary

Healthy diets include servings from all food groups, especially fruits and vegetables, but many 2–5-year-olds, close to 50%, do not consume enough, in many cases not even one a day (Snetselaar et al., 2021). Many interventions have been implemented with mixed results, however through literature reviews it was found that an intervention that included repeated messages, involvement activities with gardens, knowledge of farmers markets including tours, taste testing and family involvement contributed to more produce consumption. A 6-lesson series program was developed for three childcares in the specific zip codes, 48505, 48506 and 48529, in Flint, Michigan to increase the fruit and vegetable consumption using education, gardening, cooking concepts, parent involvement and children's literature. Through this program we hypothesize that fruit and vegetable consumption will not only increase among the children, but also among their families.

The program will be administered by nutrition educators and interns with consultations by a horticulturist. They will teach the childcare providers/teachers the program by holding an 8-hour workshop/professional development sessions. Sessions can be one day, or over several days, whatever serves the audience best. A workshop will also be held for parents to explain the program and the take home activities that the children will bring home.

Surveys will be administered to parents, via a Qualtrics link, at the conclusion of the program. Pre and post surveys will be administered, via a Qualtrics link, to the

childcare providers/teachers. Children will be given a short survey administered by their teacher/provider reading the questions to them and the child will mark yes or no. The yes or no is depicted by a happy face apple for yes and sad face for no. The data will be analyzed to determine the successes of the program and determine what are future needs. All surveys will not be linked to any individual's name.

Limitations of the Program

The limitations of this fruit and vegetable intervention include determining the true benefits. The program is only in three childcares in Flint where there are currently 169 registered with the Department of Licensing and Regulatory Affairs of Michigan (LARA). That represents approximately 1% of the current childcare in Flint, so the sample may not be a true equivalent population of Flint. Although childcares were chosen in low socio-economic zip codes the children and their families may not represent as low income and not representative of the community.

Other limitations would be the self-reporting surveys of the program's outcomes. Fruit and vegetable consumptions, as well as successes may be exaggerated or not reported correctly due to response bias. Children's surveys may not be true due to consensus bias, or that they may mark answers to just answer the question, rather than for the truth.

Lastly, the program will be taught by childcare providers/teachers that have different styles, and comfort levels with teaching a subject that they may not be familiar with. Consequently, some children may not get the same education or learning experience as others. Since the lessons are taught by different providers/teachers it is unknown as to

what is being taught. Some providers/teachers may have prior knowledge and could possibly teach things not included in the lessons, whereas others just teach what is in the lessons. Language barriers could also be a factor of comprehension and instruction.

Competencies

Design a population-based policy, program, project, or intervention.

This program is designed to create an environment in a population where fruits and vegetables are not readily available, and consumption is low. The zip codes of 48505, 48506, and 48529 are some of the lowest incomes within the City of Flint (Saxe-Custack et al., 2019). The childcare will receive an invitation to participate by email, phone or United States mail. The first three that agree to participate will be accepted. A waitlist will be created in the instance that any of the childcares decide not to participate.

A horticulturist will be employed to assist the childcares, staff and children in the implantation and maintenance of the garden. If space or the area is not acceptable for a traditional garden, raised beds will be provided. Lessons include education on how to grow a garden as well as the benefits of eating from a garden. Gardening is included in the intervention as a low-cost way to increase fruit and vegetable consumption and availability in the community. The produce from the garden will be incorporated into the taste testing and recipes that the teacher/providers make with the children. Any extra produce will be made available for the parents to take home to their families.

Collaboration with all staff, nutritional educators, parents and children will lead to a population policy change for the childcare that would include fruits and vegetables, that could influence healthier menus at the children's homes and families behaviors centered around healthier eating practices. Surveys will be administered after the completion of the program after six months and a year to determine if the intervention would like to be continued in the future, and with any changes. Through the data collected, the program will be enhanced so it can be delivered each year during the growing season, with the hopes that each year behaviors will be sustained and improved upon.

Select Method to Evaluate Public Health Program

The program was designed to increase consumption of fruit and vegetables using a fruit and vegetable gardening emphasis. Using gardening strategies is a way to teach children, and possibly provider/teachers and parents, where and how local fruits and vegetables are grown (Shedd et al., 2023). By participation in gardening, they take ownership and feel more adept to trying new produce and adding them to their diets (Cosco et al., 2022). Knowledge of how to prepare and eat them in different ways could increase incorporating more fruits and vegetables into menus both at home and at the childcare.

To evaluate the program surveys have been developed for children, parents, and providers/teachers. The children surveys will be read individually to them or administered as a group by providers/teachers. Most preschoolers cannot read, but after the question is read to them, they will mark the answers. The questions are simple yes or no questions indicated by an apple with a smiley face for yes and a sad apple

face for no. Names will not be placed on the surveys so that the evaluator will not know whose answers they are compiling.

Pre and post surveys will be given to the providers/teachers to assess their knowledge before and after the program. Questions are asked about the validity of the workshops, activities, lesson content, fruit and vegetable intakes, and activities provided. Additional questions about successes and improvements will be asked on the post survey. The survey will be administered via Qualtrics for anonymity.

Parent surveys will be conducted via Qualtrics post program. Questions are asked about outcomes of fruit and vegetable selection at home and consumption of the family as well as their child(ren) that took part in the intervention. Zoom, blog and Farmers Market Day participation will be asked to determine whether the program was useful and to continue to provide future interventions.

Develop Goals and Objectives

The goal of the program is to increase fruit and vegetable consumption among 2-5 years olds in three childcares in the City of Flint, Michigan. By involving parents along with the provides/teachers and children from the beginning of the project, by way of focus groups and workshops it is the intention the objectives can be reached and possibly sustained. Furthermore, by including everyone from the beginning of the project all will know the goals and objectives both at the childcare and at home. The parents will know what the child is learning, thus can replicate it at home and participate in the home activities with valuable knowledge. Furthermore, children may choose to eat the new fruit or vegetable while at childcare, but they do not ultimately do the

shopping or selection of items on a menu at home, therefore choices are limited to them. With this intervention a child can try a new vegetable or fruit at childcare the parent will know about it, ask questions whether or not they liked it, and obtain it for home menus, and it consequently becomes part of their menu, and is included in multiple home recipes.

Examine factors that impede the process of health education/promotion and influence the process by which people learn

By developing a multi-level health education intervention in the target community of Flint, Michigan, a low socio-economic community, it can increase the knowledge around fresh fruits and vegetables and its importance of a healthier diet for a decrease in cardiovascular disease, many cancers and diabetes. Factors impeding the promotion of eating healthier, includes the unavailability of good affordable produce, cost, and the knowledge of how to prepare it easily.

This multi-level intervention includes parents, teachers/providers and the children working and learning together therefore supporting each other to understand the importance of eating the recommended amounts of fruits and vegetables according to the USDA dietary guidelines. Several modes of communication and learning styles have been identified and developed to ensure that all learn and gain the knowledge intended for healthier behaviors. Examples are websites, Zoom, classroom parent newsletters, and hands-on activities. Field trips to vegetable farms and to the Farmers Market with free tokens and coupons to obtain fresh produce will be offered. Incentives will be given for participation in attending, in addition to visiting education areas.

Education areas include cost saving tips, preparation, how to choose the best produce for your needs, different ways to prepare and taste testing.

Recommendations for Future Program and Research

From the data collected, future programming enhancements will be determined and key to understanding what was effective within the goal of better fruit and vegetable consumption. Since the program has more than one activity, highlighting those that were more effective will be expanded. Future programs should make lesson changes to include different books to highlight, different vegetables, or recipes as the population, culture or need changes. Before each program year, focus groups would be beneficial to help with changes and improvements with special attention to the culture of children and their families enrolled in the childcare.

Included in Appendix P is a suggested timeline that includes IRB approval, focus groups, teaching of lessons, garden planting and harvesting, and analyzing of data over a one-year time. The timeline should be adjusted if during first year activities or lessons are completed too quickly and retention is not accomplished.

Inclusion of parents is essential to increasing fruits and vegetables intakes, as parents acquire the food for the family and cook it but to what degree and how much i.e. zoom or face to face meetings. Zoom or face to face meetings of how to prepare recipes using fruits and vegetables are beneficial in promoting and expanding home menus. Easy recipes, without a lot of preparation or time, should first be introduced with suggestions from the participants as the cooking meetings progress. Blogs should contain quick tips or information on what produce is ready for harvest and available at markets, as in season produce is cheaper than out of season produce.

Future research should include different programs for different communities and cultures. Attention should be given to produce and recipes that represent the population, so the community members can relate and embrace change. For example, if a population does not eat beans, recipes and meetings should not include beans as the food will not be eaten and wasted. That can be true of certain traditions around food as well.

Recommendations for Quasi-Experimental Studies

The data collected from 3 Flint childcare centers can be used for other childcares in Flint, Genesee County or the state of Michigan. A quasi-experimental study could be used. This type of study could also be compared with childcare centers in the same community with the same populations, socio-economic status and availability of fruits and vegetables. Childcare A could be assigned to teach only the cooking lessons, where Childcare B would only teach the gardening lessons, and Childcare C would be the control and not teach any of the lessons. Data would then be collected to determine what lessons were beneficial or if they were beneficial at all.

Due to the nature of the garden, farmers market field trips and cooking education, the program should be delivered during the growing season for all the childcares participating for best outcomes. In Michigan the growing season typically, begins in May and ends in October. In other states, especially those in warmer climates, it could be delivered at different times of the year. If the growing season is determined to be a bad season, due to too much or lack of rain, the data collected should reflect if that was to happen, and another intervention should be performed.

Recommendation for Randomized Controlled Trial

Information collected from quasi-experimental studies could indicate that a randomized control trial could be developed. As with the quasi-randomized study it could be used with other childcares in Flint, Genesee County or the state of Michigan, but preferably with childcares not within the same community. Childcare A would teach the lesson series with gardening, but not involve the parents, other than the parents granting permission for the child to participate. Childcare B would have the intervention with the parent component. Surveys would be administered to all parents, teachers/providers and children in both childcares. This intervention could have several childcares participating at the same time. Then they would be grouped into two groups rather than childcares, i.e. Group Peaches and Group Pears. The study would determine if the parent involvement is pertinent to the success of the program, and whether it continued to be part of the program or removed.

Recommendation for Case-Control Study

For a case-control study an educator can determine, either by self-reporting or BMI scores, if any of the children enrolled in the daycares are obese or at risk of becoming obese. All participants will be given surveys about their eating habits or interviewed by trained nutritionists. Parents would be part of this as many children under the age of 5 do not have the knowledge of their eating habits and how much they eat or do not eat.

The results from the surveys and/or interviews would then be analyzed to determine what might have caused their health risk. This study could also be administered before the intervention begins to assist in lesson development and what

kind of interventions or activities could be added or taken out of the current curriculum to aid in healthier behaviors and outcomes.

Recommendations for All Childcares

Many lessons can be learned from fruit and vegetable programs that include gardening, benefiting the providers/teachers that teach it, children who receive the education, as well as the parents and families of the children. Understanding the outcomes of the intervention is crucial in sustaining better consumption of fruits and vegetables, as well as incorporating them into their menus, and how to obtain or purchase fresh produce. While interventions provide incentives during the time of the program's delivery, future interventions need to be able to find ways so that the increase of fruit and vegetable consumption is sustained, so that children and their families have healthier diets and behaviors, with less chronic diseases.

Teacher/Providers-Implications for Practice

Childcare teachers/providers could benefit from fruit and vegetable intervention to gain knowledge about healthy eating habits and behaviors and have healthier outcomes and have healthier health outcomes. Children spend an average of 8 hours, 5 days a week in childcares, with that in mind, teachers/providers play an important role to those children (Cooper & Contento, 2019). They are considered role models and many replicate behaviors they have. For example, if a teacher/providers drinks something different than what the children are drinking (diet coke), chances are they want to begin drinking what they are or no longer drink what is available to them i.e. water or milk. It is also important for them to eat with the children. This encourages the children to try

things that are unfamiliar or that they think they may not like, due to social influence or it looking unappealing.

Conclusion

This intervention engages parents with field trips, children's literature, educational take home lessons, as well as a horticulturist assisting with garden activities. Through these efforts it is important to remember that good habits are not easy to sustain after interventions conclude. It is important to consider that parents and teachers/providers working together during the intervention can be a support system for each other, especially if the child is requesting recipes or produce that was introduced during the intervention.

Including sustainable interventions is vital to successes of programs that aim to increase fruit and vegetable consumption and behaviors, and while using real life activities such as gardening, farmers markets and recipe creation all while demonstrating cultural competencies is encouraging researchers to continue to create intervention and lead to healthier lives for the children in the future.

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Appendix

Appendix A: Logic Model Fruit and Vegetable Intervention

Goal	To increase fruit and vegetable consumption among preschoolers and their families among three childcares in the City of Flint
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Inputs	Activities	Outputs	Short-Term Outcomes	Intermediate Outcomes	Long-Term Outcomes
<ul style="list-style-type: none"> • Staff • Time • Teachers/child care providers • Interns • Horticulturist • Space • Office Supplies • Materials • Equipment • Technology • Zoom Meetings • Blog • Website content about lessons and extension activities to do with children • Lesson plan materials (books, dirt, containers for planting, paper, glue, 	<p>Staff:</p> <ul style="list-style-type: none"> • Participate in focus groups led by nutrition educators • Meet with nutrition educators to learn about intervention lessons to increase fruit and vegetable consumption • Meet with horticulturist to learn about gardening • Meet with website designer to learn about website and parent newsletter creation • Learn how to make new cooking recipes • Plan field trips to vegetable farm and farmers market • Weekly zoom with parents about 	<p>Staff:</p> <ul style="list-style-type: none"> • Focus group • Professional development • Garden education meetings • Weekly Zoom meeting with parents about lessons with children • Activities shared with parents on weekly zoom <p>Children</p> <ul style="list-style-type: none"> • Knowledge from lesson • Gardening skills for growing season (20 weeks) • Activities from lessons for 6 weeks 	<p>Staff</p> <p>Increase knowledge about fruit and vegetable consumption</p> <p>Children</p> <p>Increase knowledge about fruit and vegetable consumption</p> <p>Parents</p> <p>Increase knowledge about fruit and vegetable consumption</p>	<p>Staff</p> <ul style="list-style-type: none"> • Increase in fruit and vegetable consumption • Increased garden education <p>Children</p> <ul style="list-style-type: none"> • Increase in fruit and vegetable consumption • Increase in preference of fruits and vegetables • Increased garden education <p>Parents</p> <ul style="list-style-type: none"> • Increase in fruit and vegetable consumption • Increase in preference of fruits and vegetables • Increased garden education 	<p>Staff:</p> <ul style="list-style-type: none"> • Increase in purchasing and or growing of vegetables • Garden at preschool is maintained annually (yearly) with produce used in menus • Policies put forth that fresh produce grown from garden used in menus • Policy for variety of fruits and vegetables on menus <p>Children</p> <p>Consumption of fruits and vegetables increases or maintains</p> <p>Parents</p>

<p>markers, scissors, plastic bags, small watering cans, popsicle sticks, garden tools, seeds)</p> <ul style="list-style-type: none"> • Other 	<p>lesson activities with children</p> <ul style="list-style-type: none"> • Blog information entered at least 2 times weekly for parents <p>Children:</p> <ul style="list-style-type: none"> • Participate in lesson plan activities • Participate in garden activities • Attend farmers market • Attend vegetable farm <p>Parents:</p> <ul style="list-style-type: none"> • Participate in focus groups led by nutrition educators • Meet with nutrition educators to understand intervention plan that includes home activities • Meet with web designer to understand and how to use website, blog, zoom meetings • Participate in weekly Zoom meetings about what is happening at childcare • Access and 	<p>Parents:</p> <ul style="list-style-type: none"> • Focus group • Blog • Weekly Zoom meeting with teachers/providers about lesson with children • Activities shared 			<ul style="list-style-type: none"> • Increase in purchasing and or growing of vegetables • Produce from garden that is not used at childcare offered to parents
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	<p style="text-align: center;">Educational and Professional Development</p> <p>Develop lesson plans for teachers/providers</p> <p>Hold focus groups for inputs on lessons</p> <p>Teach lessons to teachers/providers-that includes gardening skills, new recipe preparation/cooking with preschool children</p> <p>Ensure lessons are inclusive of all populations that are being served</p> <p>Peer teaching of lessons to teachers/providers</p> <p>Field trips to a vegetable farm and farmers market with \$5 and garden bag planned for preschool children</p> <p>Farmers market visit with \$25 incentive for parents</p> <p>Garden skills taught by horticulturist with by-weekly visits to childcare centers for preschool children and teachers/providers</p> <p>Develop parent letters for parents about happenings at childcare</p>	<p>6 weeks of lessons taught to preschool children</p> <p>75% parent participation in blogs</p> <p>50% parent participation in zoom cooking lessons</p> <p>Garden produces food for taste testing and recipes in at least 1 menu food a week</p>	<p>Increase produce knowledge, including how to grow and purchase, and how to use in meals and recipes</p>		

	Develop blog for parents to ask questions or have comments- teachers/providers will maintain				
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Appendix B Focus Group Outline

To begin the focus group the description of the project will be explained that includes the planned methods and lessons. After the explanation and lessons are reviewed, time for questions about the methods and/or lessons will follow.

Before answering specific focus questions, a projection questioning activity will be used. As explained in the article by Erminia Colucci who outlined several ideas on how to get participants engaged in a subject. One that will be used is a box collage. Pictures from various magazines, and internet will be used, a printer for printing pictures from a phone will be provided, empty boxes (cereal or pasta), glue, markers, and scissors. Participants will be asked to find pictures of their strengths and weaknesses about teaching and glue their strengths to the outside of the box and place their weaknesses inside the box.

When the participants are finished with the boxes, they will be asked if they are comfortable, in sharing at least one strength and one weakness. They will be recorded on index cards, topics that are similar/alike will be grouped together on the wall. Discussion will be asked for clarification purposes and development of questions. The hope of this activity is to have participants comfortable with each other and sharing their honest opinions about the initiative.

After the activity the following questions will be asked to the whole group:

- What training and/or tools do you as teachers need to teach students?
- What tools are needed so students can learn?
- What kind of professional development do you think is needed for this kind of initiative?
- How do you see this curriculum being taught?

- How much extra time do you think might be needed to teach a new intervention?
- What kind of barriers do you see with this initiative?
- What if any partners should be included for this initiative to be successful?
- This is a gardening initiative, what are some weaknesses when it comes to gardening?
- When cooking with the kids what are some strengths and weaknesses?

The project coordinator will lead the questioning, making sure that all participants have agreed the focus question discussion will be recorded, so that the project coordinator can listen and capture anything that was missed in the notes. The answers will then be qualitatively coded to find similar/alike topics, subjects or themes.

Appendix C-Budget

Focus Group Costs (2)

Nutrition Education Leader	\$24/hour	\$96	
Provider/Teacher	\$16/hour	\$32	
Snacks		\$100	
Total cost			\$228

Professional Development Costs

Nutrition Education Leader	\$24/hour	\$192	
Provider/Teacher	\$16/hour	\$128	
Horticulturist	\$35/hour	\$70	
Web Designer	\$50/hour	\$100	
Lunch and Snacks		\$500	
Supplies:			
Lesson Binders		\$900	
Markers, glue, paper, soil, plant pots, seeds, etc		\$300	
Children's book for lesson		\$270	
Miscellaneous supplies		\$200	
Total cost			\$2660

Lesson Supply Costs

Horticulturist visits		\$350	
Web designer assistance		\$3000	
Pots for beginning planting		\$50	
Potting Soil		\$100	
Indoor Greenhouses		\$150	
Seeds		\$40	
Gardening kids tools		\$200	
Kids wheel barrels		\$280	
Watering hose		\$200	
Watering cans		\$90	
Groceries for recipes		\$300	
Cutting boards		\$60	
Safety knives		\$60	
Veggie scrubbers		\$150	
Miscellaneous supplies		\$500	
Total Costs			\$5330

Field Trip Costs

Transportation costs		\$900	
Garden bags		\$150	

Take home produce	\$300
Farmers Market \$5 tokens	\$300
Total cost	\$1650

Farmers Market Family Night Cost

Voucher/coupons for each family	\$25/family	\$2500	
Lanyards for passports		\$30	
Garden bag		\$200	
Incentives for passports		\$500	
Total cost			\$3230
Miscellaneous costs			\$500
Total Project Cost			\$11,948

Appendix D: Outline for Provider/Teacher Workshop/Training

Outline for Provider/Teacher Workshop/Training

This training will be 8 hours, it can be a whole day training or split up into 2–4-hour training or 4-2-hour training. Food will be provided, and providers/teachers will be paid for their time spent at the training(s). The trainings will consist of teaching the lessons and the activities associated with them. A horticulturist will be part of the training to present on how to plan and plant a garden. A web designer will also take part in the training to introduce the website, how to create parents' classroom letters, how to access and use Zoom, and participate in group chats and blogs.

Example of an 8-hour training

Welcome and Introductions of Trainers (10 minutes)

Icebreaker and introduction of providers/teachers (20 minutes)

- State your name, how long you have been working in childcare, and how do you like to eat your vegetables.

Agenda for the day (this can be split up if presenting on multiple days) (5 minutes)

Overview of Initiative (30 minutes)

- Distribute binders-one per teacher/provider
- Describe the design of the project

Lesson Series One (45 minutes)

- How to teach the lesson
- Peer led teaching or teaching by nutrition leader
- Questions

Break (15 minutes)

Lesson Series Two (45 minutes)

- How to teach the lesson
- Peer led teaching or teaching by nutrition leader
- Questions

Lesson Series Three (45 minutes)

- How to teach lessons
- Peer led teaching or teaching by nutrition leader
- Questions

Lunch-(provided) (30 minutes)

Lesson Series Four (45 minutes)

- How to teach lessons
- Peer led teaching or teaching by nutrition leader
- Questions

Lesson Series Five (45 minutes)

- How to teach lessons
- Peer led teaching or teaching by nutrition leader
- Questions

Lesson Series Six (45 minutes)

- How to teach lessons
- Peer led teaching or teaching by nutrition leader
- Questions

Break with provided snack-recipe from lesson series (15 minutes)

Horticulturist (45 minutes)

- Garden picture sheets
- Garden education
- Questions


Website Coordinator (45 minutes)

- Website overview
- Using templates for newsletters
- Zoom and blogs
- Questions

Final thoughts and adjourn

Appendix E: Lesson Series


Vegetable Lesson-Inspecting Vegetables



Vegetable Lesson

Inspecting Vegetables

Time: 30 minutes





Supplies

- Book Growing Vegetable Soup by Lois Ehlert
- Several fresh vegetables i.e. corn, lettuce, carrots, cucumber, beets, sweet potatoes
- Have canned and frozen of at least two vegetables
- Cutting board
- Knives-safety knives for kids
- Magnifying glasses
- Plastic tweezers
- Kid microscope (if have one)

Activities

- Read the book Growing Vegetable Soup by Lois Ehlert
- Explain to kids importance of eating vegetables-eat a rainbow of vegetables
- Have kids wash hands with soap
- Let kids inspect the different vegetables
- Inspect fresh and frozen varieties
- Cut fresh vegetables and inspect them-look for colors, seeds, touch, smell
- Encourage to taste vegetables, use modeling skills






Notes

- When selecting fresh vegetables select some that the kids are familiar with and some they are not familiar with
- Remember to use modeling when presenting vegetables, so kids have positive feelings about them
- Use left over vegetables for a new recipe or roast them for a menu item

Goals

- Identify vegetables, some new
- Learn about benefits
- Understand what Eat a Rainbow means
-



Vegetable Lesson-Planting Vegetable Seeds



Vegetable Lesson

Planting Vegetable Seeds

Time: 30 minutes



Supplies



- Growing Vegetable Soup book by Lois Ehlert
- Vegetable Seeds
- Small growing containers-one for each child
- Dirt
- Spoons
- Water
- Growth chart
- Sunlight space or grow light
- Small water can
- Popsicle sticks

Activities

- Read the book Growing Vegetable Soup by Lois Ehlert
- Let children choose what kind of seed they would like to plant and container
- Write name on container and what kind of seed it is or on popsicle sticks
- Let children put dirt and plant seed in container, making sure the seed is covered by dirt and is watered
- Place seed containers in sunlight
- Give each child a growth chart to record water and growth
- Record observations daily
- Water as needed, but check daily



Notes

- Seeds will be planted inside then replanted outside after 6-8 weeks of growth
- Have several varieties of seeds that grow easily and quickly for best results
- Instead of writing name of vegetable on container can use popsicle sticks for identification
- Pick seeds according to when planting season-can plant at different times to stretch out planting and include more kids due to absence



Goals

- Learn how vegetables are grown
- Learn about where vegetables come from
- Observation skills
- Practice patience
- Art skills (drawing what plant looks like)



Vegetable Lesson-Cooking

Vegetable Lesson

Cooking with Vegetables



Time: 30 minutes (6 hours for soup to cook)

Supplies

- Growing Vegetable Soup book by Lois Ehlert
- Recipe for Vegetable Soup
- Ingredients for the soup: 1 onion, 2 potatoes, 4 stalks celery, 5 carrots, 3 tomatoes, 6 cups chicken broth, salt, pepper, parsley
- Crockpot
- Cutting board
- Knife, safety knives for kids
- Big Spoon
- Bowls and soups to eat soup
- White, red, green paper
- Googly eyes
- Glue

Activities

- Read the book Growing Vegetable Soup by Lois Ehlert
- While reading book stop at pages to ask questions about tools, planting, watering, sunlight, harvesting, washing
- Wash hands with soap before preparing to make soup
- Make Vegetable Soup-have kids help cut up vegetables, put ingredients in soup, and stirring
- While soup is cooking make paper tomatoes (instructions on back)
- Eat soup together, family style



Notes

- This lesson is part of a series for the book Growing Vegetable Soup by Lois Ehlert
- Take pictures (with permission)
- Talk about the vegetables in the book and as the soup is being prepared
- Can add other vegetables to soup i.e sweet potatoes, broccoli, cauliflower, rutabaga or anything else that was grown in the garden
- If the classroom has pretend play add a pretend vegetable soup set

Goals

- Identify vegetables
- Recall how vegetables are grown
- Hands-on experience with cooking utensils
- Promote self-efficacy
- Following Directions

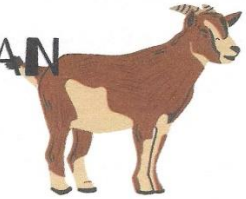


Vegetable Soup Lesson-Community Soup



VEGETABLE SOUP LESSON PLAN

Community Soup



Supplies



- Community Soup book by Alma Fullerton
- Ingredients for soup recipe in Community Soup book
- Big pot for soup
- Hand washing supplies
- Cutting boards, safety knives, spoons, measuring cups, measuring spoons
- MyPlate

Activities

- Show cover of the book, ask if they remember what the book is about before reading it
- Explain and read the recipe that they are going to make Pumpkin Vegetable Soup today with their help-assign everyone a job
- Wash hands before preparing to make the soup
- Using MyPlate ask where the ingredients belong
- When the soup is done eat it together family style
- Send copies of the recipe home with the kids



Notes



- Make sure you have a job for everyone when making the soup, cleaning vegetables, cutting vegetables, putting ingredients in the pot, stirring, setting table, cleaning up
- To help with directions you could make the soup before the lesson and take pictures of what the steps would look like
- Make copies of the recipe so they can take it home and make it

Goals

- Identify vegetables in the book
- Can use vegetables to make a healthy soup
- Use my MyPlate for vegetable and dairy group



Visiting a Garden Lesson



VISITING A GARDEN LESSON PLAN

Community Soup



Supplies

- Community Soup book by Alma Fullerton
- Set up a field trip to a produce farm or community garden to visit
- Permission slips for visiting a garden
- Arrange for guided tour by the farmer or master gardener
- Arrange so kids can pick 3 vegetables/fruits to take home
- Vegetable garden bag for kids to take home selected fruits/vegetables
- One recipe that includes selected fruit/vegetable to take home so they can prepare with family also include a note for the parents explaining the objective of the take-home produce and recipe



Activities

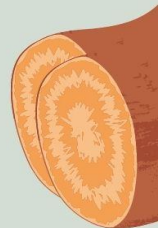
- Show the cover of the book, ask if they remember what the book is about before reading it
- Ask the kids where the book takes place (garden)
- Tell them they are going to visit a garden and explain procedures and rules before leaving
- Give them some things to look for at the garden so they can be discussed after the field trip or the next day.
- When the time is appropriate give them their produce bags and let them pick 3 to take home
- Have available recipes to put in their bags before they leave so they can make it at home with their families

Notes

- Besides the vegetables in the book have other foods so kids can determine what part of a plant they are
- An activity sheet called Eating the Parts of the Plant is provided kids can either draw the different parts of place real food in the correct boxes

Goals

- Identify vegetables in the book
- Identify different fruits/vegetables and how they are grown
- Make a recipe with family at home



I can eat a **WHOLE** plant

Seeds →

Flower →

Stem →

Leaves →

Roots →

Plant Parts Salad

Plant Parts Salad

Plants Feed Me by Lizzy Rockwell

Supplies

- Plants Feed Me book
- Fresh vegetables, one leaf, one root, one stem, one flower, one seed-can use book as a guide
- Cutting board
- Kid safe knives
- Big bowl
- Salad bowls
- Serving spoon
- Forks or spoons
- Salad Dressing (optional)

Activities

- Read the Book Plants Feed me by Lizzy Rockwell
- As you read the book point out vegetables and where they belong on plant
- Look at plants and let kids decide what parts we eat
- Wash and prepare parts for a "Plant Parts" Salad giving kids jobs to help make it
- While eating ask kids what other parts could be added

Notes

- Another activity for this lesson is to do the Planting Food Scraps from the Garden Storyboard so the kids can see how roots grow.
- Having the kids help with preparing the salad helps with them trying it.
- Make sure to eat with the kids!
- Could make homemade salad dressing to go with the salad

Goals

- Observe and identify plant parts
- Help prepare a salad using different parts of plants

Garden Hats

Garden Hats

Plants Feed Me by Lizzy Rockwell

Supplies

- Plants Feed Me by Lizzy Rockwell
- Newspapers (2-page spread)
- Packaging tape or masking tape
- Markers
- Stickers
- Colored paper
- Glue

Activities

- Read the book Plants Feed Me
- Ask questions about the garden and what vegetables they would like to plant (continue planning)
- Make a garden hat using newspapers
- Have children decorate with markers, stickers, colored paper
- Find a place to store their hats so they can be worn when working outside in the garden

Garden Hat Directions

- Place the middle of the newspaper on top of the child's head
- Push the paper around the child's head and tape the newspaper around their head
- Curl up the edges to make the brim of the hat-this can be taped to secure it
- Let the children decorate it however they would like with stickers, colored paper and markets

Goals

- Make a garden protec heads from the sun
- Working together

Start Planning

Start Planning

Plants Feed Me by Lizzy Rockwell

Supplies

- Plants Feed Me by Lizzy Rockwell
- Pictures of vegetables or fruits that can be grown in a garden
- Chart paper or poster board
- Markers
- Stickers

Activities

- Read the book *Plants Feed Me*
- Introduce the idea of starting to plan the garden
- Pass the vegetable/fruit pictures around, explaining what they are
- Have the kids put a sticker on the pictures they think should be included in the garden
- After seeing all the cards make a graph and determine which ones got the most votes

Goals

- Begin to plan what vegetables/fruits to plant in garden
- Children share preferences and cultural connections

Notes

- Explain that planning is important to planting a successful garden.
- Be sure to share the results of the voting with the parents (share graph, parent newsletter)

Floating Fruits

FLOATING FRUITS

A Fruit is a Suitcase for Seeds
by Jean Richards

Supplies

- Book A Fruit is a Suitcase for a Seeds by Jean Richards
- Variety of fruits-make sure one is an orange
- Large clear container filled with water
- Optional: Chart paper to make a chart of guess and whether they float or not

Goals

- Experiment and guess whether fruit will float or not-with or without peels
- Learn about something that a scientist might do pertaining to this lesson

Activities

- Read the book A Fruit is a Suitcase for Seeds
- Talk about how peels protect fruit and seeds
- Tell the kids they are going to be scientists today-explain what scientists do (experiment with things)
- Start with the orange and ask them if they think it will float if you put it in the container of water you have
- Peel the orange and ask them if they think it will float or not
- Tell them the peel has air inside of it that helps the orange to float
- Repeat with other fruits
- Optional: make a chart of guesses and what happened

Fruit Investigation

FRUIT INVESTIGATION

A Fruit is a Suitcase for a Seed
by Jean Richards

Supplies

- Book A Fruit is a Suitcase for Seeds by Jean Richards
- Variety of Fruit with and without edible peel
- Safety knives
- Cutting board
- Muffin cups

Activity

- Read the book A Fruit is a Suitcase for Seeds
- Wash and dry and fruit
- Ask if they can name the fruits
- Ask which ones you can eat with peel
- Talk about how the peel protects the fruit and seeds
- Cut peels off and talk about the differences, thickness, color, smooth, rough etc
- Explain what the word edible means
- Let them taste each fruit or encourage them to lick it if they are hesitant to try it
- Optional: Make a fruit salad with the fruit
- Optional: Take pictures of the kids trying the fruit

Goals

- Discover what fruits can be eaten with or without peels
- Learn what the word edible means

Making Juice

MAKING JUICE

A Fruit is a Suitcase for Seeds
by Jean Richards

Supplies

- Book A Fruit is a Suitcase for a Seeds by Jean Richards
- Variety of fruits or vegetables
- Hand held juicer with clear bottom attached or electric juicer
- Knife (for teacher use)
- Mini pitchers for juice
- Mini disposable cups for taste testing

Goals

- Learn how to make juice
- Taste test to see which ones taste best
- Learn benefits of fruit/vegetable whole fruit

Activities

- Read the book A Fruit is a Suitcase for Seeds
- Talk about how fruits and vegetables can make juice
- Talk about which fruit/vegetables or combinations would make the best juice
- Point out the texture of fruit/vegetables before juicing them
- Start with a juicy fruit/vegetable for kids to first squeeze with their hands then use a juicer (handheld or electric) to juice
- Repeat with other fruits
- Combine some of the juices at the request of the kids to see if they taste good as a combination
- Ask if the texture is the same as it was before the fruit/vegetable was juiced
- Explain that 100% juice is good for you but eating whole fruit/vegetable is best because of fiber and nutrients in skin/peel
- Optional: vote to see which one is the favorite

Credit to JMG Junior Master Gardener

Plant Experiment

From Seed to Plant by Gail Gibbons

Activity

Supplies

- From Seed to Plant book
- Ziploc bags
- Soil
- Seeds
- Water
- Cotton balls
- Chart graph paper or take home grow charts

Goals

- Learn about what an experiment is
- Compare different way to start seeds

- Read book From Seed to Plant
- As reading the book point out how plants are grown & what they need to grow
- Tell the kids they are going to be scientists and do an experiment
- Give each child 2 Ziploc bags, in one bag fill it half full with soil, in the other add cotton balls, add the same kind of seeds to each bag (beans or lettuce grow best)
- The kids can take them home to watch them grow, or have a place in your classroom near a window to watch them grow
- Record the growth progress on a chart in the classroom or have the kid chart it on their own charts



Planting Plants

From Seed to Plant by Gail Gibbons

Supplies

- From Seed to Plant book
- Plants (either purchased or ones that have been grown by the kids)
- Horticulturist visit
- Watering cans
- Garden tools
- Garden area or raised beds
- Label what the plants are
- Growth chart

Activity

- Read book From Seed to Plant
- As reading the book point out how plants are grown & what they need to grow in a garden
- Talk about what kind of plants they want in their garden that they will try if given
- Invite the horticulturist to talk to the kids about their garden and how to plant their plants either in the garden or raised beds
- Have each child plant at least one plant
- Label plants
- Develop job chart for garden
- Chart growth

Goals

- Learn about what is needed for plants to grow
- Learn about how to plant a plant into a garden or raised bed



Plant Diagram

From Seed to Plant by Gail Gibbons

Supplies

- From Seed to Plant book
- Colored cardstock
- Cupcake liners
- Green straws or green pipe cleaners
- Sunflower seeds
- Markets/crayons
- Scissors
- Glue

Activity

- Read the book From Seed to Plant
- As reading the book point out how plants are grown & what they need to grow in a garden
- Talk about how a seed grows
- Show an example of 3D they will be make-display for reference (picture insert)
- Pass out supplies
- Remember to let kids make it the way they want
- Display the finished diagrams

Goals

- Learn about the parts of a plant
- Make a diagram of the plant parts



Farmer's Market Activity

FARMER'S MARKET ACTIVITY

A Visit to the Farmer's Market by Peggy Sissel-Phelan, EdD

Supplies

- A Visit to the Farmer's Market book by Petty Sissel-Phelan
- food or pictures of food that is available at the farmer's market
- Farmers Market bags
- Baskets for fruit/vegetables (display)
- Labels and price tags for baskets
- Cash register
- Play money/tokens
- Baskets or bags to shop/gather
- If available to you-farmers market stand

Activity

- Read A Visit to the Farmer's Market book
- As you read the book point out the different things that are at the market
- Set up a pretend farmers market in the classroom using fake or pictures of fruits and vegetables that are available at farmers' markets
- Have kids "shop" the market with pretend money and let them take turns playing different roles of market personnel ie. farmers, cashiers, managers

- Children get familiar with a farmers market before they visit
- If space is an issue visit Farmer's Market Busy Bag Idea (momswhothink.com)



Farmer's Market Taste Test

FARMER'S MARKET TASTE TEST

A Visit to the Farmers' Market by Peggy Sissel-Phelan

Activity

Supplies

- Fruits/vegetables found at Farmers' Market
- Scrub brushes
- Cutting boards
- Knives
- Plates
- Knapkins
- Variety of dips
- Serving bowls or plates
- Tongs
- Optional chart paper

Goals

- Introduce new fruits/vegetables
- Making their own snack

- Read the book A Visit to the Farmers' Market
- Talk about what you can find at the market
- Explain that they are going to make a snack from things found at the market
- Either prepare the produce ahead of time or have kids help
- Put one fruit or vegetable in separate bowls or plates and place them out like a buffet
- Let kids serve themselves
- Eat together and discuss what they like/dislike about what they chose



Farmer's Market Food Groups

FARMER'S MARKET FOOD GROUPS

A Visit to the Farmers Market by Peggy Sissel-Phelan

Supplies

- MyPlate poster
- Pictures of items that are at a Farmers Market (laminated)
- Baskets labeled with food groups
- Bags or baskets to shop with



Goals

- Name fruit and vegetables
- Identify where food belongs in food groups

Activity

- Read the book A Visit to the Farmers Market
- Talk about all the foods available at the farmer's market
- Use pictures of available products at the market and identify where they go on MyPlate
- Display MyPlate poster and explain MyPlate activity of identifying what food group each food belongs to
- For this activity, children will gather food from baskets and place them into the correct food group basket



Appendix F: Garden Storyboards

Making a Pot From A Newspaper

MAKING A POT FROM A NEWSPAPER

From Lindy-Cottage Hill



- If you don't have the money to buy pots for planting you can make them from newspapers. Even grocery store ads would work



- Fold the newspaper into thirds, and wrap it around a soup can about 1/4 of an inch from the top of the can. Use tape to secure it



- Flip the can onto its top and start folding the bottom inward like the the picture. .



- After all the edges are folded in secure the bottom with tape.



- Flip it over so that the folded part is on the bottom.



- Slip the can out and there you have a pot for planting!

Photo credit to http://www.myfreecopyright.com/registered_mcn/bkc87_ussyv_d5d5g

More Scraps That Can Be Regrown

MORE SCRAPS THAT CAN BE REGROWN

Adapted from i Creative Ideas!



Romaine Lettuce can be regrown by first putting the stump into a dish with water, when new leaves sprout plant it in soil and watch it grow!



Green onions can be regrown by cutting them 1/2 inch from the roots and placing them in water. No need to plant them in the ground, they keep growing in the water. Change the water weekly.



Regrow celery by cutting off the base and placing it in a bowl of water. After the new leaves sprout from the middle transfer it to soil.



Sweet potatoes can be regrown by place it in a jar of water in direct sunlight. After it has really sprouted it can be planted in soil



Leeks can be regrown by cutting them about 2 inches from the roots and place them in a glass of water. After about a week they will sprout and can be planted in soil.



Basil can be grown by placing stems with leaves in water. Wait for the roots to grow about 2 inches before planing them in soil.

Photo credit to iCreative Ideas

Planting a Seed

PLANTING A SEED



Pick a seed that you would like to plant



Pick a pot and fill it with dirt. You might want to put what kind of seed you are going to plant on the outside of your pot.




Poke a hole in the dirt and put your seed in the hole



Cover the seed with dirt and water it



Place the cover on your pot and place it in a sunny place

Growth Chart of their 

2	Day 3
6	Day 7

Draw a picture of what happens to your seed on your growth chart



Planting with Kitchen Scraps

PLANTING WITH KITCHEN SCRAPS

Planting Carrot Tops for Carrot Greens



- Trim the leaves off the carrots so they are not any longer than 1/2 inch.



- Fill a shallow bowl or dish with water and place the carrot top in the water



- Place the bowl in a sunny place and water it every day so it does not dry out



- When the tops start sprouting and the tops get a few inches tall, in about 7-14 days, plant it in moist ground where it will get sunlight



- Remember you won't grow any carrots but you can eat the carrot greens!



- You can use carrot tops in soups or salads or make a pesto to use a dip while trying other vegetables from the garden

Appendix G Children's Survey

Process Evaluation

Did you like making the recipes with fruits and vegetables?



Did you make any of the recipes at home?



Did you like gardening?



Did you like eating the fruits and vegetables from the garden?



Did you like reading the books about fruits and vegetables?



Outcome Evaluation

Improved Attitudes

Do you like eating carrots?



Do you like eating eggplant



Do you like eating lettuce?



Do you like eating cantaloupe?



Appendix H Childcare Provider/Teacher Survey (only post)

This survey is to collect information about the fruit and vegetable program that you participated in. Please be honest in your answers as it will be used for future programming. All your answers will be kept confidential and will be anonymous.

1. What is your role at the childcare?
 - a. Administration
 - b. Teacher
 - c. Teacher assistant
 - d. Childcare provider
 - e. Other
2. How many years have you been employed by your current employer?
 - a. Less than a year
 - b. 1-2 years
 - c. 3-4 years
 - d. 5-6 years
 - e. 7-10 years
 - f. 11 years or more
3. Before the fruit and vegetable intervention did you think the childcare did a good job of offering fruits and vegetables to the children?
 - a. Yes
 - b. No
4. Before the fruit and vegetable intervention did you do any gardening with the children?
 - a. Yes
 - b. No
5. If you did do some kind of gardening what did you do? (i.e. plant seeds in pots, garden on site etc.)
6. How many of the lesson series did you do with the children?
 - a. 1 series
 - b. 2 series
 - c. 3 series
 - d. 4 series
 - e. 5 series
 - f. 6 series

Process Evaluation

7. Did you like how the lesson series were written?
 - a. Yes
 - b. No
 - c. Sort of like them but I think they could have had _____
8. What did you like about the lessons?
9. What did you not like about the lessons?

10. Did you think the workshop on how to teach the lessons was beneficial?
 - a. Yes
 - b. No
11. What did you like about the workshop?
12. What did you not like about the workshop?
13. What do you think could be improved about the workshop?

14. Did you like having a horticulturist to help with the garden activities?
 - a. Yes
 - b. No
15. Did you attend the family day at the farmers market?
 - a. Yes
 - b. No
16. Did you think the family day at the farmers was a good activity for the families?
 - a. Yes
 - b. No
17. Did you like the field trip to the produce farm?
 - a. Yes
 - b. No
18. Why or why not did you like the produce farm field trip?

19. Do you think the activities increased the children's likeness to try new fruits and vegetables?
 - a. Yes
 - b. No
20. Do you think gardening with the kids helped you with your likeness to try new fruits and vegetables?
 - a. Yes
 - b. No
21. Did the produce from the garden supply menu items for the childcare?
 - a. Yes
 - b. No
 - c. Just provided a taste test after harvesting
22. Did the fruit and vegetable program help you personally with intakes of fruits and vegetables?
 - a. Yes
 - b. No
23. Do you think the fruit and vegetable program helped with intakes of fruits and vegetables of the children? In other words, do you think they ate more fruits and vegetables?
 - a. Yes
 - b. No
24. Did you like the fruit and vegetable program included a gardening component?
 - a. Yes

b. No

25. Did you think that by involving the parents with the program helped with the children trying new fruits/vegetables? Why or why not?

26. What do you think needs to be improved in the program? (All suggestions are welcome)

Outcome Evaluation

27. How many fruits should a child eat every day?

- a. One
- b. Two
- c. Three
- d. Four or more

28. How many vegetables should a child eat every day?

- a. One
- b. Two
- c. Three
- d. Four or more

29. Do different fruits and vegetables provide different vitamins and minerals?

- a. Yes
- b. No
- c. I am not sure

30. Is it important to eat green fruit and vegetables daily?

- a. Yes
- b. No
- c. I am not sure

31. Potatoes, carrots, and turnips are all a _____ vegetable?

- a. Leaf
- b. Stem
- c. Root
- d. Flower

32. What ways can you eat a vegetable?

- a. Raw
- b. Boiled
- c. Roasted
- d. Pan fried
- e. All of the above

33. What are the three things a plant needs to grow?

- a. Soil, water, sunlight
- b. Wet soil, raised bed, rain
- c. Water and sunlight

34. What is the best way to purchase fruits and vegetables?

- a. Canned
- b. Frozen
- c. Fresh

35. A fruit always begins growing from a flower

- a. Yes
 - b. No
 - c. I am not sure
36. Should I wash fruits and vegetables before putting them in the refrigerator?
- a. Yes
 - b. No
 - c. I am not sure
37. It is important to plan before planting a garden?
- a. Yes
 - b. No
 - c. I am not sure
38. It is okay to start seeds inside before planting them outside?
- a. Yes
 - b. No
 - c. I am not sure
39. According to the USDA dietary guidelines half of your plate should be fruits and vegetables?
- a. Yes
 - b. No
 - c. I am not sure

Appendix I Parent Survey

Parent Pre-Post Survey

This is a survey to determine what habits and knowledge your family has before the Fruit and Vegetable Intervention. Please be honest with your answers as it influences future programming at the childcare center. All answers will be kept confidential.

1. How many children do you have enrolled in the childcare?
 - a. 1
 - b. 2
 - c. 3
 - d. 4 or more
2. Is your child(ren) enrolled full-time or part-time?
 - a. Full-time
 - b. Part-time
3. How long has your child been enrolled at this childcare?
 - a. Less than a year
 - b. 1 year
 - c. 2 years
 - d. 3 years
 - e. 4 or more years
4. On an average week how many fruits and vegetables are on your menu?
 - a. 1-2
 - b. 3-4
 - c. 5-6
 - d. 7 or more
 - e. none
5. Are they mostly:
 - a. Fresh
 - b. Frozen
 - c. Canned
6. When choosing fruits and vegetables to feed to your family what do you prefer?
 - a. Fresh
 - b. Frozen
 - c. Canned
7. What, if any, is a barrier to having fresh fruits and vegetables on your menu?
 - a. Cost
 - b. Time
 - c. Finding good tasting fruits and vegetables
 - d. My family does not like them
 - e. Too hard to prepare
 - f. Do not have any good recipes
 - g. Other, please specify
 - h. No

Process Evaluation

8. Do you intend to reference the blog for information?
 - a. Yes
9. No Is your family willing to try new fruits and vegetables?
 - a. Yes
 - b. No
10. Does your family prefer fruits or vegetables?
 - a. Fruits
 - b. Vegetables
 - c. No preference
11. Do you intend to participate in the take home activities with your child?
 - a. Yes
 - b. No
12. Do you intend to participate in any of the zoom meetings?
 - a. Yes
 - b. No

Outcome Evaluation

13. How many fruits should a child eat every day?
 - a. One
 - b. Two
 - c. Three
 - d. Four or more
14. How many vegetables should a child eat every day?
 - a. One
 - b. Two
 - c. Three
 - d. Four or more
15. Do different fruits and vegetables provide different vitamins and minerals?
 - a. Yes
 - b. No
 - c. I am not sure
16. Is it important to eat green fruit and vegetables daily?
 - a. Yes
 - b. No
 - c. I am not sure
17. Potatoes, carrots, and turnips are all a _____ vegetable?
 - a. Leaf
 - b. Stem
 - c. Root
 - d. Flower
18. What ways can you eat a vegetable?
 - a. Raw
 - b. Boiled
 - c. Roasted
 - d. Pan fried

- e. All of the above
19. What are the three things a plant needs to grow?
- a. Soil, water, sunlight
 - b. Wet soil, raised bed, rain
 - c. Water and sunlight
20. What is the best way to purchase fruits and vegetables?
- a. Canned
 - b. Frozen
 - c. Fresh
21. A fruit always begins growing from a flower
- a. Yes
 - b. No
 - c. I am not sure
22. Should I wash fruits and vegetables before putting them in the refrigerator?
- a. Yes
 - b. No
 - c. I am not sure
23. It is important to plan before planting a garden?
- a. Yes
 - b. No
 - c. I am not sure
24. It is okay to start seeds inside before planting them outside?
- a. Yes
 - b. No
 - c. I am not sure
25. According to the USDA dietary guidelines half of your plate should be fruits and vegetables?
- a. Yes
 - b. No
 - c. I am not sure

Appendix J: Additional Curriculums

Below are curriculums that promote fruit and vegetable and the Farm to Early Childhood initiatives. They may be helpful when lessons provided with the project do not fit the needs or the teacher wants more enrichment activities.

Grow It! Try It! Like It!

A nutrition education kit that uses MyPlate is a garden-themed curriculum for child care center staff that introduces seven booklets featuring peaches, strawberries, cantaloupe, spinach, sweet potatoes, and crookneck squash. It includes hands-on activities, planting activities, and nutrition education activities. Available as a child care center or family child care kits. Free from USDA

Family childcare; <https://www.fns.usda.gov/tn/grow-it-homes>

Center childcare: <https://www.fns.usda.gov/tn/grow-it>

Grow Getters: Garden-Based Education

The “Grow Getters” series consists of lessons to engage youth in hands-on activities even without a garden! The lessons include key topics of the gardening process along with physical activities. Each lesson includes a book suggestion, vocabulary and three activities. All lessons are written with classrooms and childcare centers in mind. Free from South Dakota University State University Extension

Lessons available online: <https://extension.sdstate.edu/grow-getters-garden-based-education-preschool-3rd-grades>

Learn, Grow, Eat & Go Early Childhood

A four week garden based curriculum that combines plant and garden learning, food exposure, physical activity and parent engagement built around plant part themes.

To purchase curriculum from Texas A&M AgriLife Extension: <https://jmgkids.us/earlychildhood/>

Reach for the Stars with Farm to Preschool

The purpose of the Reach for the Stars with Farm to Preschool Guide published by the North Carolina Farm to Preschool Network is to help childcare centers and home daycares integrate gardening and farm activities into their educational curriculums. It is organized by four activities: Edible Gardening with Young Children, Farm Field Trips/Farmer Visits with Young Children, Local Food Classroom Cooking, Taste Tests with Young Children, and Local Food Served in Meals and/or Snacks.

Available online: <https://growing-minds.org/wp-content/uploads/Reach-for-the-Stars-2020-2nd-Edition.pdf>

From Our Farms

From Our Farms is a fun-filled project by Rutgers University Cooperative Extension that teaches children and their families about the importance of good nutrition, local agriculture and the role farms play in communities and the environment. Activities are hands-on and use literacy to reach children and their families. The activities also include math, reading, writing and cognitive development.

To inquire about the program visit: <https://gloucester.njaes.rutgers.edu/fchs/from-our-farms/>

Harvest for Healthy Kids

Harvest for Healthy Kids was a joint effort by Portland University and the Mount Hood Community College Head Start and Early Head Start. It includes 13 lesson/kits that include color picture cards in different languages, information on the fruit or vegetable recipes, garden information, hands-on activities and family newsletters.

To register for free for the program: <http://www.harvestforhealthykids.org/>

How's it Growing

How's it Growing was designed in Twin Cities, Minnesota to be altered to meet the needs of any audience and a variety of schools. It's focus is on local food systems and healthy food choices. It also incorporates hands-on teaching components, and parent and community engagement.

For the free online curriculum: <https://howsitgrowingpreschool.wordpress.com/about/>

Appendix K: Farmers Market Family Night Poster



\$25 PER FAMILY TO SPEND AT MARKET
FLINT FARMERS MARKET

Add Time

Talk to farmers Extra prizes Cooking Demos

Tour the market Food safety tips

Contact: Your child's teacher to sign up

Appendix L: Farmers Market Family Night Preparation



Preparation

- Schedule night with Farmers Market
- Talk to farmers
- Prepare \$25 coupons
- Set up cooking demo instructor
- Develop sign-up list/qualtrics
- Order incentives-bags, prep tools, cutting boards etc
- Develop market tour and guides
- Develop passport for attendees
- Order lanyards for passports

Supplies

- incentive prizes
- \$25 coupons
- Bags
- Sign in list
- Passport lanyards
- Photo permission slips
- Camera or phone with a camera

Appendix M: Farmers Market Visit With Kids

FARMERS MARKET VISIT W/KIDS

Before the Visit

- Call/visit the Flint Farmers Market to arrange a time to visit
- Talk with market about area where kids can shop
- Arrange tokens/coupons for kids to spend at the market
- Obtain permission from the parents
- Arrange transportation
- Contact at least 2 farmers to talk to kids at the market
- Read the book A Visit to the Farmers' Market
- With the kids help come up with questions to ask the farmers
- Explain to kids they will get tokens/coupons and how to spend them

While at the market

- Visit the farmers and ask the prepared questions to selected farmers
- Tour the market
- Give kids their bags and tokens/coupons
- Have kids pick out 3 fruits/vegetables to take home

Goals

- Awareness of different types of produce
- Learn about local produce

Supplies

- Permission slips
- Market bags
- Tokens/coupons
- Class list

Appendix N: Classroom Newsletter Example



Classroom Newsletter



This Week in Class

This week in class we have looked at different fruits. We talked about how it grows, where it grows, and different ways to eat it. We read the book *A Fruit is a Suitcase for Seeds* by Jean Richards.

If you have not already please sign up for the Family Night at the Flint Farmers Market you can sign-up from our website. It is important to sign up so that we have enough materials and coupons for everyone attending.

The horticulturist came to visit to see how our garden is growing. It is doing quite well and we will be harvesting some strawberries probably next week. Please check the board to see what day we will be harvesting, so you can plan accordingly.



REMINDER

There are activities on the blog and website that you can do with your child to reinforce what we are doing during the day.

UPCOMING EVENTS

Field Trip to ABC Farm
Bring a Fruit to School for our fruit salad
Family Night at Flint Farmers Market

teacher@childcare.org

Photo Credit Getty Images/Xixinxing



Appendix O: Parent Engagement Ideas

Parent Engagement Ideas



This is a list of some activities that you could use for parent engagement at home. They could be posted on the website, used during Zoom discussions, or made into flyers to be sent home with the parents.

- After talking with the kids about parts of the plant suggest making faces with different fruits/vegetable edible parts
- Using a grocery store flyer have kids identify different fruits/vegetables. Let them pick out a new one to try.
- Growing some plants at home as well as in childcare. Let them try different places to see where they grow best.
- Make a recipe at home with the same fruit/vegetable that was used at daycare. Let the kids help in the preparation.
- Have several recipes available for parents to try with their kids.
- When preparing fruits/vegetables ask kids what part of the plant are being used
- Post a list of tips to help with tasting new fruits/vegetables or recipes
- Hold a Zoom cooking lesson that they can follow along with at home
- Ask parents to share pictures of the activities they do at home
-



Appendix P: Timeline

