BEE SMART, EAT SMART: A POLLINATED FOODS GARDEN CURRICULUM TO IMPROVE CHILDREN'S PREFERENCES FOR FRUITS AND VEGETABLES

by

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(Under the Direction of Caree J. Cotwright)

ABSTRACT

Low fruit and vegetable consumption among youth is a public health concern in the United States (US) with less than 10% of children and adolescents consuming the recommended amounts of fruits and vegetables (FV). The lack of fruits and vegetables in the diet can increase children's risk for many chronic diseases such as obesity. Since pollination is one step that must occur for the growth FV, researchers chose to make honey bee pollination an underlying theme of the curriculum. A gardening curriculum on pollinated FV may be a promising way to improve preferences for FV among this population. The BSES curriculum includes lessons pertaining to cooking, nutrition, and gardening to teach about fruits and vegetables. The overall goal of this intervention/control pilot study is to determine if the *Bee Smart, Eat Smart* (BSES) curriculum will influence children's knowledge of FV, attitudes towards FV, and willingness to try FV.

INDEX WORDS: nutrition education, cooking, garden, pollinators, fruits and vegetables, curriculum, youth

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DEDICATION

This paper is dedicated to my parents and grandparents, who have instilled in in me a strong desire for excellence and have taught me what it means to endure in the face of adversity. This thesis would not be possible without their constant support and encouragement to press forward toward my dreams.

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CHAPTER 1

INTRODUCTION

The increase in childhood obesity prevalence across the nation is a major public health concern. The national childhood obesity rate is 18.5 percent and has increased significantly from the national rate of 13.9 percent seen in 1999-2000 (Segal et al., 2017). Not only can obesity in childhood lead to prolonged obesity into adult years, but it can also contribute to various comorbidities such as type 2 diabetes, hypertension, cardiovascular and respiratory diseases (Gatto et al., 2017). Increasing fruit and vegetable consumption is one proposed approach to promoting a healthy weight among children. However, less than 10% of children and adolescents in the United States are consuming the recommended amounts of fruits and vegetables (Olsho et al., 2015). Fruits and vegetables contribute key nutrients to the diet and are necessary for the growth and development of children. Individuals are encouraged to focus on variety and nutrient density by including different subgroups of vegetables such as red, orange, and dark leafy greens; in addition to various colors of fruits. The Dietary Guidelines for Americans encourages individuals to strive for a healthy intake of both fruits and vegetables (HHS & USDA, 2015). Specific recommended amounts per day vary by age, sex, and physical activity level, but one recommendation that remains consistent across the lifespan is to fill half your plate with fruits and vegetables at every meal. Research has shown that childhood is an important stage for influencing fruit and vegetable consumption (Birch, 1999).

Social modeling of healthy behavior is one method of changing childrens' attitudes towards and willingness to try fruits and vegetables to increase consumption in the long term (Birch, Savage, & Ventura, 2007). Several studies have explored the use of garden-based and cooking nutrition education interventions in school and community settings; and have found varied success (Berti, Krasevec, & Fitzgerald, 2017). However, there are currently no fruit and vegetable focused garden curricula that address pollination and its key role in growing fruits and vegetables. *Bee Smart, Eat Smart* is a curriculum

that will spark conversations around pollination while also improving attitudes and willingness to try fruits and vegetables.

Project Partnership

The proposed study is *innovative* in that it will model how universities, state botanical gardens, and food banks can work together to show the connection between nature and human health. This project was sparked by the interests of a donor who saw the need for a children's garden curriculum focused on cooking and nutrition that could meet the mission of both the State Botanical Garden of Georgia and the Food Bank of Northeast Georgia in Clayton, Georgia. The State Botanical Garden of Georgia saw a need to address the role of insect pollinators, such as honey bees, in the growth of fruits and vegetables. We then used a modified version of the *Bee Smart, Eat Smart* curriculum to serve economically disadvantaged populations in the Clayton, Georgia. This partnership offers a unique model, and the outcomes observered through this study will be a *substantial contribution* to the knowledge base which explores the role of a partnership to provide nutrition education interventions; specifically, in environments outside of a school setting. Further, *Bee Smart, Eat Smart* is a is a curriculum that will spark conversations around insect pollination and fruits and vegetables among children. Insect pollinators such as honey bees play a role in the growth of fruits and vegetables. In recent years important pollinators such as honey bees have been declining. Increasing understanding of the connection between nature and the fruits and vegetables we eat can have a *significant positive impact* in community efforts to improve fruit and vegetable consumption among children.

CHAPTER 2

LITERATURE REVIEW

Fruit and Vegetable Consumption Among Children & Childhood Obesity

Fruits and vegetables provide many vitamins and minerals necessary for growth and development; and a diet rich in fruits and vegetables is deemed protective against specific chronic diseases including cancers, type 2 diabetes, and even obesity. However, there has been a rise in chronic diseases in the United States. Currently, only 12.2 % of adults meet daily fruit intake recommendations and 9.3% of adults meet daily vegetable intake recommendations (CDC, 2018). With this, low fruit and vegetable consumption has also been observed among school aged children. Less than 10% of US children and adolescents consume the recommended amounts of 1-2 cup-equivalents of fruits and 1-3 cup-equivalents of vegetables (Olsho et al., 2015); and unfortunately, adherence to these recommendations declines with age (Moore, Thompson, & Demissie, 2016). When looking at obesity geographically by state, states reporting higher intakes of fruits and vegetables have lower rates of obesity (Struempler et al., 2014). Children in Georgia are consuming approximately 1 serving of fruit and 1 serving of vegetable daily, which is significantly lower than the recommended amount.

One potential explanation for associations observed between high fruit and vegetable consumption and low obesity rates is an establishment of energy balance. Fruits and vegetables are low-energy density and can contribute to weight management when consumed in place of foods with higher energy density. Researchers in a 2001 observational study found higher fruit and vegetable consumption associated with lower instances of overweight in a group of 634 children ages 7 to 11 (Rudolf, Sahota, Barth, & Walker, 2001). Additionally, a cohort study conducted by Maynard, Gunnell, Emmet, Frankel, & Davey (2003) researchers found increased childhood fruit intake was associated with a reduced incidence of cancer and heart disease as an adult. Fruit and vegetable consumption in childhood poses many long-term implications. This makes childhood an important stage for intervention.

Although children's diet is largely controlled by parents or caregivers, childhood is an important stage for influencing attitudes towards fruits and vegetables (Birch, 1999). Our current food environment which is high sugar, fat, and salt lends to an obesogenic environment that is conflicting to the Dietary Guidelines. According to Birch, there is a strong link between adiposity and children's food preference and food selection (1999). Several strategies have been presented as solutions to promote fruits and vegetables among children and overall healthier environments for children. These include strategies to target places where children and families spend most of their time and are surrounded by peers (CDC, 2018). Two specific strategies that researchers were interested in for this literature review were cooking and nutrition education programs as well as garden-based education programs.

Cooking-Based Interventions to Improve Fruit and Vegetable Consumption

Cooking self-efficacy is an important factor in the consumption of fruits and vegetables. One's lack of knowledge of how to prepare a certain fruit or vegetable can result in poor attitudes towards these foods and overall decreased consumption. Several studies have looked at the use of cooking and nutrition education to increase preference for healthy meals. One example is the Cookshop Program (CS), a nutrition education intervention conducted with elementary school children in kindergarten to 6th grade. This quasi-experimental study used pre/post intervention comparison with a total of 39 classes of 590 students and observed attitudes, knowledge, self-efficacy in cooking, and behavioral intentions in addition to preference. The Cookshop Program was developed in the Central Harlem Community of New York City and based in Social Cognitive Theory (SCT). The program includes classroom, school lunch, as well as parent and community components. (Liquori, Koch, & Contento,1998). Researchers' findings included higher mean food preference scores for both older and younger who completed the intervention (Liquori, Koch, & Contento,1998). Attitudes toward health and cooking were not impacted by the intervention based on the 4-point scale. However, the Cookshop Program had positive impacts on knowledge, cooking self-efficacy, and behavioral intentions with higher mean scores for each.

Researchers in Ontario, Canada explored Cook It Up, an 18-month community cooking program for at-risk youth. This intervention developed for at risk youth in Canada was implemented in 2009 and focused on food education through chef-led field trips including grocery shopping, weekly journaling, and hands-on cooking activities. Cook It Up sessions were offered twice a month on Monday evenings at a local church. The aims of this intervention were to improve self-efficacy, knowledge, self-confidence, and self-esteem with cooking. Thomas & Irwin sought to achieve this through a culinary arts program, grocery store field trips, and journal activities. Researchers evaluated the Cook It Up program using Photovoice methodology and qualitative interviews of a total of 25 individuals. Results of the intervention were not reported, only detailed applications. However, researchers of the Cook It Up program concluded that a program focused on cooking would also help with development in other areas including social and economic management skills.

Another study sought to determine whether an experiential cooking and nutrition education program would increase vegetable consumption in children in grades 3-8. The researchers hypothesized that combining cooking and nutrition education into one intervention would improve students' fruit and vegetable exposure, liking, and consumption. The intervention period occurred in 17 elementary schools and 1 middle school over the course of 10 weeks with one 2-hour session held each week. The sessions featured the Common Threads curriculum, which was reviewed by a registered dietitian and included 30 minutes of nutrition and cultural awareness lectures, 75 minutes of culinary instruction, and 15 minutes to share a meal together. Recipes were designed to be easy and affordable, and lessons covered a range of topics including composition of a healthy meal, reading nutrition labels, and balance of macronutrients. The impact of the intervention was assessed without random assignment using a pre-post survey design. Survey results indicated increased knowledge scores from 0.6 to 0.8, cooking self-efficacy scores from 3.2 to 3.6 and vegetable consumption scores from 2.2 to 2.4. All values were found to be statistically significant. Cooking interventions such as this one have shown positive impacts on behaviors towards

foods. Garden-based interventions are another approach which has been previously studied in the literature.

Garden-Based Interventions to Improve Fruit and Vegetable Consumption

School gardens have been presented to prevent and lower childhood obesity rates. Such an approach has been explored in various studies. However, there are various implications to instituting school gardens. Huys et al. explore implementation practices and perceptions of school gardens through interviews with key community members and focus groups with children in 5th to 6th grade (ages 10-13) across four primary schools in Belgium. Researchers suggest schools are a convenient location to target an important avenue to impact children's preference, attitude, and knowledge of fruits and vegetables. Questions for both children and key members fell into 3 categories: contextual information on the school garden and perceptions on implementation, perceived effects of school gardens, and attitude towards the school garden and the development of school garden projects. Researchers found perceptions of school gardens to generally be positive, although some key members indicated they did not perceive positive effects on fruit and vegetable consumption (Huys et al., 2017). Other perceived barriers included limited space and belief that school gardens would be difficult to keep up during school holidays.

One study conducted in 2009 by Heim, Stang, & Ireland looked specifically at the ability of school gardens to enhance fruit and vegetable consumption among children. Researchers in Rochester, Minnesota implemented a 12-week garden-based nutrition education program at YMCA for children grades 4-6. Children took part in activities twice per week from June to August. The intervention which was called Delicious and Nutritious was based on Social Cognitive Theory. Delicious and Nutritious was evaluated using 8 scales to assess behavioral factors, personal factors, and socioenvironmental factors. Researchers used McNemar and Wilcoxon signed rank test to determine impact from the evaluation. Researchers found 97.8% of children enjoyed tasting fruits and vegetables, 93.4% liked preparing fruits and vegetables, 95.6% liked working in the garden; and overall there was a significant increase in asking behavior of children from baseline to follow up (Heim, Stang, & Ireland, 2009).

Sarti et al. looked at the ability of school gardens to improve vegetable consumption in children from a community of low socioeconomic status in Amsterdam. The Amsterdam School Gardening Programme included 13 school garden complexes and approximately 6800 students. However, 2 schools as well as 45 students agreed to participate in the study. Children were ages 9-10 and including 18 boys and 27 girls were included in the study. The course itself includes 25 90-minute lessons in which children were extended the opportunity to grow and harvest vegetables, herbs, and flowers. Evaluation of this study included qualitative data which researchers gathered from participant observation, interviews, and focus groups. Researchers found the school garden programming to be successful in improving children's attitudes towards vegetables including consumption and asking behavior of vegetables in the home; confirmed by children and parent's commentary following the intervention (Sarti et al., 2017).

A study conducted by a previous graduate student from the Department of Horticulture at the University of Georgia looked at the effects of school gardens on nutrition, physical activity, and learning of children at three elementary schools. (Holloway, 2016) The intentions of her study were to address the lack of understanding of how students learn in a school garden context and how vegetable preferences are influenced by that context. The study showed that school gardens significantly increased physical activity during the school day. Conversely, Poston and others (2005) and O'Brien and Shoemaker found school gardens in conjunction with nutrition education to be ineffective in improving children's preference for vegetables and their consumption (Sarti et al., 2017). However, some studies have looked at the combined effects of both cooking, gardening, and nutrition education interventions to improve attitudes, preference for, and knowledge of fruits and vegetables.

Combined Garden and Cooking Interventions

Lautenschlager et al evaluated the Youth Farm Market Project (YFMP), which is a multicultural gardening enterprise in Minnesota devoted to involving inner-city youth aged 8 through 13 in the growing process of healthy foods. In addition to gardening, children participated in cooking activities, classroom lessons, and field trips to grocery stores, restaurants, and community markets. Researchers used a qualitative study design and evaluated the impact of the Youth Farm Market project using focus group methodology to assess childrens' intentions, attitudes, perceived behavioral control, and subjective norms. Focus groups were recorded, transcribed, and evaluated using NVivo software. They found an increase in willingness to try unfamiliar foods in youth who participated in YFMP. They also noted an increase in preference for select vegetables, snow peas and zucchini, which were retained over time (Lautenschlager & Smith, 2007).

Another combined garden and cooking-based intervention is LA Sprouts. LA Sprouts is a 12-week nutrition, cooking, and gardening program to reduce obesity in Hispanic/Latino youth. The study included two schools that received the intervention and two schools that were delegated to the control group. The LA Sprouts program was held once a week for 90 minutes over the course of the 12 weeks. Instruction included 45-minutes of interactive cooking/nutrition and 45-minutes of a gardening lesson. The control group received no nutrition, cooking, or gardening programming. Researchers collected data at baseline including BMI, waist circumference, dietary intake, and fasting blood samples. Participants in the LA Sprouts program showed reduced BMI z-scores compared to children who did not receive the intervention as well as reduction in the number of LA Sprouts participants who displayed metabolic syndrome. Speculations on the cause of such reductions are uncertain as vegetable intake decreased among both groups. However, researchers concluded that teaching children to grow, prepare, and eat fruits and vegetables is an effective approach to reducing disease risk (Gatto et al., 2017).

Exposure to cooking and gardening at a young age can influence preference and consumption for fruits and vegetables has been shown to improve attitudes towards fruits and vegetables as researchers

observed with long-term interventions. There has been a vast amount of research conducted related to school gardens during the school semester. However, one identified barrier is time. Longer duration interventions may not be feasible in all school settings as teachers may not have adequate time or resources to facilitate garden curriculums. Short duration cooking and garden focused interventions may be an important focal point for new research. Further, the community-based garden approach has been assumed to improve productivity, food availability, and nutrition of underserved populations (Berti & Krasevec J, 2003). Although, there is little research associated with food banks and public garden facilities. Curriculum implementation with Food Banks and Botanical Gardens among underserved populations may be another novel approach to addressing the issue of fruit and vegetable consumption.

CHAPTER 3

METHODS

Study Sample and Study Design

Study Sample

To be eligible for participation in the study, children were required to be between the ages of 5-12 and enrolled in the *Bee Smart, Eat Smart* summer camp or the "Georgia's Critters" summer camp. Participants were recruited by the State Botanical Garden of Georgia. The study sample included thirty-four children residing in North Georgia (n=16 Control; n=18 Intervention.) Eligibility requirements for the parent-child cooking class included any parent or child set residing in Clayton, Georgia. Participants for the parent-child cooking class were recruited in partnership with the Food Bank of Northeast Georgia from a sample of parents and children in Rabun, County. Researchers aimed to recruit a total of 10 parent-child dyads. A total of 3 parent-child dyads were in attendance. All participants signed informed assent and consent forms before participation in the study.

Study Design

This pilot study examined children's knowledge of, willingness to try, and attitudes towards fruits using a pre-test-posttest, intervention/control design. Two separate interventions took place, the *Bee Smart, Eat Smart* Summer Camp and the *Bee Smart, Eat Smart* Parent-Child Cooking Class. The *Bee Smart, Eat Smart* curriculum is composed of 4 sections; red, orange/yellow, green, blue/purples, and a 'Chef Day' section. Sections include fruit and vegetable lessons, crafts, skits, games, story time prompts, and recipes. The *Bee Smart, Eat Smart* curriculum is tailored for a 5-day summer camp. For the *Bee Smart, Eat Smart* Summer Camp, a convenience sample was recruited from students aged 5-12 who attend summer camp at the State Botanical Garden of Georgia. The one-week comprehensive garden-based cooking curriculum was developed in partnership with educational programming leaders from the State Botanical Garden of Georgia. The curriculum was implemented for 5 consecutive days for a period

of one week during summer camp in June 2018. Each camp day lasted approximately 6 hours and included cooking, pollination activities, plant lessons, as well as fruit and vegetable crafts. The control group participated in a one-week summer camp program about "Georgia Critters"; with no exposure to nutrition information. The camp was held a different week during the summer session and each day of the Georgia Critters camp lasted approximately 6 hours as well.

Both the intervention and control group received pre- and post- assessments to measure changes in children's knowledge of, willingness to try, and attitudes about eating fruits and vegetables. The *Bee Smart, Eat Smart curriculum* was also utilized to create a condensed one-day parent-child cooking class for the Food Bank of Northeast Georgia teaching kitchen in Clayton, Georgia. The cooking class engaged parents and children through the preparation of three recipes from the *Bee Smart, Eat Smart* curriculum. There was no control group for the parent-child cooking class.

Developmental Phase

Curriculum Development

Bee Smart, Eat Smart was created to promote fruit and vegetable consumption among children. First, an initial meeting was held with the State Botanical Garden of Georgia and the Food Bank of Northeast Georgia to discuss specific needs from the partnership. A need identified by the State Botanical Garden of Georgia was the desire to include a theme of pollination within the curriculum. The State Botanical Garden of Georgia has a program called Connect to Protect that is devoted to the conservation of bee species across Georgia. They identified bee pollination as an often-overlooked step that is necessary for the growth of fruits and vegetables. With this in mind, pollinated fruits and vegetables were chosen as the focus for the curriculum; and pollination information and activities are included throughout the curriculum. The honey bee was selected as the pollinator mascot for the curriculum. A need identified from the Food Bank of Northeast Georgia in Clayton, Georgia was the underutilization of the Teaching Kitchen. We discussed feasibility of conducting a program in either setting given time frame. It was

decided that a summer camp format would be best for the State Botanical Garden of Georgia and a one-day parent child cooking class would be best for the Food Bank of Northeast Georgia in the initial pilot study. Prior to curriculum development, the primary researcher observed a full week of the *Plants We Eat* summer camp at the Botanical Garden of Georgia and a *Cooking Matters* course at the Food Bank of Northeast Georgia. Logistics of each were noted such as duration, activities that were most engaging to children, and feasibility of cooking and garden activities in each setting. It was noted that cooking and equipment space as well as experiential growing space was limited for summer camp use. A longer duration summer camp was not feasible with a consecutive weekly schedule of summer camps. Further, the anticipated completion of the State Botanical Garden's Children's Garden was not finished at the time of the initial curriculum development and implementation.

The *Bee Smart, Eat Smart* Curriculum was developed within these parameters. Professional expertise was sought in the area pollination from Dr. David Knauft and curriculum development from Dr. Judy Harrison. Information related to pollination was obtained through the University of Georgia Honey Bee Program, University of Georgia Cooperative Extension, and the State Botanical Garden of Georgia *Connect to Protect* Program. Insight about cooking and nutrition education and kids was sought from Cara-Lee Langston, former program director at the Food Bank of Northeast Georgia. Inspiration for curriculum included the Cooking Matters program and the *USDA Grow It, Try It, Like It!* curriculum.

The first step in curriculum development was recipe selection. Recipes were selected based on inclusion of pollinated foods. The State Botanical Garden of Georgia provided a list of honey bee pollinated foods; 4 fruits and 4 vegetables were selected for the curriculum. Recipes were selected based on taste appeal and ease of preparation for children. Developmentally appropriate tasks for each age group were considered with recipes. Likewise, activities such as crafts and games were selected based on their previous use with kids; games and crafts included have either a nutrition or pollination themes. The curriculum was created using Microsoft Publisher software. Objectives of the curriculum included

improving children's knowledge of fruits and vegetables, attitudes towards fruits and vegetables, and willingness to try fruits and vegetables while increasing children's understanding of the role of pollination in the growth of fruit and vegetables.

Implementation Phase

The *Bee Smart, Eat Smart* program with implemented in two phases. The first phase was Implemented at the State Botanical Garden of Georgia in June 2018. The curriculum was implemented following the layout of the curriculum manual. The five-day summer camp corresponded to lessons from the curriculum for each day (see Appendix A). *Bee Smart, Eat Smart* camp activities were led by camp counselors hired by the State Botanical Garden of Georgia. There was a total of three senior camp counselors and three junior camp counselors. The director of education, Cora Keber, and the Childrens Program Manager, Berkeley Boone, oversaw counselors and camp activities.

Planning for the cooking class was concurrent with planning for the summer camp. The one-day parent child cooking class was held in Clayton Georgia on October 24, 2018 at the Teaching Kitchen of Northeast Georgia. The cooking class was led by this researcher with the assistance of Cara-Lee Langston, the teaching kitchen director. Volunteers from the Rabun county community assisted with prep before the class. Ingredients and equipment were arranged for easy access. Upon the arrival of participants, each child and parent set received consent forms and recipe cards. The group was introduced the *Bee Smart, Eat Smart* curriculum and the three recipes chosen for the cooking class. Recipes included: eggplant pizzas, kale pesto pasta, and mini carrot cupcakes.

CHAPTER 4

STUDY SAMPLE AND MEASUREMENTS

Participants

Using power calculators, it was determined that 150 participants would be needed to show that differences within and between groups are statistically significant. Approximately 34 individuals were eligible for the study and completed the study (n=16 Control; n=18 Intervention.) Eligibility requirements for the study were children ages 5-12 enrolled in the *Bee Smart, Eat Smart* summer camp and the "Georgia's Critters" summer camp. Participants were recruited by the State Botanical Garden of Georgia. Eligibility requirements for the parent-child cooking class included any parent or child set residing in Clayton, Georgia. Participants for the parent-child cooking class were recruited in partnership with the Food Bank of Northeast Georgia from a sample of parents and children in Rabun, County. We expected a total of 10 parent-child dyads, but 3 parent-child dyads were in attendance. All participants were asked to have an informed assent and consent forms signed by before participation in the study.

Measures

For the summer camp pilot study, both intervention and control groups received pre- and post-assessments to measure changes in children's knowledge of, willingness to try, and attitudes about eating fruits and vegetables. The assessment utilized existing measurement tools shown to be successful measuring ability to identify fruits and vegetables among children in addition to preference for fruits and vegetables. We used items from both the Fruit and Vegetable Preference Questionnaire and Fruit and Vegetable Survey (Parmer, 2009) as well as a Taste and Rate Protocol (Birch, 1999). Pre-assessment occurred on the first day and was administered in paper format. Children were read the questions and allowed to answer independently. The post assessment occurred on the final day of activities. For the

parent-child cooking class, assessments took place after the cooking class to gauge how the cooking class was received by participants.

For the summer camp group, knowledge of fruits and vegetables; attitudes towards fruits and vegetables; and willingness to try fruits and vegetables were all assessed with separate items of the *Fruit and Vegetable Questionnaire* of Appendix B. Knowledge was determined by correct matching of the fruit or vegetable image to the name. Attitude toward fruits and vegetables was assessed using a caricature scale. Students were asked to taste a piece of a series of fruits and vegetables and rate how they liked it. A smiley face indicated that the child did like the fruit or vegetable; a straight face was used to indicate neither liking or disliking; and a sad face was used to indicate that the child disliked the fruit or vegetable. Willingness to try fruits and vegetables was assessed by asking children whether they would try a new recipe with a selected fruit or vegetable. The control group received the same pre and post assessment. For the parent-child cooking class, a separate survey (Appendix C.) was created to assess behaviors of fruit and vegetable consumption at home, perceptions of recipes included in the class, and overall experience with the program. Responses were not evaluated due to small sample size.

Statistical Analyses

Pre and post paper assessments were deidentified, coded, and analyzed using IBM SPSS Statistics 25. McNemar tests were used to determine within group differences for both the knowledge and willingness to try an item. A Wilcoxon Signed Rank Test was used to compare within group changes with ordinal responses of the attitude item. An α level of $P<0.05$ was used to determine statistical significance. All methods and procedures were approved by the University of Georgia Institutional Review Board on Human Subjects before any procedures with human subjects were initiated. Fischer's Exact test was used to compare percentages of liking or "yes" response between groups for knowledge and willingness to try. This specific test was chosen to account for small sample size. A gamma statistic test was used to analyze between group differences with ordinal variables of the attitude item. A significant negative value would

indicate that the control group preferred a target fruit or vegetable more, while a positive value would indicate the intervention group preferred a target fruit or vegetable more.

CHAPTER 4

RESULTS

Findings from the *Bee Smart, Eat Smart* Summer Camp

Findings from the Fruit and Vegetable Questionnaire (Appendix B.) are summarized in Table 1-3. A total of 34 children participated in the study (control n = 16; intervention n=18). However, of the 34 children, there were instances of missing data for questions that were skipped from the beginning to end of the survey.

Knowledge of Fruits and Vegetables

McNemar tests were used to show differences in knowledge within control and intervention groups. Results from the knowledge item of the questionnaire are included in Table 1. Knowledge in the intervention group was largely unaffected by the *Bee Smart, Eat Smart* curriculum due to strong foundational knowledge of the selected fruits and vegetables at baseline. To determine if changes were significant between the two groups, a Fischer's Exact test was performed. There were no significant differences between the groups at baseline and post intervention.

Willingness to Try Fruits and Vegetables

McNemar tests were used to show differences in willingness to try within control and intervention groups. Results from the willingness to try item of the questionnaire are included in Table 2. Comparisons of both the intervention and control group show the greatest percent change from "No" to "Yes" in the intervention group when asked about whether they would try a new recipe with the specified fruit or vegetable. The intervention group was also more likely to respond "yes" at post-assessment to blueberries (92.3%), carrots (100%), eggplant (46.2%), kale (92.3%), mango (84.6%), and red bell pepper (84.62%) than at baseline; and more likely to respond "yes" than the control group at either time point. However,

these values did not reach significance. Fischer's Exact test was performed to determine if there was a difference between both groups at baseline and intervention. Analyses showed there were differences in how the intervention group was likely to respond at post-intervention. The intervention group was significantly likely to indicate "yes" for willingness to try peppers ($p = .035$) and kale ($p = .010$).

Attitudes Towards Fruits and Vegetables

Wilcoxon Signed Rank tests were used to evaluate ordinal paired data. This test determines whether the rating has significantly increased or decreased from pretest to posttest within each group. Regarding assessment of attitude toward each of the selected fruits and vegetables, the greatest amount of change was observed with the intervention group, although non-significant. Few campers who expressed "dislike" or "neither like or dislike" at baseline switched response to "like" for the post-assessment. Comparisons of the kale item for both within changes was found to be statistically significant at $p = .007$. Gamma Statistic tests were used to determine relationships across ordinal variables. Gamma values can be between -1 and 1. In this analysis, a value closer to -1 indicates the control group liked the target fruit or vegetable more, while a value closer to 1 indicates the intervention group liked the target fruit or vegetable more. At post intervention the intervention group showed a greater liking of peppers (.750, $p = .002$) and the idea of vegetables as snacks (.640, $p= .027$) in general.

Parent-Child Cooking Class

Due to a smaller sample size than anticipated, post-assessment responses from the cooking class survey were not included. However, comments received from parents following the cooking class were included in Table 4. Overall, the cooking class was received well by both parents and children, and comments reflected positive impacts on both parent and child. Although, some activities were withheld due to unforeseen circumstances. Researchers anticipated that some key ingredients were to be harvested from garden beds near the food bank and the indoor kale tower. However, due to unforeseen circumstances,

both activities were removed from the itinerary. The class proceeded with the preparation of three recipes from the BSES curriculum and discussion of the importance of pollinated foods.

Table 1. Within group analysis of knowledge of fruits and vegetables at pre- and post-intervention among children participating in the *Bee Smart, Eat Smart* pilot study (n= 34)

Target Food[1] Outcome Measure	**Control (n=10)[2]**	**Intervention (n=16)[2]**
Blueberry		
Pre-intervention, n (%)	9 (90.0)	16(100.0)
Post-intervention, n (%)	9 (90.0)	16 (100.0)
P-value[3] for difference	0.50	0.50
Carrots		
Pre-intervention, n (%)	9 (90.0)	16 (100.0)
Post-intervention, n (%)	10 (100.0)	16 (100.0)
P-value for difference	0.50	0.50
Eggplant		
Pre-intervention, n (%)	9 (90.0)	15 (82.3)
Post-intervention, n (%)	9 (90.0)	17 (100.0)
P-value for difference	0.50	0.12
Kale		
Pre-intervention, n (%)	7 (70.0)	15 (93.7)
Post-intervention, n (%)	9 (90.0)	17 (100.0)
P-value for difference	0.50	0.06
Mango		
Pre-intervention, n (%)	6(60.0)	15(93.7)
Post-intervention, n (%)	9 (90.0)	16 (100.0)
P-value for difference	0.50	0.11
Pear		
Pre-intervention, n (%)	7 (77.7)	15 (93.7)
Post-intervention, n (%)	7 (77.7)	16 (100.0)
P-value for difference	0.50	0.50
Pepper		
Pre-intervention, n (%)	7 (77.7)	16 (100.0)
Post-intervention, n (%)	7 (77.7)	16 (100.0)
P-value for difference	0.50	0.50
Strawberry		
Pre-intervention, n (%)	10 (100.0)	16 (94.1)
Post-intervention, n (%)	10 (100.0)	17 (100.0)
P-value for difference	0.50	0.50
Fruits		
Pre-intervention, n (%)	5(62.5)	14 (93.3)
Post-intervention, n (%)	7 (87.5)	15 (100.0)
P-value for difference	0.50	0.18
Vegetables		
Pre-intervention, n (%)	4(50.0)	13 (86.6)
Post-intervention, n (%)	4(50.0)	14 (93.3)
P-value for difference	0.50	0.12

*Knowledge was determined by child's ability to identify target fruit or vegetable. Percentage of children who identified each fruit or vegetable correctly is reported

[1] Fruits and vegetables introduced to children during the BSES Intervention

[2] Sample sizes varied by food and timing of measurement. There were small numbers of children at both time points with missing data for certain foods

[3] Exact McNemar test p-value, $P < 0.05$ indicates significance

Table 1b. Between group analysis of knowledge of fruits and vegetables at pre- and post-intervention among children participating in the *Bee Smart, Eat Smart* pilot study (n= 34)

Target Food[1] Outcome Measure	**Control (n=15)***	**Intervention (n=18)***	**Significance[3]**
Blueberry			
Pre-intervention, n (%)	14 (93.3)	18 (100.0)	.455
Post-intervention, n (%)	10 (90.9)	16 (100.0)	.407
Carrots			
Pre-intervention, n (%)	13 (86.7)	18 (100)	.199
Post-intervention, n (%)	11 (100.0)	16 (100.0)	1.00
Eggplant			
Pre-intervention, n (%)	13 (86.7)	15 (83.3)	1.00
Post-intervention, n (%)	10 (90.9)	17 (100.0)	.393
Kale			
Pre-intervention, n (%)	11 (73.3)	15 (83.3)	.674
Post-intervention, n (%)	10 (90.9)	16 (100.0)	.407
Mango			
Pre-intervention, n (%)	9 (60.0)	15 (83.3)	.239
Post-intervention, n (%)	10 (90.9)	16 (100.0)	.407
Pear			
Pre-intervention, n (%)	10 (76.9)	18 (100.0)	.064
Post-intervention, n (%)	9 (81.8)	16 (100.0)	.157
Pepper			
Pre-intervention, n (%)	12 (85.7)	17 (94.4)	.568
Post-intervention, n (%)	11 (100.0)	16 (100.0)	.157
Strawberry			
Pre-intervention, n (%)	14 (93.3)	17 (94.4)	1.00
Post-intervention, n (%)	11 (100.0)	17 (100.0)	1.00
Fruits			
Pre-intervention, n (%)	8 (57.1)	17 (94.4)	.027
Post-intervention, n (%)	8 (88.9)	15 (100.0)	.375
Vegetables			
Pre-intervention, n (%)	7 (50.0)	14 (77.8)	.142
Post-intervention, n (%)	5 (55.6)	14 (93.3)	.047

*Knowledge was determined by child's ability to identify target fruit or vegetable. Percentage of children who identified each fruit or vegetable correctly is reported

[1] Fruits and vegetables introduced to children during the BSES Intervention

[2] Sample sizes varied by food and timing of measurement. There were small numbers of children at both time points with missing data for certain foods

[3] Fischers Exact test p-value, $P < 0.05$ indicates significance

Table 2. Within group analysis of willingness[+] to try fruits and vegetables at pre- and post-intervention among children participating in the *Bee Smart, Eat Smart* pilot study (n= 34)

Target Food[1] Outcome Measure	**Control (n=6)[2]**	**Intervention (n=13)[2]**
Blueberry		
Pre-intervention, n (%)	3 (50.0)	11(84.6)
Post-intervention, n (%)	4 (66.7)	12 (92.3)
P-value[3] for difference	0.25	0.25
Carrots		
Pre-intervention, n (%)	4 (66.7)	12(92.3)
Post-intervention, n (%)	4 (66.7)	13(100.0)
P-value for difference	0.50	0.50
Eggplant		
Pre-intervention, n (%)	1 (16.7)	3 (23.1)
Post-intervention, n (%)	1 (16.7)	6 (46.2)
P-value for difference	0.50	0.12
Kale		
Pre-intervention, n (%)	2 (33.3)	7 (53.4)
Post-intervention, n (%)	2 (33.3)	12 (92.3)
P-value for difference	0.50	0.06
Mango		
Pre-intervention, n (%)	4 (80.0)	11 (84.6)
Post-intervention, n (%)	3 (60.0)	11 (84.6)
P-value for difference	0.25	0.50
Pepper		
Pre-intervention, n (%)	2(33.3)	7(53.8)
Post-intervention, n (%)	2(33.3)	11(84.6)
P-value for difference	0.50	0.10

*Willingness to try was determined by indicating by a yes or no response. Percent of children who responded "yes" are reported

[1] Fruits and vegetables introduced to children during the BSES Intervention

[2] Sample sizes varied by food and timing of measurement. There were small numbers of children at both time points with missing data for certain foods

[3]Exact McNemar test p-value, $P < 0.05$ Indicates significance

Table 2b. Between group analysis of willingness[+] to try fruits and vegetables at pre- and post-intervention among children participating in the *Bee Smart*, *Eat Smart* pilot study (n= 34)

Target Food[1] Outcome Measure	**Control (n=12)***	**Intervention (n=18) ***	**Significance**
Blueberry			
Pre-intervention, n (%)	8 (66.7)	16 (88.9)	.184
Post-intervention, n (%)	5 (50.0)	13 (92.9)	.050
Carrots			
Pre-intervention, n (%)	9 (75.0)	16 (88.9)	.364
Post-intervention, n (%)	7 (70.0)	13 (92.9)	.272
Eggplant			
Pre-intervention, n (%)	3 (25.0)	3 (16.7)	.660
Post-intervention, n (%)	2 (20.0)	6 (42.9)	.388
Kale			
Pre-intervention, n (%)	7 (58.3)	9 (50.0)	.722
Post-intervention, n (%)	3 (30.0)	12 (85.7)	**.010***
Mango			
Pre-intervention, n (%)	9 (81.8)	16 (88.9)	.622
Post-intervention, n (%)	6 (60.0)	12 (85.7)	.192
Pepper			
Pre-intervention, n (%)	5 (41.7)	10 (55.6)	.355
Post-intervention, n (%)	3 (30.0)	11 (78.6)	**.035**

*Willingness to try was determined by indicating by a yes or no response. Percent of children who responded "yes" are reported

[1] Fruits and vegetables introduced to children during the BSES Intervention

[2] Sample sizes varied by food and timing of measurement. There were small numbers of children at both time points with missing data for certain foods

[3]Fischer's Exact test p-value, $P < 0.05$ indicates significance

Table 3. Within group analysis of attitudes[+] towards fruits and vegetables at pre- and post-intervention among children participating in the *Bee Smart, Eat Smart* pilot study (n= 34)

Target Food Outcome Measure	**Control (n=9)[2]**	**Intervention (n=14)[2]**
Strawberries		
Pre-intervention, n (%)	7(77.78)	13(92.8)
Post-intervention, n (%)	6(66.7)	14 (100.0)
P-value[3] for difference	0.15	0.15
Peppers		
Pre-intervention, n (%)	2 (22.2)	10 (71.4)
Post-intervention, n (%)	1 (11.1)	10 (100.0)
P-value for difference	0.15	0.15
Mango		
Pre-intervention, n (%)	4(50.0)	11 (78.5)
Post-intervention, n (%)	3(60.0)	11 (78.5)
P-value for difference	0.15	0.50
Carrot		
Pre-intervention, n (%)	3 (42.8)	11 (78.5)
Post-intervention, n (%)	4 (57.1)	11 (78.5)
P-value for difference	0.15	0.15
Pear		
Pre-intervention, n (%)	3 (42.8)	11 (78.5)
Post-intervention, n (%)	4 (57.1)	12 (85.7)
P-value for difference	0.15	0.15
Kale		
Pre-intervention, n (%)	2 (28.6)	**3 (21.4)**
Post-intervention, n (%)	1 (14.3)	**9 (64.3)**
P-value for difference	0.28	**0.007***
Blueberry		
Pre-intervention, n (%)	3 (50.0)	13 (92.9)
Post-intervention, n (%)	3 (50.0)	13 (92.8)
P-value for difference	0.15	0.50
Eggplant		
Pre-intervention, n (%)	5 (41.6)	2 (16.7)
Post-intervention, n (%)	2 (16.7)	2 (14.3)
P-value for difference	0.50	0.07
Vegetables		
Pre-intervention, n (%)	3 (42.9)	10 (71.4)
Post-intervention, n (%)	1 (12.3)	10 (71.4)
P-value for difference	0.07	0.50
Fruits		
Pre-intervention, n (%)	5 (83.3)	13 (92.9)
Post-intervention, n (%)	13 (92.9)	14 (100.00)
P-value for difference	0.15	0.15

[+]Attitude or preference was determined by indicating Like, Dislike, or Neither. Percent of children who indicated liking are reported

[1] Fruits and vegetables introduced to children during the BSES Intervention

[2] Sample sizes varied by food and timing of measurement. There were small numbers of children at both time points with missing data for certain foods

[3]Exact Wilcoxon signed rank test *P* value for paired data, $P < 0.05$ indicates significance

Table 3b. Between group analysis of attitudes[+] towards fruits and vegetables at pre- and post-intervention among children participating in the *Bee Smart, Eat Smart* pilot study (n= 34)

Target Food Outcome Measure[2]	Control (n=14)[1]	Intervention (n=18)[1]	Value	Significance[3]
Strawberry				
Pre-intervention, n (%)	11 (78.6)	17 (94.4)	.651	.185
Post-intervention, n (%)	7 (70.0)	14 (93.3)	.725	.126
Peppers				
Pre-intervention, n (%)	6 (42.9)	12 (66.7)	.513	.069
Post-intervention, n (%)	2 (20.0)	11 (73.3)	.750	**.002**
Mango				
Pre-intervention, n (%)	9 (69.2)	12 (70.6)	.143	.701
Post-intervention, n (%)	5 (50.0)	11 (73.3)	.529	.139
Carrot				
Pre-intervention, n (%)	7 (58.3)	13 (72.2)	.391	.264
Post-intervention, n (%)	7 (70.0)	11 (73.3)	.188	.657
Pear				
Pre-intervention, n (%)	4 (33.3)	17 (94.4)	.902	**.000**
Post-intervention, n (%)	6 (60.0)	13 (86.7)	.636	.121
Kale				
Pre-intervention, n (%)	5 (41.7)	3 (16.7)	-.603	**.016**
Post-intervention, n (%)	2 (20.0)	9 (60.0)	.481	.101
Blueberry				789
Pre-intervention, n (%)	6 (50.0)	17 (100.0)	1.00	**.001**
Post-intervention, n (%)	4 (44.4)	14 (93.3)	.893	.007
Eggplant				
Pre-intervention, n (%)	5 (41.7)	2 (11.1)	-.348	.276
Post-intervention, n (%)	0 (0.00)	3 (20.0)	.143	.687
Vegetables				
Pre-intervention, n (%)	8 (66.7)	12 (66.7)	.059	.878
Post-intervention, n (%)	2 (20.0)	9 (60.0)	.640	**.027**
Fruits				
Pre-intervention, n (%)	8 (66.7)	17 (94.4)	.789	.060
Post-intervention, n (%)	8 (88.9)	14 (93.3)	.273	.718

[+]Attitude or preference was determined by indicating Like, Dislike, or Neither. Percent of children who indicated liking are reported.

[1] Fruits and vegetables introduced to children during the BSES Intervention

[2] Sample sizes varied by food and timing of measurement. There were small numbers of children at both time points with missing data for certain foods

[3]Exact gamma statistic *P* value for ordinal variables, $P < 0.05$ indicates significance

Table 4. Bee Smart, Eat Smart Parent Child Cooking Class Comments (n=6)	
	Comment
Parent 1	"Loved the child/parent cooking class. The instruction was wonderful, kitchen is amazing. Loved the way children are encouraged and their attempts are accepted! It was a tasty and nutritious meal plan…"
Parent 2	"Everyone was helpful and knowledgeable. The food was prepped well, and the kitchen is wonderful! What a great program to teach children the importance of preparing food at home and making healthy choices…"
Parent 3	"Liked everything. Wouldn't change anything."

CHAPTER 5

DISCUSSION

The current study examined short-term effectiveness on a pollinated foods garden-based curriculum. We hypothesized that the *Bee Smart, Eat Smart* curriculum would improve children's behaviors towards fruits and vegetables. In general, these findings showed that the *Bee Smart, Eat Smart* curriculum data showed a trend toward improving willingness to try and attitudes towards fruits and vegetables. Children participating in the *Bee Smart, Eat Smart* intervention were more likely to correctly identify a specified fruit or vegetable; more likely to express interest in trying a new recipe with a specified fruit or vegetable; and more likely to indicate a preference for or liking of a specified fruit or vegetable.

The *Bee Smart, Eat Smart* curriculum highlighted the role of honey bee pollination in the growth of fruits and vegetables while exposing children to nutrition and cooking principles. Insect pollination, specifically honey bee pollination, was identified as an important theme to raise awareness about the pollinators' role in the growth of fruits and vegetables. Making the connection between nature and the foods children eat was a valuable component of the *Bee Smart, Eat Smart* curriculum relayed through activities including crafts, skits, games, puppet lessons, and cooking. Although previous studies have taken care to expose children to experiential garden practices such as planting, growing, and harvesting, this was not feasible due to short time frame and limitations related to setting. The curriculum was originally designed to be implemented in the new Children's Garden at the State Botanical Garden of Georgia to be completed in Spring 2019. The new addition features a *Dig and Grow* area which allows children to plant and harvest. Time frame was another area in which researchers had to be flexible.

Previous studies that have explored the effects of long-term (approximately 12-weeks) garden-based and/or cooking and nutrition education interventions and have found success in improving nutrition knowledge and preference for fruits and vegetables (Lautenschlager, 2006; Huys, 2017; Sarti, 2017). It is

well recognized that long-term experiential garden programming can influence children's behaviors. However, this pilot study of *Bee Smart, Eat Smart* sought to show the feasibility of a short-term garden-based summer camp and cooking-class intervention with children in two settings. The *Bee Smart, Eat Smart* program was intentionally designed to be short-term to correspond with existing programming of the State Botanical Garden of Georgia and the Food Bank of Northeast Georgia. It was not feasible to implement a 12-week summer camp garden curriculum as the Botanical Garden hosts different camps weekly throughout the summer. It was also not desirable to implement a cooking class program with a great amount of time commitment from participants. When planning for the parent-child cooking class, a single day was selected for the Food Bank during the Fall. Low retention rates for previous programming and school schedules were expressed as barriers to implementing long duration programming. Although, the literature highlights long-term interventions as optimal, short-term interventions are worth exploring because they are low commitment and can be implemented with varying flexibility.

Another way in which this study varies greatly from the literature is that it occurs outside the realm of public-school gardens; this has both benefits and restraints. School garden programming is often implemented in conjunction with core subjects such as science or math as a part of the school day (Huys et. al., 2017). While this allows for more structure and provides a familiar learning environment, classroom garden interventions can be limited by time and space. Further, summer months, when school is not in session have been shown to be an important time period for intervention as summer weight gain is of concern among youth (Tanskey, Goldberg, Chui, Must, & Sacheck, 2018). This study proposes that with weight gain, there could also be a decline in fruit and vegetable consumption when children are out of school. *Bee Smart, Eat Smart* addresses this concern by engaging children with summer camp activities to influence behaviors towards fruits and vegetables.

With this present study that occurred during the Summer of 2018 and Fall 2018, researchers were able to expose children to a larger garden environment at the State Botanical Garden and a state-of-the-art Teaching Kitchen at the Food Bank of Northeast Georgia in two phases of the BSES study. While the

curriculum was received well and deemed engaging by participants, data does not reflect statistically significant change, and there were several limitations of the study. Insignificance could be attributable to small sample size, missing data, and a variety of other factors. Some may even speculate that initial self-selection into the study could present bias. It is also important to note that researchers did not control for age, sex, race, socioeconomic status, or education level. Even though specific demographic features were not collected, the population included in the study may be considered higher socioeconomic status from previous observations. These are all important considerations for future research and practice.

Chapter 6

CONCLUSION AND FUTURE RESEARCH

In conclusion, the *Bee Smart, Eat Smart* program is a novel approach in nutrition, cooking, and garden-based experiential programming. Although overall not statistically significant, the intervention showed trends toward moderate differences in baseline response and post-intervention response of children related to knowledge, willingness to try, and attitude towards fruits and vegetables. However, when discussing future research and changes to study design, a larger sample size may present some issues. Such experiential learning truly requires individualized attention and instruction. This was difficult to achieve with the counselor to camper ratio. Given the higher socioeconomic status observed with the summer camp population, future research should explore the *Bee Smart, Eat Smart* Program with populations of low socioeconomic status. Further, the measures used in this study were not truly representative of the curriculum's impact. To improve this study design, future research should explore qualitative data analysis of parent and child response to the summer camp and parent-child cooking class.

Overall, the *Bee Smart, Eat Smart* curriculum has the potential to positively impact preferences for fruits and vegetables among children and families. The *Bee Smart, Eat Smart* program, including both the summer camp curriculum and parent-child cooking class have great potential. Researchers expect that the BSES curriculum will be expanded to continue to meet the needs of our partners as resources become available. Upon completion of the Children's Garden, the curriculum will be fully implemented at the State Botanical Garden of Georgia. Additionally, this pilot study will serve as a foundation to guide the Food Bank in implementing the curriculum in Rabun County at the Teaching Kitchen.

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Appendix A.

Bee Smart, Eat Smart Curriculum

Manual

Foods & Nutrition
College of Family and Consumer Sciences
Childhood Obesity Prevention Laboratory
UNIVERSITY OF GEORGIA

FOOD BANK of NORTHEAST GEORGIA
REGIONAL BRANCH
IQF Line + Teaching Kitchen

State Botanical Garden of Georgia
UNIVERSITY OF GEORGIA

Bee Smart, Eat Smart Curriculum

Introduction

The Dietary Guidelines for Americans encourages a healthy intake of both fruits and vegetables. Specific recommended amounts per day vary by age, sex, and activity level; however, one recommendation that remains consistent across the lifespan is to fill half your plate with fruits and vegetables at every meal. Fruits and vegetables contribute key nutrients to the diet and are necessary for the growth and development of children. Individuals are encouraged to focus on variety and nutrient density by including different subgroups of vegetables such as red and orange, dark leafy greens, and various colors of fruits. Fruits and vegetables can be implemented into a healthy eating pattern by including fresh, frozen, or other forms at meal and snack times throughout the day. Despite recommendations, low fruit and vegetable consumption among youth is a public health concern.

It is also known that insect pollinators such as honey bees play a role in the growing process of fruits and vegetables. In recent years important pollinators such as honey bees have been declining. The State Botanical Garden of Georgia saw a need to address the role of insect pollinators, such as honey bees, in the growth of fruits and vegetables. This curriculum is innovative in that it models l how universities, state botanical gardens, and food banks can work together to show the connection between nature and human health. This project was sparked by the interests of a donor, Lynn Pattillo, who saw the need for a children's garden curriculum focused on cooking and nutrition that could meet the mission of both the State Botanical Garden of Georgia and the Food Bank of Northeast Georgia in Clayton, Georgia.

I believe this partnership offers a substantial contribution to the knowledge base which explores the role of partnerships to provide nutrition education interventions. Further, Bee Smart, Eat Smart is a is a curriculum that can spark conversations around insect pollination and fruits and vegetables among local communities and across the nation. Increasing understanding of the connection between nature and the fruits and vegetables we eat can have a significant positive impact in community efforts to improve fruit and vegetable consumption among children. This curriculum focuses specifically on honey bees as pollinators.

The layout of the curriculum features 5 total sections, each represented by a color and the final "Chef Day"". The color corresponds to the color of fruits and vegetables that will be emphasized on a given day. The underlying theme of the camp is to "Eat a Rainbow". Each section is made of activities that include: an icebreaker, recipes, skits, and crafts. The purpose of these activities are to familiarize kids with color, taste, appearance, and other aspects of fruits and vegetables. The final Chef Day will serve as the culminating project to put to practice all that has been learned throughout the week. It is my hope that this curriculum will undermine the thought that fruits and vegetables are boring by providing hands on activities and exciting recipes to spark interest.

With sincere gratitude,
Camaria Welch
Graduate Assistant, UGA Department of Foods and Nutrition

Bee Smart, Eat Smart Curriculum

Lesson 1: Red

When we are first learning colors we are taught to associate the color red with an apple. While apples are certainly delicious there are many other fruits and vegetables, that can be classified into the red group. The red color of a specific fruit or vegetable can be attributed to different pigments and/ or antioxidants. Antioxidants and pigments are different from vitamins and minerals, but they also provide health benefits. For example, one antioxidant that is important to the color of tomatoes is lycopene. Lycopene plays a role in the prevention of some cancers and heart disease. Other red antioxidants that can be found in red fruits and vegetables include anthocyanins. They are important to fight against compounds that can be harmful to the body. We'll discuss them further later in the curriculum. There can be many different antioxidants, pigments, vitamins, and minerals in red fruits and vegetables. This is why it essential to include diversity in the diet. This section will explore red fruits and vegetables using activities, crafts, games, and cooking.

Bee Smart, Eat Smart Curriculum

Game: Categories

This activity serves as an icebreaker for the first day of camp and an introduction to the activities to the week. The objective of this game is to get campers thinking about different fruits and vegetables. *Estimated Time:* 30 minutes *Instructions:*

1. Form a circle with campers and allow others to join in as they arrive.

Before starting the game, establish the category. It should be a specific color.

1. Ask students to list only fruits and vegetables that fall into that color category.
2. For example, for the first round the category could be red. Follow the order of the circle and each student should name a red fruit or vegetable. No repetitions are allowed.

1. If a student says a fruit or vegetable that has already been used they are out of the game.
2. Continue the game until all but one camper is out. If necessary, you may change the color category.

Bee Smart, Eat Smart Curriculum

Activity: What's In the Bag

Objective:

Students will be able to identify key differences in red fruits and vegetables.

Instructions:

1. Place all fruit and vegetable items into the brown paper bag.
2. Ask one student to pull an item from the bag .
3. As the student pulls a fruit or vegetable **ask them to describe what they see and feel.**
4. Allow students to take a moment to journal/draw the different characteristics they observed
5. Next ask the students if they have tried any of the fruits or vegetables before. If they have allow them to share experiences with the group.
6. Continue to pull fruits and vegetables out of the bag until all items have been chosen.

Estimated Time:

30 minutes

Materials:

- 1 Medium-Sized Brown Paper Bag
- 1 Pomegranate
- 1-2 Fresh Strawberries
- 1-2 Cherries
- 1 Red Bell Pepper
- 1 Red Apple

Honey Drop:

Spark conversation! Ask campers f they have a favorite red fruit or vegetable. Allow campers to try fruits and vegetables that are unfamiliar.

Bee Smart, Eat Smart Curriculum

Strawberry Lesson

Estimated Time: **30 minutes**

Materials: **Parker Pepper Garden Hero®, Plant Picture, Vegetable Picture**

Instructions:

1. Prepare strawberry snack recipe with campers.
2. While preparing the snack describe what the strawberry looks like to campers; pointing out features of color and surface texture.
3. As children are eating the snack, show and pass around laminated images of what a strawberry plant looks like. Point out the specific parts as labeled.
4. Use Stella Strawberry puppet to further describe the imagery of crown and fruit parts of the strawberry.
5. Reinforce strawberry snack lesson by observing a real life strawberry plant if available.

What does a strawberry plant look like?

Strawberry plants have green leaves with a white flower. Leaves and flowers extend from the crown portion of the plant. The strawberry flower has 5 sepals. These are the smaller leaf structures under the flower. Roots anchor the plant and allow for the uptake of water and nutrients.

What does the fruit look like?

The green leaves we see on the fruit of the strawberry are known as the calyx or the “cap”. The fruit of the strawberry is bright red once ripened. Small seeds are located on the outside of the fruit.

How does this plant grow?

Crown development occurs in the fall , mainly October, while leaves and flowers develop from the buds in the crown in early Spring. Strawberries grow in clusters; with primary, secondary and tertiary berries. Primary berries are the first to ripen and have the most seeds of the cluster.

How is this plant pollinated?

The stamen part of the plant releases pollen that fertilizes the pistils or flowering part. Strawberries produce their own pollen , but they need the assistance of bees to transfer the pollen from the stamen to the pistils. After bee pollination and with the required nutrients, water, and sunlight the strawberries

Honey Drop:

Strawberries can also be pollinated by wind or other insects including: hover flies, butterflies, soldier beetles, and spotted cucumber beetles.

will reach maturity.

Bee Smart, Eat Smart Curriculum

Red Bell Pepper Lesson

Estimated Time: 30 minutes

Materials: Parker Pepper Garden Hero®, Plant Picture, Vegetable Picture, Markers, Plain Paper

Instructions:

1. Use the Parker Pepper Garden Hero ® to teach about red bell peppers.
2. Use the following prompt and the Parker Pepper Garden Hero to introduce red bell peppers to campers. Begin the discussion by focus on color and texture.
   " Hey, everyone this is Parker Pepper….."
3. Let children pass around the Parker Pepper puppet.
4. Next use the laminated plant picture to describe how Parker Pepper grows. For example, "Parker pepper grows from a plant that looks like this. When he is young he may be green; but he turns red as he gets more mature."
5. Continue to use this theme to describe aspects of how bell peppers are grown, pollinated, etc.
6. Pass around the plant pictures and allow kids to comment. Finally give campers the opportunity to draw Parker pepper if time allows.

What does a red bell pepper plant look like?

The bell pepper plants consist of a thick woody green stems with large, elongated leaves, and white flowers.

What does the vegetable look like?

We're focusing on red bell peppers, but these peppers come other colors including green and yellow. Bell peppers have a thick woody stem while the skin of the pepper itself is smooth and shiny.

How does this plant grow? When is it grown?

Red bell peppers start off as green in color when they are immature. As they ripen they transition to red. Red bell pepper plants grow best in soil that is warm and around 65-75°F. This plant needs at least 6-8 hours of sunlight a day.

How is this plant pollinated?

The small white flower component of the plants undergo pollination by transfer of pollen from the anther to the stigma. This leads to the development of the mature fruit. Meaning the pepper is ready to eat!

Honey Drop:

Herb plants like oregano and basil can attract bees to the garden . Bees in turn pollinate the pepper plants.

Bee Smart, Eat Smart Curriculum

Yogurt-Dipped Cheerio Strawberries

Estimated Time: **30 minutes**

Ingredients:

- 1 container (6 oz.) Vanilla or Plain Greek Yogurt
- 1 tablespoon Honey
- 2 cups Honey Nut Cheerios
- 12 Strawberries

Instructions:

1. In a small bowl, stir together the yogurt and honey
2. Place the Cheerios in a shallow bowl
3. Dip the strawberries in the yogurt once or twice until they are nicely coated, then roll in the Cheerios
4. Can be frozen for a refreshing treat!

Counselors Prep in Advance:

☐ Wash hands

☐ Count strawberries, 1-3 for each member of your group, and wash

☐ Pre-portion Cheerios to amount needed for group

☐ Have napkins set aside **Kid**

Snack Time Duties:

☐ Wash hands prior to snack time

☐ Get the campers involved by allowing them to help with the recipe

Honey Drop:

Use the Honey Nut Cheerios as a talking point to introduce the concept of honey bees and pollination. "Honey bees produce honey, and they also pollinate strawberries!"

 Clean up

Bee Smart, Eat Smart Curriculum

Strawberry Craft

Materials:

- Red construction paper
- Green construction paper
- Scissors
- Black Paint
- Small Paint Cup
- Cotton Swap
- Pencil

Instructions:

1. Fold red construction paper in half lengthwise. Draw a heart with a rounded bottom on one half of the construction paper to resemble a strawberry shape.
2. Cut on the line and open to reveal strawberry shape.
3. Dip the cotton swab in the cup of black paint. Press the wet cotton swab on the strawberry to symbolize seeds.
4. While the paint dries help the kids trace their hands on the green construction paper twice. Glue them on the top of the strawberry for the leaves.
5. Cut a small rectangle from the green construction paper for the stem and glue on the back of the handprint leaves.

Alternatively, campers can make a strawberry flower which will be used in a game on pg. 10.

Materials

- White construction paper
- Yellow construction paper

Instructions

Honey Drop:

Label the parts of the flower. This can be used in later activities to teach about pollination.

1. Using the strawberry flower petal template, trace petals onto white construction paper. Cut out seven petals total
2. Assemble and glue petals into a flower shape.
3. Trace the central portion of the flower using the template onto yellow construction paper.

Bee Smart, Eat Smart Curriculum

Bee Finger Puppets

Materials:

- Yellow and white cardstock paper
- 3/4 –inch circle puncher
- Googly eyes
- Black or white pipe cleaners
- Black marker
- Glue

Instructions:

1. Cut one large and one smaller circle from the yellow cardstock.
2. Draw black stripes on the larger circle. Using the circle puncher, punch two wholes at the bottom of the circle that is to be the bee body.
3. Glue the smaller circle on top of the larger circle to represent the bee head.
4. Cut a semicircle from the white cardstock to represent wings. Glue on the side of the larger semi circle.
5. Glue on google eyes and use another marker to draw a mouth.
6. Cut 2 inch pieces of pipe cleaner to represent antennas. Bend and curl ends of antennas as desired.
7. Glue antennas on the back of the bee head.

Honey Drop:

Honey bees are attracted to pollinator plants such as calendula, wild lilac, echinacea, and others!

Bee Smart, Eat Smart Curriculum

Game: Bee Fast Relay

This activity will utilize crafts previously created by campers to demonstrate a simplified version of pollination. The goal is to get the pollen to the strawberry plant via honey bees. However let's just say the wind may blow the pollen away from the bees thus preventing pollen from getting to the strawberry plant.

Instructions:

1. Divide campers into three teams, two bee teams and one wind team.
2. Line up both teams adjacent to each other at one end of the room.
3. Place a bucket of yellow pom poms in between both groups to represent bee pollen.
4. Place two giant strawberry flowers on the far end of the room opposite of campers.
5. Place members of the wind team sporadically between the strawberry flowers and the pollen bucket. The wind team is to serve as obstacles to keep the pollen from the strawberry plants.
6. The objective is for both bee teams to try to accumulate as much pollen as possible on their strawberry plant.

Estimated Time:

30 minutes *Materials:*

- Bee finger puppets
- Strawberry flowers
- Yellow craft pom poms

Honey Drop:

Bee Smart, Eat Smart Curriculum

Red Bell Pepper Flower

Ingredients:

1 Red Bell Pepper, Cored
1 Green Bell Pepper
Spinach Leaves
Cooking Spray
6 eggs
Salt and Pepper, to taste

Instructions:

1. Slice the red bell pepper into rings
2. Lightly coat a skillet with cooking spray or oil. Place 6 of the bell pepper rings in the skillet over medium heat. Crack an egg in each ring and allow it to spread out to fill the bell pepper ring. Season the egg with salt and pepper to taste.
3. Cook over low heat for 3-5 minutes, or until eggs are cooked to preference.
4. Alternatively, you can scramble eggs and pour the mixture inside the ring. Use other ingredients to represent the center of flower.

Counselors Prep in Advance:

- Wash hands
- Arrange the ingredients and equipment on the table
- Wash bell peppers

Kid Snack Time Duties:

- Wash hands prior to cooking
- Use cut resistant gloves and Curious Chef knives to slice bell peppers
- Crack egg into separate bowl and poor in skillet at the appropriate time.
- Clean up!

Honey Drop:

Use plastic Easter eggs to practice egg cracking ahead of time.

Bee Smart, Eat Smart Curriculum

Cooking Concept

Cracking an Eggs: Knowing how to crack eggs is an important skill in the kitchen. First timers may find themselves cracking the egg too hard sending shells everywhere; or too lightly leaving only a slight indent in the shell. With the Red Bell Flower Pepper Recipe, teach the importance of applying appropriate pressure. Allow volunteers to crack an egg.

Key Points:

- Crack egg into a separate bowl to eliminate risk of getting shells into the dish.
- Tap egg on the side of the bowl instead of on the counter to eliminate the risk of spreading germs .
- Hold egg firmly between thumb and pointer finger to crack applying all of the pressure to the bowl.

Knife Skills This recipe should serve as a knife skill introduction. With this curriculum campers will use the Curious Chef® kid safe knives as well as cut resistant gloves to practice cuts. All other prep work that requires extensive cuts will be made by camp counselors.

Key Points:

- Knife Skill exercises are only to be completed by campers aged 9 & 10.
- Show campers how to grip the knife, how to tuck fingers, and how to hold the object in position before making cut.

Using a Sauté Pan Introduce campers to using a heat source.

- Describe the features of a sauté pan.
- Show campers the range of heat and emphasize to start on medium low heat.

Note: For younger kids this may be more of a demonstration and tasting activity.

Honey Drop:

Egg shells may carry salmonella, a bacteria that can lead to food -borne illness. Be sure to wash hands before and after handling eggs. Try not to touch other surfaces or ingredients before you have done so.

Ensure all eggs are cooked thoroughly.

Bee Smart, Eat Smart Curriculum

Nutrition Concepts

We will use puppets and skits to teach nutrition concepts. A fruit and vegetable character will "make an appearance" before the cooking activity to teach campers about the nutrients in the foods they eat.

Instructions:

1. Follow the scripts below to convey nutrition concepts for Vitamin C and Antioxidants with the Stacy Strawberry Puppet/Costume.

Stacy Strawberry: Hey Everyone! My name is Stacy! Do any of you know what I am? Am I a fruit or vegetable?

allow responses from kids

Stacy Strawberry: Yes! I am a strawberry! How could you tell? Was it my green seeds or my red color! *dances and points at fruits* And yes, I am a fruit. You all are some very smart kidos!

Stacy Strawberry: *sings* I am Stacy Strawberry and I have lots of Vitamin C Counselor:
What's Vitamin C Stacy?
Stacy Strawberry: *gasps* What's Vitamin C? You don't know what Vitamin C is? Oh my….well I'll tell you!. Vitamin C is one of many vitamins. Vitamins are found in food and help make our bodies healthy and strong. Vitamin C is found in fruits and vegetables like oranges, green beans, bell peppers, broccoli, bananas, and strawberries like me!

Vitamin C helps heal your bodies heal after a cut or a scrape. Vitamin C even makes your immune system stronger and helps it fight nasty bugs to prevent you from getting sick.

Stacy Strawberry: Does anyone know what the C in Vitamin C stands for?

allow responses

Stacy Strawberry: It stands for cool!! Vitamin Cool

Stacy Strawberry: *sings* My name is Stacy Strawberry, I'm red with a green crown, and I have Vitamin cool!! Do you know what else I have?

Counselor: No Stacy Strawberry, what else do you have?

Stacy Strawberry: I have Antioxidants…..Antii….oxi….dants……say it with me…..antii….oxi dants…..

Antioxidant are the good guys! They are not vitamins but they make your bodies healthier. You know why? Because they help fight the bad guys, free radicals, or free rads!!

The free rads like to bump into things and cause trouble in our bodies. The antioxidants are the good guys that show up with their superhero capes on, and say "STOP!" They use their super powers to protect you against the free rads!

Counselor: That's so cool Stacy, they tried strawberries this morning so our campers are full of antioxidants!

Stacy Strawberry: You did! You know what else has antioxidants and even vitamin C, red bell peppers. I hear you all will being cooking a super special recipe with red bell peppers after this.

Counselor: Yes we will, do you all want to say bye to Stacy Strawberry so we can go cook a super tasty recipe with red bell peppers? **End

Honey Drop:

Spark conversation! Ask campers f they have a favorite red fruit or vegetable.

Allow campers to try fruits and vegetables that are unfamiliar.

skit and lead into cooking activity.**

Lesson 2: Orange and Yellow

The sun provides warmth and helps plants make food while honey bees are busy pollinating fruits and vegetables we eat. Both are yellow and essential for growing fruits and vegetables that our bodies need to grow big and strong. These aren't the only orange and yellow things that are essential. Yellow and orange fruits and vegetables are also essential to our health because they provide vitamins, minerals, and nutrients that may not be found in other colors of fruits and vegetables. The orange and yellow group also isn't just composed of oranges and bananas. This section will show you how to add brightness to your plate while also learning about what plants need to grow and flourish.

Bee Smart, Eat Smart Curriculum

Garden Heroes® Scavenger Hunt

The objective of this game is to help campers identify fruits and vegetables and their key characteristics.

Instructions

Estimated Time:

30 minutes

Materials:

Garden Heroes®

Paper

Garden Heroes® are plush fruit and vegetable toys made by Learning Zone Express™. These toys are often used in school settings to teach kids about nutrition.

1. Hide the 8 Garden Heroes®: Billy Blueberry, Kristi Kale, Parker Pepper, Eddie Eggplant, Peter Pear, Maya Mango, Stella Strawberry, and Carrie Carrot. Chose locations within the building and outside that are somewhat hidden but easily accessible to campers.
2. Create a list of clues to give each group. Try to choose locations and clues that correspond to the fruit or vegetable. For example, Maya Mango can be hidden in the rainforest by the mango tree.
3. Divide the campers into groups. Pair at least one counselor with each group.
4. The group that finds the most Garden Heroes® wins the game.

Honey Drop:

Plan "hiding locations" in advance and print clues on individual sheets of paper.

Bee Smart, Eat Smart Curriculum

Activity: What's In the Bag?

Objective:

Students will be able to identify key differences in orange and yellow fruits and vegetables.

Instructions:

1. Place all fruit and vegetable items into the brown paper bag.
2. Ask one student to pull an item from the bag .
3. As the student pulls a fruit or vegetable **ask them to observe and describe what they see and feel.**
4. Allow students to take a moment to journal/draw the different characteristics they observed/
5. Next ask the students if they have tried any of the fruits or vegetables before. If they have allow them to share experiences with the group.
6. Continue to pull fruits and vegetables out of the bag until all items have been chosen.

Estimated Time:

30 minutes

Materials:

- 1 Medium-sized Brown Paper Bag
- 1 Peach
- 1 Mango
- 1 Carrot
- 1 Yellow Bell Pepper
- 1 Crookneck Squash

Bee Smart, Eat Smart Curriculum

Mango Lesson

Instructions

1. Prepare the mango snack recipe with campers.
2. While preparing snack describe what the mango looks like to campers; pointing out features of color and surface texture.
3. As children are eating the snack, show and pass around laminated images of what a Mango plant looks like. Point out the specific parts as labeled.
4. Use the Mango Maya puppet to further describe the imagery of parts of the mango.
5. Reinforce mango snack lesson by observing a real life mango plant if available.

What does a mango tree look like?

The mango tree is dense with glossy green leaves and shoots. They produce pink flowers that are clustered at the end of the branches. Mango trees can grow to be 115 feet. They can also be pruned frequently to keep the tree short.

What does the fruit look like?

The skin of the mango can vary in color ranging from green, yellow, orange, to red. The skin is also smooth and waxy. It is only green when the fruit has not ripened. Once it has fully ripened the skin of the mango will transition to a bright orange/red color with some traces of green. The flesh of the fruit varies from yellow to orange due to variety and also ripeness. A short brown stem can be found at the top of the mango.

How does this plant grow? When is it grown? Where is it grown?

Mangoes are grown from a large seed. They are a tropical fruit that grow best in a frost free climate. Mango trees need a lot of light for growth. They grow best at the beginning of the summer season.

How is this plant pollinated?

Mangoes rely largely on pollinators to thrive. Pollinators such as honey bees visit the flowers of the mango tree in swarms and transfer pollen from one part of the plant to another. Wildflowers in the

Honey Drop:

Mangoes can also be pollinated by wasps, flies, and butterflies.

natural habitat also play a role in attracting pollinators to the mango tree.

Bee Smart, Eat Smart Curriculum

Carrot Lesson

Instructions:

1. Use the Carrie Carrot Garden Hero® to teach about carrots.
2. Use the following prompt and the Carrie Carrot Garden Hero to introduce carrots to campers. Begin the discussion by focus on color and texture. " Hey, everyone this is Carrie Carrot….."
3. Let children pass around the Carrie Carrot puppet.
4. Next use the laminated plant picture to describe how Carrie Carrot grows. For example, "Carrie Carrot grows from a plant that looks like this. The orange part grows underground."
5. Continue to use this theme to describe aspects of how carrots are grown, pollinated, etc.
6. Pass around the plant pictures and allow kids to comment. Finally give campers the opportunity to draw Carrie Carrot if time allows.

What does a carrot plant look like?

Carrots are made up of the taproot and the stem. The taproot is the cone shaped portion of the plant that we recognize as the carrot. The root can vary in width and length. Carrot plants also produce a cluster of small white flowers called umbels. These white portion of the flower can sometimes appear to be tinted yellow or green.
The center of the flower is dark red.

What does this vegetable look like?

Orange carrots are most common however carrots can come in a variety of different colors. They can be white, purple, yellow, or red. Orange carrots that are harvested straight from the garden will have a bright green stalky top with a slender orange bottom.

How does this plant grow?

Carrots are grown from tiny brown seeds . It is best to plant them at least 2 to 3 months before cold weather starts. The taproot of the carrot that we are used to eating grows below ground, and the stem grows above ground.

How is this plant pollinated?

The nectar and umbels of the carrot flower attract pollinators. Nectar is a syrup like substance produced by the flower. The flower

Honey Drop:

Carrots are in the Apiaceae family which derives it's name due to its affinity in attracting bees. Other plants in this family include parsley, celery, coriander, caraway, fennel, and dill.

has five stamens, and a stigma which receive pollen. The stamens can fall off before the stigma accepts pollen so bees are responsible from transferring pollen from the stamen to the stigma.

Bee Smart, Eat Smart Curriculum

Mango Orange Banana Sunrise Smoothie

Ingredients:

- 1 cup cubed peeled ripe mango or frozen mango
- 1 small orange, tangerine, or clementine, peeled and sliced
- 1 banana, sliced • 1/3 cup yogurt (or milk) *Instructions:*

1. Combine all the ingredients in a food processor. Blend for 2 minutes until thick, creamy,

Counselors Prep in Advance:

 Pre-portion ingredients

 Have napkins set aside **Kid**

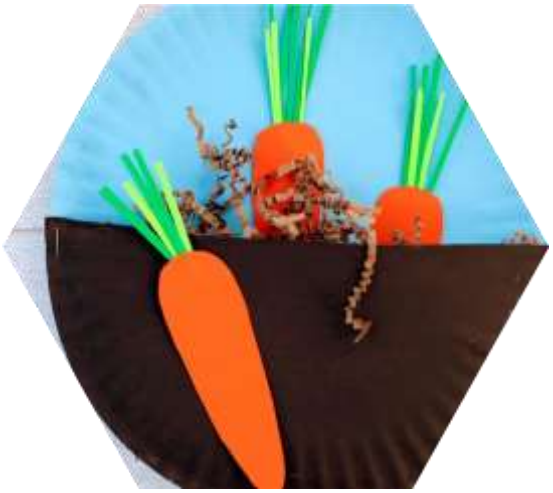
Snack Time Duties:

 Measure ingredients

 Put ingredients in the blender

Bee Smart, Eat Smart Curriculum

Carrot Garden Plate



Materials:

- 2 paper plates
- Light blue and brown paint
- Stapler
- Green and orange paper
- Glue
- Brown Easter grass

Instructions:

1. Paint one paint blue and the other brown. The brown plate can be cut if half and shared with another camper.
2. Once the plates are dry cut the brown one in half. You will only need half of the brown plate for this craft (2 campers can share).
3. Staple the halve of the brown plate to the bottom of the blue plate. It should resemble a blue sky and soil.
4. Draw carrots on orange construction paper and cut them out. Cut a few strips of green paper to represent carrot tops. Glue the green strips to the back of the orange carrots.
5. Place a few of the carrots in the pocket created by the brown flap. Alternatively campers can glue them on the plate.
6. Add a few strips of Easter grass.

Bee Smart, Eat Smart Curriculum

3D Fruit Book

Materials:

- Fruit templates
- Colorful construction paper
- Scissors
- Glue
- Stapler

Instructions:

1. Using a fruit template, trace the shape on colored construction paper. Each camper should have 3 cutouts of the same shape.
2. Using the stem template, trace the shape on construction paper.
3. Next, stack fruit shapes together. Staple the pages in the center at the top, middle, and bottom.
4. Separate the pages to make it look like a book.
5. Glue the stem in the middle of the fruit at the top of the pages.

Honey Drop:

Make this booklet ahead of time. It will be used in journaling activities.

Bee Smart, Eat Smart Curriculum

Dig and Grow

This activity is designed to expose campers to a true growing environment. While teaching about the characteristics of fruits and vegetables is a great learning opportunity is beneficial for students to have hands on experience in the garden.

Lead campers to the growing space and emphasize key characteristics of nature that allow for the growth of fruits and vegetables.

Key Points:

- Plants need water, soil, and sunlight to grow.
- Plants need a clean environment to thrive.
- Observe the pollinator gardens that attract species such as honey bees.
- Point out the specific parts of the plant: roots, stems, leaves, flowers, and fruits or vegetables.
- Allow campers to harvest from the staged growing beds and show them how to wash produce fresh from the garden.

Honey Drop:

Spark conversation! Ask campers if they have a favorite yellow or orange fruit or vegetable. Allow campers to try fruits and vegetables that are unfa-

Give campers the opportunity to try fruits or vegetable straight from the garden.

Bee Smart, Eat Smart Curriculum

Mini Carrot Cupcakes

Ingredients:

- 1 1/4 cups all purposed flour
- 1 tsp baking powder
- 1/2 tsp salt
- 1 tsp ground cinnamon
- 1/2 tsp ground ginger
- 1/4 tsp all spice
- 1 1/2 cups grated carrots
- 2/3 cup of vegetable oil
- 1 cup of sugar
- 3 large eggs
- 1 tsp vanilla extract

For Frosting:

- 2 1/2 cups confectioners sugar
- 8 ounces cream cheese, softened
- 2 tablespoons unsalted butter, softened
- 1 tsp lemon juice

Instructions:

1. Make the cupcakes: Preheat the oven temperature to 350 degrees F.

Counselors Prep in Advance:

- Grate most of the carrots required for the recipe, but leave some to demonstrate with campers.

Kid Snack Time Duties:

- Measure ingredients
- Put ingredients in bowl
- Mix ingredients
- Spoon cupcake mix into muffin pans

2. Line two 24-cup mini-muffin pans with paper liners. Put the flour, almonds, baking powder, baking soda, salt, cinnamon, ginger and allspice in a food processor and pulse until the nuts are finely ground.
3. Whisk the grated carrots, vegetable oil, granulated sugar, eggs and vanilla in a large bowl until combined. Stir in the flour mixture until just combined.
4. Divide among the mini-muffin cups, filling each three-quarters of the way. Bake until a toothpick comes out clean, 10 to 15 minutes.
5. Transfer to a rack and let cool 5 minutes, then remove the cupcakes from the pans to cool completely.
6. Meanwhile, make the frosting. Beat the confectioners' sugar, cream cheese and butter with a mixer until fluffy. Beat in the lemon juice and almond extract. Pipe or spread on the cupcakes.

Honey Drop:

While cupcakes are baking and cooling prompt kids to write letters to or draw pictures for Cassie Carrot or Stacy Strawberry

Cooking Concepts

Measuring Ingredients: For some recipes, particularly in baking , it is important to follow precise measurements. With the mini carrot cupcake recipe, campers will learn how to measure both dry and liquid ingredients.
Key Points:

- Measure ingredients such as flour, sugar, and carrots with dry measuring cups.
- Emphasize key distinctions between 1 cup and 1/2 cup.
- Spices such as cinnamon and ginger are technically dry measurements, while vanilla is liquid. However, for these small quantities there are not separate tools for liquid and dry.
- Emphasize key distinctions between 1 tablespoon and 1 teaspoon.

Mixing ingredients: When mixing ingredients for baking it's important to not overmix. With the mini carrot cupcake recipe, first demonstrate mixing motions in an empty bowl.
Key Points:

- Show campers how to keep ingredients in the bowl by stirring gently.
- Emphasize scraping down the sides of the bowl too incorporate all ingredients.

Nutrition Concepts

We will use a combination of puppets and skits to teach nutrition concepts. A fruit and vegetable character will "make an appearance" before the cooking activity to teach campers about the nutrients in the foods they eat.

Instructions:

Follow the scripts below to convey nutrition concepts for Beta Carotene and Vitamin A with the Cassie Carrot Puppet/Costume.

Cassie Carrot: Hello everyone! My name is Cassie Carrot. I am a vegetable and not a fruit! You can find me hanging out at the garden with some other fruit and veggie friends There are a lot of us so if you want to spot me, look for my spiky green top.

Do you know what else you can look for to spot me???

allow responses

Cassie Carrot: Yes, my orange carrot skin *dances*

Do you know what makes me orange? Any ideas, do you think it's the sun *points to the sun*….or do you think it's the soil *points to the ground*

waits for kids responses

Cassie Carrot: Well not exactly, those things do help me grow big and strong, but what makes my skin orange is beta carotene…..say it with me beta….carooooo….teeeeen…..

B.E.T.A C.A.R.O.T.E.N.E…..Beta carotenes is one of those cool antioxidants things we talked about yesterday!

Does anyone remember what antioxidants do? *allow responses*

Cassie Carrot: Yes they help fight the bad guys, free rads! They keep the free rads from bumping into things and causing trouble.

Beta carotene is my antioxidant. It is made into Vitamin A to be used by YOU! We talked about vitamins yesterday, does anyone remember what a vitamin is?

allow responses

Cassie Carrot: Yes! They make our bodies healthy. Vitamin A is built from beta carotene. Carrots and other yellow or orange fruits and vegetables; and even some red fruits and vegetables will have lots of vitamin A.

Does anyone know what the A stands for?

allow responses

Cassie Carrot: Awesome! It stands for awesome. Vitamin Awesome. I heard you guys made mango smoothies this morning. Mangoes have lots of vitamin awesome.
So today you must be some pretty awesome kids

Counselor: Yes! They are pretty awesome! I think we should take these awesome kids to go make those mini carrot cupcakes.

Cassie Carrot: Of course! Well I'll see you next time. Send me some mail until then!

Lesson 3: Green

What do you think of when you hear the word green? Is it nature or maybe the unpleasant memory of the green beans your mom made you eat? Either way, green fruits and vegeta-
bles shouldn't be feared. They are full of vitamins and minerals that are great for the body.

You may be used to seeing bright green apples, but other green fruits and vegetables include broccoli, kale, spinach pears, kiwi, and so many more! This section will introduce you to a few of these fruits and vegetables and give you some tasty green recipes to try!

The objective of this game is to keep as many fruits and vegetables thriving as possible without getting sent to the compost pile. Campers who show teeth/smile get sent to the compost pile. Campers who hesitate on their turn also get sent to the compost pile.

Game: Vegetable Garden

Instructions:

1. Form a circle and assign each camper a vegetable. They may choose to select a vegetable of their choice.
2. Select one person to be the sun to sit in the middle of the circle. This person will start the game by saying their vegetable twice followed by another vegetable. Ex. “Tomato, Tomato, Cucumber!” The last fruit/vegetable name that the sun says takes the next turn.
3. Continuing with the previous example, the person who is the cucumber would become the sun. Continue with the game until all campers have had an opportunity to be the sun. If a camper hesitates or shows teeth they are sent to the compost pile.
4. As people get sent to the compost pile, the circle gets tighter. The final two campers win the game.

Bee Smart, Eat Smart Curriculum

Activity: What's In the Bag?

Objective:

Students will be able to identify key differences in green fruits and vegetables.

Directions:

1. Place all fruit and vegetable items into the brown paper bag.
2. Ask students to draw fruits and vegetables from the bag individually.
3. As the student draws out a fruit or vegetable **ask them to observe and describe what they see and feel.**
4. Allow students to take a moment to journal the different characteristics they observed
5. Ask students if they have tried any of the fruits or vegetables before. If they have allowed them to share experiences with the group.

Estimated Time:

30 minutes *Materials:*

- 1 Medium-Sized Brown
- 1 Pear
- 1 Avocado
- 1 Head of Broccoli
- 1 Bunch Kale
- 1 Green Apple

Bee Smart, Eat Smart Curriculum

Pear Lesson

Instructions:

1. Prepare pear snack recipe with campers.
2. While preparing snack describe what the pear looks like to campers; pointing out features of color and surface texture.
3. As children are eating the snack , show and pass around laminated images of what a pear plant looks like.
4. Use the Peter Pear plush Garden Hero to further describe the imagery of stem and fruit parts of the pear.
5. Reinforce pear snack lesson by observing a real life pear tree if available.

What does a pear tree look like?

Pear trees are very tall in stature and require several years to grow. Leaves of the tree are oval shaped . Flowers look similar to small white roses.

What does the fruit look like?

The fruit of a pear is shaped like a tear drop and can take on a variety of colors. Colors range from yellowgreen to golden brown to red. The pear fruit has a brown woody stem.

How does this plant grow?

Pear trees should be planted in a location that receives a lot of sun. Pear trees require lots of room for roots to grow, so they do well in open spaces that are not crowded with other vegetation.

While the flowers of pear trees bloom in early spring, trees produce fruit in the fall and then lose their leaves in the winter. This helps the tree to last during colder months.

How is this plant pollinated?

When flowers are in bloom bees are attracted to the food source of nectar. Bees help transfer pollen from the stamen to the stigma. Some factors that could prevent pollination include inclement weather, competing plants, and insecticides.

Honey Drop:

Fun fact! It take a pear tree three years to produce it's first fruit. However, they won't produce a full crop for five to seven years.

Bee Smart, Eat Smart Curriculum

Kale Lesson

Instructions:

1. Use the Kristi Kale Garden Hero ® to teach about kale .
2. Use the following prompt and the Kristi Kale Garden Hero to introduce kale to campers. Begin the discussion by focus on color and texture.
   "Hey, everyone this is Kristi Kale….." Let children pass around the Kristi Kale puppet.
3. Next use the laminated plant picture to describe how Kristi Kale grows. For example, "Kristi Kale grows from a plant that looks like this. When she is young her leaves may be small, but they get larger as she matures."
4. Continue to use this theme to describe aspects of how kale is grown, pollinated, etc.
5. Pass around the plant pictures and allow kids to comment. Finally give campers the opportunity to draw Kristi Kale if time allows.

What does a kale plant look like?

The kale plant consists of a massive bushel of light yellow flowers with green stems. The kale grows at the base of the plant.

What does this vegetable look like?

Kale leaves range from bright to dark green. Depending on the variety, the leaves may be frilly, flat, or smooth. Kale leaves are green in color, ranging from bright green to dark green.

How does this plant grow?

Kale grows best in the fall months, when it is not too cold or too hot. It is ideal to plant kale in late summer leading to harvest in the fall. Kale grows in large bunches with layers of leaves extending from the central core. The leaves at the base of the Kale plant are ready for harvest.

How is this plant pollinated?

Kale relies on pollen brought by bees. When the bees deposit pollen in the kale flowers.

Pear Salsa

Pollen is transferred from the stamen (male flower part) to the pistil (female flower part).

Estimated Time: 30 minutes *Ingredients:*

- 1 pear, cored and finely chopped
- 1 apple, cored and finely chopped
- 2 kiwi fruit, peeled and finely chopped
- 1 orange , peeled and finely chopped
- 2 tablespoons honey
- 1 tsp lemon juice
- Graham Crackers

Instructions:

1. Combine chopped fruit in a medium sized bowl. Pour honey and lemon juice over fruit and gently toss. Scoop up bites of fruit salsa with graham crackers.

Counselors Prep in Advance:

□ Gather ingredients for group

□ Cut apples, pear, kiwi, and oranges into large pieces

□ Have napkins set aside

Kid Snack Time Duties:

□ Wash hand prior to snack time

□ Allow campers to cut large pieces of fruit into smaller pieces using Curious Chef ™ knife and cut resistant gloves

□ Measure and Mix Ingredients

Honey Drop:

This recipe contains honey! Use this as a talking point to discuss honey bees and pollination. Honey starts as flower nectar, which gets broken down into simple sugars stored inside the honeycomb.

Bee Smart, Eat Smart Curriculum

Paper Pears

Materials:

- Dark green and light green construction paper
- Brown construction paper
- Cotton balls
- Black marker

Instructions:

1. Using the light green construction paper cut out a pear shape.
2. Tear apart and stretch cotton into flat pieces. Glue pieces into the middle of the pair, leave space on the edge to represent the outside of the pair.
3. Next cut a small rectangular stem from the brown construction paper and glue on the back of the pair. Several students can share the same piece of brown construction paper.
4. Use the dark green construction paper to make small leaves. Glue the leaves on the front of the pear.
5. Allow the paper pears to fully dry. Use the black marker to draw two teardrops in the middle on the fruit to represent seeds.

Bee Smart, Eat Smart Curriculum

Kale Stencils & Painting

This is a free range activity to get campers to observe characteristics of kale. Allow them to use the kale as either a stencil or a painting tool.

Materials:

- 2-3 Kale Leaves
- White paper
- Construction paper
- Paint
- Crayons or colored pencils
- Newspaper • Paper plates

Instructions:

1. For the stencil craft, lay a kale leaf on a flat surface. Place a piece of paper on top. Lightly press down with either a crayon or colored pencil to reveal kale etchings.
2. For the painting craft, lay a sheet of newspaper on the painting surface. Pour pant colors on colors on several plates and allow campers to dip kale in pain and make patterns across white printer paper or colorful construction paper.

Bee Smart, Eat Smart Curriculum

Activity: What's for Lunch?

This activity will show how to add fruits and vegetables to their everyday life. Adults can encourage students to eat more fruits and vegetables by modeling behaviors. Campers will partner with two different individuals at the botanical garden before lunch to discuss and observe.

Instructions:

1. Pack a lunch beforehand to include all the components of MyPlate. An example of this could be: A pear, carrot sticks, a turkey sandwich on whole wheat bread, and a yogurt cup.
2. Pack another lunch that is missing fruits and vegetables.
3. Designate two individuals to carry each lunch and instruct campers to go find these individuals at the time of the activity.
4. Unpack lunches at the same time.

Key Points:

- Ask campers which lunch do they think is more balanced? ***A balanced meal contains fruits, vegetables , whole grains, and lean protein.***
- Try to pack lunches that include fruits and vegetables that have been previously covered in the lessons. Ask campers what they know about the fruits or vegetables.
- Encourage campers to share what they bought for lunch with the group.

Bee Smart, Eat Smart Curriculum

Kale Pesto Pasta Salad

Yield: 4-—6 Servings

Ingredients:

- 1 large bunch fresh kale (flat leaf or curly), destemmed
- 1 cup fresh basil leaves, lightly packed and chopped
- Juice of ½ lemon
- 1 clove garlic, minced
- 1/4 - 1/3 cup olive oil
- ½ -1 teaspoon salt
- 12 ounces of pasta, cooked according to package directions
- 1 medium cucumber, sliced
- 1 cup shelled edamame, frozen and thawed.
- Paper towels

Instructions:

1. Boil pasta following package instructions.
2. Tear kale into small pieces. Place the kale into a large bowl and cover with boiling water. Let kale sit until wilted, stirring a bit, about 3 minutes. Drain and let cool. Squeeze dry.
3. Add the wilted kale to the bowl of a food processor or blender along with lemon juice, garlic, parmesan, and half of the olive oil. Blend to combine, stop to scrape down the sides of the container. Add more olive oil as you go to make a smooth and spreadable consistency. Season with salt to taste.
4. Stir pesto into cooked pasta with sliced cucumbers and edamame. Serve warm, at room temperature, or chilled.

Counselors Prep in Advance:

 Wash bunches of kale, basil leaves, and cucumbers

 Lay out all necessary ingredients and cooking equipment

Kid Snack Time Duties:

 Wash hands prior to cooking

 Allow kids to tear kale into small pieces, measure ingredients, and place them into food

processor

Cooking Concept

Using a Blender - It is really important to stress safety because blender blades can be very sharp. Advise campers not to stick their hand inside the blender. Blenders are often used to crush ice, mix liquids, and break down soft food ingredients such as fruits or vegetables. When using a blender it is important to have some liquid such as water, milk, or yogurt to ensure ingredients are combined It is best to put denser ingredients in first before liquid to avoid splashing.
Putting the denser ingredients in first followed by liquid also helps them to blend quicker.

Knife Skills – This is another opportunity to practice pressure in using a knife with the Curious Chef knives as this recipe called for chopped kale. To start, remind campers how to hold a knife, with the pointer and the index finger gripping the top of the knife and the remaining fingers wrapping around the base. You can show them alternative ways to hold a knife such as the index finger pointing to the bolster of the knife. Remind campers to keep their hands away from the blade. Ensure that campers are at an appropriate height when standing at the countertop.

Boiling Pasta– Allowing children to help prepare this recipe is an amazing way to demonstrate the process of cooking. Before you begin the cooking go over safety procedures with campers. Boiling pasta uses very high heat. Instruct campers to not directly touch the burners. The eye for induction tops will only heat up when in direct contact with metal.

- Observe what pasta feels like before and after cooking.

Nutrition Concept

We will use a combination of puppets and skits to teach nutrition concepts. A fruit and vegetable character will "make an appearance" right before the cooking activity to show kids the importance of nutrients in the foods they eat.

Instructions:

1. Follow the scripts below to convey nutrition concepts for Vitamin K and Calcium with the Brittany Broccoli Puppet/Costume.

Brittany Broccoli: Hi guys, I'm Brittany Broccoli! I'm the royal one in the bunch! Do you see my crown *points to the crown of broccoli* I am the princess of all the fruits and veggies, event though my friends are very important too! I think you've already met them; Stacy Strawberry and Cassie Carrot! Those are my besties….and tomorrow you'll meet Benny Blueberry! He's pretty cool.

Brittany Broccoli: Did Stacy and Cassie tell you about vitamins?

allow responses

Brittany Broccoli: They did! Awesome!

Counselor: What vitamin do you have Brittany?

Brittany Broccoli: Me? Well I have vitamin C and a little bit of that vitamin A….but I really think you should know about vitamin K. Vitamin K can also be found in other green vegetables such as spinach, brussel sprouts, collard greens, just about all the leafy greens. ….I heard you guys were making kale pesto pasta after this! Fun stuff! Vitamin K can be found in kale!

Brittany Broccoli: Do you like green vegetables?

allow responses

Brittany Broccoli: No? I can help change your mind! Do you know green vegetables help you grow big and strong because they have vitamin K. Vitamin K helps with wound healing. Vitamin K is also important for bone health….and speaking of bone health. I am a good source of calcium, a mineral that is important for bone health. A mineral is different from vitamins and antioxidants, but it also provides health benefits! A lot of people think that you can only get calcium from milk, but that is not true!! I'll bet you my crown that I'm a good source of calcium too! And so are my other leafy green friends.

Brittany Broccoli: Well I think I have to let you all go to make your tasty Kale Pesto Pasta,! But before I leave are there any questions for me??

Allow campers to ask questions

Honey Drop:

Plants related to broccoli include: cauliflower, cabbage, brussel sprouts, collards, kale, and kohlrabi!

Lesson 4: Blue andPurple

An-tho-cy-an-in….anthocyanin. This is probably not one of the first words you heard as a kid but it's a good one to know. Anthocyanin is among the group of antioxidants and pigments
responsible for giving purple and blue fruits and vegetables their color. Purple and blue fruits and vegetables provide key nutrients and antioxidants our body uses to thrive. Lesson 4 will use cooking activities, games, and crafts to teach about fruits and vegetables in this group.

Bee Smart, Eat Smart Curriculum

Fruit and Vegetable Relay

Instructions:

1. Label two large paper bags “fruits” and “vegetables”
2. Place the two large brown paper bags on the far end of the room.
3. On the other side of the room form two lines of campers.
4. Place a stack of laminated fruit and vegetable images in between the line of campers.
5. Instruct campers to chose an image once a designated individual yells, “go” .
6. Campers will choose either a fruit or vegetable image and run to the far end of the room and place the picture in the fruit or vegetable brown paper bag.
7. After placing the image in the brown paper bag, they will need to run back to their group and tag the first person in line.
8. The first person in line will repeat the process.
9. At the end compare which fruits and vegetables each group chose.
10. The group with the most fruits and vegetables wins.

Estimated Time:

30 minutes

Materials:

- 2 Brown Paper Bags
- Laminated Fruit and Vegetable Images

Bee Smart, Eat Smart Curriculum

What's In the Bag

Objective: Students will be able to identify key differences in blue and purple fruits and vegetables.

Directions:

1. Place all fruit and vegetable items into the brown paper bag.
2. Ask students to draw fruits and vegetables from the bag individually.
3. As a student draws out a fruit or vegetable **ask them to describe what they see and feel.**
4. Allow students to take a moment to journal the different characteristics they observed
5. Next ask the students if they have tried any of the fruits or vegetables before. If they have allow them to share experiences with the group.

Estimated Time:

30 minutes *Materials:*

- 1 Medium-Sized Brown Paper Bag
- 1 Plum
- 1 Pint of Blueberries
- 1 Pint Blackberries
- 1 Eggplant
- 1 Purple Cauliflower
- 1 Purple Carrot

Bee Smart, Eat Smart Curriculum

Blueberry Lesson

Instructions:

1. Prepare blueberry snack recipe with campers.
2. While preparing snack describe what the blueberry and it's plant looks like to campers; pointing out features of color and surface texture.
3. As children are eating the snack , show and pass around laminated images of what a blueberry plant looks like. Point out the specific parts as labeled.
4. Use the Billy Blueberry puppet to further describe the imagery of crown and fruit parts of the blueberry.
5. Reinforce blueberry snack lesson by observing a real life blueberry plant if available.

What does a blueberry plant look like?

Blueberries grow on bushes with green leaves and a thin woody stem. There are different varieties of blueberries. You will find highbush, lowbush, hybrid half-high, and rabbiteye. The highbush variety is the most commonly planted.

What does the fruit look like?

The blueberry fruit is small and spherical. Raw blueberries have a dark blue or purple in color skin with a somewhat translucent fruit center

How does this plant grow?

They grow best in a sunny, but sheltered spot. They also thrive in acidic soil. Blueberries are not deep rooted plants, so therefore they require soil that holds moisture.

Blueberries are an important Georgia crop, although they can grow in other places.

How is this plant pollinated?

Blueberries must be pollinated by insects. The structure of the flower parts prevents pollen from falling onto the stigma on it's own. Honey bees are used by growers to add to native pollinators.

Honey Drop:

Other insect pollinators that are attracted to blueberries include: South-eastern blueberry bees, bumble bees, and carpenter bees

Bee Smart, Eat Smart Curriculum

Eggplant Lesson

Instructions:

1. Use the Eddie Eggplant Garden Hero ® to teach about red bell peppers.
2. "Use the following prompt and the Eddie Eggplant Garden Hero to introduce eggplants to campers. Begin the discussion by focus on color and texture. "Hey, everyone this is Eddie Eggplant….."
3. Let children pass around the Eddie Eggplant puppet.
4. Next use the laminated plant picture to describe how Eddie Eggplant grows. For example, "Eddie Eggplant grows from a plant that looks like this."
5. Continue to use this theme to describe aspects of how eggplants are grown, pollinated, etc.
6. Pass around the plant pictures and allow kids to comment. Finally give campers the opportunity to draw Eddie Eggplant if time allows.

What does an eggplant plant look like?

This plant has large flat green leaves branching from a thick stem. Leaves can be anywhere from 4 inches to 8 inches. The plant produces purple flowers.

What does this vegetable look like?

Eggplants have a waxy dark purple skin with a thick green stem. The interior flesh is white with yellow colored seeds.

How does this plant grow?

It is recommended that eggplant plants be started indoors. If you are planting eggplants outdoors they grow best in a sunny spot that doesn't flood easily. Warm, nutrient rich soil is ideal. Mature eggplant plants grow to be very tall, angular plants. For this reason they should be spaced out anywhere from 24 to 36 inches to allow growth. Since they grow tall, it is best to tie them to stakes to prevent them from falling.

How is this plant pollinated?

The structure of the eggplant plant allows it to be easily self-pollinated. Self pollination can occur when pollen produced by the anthers automatically falls to the pistils.

Honey Drop:

Fun fact! Eggplants are closely related to the tomato plant family.

Bee Smart, Eat Smart Curriculum

Bear Toast

Yield: 2 Servings

Ingredients:

- 2 Slices Whole Grain Bread
- 4 Tablespoons of Sun Butter
- 1 Banana, sliced
- 6 Blueberries

Instructions:

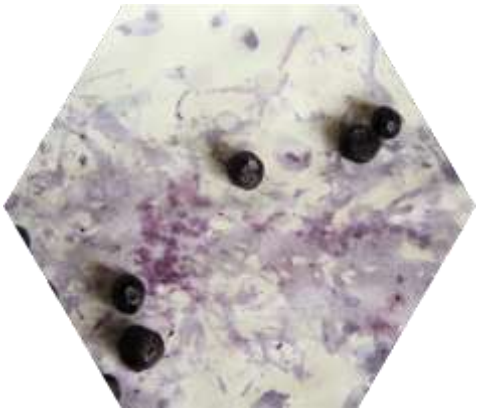
1. Place the bread slices in a toaster until golden brown.
2. Spread 2 tablespoons of nut butter onto each piece of toast and shape into 1 large circle for the teddy bear face and two small circles for the teddy bear ears.
3. Place a banana slice in the center of each small circle to make ears, and one banana slice in the center of the large circle to make the nose.
4. Place 2 blueberries above the center banana slice to make eyes, and 1 blueberry on top of the center banana slice.

Counselors Prep in Advance:

- ☐ Gather ingredients
- ☐ Wash blueberries
- ☐ Toast bread

Bee Smart, Eat Smart Curriculum

Berry Painting



Estimated Time: 30 minutes

Materials:

- White cardstock or watercolor paper
- Berries fresh or frozen: blueberries, raspberries, blackberries, etc.
- Tablecloth or newspaper to cover painting area.
-
-

Instructions:

1. Give each child a piece of paper and a small bowl of mixed berries.
2. Instruct campers to hold berries like crayons and draw with them.
3. Campers can also smash berries to release juices for finger painting.

Felt Eggplant

Instructions

1. Use the eggplant templates to trace the bulb of the eggplant onto purple felt. Leave enough space to trace twice.
2. Trace the stem of the eggplant onto green felt.
3. Place the two pieces of purple felt on top of one another. Staple the edges of the sides and bottom. Leave an opening at the top.
4. Stuff cotton balls in the top of the eggplant. Once somewhat full, staple the top of the eggplant closed.
5. Glue the green stem to the top of eggplant and allow to dry.

Estimated Time:

30 minutes

Materials:

1 piece of Green Felt

1 Piece of Purple Felt

Stapler

Glue

Eggplant Templates

Cotton Balls

Bee Smart, Eat Smart Curriculum

Eggplant Pizza

Yield: 3-4 Servings

Ingredients:

- 1 globe eggplant
- 1 tablespoon salt, for drawing water out of the eggplant
- 2 tablespoons olive oil, for brushing eggplant before roasting
- 2 teaspoons dried Italian seasoning
- 10 large basil leaves, cut into chiffonade strips
- 1/3 cup freshly grated Parmesan
- 1/3 cup finely grated low-fat mozzarella blend

Sauce Ingredients:

Instructions:

1. Cut off both ends of the eggplant; then cut it into ¾ inch thick slices (trying to make them the same thickness!) Put the eggplant pieces on a double layer of paper towels and sprinkle both sides generously with salt. Let the eggplant sit with the salt on it for about 30 minutes t draw out the liquid. (After thee eggplants sits for 15 minutes, turn on the oven to 375 degrees.)
2. While the eggplant sits, make the sauce. Heat 2-3 tsp. olive oil (depending on your pan) and sauté the finely chopped garlic just until it becomes fragrant (don't let it brown.) Add the petite diced tomatoes, dried Italian seasoning, and dried oregano and let the sauce cook at a low simmer until it's thickened, breaking up the tomatoes with a fork as it cooks. (Add water as needed, a few tablespoons at a time as the sauce cooks, keeping it hot by simmering at very low heat until it's needed for eggplant slices.)
3. After 30 minutes, wipe the eggplant dry with paper towels (this also removes most of the salt.) Spray a roasting sheet with olive oil or non-stick spray, lay eggplant slices on, brushing the tops of the eggplant with olive oil, and sprinkle with dried Italian seasoning. 4. Roast the eggplant about 25 minutes (but not so long that the slices get mushy and lose their shape" as Julia says.)
5. While the eggplant roasts, thinly slice the fresh basil leaves (if using) and combined freshly grated Parmesan and low-fat mozzarella blend. After 25 minutes or when the eggplant pieces are done, remove eggplant from the oven and turn oven setting to broil. Spread a few tablespoons of sauce on the top of each eggplant slice, sprinkle with thin basil slices (if using) and top with a generous amount of cheese.
6.
7. Put pizzas under the broiler until the cheese is melted and slightly browned (This tool 6-7 minutes for me, but I was using a toaster oven. Serve hot.

Counselors Prep in Advance:

- Preheat oven
- Wash eggplant
- Slice eggplant

Kid Snack Time Duties:

- Measure ingredients
- Make sauce

Honey Drop:

Take campers on a field trip to the herb garden to pick basil for the recipe.

Cooking Concept

- Assemble pizzas

Mise En Place

This is a French phrase that translates to “everything in it’s place” this is a practice of measuring and prepping all your ingredients . With recipes that contain a lot of ingredients or multiple steps, it is best to gather ingredients ahead of time. This saves time and helps with clean up. This is often done in “mise en place cups as pictured below. Practice this technique with kids for the Eggplant Pizza recipe

Modified Chiffonade:

Roll the basil up towards the point of the leaf. Try to make it as compact as possible. Make the chiffonade cut by cutting thin slices from left to right. Chiffonade strips should look similar to the image below. For kids, use the Curious Chef™ knife. While this knife does not have a very sharp blade which is often crucial for making a chiffonade cut, this activity will teach technique.

Bee Smart, Eat Smart Curriculum

Nutrition Concept

We will use puppets and skits to teach nutrition concepts. A fruit and vegetable character will "make an appearance" before the cooking activity to teach campers about the nutrients in the foods they eat.

Instructions:

1. Follow the scripts below to convey nutrition concepts for Anthocyanins with the Benny Blueberry Puppet/Costume.

Benny Blueberry: "I'm Benny Blueberry!" *strikes super hero pose* I am the best.

Counselor: Benny you're cool, but Brittany Broccoli is a princess, she's the best!

Benny Blueberry: *gasps* What? No, I'm the best and I'll tell you why! I'm full of antioxidants. Do you remember learning about those? My antioxidant is anthocyanin……say it with me….an….tho….cy….an...nin! Anthocyanin!

Benny Blueberry: In addition to anthocyanin...I have many phytonutrients (*whispers* that are really hard to pronounce)! Phytonutrients are substances found in plants that also provide health benefits! They are different from vitamins and minerals.

Benny Blueberry: These phytonutrients and antioxidants make me a super amazing food.

Benny Blueberry: So Brittany Broccoli may have a crown, but I have super powers that make me super hero! *strikes super hero pose* all my vitamins, antioxidants and phytonutrients help your body in a variety of ways.

I help keep your mind healthy *points to brain*

I help keep your heart healthy *places hands over heart*

….and I help keep your tummy happy by promoting good digestion *rubs stomach*

Benny Blueberry: I am one of the only foods that are naturally blue...and I should also tell you...that some species of blueberries are native to Georgia! I could be growing right around the corner!

Benny Blueberry: So not only am I super *strikers superhero pose* good for you, but I'm local….so I'm the best! *smirks*

Counselor: Yes, you're pretty awesome Benny. But today we're making Eggplant Pizzas. Do eggplants have anthocyanins in them too?

Benny Blueberry: You're making pizza! *acts excited* Save me some!! But oh, yes! Eggplants are rich in antioxidants, that's what gives them their purple color!

Benny Blueberry: When are you making pizzas?

Counselor: I actually think it's time to head over there now to start making pizzas!

Lesson 5: Chef Day

Throughout the week campers discovered many different fruits and vegetables. They learned various cooking techniques and skills. On this final day campers will practice all the skills and techniques they have learned by creating two dishes that can be shared with family or friends. Campers will have the opportunity to plant their own fruit or vegetable to take home. They will then create two recipes; a vegetable recipe and a fruit recipe. Parents and family members will be invited to try their

camper's creations.

Activity: Sowing Seeds

This activity will allow campers to get their hands dirty. Campers will have creative control in designing their mini flower pots and choosing a seed to plant.

Instructions:

1. In an open space outdoors, lay out all materials and supplies needed. Create a space for decorating pots, filling pots with soil, and sowing seeds.
2. Allow campers to decorate pots with either paint or markers. If using paint, allow some time to dry. Remember to include names on the flower pot.
3. Designate one counselor to help campers fill pots with soil.
4. Provide a selection of seeds that campers can choose from. Show campers how to sow seeds into the pots.
5. Water seeds and leave them in the sun until the end of the day.
6. Allow campers to pick up pots at the end of the day with their parents.

Estimated Time:

1 hour minutes

Materials:

Seeds

Soil

Flower Pots

Markers

Paint

Honey Drop:

Provide seeds of fruits and vegetables discussed throughout the week! This can be a fun way to encourage healthy behaviors at home.

Bee Smart, Eat Smart Curriculum

Rainbow Veggie Flatbread

Estimated Time: 1 hour

Ingredients:

1 package (2-piece) Stonefire naan

1/2 cup pizza sauce

1/2 cup shredded part-skim Mozzarella cheese

about 4 cups chopped colorful veggies (Broccoli florets, green peppers, yellow peppers, orange peppers, grape tomatoes)

2 tsp. olive oil

1 tsp. Italian seasonings

Directions:

Preheat oven to 425 degrees F.

Lay out both pieces of naan in a single layer on a large baking sheet. Divide pizza sauce between the two pieces of naan, and use a spoon to spread it over the top of the naan. Sprinkle the cheese on top of the pizza sauce. Then layer the veggies in a rainbow pattern on top of the cheese. Drizzle or mist each pizza with a bit of olive oil. Then sprinkle each pizza with the Italian seasonings.

Bake for about 20 minutes, or until the veggies are cooked and the crust is slightly golden. Remove pizzas from oven, and sprinkle with optional toppings if desired. Slice and serve warm. **Counselors Prep in Advance:**

- Wash and cut vegetables into larger chunks
- Set out all other ingredients and equipment that are needed

Kid Snack Time Duties:

- Wash hands prior to cooking
- Allow campers to measure ingredients
- Use Curious Chef™ knives to cut vegetables into smaller pieces for pizza

Bee Smart, Eat Smart Curriculum

Peach and Berry Mint Salad

Ingredients

4 perfectly ripe peaches, pitted and sliced
1 cup (1/2 pint) blueberries
1/4 cup freshly squeezed lemon juice
1/4 cup sugar
2 tablespoons chopped fresh mint
1 cup (1/2 pint) raspberries
1 cup (1/2 pint) blackberries

Instructions

Combine peaches, blueberries, lemon juice, sugar and mint in a serving bowl and toss. Cover with plastic wrap and refrigerate until ready to serve (up to six hours).

Right before serving, add raspberries and blackberries and toss gently. Taste and add a bit more sugar if necessary. Garnish with a sprig of fresh mint.

Counselors Prep in Advance:

- ☐ Wash fruits
- ☐ Cut pieces into larger chunks
- ☐ Take campers to pick mint from herb garden

Kid Snack Time Duties:

- ☐ Wash hands
- ☐ Measure ingredients
- ☐ Mixing ingredients
- ☐ Chopping fruit into smaller pieces if necessary

Honey Drop:

Peaches and Blueberries are grown locally in Georgia!

Food Safety Tips

- Chopping mint

1)Wash hands with warm soapy water before handling food.

1) Keep raw meats, fish, and poultry separate from produce and ready to eat foods.
2) Ensure that all raw foods are kept refrigerated (below 41°F when not in use).
3) When handling ready to eat foods, wear gloves even after washing hands.
4) Do not use produce with broken skin that appears to be rotten.
5) Wash produce before use.
6) Always ask about allergies before each food activity.

Bee Smart, Eat Smart Curriculum

Cooking Safety Tips

1. Keep a close eye on knives and only allow kids to use Curious Chef® knives with assistance and while wearing cut resistant gloves.
2. Never leave child unattended near blades or a heat source.
3. Before cooking roll up long sleeves and tie back long hair.
4. Constantly remind campers there should be no running in the cooking space to avoid tripping and injury.
5. Never put water on a cooking fire. Use a fire extinguisher, baking soda, or flour to put out fire.
6. Keep clothing, paper towels, and dish towel away from heat sources to avoid fire.

Conclusion

Be Creative

Children are more likely to meet fruit recommendation's because they are naturally sweet in flavor. Vegetables however are often less palatable for kids; but they do not have to be bland or boring. There are so many
different ways to prepare vegetables. Roasting, sautéing, and tossing with other flavors such as garlic and herbs can pack tons of flavor. Different spices can also lend additional flavor. It's best to be as creative as possible when introducing new vegetables to kids!

Eat a Rainbow

It is also important to eat a variety of different color fruits and vegetables. As highlighted in this curriculum fruits and vegetables each contribute different vitamins, minerals, and antioxidants to a healthy plate. While some overlap can occur, some of these nutrients and antioxidants are unique to specific fruits or vegetables. This is why it's important to eat a rainbow of fruits and vegetables including red, orange, yellow, green, blue, and purple.

Appendix B.

Fruit and Vegetable Questionnaire

Test Knowledge about Fruits and Vegetables

Draw a line connecting the name of the fruit or vegetable and its picture.

1. Strawberries

2. Eggplants

3. Carrots

4. Blueberries

5. Kale

6. Mango

7. Pear

8. Red Bell Pepper

1. Which of the following is a vegetable?
    a. Eggplant
    b. Kiwi
    c. Mango
    d. Pomegranate
2. Which of the following is a fruit?
    a. Spinach
    b. Carrot
    c. Mango
    d. Kale

Test Attitude Toward Fruits and Vegetables

Circle how the fruit or vegetable makes you feel.

1. How do you feel about the taste of strawberries?

2. How do you feel about the taste or red bell peppers?

3. How do you feel about the taste of mangoes?

4. How do you feel about the taste of carrots?

5. How do you feel about the taste of pears?

6. How do you feel about the taste of kale?

7. How do you feel about the taste of blueberries?

8. How do you feel about the taste of eggplant?

9. How do you feel about food/snacks made from vegetables?

10. How do you feel about food/snacks made from fruits?

Test Willingness to Try Fruits and Vegetables

1. Will you try a new recipe with ***blueberries***?

YES NO

2. Will you try a new recipe with ***red bell peppers***?

3. Will you try a new recipe with ***mango***?

4. Will you try a new recipe with ***carrots***?

5. Will you try a new recipe with ***eggplant***?

6. Will you try a new recipe with ***kale***?

Appendix C.

Parent-Child Cooking Class Survey

1. **Do you prepare fruits and vegetables regularly at home?** **YES** **NO**
2. **Do you purchase fruits and vegetables regularly?** **YES** **NO**
3. **Does your child eat fruits regularly?** **YES** **NO**
4. **Does your child eat vegetables regularly?** **YES** **NO**
5. **How would you rate the Kale Pesto Pasta recipe?**

Parent  **Child**

6. **How would you rate the Eggplant Pizza recipe?**

Parent  **Child**

7. **How would you rate the Mini Carrot Cupcake recipe?**

Parent  **Child**

8. **As a result of this class please indicate the vegetables and recipes you intend to try at home:**

PARENT

Vegetable	Tried before class	Will try vegetable again	Will try recipe again
Carrots	YES NO	YES NO	YES NO
Eggplant	YES NO	YES NO	YES NO
Zucchini	YES NO	YES NO	YES NO
Kale	YES NO	YES NO	YES NO

CHILD

Vegetable	Tried before class	Will try vegetable again	Will try recipe again
Carrots	YES NO	YES NO	YES NO
Eggplant	YES NO	YES NO	YES NO
Zucchini	YES NO	YES NO	YES NO
Kale	YES NO	YES NO	YES NO

9. **As a result of this class, how likely are you to let your child assist you with cooking at home?**
   - ❑ **I was already doing this**
   - ❑ **Very Likely**
   - ❑ **Somewhat Likely**
   - ❑ **No at all Likely**

10. **On a scale of 1-10, how likely are you to participate in this type of program again?**

1	2	3	4	5	6	7	8	9	10

11. **What aspects of the program did you like? What do you think could be improved?**

Appendix D.

Bee Smart, Eat Smart
Parent-Child Cooking Class

Please join us on October 20th 2018!

The UGA Department of Foods and Nutrition and the Food Bank of Northeast Georgia will be hosting a parent child cooking class from 12pm to 3pm.

Food Bank of Northeast Georgia Teaching Kitchen

46 Plaza Way, Clayton, GA 30525

This class will feature 3 recipes focused on

A pollinated fruit or vegetable:

Eggplant Pizza

Kale Pesto Pasta

Mini Carrot Cupcakes

Participants in the class receive a cooking or nutrition gift as an incentive.

Contact us: Cara-Lee Langston, Teaching Kitchen Manager

Phone: 706-782-0780

Email: teachingkitchen.mtn@foodbanknega.org

Online: visit www.foodbanknega.org/teachingkitchen

Cooking class participants will also be invited to participate in a research study. Participation is voluntary. Please contact the researcher with any questions at camariaw@uga.edu.

Foods & Nutrition
College of Family and Consumer Sciences
Childhood Obesity Prevention Laboratory
UNIVERSITY OF GEORGIA

FOOD BANK of NORTHEAST GEORGIA
REGIONAL BRANCH
IQF Line + Teaching Kitchen

State Botanical Garden of Georgia
UNIVERSITY OF GEORGIA