DEVELOPMENT OF A VIRTUAL COOKING CLASS FOR PARENTS

ON INTEGRATING SAM (SCIENCE, ART, MATH) TO PROMOTE VEGETABLES

TO PRESCHOOL CHILDREN ENROLLED IN GEORGIA HEAD START

by

GIA N JOSEPHINE SHIEH

(Under the Direction of Caree J. Cotwright)

ABSTRACT

Early childhood is an optimal time for establishing healthy eating habits which may prevent disease later in life. In Georgia, the child obesity rate hovers at 13% with the majority being children from low-income Black or Hispanic families. Currently, the *Dietary Guidelines for Americans* recommend children aged 2-5 consume 1-1.5 cups of vegetables daily, yet only a small percentage consume recommended amounts. As nutrition gatekeepers, parents play important roles in facilitating their children's vegetable intake, but they may experience barriers that extend beyond the scope of diet. This indicates that multi-layered approaches which target multiple health determinants will be required to achieve healthy equity. Interventions to strengthen other key influencers of health and go beyond singularly addressing dietary factors are needed. Studies show there is an inverse relationship between education level and poor health, indicating that one potential intervention area is early education, which encompasses physical, cognitive, and linguistic developmental areas as well as scientific and mathematical reasoning. One under-explored area of potential intervention to simultaneously address both nutritional and educational disparities is a cross-curricular approach that integrates SAM

(Science, Arts, Mathematics) into food learning experiences. Food can function as a vehicle to integrate academic and developmental learning. SAM use among school-aged children has successfully improved cognitive development and academic achievement in classroom content areas. However, utilization of SAM by parents to promote vegetable intake in younger children within a home setting remains untested. In this study, researchers developed a pilot nutrition education curriculum for parents of Head Start children ages 3-5, that focuses on cooking and SAM engagement strategies which parents can use to promote vegetables to their children. Needs assessment interviews were conducted to inform curriculum development within the framework of Social Cognitive Theory. The curriculum was pilot tested in parents (n=34) of preschool children enrolled in Head Start programs in northeast Georgia. Parental knowledge, self-efficacy, and acceptability were measured. Findings showed that SAM integration is acceptable to parents for introducing vegetables to young children with the goal of changing dietary behaviors.
INDEX WORDS: Obesity, Preschool, Vegetables, SAM, Head Start, Parents, Self-efficacy

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DEDICATION

This dissertation is dedicated to my mom.

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CHAPTER 1

INTRODUCTION

Background and Problem

In the U.S., childhood obesity is a serious national health concern that has profound consequences (Smith et al., 2020). Children from low-income households experience disproportionately higher rates of obesity which puts them at greater risk for developing nutrition-related metabolic conditions and diseases such as hypertension, hypercholesterolemia, diabetes, and cardiovascular disease in adolescence and adulthood (Weaver et al., 2019). In 2018, the prevalence of obesity among children aged 2-5 years old in the U.S. was 13% (CDC, 1). In the state of Georgia, the childhood obesity rate for children aged 2-19 years old approximates the national average, hovering between 12%-16%, with the vast majority of this percentage being children from Black or Hispanic families living at or below the federal poverty level, which is defined by the Department of Health and Human Services in 2023 as an annual income at or below $24,860 for a family of 3, and with lower levels of educational attainment (Ogden et al., 2018; DHHS, 2023). However, socioeconomic factors alone do not account for causation. Obesity's etiology is complex and arises from genetic predisposition coupled with an obesogenic environment and lifestyle behaviors including physical activity and dietary intake (Albuquerque et al., 2017). Increased intake of calorically-dense foods and beverages high in sugar and fat and reduced consumption of nutrient-dense foods may be chief drivers. Current obesity rates among children are not surprising since most children in this age group fail to meet the recommended intake amounts of vegetables (Arcan et al., 2019). Currently, the *DGAs 2020-*

2025 recommend that children ages 2-5 consume 1-1.5 cups or oz equivalents of vegetables per day (DGAs). However, recent analysis of data from the 2021 National Survey of Children's Health (NSCH) found that among children aged 1-5 years, only half consumed a daily vegetable (Hamner et al., 2023). Preschool children consume the majority of their meals at childcare centers and in the home, and while most federally subsidized childcare programs are required to adhere to nutrition standards, the parent's decision or ability to adhere to these in the home environment can vary (Sisson et al., 2017). Moreover, this variation may depend on factors outside of the parent's control. Parental ability to adequately feed their children vegetables is oftentimes met with an assortment of barriers such as limited temporal and financial resources, inadequate access to fresh produce, lack of culinary skills to prepare healthy meals, child neophobia, and conflicting cultural feeding styles that extend beyond the scope of individual dietary behaviors. Barriers to healthy eating may arise from non-food related sectors such as income-level, education-level, or neighborhood safety, and may not be addressed since their etiology is not always apparent.

At the physiological level, childhood obesity is a result of a metabolic imbalance in energy intake and energy expenditure and can develop when excess caloric intake exceeds energy expenditure (Lin & Li, 2021). Although metabolic and nutritional imbalances can have genetic causes, they are primarily a result of engaging in obesogenic behaviors such as low physical activity, sedentary habits, and excess consumption of processed foods and beverages that are high in saturated fat, sugar, and sodium (Sisson et al., 2016). These behaviors may, in turn, be governed by an obesogenic environment composed of many influencers known as social determinants of health (SDOH) (Townshend & Lake, 2017; Hobbs & Radley, 2020). Social determinants of health are found within the environments in which people are born, live, learn, work, play, and age (Braveman & Gottlieb, 2014; Islam, 2019, Yusuf et al., 2020). Examples of determinants can include regional cost of living, income-level, education level, job quality, security, and mobility, affordable and safe housing, access to gyms, supermarkets, parks and green space, neighborhood crime rates, and affordable healthcare. Individually, these determinants may not act as direct causative agents in the development of obesity but rather work together to affect the overall health of an individual (Javed et al., 2022).

Although social determinants may lie outside the scope of an individual's control, they are modifiable. Health equity recognizes that each individual experiences different physiological, social, behavioral, and economic conditions but that with the proper supports, these individuals have an equal opportunity to be as healthy as possible (Brownson et al., 2021; Jack, 2021; Lee et al., 2020; Petersen et al., 2021). Efforts to realize health equity can be seen in federal policy programs, which have been established to meet the various needs of limited-resource households. Of these needs, a particular area of importance is providing families with access to early childhood education. One critical arm in the repertoire of programs designed to address educational inequities is Head Start (HS), which is the most extensive federally funded early care and education program in the U.S. that meets the educational needs of disadvantaged populations including minority families of low socio-economic status (SES) (USDHSS). All Head Start grantees are required by The Head Start Program Performance Standards (HSPPS) to implement the Head Start Early Learning Outcomes Framework (ELOF), which outlines the skills, behaviors, and content knowledge that must be taught to preschool-aged children in order to prepare them for kindergarten (ELOF). The ELOF has been designed to meet the needs of children from diverse linguistic, economic, and cultural backgrounds including children with disabilities (Kim et al., 2021). Although Head Start is not exclusively dedicated to enhancing nutrition education and promotes enhancement of various developmental learning areas, Head Start programs may help increase access to healthy foods. Head Start grantees that are part of school systems can engage in food access programs such as the National School Lunch Program (NSLP), and all Head Start programs are required to participate in the Child and Adult Care Food Program (CACFP), which may aid in promoting healthy dietary patterns. Furthermore, Head Start plays a critical role in advancing health equity since it helps to prepare young children for kindergarten and may help facilitate academic achievement in later years (Lee et al., 2014). This can lead to attainment of higher education and higher income, major factors which can play a critical role in influencing other social determinants of health and potentially halting cycles of intergenerational poverty (Sells & Mendelsohn, 2021). Federal programs that focus on addressing hunger and food insecurity include: the *Child and Adult Care Food Program* (CACFP), which reimburses families with young children who are enrolled in participating child or adult care centers for nutritious meals and snacks (Hasnin et al., 2020); the *Special Supplemental Nutrition Program for Women, Infants, and Children* (WIC) that provides women who have a family income below 18% of the federal poverty level and are pregnant, breastfeeding, or have children less than 5 years of age with food in the form of food checks or electronic benefit transfer cards (EBT), formula vouchers, free access to nutrition education training and materials, breastfeeding materials, and additional support in other health areas (Caulfield et al., 2022); the National School Lunch Program (NSLP) which is a meal assistance program that provides free or low-cost lunches to children at school (Kinderknecht et al., 2020); and finally the Supplemental Nutrition Assistance Program (SNAP) which is the largest federal assistance program in the U.S. that provides eligible low-income families with an EBT card (Rivera et al., 2019).

One point of mention is that the majority of obese adults and children are also food insecure, illustrating an obesity-food insecurity paradox (Dhurandhar, 2017). This puzzling phenomenon suggests that food access alone is not the only factor responsible for unhealthy eating patterns in young children and that addressing food insecurity alone may be insufficient for combatting the obesity epidemic. Additional psychosocial factors must be accounted for (Mata et al., 2017); one example is the availability of and access to adequate and culturally appropriate nutrition education resources for families with young children. Thoughtfully tailored interventions that emphasize not only best practices for feeding but also parent-mediated engagement strategies to facilitate vegetable consumption are needed to maximize the success of federal policy initiatives that address hunger and food insecurity (Fisher & Dwyer, 2016). In response, the federal government has instituted nutrition education programs such as the Expanded Food and Nutrition Education Program (EFNEP) and also SNAP-Ed to help close these gaps (Perkins et al., 2019; Puma et al., 2021). However, cross-talk among these programs and programs in other sectors such as childcare, housing, and safety are lacking. Despite the presence of multiple arms of federally funded initiatives that target specific area issues, an interconnected network of multilevel intervention approaches that simultaneously target more than one determinant of health at a time may be needed to effectively address the barriers that parents face in feeding their young children vegetables.

Study Rationale

Early childhood represents a critical window of time in which children’s taste preferences begin to develop and can carry over into adolescence and adulthood (Birch, 1999). Because of this, intercession during these early years is critical (DeCosmi et al., 2017). Designing effective interventions to address early childhood nutrition involves understanding the array of causative factors that can contribute to unhealthy eating during the early years including intrinsic personal and behavioral tendencies and preferences as well as extrinsic environmental factors that are primarily mediated by the parent or caregiver. Parents and guardians serve as the primary nutrition gatekeepers for their children given that they are the main decision-makers when it comes to the quality and variety of foods that are purchased, what meals and snacks are made available, accessible, or served to the child in the home, how meals are prepared, when meals are served, and the frequency and allowable amount of food that is consumed by the child (Vaughn et al., 2018). Key parent-mediated influencers include role modeling, knowledge, attitudes, and self-confidence in preparing healthy foods, mealtime structure, atmosphere, and frequency, the amount of screen time a child is exposed to and caregiver feeding styles (Johnson, 2016). Thus, as nutrition gatekeepers for their families, parents play an indispensable role in facilitating their children's fruit and vegetable intake.

However, despite the influence that they wield, parents, especially those from limited resource backgrounds, may experience barriers to ensuring that their children meet recommended intakes (Nepper & Chai, 2016). Some parents may lack the necessary physical resources to provide healthy options, while others may need tailored guidance, training, and support in order to serve nutritious meals. Thus, interventions that identify parental needs and challenges when serving vegetables in a home setting should be implemented in order to inform the development of culturally-appropriate nutrition education programs. In turn, curricula content should be designed according to current best practice recommendations. Among the suite of expert recommendations for feeding that have been studied, the most common and universally agreed upon best practice for introducing novel foods to young children is repeated exposures

(Spill et al., 2019). However, verbal attempts to persuade young children to consume nutrient dense foods such as fruits and vegetables may be met with prolonged resistance especially during early childhood years (Birch & Fisher, 1998; Johnson, 2016). As a result, the use of more indirect approaches for facilitating exposure experiences are necessary. In fact, previous studies have demonstrated that interventions that use hands-on experiential learning and sensory-based approaches may be viable and effective solutions not only for engaging school-aged children to consume vegetables but also for facilitating academic learning of school content and academic subject areas (Ehrenberg et al., 2019; Skelton et al., 2020). Ultimately, approaches that actively engage, introduce, and familiarize young children with vegetables may be a preliminary stepping stone to effectively increase children's vegetable intake.

According to a consensus by obesity research professionals and stakeholders, multilevel interventions will be necessary in order to make strides in obesity prevention (Ward et al., 2013). Multilevel interventions involve addressing social determinants of health at every level, not just one (Kumanyika, 2019). There is a present need for interventions to strengthen other key influencers of health and well-being and go beyond singularly addressing dietary factors. In fact, studies have demonstrated that there is an inverse relationship between education level and poor health. This indicates that one contributor to health that should be targeted is early childhood education and learning, which encompasses various developmental areas such as physical, cognitive, literary, lingual as well as creative, scientific, and mathematical reasoning and thinking. Existing interventions either target nutrition education or academic learning, but only a few may simultaneously target both of these seemingly unrelated correlates of health (Carraway-Stage et al., 2015). This is unfortunate given that food can be used as a platform for promoting both nutrition education as well as academic learning (Doustmohammadian, et al., 2020; Nasrin et al., 2022). Recently, there has been an emerging interest in the contextual use of language, literacy, art, math, and science as vehicles for delivering nutrition education in the childcare and school environment (Basu & Nguyen, 2021; Owen et al., 2018; Sepp & Hoijer, 2016; Carraway-Stage et al., 2015; Stage et al., 2018). One currently under-explored area of potential intervention to simultaneously address both child nutritional and educational disparities is a cross-curricular educational approach that integrates SAM (Science, Arts, and Mathematics) into food learning experiences. Food and nutrition experiences can function as complementary vehicles for educators to seamlessly weave in topics related to various aspects of academic and developmental learning. Several studies have explored the use of SAM and SAM-related educational approaches such as STEM (science, technology, engineering, math) or STEAM (STEM + Art) with older school-aged children and found it viable in improving cognitive outcomes and academic achievement, but few studies have examined its use to promote fruit and vegetable consumption among young pre-school age children outside the classroom (Bayles et al., 2021; Oppenheimer et al., 2020; Roseno et al., 2015; Hovland et al., 2013; Duffrin et al., 2010). The use of SAM strategies within the framework of state-developed standards among older school-aged children have been successful in improving both cognitive development as well as academic achievement in classroom content areas (Ozkan & Topsakal, 2021). However, its acceptance by parents and its functional utility in cultivating vegetable intake in younger children within a home setting remains untested.

Statement of Purpose and Goal

Overall, the present study provided Head Start families in Georgia with culturally appropriate nutrition education programming to increase parental confidence, knowledge, and skills in promoting vegetables to their children with the goal of creating sustainable healthy eating routines within the home. The overarching purpose of this study was to investigate, design, implement, and conduct a formative evaluation of a novel method of educating Georgia Head Start parents on how to promote vegetables to young children in the home using engagement strategies that integrate science, art, math (SAM) through hands-on sensory-based experiences. In the first study, a needs assessment was conducted in order to identify determinants of vegetable feeding behaviors in the home. The aim of the needs assessment was to identify the barriers, facilitators, and preferences of parents when promoting vegetables to their children in the home. In the second study, data from the needs assessment was used to develop and tailor a pilot curricula for parents of young children aged 2-5. After the curricula was developed, a pilot intervention consisting of a virtual nutrition class series that provides parents and caregivers of young children aged 2-5 years with nutrition knowledge, culinary skills, recipes, and science, math, and art-based child engagement strategies to expose young children to vegetables and encourage vegetable consumption was implemented. In this study, qualitative and quantitative assessments were administered to evaluate the impact and acceptability of the intervention.

The long-term goal of this study was to increase vegetable intake among preschool children by increasing repeated exposure to vegetables in a positive learning environment through improving parental ability to promote vegetable exposure strategies (knowledge), increasing confidence and ability to use these strategies (skills), and acceptance of novel approaches for offering and exposing their children to vegetables. Since young children rely on parents and caregivers to shape their feeding environments and eating habits, in this study parents as proxies were targeted in order to stimulate changes in child eating behaviors.

Ultimately, the long-term goal of the study is to increase preschool children's consumption of vegetables in the home setting by increasing children's willingness to try vegetables. However, it is expected that by exploring the determinants of parental feeding behaviors and changing parental food-related knowledge, skills, and practices, that improvements in feeding behaviors of the young children they are caring for can be achieved.

Specific Aims

This study has three specific aims: 1) The first aim of the study was to identify the barriers, facilitators, and needs of parents when promoting vegetables to their children at home in order to develop a curricula tailored for them; 2) The second aim of the study was to develop and implement the curricula to increase parent knowledge, skills, self-efficacy in using cooking and engagement strategies to serve vegetables to preschool children aged 2-5 years in the home setting; 3) The third aim of the study was to evaluate parent acceptability (A) of a SAM curricula for serving vegetables to their young children.

Research Question and Hypothesis

This project seeks to address the following research questions: 1) What are the personal, behavioral, and environmental barriers, facilitators, needs, and preferences of parents when serving vegetables to young children in the home? 2) Does a nutrition curriculum that emphasizes vegetable promotion using SAM engagement strategies increase parent knowledge of, skills, and self-efficacy in serving vegetables to their children? 3) Is a virtually-delivered parent-child cooking class that provides groceries and SAM activities for promoting vegetables acceptable to parents and children? Based on the success of SAM integration in improving cognitive and behavioral outcomes among other age groups, we hypothesize that a virtual nutrition education curriculum focused on providing SAM strategies will increase parent's self-efficacy and ability to serve vegetables to their children in the home setting. Based on the results of a needs assessment and surveys of parental preferences for a nutrition curriculum, we also hypothesize that this curriculum will be acceptable to parents of young children.

Theoretical Framework

The underlying conceptual framework for the proposed study intervention is Albert Bandura's Social Cognitive Theory (SCT). Due to the key roles its underlying constructs play in influencing health behavior (Painter et al., 2008), SCT is one of the most widely accepted theoretical frameworks applied to nutrition education interventions. The theory posits that behavior change can be achieved by exploring the interactions among an individual's personal cognitive factors (e.g., beliefs and outcome expectations), the environment (e.g., physical factors and socio-cultural norms), and the behavior itself (Bandura, 1986, 1989, 1997, 2001, 2004). The core of SCT rationalizes that personal, behavioral, and environmental determinants work together to produce a behavior. Overall, the mutual interplay among these three core components and their constituent constructs is known as reciprocal determinism.

Social Cognitive Theory is a suitable theoretical framework for this study in several aspects (Figure 1). The first research question this study seeks to investigate is what personal, behavioral, and environmental barriers, facilitators, needs, and preferences do parents experience when introducing or serving vegetables to young children in the home. According to Susan Johnson's model, the following key areas have been found to be positively associated with improving children's willingness to try vegetables: 1) providing children with multiple opportunities for engagement and repeated exposure through food-based (FB) and sensory learning (SL) experiences 2) making vegetables available and accessible 3) parental knowledge, beliefs, and behaviors that model healthy eating patterns 4) use of responsive parental feeding styles and practices (Johnson, 2016). Social Cognitive Theory can be used to understand how these personal, behavioral, and environmental determinants interact to influence both parental behaviors related to offering vegetables to their children and children's reactions to these behaviors during and outside of meal and snack times. By exploring reciprocal determinism among these three components, the needs assessment can inform interventions on how to increase parental implementation of best practices such as providing repeated exposures to vegetables through specific types of learning experiences using a variety of feeding strategies. In addition to the needs assessment, the proposed study intervention will be designed to target individual, behavioral, and environmental determinants of behavior to affect behavioral outcomes.

The second research question that this study seeks to explore is whether using a curriculum that focuses on providing parents with innovative yet simple strategies for engaging, familiarizing, exposing, and offering vegetables to their children can increase parent knowledge, skills, and self-efficacy in serving vegetables to their children. Personal determinants of parent behaviors may include parents' lack of self-efficacy due to personal factors like beliefs about knowledge (e.g., parents may not know any engagement strategies and which would be appealing and age-appropriate for their child., time (e.g., parents may feel they have no time to prepare vegetables in the midst of a busy schedule), and convenience (e.g., parents may feel that engaging their child to eat vegetables requires too much effort when they can just put on a television show in the background). Outcome expectations regarding the child's willingness to consume a vegetable may be negatively reinforced by knowledge of the child's idiosyncrasies or negative reactions to the vegetable in the past (e.g., parents may feel that their child is picky and will probably not want to eat something they refused to eat in the past so there is no reason to bother serving the vegetable again). Parents may perceive that the risks/consequences of not engaging their child to eat vegetables are not necessarily urgent or dire (e.g., parents may feel that if their child doesn't eat their vegetables on a given day, they will still be okay the following day since it is not a life-or-death matter and the child has their whole life to eat vegetables.). The perception that barriers and costs (e.g. parents may possess limited funds to purchase many different vegetables once a week so they may not feel that it's worth their time to prepare a variety of vegetables every day when their child may simply refuse to eat it, parents may have no energy or patience to keep prompting the child to eat something over and over again) outweigh the benefits of using repeated exposure and engagement strategies (e.g. parents may not be able to see positive outcomes including fewer tantrums at mealtimes, less stress, reduced waste of time, money, and food, reduced worry over their child being hungry if they don't eat something, and greater health status) may also serve as powerful determinants of parent feeding behaviors. Additionally, self-evaluative outcome expectations related to satisfaction and self-worth (e.g., parents may feel good because they know their child is meeting doctor's recommendations, parents may feel proud because they were able to prompt their child to eat more vegetables which is not an easy task) may serve as determinants for change.

The study also seeks to explore behavioral determinants and their influence on self-efficacy and the behavior itself. These determinants encompass parent's behavioral capabilities such as cognitive, behavioral, and affective skills, which are in turn contingent upon parental knowledge (e.g., parents may not know what the health benefits of certain vegetables are or they may not know what SAM engagement or sensory-based learning is and how they will benefit their child') or procedural (e.g., parents may not know how to carry out a food activity). The presence or absence of cognitive skills such as decision-making skills (e.g. the parent not know at what point they should stop pressuring their child to eat a vegetable or how strict or lenient they should be about their child finishing all their food) and critical thinking skills (e.g. parents may not know how they can introduce a vegetable to their child in a creative way) serve as important influencers of parents' ability to practice engagement and exposure strategies, especially in the context of feeding styles and best-practices. For example, parents may engage in either preferred or learned feeding behaviors that are neither evidence-based nor conducive to their child's willingness to try new vegetables (e.g., the parent may feel that when their child refuses to eat a certain vegetable when they engage in force-feeding and pressuring tactics, this discourages the parent from serving that vegetable in the future). Furthermore, equipping parents with affective skills to cope with stressful situations (e.g., parents may not know how to respond when their child repeatedly overturns their plate or throws a new vegetable on the ground), communicate clearly (e.g. the parent may not understand how to talk to their child when they are crying or protesting or how to start a conversation about vegetables with their child outside of mealtimes) may be just as imperative as equipping parents with behavioral skills such as how to obtain, select, cook/prepare, incorporate, and serve vegetables in an appealing manner to their children using cross-curricular activities and hands-on experiential learning strategies. Differences in parents' ability to engage in self-regulation through the use of goal setting are also strong influencers of behavior. A final behavioral determinant of parental self-efficacy is positive or negative reinforcement which may be either external or internal. Previous experiences and children's responses to vegetable exposures can serve as strong external reinforcements to parents to either avoid or favor serving certain vegetables or foods over others (e.g., parents may feel that if their child repeatedly rejected a vegetable in the past for no reason, they may feel more inclined to serve a vegetable which the child did like). Internal reinforcements may manifest as feelings of failure or accomplishment when a vegetable is refused or accepted by their child, prompting the parent to use or avoid the same/similar engagement strategy in the future.

Environmental determinants of feeding behaviors may be influenced by regional, local, familial, social, and cultural norms regarding how to serve vegetables and the types of vegetables that others in the environment tend to serve or feel should be served (injunctive and descriptive norms). For example, given that the primary audience in this study resides in Georgia, a southern state, parents may prefer serving specific types of vegetables like dense leafy green varieties in lieu of other vegetables (e.g., parents may tend to serve eggplant, beets, cabbage) or advocate for specific flavor-flavor pairings due to long-standing familiar traditions (e.g., parents may feel that they are more inclined to serve certain vegetables like collard greens and butter beans that they were served as a child). Others' comments and assertions about their beliefs and attitudes of what is socially appropriate may also affect parent's use of valuable feeding approaches such as food-based and sensory learning strategies (e.g., parents may feel that letting their child play with their food is wasteful or that it is not their responsibility to teach their child about vegetables). Observational learning from family or peers who provide advice, comments, and testimonies of their own failures, successes, and experiences (e.g., parents may give other parents comments about picky eating is a temporary phase that the child just needs to grow out of with time, not expecting children to like something if the parent didn't like it when they were younger, or not having any issues getting their own child to eat) may also affect parental self-efficacy by causing parents to feel that getting their child to eat vegetables is something that is out of their control or something that does not necessarily need to be viewed as a problem. Finally, physical factors such as availability (e.g., lack of variety, poor selection, only spoiled/rotten ones remaining), accessibility (e.g., lack of transportation, lack of supermarkets with fresh produce), lack of freedom to purchase vegetables due to other demands (e.g., no childcare available, work schedule limits time spent grocery shopping/planning), and high cost due to factors like location, type of vendor, and seasonality may act as indirect barriers that further exacerbate parents lack of self-efficacy to serve a variety of vegetables to their children or engage in repeated exposures. In summary, several major constructs of the Social Cognitive Theory can be applied to the primary audience in this study, making it the most appropriate epistemological framework for guiding this intervention.

CHAPTER 2

LITERATURE REVIEW

Achieving Health Equity by Examining Social, Environmental, and Personal Barriers to Nutrition and Healthy Dietary Patterns

Health equity is the state in which every individual has an equal opportunity to achieve their maximum health potential (Braveman et al., 2017). Given that many different biological, social, behavioral, and economic factors work together to influence the overall health of an individual, the definition of health equity takes into account the unique circumstances of an individual and allocates the appropriate resources to that individual based on their distinct situation. This should be distinguished from health equality which is when all individuals are allotted equal amounts of resources, regardless of their circumstances. When only health equality is addressed and health equity is neglected, this can perpetuate a cycle of health inequity (McCartney et al., 2019). Achieving health equity will require a comprehensive understanding of all the interdisciplinary factors that work together to impact an individual's health. This can include a diversified array of causative factors such as education, school readiness and academic achievement, access to housing, and affordable healthcare.

One fundamental area of policy and research focus is food insecurity and its relation to nutrition-related health conditions. According to the National Health and Nutrition Survey in 2015, food insecurity is associated with an increased risk of obesity in children ages 6-11 (Kaur et al., 2015). Despite the government and state-subsidized food programs that are currently available in the

U.S., health inequities related to food insecurity and the obesity epidemic continue to persist, particularly among low-income, low-educated socially marginalized communities of color in both urban and rural areas.

Environmental factors that may contribute to nutrition-related health inequities include limited access to grocery stores that carry fresh fruits and vegetables (food deserts), lack of public transportation and long traveling distances to supermarkets, the prevalence of convenience stores and fast-food restaurants (food swamps), lack of public recreational facilities such as parks, playgrounds, and gyms that encourage physical activity throughout the seasonal year, high crime rates that deter outdoor exercise, and lack of health education resources in early care centers and schools. Persistent exposure to advertisements on billboards, television, and the radio encouraging individuals to consume a specific food item (e.g., coke) may also disproportionately affect communities of color. Furthermore, government subsidized meals are often designed to be "one-size-fits-all," not accounting for children who are at risk of being or are already overweight, obese, or diabetic. As a result, dependence on government-subsidized meals may result in reduced dietary flexibility (Stookey, 2015).

Personal factors (e.g., financial, temporal, social, cultural, cognitive) that may contribute to health inequities in nutrition include household income level, level of educational achievement, demanding blue-collar work schedules, lack of transportation, lack of time to plan, shop, and prepare nutritious meals, lack of culinary skills and/or equipment access, lack of inspiration for what meals to prepare, incorrect assumptions of what constitutes a healthy meal, the perceived cost of healthy ingredients, desire for convenience meals, culturally ingrained ways of cooking that rely on the use of unhealthy ingredients such as salt, sugar, and oil, cultural preferences that are more heavily biased towards a specific food group (e.g., meat) while neglecting others (e.g., vegetables).

Behavioral factors that may contribute to health inequities include being drawn to purchase unhealthy foods having attractive labeling and low cost, desire to placate picky eaters with convenience meals (e.g., snacks with low nutritional density, microwaveable TV dinners, fast food, or take-out), and intergenerational assimilation of unhealthy eating behaviors, habits, and patterns from family members, friends, or other social support systems.

All of these contextual factors in the environment and in the homework together and rely on one another to perpetuate a cycle of disparities in health. It is vital that current policies, programs, and health interventions not only account for these contextual factors but also target them directly in an effort to break the cycle (Kumanyika, 2019). Ultimately, there is a need for intervention programming that utilizes culturally appropriate and meaningful approaches and strategies related to aspects including but not limited to recipes, sensory profiles of food ingredients, food preparation styles, language/wording on distribution materials and in workshops, and social engagement approaches (Airhihenbuwa et al., 1996; Mier et al., 2010; Scott et al., 2019).

Disparities in National and Regional Prevalence of Obesity by Race, Income, and Education

Adult, adolescent, and childhood obesity and overweight continue to be an epidemic among the U.S. population. In 2018, the U.S. obesity prevalence among adults was 42.4%, which was over a 10% increase from the previous decade (CDC,1). According to the CDC's National Center for Health Statistics (NCHS), non-Hispanic black adults (49.6%) had a higher prevalence of obesity followed by Hispanic adults (44.8%) (CDC,1). In 2018, the U.S. obesity prevalence among children was 13.4% among 2-5-year-olds, 20.3% among 6-11-year-olds, and 21.2% among 12-19-year-olds (CDC,2). Obesity prevalence was highest nationally for Hispanic children (25.6%) followed by non-Hispanic black children (24.2%) (CDC,2). Moreover, according to the CDC's Morbidity and Mortality Weekly Report, national obesity prevalence for children and adolescents aged 2-19 years in higher-income groups was almost half of what it was among children and adolescents in lower and middle-income groups (CDC,2). Unsurprisingly, national obesity prevalence among children and adolescents aged 2-19 years was found to decrease as the head of household's educational level increased (CDC,2).

According to the CDC's recent 2019 regional surveillance data, the Midwestern (33.9%) and southeastern (33.3%) regions of the U.S. exhibited the highest rates of obesity compared to the northeast (29.0%) and western (27.4%) regions (CDC,3). In 2019, the overall prevalence of self-reported obesity in the state of Georgia was 33.1% (CDC,3). In 2019, the prevalence of self-reported obesity among non-Hispanic black adults in Georgia is 39.2%, which exceeds the percentages of their Hispanic (32.9%) and non-Hispanic white (30.1%) counterparts (CDC,3). In 2019, the obesity rate for adults participating in the Women Infant and Child program (WIC) in Georgia was 33.1%, while the obesity rate for children aged 2-4 years was 13.6% in 2018 (Robert Wood Johnson Foundation). Collectively, this data reveals that obesity and overweight is an epidemic that disproportionately affects specific populations based on racial and ethnic background, educational and income status, as well as geographical location.

The Obesity Food Insecurity Paradox

Upon examination of the above demographic data for both obesity and food insecurity, it is interesting to note that many of the same populations who experience food insecurity are also either overweight or obese. This phenomenon is often referred to as the "food insecurity and obesity paradox" or the "double burden of malnutrition." This paradox exists for several reasons. In order to understand the coexistence of these two contradictory phenomena and how they perpetuate one another, the biological, social, and environmental factors that contribute to both obesity and food insecurity and how they interact should be thoroughly examined.

At the physiological level, obesity is a result of a metabolic imbalance in energy intake and energy expenditure (Romieu et al., 2017). Obesity occurs when excess caloric intake exceeds energy expenditure (Piaggi et al., 2018). Although food insecure households experience limited access to adequate amount of foods and thereby would be expected to experience an equal deficit in caloric supply, there are several explanations for why this may not be the case (Tan et al., 2019; Zizza et al., 2008). First, it is important to consider the quality and composition of the foods that food insecure households have and do not have access to and how this can contribute to a surplus of energy intake (Rincor et al., 2022). Fundamentally, foods may be characterized by their nutrient density and energy density (Gupta et al., 2019). Nutrient dense foods are foods that contain a higher abundance and variety of nutrients which are defined as carbohydrates, protein, fat, vitamins, minerals, and water (Drewnoski & Fulgoni, 2014). Nutrient dense foods also tend to be high in fiber which contributes to a feeling of fullness during and after consumption (Hervik et al., 2019). Energy dense foods are foods that contain a high number of calories per gram (kcal/gram) of food (Rolls et al., 2017). Energy dense foods can exhibit either high or low nutrient density as well as other non-nutrient disparities in composition and quality (Biltoft-Jensen et al., 2022).

Food insecure households tend to have access to foods that are high in fat and sugar and are therefore more calorically dense (Morales et al., 2016). Furthermore, many of these nutrient-poor foods are low in fiber and tend to contain many food additives designed by food manufacturers to increase palatability and consumption which may make it more difficult for the body to feel satiated (Anguah et al., 2017). For example, many calorically dense foods contain high fructose corn syrup which is not converted into glucose and released into the bloodstream; as a result, the body does not release insulin and the feedback mechanisms that signal the brain to stop eating is absent, which may cause the individual to consume more of the HFCS-containing food item in order to feel full (Patterson et al., 2018). Furthermore, several nutrients have been found to play a role in regulating appetite and cravings. However, many of the foods that are consumed by food-insecure households may be less nutrient dense. As a result, the body experiences a deficiency in these nutrients, which may contribute to dysregulated dietary patterns.

Second, the physiological interplay between perceived food insecurity and food intake has also been found to be contingent on social status. Individuals with low social status may be more susceptible to perceived threats of food insecurity (Dean et al., 2011). Experiments have shown that non-dominant animals exposed to conditions that produce an increased sense of food insecurity exhibited increased fat storage compared to their dominant counterparts (Pravosudov, 1999). This phenomenon has also been seen in humans where individuals who desired money also exhibited an increased desire for caloric intake (Briers et al., 2006). Third, food insecurity can contribute to anxiety which can lead to reduced quality of sleep (Troxel et al., 2019). Food-insecure adults are more likely to experience reduced sleep (Ding et al., 2015). Children also tend to experience more disrupted sleep patterns (Na et al., 2019). Reduced sleep as well as dysregulated sleep patterns have been associated with obesity (St-Onge, 2017).

Fourth, there is a direct relationship between hormone levels and food intake. Elevated plasma cortisol levels can stimulate neuropeptide Y (NPY), an orexigenic neuroprotein that is responsible for stimulating food intake (Hewagalamulage et al., 2016). Prolonged elevation in cortisol levels can stimulate glucose production, which, if not balanced by energy expenditure, is stored as visceral fat (Morais, 2019). Food-insecure households tend to experience higher levels of stress, anxiety, fatigue, and depression due to limited financial and physical resources (Wolfson et al., 2021). They may also experience greater levels of stress due to environmental factors. For example, these may include anxiety about walking or moving from one place to another due to high crime rates and residing in or around unsafe neighborhoods which can be compounded by a lack of personal transportation vehicle or limited ability to purchase gasoline (Rudolph et al., 2014). From an environmental aspect, many food-insecure households live in regions that have limited access to green space and exercise facilities (e.g.,, parks and gyms). Both green space and physical activity have been found to decrease stress levels (Roe et al., 2013). In addition, access to green space also affords individuals opportunities for physical activity, and reduced availability or access is associated with increases in obesity (Knobel et al., 2021). Additional environmental factors such as the availability of and access to supermarkets that sell fresh fruits and vegetables and the prevalence of fast-food establishments and convenience stores in food-insecure neighborhoods may also contribute to the prevalence of obesity in food-insecure households (Cooksey-Stowers et al., 2017). Finally, social determinants of health such as low income, affordability of high-quality nutrient-dense foods, and targeted marketing strategies by fast food companies also play key roles in perpetuating the obesity-food insecurity paradox (Zhang et al., 2013; Isselmann et al., 2017).

Etiology and Risk Factors of Childhood Obesity

The etiology of childhood obesity can be attributed to a myriad of factors (CDC, 5). These can include genetic predisposition (e.g., BMI-associated loci modulate signaling pathways for insulin uptake, energy expenditure and storage, appetite and satiety, and fat metabolism), an obesogenic built environment (e.g., proximity to fast food restaurants, convenience stores, and grocery stores, parks, playgrounds, and recreational facilities), maternal diet and weight status pre and post pregnancy, and lifestyle behaviors (Locke et al., 2015; Kaczynski et al., 2020; Heselhurst et al., 2019; Ohlendorf et al., 2019; Dhana et al., 2018). A comprehensive understanding of the risk factors of different racial, sex, and geographical demographics can improve obesity outcomes through the implementation of preventative and diagnostic screening methods.

Genome-wide association studies (GWASs) utilizing metabochip meta-analysis of BMI have found evidence suggesting that obesity susceptibility is, to a degree, heritable (Herrera & Lindgren, 2010; Locke et al., 2015; Brandkvist et al., 2019). From a clinical perspective, adoption studies conducted two decades ago recorded strong associations between BMI distributions of adopted adults and their biological parents compared to their adoptive parents (Stunkard et al., 1986; Maes et al, 1997; Sorensen & Stunkard, 1998). These findings were further supported by a 2009 meta-analysis which, again, consistently showed that BMI correlations between biological child and biological parent dyads were quite strong; yet it should be noted that correlations between adopted children and adopted parents were not altogether absent in this study, showing that family environment does play a role in BMI disparities (Silverton et al; 2009). In fact, a recent study examining overweight status in biological and adoptee dyads found that when both adoptive parents were overweight, adopted children's likelihood of being overweight was 21% higher than when both adoptive parents were not overweight; in biological dyads, the likelihood of overweight in biological children born to two overweight parents was only slightly higher at 27% with a mere difference of 6 percentage points, suggesting that familial lifestyle still contributes substantially to child weight status (Costa-Font et al., 2015).

Regardless of their findings, many of these studies were performed exclusively using Caucasian family models which may nullify their generalizability to more ethnically diverse populations. Despite the controversy surrounding the etiology of obesity, more recent evidence in the past decade supports the idea that genotype alone is not the major driver of obesity (Anderson & Butcher, 2006; Sahoo et al, 2015; Smith et al., 2020; CDC,19). Rather, it is the interactions between genes, environment, and lifestyle behaviors that are hypothesized to be the more likely primary determinants for overweight and obesity in children (Skelton et al., 2011; Jackson et al., 2020).

Early Prevention: Early Childhood Being an Optimal Time for Development of Healthy Dietary Patterns

Given that few therapies exist to address genetic predisposition and that the familial environment has the potential to exert a strong influence on an individual’s eating patterns, it is logical to focus on addressing environmental influences on an individual’s eating behaviors. The optimum time period to do this is during early childhood, which is a critical time period for several reasons. First, the taste perceptions and preferences experienced by an individual are more pronounced during infancy and toddler years (Mennella et al., 2016). Second, it has been shown that childhood eating habits plateau after 3-4 years of age and can even carry over into adolescence and adulthood (Singer et al., 1995). Thus, childhood is a crucial period for establishing healthy eating patterns throughout the rest of the lifespan (Luque et al., 2018). Research shows that when vegetables were introduced at earlier ages, acceptance rates of vegetables increased proportionally (Lange et al., 2013; Grimm et al., 2014). One study showed that daily exposure (in the form of tasting) to vegetables for a period of 8-10 consecutive days increased acceptability compared to pre-exposure acceptability, with indicators of acceptability being the amount and rate of food intake (Spill et al., 2019). In fact, just one exposure to a vegetable had the capacity to double the intake of a new vegetable in 4-7-month-old infants compared to similar tests in older children where repeated exposures were required to achieve the same result (Birch et al., 1987; Birch et al., 1998). Moreover, this exposure also increased the likelihood of a child's acceptability of another vegetable later on. Data shows that infants who were exposed to a variety of different vegetables consumed not only more of the vegetables they were exposed to but also novel vegetables they had no previous exposure to, compared to infants who were exposed to a single vegetable (Gerrish & Mennella, 2001). It has also been observed that the acceptability of novel foods increased proportionally to the number of different foods that a child is exposed to, suggesting that receptiveness to new flavor and texture profiles can be cultivated early on (Maier et al., 2008; Maier-Noth et al., 2016). For this to occur, exposure to a variety of flavor and texture profiles is necessary.

Disparities Between Current Child Vegetable Intake Recommendations and Actual Consumption

In the U.S., vegetable intake among young children aged 2-5 continues to fall short of federal recommendations. The Dietary Guidelines for Americans 2020-2025 recommends that young children who consume between 1,200-1,600 calories per day consume at least 1-1.5 cups equivalents of dark green vegetables per day (DGAs, 2020). However, current average intake ranges show that children aged 2-4 years do not consume enough vegetables across all vegetable subcategories including dark green vegetables, red and orange vegetables, starchy vegetables, and beans, peas, and lentils (DGAs, 2020). According to an NCHS report based on data collected from the National Health and Nutrition Examination Survey over the years 2015-2018, only 13.9% of children aged 2-5 years consumed dark green vegetables, while 50.9% consumed starchy vegetables (Wambogo et al., 2020). Thus, even when vegetables are consumed, they are usually in the form of sweet potatoes, white potatoes, carrots, squash, and beans (Roess et al., 2016). Furthermore, this trend of low vegetable intake continues to be seen in adolescents and adults suggesting that inadequate dietary intake of vegetables at a young age may track into adolescence and even adulthood. Studies assessing changes in vegetable intake with age found no significant changes in vegetable intake between children during childhood and later on in adolescence (Albani et al., 2017). Thus, helping young children to develop adequate vegetable intake patterns in early childhood is critical in setting the stage for developing healthy dietary patterns later in life and ultimately in preventing development of nutrition-related chronic diseases.

Primary Influencers of Child Vegetable Preferences and Intake

Low vegetable consumption among young children may be attributed to several personal, behavioral, and environmental causes. A scoping review found that the most common intrinsic personal factors are the child's individual taste and sensory sensitivities, personality, and attitudes toward a certain vegetable (Chilman et al., 2021). Second, from a behavioral view, typically by the age of two years children enter a developmental stage of picking eating and begin to exhibit food neophobia which may be mediated by the frequency of taste exposures (Białek-Dratwa et al., 2022; De Cosmi et al., 2017; Nekitsing et al., 2018). Physiologically, this may be due to children's innate aversion to bitter tastes and an increased preference for sweet and salty tastes during early childhood (Mennella & Bobowski et al., 2015; Vennerod et al., 2018). Finally, extrinsic factors in the child's environment have been found to exert a profound influence on children's vegetable intake. The scoping review found that key influencers such as parental intake, parental modeling, parental knowledge, beliefs, and skills about food and how it can and should be prepared, caregiver feeding practices (e.g., feeding styles and mealtime routines), and provisioning of vegetables in the home are all key influencers of child dietary patterns (Chilman et al., 2021; Johnson, 2016). According to Susan Johnson's model, the following key areas have been found to be positively associated with improving children's willingness to try vegetables: 1) providing children with multiple opportunities for engagement and repeated exposure through food-based (FB) and sensory learning (SL) experiences 2) making vegetables available and accessible 3) parental knowledge, beliefs, and behaviors that model healthy eating patterns 4) use of responsive parental feeding styles and practices (Johnson, 2016).

Overall, these overarching influencers work together to shape young children's dietary intake patterns. However, of all of these, the food environment, which is shaped by the child's parent or guardian, is perhaps the most modifiable factor given that the child's food environment is arguably the most pervasive factor in the child's life and encompasses several of the causative factors mentioned earlier. The literature consistently supports the fact that parents and caregivers can significantly influence the dietary behaviors of young children and ultimately their long-term health (Coto et al., 2019; Enright et al., 2020). Several meta-analyses of nutrition and physical activity interventions concluded that interventions with a parent component were more successful in improving child weight status (Tomayko et al., 2021). Thus, in this section, key parental influencers on children's dietary patterns and best practices for feeding will be examined.

Key Influencer #1: Parental Modeling and Consumption

Given that parents and caregivers serve as the primary role models for their children, parental dietary practices may be replicated in children through early observational learning and modeling with both maternal and paternal food preferences having the ability to influence children's food preferences (Kahkonen et al., 2021). Meta-analyses have shown that parental modeling along with food availability exhibit the strongest associations with both healthy and unhealthy food intake (Yee et al., 2017). Analysis of food intake among parent child dyads showed that parental modeling of fruit and vegetable intake exhibited strong cross-sectional associations with greater intake of fruit and vegetables in young children (Flores-Barrantes et al., 2021; Wirthlin et al., 2020). In a similar but smaller study performed in preschool aged children, a positive association between parental modelling and children's intake of fruit, vegetables, and fish was observed (Mazza et al., 2022). It has also been found that parental modelling of energy dense foods was associated with greater intake of sugar-sweetened beverages, a trend which was also seen among parent and adolescent child dyads (Imoisili et al., 2020; van de Gaar et al., 2017; Wirthlin et al., 2020). The influence of paternal eating habits has been less studied but evidence from a recent systematic review revealed that paternal dietary intake was predictive of child dietary intake and also BMI (Litchford et al., 2020; Rahill et al., 2020).

Moreover, parental consumption of a food has been shown to be one of the primary drivers of young children's consumption of the same food item (Mahmood et al., 2021). In studies examining correlations between parental and child food intake categories, the analysis showed that correlations between maternal and child dietary patterns were highly significant across most categories of foods (Tang et al., 2020). Interestingly, the association between parental food intake and children's food intake has been shown to be the most significant when children are younger indicating that early childhood is an optimal time for parental influences to shape dietary patterns (Tang et al., 2020). Another study found that children were 59% less likely to consume vegetables when their parents failed to consume vegetables (Bassul et al., 2020). This data indicates that nutrition interventions that utilize a parental modelling component have a strong potential to mediate children's intake of both healthy and less healthy food items.

Key Influencer #2: Parental Knowledge, Beliefs, and Self-Efficacy as Predictors of Child Food Intake

In addition to parental modeling of food consumption, parents and caregivers may influence both child dietary intake and children's attitudes towards nutrition, diet, and health through their own knowledge and beliefs about food and health and their self-efficacy with regard to cooking skills. In a study of parent-child dyads, guardian nutrition knowledge was found to be correlated with higher child vegetable intake showing that parental knowledge may be a primary factor that contributes to a child's vegetable consumption (Asakura et al., 2017). In the ToyBox Study which examined parental influences on young children's snacking behaviors, not only was parental healthy and unhealthy snacking associated with their children's snack choices, but parents with higher snacking-related nutritional knowledge had children who consumed more healthy snacks compared to their control dyads (Gibson et al., 2020). Regarding beverages, parental knowledge about sugar in beverages has also been found to be significantly correlated with child dairy beverage intake (Zahid et al., 2017). It should be noted that greater parental nutrition knowledge has also been associated with lower BMI percentiles, lower waist circumference, and even lower percent body fat (Kakinami et al., 2016).

Interestingly, other studies have demonstrated that aside from parental nutrition knowledge, parental healthy eating attitudes are associated with nutritional adequacy and diet quality in preschool children (Romanos-Nanclares et al., 2018). In the SENDO study, children whose parents scored higher on a parental attitude index, with higher scores indicating healthier attitudes towards their children's diets, had significantly increased odds of developing healthier dietary patterns (Santiago et al., 2021). Another cross sectional study collected data on parent's health beliefs and their effects on child snack consumption and found that children of parents who agreed/strongly agreed with the statements that "health was determined by destiny" and that "I have little control on preventing disease" consumed less sweet and salty snacks compared to children of parents who disagreed/strongly disagreed with these statements, indicating that parental deterministic health beliefs can influence child snack intake (Papamichael et al., 2021).

Aside from the effects of parental nutrition knowledge and beliefs on child dietary eating patterns, parental self-efficacy with regard to cooking skills has also been found to influence child food intake (Zarychta et al., 2021). One study found that children with parents who reported having low-level cooking skills were nearly three times more likely to have lower frequency of vegetable intake and nearly two times more likely to be obese compared to children with parents who reported having mid or high-level cooking skills (Tani et al., 2021). Similarly, another study revealed that parental cooking skill confidence was found to decrease children's intake of ultra-processed foods showing that parental cooking skill confidence can serve as a protection again child consumption of ultra-processed foods (Martins et al., 2020). In concurrence with this study, associations between high parental self-efficacy scores and increased fruit intake and decreased consumption of unhealthy snacks have also been observed in other studies (Parekh et al., 2017). Overall, parental self-efficacy has been found to be a strong predictor of children's fruit, vegetable, and soft drink intake (Mohler et al., 2020; Walsh et al., 2019).

Key Influencer #3: Family Mealtime Structure, Atmosphere, and Frequency as Influencers of Child Eating Patterns

In addition to parental modeling and nutrition knowledge, there is systematic review evidence that family meals (versus isolated eating) can lead to favorable health outcomes in young children and adolescents (Verhage et al., 2018). Family mealtimes can serve as prime opportunities for parents to support and encourage healthy eating behaviors among children (Litterbach et al., 2017). In fact, increased mealtime structure has been shown to increase desirable eating behaviors such as less food fussiness and greater enjoyment of food among children (Finnane, 2017). Children of families who reported consistent mealtime routines (eating at set times) and planning skills consumed more fruits and vegetables compared to children of families in the other three class models in the study (Lee et al., 2022). Meta-analyses have shown that family-centered meals are associated with improved intake of fruit and vegetables in children (Berge et al., 2021; Glanz et al., 2021). In addition to the structure of meals served in the home, the frequency of family meals has also been shown to improve dietary outcomes in children aged 2-18 years (Mahmood et al., 2022; Robson et al., 2020). Further meta-analyses have also revealed significant associations between higher family meal frequency and better overall diet quality, more healthy diets, and lower BMI (Dallacker et al., 2018). Furthermore, parental facilitation of a positive mealtime atmosphere was also found to be one of the strongest predictors of child dietary quality (Knobl et al., 2022). Together, these findings indicate that nutrition interventions aiming to increase diet quality in young children should contain components that encourage family meal time quality, frequency, and atmosphere (Fulkerson et al., 2017).

Key Influencer #4: Television and Screentime Practices as Negative Influencers of Child Dietary Intake

Unfortunately, the positive effects of family-centered mealtime structures on child diet quality may be hindered by television viewing during meal and snack times (Avery et al., 2017). Research has consistently demonstrated that eating while watching television is an obesogenic factor (Parkes et al., 2020). Television viewing during meals has been associated with lower diet quality among young children, resulting in more frequent intake of sugar-sweetened beverages and unhealthy foods, along with lower fruit and vegetable intake (Jusiene et al., 2019; Trofolz et al., 2019). Studies have found that watching television for more than one hour daily was associated with a decreased probability of vegetable consumption and an increased probability of consuming sugar-sweetened beverages (Bassul et al., 2020). After school television watching has also been shown to decrease impulse control related to high calorie foods (Cartanya-Hueso et al., 2021; Efraim et al., 2021). Interestingly, such adverse effects are not limited to just television viewing but also to use of screen-based devices in general (Wedde et al., 2020).

Mobile phones use by caregivers is a common behavior during feeding interactions (Kiefner-Burmeister et al., 2020). Studies have even shown that parental mobile device use was associated with less healthy feeding practices such as exerting pressure on the child to eat and displays of increased bids for attention from the child (Radesky et al., 2014; Vik et al., 2021). Similarly, children of parents who engaged in technological distractions at mealtimes were more likely to eat in response to environmental food cues even if not hungry, suggesting that parental technology use can increase a child's risk for overeating (Gramm et al., 2019). Given that allowance of screen-time and placements of electronic devices in child eating areas are parent-mediated, interventions that emphasize educating parents and caregivers on the importance of reduced screen time during meal and snack times are recommended to improve child dietary quality.

Key Influencer #5: Parental Feeding Styles and Use of Reinforcements

There is evidence that parental feeding behaviors may serve as one of the primary determinants of child eating behaviors – namely food neophobia, as well as the quality of the child's diet (Cole et al., 2017; Lopez et al., 2018; Scaglioni, 2018). Four feeding styles have been previously described in the literature: uninvolved, indulgent, authoritarian, and authoritative (Shloim et al., 2015). These feeding styles can be measured along two dimensions: responsiveness (recognition, response to, and acceptance of a child's needs) and demandingness (regulation and control over a child's eating behaviors) (van der Horst & Sleddens, 2017). Parents who engage in indulgent feeding styles are responsive to their child's needs but experience issues in establishing eating-related boundaries with their children (Hughes et al., 2011). Parents who exhibit an uninvolved feeding style are neither responsive to nor demanding of their children (Perez et al., 2022).

In studies of Head Start children, children who were parented with the uninvolved feeding style exhibited a greater risk for obesity (Horodynski et al., 2018). The authoritarian feeding style is characterized by high demandingness and low responsiveness to the child's needs and was found to be associated with reduced liking of vegetables among young children (Vollmer, 2019). Parents who engage in the final feeding style of the four, authoritative, encourage healthy eating behaviors using supportive and positive methods such as praise (Shloim et al., 2015). Studies have consistently found that authoritative feeding styles promote increased healthy eating patterns in young children from low-income minority families compared to the other three feeding styles (Arlinghaus et al., 2018; Goodman et al., 2020).

Feeding styles have also been characterized according to the following four dimensions: autonomy support (e.g., praise, modeling), structure (planning, routine, monitoring), coercive control (restriction, pressure), and permissiveness (disinterest, no regulations), some of which have been examined separately in other studies (Davison et al., 2015). For example, one study found that child intake of healthy foods was associated with the use of positive feeding practices such as active involvement, praise, and encouragement, illustrating that parental encouragement of healthy eating can also improve children's dietary intake (Holmes et al., 2021; Mazza et al., 2022; Rotman et al., 2020). Interestingly, although high availability of healthy foods has been shown to be a strong predictor of the quality of child food intake, the association between food availability and healthy food consumption was enhanced when parents practiced positive parenting styles (Gubbels et al., 2020). Conversely, parental pressuring or prompting to eat, measured as higher pressure to eat scores, was shown to decrease fruit and vegetable intake in children and be one of the main factors associated with food neophobia (Chilman et al., 2021; Torres et al., 2020; Warkentin et al., 2020). Restrictive feeding has also been strongly associated with increased snacking among young children (Blaine et al., 2017; Papamichael et al., 2021). Interestingly, plate-waste data shows that when parents order meals for children at fast food restaurants, children consume significantly fewer calories and fat compared to when children ordered meals by themselves (Cohen, 2020). Moreover, restrictive feeding styles were associated with lower SSB intake among young children (Langer et al., 2017). These two studies show that moderate-level restrictive feeding may be beneficial at certain times.

Parent feeding styles also involve the parent's decision to employ positive and negative reinforcements to reward or punish children's food behaviors. A systematic review of methods for improving vegetable intake among young children found that along with repeated exposures and parental modelling, the use of non-food incentives for rewarding young children's eating behaviors were the most effective strategies for increasing vegetable intake (Holley et al., 2017). For example, the use of stickers as rewards was found to be effective in increasing vegetable intake among young children (Belot et al., 2016; Braga-Pontes et al., 2022). Interestingly, tangible non-food rewards have been found to be more effective for increasing vegetable intake compared to the use of social praise (Morrill et al., 2016). However, such incentives may yield diminishing returns over time (Toossi et al., 2017).

Recommended Best Practices for Feeding Young Children

Despite the multitude of studies that have investigated the key environmental influencers on child vegetable intake, there is a need for the results of these studies to be translated into best practices and disseminated to the public. Several federal and private programs and organizations have released best practice recommendations for feeding young children aged 2-5 years that are geared towards early care and education centers, parents, and caregivers. The Nutrition and Physical Activity Self-Assessment for Child Care (NAPSACC) intervention is an evidence-based program that was developed by the UNC Center for Health Promotion and Disease Prevention to improve nutrition and physical activity practices in early childhood programs. Their best practice recommendations for childcare facilities include the use of repeated exposure to vegetables, presenting a variety of foods to children throughout the week, making water easily visible and available for self-serve, use of positive encouragement, use of non-food rewards to encourage eating, staff attendance at meal and snack times, and role modelling (NAPSACC, 2007). The American Academy of Pediatrics (AAP) has also released feeding and nutrition practice recommendations which include offering a range of healthy foods, establishing regular meal times and eating together, serving children smaller portions, and turning off the television during mealtimes (American Academy of Pediatrics, 2016). The Stanford Children's Hospital has also provided the following recommendations: offering children a variety of foods, not putting pressure on children to eat, role modelling, provision of regular daily mealtimes, involving children in the preparation of meals, limiting screen time to less than 2 hours per day, and encouraging children to replenish fluids by drinking more water (Stanford Children's Health, 2022). In like manner, Johns Hopkins University School of Medicine's feeding recommendations for toddlers include: providing regular meals and snacks, repeated exposures to new foods, paying attention to portion sizes, making foods easy to eat, not using dessert as a reward, regular consumption of water, involving children in the selection and preparation of foods, demonstrating healthy dietary habits, and limiting video, television, and computer use to less than two hours per day (Johns Hopkins USM, 2022). The CDC has also released similar recommendations such as: eating meals as a family, talking with children during meals, providing healthy food options, modelling healthy foods (CDC, 2021). The University of Michigan's Best Feeding Practices for Toddlers also recommends repeating exposures to new foods, not forcing children to finish meals, parental role modelling, having set times for eating, eating as a family, and involving children in meal planning and preparation. Healthy Eating Research (HER) which is a national program funded by the Robert Wood Johnson Foundation also provides similar recommendations (Sigman Grant et al., 2017). Delaware's Child and Adult Care Food Program (CACFP) in conjunction with Nemours Health and Prevention services have also released best practice recommendations for both infants and young children that reflect those above (Wetherbee, 2008). The findings from these studies support the need for more parental involvement components in nutrition interventions for young children and have been translated into best practice recommendations for feeding young children by federal and private organizations focusing on child nutrition and health including the CDC and the American Academy of Pediatrics. Overall, 7 evidence-based best practice recommendations were the most commonly recommended. These include: 1) Engage in role modelling eating behaviors, 2) Provide repeated exposures to health options, 3) Establish set mealtimes, 4) Eat together as a family, 5) Limit screen time, 6) Avoid using food to reward or punish children, 7) Involve your children in the meal preparation process. By leveraging parental knowledge of key influencers of child dietary intake and caregiver implementation of best practices in feeding, the eating habits of young children may be gradually modified to reflect those consistent with federally recommended healthy dietary patterns.

Caregiver Feeding Styles: Conceptual Framework and Characteristics

Based on current research, interventions to prevent and reduce pediatric obesity should focus primarily on parents and caregivers (Golan, 2006; Coto et al., 2019; Enright et al., 2020). One major factor that contributes to an obesogenic home environment is 1) caregiver feeding styles and 2) caregiver feeding practices (Shloim et al., 2015; Wood et al., 2020). Research has shown that children are born with innate self-regulation in eating and have the capacity to respond accordingly to foods that vary in energy density; parent/caregiver behaviors can either support or hinder this process of response to internal hunger and satiety cues (Birch & Fisher, 1998). Caregiver feeding styles are defined as general constructs that set the emotional context within which parents and children interact during meals and snack times (Shloim et al., 2015). A feeding style can be thought of as the emotional climate that is present during a meal (Wood et al., 2020). Caregiver feeding styles can be measured along two axes: responsiveness (warmth, acceptance, involvement in response to the child's needs) and demandingness (regulation, supervision, and control that is exercised). This classification results in a total of four different types of feeding styles: authoritarian, authoritative, indulgent, and uninvolved (Figure 1). Multiple studies have discovered that children had higher weight status when their parents self-reported having indulgent feeding styles, which is characterized by high responsiveness and low demandingness in the form of responsiveness to hunger/satiety cues accompanied by a lack of structure and boundaries (Hughes, 2011; Hughes, 2008). The authoritarian feeding style is high in parental demandingness but low in responsiveness and utilizes reward/punishment systems and overt directives. However, this approach has been shown to be less effective than the authoritative feeding style, which focuses on more covert strategies that do not employ directives. The authoritative feeding style may be characterized reasoning, complimenting, exerting control over the food environment instead of the child, establishing mealtime routines, and providing a selection of nutrient dense options that are readily available. Evidence suggests that of the four feeding styles, this feeding style is the most effective for supporting child self-regulation (Patrick, 2005; Arlinghaus, 2018). Apart from parenting styles, feeding styles, and feeding practices childhood eating patterns are influenced by other contextual factors external to these frameworks such as culture, beliefs and attitudes towards food, eating, and what constitutes a healthy weight, children's temperaments, eating traits, and learned behaviors.

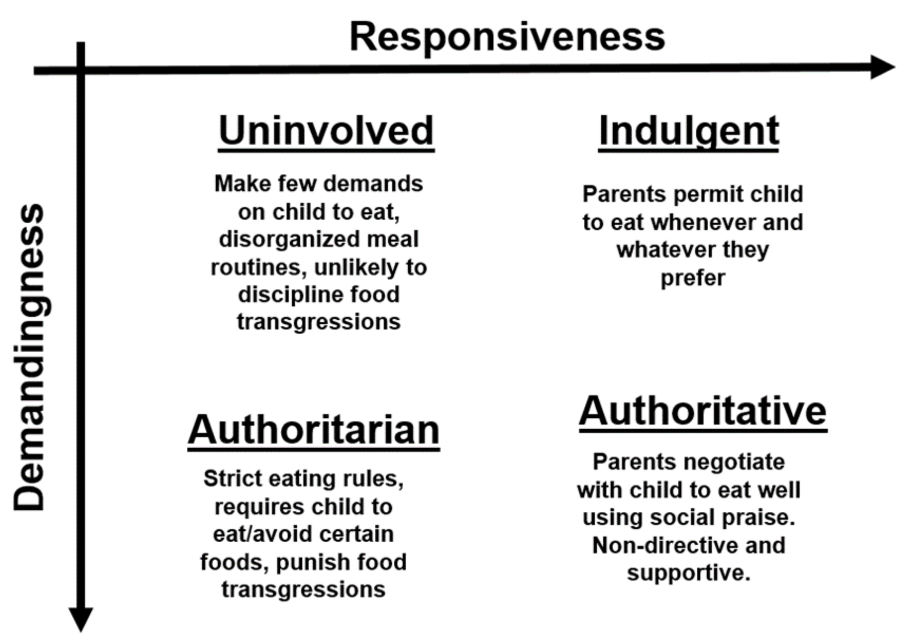


Figure 1. Conceptual Framework of Caregiver Feeding Styles

Satter's Division of Responsibility for Toddler Feeding

One evidence-based model that encapsulates the authoritative feeding style is Ellyn Satter's Feeding Dynamics Model (fdSatter) which focuses on the concept of the "Division of Responsibility" (sDOR) in order to achieve eating competence from infancy to adolescence (Ellyn Satter Institute; Satter, 2007; Satter, 2007). Satter's model posits that both the parent and the child are jointly responsible for children's dietary patterns (Satter, 1990; Satter, 1995). When applied to toddlers, the parent is responsible for what, when, and where the child eats, while the child is responsible for how much they eat and whether to eat what is provided. The practical implementation of the parent's responsibilities involves: providing, choosing, and preparing food (WHAT), providing food using a regular routine (WHEN, WHERE), not allowing consumption of additional food or beverages between designated meal and snack times with the exception of water, not catering to the child's likes or dislikes while being considerate of their lack of experience with food, teaching the child appropriate mealtime behaviors, making eating enjoyable. Underlying these parental responsibilities of providing structure, support, and opportunities is the principle of trusting the child to: eat, eat the amount that is appropriate for them, progressively consume a variety of food, grow normally and predictably, and learn appropriate mealtime behaviors. This trust is predicated upon the theory that children innately desire to eat, know how much to eat based on their own internal hunger and satiety signals, and are inclined to grow in a normal and predictable manner (Birch and Deysher, 1986; Birch and Fisher, 1995; Satter, 1996). Parental adherence to the sDOR can be measured using the Satter Division of Responsibility in Feeding for Children Aged 2 to 6 Years Feeding Dynamics Inventory (sDOR.2-6y) tool which has been shown to have translational and construct validity (Lohse and Mitchell, 2021; Lohse and Satter, 2021; Lohse, Satter, and Arnold, 2014).

Reciprocity of Feeding: Child Communication and Parent Recognition of Verbal and Nonverbal Hunger and Satiety Signals

The interactions between parents and children at mealtimes are not only dependent on the caregiver feeding style, but also on the child's ability to communicate their needs and on the parent's ability to recognize, perceive, interpret, and respond to verbal and nonverbal signals given at different stages of life (Wood et al., 2020). Moreover, caregivers must be able to discriminate these signals from signals for non-hunger-related distress. In infancy, external hunger cues include crying, sucking, smacking/licking lips, and repeated opening/closing of the mouth. However, satiety cues can include frowning, grimacing, gaze aversion, placing hands on the face, taking interest in surroundings, decreasing activity level, detaching from the nipple, and falling asleep (Wood et al., 2020). In the toddler years, appetite and satiety cues may include reaching for food and rudimentary babbling. It should be noted that these may be complicated by the temporary onset of fussiness or picky eating. In the preschool years, children exhibit more autonomy and more responsiveness to prompts that involve questions, suggestions, and offerings of foods in a structured environment that is time regulated and has selective food availability (Wood et al, 2020).

The Social Cognitive Theory as a Framework to Address Obesity

Social Cognitive Theory contends that individuals are more likely to engage in behaviors when the physical health benefits outweigh the costs of performing a behavior. Personal determinants that play a role in motivating a specific behavior include outcome expectations, expectancies, and self-efficacy. Outcome expectations are an individual's beliefs about what outcomes might result from performing or not performing a behavior. Expectancies refer to the value an individual places on the anticipated outcomes of a behavior. Outcome expectations can include physical outcomes, social outcomes, and self-evaluative outcomes. Physical outcomes refer to the perceived physical health effects of a behavior. Social outcomes refer to the perceived social consequences of performing a behavior and can include injunctive norms (the behaviors that others feel an individual should perform) and descriptive norms (the behaviors that others engage in). Social Cognitive Theory asserts that individuals are less likely to engage in behaviors that are not/deemed not to be socially or culturally acceptable. Self-evaluative outcomes refer to the sense of personal satisfaction or self-worth that results when a behavior is performed. Social Cognitive Theory rationalizes that individuals are more likely to engage in behaviors that result in personal satisfaction and an increased sense of self-worth. Social Cognitive Theory proposes that these three types of outcomes can be positive or negative, and an individual is more likely to perform a behavior that maximizes expected positive outcomes and minimizes expected negative outcomes (Contento & Koch, 2020). The second important personal determinant of behavior is self-efficacy, which is defined as an individual's belief that he/she has the power to achieve a desired result through a behavior. Social Cognitive Theory proposes that an individual is more likely to perform a behavior if they believe that they can achieve a desired result through performing that behavior (Bandura, 1997, 2001).

Behavioral determinants that facilitate behavior change include behavioral capabilities and self-regulation skills/action goal setting. Behavioral capabilities include knowledge and cognitive skills, affective skills, and behavioral skills. Knowledge and cognitive skills refer to knowledge that is needed to perform a behavior and can include nutrition literacy which is the ability to access and comprehend nutrition information (e.g., where to find a food label on a product), factual knowledge (e.g., Dietary Guidelines recommendations, amount of nutrients in red cabbage), procedural knowledge (e.g., how to read a recipe, describing how to grow a tomato plant), and decision-making critical-thinking skills (e.g., how to purchase the greatest quantity of nutritious vegetables on a cost-effective budget). Affective skills refer to the skills needed to manage any negative psychological feelings related to performing a behavior. Affective skills may include coping skills (e.g., how to maintain a healthy diet even on vacation), communication skills (e.g., how to ask family members to stop purchasing junk food that is tempting to eat), and delayed gratification (e.g., if consuming a bag of carrots instead of a Twinkie will avoid a sugar crash later on). Behavioral skills refer to the skills that an individual needs in order to actually perform the behavior (e.g., cooking skills, chopping skills, food safety skills) or to food literacy skills (e.g., how to choose, purchase, plan, and prepare meals). Self-regulation skills refer to an individual's own attempts to modify their own behavior. Self-regulation can be achieved either through action goal setting or the presence of reinforcements which are defined as the response to an individual's behavior that either increases or decreases the occurrence of that behavior. Reinforcements can be external (e.g., free water bottle) or internal (e.g., self-confidence about body image from weight loss).

Environmental determinants of behavior can include the actual external environment itself or an individual's internal perception of their environment which is known as situation. Environmental influences can include direct influences such as lack of access to grocery stores, lack of transportation, unsafe neighborhoods, unhealthy eating behaviors of family or peer support networks (observational learning), sociocultural eating norms.

Targeting Components of Social Cognitive Theory

One aspect of food-based interventions that makes them suitable avenues for improving nutrition outcomes is that they have the potential to target individual and environmental determinants of behavior, core components of Albert Bandura's Social Cognitive Theory (Bandura, 1989). Social cognitive theory is one of the most common theoretical frameworks underlying nutrition interventions due to the key roles its underlying constructs play in influencing health behavior (Painter et al., 2008).

Reciprocal Determinism

Social Cognitive Theory is a health behavior theory that posits that human behavior is modulated by the interplay between personal factors, environmental influences, and the behavior itself (Figure 2). The mutual interplay among these three core components is known as reciprocal determinism.

Constructs of Personal Factors

Personal or cognitive factors refer to an individual's beliefs, attitudes, and expectations. Constructs such as self-efficacy, self-control, and expectations are all examples of personal factors. Self-efficacy is an individual's confidence in their own abilities, while self-control is an individual's ability to regulate their own behaviors. Self-control can be divided into three sub-constructs: self-monitoring, self-judgement, and self-evaluation. Possible applications of intervention to increase an individual's self-efficacy may include the setting of small achievable goals, while strategies for improving self-control may include self-monitoring in making decisions and rewarding oneself. Outcome expectations refer to an individual's beliefs about the extent to which a behavior will result in a certain outcome. These can be shaped by modeling attractive outcomes of the desired health behavior. Overall, interventions targeting these constructs have been useful in improving health outcomes (Tougas et al., 2015; Hall et al., 2016).

Constructs of Environmental Factors

Environmental factors refer to external influences, both social and physical, on an individual’s personal beliefs and their behavior. One major environmental factor that can be introduced to modulate behavior is reinforcements, which refer to reward and punishment stimulus systems that can increase or decrease the occurrence of a behavior.

Constructs of Behavioral Factors

Behavioral factors include the actual behavior itself, behavioral capability, and observational learning. Behavioral capability is defined as the knowledge base and skill set an individual needs to perform a specific health behavior and can be improved by providing an individual with appropriate training tools that will permit mastery of a certain topic or skill. Observational learning refers to the process of assimilating and adopting behaviors through observing other’s behaviors and outcomes. It is composed of the following processes: attention, retention, reproduction, and motivation (Hosrburgh and Ippolito, 2018). One interventional application to this construct may be the use of role modelling.

Overall, a comprehensive understanding of behavioral science theory is critical since these models can identify and target the most significant factors that shape the health of an individual or population. Health interventions that are based on an underlying health behavior framework may be more effective and successful compared to those that are not (Knol et al., 2016; Adhikari et al., 2018).

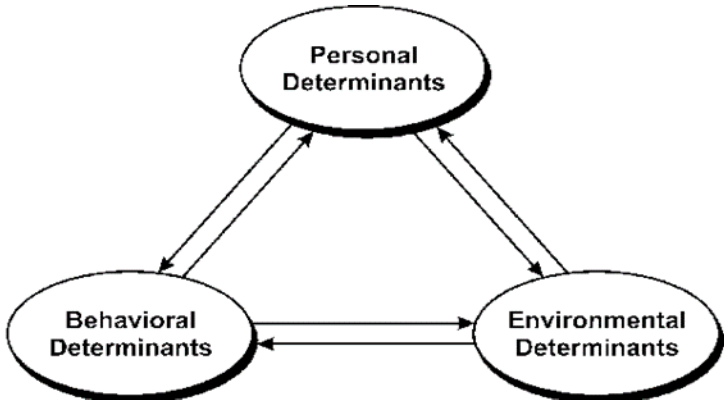


Figure 2. Reciprocal Determinism Among Social Cognitive Theory Components

Federal Policy Initiatives for Food and Nutrition Assistance

Currently, federal policy initiatives include the establishment and continued funding of several different food and nutrition assistance programs for limited-resource families with young children. The Child and Adult Care Food Program (CACFP) is a USDA-funded federal assistance program that reimburses families with young children who are enrolled in participating child or adult care centers for nutritious meals and snacks. Studies have shown that households enrolled in CACFP-participating facilities have experienced a 4.19% reduction in the risk of food insecurity (Heflin et al., 2015). The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) is another USDA-funded federal assistance program that serves women who have a family income below 18% of the federal poverty level and are pregnant, breastfeeding, and have children less than 5 years of age. Participants are able to receive food in the form of food checks or electronic benefit transfer cards (EBT), formula vouchers, free access to nutrition education training and materials, breastfeeding materials, and additional support in other health areas such as immunizations, drug, and alcohol programs. A recent study found that aging out of WIC increases food insecurity by 1.1% (Cho, 2022) while another longitudinal study found that an additional WIC visit reduced the odds of food insecurity (Metallinos-Katsaras et al., 2011). Finally, the Expanded Food and Nutrition Education Program (EFNEP) is a nationally available community outreach program funded by land grant universities that provides nutrition education to low-income families with young children through the administration of 10-12 lessons on developing healthy dietary patterns taught by volunteer educators. Studies have shown that participation in EFNEP was able to improve eating behaviors and healthy eating indices (HEIs) (Atoloye et al., 2021). Additional assistance programs include the National School Lunch Program (NSLP) which is a meal assistance program that provides free or low-cost lunches to children at school as well as the USDA administered Supplemental Nutrition Assistance Program (SNAP) which is the largest federal assistance program in the U.S. that serves eligible low-income families by providing them with an EBT card. Studies examining the association between SNAP participation and food security status found that across 6,500 households participating in the program decreased the percentage of food insecure households from anywhere between 6-17%. Additionally, the percentage of households who experienced very low food security decreased by 12-19% (Mabli et al., 2015). This indicates that SNAP continues to play a critical role in reducing food insecurity in the U.S. Currently the white house has proposed several policy initiatives following Covid-19. The American Rescue Plan has pledged to extend a 15% increase in SNAP benefits, has proposed $3 billion in additional funding for WIC, and plans to send $350 billion to state and local governments to support anti-hunger initiatives. President Biden has also signed an executive order to increase benefits for the

EBT program by 15%, increase SNAP Emergency Allotments, and modify the Thrifty Food Plan to account for inflation costs of food.

The Insufficiency of Access Alone and the Importance of Both Nutrition Education and Early Childhood Learning in Achieving Healthy Dietary Patterns and Improving Health Outcomes

Although food insecurity is historically associated with poor eating habits and nutrition-related health outcomes, access alone to healthy foods may not serve as the sole catalyst for increasing fruit and vegetable consumption (Litton and Beavers, 2021; Turnbull, Homer, & Ensaff, 2021). Additional barriers such as income allotted to grocery purchases, concerns about food waste due to child responses to less palatable food purchases, use of food as a palliative agent for counteracting the constraints of poverty, and use of food as a way to derive a sense of self-worth as a parent or caregiver are all driving forces for unhealth food choices (Drisdelle et al., 2020; Fielding-Singh, 2017, 2021). At the core of many nutrition interventions is nutrition education. In one study, researchers recruited 209 children enrolled in a Head Start program and tested their fruit and vegetable intake following three different interventions (Smith, Sutarso, Kaye, 2020). One group of children was provided with fruit and vegetables for 2 months, while a second group was provided with both fruit and vegetables as well as weekly fruit and vegetable lessons along with information and recipes; a third control group received neither access nor education. After measuring the children’s carotenoid values, researchers found that the carotenoid values were higher for children in the group who received both access to fruit and vegetables as well as educational lessons and resources compared to those who only received fruit and vegetables. The results of this study illustrate that simply providing individuals with access to health foods may still be insufficient for improving health food intake and that educational scaffolding is needed in addition to access.

Head Start Programming Curriculum and Preschool Nutrition Education

Head Start (HS) is the oldest and most extensive federally funded early care and education program in the U.S. that was specifically designed to meet the needs of disadvantaged populations including low-income minority families of low socio-economic status (SES). Head Start was begun in 1964, and is currently administered by Office of Head Start (OHS), which has 12 regional offices scattered throughout the U.S. The OHS is located within the Administration for Children and Families (ACF), a division of the U.S. Department of Health and Human Services (HHS). Currently, Head Start has an annual budget of approximately $10.6 billion, which is distributed throughout the 1,600 public and private agencies that provide Head Start services in every U.S. state and territory. In addition to funding, the OHS provides policy oversight and training to grantees (Head Start Programs). Head Start grantees implement the policies and standards outlined in what is known as The Head Start Program Performance Standards (HSPPS) which were developed in 1975 and then revised in 2016. These standards were developed based on child development research data as well as best practices. Head Start programs are evaluated, in part, by the Office of Planning, Research, and Evaluation. Currently, Head Start is available free of charge to children, from birth to age 5, of low-income families who meet requirements outlined in the federal government's Poverty Guidelines. The federal government requires that at least 90% of the families whose children are enrolled in Head Start be low-income and that at least 10% serve children with developmental disabilities (Magnuson & Duncan, 2016).

All Head Start grantees in the state of Georgia are required by The Head Start Program Performance Standards (HSPPS) (set forth by the Head Start Act of 2007) to implement the Head Start Early Learning Outcomes Framework: Ages Birth to Five (ELOF) in their teaching curriculum. The Early Learning Outcomes Framework is a document which outlines the skills, behaviors, and content knowledge that must be taught to preschool aged children in order for them to succeed (Head Start Early Learning Outcomes Framework). It is intended that the Framework would guide the teaching curriculum and practices of Head Start program educators. The framework is research-based and measurable meaning that its design is informed by research and that the skills, behaviors, and content knowledge contained in it can be evaluated. It is comprehensive and includes a breadth and depth of early learning areas. The ELOF has also been designed to meet the needs of children from diverse linguistic, economic, and cultural backgrounds; this includes children with disabilities From a bird's eye view, the ELOF is organized into Domains, Sub-Domains, Goals, Developmental Progressions, and Indicators. One characteristic of the framework is that it accounts for developmental differences among children aged 0-3 (infants and toddler group) and children aged 3-5 (pre-K), which means that there is a version of the framework that is specific to infants and toddlers, and a version that is specific to children aged 3-5. For example, the single-domain Cognition (for toddlers) is divided into the two domains of Mathematics Development and Scientific Reasoning for children aged 3-5 (Head Start Early Learning Outcomes Framework).

The ELOF consists of five areas of pre-K learning called central domains (Figure 3). These five domains include 1) Approaches to Learning, 2) Social and Emotional Development, 3) Language and Literacy, 4) Cognition, and 5) Perceptual, Motor, and Physical Development.

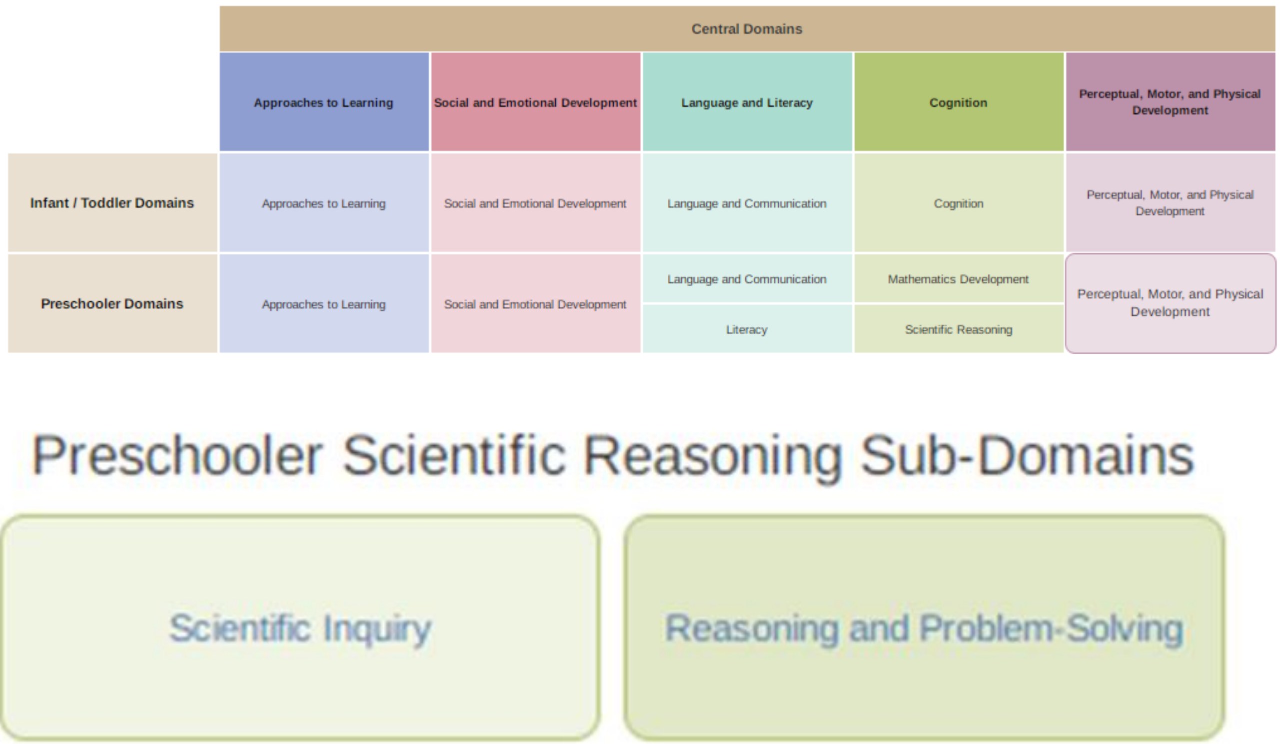


Figure 3. Central Domains of ELOF and Sub-domains for Preschool Scientific Reasoning Domain

Within each of ELOF's domains is a set of sub-domains (Figure 3). For the Approaches to Learning Domain, sub-domains include: 1) Emotional and Behavioral Self-Regulation, 2) Cognitive Self-Regulation (Executive Functioning), 3) Initiative and Curiosity, and 4) Creativity. For the Social and Emotional Development Domain, sub-domains include: 1) Relationships with Adults, 2) Relationships with Other Children 3) Emotional Functioning and 4) Sense of Identity and Belonging. For Domain 3a on Language and Communication, sub-domains include: 1) Attending and Understanding, 2) Communicating and Speaking, and 3) Vocabulary. For Domains 3b on Literacy, sub-domains include: 1) Phonological awareness, 2) Print and Alphabet

Knowledge, 3) Comprehension and Text Structure, and 4) Writing. Under Cognition, for the Mathematics Development domain, sub-domains include: 1) Counting and cardinality, 2) Operations and Algebraic Thinking, 3) Measurement, and 4) Geometry and Spatial Sense. For the Scientific Reasoning Domain, sub-domains include 1) Scientific inquiry and 2) Reasoning and Problem Solving. For the domain of Perceptual, Motor, and Physical Development, sub-domains include: 1) Gross motor, 2) Fine motor, and 3) Health, Safety, and Nutrition.

Under the domain for Perceptual, Motor, and Physical Development, one sub-domain is Health, Safety, and Nutrition. The goal for this sub-domain is Goal P-PMP5 which encourages the child to develop knowledge and skills that help promote nutritious food choices and eating habits (Figure 4). The ELOF also outlines developmental progression objectives for different age groups (Figure 4). Children aged 36-48 months are expected to demonstrate a basic knowledge of the role of foods and nutrition in healthy development (while requiring adult guidance and supervision). Children aged 48-60 months are expected to demonstrate an increasing understanding of the ways in which foods and nutrition help the body grow and be healthy (it is anticipated that children will make healthy eating choices both independently and with support). Indicators are outcomes that signal that the goals for this domain have been adequately addressed. For children who have reached 60 months, the child should be able to 1) Identify a variety of healthy and unhealthy foods 2) Demonstrate a basic understanding that eating a variety of foods helps the body grow and be healthy 3) Moderate food consumption based on awareness of own hunger and fullness (Figure 4).

Goal P-PMP 5. Child develops knowledge and skills that help promote nutritious food choices and eating habits.

Developmental Progression		Indicators
36 to 48 Months	48 to 60 Months	By 60 Months
Demonstrates a basic knowledge of the role of foods and nutrition in healthy development. Often requires adult guidance and supervision to make healthy eating choices.	Demonstrates an increasing understanding of the ways in which foods and nutrition help the body grow and be healthy. Makes healthy eating choices both independently and with support.	• Identifies a variety of healthy and unhealthy foods. • Demonstrates basic understanding that eating a variety of foods helps the body grow and be healthy. • Moderates food consumption based on awareness of own hunger and fullness.

Goal P-SCI 1. Child observes and describes observable phenomena (objects, materials, organisms, and events).

Developmental Progression		Indicators
36 to 48 Months	48 to 60 Months	By 60 Months
Uses the five senses to observe objects, materials, organisms, and events. Provides simple verbal or signed descriptions. With adult support, represents observable phenomena, such as draws a picture.	Makes increasingly complex observations of objects, materials, organisms, and events. Provides greater detail in descriptions. Represents observable phenomena in more complex ways, such as pictures that include more detail.	• Identifies the five senses (smell, touch, sight, sound, taste) and uses them to make observations. • Uses observational tools to extend the five senses, such as a magnifying glass, microscope, binoculars, or stethoscope. • Describes observable phenomena using adjectives and labels, such as lemons taste sour and play dough feels sticky. • Represents observable phenomena with pictures, diagrams, and 3-D models.

Figure 4. ELOF Science and Nutrition-Related Goals, Developmental Progressions, and Indicators

Georgia Early Learning and Development Standards (GELDS)

The Georgia Department of Early Care and Learning (DECAL), also known as Bright from the Start (BOS), is a state-run department that is responsible for licensing and evaluating all state-funded early childcare centers (including home-based childcare facilities) in the state. It administers Georgia's Pre-K Program, Georgia's Childcare and Parent Services (CAPS) program, Georgia's Quality Rated childcare rating system, and also federally funded nutrition programs such as the Child and Adult Care Food Program (CACFP) and the Summer Food Service Program

(SFSP). Originally, the state had two systems of standards, one for children aged 0-3 (Georgia Early Learning Standards - GELS) and one for children aged 3-5 (Pre-K Content Standards). However, in 2013, it released the Georgia Early Learning and Development Standards (GELDS) which consists of a single set of state-developed standards that outline the skills, behaviors, and concepts that children aged 0-5 should be taught (Figure 5) (GELDS). Similar to the ELOF, the GELDS consist of 5 overarching learning domains including: 1) Physical Development and Motor Skills (PDM) 2) Social and Emotional Development (SED), Approaches to Play and Learning (APL), Communication, Language, and Literacy (CLL), and Cognitive Development and General Knowledge (CD). Within each domain is a sub-set of strands, with each strand containing a set of standards. With each standard, rationale and specific examples of standard achievement are provided. The GELDS are evidence-based and have been aligned with the Head Start Early Learning Outcomes Framework (ELOF) as well as the Common Core Georgia Performance Standards (CCGPS) for K through third grade. It is intended that early care educators and parents would use these standards as a guide to promote high quality early learning experiences.

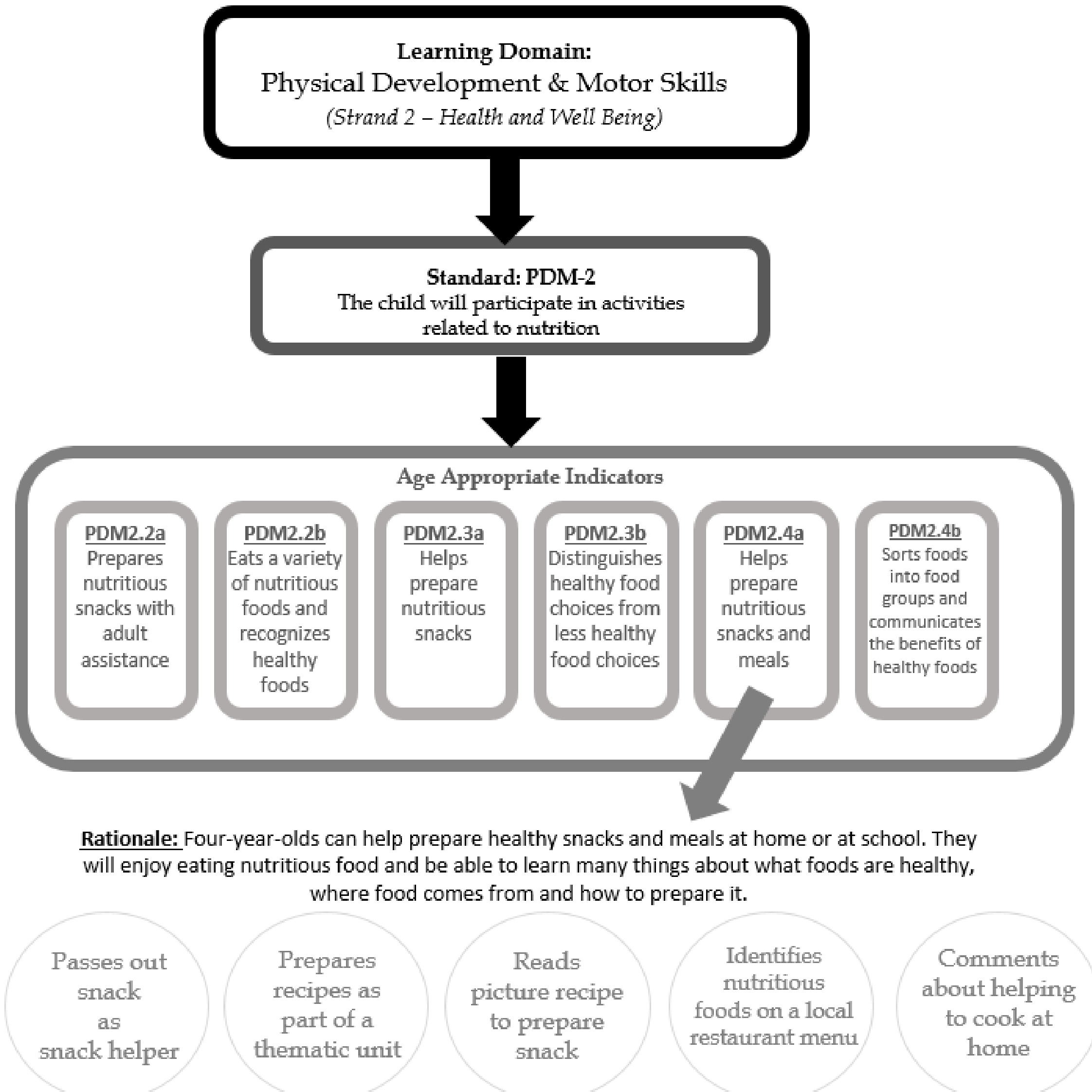


Figure 5. Example of a Nutrition-Related Georgia Early Learning and Development Standard

The Georgia Department of Early Care and Learning (DECAL) is also home to the Head Start State Collaboration Office (HSSCO) which is the state unit that is responsible for establishing comprehensive partnerships between the federally funded Head Start program and the state of

Georgia's own early care and education programs (About Head Start Collaboration Office). Currently, the HSSCO has aligned programming for early care and education programs in the state with the Head Start Program Performance Standards (HSPPS) which coincidentally make up a part of Georgia's K-12 education standards.

Correlates Between Child Obesity and Educational Attainment

Current evidence shows that there is a well-established association between child adiposity and parental socioeconomic status (SES) (Cohen et al., 2013; Lindberg et al., 2021; McLaren, 2007; Shrewsbury & Wardle, 2008; Tchicaya, 2012). Socioeconomic status can be defined by a variety of indicators, but a major predictor of SES is education level (Khodayari et al., 2022). Some researchers have hypothesized that education level logically determines career and occupation choices and thereby income level and subsequent access to healthcare (Kim and Knesebeck, 2018) but other researchers have added that the link between education level and decision making and thinking regarding health behaviors is also a culprit (Cutler & Lleras-Muney, 2006; Devaux et al., 2011). For example, a handful of studies have observed that the relationship between parental education level and child BMI is mediated by breakfast consumption behaviors along with other lifestyle behaviors such as television watching and sugar sweetened beverage consumption (Fernández-Alvira et al., 2013; Manios et al., 2015; Velduis et al., 2013). Thus, although education level is not a direct cause of obesity, it plays a critical role in driving nutrition and health-related decision-making behaviors (Alderman & Headey, 2017; Almeida et al., 2021; Chung et al., 2016). Regardless of the specific mechanism, higher educational attainment has been associated with lower levels of obesity on a global scale (AlTamimi et al., 2020). Furthermore, the protective effects of higher education level against obesity are generational. This is supported by the fact that the prevalence of overweight and obesity among children is significantly lower when parents have attained a higher education; in fact, a lower education level has been found to be associated with higher body mass index (BMI) in children and adolescents (Paduano et al., 2020; Muthuri et al., 2016; Seum et al., 2022).

Integrating Science, Art, and Math (SAM) Learning with Nutrition Education

Scientific thinking involves a repertoire of information-seeking behaviors such as making observations, asking questions, testing hypotheses, and drawing inferences. Interestingly, many features of young children's thinking bear a striking resemblance to those of scientific thinking (Jirout, 2020; Gopnik et al., 2012). Cognitive behavioral research consistently shows that children are predisposed to use their senses to engage in information-seeking behaviors from a young age in order to make sense of their external environment (Liquin & Lombrozo, 2020; Inhelder and Piaget, 1958; Piaget, 1926). Since young children possess a natural curiosity about the world around them, this leads them to actively engage in inquiry and exploration (Jirout & Zimmerman, 2015; Ronfard et al., 2018). Subsequently, these behaviors may lead to the construction of simple theories which the child may informally test, leading to either a revision of the original theory or the generation of new questions. Nurturing such curiosity in early childhood can have profound effects on the child's development and academic achievement later on (Gruber & Fandakova, 2021). Longitudinal studies have found that parental promotion of curiosity during the early childhood years can lead to greater reading and math achievement in kindergarten as well as science achievement in the high school years (Gottfried et al., 2016; Shah et al., 2018). Cultivation of early science thinking skills can help children develop the confidence to handle science and math concepts in middle and high school years. In turn, this could put them on a trajectory to pursue higher education and ultimately enter higher-paying occupations and professions in STEM (science, technology, engineering, math). Despite controversy over whether the relationship between education level and obesity is one of causality or merely correlation, there exists an undeniable association between them that can be used to inform and design multilevel interventions that target indirect determinants of obesity such as academic readiness and educational achievement (Devaux et al., 2011).

In both school and home-based food environments, there exist numerous opportunities to simultaneously provide young children with both nutrition education as well as simple academic experiences that promote early learning, critical thinking, and decision-making skills which could ultimately favor healthy lifestyle behaviors, such as consuming more vegetables, during adolescence and adulthood. This is because there exists an inherently complementary dynamic between food, food experiences, and the learning of content-area concepts such as math, science, and even art (Stage et al., 2018). For example, food undergoes physical and chemical changes during the ripening/oxidation/fermentation, preparation, and cooking processes; food can be counted, measured, and quantified; food possess aesthetic properties that have made it not only the subject of Renaissance painters but also the very content of popular television shows due to their malleable properties which allows them to be creatively manipulated and synthesized to please and delight the senses. Food provides a natural playground on which children can explore, inquire, create, and learn (Sepp & Höijer, 2016). Food-related activities such as purchasing, preparation, and cooking provide a landscape for children and adolescents to learn and become exposed to academic concepts that would otherwise be delivered directly via rote learning in a classroom setting. The rich and varied properties of food can be used as a vehicle for not only modelling healthy nutrition-related behaviors, but also communicating academic concepts and facilitating cognitive development (Kähkönen et al., 2018; Basu & Nguyen, 2021). This conceptual triad of food, nutrition, and academic learning is significant, since it provides an efficient strategy for using existing food experiences during and outside of meal and snack times to simultaneously target two different determinants of health: nutrition education and academic achievement. Currently, there are only a small handful of interventions that recognize and take advantage of this convenient overlap between food/nutrition education and academic content-area learning (Duffrin et al., 2010). In the EatFit intervention, researchers found that a nutrition education program was able to elicit greater performance on math and English standardized tests among 6th graders (Horowitz et al., 2004; Shilts et al., 2009). In the Food, Math, and Science Teaching Enhancement Resource Intermediate (FoodMASTER abbv. FMI) curriculum, children who were exposed to a food-centered math and science curriculum exhibited significant increases in science and mathematics-content area knowledge (Hovland et al., 2013; Roseno et al., 2015). Conversely, this curriculum has also demonstrated efficacy in improving nutrition knowledge in addition to gains in content-area knowledge (Carraway-Stage et al., 2015; Stage et al., 2018). A recent study was also able to show that a food-based STEAM curriculum for Head Start preschoolers was able to reduce declines in skin carotenoid status (Bayles et al., 2021).

Despite the efficacy and success of these interventions in school-aged children in a classroom setting, interventions that integrate food, nutrition, and content-area concepts have not been tested in younger low-income preschool-aged children within a home setting. Furthermore, there are also no interventions designed to educate limited resource parents of younger children on the dual benefits of using home food experiences to encourage both nutrition education and familiarization with academic subject areas. These studies have not been tailored for parents of young children nor have their success when administered in a virtual format in the home setting been assessed in Georgia. Therefore, this research study intends to pilot test the acceptability and impact of a nutrition education curriculum that encourages parental serving of vegetables through cooking activities as well as child vegetable intake through approaches that integrate science, art, and math to promote vegetable familiarization.

Culinary Skills Education as a Vehicle for Improving Nutrition Outcomes

One approach to dismantling the infrastructure of early childhood obesity is the introduction of food-based culinary education interventions that emphasize cooking skills and nutritious recipes conducive to the development of healthy dietary patterns. Culinary skills programs are attractive vehicles for improving nutrition outcomes since they can serve as experiential learning outlets that allow children to practically apply the seemingly abstract nutrition knowledge, they have either observed or assimilated (Figure 6) (Kolb et al., 1984; Nelson et al., 2013). In fact, one study found that children who were involved in meal preparation consumed significantly more vegetables compared to control groups indicating that child involvement in meal preparation can increase vegetable intake (van der Horst et al., 2014). Even simple hands-on experiences with foods can confer benefits (Dazeley et al., 2012; Maugeri et al., 2021; Sepp et al., 2016). Data from a California study showed that an intervention promoting ethnic produce through simple food demonstrations, tastings, and home cooking activities was able to improve familiarity, preferences, appreciation, consumption, and food preparation involvement among ethnically diverse elementary school children and their parents (Chen et al., 2014).

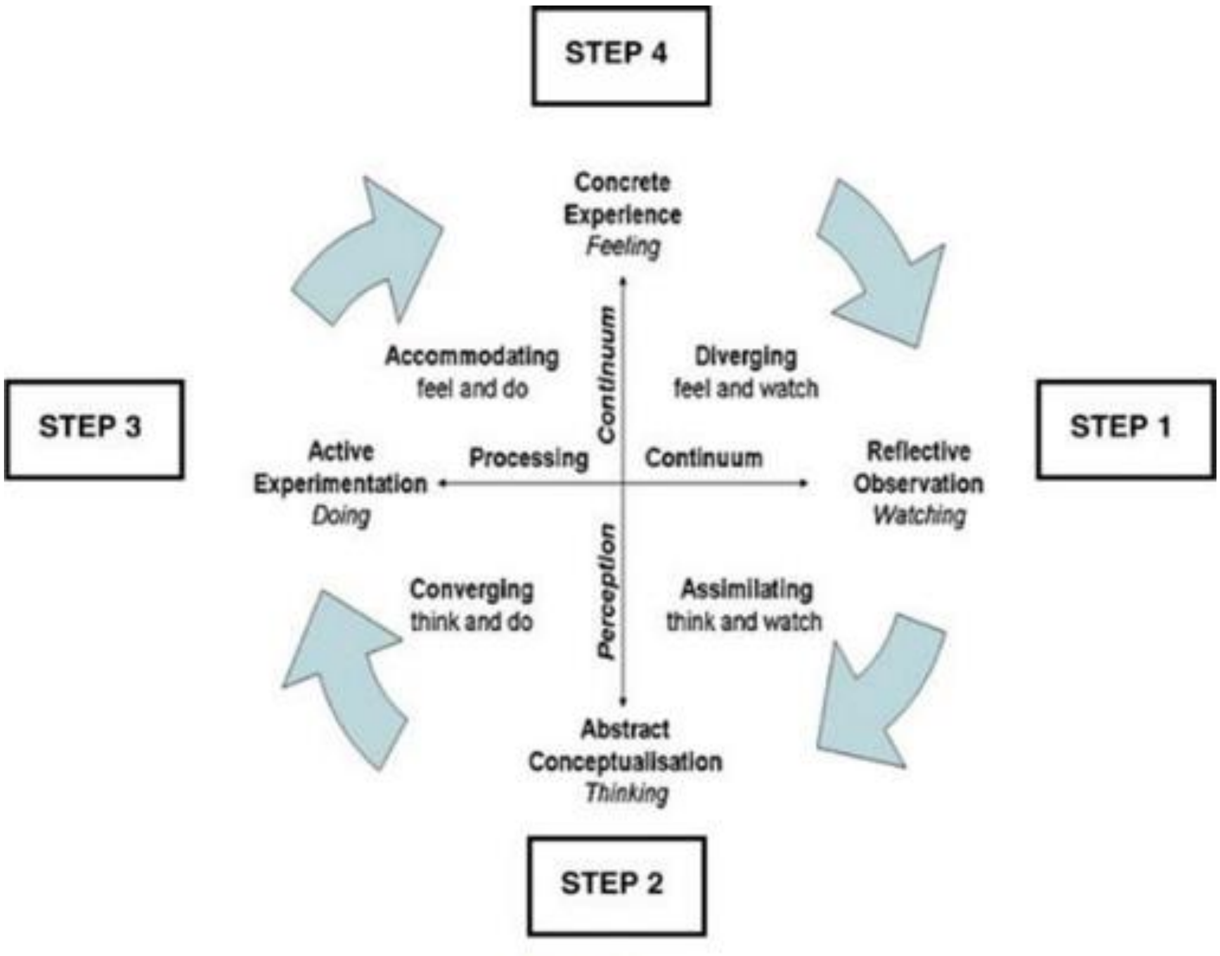


Figure 6. Application of Kolb's Conceptual Framework of Experiential Learning to Nutrition Outcomes Using Culinary Skills Education

Impact of Culinary Education Programs on Knowledge, Perceptions, Anthropometric Outcomes, and Dietary Intake Patterns

Systematic reviews examining evidence across an extensive range of research databases have established that culinary education programs have the potential to at least modify if not significantly improve knowledge, attitudes, self-efficacy, dietary intake behaviors, and in some cases anthropometric measures in adults and children (Hasan et al., 2019; Hersch et al., 2014). Models such as the Cook-Ed Model for planning, implementing, and evaluating cooking programs with the purpose of improving diet and nutrition-related outcomes have been proposed to refine how these programs can be optimized (Asher et al., 2020).

Culinary Interventions Targeting Parent-Child Dyads Serve as Realistic Models of Meal Preparation Interactions in the Home Setting

Evidence also suggests that characteristics of effective behavior change models for obesity prevention in 4–6-year-olds include high levels of parental involvement indicating that this should be a consideration when developing and implementing cooking courses (Nixon et al., 2012; Tomayko et al., 2021). Culinary interventions that are designed to facilitate mutual interactions between caregivers and children may serve as more realistic models of interactions in the home setting, given that it is seldom expected that very young children will prepare snacks or meals by themselves without parental supervision or guidance. Several studies have tested culinary interventions that involve parent and child dyads. In the iCook 4-H intervention, caregivers in five states (Maine, Nebraska, South Dakota, Tennessee, and West Virginia) who participated in a 3-month childhood obesity prevention program modeled on the parent-child dyad approach, exhibited improved meal planning, prioritization of healthy meals, shopping using a grocery list, nutrition facts label literacy, cooking confidence, desire for home cooked meals, and feeding interactions; improvements in both child and caregiver consumption of fruit juice, vegetable soup, and whole grains were also observed (Miller et al., 2016). Increased consumption of fruits and vegetables and key nutrients were also observed in the Healthy Home offerings Via the Mealtime Environment (HOME) study which involved parent-child dyads in taste-testing and hands-on meal preparation sessions as well as the Oklahoma Cooperative Extension Service cooking class program (Brown & Hermann, 2005; Fulkerson et al., 2011). Positive outcomes have been demonstrated across a wide range of participant demographics. Although the participants in the Miller study were predominantly educated, Caucasian, and married, with only 30% of participants receiving supplemental assistance, other studies that have worked with more racially and ethnically diverse populations from lower socioeconomic backgrounds have also observed beneficial effects of culinary programs. In the Flint Kids Cook (FKC) study, urban African American females serving as caregivers for children and adolescents (8-18 years old) from low-income backgrounds participated in a 6-week (90-minute sections, total 9 hours of instruction) chef-led nutrition culinary program taught in a farmer's market kitchen (Saxe-Custack et al., 2021). Focus group data showed that the program improved food acceptance, dietary modifications, and self-efficacy among caregivers as well as improved measures of health-related quality of life (HRQoL). Positive nutrition outcomes have also been observed in parent-child dyad interventions lasting for shorter durations. In the TEACH Kitchen study, adults and children who participated in four 2-hour nutrition education sessions (including a cooking class, a lesson, and a discussion time) exhibited lower chronic disease complications related to diet and obesity (White et al., 2016). Culinary interventions that capitalize on peer-peer interactions such as those naturally occurring in after-school extracurricular food clubs have also received positive feedback from both parents and children (Hyland et al., 2006).

Culinary Interventions Primarily for Children and Adolescents

Although the advantages of examining feeding interactions in the context of psychosocial dyads are numerous, it may also be advantageous to remove the interaction component and apply interventions in a standalone manner to either just the parent or just the child. Such experimental designs would offer insights on the effectiveness of more narrowly targeted approaches in directly and indirectly improving the nutrition outcomes of the parent and child. Several studies have assessed the direct impact of culinary interventions on child-focused designs. In the Cooking Threads (CT) study, low-income children in grades 3-8 participated in a 10-week after-school chef-led cooking class series (Jarpe-Ratner, 2016). The results showed that children's knowledge, consumption of F/V, self-efficacy, and frequency of at-home cooking increased significantly. Interestingly, children were encouraged to relay their experiences to their families, which impacted parents' self-efficacy. In the Cooking With Kids (CWK) study, Hispanic 4th-grade students from low-income households participated in a 10-week cooking program conducted in a public school setting; similarly, improvements in vegetable preferences, attitudes, and self-efficacy were observed (Cunningham-Sabo & Lohse, 2013). Interestingly, comparisons of nutrition interventions containing culinary workshop components and those that do not have identified the benefits of culinary element. The Cookshop Program intervention compared outcomes among children assigned to one of four conditions: 1) Cookshop only 2) Lesson only 3) Cookshop + Lesson 4) Control and found that groups that engaged in classroom cooking classes improved K-6 children's knowledge, preferences, behavioral intention, and self-efficacy (Liquori et al., 1998). The Cooking Up Diversity study elementary aged children who participated in classroom food demonstrations and recipe tastings exhibited increased familiarity, preferences, consumption, and home food preparation (Chen et al., 2014). Many of these studies measure psychosocial and behavioral outcomes, but a few studies have also found anthropometric improvements in children. In the LA Sprouts study, 4-5th grade Latino children participated in a 12-week (90 min/week) garden-based nutrition class series. The intervention yielded improvements in fiber intake as well as reduced blood pressure, BMI, and weight gain (Davis et al., 2011). However, other studies have found no effects on anthropometric measures or dietary intake behaviors (Chessen et al., 2009; Fulkerson et al., 2010). As a result, the data on anthropometric measures remains controversial.

Culinary Interventions Primarily Targeting Adults Caregivers and Parents

Several studies have also focused on targeting adult parents and caregivers and revealed positive impacts on psychosocial and behavioral measures. The Eat Better Feel Better study assessed the impact of a 6-week community cooking program on low-income females and found improved cooking confidence, skills, time management, and knowledge (Garcia et al., 2017). In another study, resident physicians provided 3 culinary education workshops to patients in the community and reported improvements in cooking competency, home-cooking frequency, and lifestyle effects on behavior (Lang et al, 2019). Similarly, adult participants who enrolled in a physical 12-month-long cooking class at the central Appalachia Extension county office displayed positive attitudes toward the cooking class (Hardin-Fanning & Ricks, 2017).

Virtual, Remote, and Technology-Based Culinary Classes

A myriad of pilot and intervention studies have assessed the impact of in-person live cooking classes on nutrition-related knowledge, perceptions, and behaviors of adults and children in both the community and school settings (Muzaffar et al., 2018). However, virtual interventions may be more amenable to parents not only in terms of flexibility and financial constraints but also in light of the Covid-19 pandemic. A handful of programs have assessed the impact of cooking lessons delivered via various multimedia approaches that utilize a variety of technological modalities including avenues such as video streaming, smartphones, apps, social media (forums, blogs, chatrooms), and game-based interventions (e.g., web/mobile based video games and virtual reality) (Nour et al., 2017; LeRouge et al., 2019). Interestingly, some studies have demonstrated that simply watching cooking shows on television encourages the consumption of certain foods among children (Folkvord et al., 2021; Neyens et Smits, 2017). One study examined the use of video technology among low-skilled female participants and found that the intervention was able to improve comprehension, real-time reassurance during cooking, development of novel culinary skills, and increase satisfaction during cooking (Surgenor et al., 2017). In a UK study, young adults who viewed 15 short videos centered on cooking skills, budgeting, and calcium-rich foods expressed high acceptability for the program's effectiveness (Bramston et al., 2020). In another study, young adults who viewed smart phone delivered culinary videos displayed improved motivation for cooking as well as high acceptability (Nour et al., 2018). In another remotely administered intervention called the Patients Culinary Health Education Fundamental Coaching Program (CHEF), adult women participants were provided 12 weekly 30 min live culinary coaching sessions via telephone (with supplemental culinary videos) with the goal of improving nutritional outcomes; the program was able to improve attitudes regarding the ease of home cooking as well as self-efficacy in culinary skills and knowledge acquisition through online resources (Polak et al., 2017). A study called Cooking Online With a Chef (COWC) utilizing a total of 5 live telemedicine sessions including real-time coaching and culinary videos, was received well by health professionals (Polak et al., 2019). In a more targeted study (MOOC) conducted by Stanford School of Medicine, volunteers (mostly female women of child-bearing age) from more than 80 countries participated in a 5-week online course curriculum involving nutrition videos, cooking assignments, and quizzes improved nutritional outcomes related to eating behaviors and meal composition (Adam et al., 2015). Overall, although many parent-child cooking programs are offered, very few virtually-delivered culinary interventions have been designed and evaluated for feasibility, acceptability, and efficacy.

Home-Based Virtual Culinary and Nutrition Education Interventions

Despite the consensus that interventions implemented in a school, childcare, or family-childcare home (FCCH) settings appear to be more effective in achieving positive nutrition outcomes and that efforts have mainly focused on refining interventions in these types of settings, home-based nutrition education and cooking interventions may serve as a useful tool to reach families since they overcome physical and psychological barriers such as lack of transportation, lack of time, and lack of motivation, allowing families to cook and learn in a familiar and comfortable environment (Risica et al., 2019; Taylor et al., 2013; Williams et al., 2014; Snell-Johns, Mendez, and Smith, 2004). Aspects of home-based interventions that make them viable and convenient alternatives include physical in-person home visitation or remote instruction that is delivered virtually.

The lack of research on home-based interventions is unfortunate, given that home cooking interventions have demonstrated a short-term impact on nutritional intake in children in the context of diabetes prevention (Polak et al., 2018). In fact, individuals who consume home-cooked meals exhibited healthier dietary patterns and improved health outcomes (Mills et al., 2017; Wolfson & Bleich, 2015; Zong et al., 2016). To date, few studies have examined home-based culinary and nutrition education interventions, let alone ones that are delivered remotely. A review of the existing home-based nutrition interventions with parents of children aged 2-12 years found that parent-implemented interventions at home centering on taste exposure experiences were able to significantly increase vegetable intake (Remington et al., 2012; Touyz et al., 2018). Yet, overall success of such home-based, parent-led interventions in increasing child vegetable intake is low, indicating that additional barriers to parent implementation may exist (Hendrie et al., 2017; Millen et al., 2019). Interestingly, mediation analysis of the Healthy Habits study found that the two variables that mediate sustained intervention effects in home-based interventions are parental intake and parental provision, suggesting that these characteristics should be targeted when implementing home-based interventions (Wyse et al., 2015).

Many of the few home-based interventions currently found in the literature arose primarily in response to the arrival of the Covid-19 pandemic. Both official and self-imposed quarantine restrictions that came with the pandemic forced many in-person programs to pivot to an online virtual format. The Flint Families Cook (FFC) is a 5-week culinary program that delivered live virtual 90-minute classes centering on cooking skills, food safety, as well as nutrition education, and health benefits of family-centered meals through zoom (Saxe-Custack and Egan, 2022). Grocery boxes with ingredients and recipe cards were prepared and disseminated by a local food hub to each participant’s home 1-2 days prior to each class. Participating families prepared dishes based on USDA MyPlate recipes. The study targeted families of various income levels with children ages 8-18, and survey and focus group data revealed improvements in cooking self-efficacy, F/V consumption self-efficacy, and nutrition knowledge. Home-based interventions that rely on in-person home visitations have also been successful in reaching parents with young children (Olds et al., 1997; Paulsell et al., 2010; USDAHHS, 2022; Wen et al., 2012). A pilot cooking intervention that targeted 58 low-income parents with children ages 0-3 enrolled in Early Head Start Home Visiting program found improvements in cooking self-efficacy as well as the willingness to try vegetables; overall the program was found to be both acceptable to parents and feasible (Izumi et al., 2016).

An intervention assessing the impact of a Cooking Matters nutrition education Facebook page focused on healthy dietary behaviors targeted to low-income parents showed no significant improvements in pre and post-outcomes but demonstrated that Facebook might be a viable platform for reaching specific demographics such as single parents (Lohse, 2013; Zhang et al., 2021). Similar interventions employing the use of mobile applications (apps) have also shown small improvements in meal-preparation practices such as meal planning, shopping, cooking, and recipe use (Garvin et al., 2019). Virtual nutrition education and culinary interventions targeting demographics other than preschool children have also been implemented. In the BALANCE study, delivery of an 8-week nutrition intervention to parents of adolescents who had autism spectrum disorder showed high acceptability (Buro et al., 2022). Another study that was conducted virtually in Hong Kong delivered cooking demonstrations and free food samples to elderly adults living at home and found improvements in nutrition status (Chung and Chung, 2014).

CHAPTER 3

METHODOLOGY

Research Design

In this study, researchers employed an exploratory sequential mixed methods study design that integrates qualitative data and quantitative data (Figure 7). The study contains the below four key characteristics of a mixed methods study (Creswell, 2014): 1) The researcher is collecting and analyzing quantitative and qualitative data in response to research questions 2) The researcher is using rigorous qualitative and quantitative methods. 3) The researcher is combining or integrating the quantitative and qualitative data, interpreting this integration. 4) The researcher is framing the study within a philosophy and/or theory. The general rationale for selecting this particular mixed methods design is that the researchers plan to conduct preliminary exploration with individuals using qualitative research to ensure that the intervention best fits the needs of the participants being studied. The specific rationale for selecting this design is that the researchers intend to use qualitative methods to explore parent needs in serving vegetables to young children and then use these findings to develop a curriculum intervention to quantitatively measure its impact on variables such as parental self-efficacy, knowledge, and program acceptability (Figure 8). The intent of this study is to first explore a problem through qualitative data collection and analysis, develop an intervention, and implement a quantitative phase.

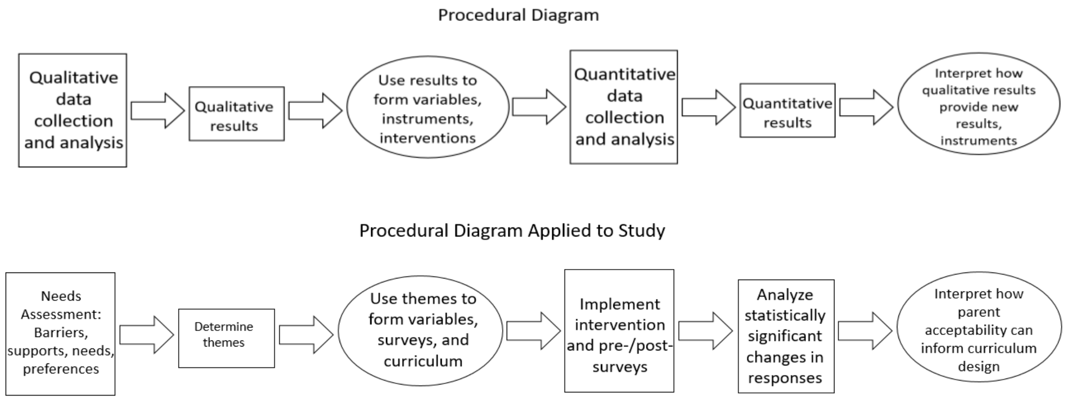


Figure 7. Exploratory Sequential Design (*adapted from Creswell, 2014, p.41)*

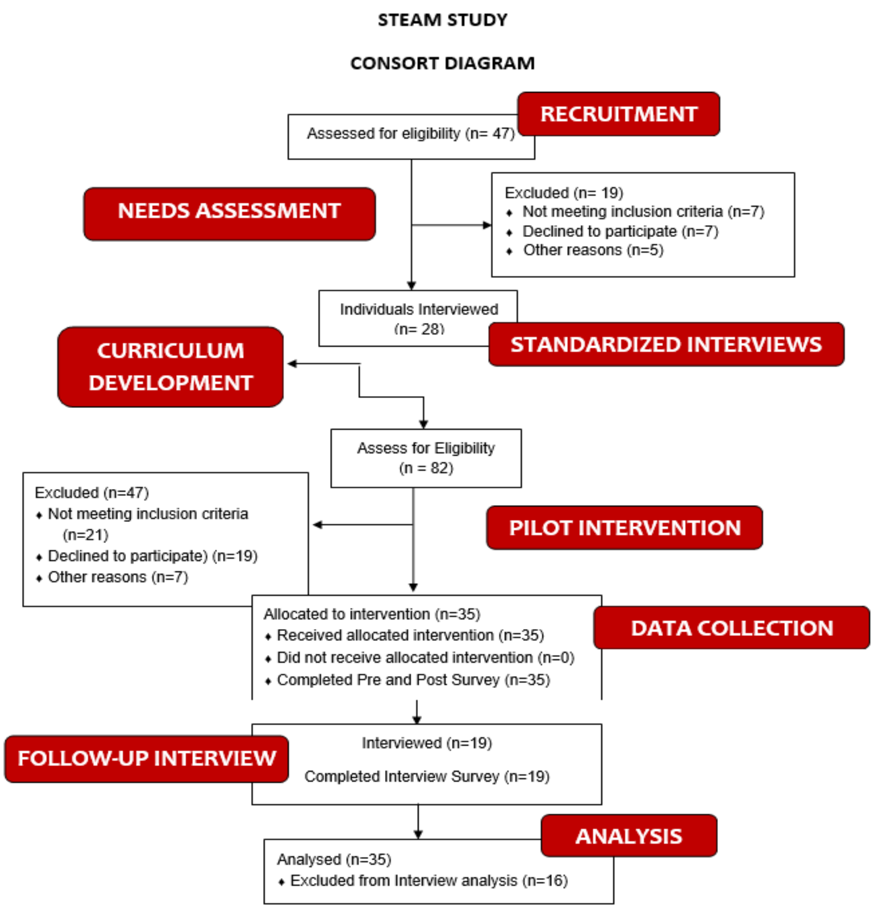


Figure 8. Consort Flow Diagram of Proposed Study

Sample Population and Eligibility Criteria

The sample population included low-income families who met the following income criteria: individuals with children having a household income either equal to or below the 2021 federal poverty level (contingent upon household size) or individuals who qualify for and successfully meet the income requirements for Head Start eligibility and have a child aged 3-5 years enrolled in Georgia Head Start. Household income was assessed using the eligibility survey which screened out parents if their income was greater than $20,000 per year based on a three-person household. Regardless of gross household income, individuals were required to have at least one child between the ages of 3-5 in order to qualify for the study. Each family was represented by a single parent. The study was open to both male and female adults > 18 years to 70 years of age. No groups were excluded on the basis of race, ethnicity, religion, sex, or disability status.

Eligibility for participation in both the individual standardized interviews and pilot intervention included the following criteria: 1) Participant must qualify as low-income based on the criteria set forth by the Georgia Department of Health and Human Services federal poverty level guidelines 2) The participant must have at least 1 child aged of 3 to 5 years enrolled in either a childcare center or a Georgia Head Start center 3) The participant must be at least 18 years of age or older 4) The participant must have access to an electronic device (laptop, desktop, or smartphone) with working internet access

Eligibility for participation in both the needs assessment interviews and the pilot intervention was determined through a screening survey that was administered during the recruitment process. Screening surveys were attached in flyer, email, and text announcements to streamline the recruitment process. The eligibility survey required participants to answer questions related to demographics such as name, age, sex, number of children, age of children, enrollment location, education level, income level, access to internet, programming time choices and availabilities (initially selected from a general list of times provided by the researcher). Upon completion, eligible participants were contacted via both e-mail and text to confirm interest in participating in the research study. Participants were contacted through e-mail, telephone call, and text messaging prior to each session to remind them to attend each session and maintain participation in the study.

Sites of Research

Recruitment materials for both the needs assessment and the pilot study included e-mails, text messages, and paper flyers (Appendix J). The Head Start center staff and parent liaisons distributed e-mail invitations and flyers electronically to parents and caregivers on behalf of the research team. Potential participants were initially identified through the Childhood Obesity Prevention laboratory's existing partnerships with the North Georgia Head Start centers (Figure 9).

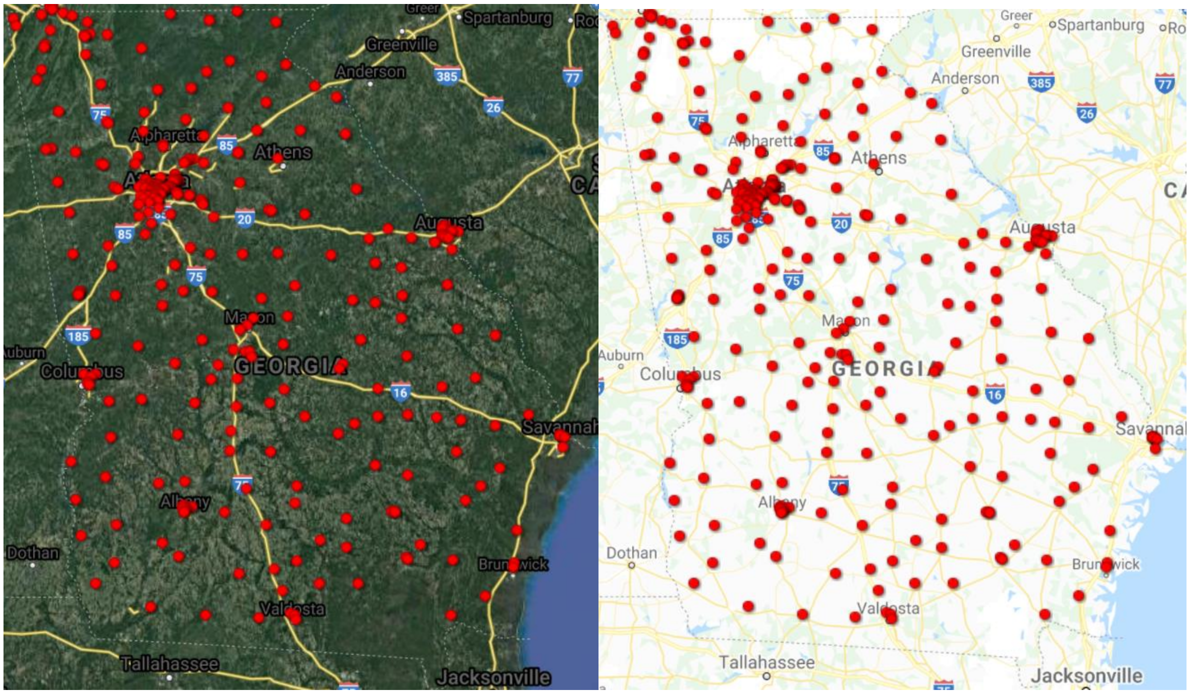


Figure 9. Satellite Images and Maps of Head Start Centers in Georgia, USA

Table 1. Overview of the Mixed Methods Study.

A Mixed Methods Study: Exploratory Sequential Design Summary Table			
Qualitative		**Quantitative**	
Participants	Parents of young children ages 3-5 enrolled in Georgia Head Start (northeast GA, metro Atlanta)	Participants	Parents of young children ages 3-5 enrolled in Georgia Head Start (northeast GA, metro Atlanta)
Recruitment Sites	Northeast GA and Athens Clarke County.	Recruitment Sites	Northeast GA and Athens Clarke County.
Sampling	Purposive sample was used.	Sampling	A purposive sample was used.
Sample Size	n = 30 parents (or until saturation, the point at which the collection of data from additional	Sample Size (G*Power)	Ideal: n=199, 2-tail, ES (d) = 0.2, power (1-β) = 0.08, α = 0.05, matched pairs, 2 dependent means.

	participants does not add substantially to the codes and themes, is reached)		Actual: n=34, 2-tail, ES (d) = 0.5, power (1-β) = 0.08, α = 0.05, apriori
Data Collection Instruments	Qualtrics eligibility survey. Individual standardized open-ended interviews conducted via Zoom, recorded on zoom cloud, transcribed using Rev transcription service. Interview survey taken post class during the interview portion.	Data Collection Instruments	Eligibility survey administered during the recruitment phase. Baseline survey administered via Qualtrics prior to the intervention. Post survey administered via Qualtrics after the intervention is finished. Interview survey taken post class during the interview portion.
Measures	Self-efficacy, knowledge, utilization of SAM, current practices, barriers, facilitators, needs, preferences when serving fruits and vegetables (F/V). Demographics	Measures	Self-efficacy Knowledge Behaviors Acceptability (attitudes and intentions to use) toward the intervention curriculum components (e.g., delivery modality, times, duration/frequency of classes, etc.)
Compensation for participation	Parents received an $80 gift card for participating in the entire study.	Compensation and incentives for participation	Each participating family received an $80 gift card for participating in each of the classes, taking all surveys, and participating in a follow-up interview. Families also received free groceries enough for 8 dishes as well as a set of 4 free activity kits along with recipe cards in a reusable tote bag.
Procedures for Data Organization and Storage	Deidentified audio from interview recordings were transcribed using an external transcription service, and securely stored in a password	Procedures for Data Organization and Storage	Aggregate survey responses were imported from Qualtrics, transferred to an Excel sheet and stored in a password protected Outlook cloud folder only accessible by authorized researchers.

	protected Outlook cloud folder only accessible by authorized researchers.		
Data Analysis Procedure and Qualitative Approach	At least 20% of interview transcripts were coded by at least two researchers for themes using Atlas.ti22 version software. Participant names were de-identified and assigned a numerical code to protect participant identities. Inductive Thematic Analysis within an essentialist/realist paradigm focusing on semantic themes was used (Braun and Clarke, 2006).	Data Analysis Procedure and Quantitative Approach	Survey responses were de-identified and assigned a numerical code to protect participant identities. Survey data will be analyzed by the researchers using IBM®SPSS software v.28. A licensed statistician, Dr. Kim Love will be consulted. Numbers were assigned to each individual's response to a question, and a non-parametric Wilcoxon signed rank test was used to determine statistical differences between each individual's responses from pre to post-test for questions involving ordinal data. The McNemar's Test of Symmetry was used to analyze correct/incorrect style questions. Two tailed p-values were used for both tests. Frequencies were reported as comparative clustered bar charts and included any significant p-values.

IRB Approval

To ensure that the proposed study is in compliance with the applicable federal, state, and institutional policies and procedures, the study (PROJECT00004283) was submitted to and approved as exempt by the University of Georgia Institutional Review Board, a requirement of the Human Research Protection Program (HRPP) administered by the Human Subjects Office within the UGA Office of Research. All researchers participating in this study will be required to complete an ethics training through the UGA Collaborative IRB Training Initiative (CITI) which offers courses on Human Subjects Training and Social and Behavioral Research. A score of 80%

of better will be required to pass the course. Informed consent will be obtained electronically during the recruitment period by administering a consent form that will be embedded at the end of the eligibility survey. The eligibility survey containing the consent form will be administered through the Qualtrics survey platform. All participant questions were clarified through telephone, e-mail, and/or text. Paper versions of consent forms were provided upon request by the Head Start Center. The degree of risk associated with participation is no more than minimal since the research activities will be conducted online. Participants were informed that participation is voluntary and are permitted to skip survey questions that they do not wish to answer. We anticipated that the findings from the research study would be used to support policies that allocate funding and nutrition education resources to low-income families with children. The findings related to feasibility of implementing a virtual curriculum to parents and children may be useful to other researchers as they endeavor to continue adapting interventions to virtual modalities due to the changing nature of COVID-19 protocols.

Needs Assessment

Interview Preparation

Given that the researcher is a human and bias may be introduced during needs assessment interviews, a 5-phase protocol for training interviewers as outlined in the article Practical Qualitative Research Strategies: Training Interviewers and Coders (Goodell, Stage, Cooke, 2016) was implemented prior to conducting interviews with study participants to ensure rigor. The protocol will include: an ethics training, a review of qualitative methods, and 3 mock interviews. The ethics training will be administered through the UGA Collaborative IRB Training Initiative (CITI) which offers courses on Human Subjects Training and Social and

Behavioral Research. The research staff will also review the purpose and features of qualitative research by reading the text Qualitative Inquiry and Research Design: Choosing Among Five Approaches (Creswell & Poth, 2017) as well as Using Thematic Analysis in Psychology (Braun & Clarke, 2006) and Qualitative Interview Design: A Practical Guide for Novice Investigators by (Turner, 2010). The first round of mock interviews involved studying a previously recorded interview with a member of the primary population from a previous similar study. The second round of mock interviews was conducted among the members of the research team. The third round of mock interviews was conducted through voluntary participation of one parent of young children previously enrolled in Georgia Head Start.

Conducting Interviews

Parents and caregivers within our Head Start networks were sent either an electronic or paper copy flyer explaining the study and a Qualtrics survey link to determine if they met eligibility criteria for participating in the study (Appendix J). Eligible and interested parents were invited to participate in a 1-hour Zoom interview which was recorded. Each parent who was interviewed received a $15 e-gift card for their participation. An interview protocol, questionnaire, and accompanying prompts was developed with qualitative research experts prior to the interviews (see Appendix F).

Interview Transcription, Storage, and Data Analysis

Following the interviews, the recorded audio transcripts were de-identified, stored in a password protected cloud folder, and sent to Rev.com remote transcription service for conversion. All transcripts were downloaded as Word Documents and stored in a password protected device and cloud. All data was coded for themes using Atlas.ti22 qualitative software to identify trends in responses. For the qualitative approach, an inductive thematic analysis within an essentialist/realist paradigm focusing on semantic themes was used (Braun and Clarke, 2006) to analyze the data using Atlas.ti22 software. A 5-phase protocol for training coders was implemented prior to and when coding the data using software. The protocol included: an ethics training, a review of qualitative methods, a review of the codebook (TBD), team coding, and independent coding. Two researchers coded the data with at least 20% of the transcripts being double coded.

Curriculum Development

Applying the DESIGN Procedure

Isobel Contento's 6-step Nutrition Education DESIGN procedure as well as the results of the Needs Assessment interviews were both used to guide the curriculum development process and is outlined below in Table 2 (Contento & Koch, 2020).

Table 2. Application of the DESIGN Procedure

1) Decide Behavior

Who is your audience?

1. *Who is your audience?:* The primary audience for this intervention is limited resource parents of young children enrolled in Georgia Head Start. This demographic was selected as the primary audience since parents serve as nutrition gatekeepers for their children and are responsible for purchasing, preparing, and introducing vegetables to their children at home during the early childhood years between birth to age 5 or over.

What are the health problems to solve of your audience?

1. *What do general sources such as the research literature and policy documents, tell you about potential problems to solve for your audience? (Consider demographics and health risks?):* The big-picture problem is childhood obesity. One main contributor to childhood obesity is unhealthy dietary patterns, which are developed in early childhood. Young children do not consume enough vegetables and are often unwilling to try new vegetables due to food neophobia, which is dependent on the child's preferences for taste, texture, aroma, and visual appeal and other miscellaneous reasons. As a result, parents experience difficulty in getting their young children to try and consume vegetables, which can lead to overweight.

2. *What are the health problems to solve that your specific audience cares about?* Children who do not consume enough vegetables or are unwilling to try new vegetables may experience overweight, obesity, diabetes, or other metabolic diseases and disorders in childhood or adolescence, which can lead to health problems later in life.

3. *State one problem to solve you will focus on for this audience:* One problem to solve for this audience is to help parents make vegetables more appealing to young children.

What are your audience's current behaviors that contribute to the problem to solve?

1. *What do general sources, such as the research literature and consumer surveys, tell you are behaviors of audiences like yours that may contribute to the problem to solve?*

   <u>Child Behaviors:</u> Young children refuse to try/consume vegetables due to food neophobia (picky eating).

   <u>Parental Behaviors:</u> Parental feeding styles and practices such as: using food-based rewards/bribery (creating unhealthy relationships with food), force-feeding (whether they eat), strictly imposing intake amounts (how much they eat), negative role modelling (consuming unhealthy foods themselves), mismanagement of mealtime routines, and not offering vegetables to children through repeated exposures (parent may offer a single vegetable only a few times or a different vegetable many times and become discouraged after the child rejects it, leading the parent to stop offering it).

2. *Use questionnaires, focus groups, interviews, and/or visits to your audience's neighborhood to learn about their behaviors that contribute to the problem to solve. Record what you learn below. (Many times, nutrition educators can only meet with their audience once prior to developing their educational plans. If this is the case for you, you will need to complete step E at the same time. In step E, you will ask your audience about their thoughts and feelings about changing their behavior).*

   <u>Child Behaviors:</u> Young children refuse to try/consume vegetables typically due to visual appearance, taste, and texture of vegetables (reported by parents in Needs Assessment interviews).

Parental Behaviors: Not serving enough vegetables (due to time, money, improper food storage, lack of access/availability) Not preparing vegetables in an appealing manner (due to lack of knowledge and cooking skills or inspiration). Always combining vegetables with unhealthy condiments (e.g., processed dressings, fatty cheeses), causing the child to always demand these combinations. Using food-based rewards/bribery (creating unhealthy relationships with food). Compensating appetite by providing child with a back-up substitute food (e.g., PBJ sandwich) when child refuses to eat vegetables. Giving up on serving vegetables after child historically rejects the vegetable a few times.

3. *What are some positive behaviors your audience does regularly that help the problem to solve? How may these assets be strengthened?* Parents engage in positive role modelling by setting good eating examples and understand that children engage in observational learning. Parents make fruits (but not necessarily vegetables) available and accessible to children in easy to reach places and in child-appropriate sizes/portions, while making unhealthy options unavailable or difficult to access. Parents do not force-feed their children; parents set attainable goals of simply having the child try/taste the vegetable but not necessarily finish the entire serving of vegetables if the child is struggling. Parents talk/have conversations with their children about the benefits of vegetables. Parents engage their children to make them interested and excited about eating vegetable using performing arts (e.g., singing, dancing, coloring) and simple mathematical exercises (e.g., counting). Parents engage in flavor-flavor pairing and creative plating techniques to make vegetables more appealing to their children. Parents offer verbal praise, encouragement, and positive feedback when children engage in desired behaviors. Parents consult with pediatricians and nutritionists to ensure their child is healthy. Parents depend on government programs like SNAP-ED and WIC for food-resource assistance. Parents contact family/peers for emotional and skills-based support.

What are some potential behavior change goals for this plan?

1. *List specific behaviors the audiences could change to help solve the problem. Behaviors can be "do more" or "do less" behaviors (e.g., eat more vegetables, eat fewer processed snack foods). Behaviors can also be substitution behaviors (e.g., replace sweetened beverages with water). Then, write a few sentences that consider the importance, feasibility, and desirability, modifiability, and measurability of each of these behaviors. Considerations: How important is this behavior in addressing the problems to solve? How feasible is changing this behavior, given the time allotted and resources available? How desirable is changing this behavior from the audience's point of view How modifiable is this behavior by educational means? How measurable is change in this behavior?*

Behaviors Parents Already Practice (from Needs Assessment data): Increase parental intake/consumption/role modelling of vegetables in the home. Increase parent practices that make vegetables more available/accessible. Increase parental use of the division of responsibility when feeding and decreasing practice of force-feeding. Increase parental conversations about vegetables with their children. Increase parental use of art and math to engage their children in eating vegetables. Increase parental use of positive feedback.

Behaviors Parents Are Currently Struggling With (from needs assessment data): Increase parental attempts to repeatedly expose children to vegetables. Decrease parental use of bribery and food-based rewards. Decrease parental reliance on unhealthy condiments during flavor-flavor pairing. Decreasing parents use of "back-up" meals. Increase parent preparation of vegetables in a more appealing manner. Increase parents resource-management to increase vegetable acquisition and availability.

What is your behavior change goal?

1. *Decide on one behavior change goal for this plan:* Increase parental preparation and serving of vegetables in a resource-friendly manner (low time, low cost, easy) that will both engage and appeal to young children… by increasing parental knowledge, skills, and self-efficacy.
2. *Explain why you chose this behavior change goal*: 1) Parents appear to struggle with preparing and serving vegetables in an appealing manner. 2) Parents also requested recipes, cooking demonstrations, and knowledge/skills related to making vegetables more appealing during the needs assessment interviews. 3) This is feasible since we can offer parents tasty, healthy, easy, and inexpensive recipes to prepare for their children as well as engagement strategies to get their children exposed to/interested in vegetables during and outside of mealtimes. By familiarizing parents with and increasing their use of engaging and appealing strategies to increase vegetable exposure children will have more opportunities to be exposed to vegetables and be more willing to consume vegetables.

2) Explore Determinants

In relation to your behavior change goal, describe your audience's socio-cultural environment:

1. *Review the research literature about the socio-cultural environment of audiences like yours. Record what you learn below.*

   Low-income parents experience barriers such as lack of money, lack of time, and lack of access to fresh vegetables.

2. *Conduct interviews, discussions, focus groups, or questionnaires with your audience and visit their neighborhood to learn about the socio-cultural environment. Record what you learn below.*

   Low-income parents possess limited resources and do not have the means to manage these resources; parents do not have tools for resource management. Parents experience a lack of money due to low-income, food spoilage, and waste from child refusal to eat AND lack of time due to busy schedules and multiple child taste preferences in the home. Parents possess limited resources that educate them about the health benefits of vegetables for them and their children. Parents do not have many resources (e.g., toys, engagement activities, motivational strategies) that help them to engage their children to eat more vegetables. There are also not many resources that parents have access to to help parents prepare vegetables that are appealing to their children.

Exploring motivational and facilitating determinants

1. *What would motivate your audience to achieve your behavior change goal?*

   Expected outcomes (perceived barriers) - Lack of time, lack of money, and child pickiness.
   Expected outcomes (perceived benefits) - Improved health outcomes, money and time savings
   Self-Evaluation (self-satisfaction) – "I am content if I can get my child to eat x amount of vegetables"
   Self-Evaluation (self-worth) – "I am fulfilling my job as a parent by serving my child vegetables"
   Perceived Norms (descriptive social norms*)* – "Children who are served more vegetables tend to be healthier"
   Perceived Norms (injunctive social norms) – "Serving children vegetables is/should be the parents' (MY) responsibility."
   Perceived Risk (negative outcomes of current behavior) – "Serving my child less vegetables may impact their health later on in life"
   Self-Efficacy – "I am confident that I am able to serve my children vegetables in a way that is appealing and engaging to them while using my financial and monetary resources wisely"

2. *What would facilitate your audience to achieve your behavior change goal?*

   Action goal setting / planning – Encouraging parents by showing them that they don't need to feed their children a large quantity of vegetables for the child to be healthy. Showing parents that eating a variety of vegetables should be a target goal. Showing parents that having a child taste a vegetable without finishing all of it is part of making progress and that it takes 10-12 exposures for a child to try a new vegetable.

   Knowledge & Skills (Behavioral Skills) – Showing parents how to acquire, prepare, and introduce vegetables to their children (e.g., food purchasing in season, budgeting, food storage, cooking quick, easy, tasty, healthy, inexpensive recipes, engagement strategies)

   Knowledge & Skills (Knowledge & Cognitive Skills) – Giving parents more information about recommended vegetable intakes, what vegetables to serve their children (e.g., concept of nutrient density and eating a variety of vegetables), information on effective evidence-based feeding best practices (e.g., Satter's division of responsibility), and enriching engagement strategies (e.g., sensory-based learning using food, integrating core content areas like math, science, and art).

<u>Knowledge & Skills (Affective Skills)</u> – Showing parents how to manage stress (e.g., when pressed for time, on vacation, during holidays, etc…) and manage resources (e.g., time, money)

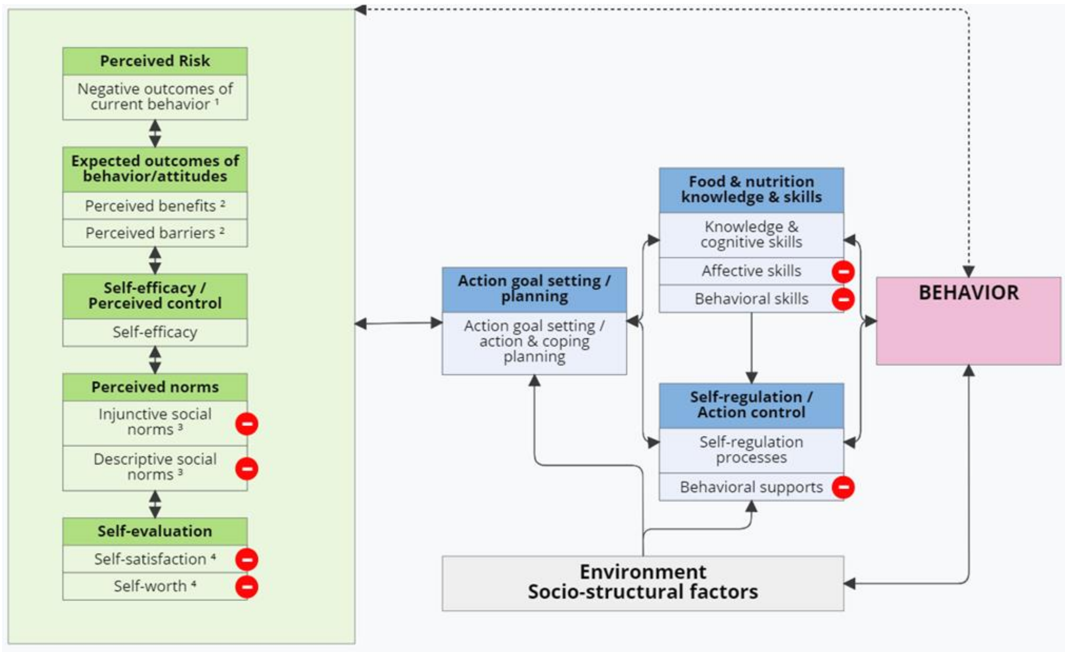
3) Select Theory Based Model

Which theory-based model best matches your selected determinants?

1. *Choose the one that best matches your selected determinants. The match may not be perfect.* Social Cognitive Theory

What determinants do you want to add and delete?

1. *Review the theory-based model you chose. Customize the model to make it appropriate for your audience and behavior change goal. Your model's integrity could be comprised if you remove too many determinants.*



Compare	Your Determinants selected in Step E	Match	Social cognitive theory Determinants
Motivating Determinants		No	Self-worth
		No	Negative outcomes of current behavior
	Perceived benefits	Yes	Perceived benefits
	Perceived barriers	Yes	Perceived barriers
	Negative emotions	No	
	Food preferences	No	
		No	Self-efficacy
		No	Injunctive social norms
		No	Descriptive social norms
		No	Self-satisfaction
Facilitating Action Determinants	Knowledge and cognitive skills	Yes	Knowledge and cognitive skills
	Affective skills	Yes	Affective skills
	Behavioral skills	Yes	Behavioral skills
		No	Self-regulation processes
		No	Behavioral supports
		No	Action goal setting / action and coping planning

Why is your customized theory-based model appropriate?

1. *Write a paragraph that justifies why your theory-based model is appropriate for your audience and behavior change goal. Social cognitive theory is a comprehensive theory that is based on a wide range of motivating and facilitating determinants. Motivational determinants are shown in green in the diagram. The theory provides extensive guidance on translating motivation into action through its emphasis on action self-efficacy and facilitating determinants, shown in blue. It emphasizes that individuals and their environments mutually influence each other, and so the environment must also be addressed. Hence the arrows are bi-directional. This theory is very useful for sessions or programs where you can aim to enhance motivation and where follow-up with the participants is also possible. It is useful for both children and adults.*

   This model is appropriate for parents of young children since parents experience a lack of self-efficacy (personal), a lack of behavioral capability in the form of knowledge & skills (behavior), and a lack of access to home-based materials and guidance (environment) that will help them provide their children with opportunities for repeated exposures to vegetables.

What is your educational philosophy for this session?

1. *Think about how you view your approach as an educator. See which of Brickman's models of educational philosophies best describes your approach in relation to this audience and health problem to solve. Brickman's models of educational philosophies. Describe what philosophy, or philosophies, you will use for this educational session.*

Parents will gain knowledge, skills, and self-confidence via "learning by doing" which will take the form of interactive cooking/recipe/activity kit demonstrations.

What are your perspectives about food and nutrition content?

1. *Write about your perspectives on the food and nutrition content issues for this educational session.*

   Consuming some vegetables is better than consuming no vegetables; however, some vegetables are more nutritious (nutrient dense) than others (USDA). It is okay to eat frozen vegetables, which are more nutritious than canned vegetables. Recipes should be adapted to meet the budgetary needs of limited-resource families. Lessons should be culturally appropriate.

4) Indicate Objectives

Composing educational objectives

1. *In this step, you write general educational objectives for each determinant in your theory-based model. These objectives will guide the planning and evaluation of your educational session. A general educational objective is what you want your audience to know, feel, or be able to do differently for each of your determinants. Remember, everything in your session is to help your audience to achieve your behavior change goal. Objectives begin with "Participants will be able to..." This is followed by a verb. Objectives can be in three domains: cognitive (what the participants will know), affective (what participants will feel) and psychomotor (what participants will be able to do). Write a mix of cognitive and affective objectives at different levels of difficulty. Write psychomotor objectives if you have the opportunity to provide practical experiences for participants, such as food preparation. See the table of possible verbs for cognitive, affective, and psychomotor objectives for verb suggestions.*

Write a general objective for each of your motivational determinants.

Motivational Determinants

Construct: Expected Outcomes (Perceived barriers)
Educational Objective: Parents will be able to view barriers such as time, money, and appeal of vegetables as not being major barriers anymore.

Construct: Expected Outcomes (Perceived benefits)
Educational Objective: Parents will be able to explain the relationship between vegetable intake amounts/types, health benefits, and disease prevention

*After the intervention, parents will also be able to explain the non-nutrition benefits of integrating academic content area learning into food experiences with children

Construct: Self-Efficacy
Educational Objectives:

a) Parents will be able to demonstrate increased self-efficacy/confidence in overcoming barriers through performing resource-management behaviors (e.g., saving money, saving time, storing, selecting nutritious in-season vegetables)
b) Parents will be able to demonstrate increased self-efficacy/confidence in cooking/preparing healthy, low-cost, tasty, and easy vegetable recipes in an appealing manner
c) Parents will be able to demonstrate increased self-efficacy/confidence in engaging children and motivating them to try/eat more vegetables during and outside of meal and snack times.
d) Parents will be able to have more confidence for managing stressors that affect the eating patterns of themselves and their children (e.g., holidays, vacations)

Write a general objective for each of your facilitating determinants

Facilitating Determinants

Construct: Action goal setting / planning
Educational Objective: *Parents will be able to set goals by stating their specific intentions to use the information learned in the class

Construct: Knowledge & Skills (Knowledge & Cognitive Skills)
Educational Objective

a) Parents will be able to state the federally recommended amounts for daily vegetable intake for preschool children
b) Parents will be able to identify which vegetables and vegetable combinations have higher nutrient density
c) Parents will be able to identify healthy feeding practices
d) Parents will be able to identify at least 1 sensory-based or SAM-based engagement strategy for motivating their child to eat more vegetables during serving

Construct: Knowledge & Skills (Behavioral Skills)
Educational Objectives:

a) Parents will be able to prepare easy, tasty, healthy, and inexpensive recipes containing vegetables that are appealing to their children
b) Parents will be able to use various sensory-based or SAM-based engagement strategies to get their children excited about vegetables

5) Generate Plans

A nutrition education curriculum that integrates elements of recipe demonstrations, lessons on nutrition, grocery shopping, time management, budgeting, healthy feeding practices and modelling, sensory, literacy, and SAM strategies for child engagement were developed (Appendix A and B). Curriculum activities for children were aligned with the Georgia Early Learning Standards (Appendix I).

6) Nail Down Evaluation

Plan how you will determine if your audience achieved the general educational objectives.

1. For each of your general objectives, plan the method you will use to determine if the objective was met by your audience and create sample question(s) you will use in your evaluation (see Tables 3 and 4).

Plan how you will determine if your audience achieved the behavior change goal.

1. For your behavior change goal, plan the method you will use to determine if your audience achieved your behavior change goal and create sample questions.

Behavior Change Goal	Evaluation Method	Sample Questions
Increase parental preparation and serving of vegetables that will appeal to young children… by increasing parental knowledge, skills, and self-efficacy.	Pre/Post Survey + Interviews	Self-Efficacy Please indicate your level of agreement with the following statements: - I am confident that I can serve vegetables to my child in an appetizing/appealing way Skills Please indicate your level of agreement with the following statements: - I have the cooking skills to prepare, cook, and serve vegetables to my child - I was able to serve vegetables to my child in a way that was appealing to them at least 3 times this week Knowledge Please indicate your level of agreement with the following statements: - I know at least 5 strategies to make vegetables more appealing to my child

Plan how you will determine if your session contributed to improving the problem to solve.

1. For your problem to solve, plan the method you will use to determine if you helped to solve this problem and create sample questions. ***Please note that for short-term interventions it is impossible to measure if you solved a long-term problem*** such as obesity epidemic, climate change, or social injustice. This plan is about if your intervention may have contributed to solving this problem.

Problem to Solve	Evaluation Method	Sample Questions
One problem to solve for this audience is to help parents serve more vegetables to their children by increasing parental knowledge, skills,	Pre/Post Survey + Interviews	Self-Efficacy Please indicate your level of agreement with the following statements: - I am confident that I can serve vegetables to my child in an appetizing/appealing way Skills Please indicate your level of agreement with the following statements: - I have the cooking

and self-efficacy in making vegetables more appealing		skills to prepare, cook, and serve vegetables to my child - I was able to serve vegetables to my child in a way that was appealing to them at least 3 times this week <u>Knowledge</u> Please indicate your level of agreement with the following statements: - I know at least 5 strategies to make vegetables more appealing to my child

Plan how you will determine how the session went for you and for the participants.

1. You will want to track if you completed your educational plan, what went well, what did not, and what your audience thought. This is called process evaluation. Use the table below to plan the methods for your process evaluation and create sample questions.

Process Component	Evaluation Method
Did parents complete the class?	Class Attendance Photo evidence + artifacts
Did you follow your plan?	Lesson plan checklist
What worked well? What did not?	Self-reflection
To what extent was your audience satisfied with the session?	Acceptability Survey
What did the audience think could be improved?	Acceptability Survey

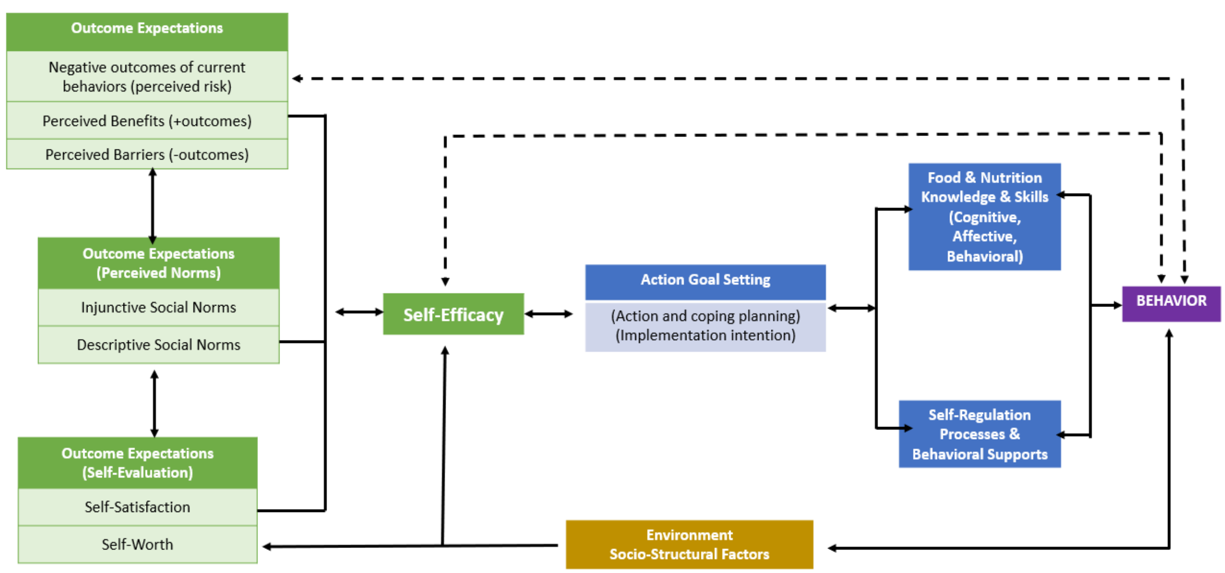


Figure 10. Motivational and Facilitating Determinants of Behavior Change in the Context of Social Cognitive Theory from *Nutrition Education* (4th ed) (Contento, p.139).

Table 3. Alignment of Theory-Based Determinants, Educational Objectives, and Survey Instrument Questions

Alignment of Theory-Determinants, Educational Objectives, and Instrument Questions		
Theory-Based Determinant	**Educational Objective**	**Survey Instrument Questions**
Perceived Barriers	Parents will be able to view barriers such as time, money, and appeal of vegetables as not being barriers.	The reason I don't serve as much vegetables as much as I should is because... - They cost too much - I don't know how to choose seasonal vegetables at the grocery store - It is hard for me to purchase fresh vegetables in my neighborhood - I don't know how to prepare vegetables - I don't like the taste of vegetables - Other (e.g., time)
Perceived Benefits	Parents will be able to explain the relationship between vegetable intake amounts/types, health benefits, and disease prevention	I serve my children vegetables because: Mark ALL that apply: € They are good for my child's health (1) € Of the vitamins & minerals they contain (2) € Increased vegetable intake has been shown to prevent disease € Vegetables contain antioxidants which prevent disease (4) € None of the above (5) Please indicate your level of agreement with the following statements - If my children have any questions about food and nutrition issues, I'm able to give them more information and advice.
	*After the intervention, parents will also be able to explain the non-nutrition benefits of integrating academic content area learning into food experiences with children	Interview Free Response Question
Self-Efficacy	Parents will be able to demonstrate increased self-efficacy/confidence in overcoming barriers through performing resource-management behaviors (e.g., saving money, saving time, storing, selecting nutritious in-season vegetables)	How confident are you that you can... - Find vegetables at a budget-friendly price at the store - Store vegetables so that they don't spoil before consuming them - Know which vegetables should be refrigerated and which should be left at room temperature - Know which vegetables go in which drawers in the refrigerator - Choose fresh, seasonal vegetables - Choose nutrient dense vegetables - Differentiate between ripe and unripe vegetables
	Parents will be able to demonstrate increased self-efficacy/confidence in cooking/preparing healthy, low-cost, tasty, and easy vegetable recipes in an appealing manner	Please indicate your level of agreement with the following statements: - I am confident that I can serve vegetables to my child in an appetizing/appealing way
	Parents will be able to demonstrate increased self-efficacy/confidence in engaging children and motivating them to try/eat more vegetables during and outside of meal and snack times.	Please indicate your level of agreement with the following statements: - I am confident that I can get my child to try a fruit or vegetable I am confident that I can: - engage my child in asking questions and constructing explanation - use STEAM to introduce vegetables to my child - engage in STEAM exercises with my child during mealtimes - engage in STEAM exercises with my child outside of mealtimes - talk with my child about math, science, and art

	Parents will be able to have more confidence for managing stressors that affect the eating patterns of themselves and their children (e.g., holidays, vacations)	How confident are you that you can get your child to eat healthy in the following situations? - when you are tired, stressed, emotionally upset, or affected by daily hassles? - when you yourself want to consume foods and beverages that are not healthy? - when your child wants to consume foods and beverages that are not healthy? - when eating out at a restaurant or fast-food establishment - when on vacation - during the holidays I have developed an effective strategy for making sure my child eats healthy foods in the following situations: - when I am tired, stressed, emotionally upset, or affected by daily hassles? - when I myself want to consume foods and beverages that are not healthy? - when my child wants to consume foods and beverages that are not healthy? - when eating out at a restaurant or fast-food establishment - when on vacation - during the holidays
Knowledge & Skills (Knowledge & Cognitive Skills)	Parents will be able to state the federally recommended amounts for daily vegetable intake for preschool children	How many SERVINGS of vegetables does the government recommend that adults/children should eat each day? a. 1 to 1.5 cups / day b. 2-2.5 cups/day c. 3-4 cups/day d. Not sure
	Parents will be able to identify which vegetables and vegetable combinations have higher nutrient density	Imagine you are eating a salad. Which of these vegetable combinations would give you the greatest VARIETY of vitamins & antioxidants? a. Lettuce, green peppers and cabbage b. Broccoli, carrot and tomatoes c. Red peppers, tomatoes and lettuce d. Not sure Which vegetable in the pair (A or B) is the most nutrient dense? Iceberg Lettuce(A) or Kale (B) Which vegetable in the pair (A or B) is the most nutrient dense? - Red Peppers (A) vs. Green Cabbage (B) Which vegetable in the pair (A or B) is the most nutrient dense? - Carrots (A) vs. Celery (B) Which vegetable in the pair (A or B) is the most nutrient dense? - White Potato (A) vs. Pumpkin (B) How nutritious is each of the following? Rank by assigning stars (1 star = not nutritious, 2 stars = somewhat nutritious, 3 stars = very nutritious) - Canned Vegetables How nutritious is each of the following? Rank by assigning stars (1 star = not nutritious, 2 stars = somewhat nutritious, 3 stars = very nutritious) - Fresh Vegetables How nutritious is each of the following? Rank by assigning stars (1 star = not nutritious, 2 stars = somewhat nutritious, 3 stars = very nutritious) - Frozen Vegetables How nutritious is each of the following? Rank by assigning stars (1 star = not nutritious, 2 stars = somewhat nutritious, 3 stars = very nutritious) - Juiced Vegetables
	Parents will be able to identify healthy feeding practices	Please indicate your level of agreement with the following statements: - I intentionally keep some foods out of my child's reach - I offer sweets (candy, ice cream, cake, pastries) to my child as a reward for good behavior - I offer my child her favorite foods in exchange for good behavior - I believe my child should always eat all of the food on his/her plate

		- Even if my child says "I'm not hungry" I try to get him/her to eat anyway - I know the difference between positive and negative reinforcement - I understand why it is important not to use food to reward or punish my child Please indicate how often you do the following? - I put fruits and vegetables in easy to reach places for my child (e.g., lower cabinet shelf) between meals - I prepare fruits and vegetables in a way that is easily eatable (e.g., bite sized pieces) between meals - I try to eat meals and snacks with my child at the dinner table throughout the week - I offer fruits and vegetables to my child in a friendly tone of voice - I verbally praise my child when they eat a fruit or vegetables Please indicate the extent to which you use any of the following sensory behaviors to engage your child: - Encourage repeated tasting of a vegetable in the same week
	Parents will be able to identify at least 1 sensory-based or SAM-based engagement strategy for motivating their child to eat more vegetables during serving	Please indicate your level of agreement with the following statements: - I know at least 5 strategies to make vegetables more appealing to my child Please indicate your level of agreement with the following statements - I know how to talk to my children about vegetables outside of mealtimes - I intend to use language (dialogue) and literacy (books, storytelling, poetry) to help my child eat more vegetables - I intend to talk to my children about vegetables outside of mealtimes - I understand that conversations about vegetables is a way to expose my child to the concept of eating vegetables
Knowledge & Skills (Behavioral Skills)	Parents will be able to prepare easy, tasty, healthy, and inexpensive recipes containing vegetables that are appealing to their children	Please indicate your level of agreement with the following statements: - I have the cooking skills to prepare, cook, and serve vegetables to my child - I was able to serve vegetables to my child in a way that was appealing to them at least 3 times this week Please answer the following questions: - How many DAYS this week did you serve your child vegetables? - How many different KINDS of vegetables did you serve your child this past week? - How many TIMES in the past week did you serve your child red, orange, or yellow vegetables? -How many TIMES in the past week did you serve your child dark green leafy vegetables?
	Parents will be able to use various sensory-based or SAM-based engagement strategies to get their children excited about vegetables	Please indicate the extent to which you use any of the following sensory behaviors to engage your child: - Ask my child to listen to and call the name of a vegetable - Ask my child to listen to a vegetable story or song - Ask my child to tap a vegetable and hear the sound - Ask my child to listen to the sound when biting and chewing the vegetable - Ask my child to look at pictures of a vegetable - Ask my child to visually explore the vegetable in different forms (e.g., whole, peeled, chopped, cooked) - Ask my child to smell the vegetable when it is whole, chopped up, or cooked - Ask my child to smell the vegetable after it is chopped up - Ask my child to feel the different textures with hands (e.g., when grated, spiralized, sliced, cooked, etc.) - Ask my child to feel the vegetable in the mouth when chewing - Ask my child to taste a small piece/bite of a vegetable

Table 4. Description of Survey Instrumentation

Description of Survey Instrumentation		
Name of Survey Tool	**Description of Survey Tool**	**Link to Supporting Paper + Citation**
Food Attitudes and Behaviors (FAB) Survey	The Food Attitudes and Behaviors (FAB) Survey is a 65-item tool that was developed by the National Cancer Institute (NCI) with the purpose of evaluating the various factors that influence fruit and vegetable intake in adults. The survey measures 8 topics including: attitudes and behaviors, purchasing, fruit and vegetable intake, eating behaviors, food preferences, physical activity, sedentary behaviors, and general health. The survey addresses the psychosocial constructs of self-efficacy, perceived barriers, social support, and F/V knowledge related to intake recommendations. The survey was tested in adults (n=579). Prior to pilot testing, the survey's content validity was reviewed by a panel of nutrition and health behavior experts. Reliability (internal consistency) of the questions on perceived barriers was demonstrated by a Cronbach's alpha = 0.85.	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4338082/ Erinosho TO, Pinard CA, Nebeling LC, et al. Development and implementation of the National Cancer Institute's Food Attitudes and Behaviors Survey to assess correlates of fruit and vegetable intake in adults. PLoS One. 2015;10(2):e0115017. Published 2015 Feb 23. doi:10.1371/journal.pone.0115017
Self-Efficacy for Vegetable Intake Expanded & Abbreviated Scales	The Self-Efficacy for Vegetable Intake Expanded and Abbreviated 43-item Scale was developed by researchers at the Children's Nutrition Research Center in the Department of Pediatrics at Baylor College of Medicine in Houston, TX as well as the University of North Carolina, Chapel Hill. The scale was tested using n = 743 6^{th} grade students in Houston, California, Pennsylvania, Oregon, North Carolina, and Texas who completed food frequency questionnaires, 24-hour dietary recalls, and anthropometric measures. The reliability and validity indicators for the survey was low, but comparable to other similar surveys.	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3099465/ Baranowski T, Watson KB, Bachman C, et al. Self efficacy for fruit, vegetable and water intakes: Expanded and abbreviated scales from item response modeling analyses. Int J Behav Nutr Phys Act. 2010;7:25. Published 2010 Mar 29. doi:10.1186/1479-5868-7-25
STEAM4U Questionnaire	The STEAM4U questionnaire was developed by a group of European stakeholders supported by the European Commission's Erasmus+ EU program to support education and youth in Europe. The survey was based off of an assortment of studies including those by Bandura (2000), Baldwin (1999), DeWitt(2011), Obra Social (2015), and the National Research Council (2012) as well as many others (listed below). It is unknown if this tool has been tested for reliability and validity.	http://steam4u.eu/wp-content/uploads/2017/10/Parents_Quest-1.pd
The Parental Self-Efficacy for Healthy Dietary and Physical Activity Behaviors in Preschoolers Scale (PDAP)	The Parental Self-Efficacy for Healthy Dietary and Physical Activity Behaviors in Preschoolers Scale (PDAP) was developed by researchers in the Department of Clinical Neuroscience at the Karolinska Institutet as well as the Stockholm County Council in Stockholm, Sweden with the purpose of	https://pubmed.ncbi.nlm.nih.gov/27765049/ Bohman B, Rasmussen F, Ghaderi A. Development and psychometric evaluation of a context-based parental self-efficacy instrument for healthy dietary and physical activity behaviors in preschool children. Int J Behav Nutr Phys Act. 2016;13(1):110. Published 2016 Oct 20. doi:10.1186/s12966-016-0438-y

	measuring parental self-efficacy in facilitating healthy dietary and physical activity behaviors in children. The tool was tested via interviews of n=27, with a total of n=698 Swedish mothers completing the survey. The total scale's internal consistency had a Cronbach's alpha of 0.94. Overall, the scale's construct validity and internal consistency were demonstrated to be adequate.	
General Nutrition Knowledge Questionnaire (GNKQ-R)	The General Nutrition Knowledge Questionnaire (GNKQ) was developed in 1994 by researchers in the Department of Epidemiology and Public Health at the University College London with the purpose of measuring nutrition knowledge of adults living in the UK. The survey was revised to be 88 items and re-evaluated. The survey measures topics such: as expert recommendations, nutritional value of foods, choosing healthy foods and food labels, diet and weight related health problems and management. Reliability (n=266), construct validity (n=96, n=89), and sensitivity to change (n=65, n=41) were assessed. Results showed that the reliability exceeded 0.7 for all survey sections with overall reliability having a Cronbach's alpha of 0.93. The survey was shown to be consistent, reliable, valid, and sensitive to change.	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5014128/#sup1 Kliemann N, Wardle J, Johnson F, Croker H. Reliability and validity of a revised version of the General Nutrition Knowledge Questionnaire. Eur J Clin Nutr. 2016;70(10):1174-1180. doi:10.1038/ejcn.2016.87
Fruit Vegetable Purchasing Outcome Expectancies (FVPOE) Scale	The Fruit and Vegetable Purchasing Outcome Expectancies (FVPOE) Scale was developed by researchers at the Children's Nutrition Research Center in the Department of Pediatrics at Baylor College of Medicine in Houston, TX with the purpose of measuring adult outcome expectancies (costs, benefits, reasons, motivating factors) for purchasing fruit and vegetables. The survey measures topics such as social desirability and home availability of F/V. The tool was tested via telephone interviews in n=261 adult food shoppers with children. Cronbach's alpha was 0.72 for the vegetable purchasing outcome expectancies section and test-retest reliability was 0.71.	https://pubmed.ncbi.nlm.nih.gov/17288626/ Baranowski T, Watson K, Missaghian M, et al. Parent outcome expectancies for purchasing fruit and vegetables: a validation. Public Health Nutr. 2007;10(3):280-291. doi:10.1017/S1368980007382499
Model of Goal Directed Vegetable Parenting Practices (MGDVPP)	The Model of Goal Directed Vegetable Parenting Practices (MGDVPP) tool was developed by researchers at the Children's Nutrition Research Center in the Department of Pediatrics at Baylor College of Medicine in Houston, TX with the purpose of evaluating parenting practices related to encouraging vegetable intake in preschool children. The tool was evaluated `by n=307 parents of preschool children who took an internet survey. Cronbach's alpha = 0.72 for the section on Attitudes.	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3848744/ Baranowski T, Beltran A, Chen TA, et al. Psychometric assessment of scales for a Model of Goal Directed Vegetable Parenting Practices (MGDVPP). Int J Behav Nutr Phys Act. 2013;10:110. Published 2013 Sep 22. doi:10.1186/1479-5868-10-110
Child Feeding Questionnaire (CFQ)	The Child Feeding Questionnaire (CFQ) was developed by researchers in the Department of Human Development and Family Studies and Graduate Program in Nutritoin at Pennsylvania State University in 2001 with the	https://pubmed.ncbi.nlm.nih.gov/11358344/ Birch LL, Fisher JO, Grimm-Thomas K, Markey CN, Sawyer R, Johnson SL. Confirmatory factor analysis of the Child Feeding Questionnaire: a measure of parental attitudes, beliefs and practices

	purpose of measuring parental beliefs, attitudes, and practices for child feeding in children aged 2-11 years. Topics included parental concerns about parental perceived weight, perceived child weight, perceived parental responsibilities, use of restriction, pressuring children to eat, and food monitoring. Two samples of n = 394 mothers and fathers and n = 148 mothers and fathers were surveyed. The instrument was found to have internal consistencies exceeding 0.70 and high validity.	about child feeding and obesity proneness. Appetite. 2001;36(3):201-210. doi:10.1006/appe.2001.0398
HomeSTEAD Family Food Practices Scale	The Home Self-Administered Tool for Environmental Assessment of Activity and Diet (HomeSTEAD) survey was a 61 item survey developed by researchers at the Center for Psychology at the University of Porto in Portugal with the aim of measuring food parenting behaviors of parents of young children ages 3-12 years. Topics include parental use of autonomy, control, support, and structure. The survey was tested by n=184 parents of children aged 3-12 who completed the questionnaire. Internal consistency (Cronbach's Alpha = 0.67-0.81, 0.62-0.73, 0.61-0.94 for all subscales respectively) was found to be moderate. Construct validity, measured by Pearson's correlation coefficient, was found to be weak to moderate.	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8314235/ Afonso L, Castro J, Parente N, Torres S. A Comprehensive Assessment of Food Parenting Practices: Psychometric Properties of the Portuguese Version of the HomeSTEAD Family Food Practices Survey and Associations with Children's Weight and Food Intake. Eur J Investig Health Psychol Educ. 2020;10(1):424-440. Published 2020 Feb 5. doi:10.3390/ejihpe10010032
Ready Set Action! (RSA) Survey	The Ready Set Action (RSA) Survey was developed by researchers at the University of Minnesota as well as Harvard Medical School's Department of Ambulatory Care and Prevention and supported by a grant from the National Institute of Diabetes and Digestive and Kidney Diseases and the NIH with the purpose of assessing both parent and child perceptions of the relationship between home food environment and child F/V intake. Topics included F/V availability in the home, accessibility of F/V in home, parental encouragement to consume F/V, family meal frequency, F/V intake, and parent relationship to child. The tool was tested through phone/mail surveys in n=73 parents from schools with primarily low-income students in Minnesota. The scale was developed based on existing instruments such as the PROJECT EAT survey and the Youth Adolescent Food Frequency Questionnaire. The tool was also pilot tested with 4^{th} to 6^{th} grade students for clarity and completion time. Validity and internal consistency/reliability were not assessed.	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2770898/ Robinson-O'Brien R, Neumark-Sztainer D, Hannan PJ, Burgess-Champoux T, Haines J. Fruits and vegetables at home: child and parent perceptions. J Nutr Educ Behav. 2009;41(5):360-364. doi:10.1016/j.jneb.2008.08.003
Food and Nutrition Literacy (FNL) Scale	The Food and Nutrition Literacy (FNL) scale is a 62-item questionnaire that was developed by researchers in the Department of Community Nutrition at the University of Tehran as well as the Department of Nutrition Research at the National Nutrition and Food Technology Research Institute in Iran	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5487019/ Doustmohammadian A, Omidvar N, Keshavarz-Mohammadi N, Abdollahi M, Amini M, Eini-Zinab H. Developing and validating a scale to measure Food and Nutrition Literacy (FNLIT) in elementary school children in Iran. PLoS One. 2017;12(6):e0179196. Published 2017 Jun 27. doi:10.1371/journal.pone.0179196

	with the goal of measuring food and nutrition literacy in elementary aged children in Tehran. An expert panel evaluated the questionnaire for content and face validity, while Explanatory Factor Analysis and Confirmatory Factor Analysis was used to evaluate construct validity. Content validity was found to be acceptable (CVR = 0.87 and CVI = 0.92). The majority of subscales exhibited internal consistency with Cronbach's alpha exceeding 0.70 for all scales except for 1. The intraclass coefficient (ICC=0.90) showed excellent reliability.	
EFNEP's Dietary Behavior Evaluation	The Expanded Food and Nutrition Education Program's Dietary Behavior Evaluation tool was developed by USDA-EFNEP researchers with the purpose of evaluating adult behaviors pre and post educational interventions. The survey measures 5 topics including: diet, physical activity, food safety, food security, and food resource management. The survey was tested through the use of interviews (n=111), expert panels, test/retest reliability assessments (n=181), and pre/post-tests (n=382). Intraclass correlation coefficients ranged between 0.48 and 0.77 which fall into the acceptable range of moderate to strong reliability. Spearman rank-order correlations were between 0.43 and 0.77, which fall into the moderate correlation range of 0.5-0.7. The results showed that the tool possessed adequate face and content validity, moderate to strong reliability and sensitivity to self-reported behavior changes in low-income diverse audiences.	https://pubmed.ncbi.nlm.nih.gov/32763052/ Murray EK, Baker SS, Betts NM, Hess A, Auld G. Development of a National Dietary Behaviors Questionnaire for EFNEP Adult Participants. J Nutr Educ Behav. 2020;52(12):1088-1099. doi:10.1016/j.jneb.2020.06.003
Dunn's Sensory Profile Scale + Dazeley and Price Nursery and Sensory Study	The Coulthard and Sealy study reported use of Dunn's Sensory Profile Scale, which is a questionnaire that was developed by Winnie Dunn in 2014 for parents and teachers to evaluate the sensory processing of children birth – 14 years. The scale has been tested multiple times for reliability and validity in different studies and was consistently found to be reliable and valid. In the Dazeley and Price study, n=92 children between 1-3 years of age were assigned to either a control or intervention group. The intervention group received exposure to smell, touch, hearing, and looking activities with unfamiliar F/V daily for 4 weeks. Follow-up meals showed that children in the intervention group touched and tasted more vegetables that they were exposed to earlier. The appendix of sensory activities was used to inform the questions for the current study. These are consistent with the principles outlined in the original paper by Dazeley.	https://pubmed.ncbi.nlm.nih.gov/25218879/ https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5829121/ Dazeley P, Houston-Price C. Exposure to foods' non-taste sensory properties. A nursery intervention to increase children's willingness to try fruit and vegetables. Appetite. 2015;84:1-6. doi:10.1016/j.appet.2014.08.040

Pilot Implementation

Intervention Recruitment

Participants of any ethnicity who met eligibility requirements were initially identified through the UGA Department of Nutritional Science's Childhood Obesity Prevention Laboratory's long-standing and existing partnerships with Head Start centers in Northeast Georgia as well as grantees in the metro Atlanta and Athens Clarke County regions. Following an onboarding meeting with Head Start center directors, family service advocates (FSAs) distributed e-mail invitations and electronic flyers (Appendix J) electronically to parents and caregivers on behalf of the research team. Participants were asked to complete an eligibility survey and read/sign the consent form via Qualtrics prior to enrollment. Once participants completed these tasks, the researchers contacted them via e-mail and phone regarding study procedures.

Intervention Structure

In this study, the pilot intervention consisted of a virtually-delivered nutrition class series that provides parents and caregivers with culinary skills, nutrition knowledge, and content-area-based preschool engagement strategies that are both culturally appropriate and sustainable. The overall curriculum was taught as a bi-weekly series of virtual zoom lessons for a duration of four weeks. Lesson plans and activities were based on a variety of sources such as the USDA MyPlate recommendations, the Dietary Guidelines for Americans 2020-2025, as well as the Georgia Early Learning Standards (GELDs), and Head Start's Early Learning Outcome Framework (ELOF). The researcher also tailored these elements to be culturally appropriate and address needs assessment findings. Recipes were adapted from those provided by Share Our

Strength's Cooking Matters initiative as well as EFNEP's cookbooks and will be reviewed by a sensory scientist (Appendix C). The curriculum included a series of eight lessons.
Each class consisted of a brief nutrition lesson and presentation for parents, a parent-child SAM activity (craft using science, art, and/or math), and a 30-minute live cooking demonstration. Parents were provided with groceries and child activity learning bags each week prior to each class. Lesson plans and activities focused on promoting vegetables. At the conclusion of the study, parents were e-mailed the e-gift card for their participation.

The intervention was composed of a series of eight 1-hr virtual Zoom sessions and lasted for a period of four weeks, with two classes delivered per week. This duration and dosage were selected based on previous studies in the literature that utilized 6–8-week interventions as well as considerations for participant retention and consistency/quality of the data. The sessions included a parent lesson as well as a demonstration time for a parent-child SAM activity. The remainder of the time was used for a virtual synchronous cooking demonstration of budget-friendly ($5=$7/meal) vegetable-based dishes focused on vegetables taught by a researcher in the lab. Attendance was taken for each class for inclusion in the process measure evaluation.

Grocery & SAM Box Delivery

Parents and caregivers were provided with children's activity Explorer Kits by Small Bites Adventure Club LLC which focuses on STEM (Appendix D) as well as groceries for the cooking demonstrations each week prior to each class. The boxes will be assembled, transported (in appropriate temperature-controlled storage containers with ice-packs), and delivered to participating Head Start centers by the researchers, where parents will be able to pick up their boxes during morning drop-off each week of the intervention. One day prior to grocery delivery, participants received an e-mail reminder to pick up their groceries and activity boxes at their designated head start drop-off center. The e-mail reminder contained food safety and storage instructions for perishable items, and a verbal reminder will be communicated to parents during grocery box transfer to ensure that parents practiced safe food handling and to minimize risk of food-borne contamination. Accommodations were provided for parents who were unable to store their groceries appropriately immediately after pick-up.

Survey Instrumentation and Data Collection

Pre and Post Intervention Surveys

Several days prior to the first-class session, participants were e-mailed a welcome e-mail packet containing an embedded link to an electronic baseline survey in Qualtrics (Appendix G). After the conclusion of the final class, participants were e-mailed a link to the post-survey in Qualtrics. The baseline and post survey were adapted from those previously developed and used in other published measures in the literature on NCCOR's (National Collaborative on Childhood Obesity Research) website which have been tested for validity, reliability, and internal consistency. The surveys were administered via Qualtrics and changes in participant knowledge, self-efficacy, and behaviors at baseline and post-intervention were measured. Following completion of the baseline survey, participants were exposed to the intervention. After the intervention, participants were asked to complete the electronic post survey. These surveys were used to assess any changes in the study measures and to collect data on participant acceptability of the curriculum. A brief interview survey was also administered to parents during the follow-up interview portion of the study (Appendix G).

Conducting Follow-Up Interviews

At least half of all parents who participated in the study were asked to conduct a follow-up interview with the researcher following the conclusion of the class. Parents and caregivers within our Head Start networks were sent a text and an e-mail containing interview instructions and a sign-up link using Calendly's scheduling system. The researcher ensured that the parent completed the eligibility survey, the pre-survey, and the post-survey, and attended at least 90% of the classes before sending out interview reminders. Eligible and interested parents were then invited to participate in a 1-hour Zoom interview which was recorded to the Zoom Cloud and then stored in a password protected device. An interview protocol, questionnaire, and accompanying prompts were developed with qualitative research experts prior to the interviews (see Appendix F).

Study Incentives

Participants completed a total of four surveys during the intervention. Once responses were recorded for each survey, parents were permitted to advance to the next part of the study. Participant attendance was recorded for each of the eight class sessions. Participants who missed more than one class were not eligible to participate in the post survey, interview survey, and the follow-up interview but were still permitted to attend the class. Participants received an $80 e-gift card for attending all class sessions and completing the four surveys. The total maximum amount a participant could receive in study participation was $80, not including the cost of groceries ($40 total for four budget-friendly cooking demonstrations) and activity kits ($25 per explorer kit).

Data Storage & Statistical Analysis

Following the intervention and participant completion of surveys, the survey responses were de-identified, assigned a numerical code, and stored in a password protected cloud folder to protect participant identities. Survey data was analyzed by the researchers using IBM®SPSS software v.27. Numbers were assigned to each individual's response to a question, and a non-parametric Wilcoxon signed rank tests and McNemar's test of symmetry was used to determine statistical differences between each individual's responses from pre to post-test. For the qualitative data on curriculum acceptability, an inductive thematic analysis within an essentialist/realist paradigm focusing on semantic themes was used (Braun and Clarke, 2006) to analyze the data using Atlas.ti22 software. A 5-phase protocol for training coders was implemented prior to and when coding the data using software. The protocol included an ethics training, a review of qualitative methods, review of the codebook (Appendix H), team coding, and individual coding. Atlas.ti22 was used to code all transcripts. At least 20% of the transcripts were double coded by another qualitative researcher, and all coding was overseen by a senior qualitative researcher.

Limitations of Study

Table 5. Limitations of Study

Limitations of Study		
	Challenge	**Solution**
1	Participant households may contain children of different ages and programming may not be suited for each age group.	The curriculum will need to be differentiated in a manner that is age-appropriate for all children in the household who are participating in the study. This may include providing strategies that are applicable to all children regardless of age or providing an assortment of strategies that parents can select from based on their children's ages. We will limit our findings to children aged 3-5.

2	Caregivers may not complete both surveys or dropout from the study in lieu of other obligations or unexpected events (e.g., illness) due to the extended duration of the study.	Monetary incentives as well as groceries will be provided for attending and participating in classes and completing electronic survey assessments to increase retention and attendance. Each participating family will receive an $80 gift card for participating in each of the classes, completing the surveys, and follow-up interview.
3	There is a dearth of validated instruments (curricula, surveys) possessing strong psychometric properties that have been used to assess the effects of SAM, STEM, and STEAM interventions on parental self-efficacy in serving fruit and vegetables to preschool children.	In order to ensure the rigor of the survey instrument's psychometric properties, we have adapted our surveys from existing studies that examine the impact of general nutrition curricula and programming on parental self-efficacy, using validated food behavior checklists. If time allows, we would ideally pre-test the survey items with a small sample similar to the primary audience undergoing the intervention using exploratory factor analysis, conducting reliability analysis, and using structural equation modeling to identify latent variables, and looking for evidence of construct validity (Creswell, 2015, p. 41).
4	The gold standard of experimental design is the use of randomized control trials to reduce sampling bias. In this study, we plan to employ purposive sampling which is a type of non-probability sampling for both the qualitative and quantitative components of this study. Furthermore, the study population is not random. It is limited to northeast GA and metro Atlanta due to the existing partnerships we have with Head Start centers in these areas. At present, given our previous experiences working with this population, we do not anticipate a large enough pool of	We justify our use of purposive sampling in the sense that the purpose of the study is intended to assess the needs and impact of intervention on this particular primary audience. We are purposively selecting participants who can best help understand the phenomenon we are investigating. Thus, it is advantageous that only participants who meet the predetermined eligibility criteria will be permitted to participate in the study. Given that one aspect of the study is to investigate variables in Georgian residents and given the preliminary/exploratory nature of this pilot study, we feel that it is adequate to begin data collection specific to the geographical regions that encompass recruitment sites. We may of course, still take a random sample from an initial pool of participants who meet predetermined criteria. If a larger participant pool becomes available during the course of the study, the researchers will consider either utilizing maximal variation sampling (selecting individuals who differ within the constraints of eligibility in order to enhance representation), or randomizing sample participants who meet the eligibility criteria to a control group and an intervention group.

	participants to be available for random sampling. This may cause the results to not be generalizable to all Head Start parents of young children located in the entire state of Georgia.	
5	The sample size and population for the qualitative component will differ from that of the quantitative component.	Since the main purpose of the design is to develop a new intervention and not to use the quantitative data to determine whether the qualitative data can be generalized to a larger sample, the sample size can differ between the first and final stage of the exploratory sequential design (Creswell, 2015, p. 81).
6	How can we take qualitative data and use it to construct a quantitative instrument for use in the intervention?	The qualitative data will yield verbatim quotes from participants, which will be condensed into codes, which will be compiled into themes which will be transformed into measures or variables. For example, the quotes can represent items, the codes can represent variables, and the themes can represent scales.

CHAPTER 4

HEAD START PARENT PERCEPTIONS ABOUT BARRIERS, FACILITATORS, EXISTING PRACTICES, AND PREFERRED SUPPORTS FOR SERVING VEGETABLES TO YOUNG CHILDREN IN THE HOME[1]

[1] Shieh, J.G., Stage, V.C., Gallo, S., Cox, G., Laing, E., Cotwright, C.J. To be submitted to the *Journal of Public Health Nutrition*.

Abstract

The development of healthy dietary patterns during early childhood is critical in preventing the development of nutrition-related diseases such as obesity and diabetes in later life. As the nutrition gatekeepers for their families, parents play a critical role in facilitating vegetable intake in young children. Development of interventions that support parental practices of serving vegetables require a comprehensive understanding of the factors and relationships among those factors that affect parental behaviors related to serving vegetables. Thus, the purpose of this study was to assess parents' perceptions of barriers and facilitators to serving their children vegetables, how parents serve their children vegetables, as well as what resources parents prefer for serving vegetables to their children. Researchers conducted twenty-eight (n=28) individual semi-structured interviews with parents of young children residing in northeast, Georgia. Eligibility criteria included being a parent of ≥ 1 child aged 2-5 years enrolled in a Head Start program in Georgia and having an annual household income ≤$20,000. Following qualitative data analysis, three major themes emerged: 1) Parents described a negative feedback loop including financial (money) and temporal (time) resource limitations, and child taste preferences (food pickiness and neophobia) as the primary barrier to serving their children more fruit and vegetables. 2) The existing facilitators of serving fruit and vegetables are primarily parent-mediated and include the use of behavioral supports (e.g., modelling, repeated exposure, bribery, reinforcements), and various engagement strategies (e.g., food preparation tactics to increase appeal, performing arts, simple math exercises). 3) Preferred facilitators of serving fruit and vegetables include informational resources for enhancing knowledge and skills (cooking skills, child engagement, and resource management). The findings from this study indicate that parent-focused interventions should provide parents with facilitators that will scaffold personal and

behavioral determinants of behavior change such as parental self-efficacy and behavioral capability in the form of knowledge and skills, rather than just external physical resources such as money and food.

Introduction

Childhood obesity continues to affect millions of children and adolescents in the U.S., increasing the risk for developing nutrition-related comorbidities. Currently, the national child obesity rate for children aged 2-5 years hovers at 13.4% and for adolescents ages 6-11 at 20.3% (State of Childhood Obesity.org). In the state of Georgia, 13.6% of children aged 2-5 years and 18% of youth aged 10-17 years are obese, with the majority of this percentage being children from low-income Black or Hispanic families (CDC).

One natural area of interest in the meshwork of obesogenic agents is the suite of nutrition attitudes and practices exhibited by parents of young children in the U.S. (Ayine et al., 2020; Russell et al., 2018; Wolfson et al., 2015; Ek et al., 2016). Given the generational nature of obesity and the still-evolving eating habits and taste preferences of young children during early childhood, understanding and addressing the factors that influence parental feeding behaviors may be critical in halting the cycle of obesity (Lee et al., 2022; Classen & Thompson, 2016; Scaglioni et al., 2008). As nutrition gatekeepers for their families, parents and caregivers are instrumental in facilitating healthy eating habits among young children and, consequently preventing the potential development of chronic disease in later years (Jarman et al., 2022; Gago et al., 2022; Mahmood et al., 2021). However, attempts to persuade young children to consume nutrient-dense foods, like vegetables, may still be met with prolonged resistance, especially during early childhood years (Birch & Fisher, 1998; Johnson, 2016). In addition to child neophobia, parents themselves experience a host of personal and environmental barriers to serving their young children's healthy foods (Kim et al., 2019; Ling et al., 2016). The most frequently reported barriers to serving more vegetables include the cost of vegetables, the poor shelf life of fresh fruits and vegetables, lack of time to prepare, child pickiness, attempting to cater to multiple competing taste preferences, and lack of nutrition literacy (McManus et al., 2021; Millen et al., 2019; Nepper & Chai, 2017; Fisher & Dwyer, 2016; Storfer-Issof, 2015; Brown & Wenwrich, 2012; Fulkerson et al., 2011). Conversely, commonly reported facilitators included parental modelling, restricting food access; not serving previously rejected foods, and child excitement when involved in the cooking process (Millen et al., 2019; Russell et al., 2015; Goodell et al., 2017; Callender et al., 2020). Interventions that assessed parental preferences found that limited-resource parents desired nutrition classes centering on topics such as what vegetables to purchase, how to prepare them, and how to encourage their children to try, cooking classes focused on cooking healthy foods, and strategies for convincing toddlers to eat healthy food, as well as workshops that were tailored to meet specific needs (Slusser et al., 2011; Virudachalam et al., 2016; Luesse et al., 2018).

Although various studies have conducted reviews of parental barriers, facilitators, and preferences oftentimes yielding similar results, to date no studies have examined parental use of food experiences as backdrop opportunities for facilitating content-area learning of academic concepts such as science and math in young children within a home setting. Data regarding how parents integrate developmental and academic concepts into food experiences in the home is sparse. It is of value and interest to study this phenomenon since children possess natural information-seeking tendencies and behaviors during early childhood that present prime opportunities for assimilating new information and developing skills, behaviors, and ways of thinking that could potentially contribute to healthy eating habits in adolescence and adulthood. Such improvements in health and well-being could potentially lead to more opportunities for socioeconomic advancement as well as socio-ecological escape from an otherwise obesogenic environment (Jirout & Zimmerman, 2015; Ronfard et al., 2018).

In response to children's refusal to eat, researchers in the field have identified an assortment of best practices for feeding young children under the age of 5 years (Barends et al., 2019; Nekitsing et al., 2018). Among the suite of expert recommendations for feeding that have been studied, the most common and universally agreed upon best practice for introducing novel foods to young children is repeated exposures (Karragiannaki, 2021; Barends et al., 2019; Spill et al., 2019; Remi et al., 2013). This practice can take a variety of forms, such as familiarization through repeated offerings and tastings of novel foods during meal and snack times (Appleton et al., 2018; Karagiannaki et al., 2021; Fildes et al., 2014). Although implementation of direct routes for repeated exposure and offerings has yielded debatably modest improvements in vegetable consumption in clinical studies, the utility of these approaches is confined solely to improving nutritional intake and has limited benefits in other areas of child development such as executive functions, language acquisition, and problem solving and critical thinking skills which can function as indirect facilitators of healthy eating patterns in adulthood (Eichen et al., 2021; Belibağlı & Çelikkanat, 2019; Hodder et al., 2018; Qavam et al., 2015; Murawski et al., 2009). More indirect approaches to novel food exposure, such as incorporating sensory and food-based learning experiences during non-meal and snack times, are being investigated to target developmental and cognitive impacts on the whole child (Nekitsing et al., 2018). Such food-based learning experiences are often presented within and require a parent-directed contextual framework (Mura Paroche et al., 2017). For example, in a sensory-based food interaction, the parent may engage the child through visual observations of the appearance of a vegetable or group of vegetables. This exercise may involve asking the child to identify distinct colors, compare and contrast geometric forms and shapes, and describe visual changes in size when the vegetable is prepared (e.g., sliced, cooked,) or simply left out over time, all using verbal descriptions. In this simple exposure exercise, the food experience serves as a contextual vehicle for establishing familiarity with a novel vegetable as well as content-area concepts such as science, art, math, and literacy. There has been an emerging interest in the contextual use of language, literacy, art, math, and science as both backdrops and conduits for facilitating nutrition learning in the childcare and school environment and also vice versa (Basu & Nguyen, 2021; Owen et al., 2018; Sepp & Hoijer, 2016). The use of food as a framework for cultivating nutrition literacy and also academic learning is of value for several reasons. First, research has shown that learning occurs contextually (Piaget, 1926). Second, presenting nutritional concepts in the context of these content areas and also presenting content areas in the context of food experiences simultaneously facilitates nutrition learning as well as early cognitive development and potentially prepares children academically for concepts that will be introduced in kindergarten. Coincidentally, approaching exposure interactions within these integration contexts can potentially serve as the fundamental groundwork for academic readiness and socioeconomic mobility in an obesogenic environment. Currently, only a few studies have assessed the intersection of nutrition, food, and content-area learning in the classroom (Duffrin et al., 2010; Horowitz et al., 2004; Shilts et al., 2009; Hovland et al., 2013; Roseno et al., 2015; Carraway-Stage et al., 2015; Stage et al., 2018). Yet, no studies have examined their presence and use by parents in the home setting.

Therefore, given that parents experience a unique collection of baseline challenges and supports while encouraging fruit and vegetable intake, the first aim of this study was to identify parental perceptions about facilitators of and barriers to serving fruits and vegetables to young children in the home. To develop a culturally appropriate curriculum for parents of young children aged 3-5 years enrolled in Georgia Head Start programs, a needs assessment was conducted to inform curriculum design and implementation. The second aim of this study was to investigate changes in parental knowledge, skills, and self-efficacy before and after participation in a nutrition cooking class centering on engagement strategies involving science, art, and math (SAM) as well as sensory and food-based activities to introduce vegetables to their children. The third aim of this study was to assess parent acceptability of the program. Ultimately, the results of this study will be used to develop a culturally appropriate nutrition education curricula for parents of young children enrolled in Head Start and early childcare facilities in Northeast Georgia and metro Atlanta.

Methods

Study Design

This preliminary study was conducted as part of a larger exploratory sequential mixed methods study. Twenty-eight (n=28) individual semi-structured standardized interviews were conducted in English with parents of young children aged 2-5 years enrolled in Head Start programs as well as early care and education facilities located across Northeast, Georgia USA.

Study Recruitment

Interview participants were recruited through the University of Georgia's Childhood Obesity Prevention laboratory's existing partnerships with early childcare networks and Head Start grantees in Northeast Georgia, USA (Figure 1). An electronic flyer containing a description of the study along with a link to an eligibility survey were disseminated to a convenience sample of parents and caregivers (Appendix A). Eligibility criteria included: 1) being a parent of ≥ 1 child aged 2-5 enrolled in an early childcare program in Georgia and 2) having an annual household income ≤$20,000 3) having access to an internet connected device. Eligible parents were asked to provide informed consent prior to the interview.

Interview Data Collection

Parents were invited to participate in a one-hour in-depth interview over Zoom®. At the end of the interview, parents received a $15 electronic gift card for participating. Prior to the interviews, an interview protocol, questionnaire, and accompanying prompts (Appendix B) were developed with a team of trained qualitative research experts using the 5-phase protocol for training interviewers as outlined by Goodell, Stage, Cooke, 2016 to ensure rigor. All researchers involved in the interviews process completed an ethics training administered through the UGA Collaborative IRB Training Initiative (CITI). This study was approved by the Institutional Review Board at the University of Georgia.

Data Analysis

Following the interviews, the recorded audio transcripts were de-identified, stored in a password-protected cloud folder, and converted to verbatim text files using a professional transcription service. Interview transcripts were then imported into Atlas.ti Windows (Version 22.0.6.0)® software program for subsequent qualitative analysis. Prior to analysis, a coder training protocol modeled after the one proposed by Goodell, Stage, and Cooke, 2016 was implemented to ensure rigor. A codebook employing both a deductive and inductive thematic analysis within an essentialist/realist paradigm focusing on semantic themes was used (Braun and Clarke, 2006) to analyze the data. Deductive coding extrapolated pre-defined themes from the interview questionnaire, while inductive coding permitted the emergence of novel themes.

The data was double-coded by two researchers under the supervision of a third senior researcher with at least 20% of the transcripts being double-coded. Any discrepancies in coding were resolved prior to thematic analysis.

Results

Demographics

Twenty-eight parents participated in the interviews. All interview participants were female and ranged in age from 20 to 66 years. Over half of all participants identified as Black/African American (71%), with the remaining participants identifying as Hispanic/Latino (14%) or white (14%).

Table 1.1. Needs Assessment Demographic Data

Demographic Variables	**n (%)**
Gender	
Female	28 (100%)
Male	0 (0%)
Race	
Black or African American	20 (71.4%)
Hispanic or Latino	4 (14.3%)
White	4 (14.3%)
Age of Parent	
20-29 years	6 (21.4%)
30-39 years	13 (46.4%)
40-49 years	5 (17.8%)
≥ 50 years	4 (14.2%)
Annual Household Income	
< $20,000	9 (32.1%)
$20,000 - $50,000	19 (67.8%)
Education Level	
High school degree or equivalent (GED)	17 (60.7%)
Some college but no degree	4 (14.2%)
Associate degree	3 (10.7%)
Bachelor's degree	4 (14.2%)

Qualitative Findings

Three overarching themes were extracted from the qualitative data. First, parents perceive the interplay between resource limitations and child taste preferences as the primary barrier to serving their children more fruit and vegetables. Second, the existing facilitators of serving fruit and vegetables are primarily caregiver-mediated with scaffolding from community-based resources. Third, preferred facilitators of serving fruit and vegetables should be centered on enhancing internal personal factors such as parental self-efficacy, knowledge, and skills. These three themes are described in more detail below, and representative quotations are provided.

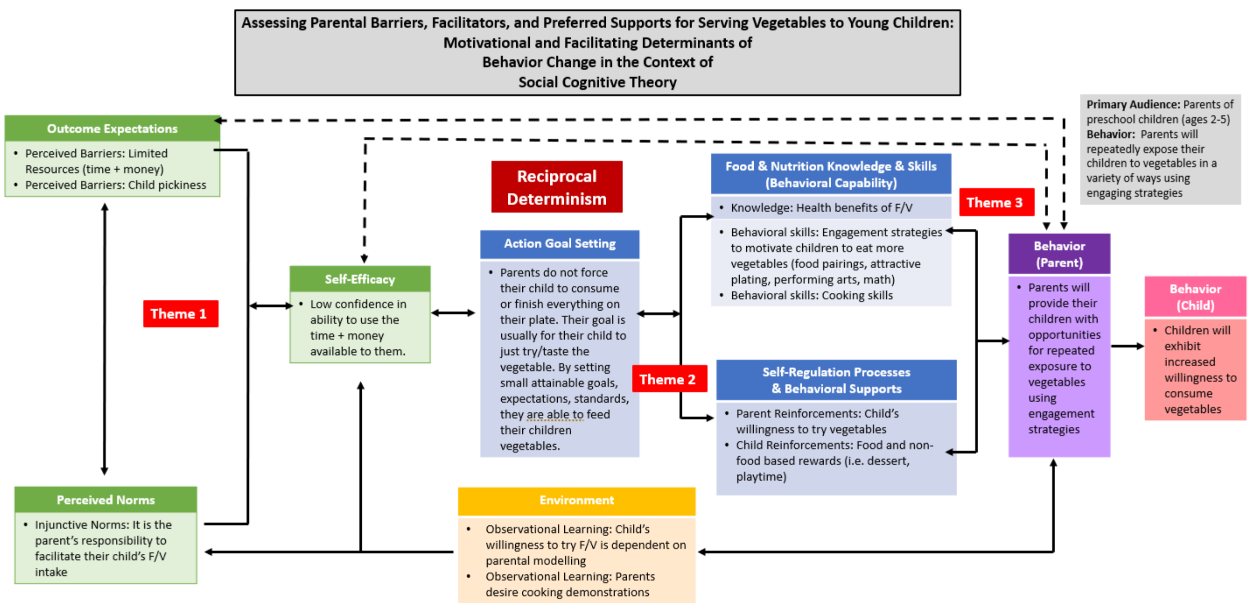


Figure 1.1. Aligned Model of Motivational and Facilitating Determinants of Parent Vegetable Serving Practices and Child Vegetable Consumption in the Context of Social Cognitive Theory

Theme 1: Parents described a negative feedback loop between resource limitations and child taste preferences as the primary barrier to serving their children more fruit and vegetables. Many parents reported that the primary barriers to serving their children vegetables was resource limitation in the form of money and time, which are secondarily compounded by child taste preferences and refusal to eat. For example, two parents expressed:

"Um budgeting…I'll cook something and then she might not want it that night or refuse eat it. And then it kind of goes to waste then…I usually try to buy fruits that are on sale. Um, but I know price is kinda, um, a limit for me."

"Definitely lack of time or energy. I'm in the kitchen a lot because they all have different preferences. And so I find myself cooking two or three meals sometimes, or just having to make snacks back to back to back, and that becomes really frustrating."

Theme 2: The existing facilitators of serving fruit and vegetables are primarily caregiver-mediated. Parents identified caregiver-centered feeding practices as the primary existing supports that they rely on to facilitate consumption when serving vegetables to their children. These include parental modelling and parents establishing realistic goals and expectations for their children's vegetable intake during mealtimes.

Most parents understood the importance of observational learning in facilitating vegetable intake, stating:

" Yes. So, yes, anyway, I try to mimic certain stuff that he doesn't like and say, "Well, it's good for mommy, so if it's good for me, it's good for you." And then, once he sees me eat

it, he's going to eat it, because he like, "Okay, she's eating it, so it must be good. If you don't eat it, then don't be like... why you want me to eat it?"

"I honestly, I think it's like a hundred percent comes from home. Because they see me eating fruits and vegetables and I think that's what helps them is like, "Okay, well mommy eats it." And at school, there are some kids where they're going to see them not eating them or saying yuck to it and yeah. Hmm. So I think it starts at home."

Parents indicated that often times, their expectations are simply that their children would try or taste the vegetable. Many parents expressed that they typically do not require their children to finish all the vegetables that are served and that they derive satisfaction simply from their child's willingness to try. For example, parents expressed:

"Strategy is just to tell them to taste it. I'll tell them, "I'm not going to give you a lot. Just taste it." For instance, like I said about squash. The smallest piece, when you cut it, it's about that big. I'll take it, cut it in half. All I want them to do is taste."

"So of course my rule is at least try it and that's how we overcome those challenges by me getting her to at least try a little bit. And sometimes I win and then sometimes I don't…"

In addition to these practices, parents also rely on other behavioral supports. First, parents often feel that they need to engage in use of bribery as well as positive and negative reinforcements such as food and non-food-based rewards. For example, parents reported that:

> *“Well, I do give them stickers sometimes…He loves his tablet, so that's one of the things I use, like, "Hey, you can't do tablet time until you eat your vegetables." He don't even say anything because he going to want to get on that tablet. I try to maneuver and give…something that he can be like, "Okay, if I do this, mama going to let me do this, so let me do this and eat this so I can do that.”*

Second, the majority of parents reported increasing physical accessibility of both fruits and vegetables through visible placement in or on reachable shelves, cabinets, refrigerator drawers, counters, or tables

> *“I keep them in the fridge and of course my five year old and my four year old just open up the fridge and then if their brother, who's 19 months, sees them and that they have something, then he goes to the fridge and so I'm like, "Okay, what do you want?" So I'll put him in his high chair and he'll snack on whatever they have…”*

Third, parents also rely on flavor-flavor pairing methods of increasing vegetable appeal. One common pairing was cheese and broccoli or carrots and ranch. For example, one parent described:

“So, I started researching stuff, to understand how you can put cheese on broccoli or how you make the carrots just a little sweet. Not too sweet, but just a little bit, like put a little brown sugar in them maybe. He'll eat them. When I started doing that, he was eating them.”

Fourth, parents also make attempts to increase the appeal of vegetables during presentation, with many parents relying on attractive plating and cutting methods that appeal to child preferences for texture, aroma, and visual appearance. For example, parents reported:

“I think I just try to make it fun. Sometimes you can cut grapes up to look like a dinosaur or different types of... So I try to make it fun. If I can get some apple slices and some oranges and cut them in funny little positions and then put them in the plate like that. And I'm like, "Roar, you're going to eat the dinosaur!" And they're like, "Ooh!" Stuff like that.”

Fifth, many parents reported using performing arts in the form of music, singing, coloring, or dance to engage their children in eating vegetables. Additionally, parents also reported incorporating simple mathematics in the form of counting (e.g., how many grapes are in the bowl) and relative proportion (e.g., more vs. less). For example, parents described the following:

“Definitely use math. For my daughter, she's three, but I always talk to her and say, "All right, if I cut the strawberry in half, how many strawberries do I have?" And she'll say,

"Two. I got two strawberries." Or my son, he loves his apples. So once I cut them up, I'm like, "Do you know how many you have?" And he'll count them and touch them. I think mostly math. Sometimes we'll sing songs, like the Super Simple Silly Songs I was telling you about earlier. When we're talking about broccoli or sometimes we'll make our own up."

"Let's see with art. I'll sometimes print out pictures of different vegetables before they eat it and I'll be like, "Oh, do you want to try apples today?" Then he'll probably be like, no, not today. And I'll say, "Let's color a few. What color do you want them to be?" Then I'll go, if he say he likes green apples or something, I'll get green and yellow apples. And then he'll be like, "Oh, yellow apple." Then he'll eat it. He'll feel like, "I just made that apple."

When asked about additional resources that parents rely on to serve their children more vegetables, parents mentioned community-centered human resources such as the child's school, pediatricians, family members, and peer/friend networks. For example, one parent mentioned:

"So the head start program that he attends...they provide a lot of resource. There's also daily, or monthly rather, classes, just little sessions that give you information about different meals, healthy meals, and how to take more concern and pay attention to reading the labels of the things that you're purchasing for you and your children to eat. So I feel the school has provided a lot of the resources because I didn't have a lot of

resources prior to that. I did see nutritionists throughout their first few years, through the WIC program, but that was the only resource that I had."

"Um, definitely speaking with other parents of kids, um, at the same age are, is very useful."

Theme 3: Preferred facilitators of serving fruit and vegetables should be centered on enhancing internal personal factors such as parental self-efficacy related to behavioral capability (knowledge and skills).

Parents reported that even though the majority of their conversations about fruit and vegetables with their children center on health benefits, they need more knowledge on the nutritional benefits of fruit and vegetables. For example, on parent indicated:

"I think if I had a toolbox, what I would want it to include is of course, brochures and pamphlets about fruits and vegetables and the benefits that they have on the body. I would want it to include just more information than what's been given out... Because for the most part, when you learn about fruits and vegetables, is just like the basics, but they never say, hey, these are the best fruits, all fruit is good fruit, but some fruits provide more benefits than some than others. Some have more sugar than others. So just knowing which fruit is best for you or just best in general."

In addition to knowledge-centered resources, parents also expressed a desire for skills-based resources such as engagement skills as well as cooking classes and recipes. For example, parents expressed the following:

> *"I would say more tips on the best way to get your kids to eat. Because like I said, my two-year-old will eat anything. I don't have a problem with him, just my five-year-old. So I could definitely use more tips on feeding, how to get your child not to think that everything is nasty…"*

> *"So I was like, so if someone could come in and teach us about how to prepare meals, all around, but in a healthy way, well family friendly way, I should say. That would be helpful."*

Discussion

Overall, three key themes emerged from the parent interviews. The first theme that emerged is that parents perceive a negative feedback loop between resource limitations and child taste preferences as the primary challenge to serving their children fruit and vegetables. The second theme that emerged is that parent perceptions of existing facilitators for serving fruit and vegetables to children are primarily parent-mediated and are scaffolded by external support from community resources. The third theme that emerged is that parents' preferred supports for serving fruit and vegetables involve resources for bolstering parental self-efficacy and behavioral capability.

In this study, parents were asked to identify parent-centered barriers as well as child-centered barriers to serving fruit and vegetables to their children. Parents mentioned a variety of parent-centered barriers including: the parent's own bad eating habits, lack of knowledge, lack of skills, lack of energy and motivation, pregnancy, produce availability at the grocery store, time, and money. Out of this assortment of obstacles, the primary barriers that parents reported were financial (limited money) and temporal (limited time) constraints. These findings are consistent with those of other needs assessment studies which have reported limited time and cost constraints as one of the most common parent-cited barriers to implementation of healthy feeding behaviors (Ravikumar et al., 2022; Shonkoff et al., 2020; Nepper & Chai, 2016). When asked about child-centered challenges to serving vegetables, parents identified the following: child allergies (e.g., lactose-intolerance), child disorders (e.g., autism), child's imitation of influencers at daycare or school (e.g., peer pressure), child's engagement in meal and snack time distractions (e.g., TV, electronics), child's lack of understanding reasons for consuming fruit and vegetables (e.g., not understanding the benefits), child's inability to resist enticement of unhealthy foods with high availability and accessibility. Of all these impediments, food neophobia, particularly child taste preferences related to visual appearance, aroma, texture, food preparation method (e.g., warm vs. cold, raw vs. cooked) of vegetables, as well as appetite and mood were the primary hindrances to not only consumption but also parental serving practices. The challenge of picky eating is consistent with findings from a study which conducted focus groups of Head Start parents to understand parent perceived feeding practices (Hoerr et al., 2005). In that study, parents reported that food selection for meals and snacks was typically dictated by their children. Interestingly, many parents did not describe monetary/temporal limitations and child pickiness as isolated barriers, but rather as deeply interconnected issues that self-perpetuate the cycle of resource limitation and refusal to eat. Interview analysis showed that parents perceive that limited money and time are further compounded by child pickiness. Parents described frustration regarding instances of child refusal to eat, citing that pickiness wastes money and time expended in preparing vegetables that are either refused by the child or needed for purchasing vegetables in the future. This reveals that parents not only experience the interplay among lack of money, lack of time, and child pickiness in this negative feedback loop but may feel poorly equipped to halt it.

In contrast to barriers, parents were also asked to identify existing facilitators of vegetable serving practices. Parents reported reliance on an assortment of supports and strategies for serving vegetables to their children including vouchers, food stamps, EBT, WIC, meal-planning, meal-prepping, use of time-saving cookware (e.g., crockpots, Instant Pot), gardening tips, idea-sharing platforms (e.g., YouTube, blogs), MyPlate, and school-provided print materials (e.g., pamphlets, brochures). Interestingly, the primary facilitator that parents identified were parent-centered feeding practices and strategies that emphasize behavioral supports implemented by the parents themselves during meal and snack times. These include parental modeling (e.g., child mimicking parent dietary patterns) and establishing realistic goals and expectations for their children's vegetable intake during mealtimes (e.g., expectation to try but no expectation to finish all vegetables served). These findings are significant since they reveal that parents are actively implementing and endorsing positive feeding strategies and practices such as parental modeling of healthy eating. Regression analysis has shown that children of parents who had higher healthy modeling scores had greater HEI scores compared to those of parents with lower modelling scores (Vaughn et al., 2018). Interestingly, healthy modelling was determined to be more associated with child diet quality than parental dietary intake (Vaughn et al., 2018). This is significant, since many parents expressed that they desired for their children to develop healthy eating practices despite discouragement from not being able to change their own eating behaviors. Ideally, improvements in both parental and child dietary intake are desirable; however, parental concern for their children's health and the strategies they undertake to ensure positive health outcomes for their child represent a unique source of motivational leverage that nutrition researchers can capitalize on to promote initial parent-mediated improvements in child diet quality. Furthermore, parents also revealed reliance on an array of behavioral supports such as use of bribery and negative and positive reinforcements (e.g., sticker charts, no playtime, food-based rewards like desserts or candy, verbal encouragement), as well as increasing availability, accessibility, and visibility of F/V through placement in reachable locations (e.g., lower shelves, on tables, refrigerator pullout drawers).

These findings represent key areas that nutrition researchers can focus on when providing caveats for healthy feeding. The association between use of food-based reinforcements and child overeating has been found to be mediated by child self-regulation; children who receive rewards for eating exhibit lower ability to regulate intake and can lead to overconsumption (Powell et al., 2017). Educating parents on these relationships can have potential to not only improve child diet quality but may have positive spillover benefits into other arenas of concerns such as emotion-driven disordered eating. Regarding the findings on food environment, although parents reported practices that increase availability and accessibility of healthy food, the role of child preference in moderating their food environments and practices was unclear. In other studies, parents have described management of the home food environment as an ongoing negotiation that is strongly influenced by child-centered influences and development (Nowicka et al., 2021).

In addition to behavioral supports, parents also reported reliance on child engagement strategies to increase vegetable appeal. These strategies include flavor-flavor pairing (e.g., pairing cheese with broccoli) and also making presentation of vegetables appealing (e.g., cutting vegetables into smaller pieces, fun shapes, plating and visual appearance). When parents were asked about their integration of math, science, or art into these strategies, the majority of parents reported using some aspect of performing arts (e.g., singing, dancing) to engage their children and also simple mathematics exercises (e.g., counting, comparing, measuring) during meal and snack times. Some of the existing arts-based strategies that parents reported using represent novel anchor points for informally introducing intermittent times of acute and sustained physical activity throughout the day. An analysis of performing arts participation by children, adolescents, and adults across more than 10 health domains revealed that exercise-based dance modalities were associated with the greatest health benefits (McCrary et al., 2021). However, there have been limited studies on the use of other types of artistic domains such as coloring or drawing to facilitate improved nutritional outcomes. More research on the link between art-based strategies and their ability to promote positive nutritional outcomes is needed to help parents take advantage of current art-related activities that they perform with their children in the home.

To a lesser degree, parents also mentioned environmental support from community-based resources such as the child's daycare/school, pediatricians, family members, and peer/friend networks. However, from the data, it is evident that the majority of existing supports reported by parents appear to be predominantly parent-mediated. This data reveals that not only do parents assume much of the accountability and burden of serving vegetables to their children and perceive the practice/behaviors of vegetable serving and intake to be modifiable, but that they rely on and implement such facilitators themselves to directly facilitate vegetable intake. To confirm this, when asked what role they feel they play in their child's vegetable consumption patterns, many parents expressed that they felt that they played some if not a large role in conjunction with the child's school or daycare program. This indicates that parents generally possess a high internal locus of control concerning responsibility and accountability for their children's eating patterns. Overall data analysis detected very little parental attribution of unhealthy eating behaviors to external sources such as school or daycare feeding practices, food advertisements and marketing, or child peer-pressure from friends. This demonstrates that parents see themselves as the primary point of influence for their children, although it is not clear if these beliefs arise primarily from descriptive norms or injunctive norms. Regardless, given that parental empowerment has been shown to be an effective intervention strategy for healthier parenting behaviors, this provides a strong foundation to build upon for interventions that seek to empower parents (Gago et al., 2022).

In addition to existing barriers and facilitators of vegetable serving practices, parents were also asked to identify supports they prefer, desire, or need for helping them to serve more vegetables to their children. Parents reported a variety of supports including technology-based resources (e.g., iPads, laptops, apps), print materials (e.g., books, charts), and to a smaller extent monetary-based resources (e.g., vouchers, coupons, money). However, an overwhelming majority of parents requested information-based resources for enhancing knowledge and skills. Parents requested wanting to know more about the nutritional aspects of vegetables (e.g., comparative health benefits), engagement strategies and child feeding, as well as resource-management (e.g., budgeting, time-management, how to purchase and store vegetables). Furthermore, parents also requested recipes and the need for procedural knowledge and skills to cook healthy meals. Interestingly, these preferences do not align with parental reported barriers of time and money, suggesting that parents recognize the importance of knowledge and skills acquisition in improving child diet quality.

Conclusion

Taken together, these findings indicate that although parents perceive monetary and temporal limitations as major barriers to vegetable serving practices, parents realize that monetary resources are not necessarily the primary or most effective and sustainable solution to overcoming these barriers. Rather, parents recognize that they need knowledge and skills centered on resource-management, child engagement, and cooking skills to facilitate vegetable intake effectively and successfully. This indicates that parent-targeted interventions should focus on providing parents with facilitators that emphasize scaffolding of personal and behavioral determinants of behavior change such as parental self-efficacy and behavioral capability in the form of knowledge and skills, rather than simply the resources themselves (e.g., groceries, money). Furthermore, parents are, to some degree, already intuitively engaging in effective feeding practices such as parental modelling and gradual taste exposures, which may provide a pre-existing foundation for researchers and nutrition educators to introduce, facilitate, and adjust parental use of evidence-based healthy feeding practices. Findings from this study also demonstrate that parents do not view child-centered challenges (e.g., child pickiness) as insurmountable, but rather as a problem that can be practically addressed through knowledge and skills-based education.

Researchers can also take advantage of the observation that parents possess existing motivation to carry out these practices and assume some degree of personal responsibility for child vegetable intake. Instead of focusing on enhancing parental willingness and motivation to serve vegetables and simply providing parents with physical resources, nutrition interventions should allocate more efforts to providing parents with the knowledge and skills-based tools they need to carry out these practices.

CHAPTER 5

DEVELOPMENT OF A VIRTUAL COOKING CLASS FOR PARENTS ON INTEGRATING SAM (SCIENCE, ART, MATH) TO PROMOTE VEGETABLES TO PRESCHOOL CHILDREN ENROLLED IN GEORGIA HEAD START[1]

[1] Shieh, J.G., Stage, V.C., Gallo, S., Cox, G., Laing, E., Cotwright, C.J. To be submitted to the *Journal of Nutrition Education and Behavior.*

Abstract

Early childhood is an optimal time for establishing healthy eating habits which may prevent disease later in life. In Georgia, the child obesity rate hovers at 13% with most of this percentage being children from Black or Hispanic families living at or below poverty level. Currently, the Dietary Guidelines recommend children aged 2-5 consume 1-1.5 cups of vegetables daily, yet only a small percentage consume recommended amounts. As nutrition gatekeepers, parents play important roles in facilitating their children's vegetable intake, but they may experience barriers that extend beyond the scope of diet. This indicates that multi-layered approaches which target multiple health determinants will be needed to achieve healthy equity. Interventions to strengthen other key influencers of health and go beyond singularly addressing dietary factors are needed. Studies show there is an inverse relationship between education level and poor health, indicating that one potential intervention area is early education, which encompasses developmental areas of physical, cognitive, literary, linguistic, creative, scientific, and mathematical reasoning and thinking. One under-explored area of potential intervention to simultaneously address both nutritional and educational disparities is a cross-curricular approach that integrates SAM (Science, Arts, Mathematics) into food learning experiences. Food can function as a vehicle to integrate academic and developmental learning. SAM use among school-aged children has successfully improved cognitive development and academic achievement in classroom content areas. However, utilization of SAM by parents to promote vegetable intake in younger children within a home setting remains untested. In this study, researchers developed a pilot nutrition education curriculum for parents of Head Start children aged 3-5 years, that focuses on cooking and SAM engagement strategies which parents can use to promote vegetables to their children. The curriculum was pilot tested in parents (n=34) of preschool

children enrolled in Head Start programs in northeast Georgia. Parental knowledge, self-efficacy, and acceptability were measured. Findings showed that SAM integration is acceptable to parents for promoting vegetables to young children.

Introduction

There are several proposed frameworks for addressing the current childhood obesity epidemic, which continues to be a serious and widespread problem affecting more than 14.7 million children and adolescents in the U.S. (CDC). Historically, researchers have agreed that multilevel interventions will be necessary to make significant progress in obesity prevention (Ward et al., 2013). The linear relationship between higher education and improved nutritional status is striking but hardly surprising, given that education can determine access to a broad assortment of resources such as healthcare and high-income occupations, which all play critical roles in influencing an individual's health (Andoy-Galvan; Kim, 2018; Zajacova and Lawrence, 2018). However, both the presence and direction of causality is still controversial (Benson et al., 2018; Dursun et al., 2018; Santana et al., 2017; Lynch & Hippel, 2016; Hippel & Lynch, 2014; Cohen et al., 2013; Witkam et al., 2021; Coetzee et al., 2021; Curry, 2020; Hill et al., 2019; Chen et al., 2012; Abdelalim et al., 2012).

Currently, the primary federal program that addresses educational disparities in early care and education in the U.S. are Head Start (HS) and Early Head Start (E-HS), which are designed to meet the educational needs of limited resource families. Head Start Program Performance Standards require all grantees to implement the Early Learning Outcomes Framework (ELOF) which outlines the academic and developmental skills, behaviors, and content that should be taught to preschool aged children for them to succeed in an educational context. However, most programs designed to help young children succeed academically are school-based and lessons may not be carried over into the home environment with parents and caregivers. Similarly, nutrition interventions for young children also tend to be predominantly school based. In fact, there is a dearth of interventions that simultaneously target both nutrition education and school readiness in a home setting among parent-child dyads. This is surprising for several reasons. First, nutrition education is inherently interdisciplinary and amenable to integration with academic content areas like math, science, and even the arts (Basu & Nguyen, 2021; Owen et al., 2018; Sepp & Hoijer, 2016; Jackson., 2010). For example, foods inherently possess scientific properties that cause them to visibly undergo physical and chemical reactions during the cooking process. Simple every-day phenomena such as a banana ripening in the kitchen fruit basket or onions caramelizing in a sizzling pan of olive oil represent opportunities to discuss scientific concepts that would otherwise be learned in school. Second, numerous opportunities for integration can be found in the home kitchen during child food experiences around meal and snack times (Greenfield, 2017). The home food environment, although informal, provides a natural setting for facilitating both academic and nutrition learning (Westerberg et al., 2022; Junge et al., 2021). Third, introducing concepts in a contextually meaningful setting can facilitate learning since these experiences allow practical real-world applications of otherwise abstract concepts (Callahan et al., 2017; Rhodes et al., 2020). Finally, early childhood is also a critical period of cognitive development when children tend to display science-thinking behaviors such as curiosity and information seeking to make sense of the world around them (Piaget, 1926; Liquin & Lombrozo, 2020; Jirout, 2020; Gopnik et al., 2012). Despite these optimal conditions, such nutrition and academic learning experiences remain largely inaccessible without adequate parental facilitation and scaffolding.

As nutrition gatekeepers for their families, parents play an indispensable role in facilitating their children's dietary intake given that early childhood is also a critical period of development in which children's taste preferences begin to evolve (Birch, 1999). Nevertheless, studies have demonstrated that parents experience an assortment of real and perceived barriers to preparing healthy meals for their children (Kim et al., 2019; Nepper & Chai, 2017). This is reflected in the fact that currently in the U.S., only 13% of children consume the recommended amounts of vegetables, with child pickiness being one of the top parent-reported challenges for facilitating vegetable intake in young children (Nepper & Chai, 2017). Consequently, assessment studies exploring parental reflections on child feeding consistently found that parents prefer and desire strategies and skills for engaging their children to consume more vegetables. Ideally, interventions that respond to parental calls for engagement strategies should integrate evidence-based best practice recommendations. According to Susan Johnson's model, one of the key areas found to be positively associated with improving children's willingness to try vegetables is providing children with multiple opportunities for engagement and repeated exposure through food-based (FB) and sensory learning (SL) experiences (Johnson, 2016). Additionally, another highly effective practice for increasing vegetable intake is involving children in the meal preparation process. Thus, one solution to bolster child involvement and engagement is the deployment of food-based culinary education programs that emphasize cooking nutritious recipes together as a family and child involvement (Bennet et al., 2021; Broad et al., 2021; Olfert et al., 2019; Muzaffar et al., 2018). Culinary skills programs are attractive vehicles for improving nutrition outcomes since they can serve as experiential learning outlets that allow children to practically apply the seemingly abstract nutrition knowledge, they have either observed or assimilated (Metcalfe & Leonard, 2018; Nelson et al., 2013; Kolb et al., 1984;). In fact, one study found that children who were involved in meal preparation consumed significantly more vegetables compared to control groups indicating that child involvement in meal preparation can increase vegetable intake (van der Horst et al., 2014) with even simple hands-on experiences conferring benefits (Dazeley et al., 2012; Maugeri et al., 2021; Sepp et al., 2016).

Therefore, the purpose of the current study was to develop, implement, and assess the impact of a pilot nutrition education curriculum for Head Start parents of preschool children aged 3-5 years, that focuses on providing parents with both cooking-centered and SAM-based engagement strategies which parents can use to excite and teach their children about vegetables. The curriculum was implemented as a 4-week virtual cooking class series. Intervention effects on parental self-efficacy (PSE), knowledge (K), and beliefs/intentions (B/I) related to engagement strategies were evaluated, in addition to program acceptability (A). In a companion study, researchers conducted a needs assessment to assess parental barriers, facilitators, existing practices, and preferences of Head Start parents of young children in Georgia. The findings from the needs assessment study confirm and reflect those found in other similar studies and were used to inform the curriculum design of the current study.

Methods

Study Design

An exploratory mixed methods study design was used to collect preliminary qualitative data to inform intervention development. The impact and acceptability of the intervention was then assessed both quantitatively and qualitatively through a combination of interviews and surveys.

Recruitment and Study Participants

In this study, participants consisted of thirty-five (n=35) female parents with young children aged 0-5 years old enrolled in Head Start programs in northeast Georgia. Convenience and purposive sampling were used to select recruitment sites through existing community partnerships, which included several northeast Georgia counties. Electronic flyers and emails containing links to an eligibility survey were distributed to the directors and staff members at each center, which were then disseminated to parents through different methods such as paper flyers, word of mouth, email, or ClassDojo (an online communication platform between parents and teachers).

Eligibility Criteria

Eligibility criteria included 1) Qualify as low-income based on the federal poverty level set forth by the Georgia Department of Health and Human Services 2) Have ≥ 1 child aged 3-5 years enrolled in a Head Start program in Georgia and 3) Access to an electronic device, internet, and zoom. Optional Zoom training was provided for parents who were not familiar with how to use the platform. The study was open to all adults aged 18 years and older. The screening survey collected information on participant demographics including center location, race, sex, age, household income, and education-level. Participants provided informed consent to participate in the study through an electronic consent form embedded in the eligibility survey. Additionally, participants were asked to indicate their availability in terms of the day/time of the week (selected from a list of days and times provided by the researchers). All interested parents who met the eligibility requirements were contacted via email and text messaging to confirm their interest in the study and proceed with enrollment.

Assessment and Evaluation

Measures

A pre and post survey was used to measure changes in parental knowledge, self-efficacy, behaviors, and attitudes towards serving vegetables to their children as well as the use of SAM strategies to facilitate vegetable intake. Prior to the first class, parents completed an 82-item pre-survey composed of Likert-type questions which was administered electronically through Qualtrics. The pre-survey collected information on each parent's baseline knowledge, attitudes, and behaviors encompassing an assortment of topics such as nutrient density, vegetable intake recommendations and behaviors, parental self-confidence, and engagement strategies including SAM and sensory-guided learning. At the conclusion of the class series, parents were asked to complete the same survey as the post-assessment.

Acceptability Assessment and Interview Survey

In addition to the post-assessment, participants were also asked to complete a 45-item questionnaire to assess parent acceptability of the program. Similar to the pre and post assessments, the acceptability questionnaire was composed of Likert-type questions, with four of the forty-five questions being open-response style. An additional survey consisting of 13 Likert-type questions was administered during follow-up interviews.

Follow-Up Standardized Semi-Structured Interviews

After the completion of the class, participants were invited to participate in individual follow-up interviews conducted through Zoom to discuss their thoughts about the class and the curriculum. Approximately half of all parents (n=19) participated in the interviews. A standardized interview protocol containing semi-structured questions and prompts was used. Interviews lasted approximately one hour and were recorded to the Zoom cloud and then stored in a password protected device prior to transcription. An interview protocol, questionnaire, and accompanying prompts were developed by the qualitative researchers.

Study Incentives

Each participant was compensated with $80 USD ($20 per week) for completing the surveys, cooking class series, and follow-up interview. In addition, parents received free grocery ingredients for eight recipes, four SAM child activity kits provided by Small Bites Adventure Club LLC®, and reusable tote bags.

<u>Curriculum Development</u>

Parent Lessons

A nutrition education curriculum consisting of eight 1-hour lesson plans was developed based on data collected from the needs assessment, conducted prior to this study. Curriculum lessons consisted of three segments: a parent lead-in lesson (15-20 minutes), a child engagement lesson (10-15 minutes), and a cooking demonstration (25-30 minutes). Parent lessons included topics on the importance of nutrition in disease prevention, nutrient density vs. caloric density, purchasing vegetables in season, money-saving strategies, food storage, healthy feeding practices and feeding styles, impact of stress management on child diet. Topics also included the use of SAM and sensory-guided strategies for engaging children to eat more vegetables. Lesson content was adapted from a variety of sources such as the USDA MyPlate recommendations, the Dietary Guidelines for Americans, Head Start and Early Head Start Early Learning Outcomes Framework, and the Georgia Early Learning and Development Standards.

SAM Activity Lesson and Explorer Kits

Following the parent lessons, lessons educating parents on SAM and each of its components were developed. Two lessons were devoted to introducing SAM, how to use it, and its benefits. Five lessons were individually allocated to highlighting a single component of SAM. The remaining lesson was used to discuss the integration of language and literacy into vegetable exposure experiences. A collection of four SAM activity kits were purchased from Small Bites Adventure Club LLC for each parent to use with their children either during the class or outside of class. The collection included the following four kits: “Go, Grow, Glow,” “Eat the Rainbow,” “Spice of Life,” and “Sensory Detectives”. Each activity kit contained instruction booklets and supplies for five SAM activities that parents could do with their children. Child activity kit topics were aligned to parent lessons based on relevance of the kit’s theme to the parent lesson for that class. For example, the “Eat the Rainbow” Explorer Kit was introduced during the class where parents were taught about the importance of eating a variety of vegetable colors and nutrient density.

Cooking Demonstration and Recipe Cards

Recipes were adapted from those provided by Share Our Strength’s Cooking Matters initiative as well as EFNEP’s cookbooks and were reviewed for age and cultural appropriateness by a professional sensory scientist. Recipes included the following: “Spinach Pita Pizza,” “Veggie Egg Muffins,” “Collard Greens and Beans,” “Squash Pesto Pasta,” “Zucchini Boats,” “Sweet Potato Fries,” “Carrot Fritters” and “Vegetable Fried Rice”. Parents were provided with hard copies of each recipe in the form of a recipe card each week. Recipe cards included the ingredients, serving yield, nutrient facts label, and instructions for preparation and cooking. To fulfill budget goals that were appropriate for the primary audience, all meals cost between $5-$7 USD including the state of Georgia’s year 2022 sales tax rate.

Program Implementation

Class Sessions, Frequency, Duration, and Structure

The overall curriculum was taught as a bi-weekly series of classes for a duration of four weeks. A total of eight 1-hour virtual classes were conducted on zoom. Parents were provided the option of attending either a morning session or an evening session (with each session being identical) based on their individual schedules and needs. Thus, a total of 4 classes were offered each week, with two of the four classes serving as alternative make-up class sessions. Each class lasted for approximately 1 hour and consisted of an icebreaker, parent lead-in lesson (15-20 minutes), a child engagement lesson (10-15 minutes), and an instructor-guided live cooking demonstration (25-30 minutes). During the child engagement lesson as well as the cooking demonstration, parents were encouraged but not required to carry out the activities with their children and cook with the instructor.

Grocery Bag and Activity Kit Assembly

One to two days prior to each class, food ingredients used for cooking demos were purchased and assembled in food-safe handling bags by members of the research team. Cardstock copies of recipe cards were printed and also included. Activity bags for the children containing the four SAM explorer kits as well as additional materials for arts, crafts, and cooking were assembled beforehand and compacted into brightly colored tote bags. Groceries and activity bags were then delivered to each Head Start Center one to two days before the cooking class to ensure that food was in stock and fresh. These were made available for pick-up by parents either in the morning during child drop-off or in the evening during child pick-up at each center.

IRB Statement

The study (PROJECT00004283) was approved by the University of Georgia Institutional Review Board.

Analysis

McNemar's Test of Symmetry

McNemar's test of symmetry was used to measure the impact of the intervention on parental knowledge encompassing a variety of topics including recommended serving sizes of vegetables as well as nutrient density. Participant responses to knowledge questions were assigned a value of zero or one, with zero denoting incorrect responses and one denoting correct responses. Statistical software SPSS v. 27® was used to generate 2x2 contingency tables to compare marginal frequencies of each dichotomous response. The McNemar's test was used to assess statistically significant improvements between pairwise survey responses, with $\alpha = 0.05$ and 95% confidence interval.

Wilcoxon Signed Rank Test

The Wilcoxon Signed Rank Test was used to assess statistically significant differences between the medians of pre and post-survey responses, with the majority of these questions centering on behavior, self-efficacy, beliefs, and intention. Because each item was a Likert-type question with a varied number of answer choices, the answers were assigned numbers from 1 to 3, 1 to 4, or 1 to 5. The non-negative differences between pre and post-survey responses were calculated and then ranked in order; the sum of the ranks of both positive and negative differences were calculated, with the smaller of each sum being used to generate the test-statistic which was then compared to a critical value for a two-tailed test ($\alpha = 0.05$).

Comparative Frequencies

Tables and bar charts of frequencies for responses to all questions were generated using SPSS v. 27®.

Thematic Analysis

Recorded audio transcripts of all follow-up interviews were de-identified, stored in a password protected cloud folder, and converted to verbatim text files by a professional transcription service. All transcripts were subsequently imported into Atlas.ti Windows (Version 22.0.6.0)® software program for subsequent qualitative analysis. Prior to analysis, a coder training protocol modeled after the one proposed by Goodell, Stage, and Cooke, 2016 was implemented to ensure rigor. A codebook employing a hybrid deductive and inductive thematic analysis within an essentialist/realist paradigm focusing on semantic themes was used (Braun and Clarke, 2006) to analyze the data. Deductive coding extrapolated pre-defined themes from the interview questionnaire, while inductive coding permitted the emergence of novel themes. The data was double coded by two researchers under the supervision of a third senior researcher with at least 20% of the transcripts being double coded. Following independent analysis, researchers convened to resolve any discrepancies in coding and reach consensus. Inter-coder reliability (ICR) using the kappa statistic was calculated to ensure a high level of consistency among the coders.

Results

Demographics

A total of 35 parents (n=35) participated in the cooking classes (Table 7).

Table 2.1 Pilot Study Demographic Data

Pilot Demographic Variables	n (%)
Gender	
Female	35 (100%)
Male	0 (0%)
Race	
Black or African American	15 (42.8%)
Hispanic or Latino	11 (31.4%)
White	5 (14.2%)
Mixed/Other	4 (11.4%)
Age of Parent	
20-29 years	7 (20%)
30-39 years	21 (60%)
40-49 years	7 (20%)
Annual Household Income	
< $20,000	17 (48.5%)
$20,000 - $50,000	18 (51.4%)
Education Level	
High school degree or equivalent (GED)	23 (65.7%)
Some college but no degree	7 (20%)
Associate degree	2 (5.7%)
Bachelor's degree	3 (8.5%)

<u>Quantitative Analysis</u>

Intervention Effects on Parental Behaviors and Practices During and Outside of Meal and Snack Times

The Wilcoxon signed-rank test showed that the intervention produced statistically significant increases in the variety of vegetables that were served. On the post-survey, 65.7% of parents reported serving at least 4 different kinds of vegetables in the past week (p=0.004). The number of parents who reported serving 3 or more red, orange, or yellow vegetables significantly increased (p=0.006) by 91% with no change in the number of dark leafy green vegetables that were served.

In question clusters related to healthy feeding practices, the majority of responses did not show significant improvements with the exception of responses to q#46, where the number of parents who indicated that they prompted their child to eat anyway despite the child expressing that they were not hungry (q#46) was greater on post survey (42.9%) compared to pre-survey (17.1%) responses (p=0.012). Small changes were seen in the number of parents who indicated that they had developed effective strategies for ensuring healthy eating in various situations such as when the parent experiences stress or food cravings, when on vacation, or during the holidays, but no significant differences between median responses to these questions were noted. No changes were seen in the number of parents who indicated that they had developed strategies for ensuring healthy eating during child food cravings, or when eating out at restaurants. Minimal changes were observed for parent practices of offering sweets (q#43) or the child's favorite foods (q#44) to as a reward for good behavior (38%, 35% decrease respectively but neither was significant. No changes were seen in indicators of parent practices including intentionally limiting or facilitating physical access to certain foods (q#42, #49), parent preparation of foods into appropriate sized pieces (q#50), parent consumption of meals with child at the dinner table (q#51), offering vegetables to children in a friendly tone of voice (q#52), or offering verbal praise when the child consumes a fruit or vegetable (q#53).

Significant changes in parental responses to questions related to using various engagement strategies to facilitate child vegetable intake were observed following the intervention. Statistically significant improvements in parental responses that: they were able to serve vegetables to their child in a way that was appealing at least 3 times that week ($p=0.001$) (q#58), frequency in use of stories and songs about vegetables ($p=0.041$) (q#60), frequency of asking their child to explore the sounds that vegetables make when tapped, bit, or chewed ($p=0.004$, $p=0.005$) (q#61,62), frequency of prompting their child to visually explore the vegetable in different forms such as when whole, peeled, chopped, or cooked ($p=0.004$) (q#64), frequency of asking the child to smell the vegetable ($p=0.008$) (q#65), and frequency of asking the child to feel the texture of the vegetable in their mouth when chewing ($p=0.005$, $p=0.008$) (q#67, q#68) were observed. Parental use of repeated exposures to vegetables through tasting (q#70) also significantly increased ($p=0.007$) pre to post intervention. Interestingly, no changes were observed for parent practices of asking their child to call the name of a vegetable (q#59) or prompting their child to look at pictures of vegetables outside of mealtimes (q#63).

Intervention Effects on Parental Self-Efficacy (PSE)

Wilcoxon analysis also revealed that the intervention was able to significantly increase median indicators of parent reported self-efficacy in the three primary question categories of vegetable selection, cooking skills, and child engagement. The question cluster prompting parents to indicate reasons for why they do not eat vegetables as much as they should exhibited varied responses. Significant differences in median responses ($p=0.041$) of parents who indicated that "cost" *was* one of the reasons why they *do not* consume as many vegetables as they should (q#16) were observed, with a 46% decrease in parents reporting that they agreed/strongly agreed with this statement. Although no changes related to reasons such as "spoilage" or "other" were observed, small non-significant changes in self-efficacy to "buy foods in season," "purchase fresh vegetables," and "prepare vegetables" were documented. Consistent with the above findings on cost, significant changes in median response indicators of parental confidence in purchasing vegetables inexpensively at the store (q#23) were seen post-intervention (p=0.018), while the frequency of parents who indicated that they were confident in storing vegetables correctly to prevent spoilage increased by 25%, although this difference was not significant. Significant changes following the intervention were also observed for questions relating to parental confidence in being able to distinguish between appropriate vegetable storage locations (q#25, #26) (p=0.045,p=0.003), parental confidence in choosing fresh seasonal vegetables (q#27) (p=0.010), as well as nutrient dense vegetables (q#28)(p=0.002), and identifying vegetable ripeness (q#29)(p=0.032).

Only small changes in responses to question clusters related to parental self-confidence in ability to facilitate healthy eating in various situations were observed. The frequency of parents who agreed/strongly agreed that they were confident in their ability to help their child eat healthy under conditions of stress (e.g., tired, emotional, upset) (q#30), when either they (q#31) or their child (q#32) experienced cravings, or when on vacation (q#34) increased by 29%, 11%, 75%, and 11% although these changes were not significant. No changes in median responses to questions related to eating healthy when eating out (q#33) or during the holidays (q#35) were seen.

Regarding cooking skills and serving meals, parental self-efficacy in ability to prepare, cook, and serve vegetables to their children (q#54) along with parental self-efficacy in ability to serve vegetables in an appetizing/appealing manner to their child (q#55) were significantly affected (p=0.007, p=0.000) by the intervention. In addition, changes in parental confidence in their ability to help their child try a fruit or vegetable (q#56) were shown (p=0.005). Significant changes in median responses to questions related to parental self-efficacy in using SAM to introduce vegetables (q#74) (p=0.049), parental self-efficacy in engaging in SAM outside of mealtimes (q#76) (p=0.003), and parental self-efficacy in talking with their child about math, science, and art during mealtimes (q#77) (p=0.055) were detected. Very minimal changes were seen in parental self-confidence to engage their child in asking questions and constructing explanations (q#73), with a 17% increase in parents who indicated moderate or extreme confidence in doing so. Similarly, only a 16% increase was seen in the number of parents who reported agree/strongly agree to being able to give their child more information and advice about food and nutrition if the child asked (q#82).

Intervention Effects on Parental Knowledge (K)

McNemar's test of symmetry revealed statistically significant differences in the frequency of correct and incorrect responses to several knowledge-related questions between pre- and post-intervention. Parental knowledge regarding the number of servings of vegetables recommended by the DGAs 2020-2025 on a daily basis for children aged 2-5 years (q#5) increased significantly (p=0.000) following the intervention. In addition, parental knowledge on comparison questions related to which vegetables were more nutrient dense (p=0.008) for peppers vs. cabbage (q#8) and white potato vs. pumpkin (q#10) significantly improved (p=0.006) after the classes. Differences in responses to other pairwise comparisons such as iceberg lettuce vs. kale (q#7) and carrots vs. celery (q#9) were not significant although the number of incorrect responses for the former pair decreased by 54% and the number of correct responses increased by 24%, with little change in the latter pair. Paired responses to questions regarding nutrient density of vegetable combinations (e.g., broccoli, carrots, tomatoes) were not significantly different between pre and post-intervention.

Pre- and post-survey responses to knowledge questions related to perceived nutritiousness of canned (q#11) and fresh vegetables (q#12) exhibited no change; however, the number of parents who perceived frozen vegetables as being very nutritious significantly increased (p=0.000) by 45% between pre and post surveys. Although not significant, the number of parents who perceived juiced vegetables as being somewhat or very nutritious increased by 39%, with the number of parents who perceived them as being not nutritious decreasing by 74% following the intervention. The number of parents who reported knowing more than 1 strategy for making vegetables more appealing significantly increased (p=0.010) following the intervention.

Responses related to feeding styles varied. Parents who indicated that they agreed that their child should always eat all the food on his/her plate (q#45) decreased by 29% following the intervention, although this decrease was not significant. The number of parents who indicated that they knew the difference between a positive and negative reinforcement (q#47) increased by 20% following the intervention, but this difference was not significant. No changes in parental reasoning for why they serve their children vegetables (q#15) (e.g., because of minerals, vitamins, antioxidants, healthful, disease prevention) between pre and post intervention. On both pre and post surveys, the majority of parents (54% and 57% respectively) responded that the reason they serve vegetables to their children is because they are good for their child’s health. No changes were seen in parental understanding of the importance of not using food as a reward/punishment (q#48), with many parents indicating that they understood this clearly on both pre and post surveys.

Intervention Effects on Parental Beliefs and Intentions

Parents’ intent to use SAM did not change significantly from pre to post intervention, but most parents agreed that they would use SAM in their household if they were given the resources to do so (q#72). The number of parents who indicated intention to use language and literacy to facilitate more vegetable intake (q#79) increased by 20% and this difference was significant (p=0.020). The number of parents who indicated intention to talk to their child about vegetables outside of mealtimes (q#80) increased significantly (p=0.033).

Parental beliefs about their ability to talk to their children about vegetables outside of mealtimes (q#78) increased significantly (p=0.004). Parental understanding that conversations about vegetables is a way to expose their child to vegetables (q#81) significantly increased (p=0.029) following the intervention. Parent beliefs about the importance of science, technology, engineering, arts, and mathematics to their child's learning did not significantly increase, although the majority of parents agreed that these subjects were very important on both pre and post surveys.

Program Process Measures and Acceptability Indicators

Acceptability of program components by parents was consistently high across curriculum content areas. The percentage of parents who indicated agree/strongly agree with each of the following questions exceeded 80%: I liked learning about how to engage my child to eat vegetables, the engagement strategies seemed easy to use, engagement during mealtimes will help parents serve more vegetables and increase child willingness to try vegetables. Furthermore, the percentage of parents who reported acceptability of the SAM strategies, their ease of use, their perceived ability to help parents serve more vegetables to their children and increase child willingness to try vegetables also exceeded 80%. Regarding acceptability of strategies to create sensory-based learning experiences as well as techniques that utilize language and literacy, these strategies were also highly acceptable to parents with responses that indicated agree/strongly agree exceeding 80% for all questions; more than 75% of parents indicated that they felt more capable of doing SAM activities with their children after the class compared to before they took the class.

In the question cluster related to intention to use, 89% of parents reported intention to use novel food preparation approaches with 86% reporting frequency of use at least two or more times a week; 83% of parents reported intention to use both sensory-based engagement strategies as well as language and literacy to engage their children with 81% and 86% of parents reporting frequency of use at least two or more times a week; 75% of parents reported intention to use SAM during and outside of meal and snack times, with 86% reporting frequency of use at least two or more times a week.

Most parents agreed/strongly agreed that the class times were scheduled at times that were convenient for them (81%) and that the duration of each class was just right for them (89%). However, 50% of parents expressed that the frequency of the 2 classes per week was too intense for them to attend consistently. More than 80% of parents agreed that the zoom delivery format made it easier for them to attend class, that they enjoyed interacting in a group setting with other parents, that adequate time was provided to ask the instructor questions, that the information presented in the classes was relevant and helpful in teaching them how to serve more vegetables to their children, that the curriculum met their personal needs in serving vegetables, and that the class was effective in helping them learn how to serve vegetables to their child. More than 90% of parents indicated that they enjoyed the class and would recommend the class to a friend, with more than 80% of parents expressing that they would be interested in participating in a similar program in the future. More than 70% of parents agreed that the incentives that were offered during the class were sufficient motivators to attend the class.

In addition, from the follow-up interview, parents reported that they felt the class significantly increased their confidence, knowledge, and skills in serving vegetables and that the knowledge and skills that were taught in the class were both relevant and useful to them. In addition, parents reported that the class increased their access to both physical resources (e.g., groceries, learning kits) as well as human resources (e.g., other parents, instructors). Regarding SAM, 94% of parents found the SAM strategies and activities very appealing, 73% found the strategies very successful, and 94% reported that the SAM strategies were very appealing to their children. Finally, parents indicated that the class significantly increased their knowledge about SAM as well as their self-confidence in using SAM. The majority of parents felt that there were many other non-nutrition related benefits of SAM.

Qualitative Analysis

Four overarching themes were extracted from the qualitative data. First, parental acceptability of the intervention was primarily attributed to the intervention's perceived benefits, it's role in reducing perceived barriers, and provision of access to human and material resources. Second, the intervention enhanced parental self-efficacy through improvements in parent's behavioral capability. Third, the intervention increased parental knowledge of preparing and serving vegetables in an appealing manner along with providing foundational knowledge about nutrition. Fourth, the intervention increased parental skills in the areas of cooking and resource-management.

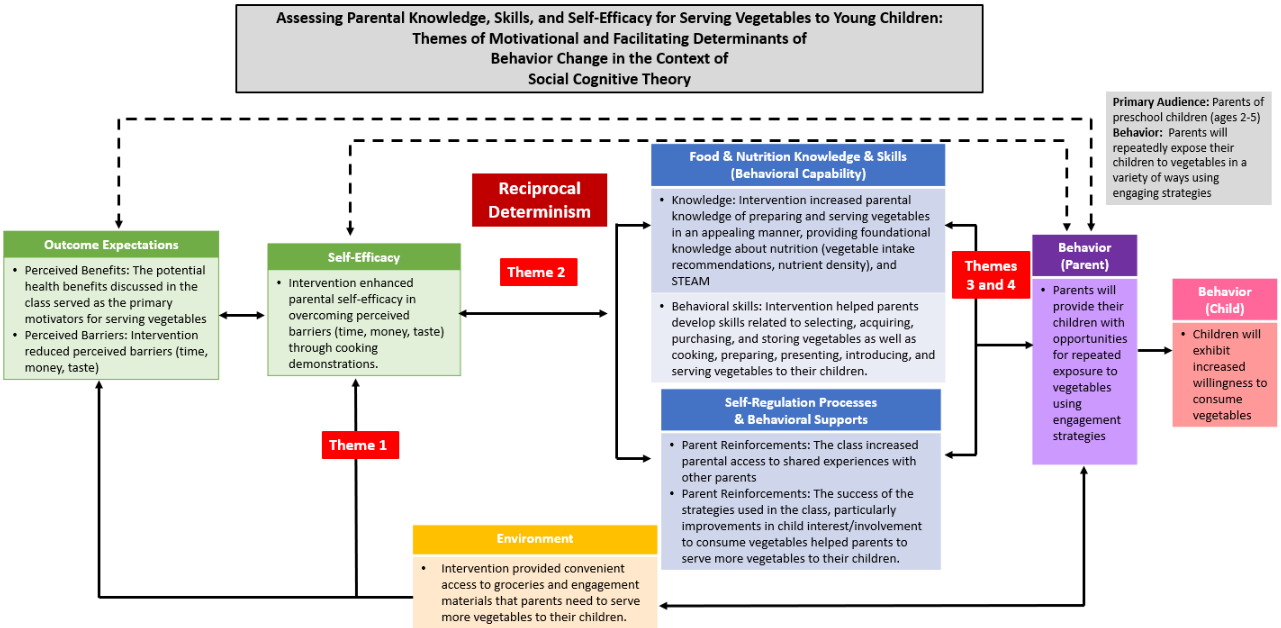


Figure 2.2. Assessing Parent Knowledge, Skills, and Self-Efficacy for Serving Vegetables to Young Children: Themes of Motivational and Facilitating Determinants of Behavior Change in the Context of Social Cognitive Theory

Theme 1: Parental acceptability of the intervention was primarily attributed to the intervention's perceived benefits, its role in reducing perceived barriers through the cooking demonstrations, and provision of access to human and material resources. The intervention was acceptable to parents for several reasons. First, the perceived benefits of the intervention were a major source of motivation for serving more vegetables. When asked how the class motivated them to serve more vegetables to their children, parents reported that the health benefits discussed in the class and the subsequent prospect of reduced trips to the doctor served as the primary motivators for serving their children vegetables. For example, parents reported:

"Yes. Cuz as I mentioned, I think in one of the, um, class is like, you know, the healthier, the healthier you eat, the less strict the doctor you'll, you'll go like, and you know, you'll have more energy in you and not only for you, but for your kids too. So it's like get to build that for them."

"It really motivated me more because, um, you know, like family history we had a problem with... So, um, you know, that's why I took the class because the doctor told me that my daughter was obese and…I wanted to, you know, kind of get her, you know, eat more healthy..."

In addition to health benefits, parents also reported that the ability of SAM to both engage their children (e.g., good for connecting, getting kids to participate be involved) in eating more vegetables as well as provide non-nutritional academic benefits in school were primary motivators for incorporating SAM when serving vegetables to their children. Parents reported that the connection between SAM and academic benefits in school might be attributed to increased confidence due to familiarity with basic concepts across different academic content areas. For example, parents reported:

"…I personally think that it will help them be more confident and, um, you know, when I think there's, there's kids that are shy and…it's mainly because they, they don't have the knowledge. And, you know, being able to see, uh, the steam in everything they do. I think…you know, there's steam in the kitchen…I think that could help them, you know, look at, there could be steam in everything, not just in the kitchen. So I think it would just, it, it

provides more knowledge to them and that's, that at the end is, is more power to them because it, it's, it's, it, it's gonna give them the confidence…"

In conjunction with educating parents about perceived benefits, the intervention also enhanced parental self-efficacy in overcoming perceived barriers through the cooking demonstrations. Parents reported that the class showed them that vegetables could be tasty, cheap, and easy to prepare. Parents reported the following:

"And, um, I feel like, you know, when you, when you were teaching a class, I was like, oh wow, that's actually is good and it's, and it's healthy at the same time. You know that not, cuz sometimes you, you say healthy and you're like, oh, that's not gonna be, that's not gonna be good. I'm gonna miss out on this and this and this and that, but when you actually make it, you're like…"

"Um, well, I learned how to cook, uh, very easy. Okay. Because usually we are Hispanic persons and we cook like, uh, with many spices and…and something like that. Yeah. And we're very complicated cooking <laugh>. And now I feel like, uh, I was talking with my husband about the, in the first class…collard greens. Well, I know now that is very easy to cook with this <laugh>. And it's a simple dinner."

"Well, I definitely <laugh> definitely learn that eating healthy is not like spending so much money on trying to eat healthy because like the pizza that we made…"

My favorite part was when, um, the way you cook…the part was very easy. Okay. Well, for me when I trying to you know, figure out what, why I am cooking today, I spend like one or two hours in the kitchen cooking stuff. You know, I have three kids, and they don't eat the same thing. <laugh> as you know, and the part I very, very enjoy, enjoy was the very easy way to cook."

Acceptability of the intervention was also through the intervention's provision of human and material resources. A majority of parents expressed appreciation for the group times with other parents where parents could exchange ideas and share experiences among themselves. For example, one parent expressed the following:

"I feel like it, it affected me because sometimes you think you're the only one struggling or you think you're the only one, you know, having a hard time trying to introduce, in this case like vegetables and, um, listening to other parents and listening to you. And, um, it was something that it helped me, you know, more because I was like, oh, I'm not the only one struggling. I'm not the only one having this, you know, trouble with, you know, trying to introduce a new vegetable to my son. And I feel like listening to e everyone else, it helped. Because believe it or not, you know, when you would ask us sometimes to write stuff in the chats and like the little chat box, I was like, you know, it, it helped them listening to their ideas, listening to, you know, how they struggle or listening to different ways of how they improve…And there's times that you don't know about different things and you know, when you listen to other people it's something it helps."

Parents also expressed appreciation for the intervention's ability to provide convenient access to materials such as groceries and activity boxes that they need to serve their children vegetables. Parents particularly appreciated the convenience of the delivery and pick-up protocol being situated at the child's school, the option of having two class times, and the remote Zoom format. For example, parents mentioned:

> *"Well the whole process of how the class was given and from, from the beginning from you, like you mentioned, you, um, getting, doing the grocery shopping for us, bringing it to the school, um, and then pretty much have, we're we're us having everything there, you know, on hand. Um, and then just, you know, having to just for us, just basically just interact with our children and, um, go ahead and do the meal. And after, you know, you giving us a lesson with the recipes and all that stuff, I feel like it was something that, that it made us, it made it easy. Okay. Um, it made it, it made it less stressful. And, and it made it, and it, and it made it like, you know, in a way that you, you gave us options. You gave us, you know, a time in the morning and a time in the, in the evening."*

> *"I feel like they were excited about it. Um, my, my son was, you know, he's three, he's, he's like, he loved it. Um, just seeing his reaction, like using the chalk, um, he liked it also cutting up like the different, um, like the, the different, um, the little squares, like cutting them up. Um, he liked the, that um, he, it, it causes more his attention. He even, he even liked the little plate, like how to divide, you know, the stuff up. He was like, I can put this here, there, there, you know. And um, and I feel like even my oldest, you know, my oldest daughter, like, she enjoys."*

Theme 2: Second, the intervention enhanced parental self-efficacy through improvements in parent's behavioral capability. When asked how the class changed their self-confidence in serving vegetables to their children (if at all), many parents reported that the class increased their self-confidence by increasing their knowledge about serving vegetables in an appealing way, providing them with more ideas, options, and strategies and by providing them with examples and skills practice in-class. Many parents commented that the success of the strategies in helping to increase children's willingness to try vegetables was a major factor in increasing their self-confidence. For example, parents expressed that:

"I gained more confidence. Cause like I said, I didn't have the knowledge I had before and I was wondering why my food would go bad so quickly. Yeah. Yeah. So I would say it gained a lot of more confidence and saved money as well. You don't need all of these, you know, you don't actually need all of these kits that we gave you. You can, there were so many different free easy ways to use steam, you know, in your, with in your home. You can just ask your child, you know, why does this turn this color? You don't need a special kit for that. So you, yes, you can save money <laugh>. "

"I think I feel more confident in exposing them to vegetables just because like I said, during your class, you would show different activities or you know, just I guess talk about it more. And so I just, so a lot of times you just give it to them and they just expect them to eat it. So I feel like, I don't know, just like cutting them up, like giving me all those ideas in the class of like how to cut them up, you know, to make them more. So I'm, I'm a lot more confident I feel with, with giving the best choice."

Theme 3: Third, the intervention increased parental knowledge of preparing and serving vegetables in an appealing manner along with providing foundational knowledge about nutrition including vegetable intake recommendations and also nutrient density. Parents pointed out that the class revealed disparities in nutritional density of different vegetables that were important to health.

"Yeah, um, you know, uh, just working with the, the vegetables, the stuff that y'all taught about, um, the cabbage, I think the nutrient, um, in the, um, density, what was good, what had more density and what less density. So I liked that, you know, learning what kind of vegetable. Cause I, I never noticed they had a purple cabbage, you know, <laugh> that was new to me."

"Before I never knew that some vegetables are not, um, as healthy as others…During the class, you make, uh, differentiated types of vegetables, those that are good, those that are more healthy, like, you know, like differentiate like somebody eating tomatoes and um, and um, carrots is still only the same family, not something different. So it gives me more knowledge about my vegetables. I have an idea about, um, vegetables that I, that are more nutritionist, that, that, uh, are more good to the body than just random, um, vegetables…"

"Well, I mean, like I mentioned before, you know, I learned how to be able to introduce the veg, the vegetables in different ways. Um, also while he's eating the vegetables, also teaching them like, you know, the colors, textures, patterns, um, different tastes…I have to take advantage that he loves vegetables. Like he loves, you know, like two

or three, you know, more than others, but it's like, hey, you know, it's not like he doesn't like any, so since I know he likes three or four. Come on, let's try to introduce him a couple of more while he's, you know, he's enjoying it."

Parents also reported that learning about what SAM was and how to integrate SAM in the kitchen was helpful in engaging their children.

"…I hadn't really like known like, about like these steam strategies or any of this until I actually took the class. Um, and it was something that maybe you hear, you know, hear people talk about it or whatnot. But after actually getting a class on it of how to use it like math, like mathematically how to use it, uh, doing activities with the kids, um, different, different ways. It was something that I feel like it opened up, it opened up my mind more…"

"I had heard about STEM at, at school, but, um, the steam, it, it, it not in the kitchen. Yeah. And it, it helped me think, you know, like you gave ideas about, you know, um, math was like, you know, measuring, you know, like let's say you measure how much sugar or milk or you know, water you have to put and, and you know, for cooking and I didn't realize that it, it was, there was, you know, science in the kitchen and there was math in the kitchen. I, it just, I never thought of it."

"I feel like I am able to introduce it in a way like, um, with the steam kits and stuff because it's not like it gives you a different format to look at. It, it in a, in a way that, like say for instance, like my son, like I was mentioning about my son and my daughter, they, I can

introduce it to them in a art type of matter. And like my second child, he's into like different types of technology and like science stuff. So I can figure out a way to incorporate it and for him to understand and like, like for it to be appealing to him. So it doesn't, and it gets them more interested and more involved into, into what I'm trying to show them and, you know, educate them."

Theme 4: Fourth, the intervention increased parental skills in the areas of cooking and resource-management. Many parents expressed that the class helped them develop skills related to selecting, acquiring, purchasing, and storing vegetables as well as cooking, preparing, presenting, introducing, and serving vegetables to their children.

"It was, um, I would say what motivated me to get em more, uh, vegetables and how you uh, uh, taught us how to store and how to shop in season with the vegetable, uh, with the fruits and vegetables. So, okay. That was, um, a good thing. Um, cuz uh, cause before I would just buy like all the uh, fruits and vegetables and just, you know, put it, leave it in the container and put it in the fridge and, and three days later it is, you know, it's spoiling and <laugh>."

"Um, well, I mean, I'm not the, I always like…doubt myself in my cooking and stuff like that. But I did definitely learn how you don't need to put like a lot of seasonings or a lot of salt into your food to give it flavor. Like it just by, cuz like I noticed like the one recipe that we had, did that you showed us it had the kale and the beans, like, I honestly did not put any kind of salt in it and I was just amazed by how good it still tasted and there was, and I

was like, oh my goodness. Like, so it made me kind of like rethink a little bit of how I season my food and instead of, you know, try to like add season to it, just mash the flavors together naturally."

Discussion

Overall, four key themes emerged from the parent interviews. Firs, parents were asked to identify how the class motivated them to serve more vegetables to their children. Parent motivators included time and money savings, the opportunity to interact with children more, as well as the appeal and novelty of learning new and tasty recipes. One of the primary motivators reported by parents centered around the health benefits of serving and consuming vegetables. Parents reported that the long-term health benefits of increased vegetable intake, the prospect of being healthier overall, and reduced doctor visits helped motivate them to serve more vegetables. The fact that few parents emphasized time and money savings as the primary motivators is significant. This finding demonstrates that parents realize the critical role of nutrition in their children's health and that this is a stronger motivator for serving more vegetables than temporal and financial gains. Moreover, parents do not necessarily need to be convinced that practices related to vegetable serving and intake are advantageous to health and well-being, since health and well-being are already perceived benefits of vegetable intake.

These findings are consistent with those reported in a study exploring parental motivations for food offerings to adolescents (Oellingrath et al., 2013). In this study and in others, parental motivation was driven primarily by sensory appeal, followed by perceived healthfulness of a food (Røed et al., 2020; Johnson et al., 2019; Russell et al., 2015). When asked about the non-nutrition benefits of incorporating academic content areas into meal and snack times, parents cited various benefits such as: cognitive development, encouraging curiosity, enabling children to express creativity and emotions, development of executive functions, language development and communication, making children technology savvy, social development, and self-confidence. Of these benefits, the majority of parents recognized SAM's ability to confer learning benefits in school either through reinforcement of topics that are learned outside the home or increasing child confidence in these topics through early familiarization. Parents also observed that SAM helped to engage, involve, and facilitate interactions with their children during mealtimes (Torslev et al., 2021). This finding shows that parents are aware of the potential benefits of integrating academic concepts during mealtimes in the early childhood years. However, parents may not be fully aware of the formal and informal SAM-related learning opportunities that are present in the home food environment (Blevins-Knabe, 2016; 2000; 1996; LeFevre et al., 2009; Senechal & LeFevre, 2002) and may feel ill-equipped to render the appropriate scaffolding (Maloney et al., 2015).

Parents primarily associate the incorporation of these academic concepts with advantages in a school environment (e.g., academic achievement, knowledge-driven confidence, higher grades), but they may not necessarily see how such advantages carryover into adulthood and how they may contribute to a higher quality of life in the long-term (e.g., higher education opportunities, higher paying career, better housing, etc.). Furthermore, parental self-efficacy in overcoming perceived barriers such as lack of time, limited finances, uncertainty regarding what vegetables to serve and how to prepare them and make them more appealing was enhanced. When asked about their favorite part of the class, parents consistently reported that they enjoyed both the cooking demonstrations as well as the recipes that were prepared. Many parents expressed surprise that vegetables could not only be tasty, but also healthy, inexpensive, and easy to prepare, showing that the intervention was able to mitigate parent's perceived barriers to serving vegetables.

Additional intervention supports that resonated with parents included the camaraderie and parent-to-parent relationships that were formed during the cooking classes. Many parents derived not only comfortability but also a sense of solidarity from cooking and learning together with other parents in a small group, reinforcing findings from other studies which have demonstrated positive influences of cooking interventions on psychosocial outcomes such as confidence and socialization (Farmer et al., 2017). In addition, parents also commented on the convenience of the grocery deliveries, the flexibility provided by having two class times during the week, and the ability to complete the class remotely on zoom. The acceptability of the course delivery format indicates that virtual interventions are viable options for improving vegetable serving practices of parents who would otherwise struggle to attend in-person cooking classes.

The intervention also assessed the effect of the cooking class on parental self-efficacy, knowledge, and skills, which are well-established motivational construct indicators (Michie et al., 2014; Bandura, 1986). When parents were prompted to describe what the class provided them with information-wise to serve more vegetables to their children, many parents mentioned that they received help from the lesson on vegetable intake recommendations and evaluating nutrient density. When parents were asked about procedural knowledge and skills from the class that helped them to serve more vegetables to their children, parents reported that they were most helped by learning skills for resource-management (e.g., selecting, acquiring, purchasing, storing) as well as cooking and preparing vegetables in an appealing manner (e.g., preparing, introducing, plating, introducing, serving).

Consistent with other culinary skills intervention studies, many parents reported that both the success of the strategies as well as the simple act of observing the cooking demonstration was a sufficient motivator for serving more vegetables to their children (Overcash et al., 2018; Wolfson et al., 2017). This aligns with Bandura's philosophy on self-efficacy beliefs. Bandura believed that self-efficacy had four main sources: mastery experiences, vicarious experiences, verbal persuasion, and emotional and psychological states (Bandura, 1997). In this intervention, parents appear to derive self-efficacy from mastery experiences, which refer to the experiences that are gained when a challenge is surmounted, as well as vicarious experiences, which refer to experiences of seeing other people model success and the application of these experiences to the self (Okpara et al., 2022). Thus, the interview data showed that parental self-efficacy was primarily accomplished through enhancement in behavioral capability such as knowledge and skills and less through motivational means. Parents possess sufficient motivation to carry out these practices, but they require the knowledge and skills to do so. These findings resemble those of other culinary intervention studies (Metcalfe et al., 2022). This finding shows that parents posses sufficient motivation to serve their children more vegetables, but they require the knowledge and skills to carry out these practices.

Conclusion

The results of this study demonstrate that a 4-week cooking class series consisting of parent lessons, lessons on integrating school subject area content into child food learning experiences, and cooking demonstrations can have an impact on nutrition knowledge, self-efficacy, and to a smaller extent behaviors of low-income families with young children. Overall, small changes were seen in parental knowledge of nutrient density, with no significant changes observed in ability to serve vegetables in stressful situations or leverage feeding practices. Parental resource-management skills related to budgeting, vegetable selection, and storage were minimally affected. However, parental self-efficacy to prepare, cook, and serve vegetables in an appealing manner to their children either using SAM or other engagement strategies was significantly affected. These findings demonstrate that a culinary model of nutrition education anchored by group cooking demonstrations and centering on skills-based topics such as child engagement strategies during mealtimes, making vegetables more appealing, and resource-management (e.g., saving money, saving time) is acceptable for limited resource parents of young children. Less attention can be given to increasing motivation, and more resources should be allocated towards providing parents with the knowledge and skills-based tools they need to succeed. Furthermore, more revision is needed to construct a curriculum that bridges the gap between parental understanding of small-scale benefits and broad-scale benefits of vegetable consumption; doing so may facilitate a heavier investment in vegetable serving practices among parents. More work is also needed to tailor curricula to provide more support on stress management and coping/affective skills, perhaps through peer-peer group cooking and facilitating solidarity through shared experiences, struggles, and successes.

CHAPTER 6

CONCLUSIONS

Summary of Findings

The concept of a virtually-delivered parent cooking class that integrates science, art, and math learning and home food experiences is a relatively underexplored area of intervention for improving both nutrition and learning in young children from limited resource backgrounds. This dissertation study examined the acceptability of a virtual nutrition education class series that integrates SAM (science, art, and math) and home cooking experiences by parents of preschool children enrolled in Georgia Head Start. Additionally, the study also assessed the effects of this intervention on parental knowledge, skills, and self-efficacy in various areas such as a basic nutrition concepts, resource-management, SAM integration, and cooking. Qualitative methodology was used to inform the intervention's curriculum design, while both qualitative and quantitative methods were used to assess intervention findings.

The first study presented in chapter 4 was a Needs Assessment. The purpose of this preliminary study was to elucidate the major barriers, facilitators, existing supports, needs, and preferences of limited resource parents with young children when serving vegetables in the home. A preliminary assessment and understanding of the challenges parents experience, the existing supports that are currently available to and used by parents, as well as the preferred supports for feeding children vegetables helped to inform curriculum design prior to implementation. Analysis of the Needs Assessment data revealed three major findings. The three primary and most widely-reported barriers experienced by parents when feeding their children fruits and vegetables was lack of time, lack of money, and child pickiness. Specifically, parents described that the positive feedback loop among combinations of these factors as being both frustrating and paradoxical. For example, child pickiness results in wasted time, and money in acquiring and preparing that food. In-depth explanations for why parents experience lack of time and money and why they encounter child pickiness were not necessarily sought, although several parents reported busy work schedules, low pay, and inability to cater to multiple taste preferences of different children in the household as causative factors.

In addition to identifying parental challenges, this study also explored the methods and existing facilitators that parents utilize to serve their children fruit and vegetables. Understanding the tools and strategies that parents depend on to achieve their feeding goals is critical since it provides not only a baseline assessment of what parents are relying on in the absence of intervention but also a potential groundwork for researchers to refine and build upon when introducing new strategies to parents (Hendrie et al., 2017; Virudachalam et al., 2016) Interview data revealed that existing supports utilized by parents are primarily parent mediated. In other words, most of the supports used to facilitate vegetable intake are carried out directly by the mothers as the primary agent of change. This suggests that mothers and grandmothers see themselves as the accountable entity for ensuring that their children consume adequate amounts of vegetables (Trofolz et al., 2019). Supports described by parents include parental modelling, repeated exposures, bribery, systems of positive and negative reinforcement, various food preparation tactics to enhance appeal, and artistic engagement strategies such as printing out coloring pages of fruits and vegetables, songs, and dances. Finally, parents were also asked what supports they need and prefer for serving fruits and vegetables to their children. Primary preferred supports included resources for improving knowledge and skills related to cooking, resource management, and child engagement. Taken in conjunction with the other findings, this suggests that parents possess sufficient motivation to feed their children vegetables as indicated by their attempts in doing so, but they need behavioral capability to do so effectively and successfully (Roed et al., 2020; Almeida et al., 2021).

The second study presented in chapter 5 was the pilot study. Parental self-efficacy related to vegetable purchasing and selection, cooking skills, and child engagement using SAM significantly increased post intervention, while no significant changes were detected for parental-confidence in vegetable storage, offering vegetables during stressful situations, and engaging children in conversations about vegetables. The intervention appeared to improve parental knowledge related to nutrient density and vegetable intake recommendations, but not parental knowledge of effective feeding styles. The intervention's effects on parental beliefs and practices were also assessed. Parental beliefs about using language and literacy to have conversations with their children about vegetables was enhanced but intention to use SAM and beliefs about the importance of SAM did not change significantly. Although only minimal changes related to use of positive feeding style practices in different mealtime situations were observed, changes in parental behaviors related to the quantity and variety of vegetable served, sensory-centered engagement strategies, and repeated exposures through tasting were seen.

In addition to the quantitative data, qualitative analysis identified four major findings. First, major contributors to intervention's acceptability by parents were the intervention's perceived benefits, it's ability to reduce real and perceived barriers, as well as its ability to promote access to needed resources. Examples of perceived benefits included reduced trips to the doctor, overall health and well-being, and confidence in school. Examples of perceived barriers included reduced time, cost, and difficulty in preparing vegetables that were both healthy and appealing. Easy access to curriculum programming and materials as well as being able to connect with other parents in the community were also cited as reasons for intervention acceptability. Second, increased parental self-confidence was largely due to improvements in behavioral capability. For example, parents reported that the class provided them with a knowledge and skills base along with innovative ideas for serving vegetables. Third, improvements in parental knowledge were mainly related to foundational concepts in nutrition and the concept of SAM, with many parents referencing gains in knowledge on nutrient density as well as how to integrate SAM in the kitchen. Fourth, enhancements in parental skills were primarily related to cooking and resource-management.

Study Strengths and Limitations

Despite the challenges of conducting controlled studies among limited resource parent populations, program retention was 100% with 92% mean attendance per class (Brannon et al., 2013). The absence of attrition may be attributed to several factors grounded in both the design and implementation. First, the collection of needs assessment data to inform the curriculum development allowed the curriculum content to be appropriately tailored to meet the needs and preferences of the primary audience, while building on the existing supports that are utilized. This helped researchers to avoid a disconnect between programming content and parent needs. Second, rigorous and consistent communication and follow-up with parent participants was established through e-mails, texts, and phone calls during the intervention. Furthermore, access to peer supports and shared lived experiences among parents during classes promoted a sense of community and also helped build rapport between the instructor and the parents. Third, the programming was conducted remotely using a virtual Zoom format, eliminating the need of transportation to a physical center. Flexibility regarding class times and grocery box pick-up times allowed parents a convenient way of obtaining the educational materials needed during the class.

Study limitations included the use of self-report measures, use of convenience sampling, absence of matched control groups, and lack of instrument validity testing. Although food frequency questions used in this study were based on food frequency questionnaires used in the literature, self-report measures may exhibit lower reliability than observational measures due to limited ability of participants to accurately recall information (Ravelli & Schoeller, 2020; Subar et al., 2015). Training of participants to self-estimate food intake may be a viable method to address this. In this study, both convenience and purposive sampling were employed due to the existing partnerships with Head Start centers in these areas. A large enough pool of eligible participants were not available for random sampling, so every participant who applied and met the eligibility criteria was able to participate in the study, limiting the generalizability of the findings to parents residing in other regions of Georgia. Since the study intended to assess the impact of intervention on limited resource parents of young children enrolled in Head Start, the purposeful selection of participants who can best help understand the phenomenon being investigated was warranted. If a larger participant pool becomes available in the future, the researchers will consider either utilizing maximal variation sampling (selecting individuals who differ within the constraints of eligibility in order to enhance representation), or randomizing sample participants who meet the eligibility criteria to either of 2 control groups and an intervention group (Tucker et al., 2006; Dollahite et al., 2014). In this study, a within-subjects repeated measures design was favored in lieu of a design employing matched control groups given the small sample size. Given the preliminary and exploratory nature of this pilot study, reliability and validity testing is also needed through multivariate assessment techniques like factor analysis and structural equation modeling.

Implications for Research, Practice, and Policy

The findings from this study illustrate the importance of engaging and supporting parent primary audiences to be key players in their children's nutritional health and well-being. Research efforts should focus on developing nutrition education interventions tailored for parents and caregivers in the home setting. In particular, efforts to enhance parental motivation and awareness are less needed, and other areas such as improving behavioral capability should be prioritized. More attention should be given to providing parents with the knowledge, skills, tools, and resources needed to promote healthy eating in the home. In addition, there is a need for the development of validated tools to assess measures of parental acceptability and other psychosocial outcomes related to nutritional intake and engagement during implementation of such interventions. The study's findings also reveal implications for practice. In this study, community partnerships with Head Start centers and researchers was critical in promoting programming to parents. Schools and childcare centers may be viewed by parents as more legitimate and trustworthy sources of programming. Thus, partnerships between university institutions' extension programs and community Head Start grantees are essential for connecting programming resources and opportunities to parents of young children. Utilization of peer support networks as a means for connecting parents to other parents in the community and facilitating the exchange of information, ideas, resources, and shared experiences may also be vital to empowering parents. In the realm of policy, there are currently no programs that are intended to simultaneously support both academic learning and nutritional wellness. SNAP-ED and EFNEP represent key programs designed to improve nutrition education among various age groups, while Head Start plays a critical role in promoting academic readiness among young children. However, no interdisciplinary program exists that fully integrates cognitive learning and nutrition. Given that both nutrition and academic learning are both vital to ensuring a healthy and productive society, there is perhaps a need for interdisciplinary program sectors that integrate nutrition and academic education. This would represent a multi-level approach to combatting obesity and metabolic disease by interrupting generational cycles of unhealthy eating in high-risk groups.

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APPENDIX A

CURRICULUM LESSON PLANS

Lesson 1
Veggies: Kind of a Big Dill!

Lesson Title: Veggies: Kind of a Big Dill!

Topics Covered:
- Importance of Eating a Variety of Different Colored Vegetables, Nutrient Density, Caloric Density, Food Forms (e.g., canned, frozen, fresh), Health Benefits, Vegetable Intake Recommendations

Description of Lesson:
- In this lesson, the concept of vegetables as "medicine" and "investments" will be introduced. Parents will reflect on the importance and health benefits of eating a variety of vegetables. Parents will understand the difference between nutrient density and caloric density and practice identifying nutrient dense vegetables. Parents will learn the amounts of vegetables that they and their children should be consuming on a daily basis. Parents will teach their children the importance of eating a variety of different colored vegetables. Parents and children will prepare a recipe that incorporates different colored vegetables.

Learning Objectives:
- Parents will be able to explain the relationship between vegetables, health, and disease prevention
- Parents will be able to identify which vegetables and vegetable combinations have higher nutrient density
- Parents will be able to state the federally recommended amounts for daily vegetable intake in both adults and children (MyPlate.gov, DGAs, 2020).

Essential Questions:
- Why is it important to eat vegetables? How are vegetables related to health and disease?
- Why is it important to eat a variety of different colored vegetables?
- What is nutrient density and caloric density, and how are they different?
- How much vegetables does your child need on a daily basis?
- How many vegetables should you (parent) eat during mealtimes?

Outline of Class Activities:

- **EXCITE: Activator (4 min)**
  - Show parents motivational quotes. Ask parents to read the quotes. Have parents discuss what the quotes mean to them. Give parents a pep talk on this class and what they will get out of the class even after it is finished. Ask parents to guess MyPlate recommendations for how much vegetables they should be eating. Ask parents to guess the DGA's recommendations for how much vegetables

children should eat and compare to how much parents think they are actually eating.

- **EXPLAIN: Let's Learn (15 min)**
  - Tell parents what the actual federal recommendations for adult and child vegetable intakes. Present DGA figures comparing recommended intakes and actual intakes in children. Discuss factors that can affect recommended intakes (e.g., age, weight, sex, activity levels) using NIDDKw website.
  - Briefly discuss the difference between portions and serving sizes, how to locate these on the nutrition label, and show parents easy ways to comparatively estimate via Nourish website. and nutrient density presented in an "eat this, not that" format. Show slides comparing nutrient density of different vegetables. Familiarize parents with color groups (red, orange, yellow, green) and benefits of each. Discuss myths of how nutrients are affected by storage (e.g., frozen vegetables are not always less nutrient dense than fresh or canned). Show parents the USDA article by McGinnis.

- **EXPAND: Let's STEAM (15 min)**
  - Introduce STEAM using Steamspirations YouTube video.
  - Discuss what STEAM is, what is stands for, and why it is important
  - Demonstrate how to use the "Eat the Rainbow" kit with child
    - ➢ Healthy Body Sticker Poster (SCIENCE) - Child will match different colored rainbow vegetable clues (stickers) to body parts that they are good for on a chart showing the human body
    - ➢ Outdoors Activity Booklet (MATH + ART) - Child can complete different challenges such as "Veggie Hop-Scotch" and "Veggie Jump" using sidewalk rainbow chalk.
    - ➢ Meet the Farmer (ENGINEERING + TECHNOLOGY) - Child will get to "meet" a farmer who grows tomatoes, learn how and where tomatoes come from, and other fun facts about tomatoes.
    - ➢ Table Talk Cards (LANGUAGE & LITERACY) - Parent and child will use the cards to have a conversation involving vegetables, colors, and feelings.
    - ➢ Swag - Vegetable Tattoo, Sticker, Magnet, 88Acres Snackbar

- **EXPAND: Let's Cook (30 min)**
  - Parents will learn how to prepare "Spinach Pita Pizza"
  - See recipe card in appendix

- **EXIT: Closing (1 minute)**
  - Have parents set 1 written goal for consuming/serving more nutrient dense vegetables (describe specific amounts) for the next 4 weeks.

<u>Process Measures</u>

- Attendance will be taken
- Parents will send at least 1 photo of their child using either the STEAM kit

- Parents will send at least 1 photo of themselves or child and their finished recipe dish

Resources Used In This Lesson

- https://www.dietaryguidelines.gov/
- https://www.myplate.gov/eat-healthy/vegetables
- https://www.niddk.nih.gov/health-information/weight-management/just-enough-food-portions
- http://www.nourishinteractive.com/healthy-living/free-nutrition-articles/129-portion-control-estimating-food-servings
- https://pubag.nal.usda.gov/catalog/7195775
- https://www.youtube.com/watch?v=C48oHf1TOcg&list=LL0Jc_1zLk5zptqOTHkhbg9A&index=4&ab_channel=STEAMspirations

Lesson 2
"How Much Romains?"

Lesson Title: "How Much Romains?"

Topics Covered:

- Importance of choosing vegetables in-season, resource management, money-saving strategies at the grocery store, food storage tips, resources for preserving/canning/growing your own vegetables, magnitude of food waste on global scale

Description of Lesson:

- In this lesson, the concept of choosing and purchasing vegetables in season will be introduced. Parents will reflect on how to obtain the most nutritional value from vegetables and the concept of "freshness" and how it can be achieved. Parents will be introduced to resources for purchasing vegetables in season. Parents will also learn about different strategies for saving money at the grocery store and calculating cost per unit/amount. Parents will reflect on food waste and learn about the consequences of improper food storage, as well as proper vegetable storage techniques/examples. Parents will teach their children how to grow their own vegetables from "garbage" at home. Parents and children will prepare a recipe that incorporates leftover vegetables.

Learning Objectives:

€ Parents will be able to demonstrate increased self-efficacy/confidence in overcoming barriers through performing resource-management behaviors (e.g., saving money, saving time, storing, selecting nutritious in-season vegetables)

€ Parents will be able to identify which vegetables have higher nutrient density

Essential Questions:

- ❖ Why is it important to purchase vegetables in-season? What are the benefits of doing so?
- ❖ What are some strategies for saving money at the supermarket? How does buying fresh help?
- ❖ How does food waste affect your time and money?
- ❖ What are some methods for properly storing vegetables?

Outline of Class Activities:

- **EXCITE: Activator (7 min)**
    - Show parents motivational quotes. Ask parents to read the quotes. Have parents discuss what eating "fresh" means to them and what does it look like practically. Ask parents to guess what vegetables might be in season right now (fall and spring)? Ask them how they came up with their answers (e.g., "What are some ways you can tell that pumpkins are in season right now?). Show them the answers using Georgia's Growing Season chart.

- **EXPLAIN: Let's Learn (15 min)**
  - Ask parents what are some ways they like to save money at the grocery store. Introduce strategies for saving money and relate how buying in season might contribute to cost-savings. Ask parents which of these strategies they currently engage in. Review 3 example "This or that" exercises with parents (e.g., "Which will probably be more expensive: precut or whole? How do you know?"). Provide parents with resources for buying vegetables in season (Seasonal Food Guide App). Present parents with bar chart of food waste on a global scale and breakdown of amounts by food category. Discuss factors that can contribute to food waste (e.g., food appearance, mishandling). Transition into the food storage.
  - Show clip of video on food scavenging in NYC and ask parents to think about why this occurs. Discuss factors like spoilage, appearance (vegetable grading/sorting), and seasonal surplus. Ask parents why is proper food storage important. Review strategies for properly storing fruits and vegetables in the refrigerator. Provide examples of vegetables and how to store them properly to preserve longevity.

- **EXPAND: Let's STEAM (15 min)**
  - Review what STEAM stands for
  - Introduce characteristics of using Science
  - Discuss how children are naturally predisposed to engage in science thinking
  - Show parents an example of using science in food experiences
    - ➢ Grown From Garbage Activities (green onion or romaine lettuce)

- **EXPAND: Let's Cook (30 min)**
  - Parents will learn how to prepare "Veggie Egg Muffins"
  - See recipe card in appendix

- **EXIT: Closing (1 minute)**
  - Have parents set written goals to select 1 in-season vegetable to purchase at the grocery store that week.

<u>Process Measures</u>

- Attendance will be taken
- Parents will send at least 1 photo of them storing a vegetable properly OR their grown from garbage vegetable growing setup
- Parents will send at least 1 photo of themselves or child and their finished recipe dish

<u>Resources Used In This Lesson</u>

- https://www.worldwildlife.org/teaching-resources/toolkits/be-a-food-waste-warrior
- https://www.nifa.usda.gov/about-nifa/blogs/usdas-complete-guide-home-canning
- https://www.seasonalfoodguide.org/download-app
- https://www.fda.gov/consumers/consumer-updates/are-you-storing-food-safely
- https://www.foodsafety.gov/food-safety-charts

- https://www.nutrition.gov/topics/food-safety/safe-food-storage
- https://www.youtube.com/watch?v=MJmCUSb-ZVo&t=5s&ab_channel=Gothamist
- https://www.youtube.com/watch?v=T9Ff7fydM24&ab_channel=EyewitnessNewsABC7NY
- https://www.youtube.com/watch?v=xgqIHCXemSg&ab_channel=AnthropologieGlobale

Lesson 3
"Every Day I'm Brusslin!"

Lesson Title: "Every Day I'm Brusslin!"

Topics Covered:
- Effects of stress on dietary patterns, diet-related stress management tips for parents, importance of meal planning in reducing mealtime related stress

Description of Lesson:
- In this lesson, parents will understand how stress impacts eating patterns of both the parent and child. The parent will reflect on the importance and health benefits of managing stressors. Parents will learn tips for managing stress (e.g., mindfulness, planning ahead, managing the child's food environment, expectations for vacations and holidays, maintain consistent healthy eating) and practice identifying stressors in fictional scenarios that are relevant to them. Parents will reflect on the benefits of meal planning in reducing mealtime stress. Parents and children will prepare a simple side dish.

Learning Objectives:
€ Parents will be able to develop a plan for managing stressors that affect the eating patterns of themselves and their children (e.g., holidays, vacations)

Essential Questions:
❖ How does stress affect what we eat and what our children eat?
❖ Why is it important to manage stress during mealtimes and snack-times?
❖ What are some strategies for managing stress during meal and snack times?
❖ How does meal planning affect our time and money?
❖ How can we effectively meal plan to set ourselves up for success?

Outline of Class Activities:

- **EXCITE: Activator (4 min)**
    - Show parents funny memes related to parental stress that may be relevant to them. Ask parents to volunteer and discuss out-loud what are some of their top stressors in daily life? Ask parents to think-pair-share and respond to another parent with a tip/strategy that the parent could use to manage the stressor. Discuss the strategies out-loud as a group.

- **EXPLAIN: Let's Learn (15 min)**
    - Discuss the impact of stress on health and child health, particularly eating patterns. Review the top stressors that most parents reported in the Needs Assessment study. Present tips (adapted from Proactive Health Labs) for helping parents to manage stressors. These include mindfulness, self-care, managing the food environment, establish pre-set responses to child demands

with other caregivers in the household, not putting pressure on self to be perfect, but rather consistent, especially during vacations and holidays. Have parents read-aloud the fictional scenarios of stressed out parents: “Diondra and the Long Weekend” and Gabriella and the Failed Vacation.” Ask parents to identify the re-occurring issues in each scenario and to provide recommendations for small changes that the parent in the scenario could make to reduce their stress.

  - Using the Cooking Matter’s No More Mealtime Madness lesson plan as a guide, discuss with parents the importance of weekly meal planning and also maintaining a pantry that is stocked with healthy foods and ingredients. Discuss how practicing these behaviors can help save money and time (eliminating spontaneous unnecessary purchases and impulse buys, driving back & forth to the grocery store due to forgotten items, using up items you already have instead of purchasing more while the other expires) and also benefit our health (reduces reliance on unhealthy convenience foods and eating out meals). Discuss how parents can delegate and involve the entire family in meal planning. Use Cooking Matter’s Making Recipes Work For You to discuss how parents can adjust recipes to optimize their food resources. Ask parents to rate the factors that affect whether a parent makes a recipe. This could include foods that the parent already has in the pantry, family’s tastes, what’s in season, ingredients that are on sale, the amount of time available, and nutrient density. Discuss the use of “recipe frameworks” that parents can use as a foundation and adapt to their own needs.

- **EXPAND: Let’s STEAM (15 min)**
  - Review what STEAM stands for
  - Introduce characteristics of using Technology
  - Complete the exercise of identifying technology examples in the kitchen
  - Review questions about technology that parents can ask their children to engage them
  - Demonstrate how to use the “Go, Grow, Glow” kit with child
    - Go, Grow, Glow Plate (ART) - Children will cut out craft cardstock photos of vegetables and place them on the correct panel on the reusable go, grow, glow plate.
    - Menu Matching Activity Booklet (SCIENCE + MATH)
      Child will circle which vegetables are good for giving energy, growing, and feeling good and discuss different proportions to eat these in.
    - Meet the Farmer (ENGINEERING + TECHNOLOGY) - Child will get to “meet” a farmer who grows carrots, learn how and where carrots come from, and other fun facts about carrots.
    - Table Talk Cards (LANGUAGE & LITERACY) - Parent and child will use the cards to have a conversation involving vegetables, colors, and feelings.
    - Swag Rewards - Sticker, Magnet, 88Acres Snackbar

- **EXPAND: Let’s Cook (30 min)**

- Parents will learn how to prepare “Collard Greens and Beans”
- See recipe card in appendix

- **EXIT: Closing (1 minute)**
    - Have parents google and select 1 inspirational quote for coping/stress management or a funny meme and post it on their refrigerator or send it to another parent.

Process Measures

- Attendance will be taken
- Parents will send at least 1 photo of their child using either the STEAM kit
- Parents will send at least 1 photo of themselves or child and their finished recipe dish

Resources Used In This Lesson

- https://phlabs.com/
- https://cookingmatters.org/community-resources/#lesson-plans

Lesson 4
"Eat Your Peas, Please!"

Lesson Title: "Eat Your Peas, Please"

Topics Covered:

- Importance of responsive feeding practices and food parenting, Satter's Division of Responsibility, and academic content-based engagement strategies that can be incorporated into meal and snack times.

Description of Lesson:

- In this lesson, parents will reflect on their individual feeding styles and learn how to implement healthy and responsive feeding practices during meal and snack times. Parents will take turns reading a script about a story of 4 parents with 4 different feeding styles and guess/discuss which strategy was the most successful in getting their child to eat their vegetables. Parents will reflect on their own reactions when their child won't eat something and what cultural/social norms affect these reactions. Parents and children will prepare a versatile vegetable pasta recipe.

Learning Objectives:

€ Parents will be able to identify healthy feeding practices

Essential Questions:

❖ Why is food parenting important for the child who is being fed?
❖ What are some examples of negative consequences of unhealthy feeding practices?
❖ What are some examples of positive outcomes of healthy feeding practices?
❖ How can we practice healthy feeding practices with our children?

Outline of Class Activities:

- **EXCITE: Activator (7 min)**
    - Show parents feeding practice memes. Have parents volunteer to share what are some feeding practices that they engage in at home to help their child eat vegetables. Ask parents how effective they feel these practices are. Have parents think about the feeding practices they were exposed to as a child and how that affects their own practices. Have parents pair up, write a short script, and act out how they might react when their child doesn't want to eat something and provide a reinforcement solution for getting them to eat the item.

- **EXPLAIN: Let's Learn (15 min)**
    - Present the continuum of feeding styles. Explain the meaning of the axes (responsiveness vs. demandingness). Review the features of each feeding style quadrant. Remind parents that they may not necessarily fall into a single quadrant, since it is a continuum. Ask parents to think about what their feeding style is. Have parents read aloud the feeding style scenarios for Maggie, Chris,

Cameron, and Shanice. Have them guess what each one's feeding style most resembles on the continuum.
    - Present the "Do vs. Don't" list of feeding practices. Show parents Satter's division of responsibility and the tasks for the parent and the child. Compare the difference between positive and negative reinforcements. Discuss the ramifications of unhealthy feeding practices such as using food to reward/punish. Have parents complete the exercises on "This vs. That." Ask parents to think about what possible substitutes they could use in place of the food on the left panel to motivate their child to eat vegetables.

- **EXPAND: Let's STEAM (15 min)**
    - Review what STEAM stands for
    - Introduce characteristics of using Mathematics
    - Discuss examples of different ways to incorporate math into food experiences with children
    - Review the Beans in the Bag activity.
        - Children will plant beans in cotton ball bags and watch them grow (SCIENCE), observing changes in size (MATH) and recording them (ART). Parents will discuss with children how the seeds are different from green beans that are ready to eat (LANGUAGE). Parents will explain how green beans are grown on a large scale in greenhouses (TECHNOLOGY & ENGINEERING). Parents will also read the handout on teaching tips.

- **EXPAND: Let's Cook (30 min)**
    - Parents will learn how to prepare "Squash Pesto Pasta"
    - See recipe card in appendix

- **EXIT: Closing (1 minute)**
    - Have parents practice implementing 1 strategy for engaging their children to eat more vegetables using healthy food parenting this week

Process Measures

- Attendance will be taken
- Parents will send at least 1 photo of a positive reinforcement they used that week to help their children eat vegetables (if any were needed/used)
- Parents will send at least 1 photo of themselves or child and their finished recipe dish

Resources Used In This Lesson

- https://www.ellynsatterinstitute.org/how-to-feed/the-division-of-responsibility-in-feeding/
- https://www.delmonte.com/growinggreat?utm_source=redtricycle&utm_medium=article&utm_campaign=growinggreat
- https://pubmed.ncbi.nlm.nih.gov/26696920/
- https://feedingbytes.com/2012/06/your-food-parenting-style-matters/

https://www.appletozucchini.com/resources/

Lesson 5
"You Won't Be-Leaf How Good This Tastes!"

Lesson Title: "You Won't Be-Leaf How Good This Tastes"

Topics Covered:

- Cooking + serving strategies for making vegetables more appealing.

Description of Lesson:

- In this lesson, parents will learn about different cooking strategies they can use in the kitchen to make vegetables more appealing to their children during meal and snack times.

Learning Objectives:

- Parents will be able to demonstrate increased self-efficacy/confidence in cooking/preparing healthy, low-cost, tasty, and easy vegetable recipes in an appealing manner
- Parents will be able to prepare easy, tasty, healthy, and inexpensive recipes containing vegetables that are appealing to their children

Essential Questions:

- ❖ What are some examples of flavor-flavor pairing? (e.g., PBJ) What is nutrient pairing and why is this important? (e.g., Spinach + citrus)
- ❖ What are some ways you could experiment with form or texture to increase vegetable appeal?
- ❖ How could you adjust how you serve vegetables so that they are more appetizing to your child?
- ❖ Why do you think it might be important to involve children in the cooking process?
- ❖ How many exposures are typically needed before a child is willing to try an unfamiliar vegetable?

Outline of Class Activities:

- **EXCITE: Activator (7 min)**
  - Show parents inspirational quotes about making eating enjoyable. Ask parents what they think the quotes mean. Have parents discuss why it is important to make food enjoyable? Ask parents if they think it is possible to make food that is tasty, nutritious, easy, and inexpensive.
- **EXPLAIN: Let's Learn (15 min)**
  - Present strategies for making vegetables appealing during the cooking process. This includes things like adding seasonings like pepper or paprika, adding aromatics such as garlic, onion, or ginger, a fat source, or caramelizing

vegetables and bringing out their natural sweetness. Next, discuss strategies that parents can use during the preparation/chopping process. This includes changing the physical form of the vegetable like cutting it into smaller bite-sized pieces that are appropriate for the child, shaping the vegetables using cookie cutters, spiralizing or grating the vegetables, experimenting with texture by pureeing or mashing, and baking or sauteeing vs. serving raw. After this, discuss strategies for presenting vegetables to children after the dish is cooked. These include offering vegetables first when the child's appetite is higher, offering children a 2 for 1 deal which gives the child options/choice but also facilitates intake of at least 1 type of vegetable, and using fun dinnerware such as utensils in the shape of dinosaurs. Suggest additional strategies like camouflaging vegetables in other meals like soups, stews, or baked goods (e.g., zucchini bread) or serving vegetables with a dip on the side to make them more palatable. In addition, discuss the importance of involving the child during the meal preparation process. This includes asking the child to choose the vegetables at the supermarket, counting them, bagging them, putting them in the cart, washing the vegetable, putting it in the pot/pan, etc… Remind parents that it takes at least 10-12 exposures before a child might exhibit willingness to try a new vegetable.

    - Have parents complete 8 practice exercises where they brainstorm as a group how to make a vegetable more appealing using different strategies they learned.
    - Material adapted from Cooking Matter's "Kids Say Yes to Fruits and Veggies" and "The Family Kitchen" lesson plans.

- **EXPAND: Let's STEAM (15 min)**
    - Review what STEAM stands for
    - Introduce characteristics of using art.
    - Discuss the benefits of art in helping to develop children's creativity and provide an outlet for self-expression. Provide parents with tips on how to make art accessible and interesting as well as their role in facilitating creativity. Review example scenario and questions that parents could ask.
    - Discuss the different forms that art can take (e.g., singing, dancing, painting, etc…) and different ways parents can integrate art during and outside of meal and snack times.
    - Demonstrate how to use the "Spice of Life" kit with child
        - Watercolor Spices (SCIENCE, ART) - Child will add water to different spices to make different paint colors and use the spice-water solutions to paint on cardstock.
        - Create Your Own Secret Spice Mix Manual (MATH) - Child will use a tablespoon/teaspoon to measure out different spices, combine them, and create their own spice/seasoning mix.
        - Meet the Farmer (ENGINEERING + TECHNOLOGY) - Child will get to "meet" a farmer who grows paprika, learn how and where paprika come from, and other fun facts about paprika.

- Table Talk Cards (LANGUAGE & LITERACY) - Parent and child will use the cards to have a conversation involving vegetables, colors, and feelings.
- Swag Rewards - Sticker, Magnet, Snackbar

- **EXPAND: Let's Cook (30 min)**
  - Parents will learn how to prepare "Zucchini Boats"
  - See recipe card in appendix

- **EXIT: Closing (1 minute)**
  - Have parents set a goal of preparing at least 1 vegetable in a different way than they normally prepare it that week.

Process Measures

- Attendance will be taken
- Parents will send at least 1 photo of themselves or child and their finished recipe dish

Resources Used In This Lesson

- https://fruitsandveggies.org/fruits-and-veggies/
- https://www.health.harvard.edu/blog/study-gives-insight-and-advice-on-picky-eating-in-children-2020060920004
- https://cookingmatters.org/community-resources/#lesson-plans
- https://www.youtube.com/watch?v=E1lUx296yGQ

Lesson 6
"Turn Up the Beet!"

Lesson Title: "Turn Up the Beet"

Topics Covered:
- Use of sensory learning in food experiences, importance of repeated taste exposures

Description of Lesson:
- In this lesson, parents will learn about different ways in getting their children interested and excited about vegetables in order to engage their children in eating vegetables. Parents will reflect on the importance of sensory learning and use of non-taste approaches for exposing their children to vegetables during and outside of meal and snack times.

Learning Objectives:
- Parents will be able to identify at least 1 engagement strategy for motivating their child to eat more vegetables during serving
- Parents will be able to use various engagement strategies to get their children excited about vegetables

Essential Questions:
- ❖ What are some of the ways in which children explore and interact with the food they are eating?
- ❖ What is food neophobia and what do you think causes it?
- ❖ Why is it important to expose our children to vegetables using non-taste approaches?
- ❖ What are some features of vegetables that you can call your child's attention to other than taste?
- ❖ Why is it important to involve children in the cooking process?
- ❖ What are some tasks that children can help with to familiarize them more with vegetables?

Outline of Class Activities:

- **EXCITE: Activator (7 min)**
  - Show parents inspirational quotes related to sensory interactions with food. Ask parents to reflect on how they prepare their vegetables and rate how involved their senses are when preparing them. Ask them how often they involve their children and why might it be important to do so? Have parents rank what they think the top reason is for their child's unwillingness to consume vegetables. Have parents select a vegetable in their house. Give each parent a Veggie Bingo sheet and read out vegetable characteristics (requires the parent to investigate

using their senses). If the parent the vegetable chose has that characteristic, they can put an X on the space.

- **EXPLAIN: Let's Learn (15 min)**
  - Present parents with data on repeated taste exposure and the average # of exposures that it takes for children to exhibit willingness to try an unfamiliar vegetable. Discuss that taste exposures are most effective when they are used with other healthy feeding practices such as parental modelling, non-food based reinforcements, flavor-flavor learning, and flavor-nutrient learning. Introduce parents to the concept of non-taste approaches for familiarizing children with vegetables (e.g., sight, hearing, smell, touch). Discuss examples of sensory-learning techniques that parents can implement during or outside of mealtimes (e.g., asking child to smell pickles vs. fresh cut cucumbers). Highlight specific examples of how to use smell (e.g., asking child to compare how onions smell when they are whole, cut, and sauteed).
  - Present ideas for how to involve the child in kitchen tasks (e.g., washing vegetables, peeling leaves or removing/pulling stems, putting them in the pot once they are chopped, etc…).

- **EXPAND: Let's STEAM (15 min)**
  - Review what STEAM stands for
  - Introduce characteristics of using Engineering
  - Demonstrate how to use the "Sensory Detectives" kit with child
    - ➢ Mystery Bag (SCIENCE) - Parent will place different vegetables in the drawstring mystery bag. Child will guess which vegetables are in the bag using their five senses.
    - ➢ Sensory Detectives Booklet (MATH, ART) - Child will complete an lettuce adventure checklist comparing the colors, sizes, and features of different lettuce varieties
    - ➢ Meet the Farmer (ENGINEERING + TECHNOLOGY) - Child will get to "meet" a farmer who grows lettuce, learn how and where lettuce come from, and other fun facts about lettuce.
    - ➢ Table Talk Cards (LANGUAGE & LITERACY) - Parent and child will use the cards to have a conversation involving vegetables, colors, and feelings.
    - ➢ Swag Rewards - Sticker, Magnet, Snackbar

- **EXPAND: Let's Cook (30 min)**
  - Parents will learn how to prepare "Sweet Potato Fries"
  - See recipe card in appendix

- **EXIT: Closing (1 minute)**
  - Have parents choose 1 kitchen related task for preparing vegetables they would involve their child in during the week.

Process Measures

- Attendance will be taken
- Parents will send at least 1 photo of the kitchen related task the child engaged in.
- Parents will send at least 1 photo of themselves or child and their finished recipe dish

Resources Used In This Lesson

- https://www.ahealthieramerica.org/articles/yes-kids-can-learn-to-love-veggies-756

https://cookingmatters.org/community-resources/#lesson-plans

Lesson 5
“You Won’t Be-Leaf How Good This Tastes!”

Lesson Title: “You Won’t Be-Leaf How Good This Tastes”

Topics Covered:
- Cooking + serving strategies for making vegetables more appealing.

Description of Lesson:
- In this lesson, parents will learn about different cooking strategies they can use in the kitchen to make vegetables more appealing to their children during meal and snack times.

Learning Objectives:
- Parents will be able to demonstrate increased self-efficacy/confidence in cooking/preparing healthy, low-cost, tasty, and easy vegetable recipes in an appealing manner
- Parents will be able to prepare easy, tasty, healthy, and inexpensive recipes containing vegetables that are appealing to their children

Essential Questions:
- ❖ What are some examples of flavor-flavor pairing? (e.g., PBJ) What is nutrient pairing and why is this important? (e.g., Spinach + citrus)
- ❖ What are some ways you could experiment with form or texture to increase vegetable appeal?
- ❖ How could you adjust how you serve vegetables so that they are more appetizing to your child?
- ❖ Why do you think it might be important to involve children in the cooking process?
- ❖ How many exposures are typically needed before a child is willing to try an unfamiliar vegetable?

Outline of Class Activities:

- **EXCITE: Activator (7 min)**
  - Show parents inspirational quotes about making eating enjoyable. Ask parents what they think the quotes mean. Have parents discuss why it is important to make food enjoyable? Ask parents if they think it is possible to make food that is tasty, nutritious, easy, and inexpensive.

- **EXPLAIN: Let’s Learn (15 min)**
  - Present strategies for making vegetables appealing during the cooking process. This includes things like adding seasonings like pepper or paprika, adding aromatics such as garlic, onion, or ginger, a fat source, or caramelizing vegetables and bringing out their natural sweetness. Next, discuss strategies that parents can use during the preparation/chopping process. This includes

changing the physical form of the vegetable like cutting it into smaller bite-sized pieces that are appropriate for the child, shaping the vegetables using cookie cutters, spiralizing or grating the vegetables, experimenting with texture by pureeing or mashing, and baking or sauteeing vs. serving raw. After this, discuss strategies for presenting vegetables to children after the dish is cooked. These include offering vegetables first when the child's appetite is higher, offering children a 2 for 1 deal which gives the child options/choice but also facilitates intake of at least 1 type of vegetable, and using fun dinnerware such as utensils in the shape of dinosaurs. Suggest additional strategies like camouflaging vegetables in other meals like soups, stews, or baked goods (e.g., zucchini bread) or serving vegetables with a dip on the side to make them more palatable. In addition, discuss the importance of involving the child during the meal preparation process. This includes asking the child to choose the vegetables at the supermarket, counting them, bagging them, putting them in the cart, washing the vegetable, putting it in the pot/pan, etc… Remind parents that it takes at least 10-12 exposures before a child might exhibit willingness to try a new vegetable.

    - Have parents complete 8 practice exercises where they brainstorm as a group how to make a vegetable more appealing using different strategies they learned.
    - Material adapted from Cooking Matter's "Kids Say Yes to Fruits and Veggies" and "The Family Kitchen" lesson plans.

- **EXPAND: Let's STEAM (15 min)**
    - Review what STEAM stands for
    - Introduce characteristics of using art.
    - Discuss the benefits of art in helping to develop children's creativity and provide an outlet for self-expression. Provide parents with tips on how to make art accessible and interesting as well as their role in facilitating creativity. Review example scenario and questions that parents could ask.
    - Discuss the different forms that art can take (e.g., singing, dancing, painting, etc…) and different ways parents can integrate art during and outside of meal and snack times.
    - Demonstrate how to use the "Spice of Life" kit with child
        - Watercolor Spices (SCIENCE, ART) - Child will add water to different spices to make different paint colors and use the spice-water solutions to paint on cardstock.
        - Create Your Own Secret Spice Mix Manual (MATH) - Child will use a tablespoon/teaspoon to measure out different spices, combine them, and create their own spice/seasoning mix.
        - Meet the Farmer (ENGINEERING + TECHNOLOGY) - Child will get to "meet" a farmer who grows paprika, learn how and where paprika come from, and other fun facts about paprika.
        - Table Talk Cards (LANGUAGE & LITERACY) - Parent and child will use the cards to have a conversation involving vegetables, colors, and feelings.
        - Swag Rewards - Sticker, Magnet, Snackbar

- **EXPAND: Let's Cook (30 min)**
  - Parents will learn how to prepare "Zucchini Boats"
  - See recipe card in appendix

- **EXIT: Closing (1 minute)**
  - Have parents set a goal of preparing at least 1 vegetable in a different way than they normally prepare it that week.

Process Measures

- Attendance will be taken
- Parents will send at least 1 photo of themselves or child and their finished recipe dish

Resources Used In This Lesson

- https://fruitsandveggies.org/fruits-and-veggies/
- https://www.health.harvard.edu/blog/study-gives-insight-and-advice-on-picky-eating-in-children-2020060920004
- https://cookingmatters.org/community-resources/#lesson-plans
- https://www.youtube.com/watch?v=E1lUx296yGQ

Lesson 7
"Lettuce Chat About Veggies"

Lesson Title: "Lettuce Chat About Veggies"

Topics Covered:
- Food literacy, conversations about vegetables

Description of Lesson:
- In this lesson, parents will reflect on the benefits of exposing children to nutrition-centered language and literacy outside of meal and snack times.

Learning Objectives:
- Parents will be able to demonstrate increased self-efficacy/confidence in engaging children and motivating them to try/eat more vegetables during and outside of meal and snack times.

Essential Questions:
- ❖ What is food and nutrition literacy?
- ❖ What are some non-nutrition benefits of having conversations with your children about vegetables?
- ❖ What are some strategies for integrating language, literacy, and food?

Outline of Class Activities:

- **EXCITE: Activator (7 min)**
    - Show parents inspirational quotes related to reading and talking with children about vegetables. Have parents volunteer to share if they agree or disagree and explain why. Ask parents to think about what the majority of their conversations with their children are about and what percentage of those conversations have to do with vegetables and/or nutrition? Have parents participate in an exercise where you show a photo of a vegetable and you ask them to write down 5 words that come to mind when they see that vegetable. Read parents a typical schedule of a full-time parent and have parents guess where they could discuss vegetables with their child.

- **EXPLAIN: Let's Learn (15 min)**
    - Present parents with the Heckmane equation of early education + early health + nutrition = healthy adult. Discuss the relationship between education and health. Ask parents if they agree with this equation and explain why or why not. Transition into discussion on vegetables and nutrition/non-nutrition benefits of this. Reference literature that discusses the relationship between language development and academic achievement. Introduce parents to the concept of food and nutrition literacy. Provide parents with tips and strategies on how to have conversations with their children. Give parents examples of how they can discuss vegetables with their children and how they an facilitate probing

questions to get their children talking. Provide parents with a list of children's literature they can use to read with their children. Show parents the resources that are available on foodhero.org. End by having parents pair up and write a short story about vegetables and read it to the group.

- **EXPAND: Let's STEAM (15 min)**
  - Parents will place an assortment of vegetables on a tray and read riddles (descriptions of each vegetable) to see if children can guess which vegetable matches the riddle. After children solve each riddle, pass the vegetable around for children to touch and smell. Have children describe the vegetables out loud.

- **EXPAND: Let's Cook (30 min)**
  - Parents will learn how to prepare "Veggie Fried Rice"
  - See recipe card in appendix

- **EXIT: Closing (1 minute)**
  - Have parents write a vegetable joke and send it to another parent.

Process Measures

- Attendance will be taken
- Parents will send at least 1 photo of themselves or child and their finished recipe dish

Resources Used In This Lesson

- https://www.foodhero.org/
- https://eclkc.ohs.acf.hhs.gov/video/engaging-children-conversations#:~:text=Conversations%20are%20important%20because%20they,also%20foster%20children%27s%20cognitive%20development.
- https://raisingchildren.net.au/preschoolers/connecting-communicating/communicating/conversation-skills
- https://blog.kaplanco.com/ii/teach-children-about-nutrition

Lesson 8
"STEAM in the Kitchen"

Lesson Title: "STEAM in the Kitchen"

Topics Covered:

- STEAM, importance of STEAM, What STEAM stands for, examples of STEAM activities

Description of Lesson:

- In this lesson, parents will revisit why STEAM is important, what it stands for, examples of STEAM activities, and myths about STEAM.

Learning Objectives:

- Parents will be able to demonstrate increased self-efficacy/confidence in engaging children and motivating them to try/eat more vegetables during and outside of meal and snack times.
- Parents will be able to use various engagement strategies to get their children excited about vegetables

Essential Questions:

- ❖ What is STEAM and what is it not?
- ❖ What does STEAM stand for?
- ❖ Why is STEAM important?

Outline of Class Activities:

- **EXCITE: Activator (7 min)**
    - Show parents inspirational quotes about education and learning. Ask parents which of these quotes resonate with them the most and why. Ask parents why not only nutrition but also education is important to their child's overall health and well-being. Discuss social determinants of health (e.g., career, income, housing, etc…). Remind parents about the Heckmane equation covered in the previous lesson.

- **EXPLAIN: Let's Learn (15 min)**
    - Review what STEAM stands for and what it is. Elaborate on the various features and aspects of STEAM (e.g., four Es and Four Cs). Remind parents why STEAM is important. Discuss the matter of jobs in the future and need for these subject areas. Show parents the success of STEAM in classroom settings among older children. Remind parents that children are natural learners and the complementary nature of STEAM and food and nutrition. Review myths of STEAM with parents by having parents guess if the statement is true or false. Briefly review the Head Start STEAM informational pages.
- **EXPAND: Let's STEAM (15 min)**

- Show parents an example that incorporates several content areas from STEAM into a single activity (Preschool Science: Dissecting Veggies).
    - Children will describe what the seeds look like, how the plant grows, and what part of the plant that we eat by cutting into vegetables and observing the peel, roots, stems, seeds, and flesh and counting them. Children will discuss what makes the vegetables alike and different by drawing them.
- Have parents complete the STEAM veggie exercise. Have parents bring a vegetable to the table. Have them plan an activity or exercise they could do with their child using the vegetable
- Make sure parents use at least 3 STEAM components. Have parents share with the class how they might use STEAM to introduce the vegetable, get their child interested in the vegetable, or familiarize the child with the vegetable. Provide prompts to guide parents.
- If time allows, show parents the exercise on homes and how these could be adapted to food and nutrition learning.

- **EXPAND: Let's Cook (30 min)**
    - Parents will learn how to prepare "Carrot Fritters"
    - See recipe card in appendix

- **EXIT: Closing (1 minute)**
    - Have parents write down 1 STEAM strategy/activity they will use to serve 1 vegetable to their child.

Process Measures

- Attendance will be taken
- Parents will send at least 1 photo of themselves or child and their finished recipe dish

Resources Used In This Lesson

- https://raisinglifelonglearners.com/dissecting-vegetables-activity/

APPENDIX B

CURRICULUM SCHEDULE

Curriculum Schedule of Lesson Topics (Classes 1 - 4)				
Component	**Class #1**	**Class #2**	**Class #3**	**Class #4**
Title	"Veggies: Kind of a Big Dill"	"How much Romains"	"Every day I'm Brusslin"	"Eat Your Peas, Please'
Parent Lesson (20 min)	Nutrient Density and Recommendations	Purchasing, Buying in-Season, Saving Money, Storage	Eating Healthy and Setting Up For Success Under Stress	Vegetable Feeding Practices
SAM Children's Activity (10 min)	"Eat the Rainbow" Explorer Kit 	"Grown From Garbage" DIY Activity	"Go, Grow, Glow" Explorer Kit 	"Beans in a Bag" DIY Activity
Recipe Demo (30 min)	Veggie Pita Pizza 	Veggie Egg Muffins 	Squash Pesto Pasta 	Collard Greens/Beans 

Lesson Topics (Classes 5 - 8)				
Component	**Class #5**	**Class #6**	**Class #7**	**Class #8**
Title	"You Won't Be-Leaf How Good This Tastes"	"Turn Up the Beet"	"Lettuce Chat About Veggies"	"STEAM in the Kitchen"
Parent Lesson (20 min)	Making Vegetables Appealing	Using Sensory Approaches to Introduce Vegetables	Using Language and Literacy to Promote Vegetable Familiarization	"Integrating Science, Art, and Math" and Food Experiences
SAM Children's Activity (10 min)	"Spice of Life" Explorer Kit 	"Sensory Detectives" Explorer Kit 	"Vegetable Riddle Game" DIY Activity	"Dissecting Veggies" DIY Activity
Recipe Demo (30 min)	Zucchini Boats 	Sweet Potato Fries 	Vegetable Fried Rice 	Carrot Pancakes 

APPENDIX C

RECIPE CARDS

Spinach Pita Pizza

Prep Time: 10 minutes | Cook Time: 20 minutes

Total Time: 30 minutes

Ingredients

(Yields 2 servings)

- 2 pita breads (whole wheat)
- 8 oz can of tomato sauce
- 1 cup shredded Mozzarella cheese
- 1 small onion
- 2 mini yellow, red, or orange peppers
- 2 cups of spinach
- Optional: pepperoni, mushrooms

Directions

1. Preheat oven to 425° F
2. Spread tomato sauce on pita bread
3. Sprinkle pita with shredded cheese
4. Dice onion + add to pita
5. Slice peppers + add to pita
6. Wash, dry, + remove stems from spinach and add to pita
7. Transfer pita to baking pan
8. Bake at 425 F° for 20 min or until crust is golden brown + cheese is bubbling
9. Serve + enjoy!

Veggie Egg Muffins

Prep Time: 10 minutes | Cook Time: 20 minutes

Total Time: 30 minutes

Ingredients

(Yields 6 servings)

- 6 eggs
- 1 cup shredded parmesan cheese
- 1 small sweet onion
- 1 beefsteak tomato
- 2 cups of spinach
- 1/2 tsp salt
- 1/2 tsp pepper
- Cooking spray

Directions

1. Preheat oven to 350° F
2. Chop onion + tomato
3. Wash + dry spinach + remove stems
4. Spray muffin tin with cooking oil
5. Crack, combine, + whisk eggs in a mixing bowl
6. Distribute eggs evenly among the muffin compartments so that each one is only half way full
7. Add vegetables, parmesan cheese, salt + pepper
8. Bake for 20 min
9. Remove from tins + enjoy!

Collard Greens and Beans

Prep Time: 10 minutes | Cook Time: 25 minutes
Total Time: 35 minutes

Ingredients

(Yields 3 servings)

- 1 bunch collard greens (5-6 leaves)
- 1 small sweet onion
- 16 oz can great northern beans
- 15 oz can chicken broth
- 1 tbsp olive oil
- Optional: salt, pepper, vinegar
- Substitutions: can use beef or veggie broth

Directions

1. Wash collard greens thoroughly
2. Remove center ribs + stems from collards
3. Cut collard leaves into 1-inch strips
4. Add olive oil to sauté pan + heat on medium
5. Dice onions, add to pan + cook until light brown
6. Add collards + sauté for 2 minutes
7. Add chicken broth to the collards + onions mixture
8. Cook for 20 minutes on high heat, stirring frequently
9. Add northern beans + cook for additional 5 minutes
10. Serve + enjoy!

Squash Pesto Pasta

Prep Time: 5 minutes | Cook Time: 25 minutes
Total Time: 30 minutes

Ingredients

(Yields 4 servings)

- 8 oz pasta (dry, any shape)
- 8 oz pesto sauce (jar)
- 1 small sweet onion
- 1 zucchini squash
- 2 tbsp olive oil
- 1/2 tsp pepper
- 1/4 tsp salt

Directions

1. Boil pasta using package instructions
2. Drain pasta using a colander
3. Add olive oil to pan + heat on medium
4. Dice onion + sauté over medium heat for 2 min
5. Chop squash + add to pan containing onions
6. Sauté the vegetables over medium heat for 3 min
7. Add pasta, pesto sauce, salt + pepper
8. Cook the mixture over medium heat for 2 min
9. Transfer to a plate + enjoy!

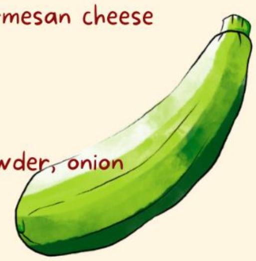
Zucchini Boats

Prep Time: 15 minutes | Cook Time: 25 minutes
Total Time: 40 minutes

Ingredients

(Yields 2 servings)

- 2 medium size zucchinis
- 1/2 cup panko bread crumbs
- 1/4 cup grated parmesan cheese
- 1/4 cup olive oil
- 1/2 tsp salt
- 1/2 tsp pepper
- Optional: garlic powder, onion powder



Directions

1. Preheat oven to 400˚F
2. Slice zucchinis lengthwise into long spears
3. Place zucchinis on a baking pan
4. Coat the zucchini spears with olive oil
5. Sprinkle with salt, pepper, + grated cheese
6. Bake in the oven for 25 minutes
7. Transfer to a serving dish to share and enjoy!

Sweet Potato Fries

Prep Time: 10 minutes | Cook Time: 30 minutes
Total Time: 40 minutes

Ingredients

(Yields 2 servings)

- 2 large sweet potatoes
- 2 tbsp olive oil
- 1/2 tsp salt
- 1/2 tsp pepper
- Optional: dried parsley, paprika

Directions

1. Preheat oven to 375˚F
2. Rinse + peel sweet potatoes
3. Slice sweet potatoes into sticks
4. Place sweet potato sticks onto baking pan
5. Coat sticks thoroughly with olive oil
6. Add salt + pepper
7. Bake for 30 minutes (toss the potatoes after 15 minutes and continue baking)
8. Transfer to a serving dish to share + enjoy!

Carrot Fritters

Prep Time: 20 minutes | Cook Time: 7-10 minutes
Total Time: 30 minutes

Ingredients

(Yields 2 servings)

- 3 large carrots
- 2 eggs
- 1/4 cup flour
- 2 tbsp olive oil
- 1/2 tsp salt
- 1/2 tsp pepper
- Optional: onion powder, garlic powder

Directions

1. Preheat pan to medium-high heat + add olive oil
2. Wash + peel carrots
3. Grate carrots into shreds using a grater
4. Crack + whisk eggs in a bowl
5. Mix egg + flour + carrots + salt + pepper
6. Use spatula to shape mixture into 2 inch circles
7. Sauté patties on medium heat for 3 min on each side
8. Transfer fritters to a serving dish to share + enjoy!

Veggie Fried Rice

Prep Time: 5 minutes | Cook Time: 20 minutes
Total Time: 25 minutes

Ingredients

(Yields 4 servings)

- 1 bag of frozen mixed vegetables
- 2 cups of rice (brown or white)
- 1 tbsp soy sauce
- 2 tbsp olive oil
- 1/2 tsp salt
- 1/2 tsp pepper

Directions

1. Measure out 2 cups of rice + cook using package instructions
2. Defrost mixed vegetables at room temperature
3. Add olive oil to frying pan + turn on heat
4. Add vegetables to pan + sauté on medium heat for 5 min
5. Add rice to pan containing vegetables
6. Sauté for another 5 minutes
7. Transfer to bowls + enjoy!

APPENDIX D

EXPLORER KITS

STEAM Activity: Eat the Rainbo

What's In This Kit?

ACTIVITIES: Match the Rainbow Color Clues to Healthy Bodies, Veggie Sidewalk Chalk Games

RECIPE: Create a Rainbow Wrap

TOOLS: Sidewalk chalk & Tomato tattoo

SNACK: 88 Acres Seed Bar

COLLECTIBLES: Meet the farmer, sticker, magnet, and table talk conversation cards

STEAM Activity: Go Grow Glow!

What's In This Kit?

ACTIVITIES: Nutrition-Focused Menu Matching

TOOL: Reusable Go, Grow, Glow Plate

RECIPE: Go, Grow, Glow Stir Fry

SNACK: 88 Acres Seed Bar

COLLECTIBLES: Meet the farmer, sticker, magnet, and table talk conversation cards

STEAM Activity: Spice of Life

What's In This Kit?

ACTIVITIES: Create a spice kit, Aromatic spice painting

RECIPE: Roasted Sweet Potatoes with Secret Spice Mix

TOOLS: Personalized spice tin, measuring spoons, artist palette, paintbrush, and watercolor paper

SNACK: 88 Acres Seed Bar

COLLECTIBLES: Meet the farmer, sticker, magnet, and table talk conversation cards

STEAM Activity: Sensory Detectives

What's In This Kit?

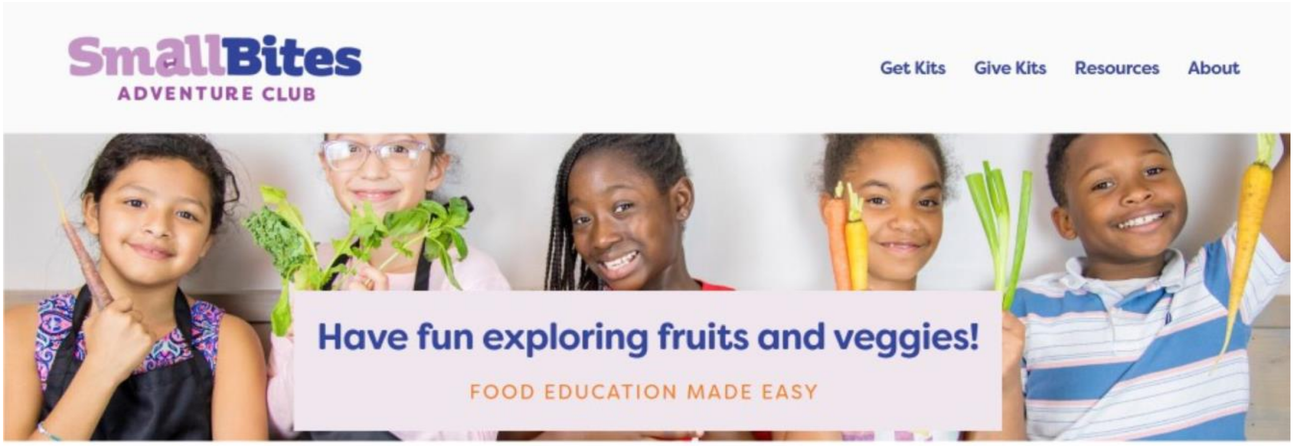
ACTIVITIES: Mindful Eating, Apple Adventure

TOOL: Mystery Bag

RECIPE: Sunflower Butter Dip

SNACK: 88 Acres Seed Bar

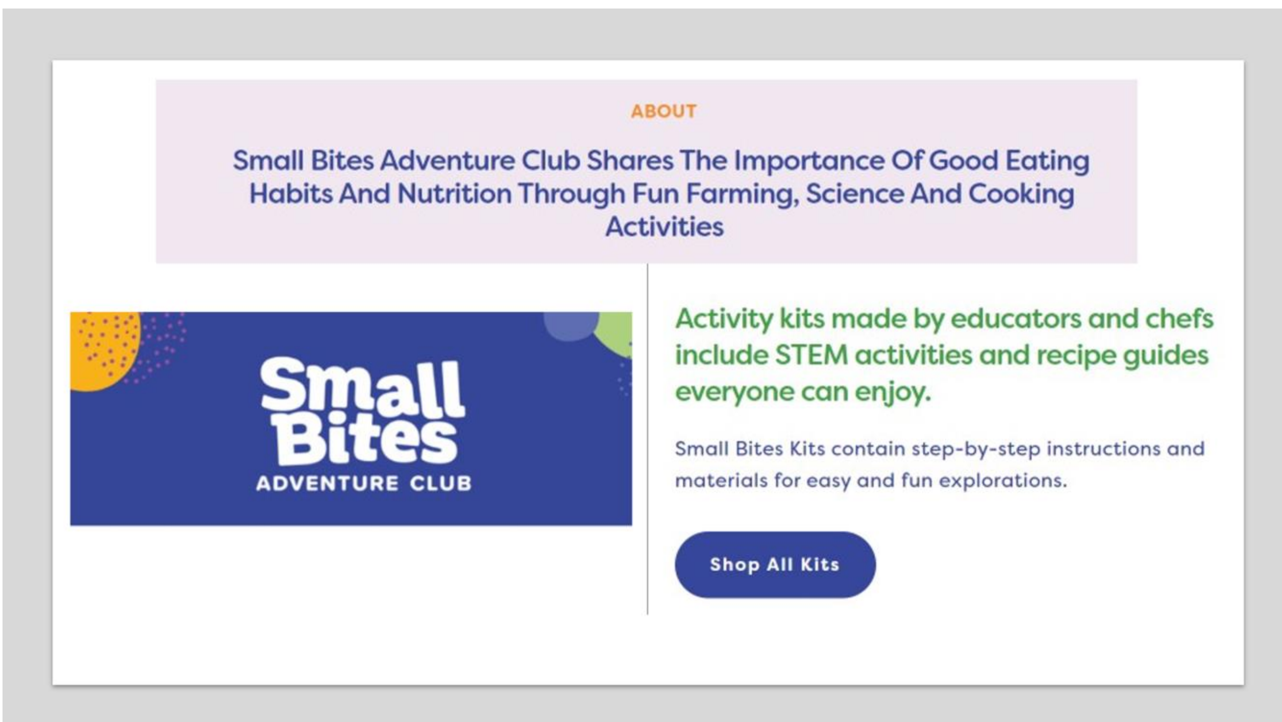
COLLECTIBLES: Meet the farmer, sticker, magnet, and table talk conversation cards



Explorer Kits

SmallBites Adventure Club LLC ®

https://smallbites.club/



Monthly hands-on cooking kits provide children with tools to learn about, grow and prepare fruits and vegetables

Nine out of 10 children in the U.S. don't eat the recommended amount of vegetables. And,some children sometimes go **days** without eating a single vegetable.

But it doesn't have to be that way. When children have the opportunity to prepare and taste fruits and vegetables - they will not only like them, they will **love** them!

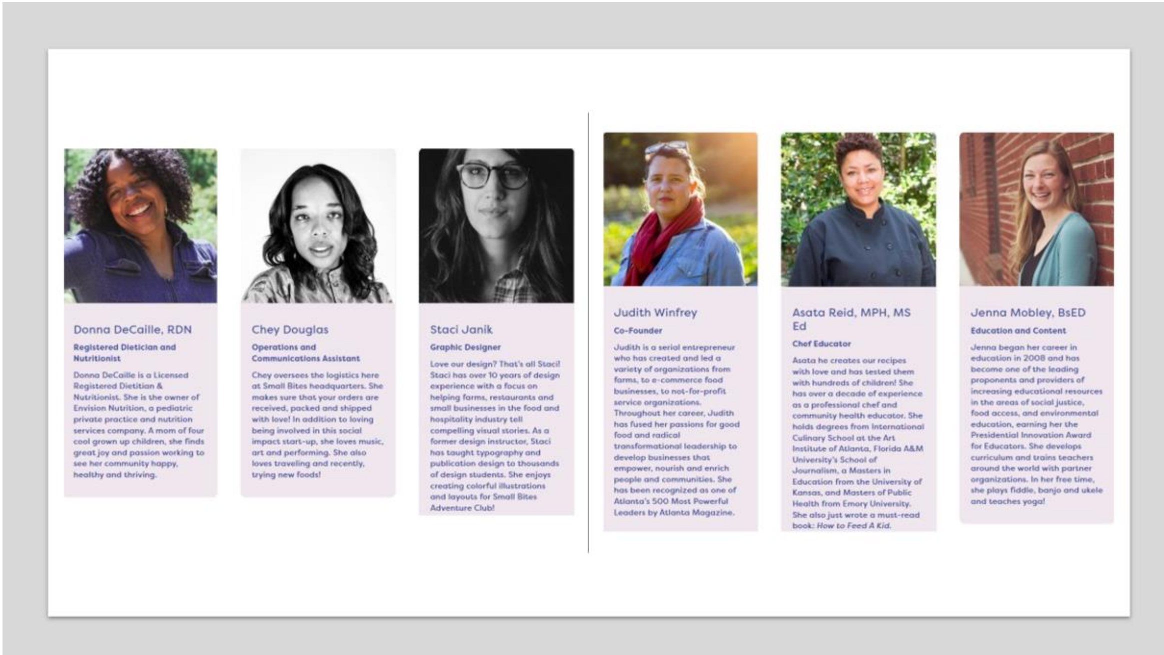
We believe that teaching kids about fruits and vegetables is not just about health - it's about discovering food in all of its wonder: how it's grown, what it looks and smells like, and how to prepare a simple recipe.

Our vision is that every child receives the opportunity to discover, eat and love fruits and vegetables. Learn about our team below.

Erin Croom, MS

Co-Founder

Erin brings over 15 years of experience growing and scaling farm to school programming in Georgia and the US. She founded Small Bites Adventure Club in 2018, with the goal of creating turn-key solutions to help children discover, love and eat their fruits and vegetables. She's lives in Atlanta with her husband, 2 kids and a perfect pup.


Donna DeCaille, RDN
Registered Dietician and Nutritionist
Donna DeCaille is a Licensed Registered Dietitian & Nutritionist. She is the owner of Envision Nutrition, a pediatric private practice and nutrition services company. A mom of four cool grown up children, she finds great joy and passion working to see her community happy, healthy and thriving.
Chey Douglas
Operations and Communications Assistant
Chey oversees the logistics here at Small Bites headquarters. She makes sure that your orders are received, packed and shipped with love! In addition to loving being involved in this social impact start-up, she loves music, art and performing. She also loves traveling and recently, trying new foods!
Staci Janik
Graphic Designer
Love our design? That's all Staci! Staci has over 10 years of design experience with a focus on helping farms, restaurants and small businesses in the food and hospitality industry tell compelling visual stories. As a former design instructor, Staci has taught typography and publication design to thousands of design students. She enjoys creating colorful illustrations and layouts for Small Bites Adventure Club!
Judith Winfrey
Co-Founder
Judith is a serial entrepreneur who has created and led a variety of organizations from farms, to e-commerce food businesses, to not-for-profit service organizations. Throughout her career, Judith has fused her passions for good food and radical transformational leadership to develop businesses that empower, nourish and enrich people and communities. She has been recognized as one of Atlanta's 500 Most Powerful Leaders by Atlanta Magazine.
Asata Reid, MPH, MS Ed
Chef Educator
Asata he creates our recipes with love and has tested them with hundreds of children! She has over a decade of experience as a professional chef and community health educator. She holds degrees from International Culinary School at the Art Institute of Atlanta, Florida A&M University's School of Journalism, a Masters in Education from the University of Kansas, and Masters of Public Health from Emory University. She also just wrote a must-read book: *How to Feed A Kid.*
Jenna Mobley, BsED
Education and Content
Jenna began her career in education in 2008 and has become one of the leading proponents and providers of increasing educational resources in the areas of social justice, food access, and environmental education, earning her the Presidential Innovation Award for Educators. She develops curriculum and trains teachers around the world with partner organizations. In her free time, she plays fiddle, banjo and ukele and teaches yoga!

APPENDIX E

DEVELOPMENT AND IMPLEMENTATION TIMELINE

Year 1								
Project Activity	**May 2021**	**June 2021**	**July 2021**	**Aug 2021**	**Sept 2021**	**Oct 2021**	**Nov 2021**	**Dec 2021**
Select dissertation topic	**X**							
Assemble advisory committee		**X**						
Submit program of study			**X**					
Present proposal to advisory committee			**X**					
Meet with statistician to solidify data analysis plan				**X**				
Develop preliminary survey instruments + curriculum + measures					**X**			
Write, submit, and obtain UGA IRB approval						**X**		
Write, submit, and obtain university grant for funding							**X**	
Develop needs assessment interview protocol & questions								**X**

Year 2								
Project Activity	**Jan 2022**	**Feb 2022**	**March 2022**	**April 2022**	**May 2022**	**June 2022**	**July 2022**	**August 2022**
Meet with Head Start directors to disseminate NA eligibility survey to parents	**X**							
Prepare for and conduct individual standardized parent interviews		**X**						
Send data to Rev for transcription		**X**						
Analyze interview data and reach consensus on			**X**					

coding tables & themes								
Write, submit, obtain Clarke County IRB approval			**X**					
Contact Erin Croom & Suppliers regarding STEAM Kit orders				**X**				
Develop, test, and revise curriculum				**X**				
Select validated survey instrument				**X**				
Disseminate eligibility survey to recruit parents for pilot intervention					**X**			
Implement 1st round of intervention (goal n=20 parents)					**X**	**X**		
Preliminary data analysis						**X**		
Spend up all grant funds by June 30th						**X**		
Prepare & submit data report for dissemination to grant stakeholders (June 30)						**X**		
Apply for additional project funding in the fall							**X**	
Meet with Head Start directors for recruitment of 2nd round of pilot study								**X**

Year 3									
Project Activity	**Sept 2022**	**Oct 2022**	**Nov 2022**	**Dec 2022**	**Jan 2023**	**Feb 2023**	**Mar 2023**	**April 2023**	**May 2023**
Implement 2nd round of pilot		**X**	**X**						

intervention (n=20 parents)									
Analyze quantitative data + meet with Dr. Love			**X**	**X**					
Send qualitative data to Rev for transcription			**X**						
Analyze interview data and reach consensus on coding tables & themes				**X**					
Prepare and send 1st draft of dissertation to committee for review					**X**				
Set up committee meetings to discuss revisions or acquire feedback via written correspondence						**X**			
Submit revised draft of dissertation to committee & obtain copyright clearance (*mandatory)						**X**			
Schedule defense date with committee (*3 months before defense)			**X**						
Schedule defense seminar/room # with department (*2 months before defense)					**X**				
Submit final dissertation to					**X**				

committee (*3 weeks before defense date)									
Notify grad coordinator of defense date, #, title, name, advisory committee (*4 wks before defense)						**X**			
Work on defense powerpoint presentation					**X**	**X**			
Defend (*must be 6 weeks prior to graduation date)							**X**		
Submit dissertation to graduate school								**X**	
Graduation									**X**

APPENDIX F

INTERVIEW PROTOCOLS

<table>
<tr><td colspan="2">

Needs Assessment
Interview Questions

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Interview Protocol

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<tr><td colspan="2">
Research Question: What are the barriers, facilitators, needs, and preferences of parents and caregivers when serving fruit and vegetables to young children?
SCT Theoretical Constructs: Self-efficacy, behavioral capability, outcome expectations, observational modelling, observational learning, reinforcements, environment, behavior, cognitive
</td></tr>
<tr><td>Before starting</td><td>
Contact Participants
1. Send participants an e-mail, text, or phone call reminding them of the interview day and time 1 day before and the day of the interview.
2. Make sure to send them the zoom link.

Prepare Questions and Prompts
1. Print the interview questions, prompts, and protocol beforehand.
2. If you are sharing your screen, refrain from having the questions on the screen.

Zoom Recording:
1. Remember to press record as soon as the interview begins. Stop the recording as soon as the interview ends.
2. The interview should be recorded to the cloud or your computer. The recording should include the audio file, the video file, and the chat messages file. Adjust Zoom settings to ensure that all components are saved.
3. After the interview, save/upload the files to a password protected folder. Label each file accordingly.
4. Notify to Dr. Cotwright when the files are ready to send to Rev for transcription. Be sure to start the recording only right before you begin the focus group. The transcription is $1.25 per minute.

Names and email addresses:
-Remember to have participants add their name and email addresses to chat to receive gift cards.
</td></tr>
<tr><td>Welcome and introductions</td><td>
Hi Ms./Mr.________________, thank you for taking the time to do this interview. My name is Jo Shieh, and I’m a PhD student at the University of Georgia. In our lab we investigate strategies to prevent childhood obesity. You were invited to participate because you are a parent with a young child enrolled in Head Start. The purpose of this interview is to learn about your experiences serving fruits and vegetables to your children.
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Housekeeping Items	Before we begin, let's go over a few things: 1. This session will last about 60 minutes. 2. It will be recorded, but all information that you share with us will remain confidential. The final report will keep all participant names anonymous. The audio will only be accessed by the researchers and transcription providers. 3. We do ask that you please turn off other electronic devices to minimize distractions and to please turn your cameras on. 4. Please speak in a clear voice. 5. There are no wrong or right answers. We are looking for honest responses and different points-of-view. We want to know your opinions. 6. Do you have any questions for me before we start?
Interview Questions and Prompts	**1. What fruits do you serve to your children (please list)?** **2. What vegetables do you serve to your children (please list)?** **3. When you serve your children <u>vegetables</u>, how do(es) your child(ren) react or respond?** ➢ Prompt: Describe the extent to which the child is willing/unwilling to try them. **4. When you serve your children <u>fruits</u>, how do(es) your child(ren) react or respond?** ➢ Prompt: Describe the extent to which the child is willing/unwilling to try them.

	5. **How would you describe your <u>feeding style</u> when serving fruit and vegetables to your child(ren)?** a. Prompt**:** How strict or lenient are you about the fruits/vegetables your child consumes? b. Prompt: What is your response when your child rejects a fruit/vegetable you have served them (e.g., punish, threaten, reason, coax, model, praise)? 6. **How <u>accessible</u> are fruits and vegetables to your child(ren) at home?** ➢ Prompt: Where are fruit/vegetables kept in the home? ➢ Prompt: How easy is it for your child(ren) to access them? ➢ Prompt: Describe the availability of fruit/vegetables in your home. ➢ Prompt: Which fruit/vegetables are harder or easier to provide? 7. **What kinds of <u>conversations</u>, if any, do you have with your child(ren) about fruits and vegetables?** ➢ Prompt: Describe the extent to which you discuss the health benefits of F/V? (e.g., Describe your discussions, if any, related to the following questions: Why it's important to eat them? What happens if they don't eat them?) ➢ Prompt: During these conversations, are you doing most of the talking or is your child? Does your child usually initiate these conversations or do you? ➢ Prompt: When do you have conversations with your children about fruits and vegetables? What is the context (time, setting) of your conversations? (e.g., is it only at meal and snack-times? Only when they ask you questions? When they see something on television or in a book?) 8. **As a parent, what are some things that make it <u>challenging</u> for you to serve your child(ren) fruits and vegetables?**

	a. Prompt: Which of the following challenges do you face at home? (e.g., Not having enough nutrition knowledge about F/V nutrition, lack of cooking skills, time, energy, money, training, physical resources, or educational resources?) b. Prompt: How serious are these challenges for you? Describe whether these are major or small barriers for you? c. Prompt: To what extent do you think these challenges can be overcome? **9. What are some <u>challenges</u> to serving fruits and vegetables from your child(ren)'s perspective?** a. Prompt: Which of the following behaviors do your children exhibit that make it difficult for you to serve them fruits and vegetables? i. Picky eating/eating preferences, inability to comprehend, and unwillingness to listen? b. Prompt: To what extent do you think these challenges can be overcome? Are they in your control out of your control? **10. What are some <u>resources</u> that you currently have access to that you feel are helpful in serving fruit and vegetables your child(ren)?** a. Prompt: What are some supports that you feel like help you serve fruits and vegetables to your children? (e.g., Advice from other doctors/nutrition professional, sharing strategies with other parents, paper handouts from school, community programs?) **11. What are some <u>activities or strategies</u> you as a parent personally use to get your child(ren) to try fruits and vegetables at home and how effective would you say these strategies are?** a. Prompt: What kinds of things do you do to get your children to try fruits and vegetables? (e.g., do you reward them or make them aware of negative consequences?)

	b. Prompt: To what extent do you use hands-on activities, if any (Hands-on activities are ones that keep the child actively involved and engaged)? **12. What kinds of physical <u>materials</u> do you use to engage your child(ren) to try fruits and vegetables?** a. Prompt: Describe any games, coloring books, children's literature, television shows, stuffed animals, figurines/toys, or puppets that you might use. b. Prompt: Describe how you obtain these materials (e.g., bought or things you already have around the house?) **13. Sensory characteristics can include the way something look, smells, feels, or tastes. Describe your experiences, if any, in discussing the <u>sensory characteristics</u> of foods with your child(ren).** a. Prompt: What other features of fruit and vegetables other than taste (e.g., smell, texture, color) do you ask your child to explore, if any, when serving them fruit and vegetables? **14. Describe how you have used art, math, or science in getting your child(ren) to eat fruit vegetables. Describe the extent to which you have included these topics.** a. Prompt: Describe any creative strategies like singing, music, role-playing, dancing, coloring, or drawing to communicate about F/V to your children. b. Prompt: Describe any strategies like counting, measuring, weighing. c. Optional Prompt: How interested are you in being able to learn how to serve your children fruits and vegetables using art, math, and science? d. Optional Prompt: How familiar are you with STEAM (Science, technology, engineering, art, math) education?

	15. If you could have a toolbox to teach your children's about F/V, what would you want it to include? ➢ Prompt: What are some tools you wish you had or feel like you need that would help you teach your child about food and nutrition? ➢ What kinds of resources (e.g., skills, knowledge, materials) would you like to have if you took a class or training? ➢ What are some topics you would like to learn more about or see covered? **16. As a parent, what role do you think you play in teaching your child(ren) to eat more fruits and vegetables?** a. Prompt: To what extent do you think it's the ECE teacher's job and to what extent do you think it's your job to teach your child to eat more fruits and vegetables? b. Prompt: Overall, whose responsibility is it to teach your children about eating fruits and vegetables? c. Prompt: How much control do you think you have over your children's fruits and vegetables intake? **17. Describe how confident you are in your own knowledge and skills in serving fruit and vegetables to your child(ren) at home.** a. Prompt: Describe the extent of your knowledge regarding how to serve fruit/vegetables to your child(ren). b. Prompt: Describe the extent of your skills regarding serving fruit/vegetables to your child(ren). c. Prompt: How would you describe your overall ability to serve fruit and vegetables to your child(ren)?
Closing	Before we conclude our interview, what additional questions or comments do you have for me? Thank you so much for your time today. Your opinions are invaluable and will inform the development of a nutrition curriculum for parents. I

	will be sending you your gift card for your participation by the end of this week. Could you please confirm that the e-mail ________________ (type this in the chat or read it back to them) is correct? If you have any questions you may email our lab at chopLab@uga.edu. Thanks you again and have a great day!

Pilot Intervention
Follow-Up Interview + Survey Questions

Interview Protocol

Introduction	Hi Mrs./Ms./Mr. ________! It's very nice to see you again! How have you been doing? How are your kids doing? The reason I wanted to follow-up with you was to see what you thought about the cooking classes you took with us and to get some feedback!
Reminders	Before we begin, here are some reminders: 1) This interview will last approximately 30 minutes 2) Please turn on your camera if possible. 3) This Zoom session will be recorded. 4) All information obtained in this interview will remain confidential. In the final report, your name will be kept anonymous. The audio will only be made accessible to the researchers and the transcription service company. 5) There are no wrong or right answers. 6) You will be reimbursed with a $10 gift card which will be sent to your e-mail. Could you please verify a good e-mail to send this to?

Question #	Question	Prompts	SCT Construct	SCT Component
1	**Tell me about some of your favorite parts or highlights of the class (if there were any)?**	Tell me some of your in-class or behind-the-scenes stories and experiences. What did you enjoy the most? What stood out to you the most? What about the classes left an impression on you?	Warm-Up	Warm-Up
2	**How has this class motivated you (if at all) to serve more vegetables to your children?**	Was there anything about the class that personally helped get you excited about serving vegetables to your kids?	Outcome Expectations	Personal
3	**How has this class affected your overall self-**	In what ways has your self-	Self-Efficacy	Personal

	<u>confidence</u> (if at all) in being able to expose your children more to vegetables? ***Would you say your confidence changed extremely, somewhat, a little bit, or not at all compared to before the class?***	confidence in being able to expose your children to vegetables changed compared to before you took the class?		
4	**How has this class affected your <u>overall knowledge</u> about serving more vegetables to your children in terms of exposure strategies?** ***Would you say your knowledge about serving vegetables to your children changed extremely, somewhat, a little bit, or not at all after the classes compared to before? Would you say the information was very relevant, somewhat relevant, a little relevant, or not at all relevant?***	Tell me about what you have learned, information-wise, about how to increase vegetable exposure using different strategies? How often would you say your use this information? Do you feel like the information is relevant and useful to you as a parent?	Behavioral capability (factual knowledge)	Behavior
5	**Next I am interested in knowing if and how this class affected your <u>skills</u> in the following areas in serving more vegetables to your children. I'm going to list each category, provide an example, and ask you to think about how your skills in each area have changed if at all.** ***Would you say your overall skills in serving vegetables to your children changed extremely, somewhat, a***	Tell me about any practices and behaviors you learned that affect how you serve your children vegetables? How often would you say you use these skills? Do you feel like these skills are effective? Do you feel like	Behavioral Capability (procedural knowledge) Observational Learning	Behavior

	little bit, or not at all after the classes compared to before? Would you say the skills you learned were not at all useful, somewhat useful, very useful, or extremely useful? **<u>Skill categories</u>** **1) Vegetable selection/acquisition skills (e.g., one skill we learned about was purchasing dark green vegetables that are in season at a low cost in bulk)** **2) Cooking skills (e.g., one skill we learned about was how to season vegetables in different ways to make them taste more appealing)** **3) Engagement skills (e.g., one skill we learned about was asking children to touch a vegetable and describe the texture)** **4) SAM skills (e.g., one skill we learned about was asking children to ask questions).**	they are relevant? Have they helped you serve more vegetables to your children? Why or why not?		
6	**Now I'd like to talk a bit about access. I want you to think about how the STEAM cooking classes were carried out. Could you please describe how the class affected your <u>access</u> to physical resources that you needed for serving vegetables to your children?** ***Did the class increase, decrease, or***	How did this class help you to obtain some/all of the materials you might need to serve more vegetables to your child?	Access Situation	Environment

	not affect your access to these resources?			
7	**Could you please describe how you were affected by your interactions with nutrition professionals and/or peer/<u>community support</u> networks during the classes?** ***Did the class increase, decrease, or not affect your access to these groups of people?***	How did this class help connect you with other individuals (e.g., instructor, other parents)? How did having these connections make you feel?	Reinforcement	Environment
8	**In our cooking classes, one of the main approaches was to use STEAM activities. One example was having children grow an onion from kitchen scraps/roots. What did <u>you</u> think about the SAM strategies in the classes?** ***Would you say the SAM strategies were very appealing, somewhat appealing, a little appealing, or not at all appealing?***	Tell me about the SAM strategies you learned in this class. Describe your reactions to them. What about these appealed or did not appeal to you? How could you make them better? Would you recommend or use them?	Beliefs	Personal
9	**How did the SAM strategies affect your ability to create experiences that exposed your child to vegetables?** ***Would you say the activities were very successful, somewhat successful, a little successful, or not at all successful in engaging***	Describe if/how you used any of the STEAM strategies with your child during or after the class. Describe how helpful and/or successful you felt they were	Behavioral Capability Observational Learning	Behavior

	your child to eat more vegetables?	in exposing your children to vegetables?		
10	**What were <u>your children's reactions</u> to the kit activities and the activity ideas that didn't require a kit?** ***Would you say the SAM strategies were very appealing, somewhat appealing, a little appealing, or not at all appealing to your children?***	Describe your children's reactions to the explorer kit activities. Did they like or dislike the SAM activities? Were they neutral? Did it make your children more excited about vegetables? Did it get them to eat more vegetables? Did it get them to eat vegetables they previously did not eat?	Reinforcements	Behavior
11	**How did learning about SAM strategies affect your knowledge about using SAM specifically as a strategy to engage your children to eat vegetables?** ***Would you say your knowledge about SAM changed extremely, somewhat, a little bit, or not at all after the classes compared to before?***	How has your knowledge about using to SAM to engage your children to eat vegetables changed after taking the classes? Did you feel like you knew more about SAM after the class than before?	Behavioral Capability (factual knowledge)	Behavior
12	**How did learning about SAM strategies and doing SAM activities with your**	How has your self-confidence in engaging	Self-Efficacy	Personal

	children affect <u>your self-confidence</u> in using SAM specifically as a strategy to engage your children to eat vegetables? *Would you say your confidence changed extremely, somewhat, a little bit, or not at all compared to before the class?*	your children to eat vegetables changed after learning about SAM strategies? What is it about the SAM activities that you feel changed your confidence if at all? (e.g., Was it because you saw positive results? Was it because you felt like the activities were easy? Was it because you felt like you didn't need a lot of materials?)		
13	**Describe some non-nutrition benefits you feel using SAM has on your child outside the home environment? *Would you say the non-nutrition benefits of SAM are: a lot, a moderate amount, a small amount, or none.***	How did/might the SAM cooking classes help your child in other areas of their life besides diet and nutritional health? If so, why do you believe/feel that SAM could help your child in this way?	Influence of Class on their Environmental Circumstances	Environment

APPENDIX G

SURVEY INSTRUMENTS

Needs Assessment
Survey Questions
Time: 10 min

Please answer the following questions about fruits and vegetable intake:

1. **How often do <u>you</u> consume <u>fruit</u> per week? (show below choices)**
   - a. 0 times a week
   - b. 1-2 times a week
   - c. 3-4 times a week
   - d. 5-6 times a week
   - e. Every day

2. **How often do <u>you</u> consume <u>vegetables</u> per week? (show below choices)**
   - a. 0 times a week
   - b. 1-2 times a week
   - c. 3-4 times a week
   - d. 5-6 times a week
   - e. Every day

3. **How often do you serve <u>fruit</u> to your children during the week? (show below choices)**
   - a. 0 times a week
   - b. 1-2 times a week
   - c. 3-4 times a week
   - d. 5-6 times a week
   - e. Every day

4. **How often do you serve <u>vegetables</u> to your children during the week? (show below choices)**
   - a. 0 times a week
   - b. 1-2 times a week
   - c. 3-4 times a week
   - d. 5-6 times a week
   - e. Every day

5. **How much <u>vegetables</u> do <u>you</u> consume per day at home? (show images of measuring cups)**

6. **How much <u>fruit</u> do <u>you</u> consume per day at home? (show images of measuring cups)**

7. **How much <u>vegetables</u> would you say <u>your children</u> consume per day at home? (show images of measuring cups)**

8. **How much <u>fruit</u> would you say <u>your children</u> consume per day at home? (show images of measuring cups)**

Pilot Study
Pre and Post Survey

Now that you have finished the cooking classes, please complete the following post-survey (20 questions = 20 min max). The bar at the bottom of each page will tell you where you are in the survey. Remember, you will receive an $80 gift card + free groceries + kids activity kits for completing the pre/post surveys + acceptability questionnaire, interview, and attending all 8 cooking classes.

What is your FIRST + LAST name:

Please answer the following questions:

1. How many DAYS this week did you serve your child vegetables?
    a. 0-1
    b. 2-3
    c. 4-5
    d. 6 or more

2. How many different KINDS of vegetables did you serve your child this past week?
    a. 0-1
    b. 2-3
    c. 4-5
    d. 6 or more

3. How many TIMES in the past week did you serve your child red, orange, or yellow vegetables?
    a. 0-1
    b. 2-3
    c. 4-5
    d. 6 or more

4. How many TIMES in the past week did you serve your child dark green leafy vegetables?
    a. 0-1
    b. 2-3
    c. 4-5
    d. 6 or more

5. How many servings of vegetables does the government recommend that children ages 2-5 should every day?
    a. 1 to 1.5 cups / day
    b. 2 to 2.5 cups / day
    c. 3-4 cups / day
    d. Not sure

6. Imagine you are eating a salad. Which of these vegetable combinations would give you the greatest VARIETY of vitamins & antioxidants?
    a. Iceberg Lettuce + Green Peppers + Green Cabbage
    b. Broccoli + Carrots + Tomatoes
    c. Red Peppers + Tomatoes + Romaine Lettuce
    d. Not sure

Which vegetable in the pair (A or B) is the most nutrient dense?

7. Iceberg Lettuce(A) or Kale (B)
8. Red Peppers (A) vs. Green Cabbage (B)
9. Carrots (A) vs. Celery (B)
10. White Potato (A) vs. Pumpkin (B)

How nutritious is each of the following? Rank by assigning stars (1 star = not nutritious, 2 stars = somewhat nutritious, 3 stars = very nutritious)

11. Canned Vegetables
12. Fresh Vegetables
13. Frozen Vegetables
14. Juiced Vegetables

15. I serve my children vegetables because: Mark ALL that apply.
    a. They are good for my child's health
    b. Of the vitamins & minerals they contain
    c. Increased vegetable intake has been shown to prevent disease
    d. Vegetables contain antioxidants which prevent disease
    e. None of the above

The reason I don't eat vegetables as much as I should is because...

16. They cost too much
    a. Strongly Agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly Disagree

17. They spoil before I can eat them
    a. Strongly Agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly Disagree

18. I don't know how to choose seasonal vegetables at the grocery store

a. Strongly Agree
b. Agree
c. Neutral
d. Disagree
e. Strongly Disagree

19. It is hard for me to purchase fresh vegetables in my neighborhood
    a. Strongly Agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly Disagree

20. I don't know how to prepare vegetables
    a. Strongly Agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly Disagree

21. I don't like the taste of vegetables
    f. Strongly Agree
    g. Agree
    h. Neutral
    i. Disagree
    j. Strongly Disagree
22. Other
    a. Strongly Agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly Disagree

How confident are you that you can...

23. Find vegetables at a budget-friendly price at the store
    a. Confident
    b. Somewhat Confident
    c. Not Confident at All

24. Store vegetables so that they don't spoil before consuming them
    a. Confident
    b. Somewhat Confident
    c. Not Confident at All

25. Know which vegetables should be refrigerated and which should be left at room temperature
    a. Confident
    b. Somewhat Confident
    c. Not Confident at All

26. Know which vegetables go in which drawers in the refrigerator
    a. Confident
    b. Somewhat Confident
    c. Not Confident at All

27. Choose fresh, seasonal vegetables
    a. Confident
    b. Somewhat Confident
    c. Not Confident at All

28. Choose nutrient dense vegetables
    a. Confident
    b. Somewhat Confident
    c. Not Confident at All

29. Differentiate between ripe and unripe vegetables
    a. Confident
    b. Somewhat Confident
    c. Not Confident at All

How confident are you that you can get your child to eat healthy in the following situations?

30. When you are tired, stressed, emotionally upset, or affected by daily hassles?
    a. Strongly Agree
    b. Somewhat Agree
    c. Neutral
    d. Somewhat Disagree
    e. Strongly Disagree

31. When you yourself want to consume foods and beverages that are not healthy?
    a. Strongly Agree
    b. Somewhat Agree
    c. Neutral
    d. Somewhat Disagree
    e. Strongly Disagree

32. When your child wants to consume foods and beverages that are not healthy?
    a. Strongly Agree
    b. Somewhat Agree
    c. Neutral
    d. Somewhat Disagree

e. Strongly Disagree

33. When eating out at a restaurant or fast food establishment
    a. Strongly Agree
    b. Somewhat Agree
    c. Neutral
    d. Somewhat Disagree
    e. Strongly Disagree

34. When on vacation
    a. Strongly Agree
    b. Somewhat Agree
    c. Neutral
    d. Somewhat Disagree
    e. Strongly Disagree

35. During the holidays
    a. Strongly Agree
    b. Somewhat Agree
    c. Neutral
    d. Somewhat Disagree
    e. Strongly Disagree

I have developed an effective strategy for making sure my child eats healthy foods in the following situations:

36. When I am tired, stressed, emotionally upset, or affected by daily hassles?
    a. Strongly Disagree
    b. Somewhat Disagree
    c. Neutral
    d. Somewhat Agree
    e. Strongly Agree

37. When I myself want to consume foods and beverages that are not healthy?
    a. Strongly Disagree
    b. Somewhat Disagree
    c. Neutral
    d. Somewhat Agree
    e. Strongly Agree

38. When my child wants to consume foods and beverages that are not healthy?
    a. Strongly Disagree
    b. Somewhat Disagree
    c. Neutral
    d. Somewhat Agree
    e. Strongly Agree

39. When eating out at a restaurant or fast food establishment
    a. Strongly Disagree
    b. Somewhat Disagree
    c. Neutral
    d. Somewhat Agree
    e. Strongly Agree

40. When on vacation
    a. Strongly Disagree
    b. Somewhat Disagree
    c. Neutral
    d. Somewhat Agree
    e. Strongly Agree

41. During the holidays
    a. Strongly Disagree
    b. Somewhat Disagree
    c. Neutral
    d. Somewhat Agree
    e. Strongly Agree

Please indicate your level of agreement with the following statements:

42. I intentionally keep some foods out of my child's reach
    a. Strongly Agree
    b. Somewhat Agree
    c. Neutral
    d. Somewhat Disagree
    e. Strongly Disagree

43. I offer sweets (candy, ice cream, cake, pastries) to my child as a reward for good behavior
    a. Strongly Agree
    b. Somewhat Agree
    c. Neutral
    d. Somewhat Disagree
    e. Strongly Disagree

44. I offer my child her favorite foods in exchange for good behavior
    a. Strongly Agree
    b. Somewhat Agree
    c. Neutral
    d. Somewhat Disagree
    e. Strongly Disagree

45. I believe my child should always eat all of the food on his/her plate
    a. Strongly Agree
    b. Somewhat Agree
    c. Neutral
    d. Somewhat Disagree
    e. Strongly Disagree

46. Even if my child says "I'm not hungry" I try to get him/her to eat anyway
    a. Strongly Agree
    b. Somewhat Agree
    c. Neutral
    d. Somewhat Disagree
    e. Strongly Disagree

47. I know the difference between positive and negative reinforcements
    a. Strongly Agree
    b. Somewhat Agree
    c. Neutral
    d. Somewhat Disagree
    e. Strongly Disagree

48. I understand why it is important not to use food to reward or punish my child
    a. Strongly Agree
    b. Somewhat Agree
    c. Neutral
    d. Somewhat Disagree
    e. Strongly Disagree

Please indicate how often you do the following?

49. I put fruits and vegetables in easy to reach places for my child (e.g., lower cabinet shelf) between meals
    a. Not Often (0-1 times / week)
    b. Occasionally (2-3 times / week)
    c. Frequently (6-7 times / week)

50. I prepare fruits and vegetables in a way that is easily eatable (e.g., bite sized pieces) between meals
    a. Not Often (0-1 times / week)
    b. Occasionally (2-3 times / week)
    c. Frequently (6-7 times / week)

51. I try to eat meals and snacks with my child at the dinner table throughout the week
    a. Not Often (0-1 times / week)
    b. Occasionally (2-3 times / week)
    c. Frequently (6-7 times / week)

52. I offer fruits and vegetables to my child in a friendly tone of voice
    a. Not Often (0-1 times / week)
    b. Occasionally (2-3 times / week)
    c. Frequently (6-7 times / week)

53. I verbally praise my child when they eat a fruit or vegetables
    a. Not Often (0-1 times / week)
    b. Occasionally (2-3 times / week)
    c. Frequently (6-7 times / week)

Please indicate your level of agreement with the following statements:

54. I have the cooking skills to prepare, cook, and serve vegetables to my child
    a. Strongly Agree
    b. Somewhat Agree
    c. Neutral
    d. Somewhat Disagree
    e. Strongly Disagree

55. I am confident that I can serve vegetables to my child in an appetizing/appealing way
    a. Strongly Agree
    b. Somewhat Agree
    c. Neutral
    d. Somewhat Disagree
    e. Strongly Disagree

56. I am confident that I can get my child to try a fruit or vegetable
    a. Strongly Agree
    b. Somewhat Agree
    c. Neutral
    d. Somewhat Disagree
    e. Strongly Disagree

57. I know at least 5 strategies to make vegetables more appealing to my child
    a. Strongly Agree
    b. Somewhat Agree
    c. Neutral
    d. Somewhat Disagree
    e. Strongly Disagree

58. I was able to serve vegetables to my child in a way that was appealing to them at least 3 times this week
    a. Strongly Agree
    b. Somewhat Agree
    c. Neutral

d. Somewhat Disagree
e. Strongly Disagree

Please indicate the extent to which you use any of the following sensory behaviors to engage your child:

59. Ask my child to listen to and call the name of a vegetable
    a. Not Often (0-1 times / week)
    b. Occasionally (2-3 times / week)
    c. Frequently (6-7 times / week)

60. Ask my child to listen to a vegetable story or song
    a. Not Often (0-1 times / week)
    b. Occasionally (2-3 times / week)
    c. Frequently (6-7 times / week)

61. Ask my child to tap a vegetable and hear the sound
    a. Not Often (0-1 times / week)
    b. Occasionally (2-3 times / week)
    c. Frequently (6-7 times / week)

62. Ask my child to listen to the sound when biting and chewing the vegetable
    a. Not Often (0-1 times / week)
    b. Occasionally (2-3 times / week)
    c. Frequently (6-7 times / week)

63. Ask my child to look at pictures of a vegetable
    a. Not Often (0-1 times / week)
    b. Occasionally (2-3 times / week)
    c. Frequently (6-7 times / week)
64. Ask my child to visually explore the vegetable in different forms (e.g., whole, peeled, chopped, cooked)
    a. Not Often (0-1 times / week)
    b. Occasionally (2-3 times / week)
    c. Frequently (6-7 times / week)

Please indicate the extent to which you use any of the following sensory behaviors to engage your child:

65. Ask my child to smell the vegetable when it is whole or cooked
    a. Not Often (0-1 times / week)
    b. Occasionally (2-3 times / week)
    c. Frequently (6-7 times / week)

66. Ask my child to smell the vegetable after it is chopped up
    a. Not Often (0-1 times / week)

b. Occasionally (2-3 times / week)
c. Frequently (6-7 times / week)

67. Ask my child to feel the different textures with hands (e.g., when grated, spiralized, sliced, cooked, etc…)
    a. Not Often (0-1 times / week)
    b. Occasionally (2-3 times / week)
    c. Frequently (6-7 times / week)

68. Ask my child to feel the vegetable in the mouth when chewing
    a. Not Often (0-1 times / week)
    b. Occasionally (2-3 times / week)
    c. Frequently (6-7 times / week)

69. Ask my child to taste a small piece/bite of a vegetable
    a. Not Often (0-1 times / week)
    b. Occasionally (2-3 times / week)
    c. Frequently (6-7 times / week)

70. Encourage repeated tasting of a vegetable in the same week
    a. Not Often (0-1 times / week)
    b. Occasionally (2-3 times / week)
    c. Frequently (6-7 times / week)

71. STEAM stands for Science, Technology, Engineering, Arts, and Mathematics. How important do you believe these subjects are for your child as a learner?
    a. They are not important (other subjects are important)
    b. A little important
    c. Moderately important
    d. Very important

72. If I was given resources describing how to incorporate STEAM into my household, I would use them:
    a. Disagree
    b. Slightly disagree
    c. Neutral
    d. Agree
    e. Strongly Agree

Please read the following statements and indicate your level of confidence:

73. Engage my child in asking questions and constructing explanations
    a. Not confident at all
    b. A little confident
    c. Moderately confident
    d. Extremely confident

74. Use STEAM to introduce vegetables to my child
    a. Not confident at all
    b. A little confident
    c. Moderately confident
    d. Extremely confident

75. Engage in STEAM exercises with my child during mealtimes
    a. Not confident at all
    b. A little confident
    c. Moderately confident
    d. Extremely confident

76. Engage in STEAM exercises with my child outside of mealtimes
    a. Not confident at all
    b. A little confident
    c. Moderately confident
    d. Extremely confident

77. Talk with my child about math, science, and art
    a. Not confident at all
    b. A little confident
    c. Moderately confident
    d. Extremely confident

Please indicate your level of agreement with the following statements:

78. I know how to talk to my children about vegetables outside of mealtimes
    a. Strongly Disagree
    b. Somewhat Disagree
    c. Neutral
    d. Somewhat Agree
    e. Strongly Agree

79. I intend to use language (dialogue) and literacy (books, storytelling, poetry) to help my child eat more vegetables
    a. Strongly Disagree
    b. Somewhat Disagree
    c. Neutral
    d. Somewhat Agree
    e. Strongly Agree

80. I intend to talk to my children about vegetables outside of mealtimes
    a. Strongly Disagree
    b. Somewhat Disagree

c. Neutral
d. Somewhat Agree
e. Strongly Agree

81. I understand that conversations about vegetables is a way to expose my child to the concept of eating vegetables
    a. Strongly Disagree
    b. Somewhat Disagree
    c. Neutral
    d. Somewhat Agree
    e. Strongly Agree

82. If my children have any questions about food and nutrition issues, I’m able to give them more information and advice
    a. Strongly Disagree
    b. Somewhat Disagree
    c. Neutral
    d. Somewhat Agree
    e. Strongly Agree

Pilot Study
Acceptability Survey

Please tell us what you thought of the Cooking Classes! We want to hear your feedback!
What is your FIRST and LAST name?

Please indicate your agreement with the following statements:

1. I liked learning about how to engage and inspire my child to eat vegetables
    a. Strongly Agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly Disagree

2. The engagement strategies I learned in the classes seem easy to use
    a. Strongly Agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly Disagree

3. Engaging and inspiring my child during meals and snack times will help me serve more vegetables to my child
    a. Strongly Agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly Disagree

4. Engaging and inspiring my child during meals and snack times will make my child more willing to try vegetables
    a. Strongly Agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly Disagree

5. I liked learning about how to use STEAM engage and inspire my child to eat vegetables
    a. Strongly Agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly Disagree

6. The STEAM engagement strategies I learned in the classes seem easy to use
    a. Strongly Agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly Disagree

7. Engaging and inspiring my child using STEAM during meals and snack times will help me serve more vegetables to my child
    a. Strongly Agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly Disagree

8. Engaging and inspiring my child using STEAM during meals and snack times will make my child more willing to try vegetables
    a. Strongly Agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly Disagree

Please indicate your agreement with the following statements:

9. I liked learning about how to help my child engage in sensory experiences to eat vegetables
    a. Strongly Agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly Disagree

10. The sensory experience strategies I learned in the classes seem easy to use
    a. Strongly Agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly Disagree

11. Implementing sensory experiences during meals and snack times will help me serve vegetables to my child
    a. Strongly Agree
    b. Agree
    c. Neutral
    d. Disagree

e. Strongly Disagree

12. Sensory experiences during meals and snack times will make my child more willing to try vegetables
    a. Strongly Agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly Disagree

13. I liked learning about how to prompt my child to ask questions out loud when trying vegetables
    a. Strongly Agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly Disagree

14. The strategies for prompting my child to ask questions aloud seem easy to use
    a. Strongly Agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly Disagree

15. Implementing think-aloud discussions during meals/snack times will help me serve vegetables to my child
    a. Strongly Agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly Disagree

16. When my child asks questions and engages in verbal discussions during meals and snack times they will be more willing to try vegetables
    a. Strongly Agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly Disagree

17. After participating in the workshops, do you feel more capable of doing STEAM activities?
    a. Yes, I feel that I am much more capable of doing science activities
    b. Yes, I feel I am only a little more capable of doing science activities
    c. No, I feel I am as capable as before of doing science activities
    d. No, I feel I am less capable as before of doing science activities

Please indicate which of the following strategies from this class you INTEND TO USE when serving vegetables to your child in the future?

18. Novel food preparation + presentation techniques (changing form, texture, taste, etc...)
    a. I intend to use this strategy
    b. Neutral
    c. I do not intend to use this strategy

19. STEAM (science, technology, engineering, art, math) to teach children about vegetables
    a. I intend to use this strategy
    b. Neutral
    c. I do not intend to use this strategy

20. Sensory approaches (asking child to smell, touch, listen to vegetables)
    a. I intend to use this strategy
    b. Neutral
    c. I do not intend to use this strategy

21. Language & literacy approaches (prompting out-loud conversations and facilitating dialogue about vegetables)
    a. I intend to use this strategy
    b. Neutral
    c. I do not intend to use this strategy

Please indicate HOW FREQUENTLY you would use each of the following strategies when serving vegetables to your child in the future?

22. Novel food preparation + presentation techniques (changing form, texture, taste, etc...)
    a. Never
    b. 1 time a week
    c. 2-3 times a week
    d. 4-5 times a week
    e. Every day

23. STEAM (science, technology, engineering, art, math) to teach children about vegetables
    a. Never
    b. 1 time a week
    c. 2-3 times a week
    d. 4-5 times a week

e. Every day

24. Sensory approaches (asking child to smell, touch, listen to vegetables)
    a. Never
    b. 1 time a week
    c. 2-3 times a week
    d. 4-5 times a week
    e. Every day

25. Language & literacy approaches (prompting out-loud conversations and facilitating dialogue about vegetables)
    a. Never
    b. 1 time a week
    c. 2-3 times a week
    d. 4-5 times a week
    e. Every day

Please indicate the extent to which you agree with the following statements regarding the curriculum:

26. The class times were scheduled at times that were convenient for me to attend
    a. Strongly Agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly Agree

27. The duration of each class was just right for me to attend
    a. Strongly Agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly Agree

28. The frequency of the classes (2x a week) was too intense for me to attend consistently
    a. Strongly Agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly Agree

29. I would prefer to attend this class in person/live instead of on zoom
    a. Strongly Agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly Agree

30. The zoom delivery format of the class made it easier for me to attend
    a. Strongly Agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly Agree

31. I enjoyed interacting in a group setting with other parents
    a. Strongly Agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly Agree

32. I had adequate opportunity to ask the instructor question
    a. Strongly Agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly Agree

33. The information presented in the curriculum was relevant to me in serving vegetables to my child
    a. Strongly Agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly Agree

34. The information presented in the curriculum was helpful in teaching me to how to serve vegetables to my child
    a. Strongly Agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly Agree

35. The information presented in the curriculum met my needs regarding serving vegetables to my child
    a. Strongly Agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly Agree

36. Overall, the class was effective for helping me learn how to serve vegetables to my children
    a. Strongly Agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly Agree

37. Overall the class was enjoyable
    a. Strongly Agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly Agree

38. I would be interested in participating in a similar curriculum in the future
    a. Strongly Agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly Agree

39. I would recommend the cooking classes to a friend
    a. Strongly Agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly Agree

40. The incentives ($80 gift card + free groceries + activity kits) were sufficient motivators to attend the cooking classes
    a. Strongly Agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly Agree

41. Please write what you liked most about the classes?

42. Please write what you disliked the most about the classes.

43. How do you feel the classes be improved?

44. Which part of the class did your children enjoy the most?

45. Would you recommend the strategies used in this class to a friend?

a. Yes
b. No

APPENDIX H

CONSENT FORMS AND RECRUITMENT MATERIALS

Needs Assessment
Parent Consent Form

To participate in this study, we need to obtain your consent. Please read the following:

Dear parent,

My name is Dr. Caree Cotwright and I am a faculty member in the Department of Nutritional Sciences at the University of Georgia. I am inviting you to take part in a research study. Before you decide to participate in this study, it is important that you understand why the research is being done and what it will involve. This form is designed to give you information about the study so you can decide whether to be in the study or not. Please take the time to read the following information carefully. Please ask the researcher if there is anything that is not clear or if you need more information. When all your questions have been answered, you can decide if you want to be in the study or not. This process is called "informed consent." A copy of this form will be emailed to you.

Study Purpose and Procedures
Introducing healthy food choices to young children is important to establish healthy habits early in life, when eating habits and preferences are being developed. The home setting is an invaluable place for early obesity prevention and the development of healthy habits. Including children in meal preparation can increase acceptance of healthy food choices served at home. This interview and online cooking class are part of a pilot study to help parents serve fruit and vegetables to their children. Your consent is being requested because you are part of our primary audience. For our research study, you will be interviewed (1 hr), take a brief eligibility survey (5 minutes), complete a pre-survey before the classes (30 minutes), and a post survey after attending the classes (30 minutes).

Risks and discomforts
We do not anticipate any risks from participating in our research study.

Benefits
By participating in this research study you will able to help researchers design art, math, and science tools and resources to help you serve fruit and vegetables to your children.

Incentives for participation
You will receive a $15 e-gift card for being interviewed. You will receive a $15 e-gift card for each class and a $10 gift card for each survey. You will also be provided with free groceries each week to use in the cooking classes. You do not have to be in the study to participate and receive the gift cards. Your name and email address will be collected and shared with our departmental business office to send the gift cards.

Voluntary participation
Participation is voluntary. You can refuse to take part or stop at any time without penalty. Your decision to participate in the research will have no impact on your participation

in the interview itself. When you are responding to interview questions please feel free to skip any questions that you do not wish to answer.

Confidentiality

Data collected from participants will be confidential. Any information that identifies them directly (e.g., name) will be coded for data collection. This research study involves the transmission of data over the Internet. Every reasonable effort has been taken to ensure the effective use of available technology; however, confidentiality during online communication cannot be guaranteed. Security efforts will include storing the survey data on a secure computer database that will be password protected with access to only the key research team. Data will be stored for one year after the study completion and all data collection. The data will be destroyed after one year of completion of the project.

If you have questions

The main researcher conducting this study is Dr. Caree Cotwright, assistant professor at the University of Georgia. Please ask any questions you have now. If you have questions later, you may contact Dr. Cotwright at cjcot@uga.edu. If you have any questions or concerns regarding your rights as a research participant in this study, you may contact the Institutional Review Board (IRB) Chairperson at 706.542.3199 or irb@uga.edu.

Sincerely,

Caree J. Cotwright

Pilot Study
Parent Consent Form

To participate in this study, we need to obtain your consent. Please read the following:

Dear parent,

My name is Dr. Caree Cotwright and I am a faculty member in the Department of Nutritional Sciences at the University of Georgia. I am inviting you to take part in a research study. Before you decide to participate in this study, it is important that you understand why the research is being done and what it will involve. This form is designed to give you information about the study so you can decide whether to be in the study or not. Please take the time to read the following information carefully. Please ask the researcher if there is anything that is not clear or if you need more information. When all your questions have been answered, you can decide if you want to be in the study or not. This process is called "informed consent." A copy of this form will be emailed to you.

<u>Study Purpose and Procedures</u>

Introducing healthy food choices to young children is important to establish healthy habits early in life, when eating habits and preferences are being developed. The home setting is an invaluable place for early obesity prevention and the development of healthy habits. Including children in meal preparation can increase acceptance of healthy food choices served at home. This interview and online cooking class are part of a pilot study to help parents serve fruit and vegetables to their children. Your consent is being requested because you are part of our primary audience. For our research study, you will complete a pre-survey before the classes (20 minutes), and a post survey after attending the classes (20 minutes).

Risks and discomforts

We do not anticipate any risks from participating in our research study.

Benefits

By participating in this research study you will able to help researchers design art, math, and science tools and resources to help you serve fruit and vegetables to your children.

Incentives for participation

You will receive an $80 e-gift card for attending 8 cooking classes. You will also be provided with free groceries each week to use in the cooking classes. We will also give you free STEAM activity boxes for your children each week. You do not have to be in the study to participate and receive the gift cards. Your name and email address will be collected and shared with our departmental business office to send the gift cards.

Voluntary participation

Participation is voluntary. You can refuse to take part or stop at any time without penalty. Your decision to participate in the research will have no impact on your participation in the interview itself. When you are responding to interview questions please feel free to skip any questions that you do not wish to answer.

Confidentiality
Data collected from participants will be confidential. Any information that identifies them directly (e.g., name) will be coded for data collection. This research study involves the transmission of data over the Internet. Every reasonable effort has been taken to ensure the effective use of available technology; however, confidentiality during online communication cannot be guaranteed. Security efforts will include storing the survey data on a secure computer database that will be password protected with access to only the key research team. Data will be stored for one year after the study completion and all data collection. The data will be destroyed after one year of completion of the project.

If you have questions
The main researcher conducting this study is Dr. Caree Cotwright, assistant professor at the University of Georgia. Please ask any questions you have now. If you have questions later, you may contact Dr. Cotwright at cjcot@uga.edu. If you have any questions or concerns regarding your rights as a research participant in this study, you may contact the Institutional Review Board (IRB) Chairperson at 706.542.3199 or irb@uga.edu.

Sincerely,

Caree J. Cotwright


NOW ENROLLING
PARENTS IN FREE VIRTUAL
FALL COOKING CLASSES!
Come cook with us & learn art, math, & science
strategies to teach your kids how to eat healthy!
Get free groceries, free activity kits & up to $80!
The UGA Childhood Obesity Prevention lab is
seeking parents with children (ages 3-5) to
participate in a 4-week research study
To register, click HERE
or scan the QR code below
Eligibility: 1) Must have a child ages 3-5 2) Must have a computer or smart phone
3) Must be at least 18 years old.
For more information, contact Caree Cotwright at choplab@uga.edu.


¡AHORA INSCRIBIENDO
PARTICIPANTES EN CLASES DE
COCINA VIRTUALES GRATUITAS!
¡Ven a cocinar con nosotros y aprender estrategias de arte, matemáticas y ciencias para enseñar a sus hijos a comer sano!
¡Obtenga comestibles gratis, kits de actividad gratuitos y hasta $ 80!
El laboratorio de prevención de obesidad infantil de UGA está buscando padres con hijos (de 3 a 5 años) para participar en un estudio de investigación de 4 semanas
Para registrarse, haga clic AQUÍ
o escanear el código QR a continuación
Elegibilidad: 1) Debe tener un niño de 3-5 2) debe tener una computadora o teléfono inteligente
3) Debe tener al menos 18 años.
Para obtener más información, comuníquese con
Caree Cotwright en choplab@uga.edu.

APPENDIX I

GELDS ALIGNMENT TABLES

<table>
<tr><th rowspan="2">Lesson #1</th><th colspan="2">Georgia Early Learning and Development Standards (GELDs)</th></tr>
<tr><th>Domain, Strand, Standards
(36-48 months)</th><th>Domain, Strand, Standards
(48-60 months)</th></tr>
<tr><td>Explorer Kit “Eat the Rainbow” Activities

Healthy Body Sticker Poster (SCIENCE) - Child will match different colored rainbow vegetable clues (stickers) to body parts that they are good for on a chart showing the human body

Outdoors Activity Booklet (MATH + ART) - Child will complete different challenges such as “Veggie Hop-Scotch” and “Veggie Jump” using sidewalk rainbow chalk.

Meet the Farmer (ENGINEERING + TECHNOLOGY) - Child will get to “meet” a farmer who grows tomatoes, learn how and where tomatoes come from, and other fun facts about tomatoes.

Table Talk Cards (LANGUAGE & LITERACY) - Parent and child will use the cards to have a conversation involving vegetables, colors, and feelings.</td>
<td>Domain: Physical Development and Motor Skills (PDM)
Strand: Health & Well-Being
Standard: PDM1: The child will practice healthy and safe habits
✓ PDM1.3a – Stays awake except during naptime
✓ PDM1.3b – Actively participates in a variety of both structured and unstructured indoor and outdoor activities for sustained periods of time.

Domain: Physical Development and Motor Skills (PDM)
Strand: Health & Well-Being
Standard: PDM2: The child will participate in activities related to nutrition
✓ PDM2.3a – Helps prepare nutritious snacks
✓ PDM2.3b – Distinguishes healthy food choices from less healthy food choices

Domain: Physical Development and Motor Skills (PDM)
Strand: Use of Senses
Standard: PDM3: The child will demonstrate an awareness of the body in space and child’s relationship to objects in space
✓ PDM 3.3a - Acts and moves with purpose and recognizes differences in direction, distance, and location with some assistance

Domain: Physical Development and Motor Skills (PDM)
Strand: Use of Senses
Standard: PDM4: Uses senses purposefully to learn about objects
✓ PDM 4.3a - Uses senses purposefully to learn about objects

Domain: Physical Development and Motor Skills (PDM)
Strand: Motor Skills
Standard: PDM5: The child will demonstrate gross motor skills
✓ PDM5.3a – Coordinates movements to perform a task
✓ PDM5.3b – Demonstrates coordination and balance

Domain: Physical Development and Motor Skills (PDM)
Strand: Motor Skills
Standard: PDM6: The child will demonstrate fine motor skills
✓ PDM6.3a – Refines grasp to manipulate tools and objects
✓ PDM6.3b – Uses hand-eye coordination to manipulate smaller objects with increasing control</td>
<td>Domain: Physical Development and Motor Skills (PDM)
Strand: Health & Well-Being
Standard: PD1: The child will practice healthy and safe habits
✓ PDM1.4a – Stays awake and alert during the day except during voluntary nap time
✓ PDM1.4b – Actively participates in a variety of both structured and unstructured indoor and outdoor activities for a sustained period of time that increase strength, endurance, and flexibility

Domain: Physical Development and Motor Skills (PDM)
Strand: Health & Well-Being
Standard: PDM2: The child will participate in activities related to nutrition
✓ PDM2.4b – Sorts foods into food groups and communicates the benefits of healthy foods

Domain: Physical Development and Motor Skills (PDM)
Strand: Use of Senses
Standard: PDM3: The child will demonstrate an awareness of the body in space and child’s relationship to objects in space
✓ PDM 3.4a - Acts and moves with purpose and recognizes differences in direction, distance, and location with some assistance
✓ PDM 3.4b – Demonstrates spatial awareness through play activities

Domain: Physical Development and Motor Skills (PDM)
Strand: Motor Skills
Standard: PDM5: The child will demonstrate gross motor skills
✓ PDM5.4a – Coordinates movements to perform more complex tasks
✓ PDM5.4b – Demonstrates coordination and balance in a variety of activities

Domain: Physical Development and Motor Skills (PDM)
Strand: Motor Skills
Standard: PDM6: The child will demonstrate fine motor skills
✓ PDM6.4a – Performs fine-motor tasks that require small-muscle strength and control
✓ PDM6.4b – Uses hand-eye coordination to manipulate small object with ease
✓ PDM6.6c – Able to perform more complex fine motor tasks with accuracy 50% of the time</td></tr>
</table>

	Domain: Social and Emotional Development (SED) **Strand**: Developing a Sense of Self **Standard:** SED2**:** The child will engage in self-expression ✓ SED2.3a – Uses a combination of words, phrases, and actions to communicate needs, ideas, opinions, and preferences	**Domain**: Social and Emotional Development (SED) **Strand**: Developing a Sense of Self **Standard:** SED2**:** The child will develop self-awareness ✓ SED1.4b – Identifies personal characteristics, preferences, thoughts, and feelings ✓ SED1.4c – Shows confidence in a range of abilities and the capacity to accomplish tasks and take on new tasks ✓ SED1.4d – Shows independence in his/her own choices **Domain**: Social and Emotional Development (SED) **Strand**: Developing a Sense of Self **Standard:** SED2**:** The child will engage in self-expression ✓ SED2.4a – Effectively uses words, phrases, and actions to communicate needs, ideas, opinions, and preferences
	Domain: Approaches to Play and Learning (APL) **Strand:** Initiative and Exploration **Standard:** APL1: The child will demonstrate initiative and self-direction. ✓ APL1.3a – Initiates new tasks by him/herself ✓ APL1.3b – Makes choices and complete some independent activities **Domain:** Approaches to Play and Learning (APL) **Strand: I**nterest and curiosity **Standard:** APL2: The child will demonstrate interest and curiosity ✓ APL2.3a – Demonstrates an increased willingness to participate in both familiar and new experiences ✓ APL2.3b – Asks questions about unfamiliar objects, people, and experiences ✓ APL2.3c – Explores and manipulates both familiar and unfamiliar objects in the environment **Domain:** Approaches to Play and Learning (APL) **Strand:** Attentiveness and Persistence **Standard:** APL3: The child will demonstrate self-control ✓ APL3.3a – Engages in a structured activity for short periods of time to achieve a goal ✓ APL3.3b – Wants to complete activities and do them well	**Domain:** Approaches to Play and Learning (APL) **Strand:** Initiative and Exploration **Standard:** APL1: The child will demonstrate initiative and self-direction. ✓ APL1.4a – Takes initiative to learn new concepts and tries new experiences. Initiates and completes new tasks by himself/herself. ✓ APL 1.4b – Selects and carries out activities without adult prompting **Domain:** Approaches to Play and Learning (APL) **Strand:** Attentiveness and Persistence **Standard:** APL3: The child will sustain attention to a specific activity and demonstrate persistence ✓ APL3.3a – Engages in independent activities and continues tasks over a period of time
	Domain: Communication, Language, and Literacy (CLL) **Strand:** Receptive Language (Listening) **Standard:** CLL1: The child will listen to conversations for a variety of purposes and demonstrate comprehension ✓ CLL1.3a - Listens and responds to conversations and group discussions **Domain:** Communication, Language, and Literacy (CLL) **Strand:** Receptive Language (Listening) **Standard:** CLL2: The child will acquire vocabulary introduced in conversations, activities, stories, and/or books ✓ CLL2.3a – Demonstrates understanding of vocabulary though everyday conversations	**Domain:** Communication, Language, and Literacy (CLL) **Strand:** Expressive Language **Standard:** CLL4: The child will use increasingly complex spoken language ✓ CLL4.4a – Uses spoken language that can be understood with ease ✓ CLL4.4c - Describes activities, experiences, and stories with more detail

	Domain: Communication, Language, and Literacy (CLL) **Strand:** Expressive Language **Standard:** CLL4: The child will use increasingly complex spoken language ✓ CLL4.3a – Speaks clearly enough to be understood ✓ CLL4.3c – Describes activities and experiences using details **Domain:** Communication, Language, and Literacy (CLL) **Strand:** Early Reading **Standard:** CLL8: The child will demonstrate awareness of print concepts ✓ CLL8.3b – Discriminates words from pictures independently	
	Domain: Cognitive Development: Mathematics (CD-MA) **Strand:** Number and Quantity **Standard:** CD-MA1: The child will organize, represent, and build knowledge of quantity and number ✓ CD-MA1.3d – Identifies quantity and comparisons of quantity **Domain:** Cognitive Development: Mathematics (CD-MA) **Strand:** Measurement and Comparison **Standard:** CD-MA3: The child will explore and communicate about distance, weight, length, height, and time ✓ CD-MA3.3b – Compares two or more objects using a single attribute, such as length, weight, and size and matches items or similar sizes ✓ CD-MA3.3c – Uses a variety of standard and non-standard tools to measure object attributes with assistance **Domain:** Cognitive Development: Mathematics (CD-MA) **Strand:** Geometry and Spatial Thinking **Standard:** CD-MA5: The child will explore, recognize, and describe spatial relationships between objects ✓ CD-MA5.3a – Follows simple directions which demonstrates an understanding of directionality, order, and position of objects **Domain:** Cognitive Development: Social Studies (CD-SS) **Strand:** People and Community **Standard:** CD-SS4: The child will demonstrate an awareness of economics of his/her community ✓ CD-SS4.3b – Recognizes a variety of occupations and work associated with them ✓ CD-SS4.3c – Recognizes that people work to earn a living ✓ CD-SS4.3d – Explores the uses of technology **Domain:** Cognitive Development: Science (CD-SC) **Strand:** Scientific Skills and Methods **Standard:** CD-SC1: The child will demonstrate scientific inquiry skills ✓ CD-SC1.3a – Uses senses to observe and experience objects in the environment	**Domain:** Cognitive Development: Mathematics (CD-MA) **Strand:** Number and Quantity **Standard:** CD-MA1: The child will organize, represent, and build knowledge of quantity and number ✓ CD-MA1.4b – Recognizes numerals and uses counting as part of play and as a means for determining quantity **Domain:** Cognitive Development: Mathematics (CD-MA) **Strand:** Measurement and Comparison **Standard:** CD-MA3: The child will explore and communicate about distance, weight, length, height, and time ✓ CD-MA3.4a – Uses mathematical terms to describe experiences involving measurement ✓ CD-MA3.4b – Compares objects using two or more attributes such as length, weight, and size ✓ CD-MA3.4c - Uses a variety of techniques and standard and nonstandard tools to measure and compare length, volume (capacity), and weight **Domain:** Cognitive Development: Mathematics (CD-MA) **Strand:** Measurement and Comparison **Standard:** CD-MA4: The child will sort, order, classify, and create patterns ✓ CD-MA4.4b – Sorts and classifies objects using one or more attributes or relationships **Domain:** Cognitive Development: Mathematics (CD-MA) **Strand:** Geometry and Spatial Thinking **Standard:** CD-MA5: The child will explore, recognize, and describe spatial relationships between objects ✓ CD-MA5.4a – Uses appropriate directional language to indicate where things are in their environment: positions, distances, order **Domain:** Cognitive Development: Social Studies (CD-SS) **Strand:** People and Community **Standard:** CD-SS4: The child will demonstrate an awareness of economics of his/her community ✓ CD-SS4.4b – Describes the roles and responsibilities of a variety of occupations

- ✓ CD-SC1.3b – Uses simple tools to experiment and observe

Domain: Cognitive Development: Science (CD-SC)
Strand: Earth and Space
Standard: CD-SC2: The child will demonstrate knowledge related to dynamic properties of the earth and sky

- ✓ CD-SC2.3b – Investigates properties of rocks, soil, sand, and mud using adult and child-directed activities

Domain: Cognitive Development: Science (CD-SC)
Strand: Living Creatures
Standard: CD-SC3: The child will demonstrate knowledge related to living things and their environments

- ✓ CD-SC3.3c – Identifies and describes the functions of a few body parts

Domain: Cognitive Development: Science (CD-SC)
Strand: Physical Science
Standard: CD-SC4: The child will demonstrate knowledge related to physical science

- ✓ CD-SC4.3a – Independently investigates objects and toys that require positioning and movement

Domain: Cognitive Development: Creative Development (CD-CR)
Strand: Visual Arts
Standard: CD-CR2: The child will create, observe, and analyze visual art forms to develop artistic expression

- ✓ CD-CR2.3a - Uses a variety of tools and art media to express individual creativity

Domain: Cognitive Development: Cognitive Processes (CD-CP)
Strand: Thinking Skills
Standard: CD-CP1: The child will demonstrate awareness of cause and effect

- ✓ CD-CP1.3a – Intentionally carries out an action with an understanding of the effect it will cause
- ✓ CD-CP1.3b – Expresses beginning understanding of reasoning skills

Domain: Cognitive Development: Cognitive Processes (CD-CP)
Strand: Thinking Skills
Standard: CD—CP2: The child will use prior knowledge to build new knowledge

- ✓ CD-CP2.3a – Uses objects as intended in new activities
- ✓ CD-CP2.3d – Uses clues and sequence of events to infer and predict what will happen next

- ✓ CD-SS4.4c – Describes how people interact economically and how goods and services are exchanged
- ✓ CD-SS4.4d – Explores the uses of technology and understands its role in the environment

Domain: Cognitive Development: Science (CD-SC)
Strand: Earth and Space
Standard: CD-SC2: The child will demonstrate knowledge related to dynamic properties of the earth and sky

- ✓ CD-SC2.4b – Explores and begins to describe properties of rocks, soil, sand, and mud

Domain: Cognitive Development: Creative Development (CD-CR) **.**
Strand: Visual Arts
Standard: CD-CR2: The child will create and explore visual art forms to develop artistic expression

- ✓ CD-CR2.4a - Uses materials to create original work for self-expression and to express individual creativity

Domain: Cognitive Development: Cognitive Processes (CD-CP)
Strand: Thinking Skills
Standard: CD-CP1: The child will demonstrate awareness of cause and effect

- ✓ CD-CP1.4a – Recognizes cause and effect relationships
- ✓ CD-CP1.4b – Explains why simple events occur using reasoning skills

Domain: Cognitive Development: Cognitive Processes (CD-CP)
Strand: Thinking Skills
Standard: CD—CP2: The child will use prior knowledge to build new knowledge

- ✓ CD-CP2.4b – Uses observation and imitation to transfer knowledge to new experiences
- ✓ CD-CP2.4c – Uses information gained about familiar objects and people and can apply to a new situation

<table>
<tr><th rowspan="2">Lesson
#2</th><th colspan="2">Georgia Early Learning and Development Standards (GELDs)</th></tr>
<tr><th>Domain, Strand, Standards
(36-48 months)</th><th>Domain, Strand, Standards
(48-60 months)</th></tr>
<tr>
<td rowspan="2">“Grown From Garbage”
SAM Activity

In this activity, children will grow a green onion from scrap roots.

Before the experiment, parents should discuss with the child why we should conserve food and the importance of not wasting food.

On day 0, they will make a prediction about how tall their plant will be.

They will place an onion bottom in a clear cup of water. As soon as roots being to appear around day 3-4, they will transfer the onion to a cup of soil. The onion plant will be watered daily. Eggshells and/or coffee can be added to improve soil quality. Parents will help child set up three experimental groups to test what environmental conditions help the onion stalk grow faster (nothing, coffee, or eggshells?). Parents can also help the child conduct research or simple experiments on what other objects might serve as effective fertilizers.

Children will measure how much their onion has grown over the course of 10 days by drawing a picture and recording the plant’s height every 2 days.

On the final day, they will think about how many times they can make a new onion from the scrap root. Eventually, they can</td>
<td>Domain: Physical Development and Motor Skills (PDM)
Strand: Health & Well-Being
Standard: PDM1: The child will practice healthy and safe habits
✓ PDM1.3a – Stays awake except during naptime
✓ PDM1.3b – Actively participates in a variety of both structured and unstructured indoor and outdoor activities for sustained periods of time.

Domain: Physical Development and Motor Skills (PDM)
Strand: Use of Senses
Standard: PDM4: The child will use senses (sight, touch, hearing, smell, and taste) to explore the environment and process information.
✓ PDM 4.3a - Uses sense purposefully to learn about objects.

Domain: Physical Development and Motor Skills (PDM)
Strand: Motor Skills
Standard: PDM6: The child will demonstrate fine motor skills
✓ PDM6.3a – Refines grasp to manipulate tools and objects
✓ PDM6.3b – Uses hand-eye coordination to manipulate smaller objects with increasing control</td>
<td>Domain: Physical Development and Motor Skills (PDM)
Strand: Health & Well-Being
Standard: PD1: The child will practice healthy and safe habits
✓ PDM1.4a – Stays awake and alert during the day except during voluntary nap time
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Domain: Physical Development and Motor Skills (PDM)
Strand: Use of Senses
Standard: PDM4: The child will use senses (sight, touch, hearing, smell, and taste) to explore the environment and process information.
✓ PDM 4.4a – Discriminates between a variety of sights, smells, sounds, textures, and tastes

Domain: Physical Development and Motor Skills (PDM)
Strand: Motor Skills
Standard: PDM6: The child will demonstrate fine motor skills
✓ PDM6.4a – Performs fine-motor tasks that require small-muscle strength and control
✓ PDM6.4b – Uses hand-eye coordination to manipulate small object with ease</td>
</tr>
<tr>
<td>Domain: Social and Emotional Development (SED)
Strand: Developing a Sense of Self
Standard: SED1: The child will develop self-awareness
✓ SED1.3c – Shows sense of satisfaction in his/her own abilities, preferences, and accomplishments
✓ SED1.3d – Shows emerging sense of independence in his/her own choices

Domain: Social and Emotional Development (SED)
Strand: Developing a Sense of Self
Standard: SED2: The child will engage in self-expression
✓ SED2.3a – Uses a combination of words, phrases, and actions to communicate needs, ideas, opinions, and preferences</td>
<td>Domain: Social and Emotional Development (SED)
Strand: Developing a Sense of Self
Standard: SED2: The child will develop self-awareness
✓ SED2.4b – Identifies personal characteristics, preferences, thoughts, and feelings
✓ SED1.4d – Shows independence in his/her own choices

Domain: Social and Emotional Development (SED)
Strand: Developing a Sense of Self
Standard: SED2: The child will engage in self-expression
✓ SED2.4a – Effectively uses words, phrases, and actions to communicate needs, ideas, opinions, and preferences</td>
</tr>
</table>

harvest the onion and use it to prepare or garnish a meal. Parents will discuss the function of tools like a pot, a watering can, and a ruler as examples of technology that is used in our every day lives to make life easier.	**Domain:** Approaches to Play and Learning (APL) **Strand:** Initiative and Exploration **Standard:** APL1: The child will demonstrate initiative and self-direction. ✓ APL1.3b – Makes choices and complete some independent activities ✓ APL1.3c – Makes plans and follows through on intentions **Domain:** Approaches to Play and Learning (APL) **Strand:** Initiative and Exploration **Standard:** APL2: The child will demonstrate interest and curiosity. ✓ APL2.3a – Demonstrates an increased willingness to participate in both familiar and new experiences ✓ APL2.3b – Ask questions about unfamiliar objects, people, and experiences ✓ APL2.3c – Explores and manipulates both familiar and unfamiliar objects in the environment **Domain:** Approaches to Play and Learning (APL) **Strand:** Attentiveness and Persistence **Standard:** APL3: The child will demonstrate self-control ✓ APL3.3a – Engages in a structured activity for short periods of time to achieve a goal	**Domain:** Approaches to Play and Learning (APL) **Strand:** Initiative and Exploration **Standard:** APL1: The child will demonstrate initiative and self-direction. ✓ APL1.4a – Takes initiative to learn new concepts and tries new experiences. Initiates and completes new tasks by himself/herself. ✓ APL 1.4b – Selects and carries out activities without adult prompting ✓ APL1.4c – Sets goals and develops and follows through on plans **Domain:** Approaches to Play and Learning (APL) **Strand:** Initiative and Exploration **Standard:** APL2: The child will demonstrate interest and curiosity. ✓ APL2.4a – Demonstrates eagerness to learn about and discuss new topics, ideas, and tasks ✓ APL2.4b – Ask questions and seeks new information. With assistance, looks for new information and wants to know more. ✓ APL2.4c – Increasingly seeks out and explores unfamiliar objects in the environment **Domain:** Approaches to Play and Learning (APL) **Strand:** Attentiveness and Persistence **Standard:** APL3: The child will sustain attention to a specific activity and demonstrate persistence ✓ APL3.3a – Engages in independent activities and continues tasks over a period of time ✓ APL3.4b – Practices to improve skills that have been accomplished
	Domain: Communication, Language, and Literacy (CLL) **Strand:** Receptive Language (Listening) **Standard:** CLL1: The child will listen to conversations for a variety of purposes and demonstrate comprehension ✓ CLL1.3b – Listens to and follows multi-step directions with support **Domain:** Communication, Language, and Literacy (CLL) **Strand:** Receptive Language (Listening) **Standard:** CLL2: The child will acquire vocabulary introduced in conversations, activities, stories, and/or books ✓ CLL2.3a – Demonstrates understanding of vocabulary through everyday conversations ✓ CLL2.3b – Listens and understands new vocabulary from activities, stories, and books **Domain:** Communication, Language, and Literacy (CLL) **Strand:** Expressive Language **Standard:** CLL4: The child will use increasingly complex spoken language ✓ CLL4.3a – Speaks clearly enough to be understood	**Domain:** Communication, Language, and Literacy (CLL) **Strand:** Receptive Language **Standard:** CLL1: The child will listen to conversations and demonstrate comprehension ✓ CLL1.4b – Listens to and follows multi-step directions with support ✓ CLL1.4c – Extends/expands thoughts or ideas expressed **Domain:** Communication, Language, and Literacy (CLL) **Strand:** Receptive Language **Standard:** CLL2: The child will acquire vocabulary introduced in conversations, activities, stories, and/or books ✓ CLL2.4b – Connects new vocabulary from activities, stories, and/or books with prior experiences and conversations **Domain:** Communication, Language, and Literacy (CLL) **Strand:** Expressive Language **Standard:** CLL4: The child will use increasingly complex spoken language ✓ CLL4.4c - Describes activities, experiences, and stories with more detail **Domain:** Communication, Language, and Literacy (CLL) **Strand:** Early writing **Standard:** CLL9: The child will use writing for a variety of purposes

	✓ CLL4.3c – Describes activities and experiences using details ✓ CLL4.3d – Uses expanded vocabulary in a variety of situations **Domain:** Communication, Language, and Literacy (CLL) **Strand:** Early Reading **Standard:** CLL8: The child will demonstrate awareness of print concepts ✓ CLL8.3b – Discriminates words from pictures independently **Domain:** Communication, Language, and Literacy (CLL) **Strand:** Early writing **Standard:** CLL9: The child will use writing for a variety of purposes ✓ CLL9.3b – Uses writing utensils with adult guidance ✓ CLL9.3c – Shows emerging awareness that writing can be used for a variety of purposes	✓ CLL9.4aF – Draws pictures and copies letters and/or numbers to communicate ✓ CLL9.4b - Uses writing tools ✓ CLL9.4d - Writes some letters of the alphabet
	Domain: Cognitive Development: Mathematics (CD-MA) **Strand:** Number and Quantity **Standard:** CD-MA1: The child will organize, represent, and build knowledge of quantity and number ✓ CD-MA1.3d – Identifies quantity and comparisons of quantity ✓ CD-MA1.3e – Quickly recognizes and names how many items are in a set up to three items **Domain:** Cognitive Development: Mathematics (CD-MA) **Strand:** Number and Quantity **Standard:** CD-MA2: The child will manipulate, compare, and describe relationships using quantity and number. ✓ CD-MA2.3d – Participates in creating and using real and pictorial graphs or other simple representations of data. **Domain:** Cognitive Development: Mathematics (CD-MA) **Strand:** Measurement and Comparison **Standard:** CD-MA3: The child will explore and communicate about distance, weight, length, height, and time ✓ CD-MA3.3a – Labels objects using size words ✓ CD-MA3.3b - Compares two or more objects using a single attribute, such as length, weight, and size and matches items or similar sizes ✓ CD-MA3.3c – Uses a variety of standard and non-standard tools to measure object attributes with assistance ✓ CD-MA3.3d – Predicts upcoming events from prior knowledge	**Domain:** Cognitive Development: Mathematics (CD-MA) **Strand:** Number and Quantity **Standard:** CD-MA1: The child will organize, represent, and build knowledge of quantity and number ✓ CD-MA1.4b – Recognizes numerals and uses counting as part of play and as a means for determining quantity **Domain:** Cognitive Development: Mathematics (CD-MA) **Strand:** Measurement and Comparison **Standard:** CD-MA3: The child will explore and communicate about distance, weight, length, height, and time ✓ CD-MA3.4a – Uses mathematical terms to describe experiences involving measurement ✓ CD-MA3.4b – Compares objects using two or more attributes such as length, weight, and size ✓ CD-MA3.4c - Uses a variety of techniques and standard and nonstandard tools to measure and compare length, volume (capacity), and weight ✓ CD-MA3.4d – Associates and describes the passage of time with actual events **Domain:** Cognitive Development: Mathematics (CD-MA) **Strand:** Geometry and Spatial Thinking **Standard:** CD-MA5: The child will explore, recognize, and describe spatial relationships between objects ✓ CD-MA5.4a – Uses appropriate directional language to indicate where things are in their environment: positions, distances, order **Domain:** Cognitive Development: Mathematics (CD-MA) **Strand:** Mathematical Reasoning **Standard:** CD-MA7: The child will use mathematical problem solving, reasoning, estimation, and communication ✓ CD-MA7.4a – Estimates using mathematical terms and understands how to check the estimate **Domain:** Cognitive Development: Social Studies (CD-SS)

	Domain: Cognitive Development: Mathematics (CD-MA) **Strand:** Mathematical Reasoning **Standard:** CD-MA7: The child will explore, recognize, and describe spatial relationships between objects ✓ CD-MA7.3a – Practices estimating using mathematical terms and numbers with adult assistance. **Domain:** Cognitive Development: Social Studies (CD-SS) **Strand:** People and Community **Standard:** CD-SS4: The child will demonstrate an awareness of economics in his/her community ✓ CD-SS4.3d – Explores the uses of technology **Domain:** Cognitive Development: Social Studies (CD-SS) **Strand:** History and Events **Standard:** CD-SS5: The child will understand the passage of time and how events are related ✓ CD-SS5.3a – Recognizes and describes sequence of events **Domain:** Cognitive Development: Science (CD-SC) **Strand:** Scientific Skills and Methods **Standard:** CD-SC1: The child will demonstrate scientific inquiry skills ✓ CD-SC1.3a – Uses senses to observe and experience objects in the environment ✓ CD-SC1.3b – Uses simple tools to experiment and observe ✓ CD-SC1.3c – Records observations through drawings or dictations with adult guidance ✓ CD-SC1.3d – Participates in simple experiments and discusses scientific properties **Domain:** Cognitive Development: Science (CD-SC) **Strand:** Earth and Space **Standard:** CD-SC2: The child will demonstrate knowledge related to dynamic properties of the earth and sky ✓ CD-SC2.3a – Investigates and asks questions about the properties of water using adult and child-directed activities ✓ CD-SC2.3b – Investigates properties of rocks, soil, sand, and mud using adult and child-directed activities **Domain:** Cognitive Development: Science (CD-SC) **Strand:** Living Creatures **Standard:** CD-SC3: The child will demonstrate knowledge related to living things and their environments ✓ CD-SC3.3a – Observes and explores a variety of animals and	**Strand:** People and Community **Standard:** CD-SS4: The child will demonstrate an awareness of economics of his/her community ✓ CD-SS4.4d – Explores the uses of technology and understands its role in the environment **Domain:** Cognitive Development: Social Studies (CD-SS) **Strand:** History and Events **Standard:** CD-SS5: The child will understand the passage of time and how events are related ✓ CD-SS5.4a – Recognizes and describes sequence of events with accuracy ✓ CD-SS5.4b – Differentiates between past, present, and future **Domain:** Cognitive Development: Science (CD-SC) **Strand:** Scientific Skills and Methods **Standard:** CD-SC1: The child will demonstrate scientific inquiry skills ✓ CD-SC1.4a – Uses senses to observe, classify, and learn about objects in the environment ✓ CD-SC1.4b – Uses simple tools correctly to experiment, observe, and increase understanding ✓ CD-SC1.4c – Records observations through dictating to an adult and drawings pictures or using other forms of writing ✓ CD-SC1.4d – Experiments, compares, and formulates hypothesis related to scientific properties **Domain:** Cognitive Development: Science (CD-SC) **Strand:** Earth and Space **Standard:** CD-SC2: The child will demonstrate knowledge related to dynamic properties of the earth and sky ✓ CD-SC2.4a – Describes properties of water, including changes to the states of water ✓ CD-SC2.4b – Explores and begins to describe properties of rocks, soil, sand, and mud **Domain:** Cognitive Development: Science (CD-SC) **Strand:** Living Creatures **Standard:** CD-SC3: The child will demonstrate knowledge related to living things and their environments ✓ CD-SC3.4a – Observes, explores, and describes a variety of animals and plants. Describes their basic needs and life cycles of living things. ✓ CD-SC3.4b – Discriminates between living and non-living things **Domain:** Cognitive Development: Science (CD-SC) **Strand:** Interaction with the Environment **Standard:** CD-SC3: The child will demonstrate awareness of and the need to protect his/her environment. ✓ CD-SC5.4a – Understands that people have an impact on the environment and participates in efforts to protect the environment **Domain:** Cognitive Development: Creative Development (CD-CR) **.** **Strand:** Visual Arts **Standard:** CD-CR2: The child will create and explore visual art forms to develop artistic expression ✓ CD-CR2.4b – Observes and discusses visual art forms and compares their similarities and differences

	plants and their environments and life cycles ✓ CD-SC3.3b – Identifies the physical properties of some living and non-living things **Domain:** Cognitive Development: Science (CD-SC) **Strand:** Interaction with the Environment **Standard:** CD-SC3: The child will demonstrate awareness of and the need to protect his/her environment. ✓ CD-SC5.3a – Participates in efforts to protect the environment **Domain:** Cognitive Development: Creative Development (CD-CR) **Strand:** Visual Arts **Standard:** CD-CR2: The child will create, observe, and analyze visual art forms to develop artistic expression ✓ CD-CR2.3a – Uses a variety of tools and art media to express individual creativity ✓ CD-CR2.3b – Observes and discusses visual art work ✓ CD-CR2.3c – Shares ideas about personal creative work **Domain:** Cognitive Development: Cognitive Processes (CD-CP) **Strand:** Thinking Skills **Standard:** CD-CP1: The child will demonstrate awareness of cause and effect ✓ CD-CP1.3a – Intentionally carries out an action with an understanding of the effect it will cause ✓ CD-CP1.3b – Expresses beginning understanding of reasoning skills **Domain:** Cognitive Development: Cognitive Processes (CD-CP) **Strand:** Thinking Skills **Standard:** CD—CP2: The child will use prior knowledge to build new knowledge ✓ CD-CP2.3a – Uses objects as intended in new activities ✓ CD-CP2.3b – Uses observation and imitation to acquire knowledge ✓ CD-CP2.3c – Identifies familiar objects and people in new situations ✓ CD-CP2.3d – Uses clues and sequence of events to infer and predict what will happen next **Domain:** Cognitive Development: Cognitive Processes (CD-CP) **Strand:** Problem Solving **Standard:** CD-CP3: The child will demonstrate problem solving skills ✓ CD-CP3.3a – Demonstrates multiple uses for objects to solve problems ✓ CD-CP3.3b – Asks questions and tests different possibilities to determine the best solution to a problem	**Domain:** Cognitive Development: Cognitive Processes (CD-CP) **Strand:** Thinking Skills **Standard:** CD-CP1: The child will demonstrate awareness of cause and effect ✓ CD-CP1.4a – Recognizes cause and effect relationships ✓ CD-CP1.4b – Explains why simple events occur using reasoning skills ✓ CD-CP1.4c – Draws conclusions based on facts and evidence **Domain:** Cognitive Development: Cognitive Processes (CD-CP) **Strand:** Thinking Skills **Standard:** CD-CP2: The child will use prior knowledge to build new knowledge ✓ CD-CP2.4b – Uses observation and imitation to transfer knowledge to new experiences ✓ CD-CP2.4c – Uses information gained about familiar objects and people and can apply to a new situation ✓ CD-CP2.4d – Makes, checks, and verifies predictions ✓ CD-CP2.4e – Explains how an activity is built on or uses past knowledge **Domain:** Cognitive Development: Cognitive Processes (CD-CP) **Strand:** Problem Solving **Standard:** CD-CP3: The child will demonstrate problem solving skills ✓ CD-CP3.4a – Makes statements and appropriately answers questions about how objects/materials can be used to solve problems ✓ CD-CP3.4c – With adult guidance and questioning, determines and evaluates solutions prior to attempting to solve a problem

Lesson #3	Georgia Early Learning and Development Standards (GELDs)	
	Domain, Strand, Standards (36-48 months)	**Domain, Strand, Standards (48-60 months)**
Explorer Kit "Go, Grow, Glow" Activity Go, Grow, Glow Plate (ART) - Children will cut out craft cardstock photos of vegetables and place them on the correct panel on the reusable go, grow, glow plate. Parents will discuss the role of scissors as an example of a technological tool that makes our lives easier. Parents will demonstrate how to safely use scissors. Menu Matching Activity Booklet (SCIENCE + MATH) - Child will circle which vegetables are good for giving energy, growing, and feeling good and discuss different proportions to eat these in. Meet the Farmer (ENGINEERING + TECHNOLOGY) - Child will get to "meet" a farmer who grows carrots, learn how and where carrots come from, and other fun facts about carrots. Table Talk Cards (LANGUAGE & LITERACY) - Parent and child will use the cards to have a conversation involving vegetables, colors, and feelings.	**Domain**: Physical Development and Motor Skills (PDM) **Strand**: Health & Well-Being **Standard:** PDM1: The child will practice healthy and safe habits ✓ PDM1.3a – Stays awake except during naptime ✓ PDM1.3b – Actively participates in a variety of both structured and unstructured indoor and outdoor activities for sustained periods of time. **Domain**: Physical Development and Motor Skills (PDM) **Strand**: Health & Well-Being **Standard:** PDM2: The child will participate in activities related to nutrition ✓ PDM2.3a – Helps prepare nutritious snacks ✓ PDM2.3b – Distinguishes healthy food choices from less healthy food choices **Domain**: Physical Development and Motor Skills (PDM) **Strand**: Use of Senses **Standard:** PDM4: The child will use senses (sight, touch, hearing, smell, and taste) to explore the environment and process information. ✓ PDM4.3a - Uses senses purposefully to learn about objects. ✓ PDM4.3b – Takes things apart and attempts to put them back together **Domain**: Physical Development and Motor Skills (PDM) **Strand**: Motor Skills **Standard:** PDM6: The child will demonstrate fine motor skills ✓ PDM6.3a – Refines grasp to manipulate tools and objects ✓ PDM6.3b – Uses hand-eye coordination to manipulate smaller objects with increasing control	**Domain**: Physical Development and Motor Skills (PDM) **Strand**: Health & Well-Being **Standard:** PD1: The child will practice healthy and safe habits ✓ PDM1.4a – Stays awake and alert during the day except during voluntary nap time ✓ PDM1.4b – Actively participates in a variety of both structured and unstructured indoor and outdoor activities for a sustained period of time that increase strength, endurance, and flexibility ✓ PDM1.4d – Communicates the importance of safety rules **Domain**: Physical Development and Motor Skills (PDM) **Strand**: Health & Well-Being **Standard:** PDM2: The child will participate in activities related to nutrition ✓ PDM2.4b – Sorts foods into food groups and communicates the benefits of healthy foods **Domain**: Physical Development and Motor Skills (PDM) **Strand**: Use of Senses **Standard:** PDM4: The child will use senses (sight, touch, hearing, smell, and taste) to explore the environment and process information. ✓ PDM 4.4a – Discriminates between a variety of sights, smells, sounds, textures, and tastes **Domain**: Physical Development and Motor Skills (PDM) **Strand**: Motor Skills **Standard:** PDM6: The child will demonstrate fine motor skills ✓ PDM6.4a – Performs fine-motor tasks that require small-muscle strength and control ✓ PDM6.4b – Uses hand-eye coordination to manipulate small object with ease

<table>
<tr><td></td><td>Domain: Social and Emotional Development (SED)
Strand: Developing a Sense of Self
Standard: SED1: The child will develop self-awareness
✓ SED1.3b – Demonstrates knowledge of personal information
✓ SED1.3d – Shows emerging sense of independence in his/her own choices

Domain: Social and Emotional Development (SED)
Strand: Developing a Sense of Self
Standard: SED2: The child will engage in self-expression
✓ SED2.3a – Uses a combination of words, phrases, and actions to communicate needs, ideas, opinions, and preferences</td><td>Domain: Social and Emotional Development (SED)
Strand: Developing a Sense of Self
Standard: SED1: The child will develop self-awareness
✓ SED1.4b – Identifies personal characteristics, preferences, thoughts, and feelings
✓ SED1.4d – Shows independence in his/her own choices

Domain: Social and Emotional Development (SED)
Strand: Developing a Sense of Self
Standard: SED2: The child will engage in self-expression
✓ SED2.4a – Effectively uses words, phrases, and actions to communicate needs, ideas, opinions, and preferences
✓ SED2.4b – With adult guidance, uses verbal and non-verbal expressions to describe and explain a full range of emotions</td></tr>
<tr><td></td><td>Domain: Approaches to Play and Learning (APL)
Strand: Initiative and Exploration
Standard: APL1: The child will demonstrate initiative and self-direction.
✓ APL1.3b – Makes choices and complete some independent activities

Domain: Approaches to Play and Learning (APL)
Strand: Initiative and Exploration
Standard: APL2: The child will demonstrate interest and curiosity.
✓ APL2.3a – Demonstrates an increased willingness to participate in both familiar and new experiences
✓ APL2.3b – Ask questions about unfamiliar objects, people, and experiences
✓ APL2.3c – Explores and manipulates both familiar and unfamiliar objects in the environment

Domain: Approaches to Play and Learning (APL)
Strand: Attentiveness and Persistence
Standard: APL3: The child will demonstrate self-control
✓ APL3.3a – Engages in a structured activity for short periods of time to achieve a goal
✓ APL3.3b – Wants to complete activities and do them well</td><td>Domain: Approaches to Play and Learning (APL)
Strand: Initiative and Exploration
Standard: APL1: The child will demonstrate initiative and self-direction.
✓ APL1.4a – Takes initiative to learn new concepts and tries new experiences. Initiates and completes new tasks by himself/herself.
✓ APL 1.4b – Selects and carries out activities without adult prompting

Domain: Approaches to Play and Learning (APL)
Strand: Initiative and Exploration
Standard: APLs: The child will demonstrate interest and curiosity.
✓ APL2.4a – Demonstrates eagerness to learn about and discuss new topics, ideas, and tasks
✓ APL2.4b – Asks questions and seeks new information. With assistance, looks for new information and wants to know more

Domain: Approaches to Play and Learning (APL)
Strand: Attentiveness and Persistence
Standard: APL3: The child will sustain attention to a specific activity and demonstrate persistence
✓ APL3.4a – Engages in independent activities and continues tasks over a period of time</td></tr>
<tr><td></td><td>Domain: Communication, Language, and Literacy (CLL)
Strand: Receptive Language (Listening)
Standard: CLL1: The child will listen to conversations for a variety of purposes and demonstrate comprehension</td><td>Domain: Communication, Language, and Literacy (CLL)
Strand: Receptive Language
Standard: CLL1: The child will listen to conversations and demonstrate comprehension</td></tr>
</table>

	✓ CLL1.3a - Listens and responds to conversations and group discussions ✓ CLL1.3b – Listens to and follows multi-step directions with support **Domain:** Communication, Language, and Literacy (CLL) **Strand:** Receptive Language (Listening) **Standard:** CLL2: The child will acquire vocabulary introduced in conversations, activities, stories, and/or books ✓ CLL2.3b – Listens and understands new vocabulary from activities, stories, and books **Domain:** Communication, Language, and Literacy (CLL) **Strand:** Expressive Language **Standard:** CLL4: The child will use increasingly complex spoken language ✓ CLL4.3a – Speaks clearly enough to be understood ✓ CLL4.3c – Describes activities and experiences using details **Domain:** Communication, Language, and Literacy (CLL) **Strand:** Early Reading **Standard:** CLL8: The child will demonstrate awareness of print concepts ✓ CLL8.3b – Discriminates words from pictures independently	✓ CLL1.4a - Listens and responds to conversations and group discussions for an extended period of time ✓ CLL1.4b – Listens to and follows multi-step directions **Domain:** Communication, Language, and Literacy (CLL) **Strand:** Receptive Language **Standard:** CLL2: The child will acquire vocabulary introduced in conversations, activities, stories and/or books ✓ CLL2.4a – Connects new vocabulary from activities, stories, and/or books with prior experiences and conversations **Domain:** Communication, Language, and Literacy (CLL) **Strand:** Expressive Language **Standard:** CLL4: The child will use increasingly complex spoken language ✓ CLL4.4a – Uses spoken language that can be understood with ease ✓ CLL4.4b – Demonstrates use of expanded sentences and sentence structures to ask questions ✓ CLL4.4c - Describes activities, experiences, and stories with more detail **Domain:** Communication, Language, and Literacy (CLL) **Strand:** Early Reading **Standard:** CLL8: The child will demonstrate awareness of print concepts ✓ CLL8.4b – Understands that letters form words. Understands that words are separated by spaces in print. ✓ CLL8.4c – With prompting and support, track words from left to right, top to bottom, and page to page.
	Domain: Cognitive Development: Mathematics (CD-MA) **Strand:** Number and Quantity **Standard:** CD-MA1: The child will organize, represent, and build knowledge of quantity and number ✓ CD-MA1.3d – Identifies quantity and comparisons of quantity **Domain:** Cognitive Development: Mathematics (CD-MA) **Strand:** Number and Quantity **Standard:** CD-MA2: The child will manipulate, compare, and describe relationships using quantity and number ✓ CD-MA2.3c – Recognizes that objects or sets ca be combined or separated ✓ CD-MA2.3d – Participates in creating and using real and pictorial graphs or other simple representations of data **Domain:** Cognitive Development: Mathematics (CD-MA) **Strand:** Measurement and Comparison **Standard:** CD-MA3: The child will explore and communicate about distance, weight, length, height, and time ✓ CD-MA3.3a – Labels objects using size words	**Domain:** Cognitive Development: Mathematics (CD-MA) **Strand:** Number and Quantity **Standard:** CD-MA1: The child will organize, represent, and build knowledge of quantity and number ✓ CD-MA1.4b – Recognizes numerals and uses counting as part of play and as a means for determining quantity ✓ CD-MA1.4d – Describes sets as having more, less, same as/equal ✓ CD-MA1.4e – Quickly recognizes and names how many items are in a set up to four items **Domain:** Cognitive Development: Mathematics (CD-MA) **Strand:** Number and Quantity **Standard:** CD-MA2: The child will manipulate, compare, and describe relationships using quantity and number ✓ CD-MA2.4c – Practices combining, separating, and naming quantities **Domain:** Cognitive Development: Mathematics (CD-MA) **Strand:** Measurement and Comparison **Standard:** CD-MA3: The child will explore and communicate about distance, weight, length, height, and time ✓ CD-MA3.4a – Uses mathematical terms to describe experiences involving measurement ✓ CD-MA3.4b – Compares objects using two or more attributes such as length, weight, and size ✓ CD-MA3.4c - Uses a variety of techniques and standard and nonstandard tools to measure and compare length, volume (capacity), and weight **Domain:** Cognitive Development: Mathematics (CD-MA)

	✓ CD-MA3.3b – Compares two or more objects using a single attribute, such as length, weight, and size and matches items or similar sizes ✓ CD-MA3.3c – Uses a variety of standard and non-standard tools to measure object attributes with assistance **Domain:** Cognitive Development: Mathematics (CD-MA) **Strand:** Measurement and Comparison **Standard:** CD-MA4: The child will sort, order, classify, and create patterns ✓ CD-MA4.3a – Independently orders objects using one characteristic ✓ CD-MA4.3b - Sorts objects by one attribute such as color, shape, or size **Domain:** Cognitive Development: Mathematics (CD-MA) **Strand:** Geometry and Spatial Thinking **Standard:** CD-MA5: The child will explore, recognize, and describe spatial relationships between objects ✓ CD-MA5.3a – Follows simple directions which demonstrates an understanding of directionality, order, and position of objects **Domain:** Cognitive Development: Mathematics (CD-MA) **Strand:** Mathematical Reasoning **Standard:** CD-MA7: The child will use mathematical problem solving, reasoning, estimation, and communication ✓ CD-MA7.3a – Practices estimating using mathematical terms and numbers with adult assistance **Domain:** Cognitive Development: Social Studies (CD-SS) **Strand:** People and Community **Standard:** CD-SS4: The child will demonstrate an awareness of economics of his/her community ✓ CD-SS4.3b – Recognizes a variety of occupations and work associated with them ✓ CD-SS4.3c – Recognizes that people work to earn a living ✓ CD-SS4.3d – Explores the uses of technology **Domain:** Cognitive Development: Science (CD-SC) **Strand:** Scientific Skills and Methods **Standard:** CD-SC1: The child will demonstrate scientific inquiry skills ✓ CD-SC1.3a – Uses senses to observe and experience objects in the environment	**Strand:** Measurement and Comparison **Standard:** CD-MA4: The child will sort, order, classify, and create patterns ✓ CD-MA4.4a – Independently orders objects using one characteristic and describes the criteria used ✓ CD-MA4.4b – Sorts and classifies objects using one or more attributes or relationships **Domain:** Cognitive Development: Mathematics (CD-MA) **Strand:** Geometry and Spatial Thinking **Standard:** CD-MA5: The child will explore, recognize, and describe spatial relationships between objects ✓ CD-MA5.4a – Uses appropriate directional language to indicate where things are in their environment: positions, distances, order **Domain:** Cognitive Development: Mathematics (CD-MA) **Strand:** Mathematical Reasoning **Standard:** CD-MA7: The child will use mathematical problem solving, reasoning, estimation, and communication ✓ CD-MA7.4a – Estimates using mathematical terms and understands how to check the estimate **Domain:** Cognitive Development: Social Studies (CD-SS) **Strand:** People and Community **Standard:** CD-SS4: The child will demonstrate an awareness of economics of his/her community ✓ CD-SS4.4b – Describes the roles and responsibilities of a variety of occupations ✓ CD-SS4.4c – Describes how people interact economically and how goods and services are exchanged ✓ CD-SS4.4d – Explores the uses of technology and understands its role in the environment. **Domain:** Cognitive Development: Science (CD-SC) **Strand:** Earth and Space **Standard:** CD-SC2: The child will demonstrate knowledge related to dynamic properties of the earth and sky ✓ CD-SC2.4b – Explores and begins to describe properties of rocks, soil, sand, and mud **Domain:** Cognitive Development: Science (CD-SC) **Strand:** Living Creatures **Standard:** CD-SC3: The child will demonstrate knowledge related to living things and their environments ✓ CD-SC3.4c – Identifies and describes the functions of a many body parts **Domain:** Cognitive Development: Creative Development (CD-CR) **.** **Strand:** Visual Arts **Standard:** CD-CR2: The child will create and explore visual art forms to develop artistic expression ✓ CD-CR2.4b – Observes and discusses visual art forms and compares their similarities and differences **Domain:** Cognitive Development: Cognitive Processes (CD-CP) **Strand:** Thinking Skills **Standard:** CD-CP1: The child will demonstrate awareness of cause and effect ✓ CD-CP1.4a – Recognizes cause and effect relationships ✓ CD-CP1.4b – Explains why simple events occur using reasoning skills

	Domain: Cognitive Development: Science (CD-SC) **Strand:** Earth and Space **Standard:** CD-SC2: The child will demonstrate knowledge related to dynamic properties of the earth and sky ✓ CD-SC2.3b – Investigates properties of rocks, soil, sand, and mud using adult and child-directed activities **Domain:** Cognitive Development: Science (CD-SC) **Strand:** Living Creatures **Standard:** CD-SC3: The child will demonstrate knowledge related to living things and their environments ✓ CD-SC3.3c – Identifies and describes the functions of a few body parts **Domain:** Cognitive Development: Creative Development (CD-CR) **Strand:** Visual Arts **Standard:** CD-CR2: The child will create, observe, and analyze visual art forms to develop artistic expression ✓ CD-CR2.3a - Uses a variety of tools and art media to express individual creativity **Domain:** Cognitive Development: Cognitive Processes (CD-CP) **Strand:** Thinking Skills **Standard:** CD-CP1: The child will demonstrate awareness of cause and effect ✓ CD-CP1.3a – Intentionally carries out an action with an understanding of the effect it will cause ✓ CD-CP1.3b – Expresses beginning understanding of reasoning skills **Domain:** Cognitive Development: Cognitive Processes (CD-CP) **Strand:** Thinking Skills **Standard:** CD—CP2: The child will use prior knowledge to build new knowledge ✓ CD-CP2.3a – Uses objects as intended in new activities	✓ CD-CP1.4c – Draws conclusions based on facts and evidence **Domain:** Cognitive Development: Cognitive Processes (CD-CP) **Strand:** Thinking Skills **Standard:** CD—CP2: The child will use prior knowledge to build new knowledge ✓ CD-CP2.4b – Uses observation and imitation to transfer knowledge to new experiences ✓ CD-CP2.4c – Uses information gained about familiar objects and people and can apply to a new situation

Lesson #4	**Georgia Early Learning and Development Standards (GELDs)**	
	Domain, Strand, Standards (36-48 months)	**Domain, Strand, Standards (48-60 months)**
"Beans in the Bag" SAM Activity	**Domain**: Physical Development and Motor Skills (PDM) **Strand**: Health & Well-Being	**Domain**: Physical Development and Motor Skills (PDM) **Strand**: Health & Well-Being

In this activity, children will plant beans in cotton ball bags and watch them grow (SCIENCE), observing changes in size (MATH) and recording them (ART). On day 0, they will make a prediction about how long it will take their bean to grow. Parents will also help the child conduct research or simple experiments on what other objects might serve as effective fertilizers. Children will measure how much their bean has grown over the course of 2 weeks by drawing a picture and recording the plant's dimensions every 3 days. Parents will discuss the function of every day items like cotton and a Ziploc bag to make our lives easier. Parents will discuss with children what plants need to grow and call attention to how the seeds are different from green beans that are ready to eat frozen or canned. Parents can also discuss how there are so many different kinds of beans (LANGUAGE). Additionally, parents will also explain how green beans are grown on a large scale in greenhouses (TECHNOLOGY & ENGINEERING).	**Standard:** PDM1: The child will practice healthy and safe habits ✓ PDM1.3a – Stays awake except during naptime ✓ PDM1.3b – Actively participates in a variety of both structured and unstructured indoor and outdoor activities for sustained periods of time. **Domain**: Physical Development and Motor Skills (PDM) **Strand**: Health & Well-Being **Standard:** PDM2: The child will participate in activities related to nutrition ✓ PDM2.3b – Distinguishes healthy food choices from less healthy food choices **Domain**: Physical Development and Motor Skills (PDM) **Strand**: Use of Senses **Standard:** PDM4: The child will use senses (sight, touch, hearing, smell, and taste) to explore the environment and process information. ✓ PDM 4.3a - Uses sense purposefully to learn about objects. **Domain**: Physical Development and Motor Skills (PDM) **Strand**: Motor Skills **Standard:** PDM6: The child will demonstrate fine motor skills ✓ PDM6.3a – Refines grasp to manipulate tools and objects ✓ PDM6.3b – Uses hand-eye coordination to manipulate smaller objects with increasing control	**Standard:** PD1: The child will practice healthy and safe habits ✓ PDM1.4a – Stays awake and alert during the day except during voluntary nap time ✓ PDM1.4b – Actively participates in a variety of both structured and unstructured indoor and outdoor activities for a sustained period of time that increase strength, endurance, and flexibility **Domain**: Physical Development and Motor Skills (PDM) **Strand**: Health & Well-Being **Standard:** PDM2: The child will participate in activities related to nutrition ✓ PDM2.4b – Sorts foods into food groups and communicates the benefits of healthy foods **Domain**: Physical Development and Motor Skills (PDM) **Strand**: Use of Senses **Standard:** PDM4: The child will use senses (sight, touch, hearing, smell, and taste) to explore the environment and process information. ✓ PDM 4.4a – Discriminates between a variety of sights, smells, sounds, textures, and tastes **Domain**: Physical Development and Motor Skills (PDM) **Strand**: Motor Skills **Standard:** PDM6: The child will demonstrate fine motor skills ✓ PDM6.4a – Performs fine-motor tasks that require small-muscle strength and control ✓ PDM6.4b – Uses hand-eye coordination to manipulate small object with ease
	Domain: Social and Emotional Development (SED) **Strand**: Developing a Sense of Self **Standard:** SED1**:** The child will develop self-awareness ✓ SED1.3c – Shows sense of satisfaction in his/her own abilities, preferences, and accomplishments ✓ SED1.3d – Shows emerging sense of independence in his/her own choices **Domain**: Social and Emotional Development (SED) **Strand**: Developing a Sense of Self **Standard:** SED2**:** The child will engage in self-expression ✓ SED2.3a – Uses a combination of words, phrases, and actions to communicate needs, ideas, opinions, and preferences	**Domain**: Social and Emotional Development (SED) **Strand**: Developing a Sense of Self **Standard:** SED2**:** The child will develop self-awareness ✓ SED1.4b – Identifies personal characteristics, preferences, thoughts, and feelings ✓ SED1.4d – Shows independence in his/her own choices **Domain**: Social and Emotional Development (SED) **Strand**: Developing a Sense of Self **Standard:** SED2**:** The child will engage in self-expression ✓ SED2.4a – Effectively uses words, phrases, and actions to communicate needs, ideas, opinions, and preferences
	Domain: Approaches to Play and Learning (APL) **Strand:** Initiative and Exploration **Standard:** APL1: The child will demonstrate initiative and self-direction. ✓ APL1.3b – Makes choices and complete some independent activities ✓ APL1.3c – Makes plans and follows through on intentions	**Domain:** Approaches to Play and Learning (APL) **Strand:** Initiative and Exploration **Standard:** APL1: The child will demonstrate initiative and self-direction. ✓ APL1.4a – Takes initiative to learn new concepts and tries new experiences. Initiates and completes new tasks by himself/herself.

	Domain: Approaches to Play and Learning (APL) **Strand:** Initiative and Exploration **Standard:** APL2: The child will demonstrate interest and curiosity. ✓ APL2.3a – Demonstrates an increased willingness to participate in both familiar and new experiences ✓ APL2.3b – Ask questions about unfamiliar objects, people, and experiences ✓ APL2.3c – Explores and manipulates both familiar and unfamiliar objects in the environment **Domain:** Approaches to Play and Learning (APL) **Strand:** Attentiveness and Persistence **Standard:** APL3: The child will demonstrate self-control ✓ APL3.3a – Engages in a structured activity for short periods of time to achieve a goal	✓ APL 1.4b – Selects and carries out activities without adult prompting ✓ APL1.4c – Sets goals and develops and follows through on plans **Domain:** Approaches to Play and Learning (APL) **Strand:** Initiative and Exploration **Standard:** APL2: The child will demonstrate interest and curiosity. ✓ APL2.4b – Ask questions and seeks new information. With assistance, looks for new information and wants to know more. ✓ APL2.4c – Increasingly seeks out and explores unfamiliar objects in the environment **Domain:** Approaches to Play and Learning (APL) **Strand:** Attentiveness and Persistence **Standard:** APL3: The child will sustain attention to a specific activity and demonstrate persistence ✓ APL3.4a – Engages in independent activities and continues tasks over a period of time
	Domain: Communication, Language, and Literacy (CLL) **Strand:** Receptive Language (Listening) **Standard:** CLL1: The child will listen to conversations for a variety of purposes and demonstrate comprehension ✓ CLL1.3a – Listens and responds to conversations and group discussions ✓ CLL1.3b – Listens to and follows multi-step directions with support **Domain:** Communication, Language, and Literacy (CLL) **Strand:** Receptive Language (Listening) **Standard:** CLL2: The child will acquire vocabulary introduced in conversations, activities, stories, and/or books ✓ CLL2.3b – Listens and understands new vocabulary from activities, stories, and books **Domain:** Communication, Language, and Literacy (CLL) **Strand:** Expressive Language **Standard:** CLL4: The child will use increasingly complex spoken language ✓ CLL4.3a – Speaks clearly enough to be understood ✓ CLL4.3c – Describes activities and experiences using details	**Domain:** Communication, Language, and Literacy (CLL) **Strand:** Receptive Language **Standard:** CLL1: The child will listen to conversations and demonstrate comprehension ✓ CLL1.4b – Listens to and follows multi-step directions with support ✓ CLL1.4c – Extends/expands thoughts or ideas expressed **Domain:** Communication, Language, and Literacy (CLL) **Strand:** Receptive Language **Standard:** CLL2: The child will acquire vocabulary introduced in conversations, activities, stories, and/or books ✓ CLL2.4b – Connects new vocabulary from activities, stories, and/or books with prior experiences and conversations **Domain:** Communication, Language, and Literacy (CLL) **Strand:** Expressive Language **Standard:** CLL4: The child will use increasingly complex spoken language ✓ CLL4.4b – Demonstrates use of expanded sentences and sentence structures to ask questions and/or respond verbally ✓ CLL4.4c - Describes activities, experiences, and stories with more detail **Domain:** Communication, Language, and Literacy (CLL) **Strand:** Early writing **Standard:** CLL9: The child will use writing for a variety of purposes ✓ CLL9.4c – Draws pictures and copies letters and/or numbers to communicate ✓ CLL9.4b - Uses writing tools ✓ CLL9.4d - Writes some letters of the alphabet

	Domain: Cognitive Development: Mathematics (CD-MA) **Strand:** Number and Quantity **Standard:** CD-MA1: The child will organize, represent, and build knowledge of quantity and number ✓ CD-MA1.3d – Identifies quantity and comparisons of quantity **Domain:** Cognitive Development: Mathematics (CD-MA) **Strand:** Number and Quantity **Standard:** CD-MA2: The child will manipulate, compare, and describe relationships using quantity and number. ✓ CD-MA2.3d – Participates in creating and using real and pictorial graphs or other simple representations of data. **Domain:** Cognitive Development: Mathematics (CD-MA) **Strand:** Measurement and Comparison **Standard:** CD-MA3: The child will explore and communicate about distance, weight, length, height, and time ✓ CD-MA3.3a – Labels objects using size words ✓ CD-MA3.3b - Compares two or more objects using a single attribute, such as length, weight, and size and matches items or similar sizes ✓ CD-MA3.3c – Uses a variety of standard and non-standard tools to measure object attributes with assistance ✓ CD-MA3.3d – Predicts upcoming events from prior knowledge **Domain:** Cognitive Development: Mathematics (CD-MA) **Strand:** Mathematical Reasoning **Standard:** CD-MA7: The child will explore, recognize, and describe spatial relationships between objects ✓ CD-MA7.3a – Practices estimating using mathematical terms and numbers with adult assistance **Domain:** Cognitive Development: Social Studies (CD-SS) **Strand:** People and Community **Standard:** CD-SS4: The child will demonstrate an awareness of economics in his/her community ✓ CD-SS4.3d – Explores the uses of technology **Domain:** Cognitive Development: Social Studies (CD-SS) **Strand:** History and Events **Standard:** CD-SS5: The child will understand the passage of time and how events are related ✓ CD-SS5.3a – Recognizes and describes sequence of events **Domain:** Cognitive Development: Science (CD-SC) **Strand:** Scientific Skills and Methods **Standard:** CD-SC1: The child will demonstrate scientific inquiry skills	**Domain:** Cognitive Development: Mathematics (CD-MA) **Strand:** Number and Quantity **Standard:** CD-MA1: The child will organize, represent, and build knowledge of quantity and number ✓ CD-MA1.4b – Recognizes numerals and uses counting as part of play and as a means for determining quantity **Domain:** Cognitive Development: Mathematics (CD-MA) **Strand:** Number and Quantity **Standard:** CD-MA2: The child will manipulate, compare, and describe relationships using quantity and number. ✓ CD-MA2.4d – Describes data from classroom graphs using numerical math language **Domain:** Cognitive Development: Mathematics (CD-MA) **Strand:** Measurement and Comparison **Standard:** CD-MA3: The child will explore and communicate about distance, weight, length, height, and time ✓ CD-MA3.4a – Uses mathematical terms to describe experiences involving measurement ✓ CD-MA3.4b – Compares objects using two or more attributes such as length, weight, and size ✓ CD-MA3.4c - Uses a variety of techniques and standard and nonstandard tools to measure and compare length, volume (capacity), and weight ✓ CD-MA3.4d – Associates and describes the passage of time with actual events **Domain:** Cognitive Development: Mathematics (CD-MA) **Strand:** Mathematical Reasoning **Standard:** CD-MA7: The child will use mathematical problem solving, reasoning, estimation, and communication ✓ CD-MA7.4a – Estimates using mathematical terms and understands how to check the estimate **Domain:** Cognitive Development: Social Studies (CD-SS) **Strand:** People and Community **Standard:** CD-SS4: The child will demonstrate an awareness of economics of his/her community ✓ CD-SS4.4d – Explores the uses of technology and understands its role in the environment **Domain:** Cognitive Development: Social Studies (CD-SS) **Strand:** History and Events **Standard:** CD-SS5: The child will understand the passage of time and how events are related ✓ CD-SS5.4a – Recognizes and describes sequence of events with accuracy ✓ CD-SS5.4b – Differentiates between past, present, and future

	✓ CD-SC1.3a – Uses senses to observe and experience objects in the environment ✓ CD-SC1.3b – Uses simple tools to experiment and observe ✓ CD-SC1.3c – Records observations through drawings or dictations with adult guidance ✓ CD-SC1.3d – Participates in simple experiments and discusses scientific properties **Domain:** Cognitive Development: Science (CD-SC) **Strand:** Earth and Space **Standard:** CD-SC2: The child will demonstrate knowledge related to dynamic properties of the earth and sky ✓ CD-SC2.3a – Investigates and asks questions about the properties of water using adult and child-directed activities ✓ CD-SC2.3b – Investigates properties of rocks, soil, sand, and mud using adult and child-directed activities **Domain:** Cognitive Development: Science (CD-SC) **Strand:** Living Creatures **Standard:** CD-SC3: The child will demonstrate knowledge related to living things and their environments ✓ CD-SC3.3a – Observes and explores a variety of animals and plants and their environments and life cycles ✓ CD-SC3.3b – Identifies the physical properties of some living and non-living things **Domain:** Cognitive Development: Creative Development (CD-CR) **Strand:** Visual Arts **Standard:** CD-CR2: The child will create, observe, and analyze visual art forms to develop artistic expression ✓ CD-CR2.3a – Uses a variety of tools and art media to express individual creativity **Domain:** Cognitive Development: Cognitive Processes (CD-CP) **Strand:** Thinking Skills **Standard:** CD-CP1: The child will demonstrate awareness of cause and effect ✓ CD-CP1.3a – Intentionally carries out an action with an understanding of the effect it will cause ✓ CD-CP1.3b – Expresses beginning understanding of reasoning skills **Domain:** Cognitive Development: Cognitive Processes (CD-CP) **Strand:** Thinking Skills **Standard:** CD—CP2: The child will use prior knowledge to build new knowledge ✓ CD-CP2.3a – Uses objects as intended in new activities ✓ CD-CP2.3b – Uses observation and imitation to acquire knowledge ✓ CD-CP2.3d – Uses clues and sequence of events to infer and predict what will happen next	**Domain:** Cognitive Development: Science (CD-SC) **Strand:** Scientific Skills and Methods **Standard:** CD-SC1: The child will demonstrate scientific inquiry skills ✓ CD-SC1.4a – Uses senses to observe, classify, and learn about objects in the environment ✓ CD-SC1.4b – Uses simple tools correctly to experiment, observe, and increase understanding ✓ CD-SC1.4c – Records observations through dictating to an adult and drawings pictures or using other forms of writing ✓ CD-SC1.4d – Experiments, compares, and formulates hypothesis related to scientific properties **Domain:** Cognitive Development: Science (CD-SC) **Strand:** Earth and Space **Standard:** CD-SC2: The child will demonstrate knowledge related to dynamic properties of the earth and sky ✓ CD-SC2.4b – Explores and begins to describe properties of rocks, soil, sand, and mud **Domain:** Cognitive Development: Science (CD-SC) **Strand:** Living Creatures **Standard:** CD-SC3: The child will demonstrate knowledge related to living things and their environments ✓ CD-SC3.4a – Observes, explores, and describes a variety of animals and plants. Describes their basic needs and life cycles of living things. ✓ CD-SC3.4b – Discriminates between living and non-living things **Domain:** Cognitive Development: Creative Development (CD-CR) **.** **Strand:** Visual Arts **Standard:** CD-CR2: The child will create and explore visual art forms to develop artistic expression ✓ CD-CR2.4b – Observes and discusses visual art forms and compares their similarities and differences **Domain:** Cognitive Development: Cognitive Processes (CD-CP) **Strand:** Thinking Skills **Standard:** CD-CP1: The child will demonstrate awareness of cause and effect ✓ CD-CP1.4a – Recognizes cause and effect relationships ✓ CD-CP1.4b – Explains why simple events occur using reasoning skills ✓ CD-CP1.4c – Draws conclusions based on facts and evidence **Domain:** Cognitive Development: Cognitive Processes (CD-CP) **Strand:** Thinking Skills **Standard:** CD-CP2: The child will use prior knowledge to build new knowledge ✓ CD-CP2.4b – Uses observation and imitation to transfer knowledge to new experiences

	Domain: Cognitive Development: Cognitive Processes (CD-CP) **Strand:** Problem Solving **Standard:** CD-CP3: The child will demonstrate problem solving skills ✓ CD-CP3.3b – Asks questions and tests different possibilities to determine the best solution to a problem	✓ CD-CP2.4c – Uses information gained about familiar objects and people and can apply to a new situation ✓ CD-CP2.4d – Makes, checks, and verifies predictions ✓ CD-CP2.4e – Explains how an activity is built on or uses past knowledge **Domain:** Cognitive Development: Cognitive Processes (CD-CP) **Strand:** Problem Solving **Standard:** CD-CP3: The child will demonstrate problem solving skills ✓ CD-CP3.4a – Makes statements and appropriately answers questions about how objects/materials can be used to solve problems ✓ CD-CP3.4c – With adult guidance and questioning, determines and evaluates solutions prior to attempting to solve a problem

Lesson #5	**Georgia Early Learning and Development Standards (GELDs)**	
	Domain, Strand, Standards (36-48 months)	**Domain, Strand, Standards (48-60 months)**
Explorer Kit “Spice of Life” Activities Watercolor Spices (SCIENCE, ART) - Child will add water to different spices to make different paint colors and use the spice-water solutions to paint on cardstock. Create Your Own Secret Spice Mix Manual (MATH) - Child will use a tablespoon/teaspoon to measure out different spices, combine them, and create their own spice/seasoning mix. Meet the Farmer (ENGINEERING + TECHNOLOGY) - Child will get to “meet” a farmer who grows paprika, learn how and where paprika come from, and other fun facts about paprika. Table Talk Cards (LANGUAGE & LITERACY) - Parent and child will use the cards to have a conversation	**Domain**: Physical Development and Motor Skills (PDM) **Strand**: Health & Well-Being **Standard:** PDM1: The child will practice healthy and safe habits ✓ PDM1.3a – Stays awake except during naptime ✓ PDM1.3b – Actively participates in a variety of both structured and unstructured indoor and outdoor activities for sustained periods of time. **Domain**: Physical Development and Motor Skills (PDM) **Strand**: Health & Well-Being **Standard:** PDM2: The child will participate in activities related to nutrition ✓ PDM2.3b – Distinguishes healthy food choices from less healthy food choices **Domain**: Physical Development and Motor Skills (PDM) **Strand**: Use of Senses **Standard:** PDM4: The child will use senses (sight, touch, hearing, smell, and taste) to explore the environment and process information. ✓ PDM 4.3a - Uses sense purposefully to learn about objects. **Domain**: Physical Development and Motor Skills (PDM) **Strand**: Motor Skills	**Domain**: Physical Development and Motor Skills (PDM) **Strand**: Health & Well-Being **Standard:** PD1: The child will practice healthy and safe habits ✓ PDM1.4a – Stays awake and alert during the day except during voluntary nap time ✓ PDM1.4b – Actively participates in a variety of both structured and unstructured indoor and outdoor activities for a sustained period of time that increase strength, endurance, and flexibility **Domain**: Physical Development and Motor Skills (PDM) **Strand**: Health & Well-Being **Standard:** PDM2: The child will participate in activities related to nutrition ✓ PDM2.4b – Sorts foods into food groups and communicates the benefits of healthy foods **Domain**: Physical Development and Motor Skills (PDM) **Strand**: Motor Skills **Standard:** PDM6: The child will demonstrate fine motor skills ✓ PDM6.4a – Performs fine-motor tasks that require small-muscle strength and control ✓ PDM6.4b – Uses hand-eye coordination to manipulate small object with ease

involving vegetables, colors, and feelings.	**Standard:** PDM6: The child will demonstrate fine motor skills ✓ PDM6.3a – Refines grasp to manipulate tools and objects ✓ PDM6.3b – Uses hand-eye coordination to manipulate smaller objects with increasing control	
	Domain: Social and Emotional Development (SED) **Strand**: Developing a Sense of Self **Standard:** SED1**:** The child will develop self-awareness ✓ SED1.3c – Shows sense of satisfaction in his/her own abilities, preferences, and accomplishments ✓ SED1.3d – Shows emerging sense of independence in his/her own choices **Domain**: Social and Emotional Development (SED) **Strand**: Developing a Sense of Self **Standard:** SED2**:** The child will engage in self-expression ✓ SED2.3a – Uses a combination of words, phrases, and actions to communicate needs, ideas, opinions, and preferences	**Domain**: Social and Emotional Development (SED) **Strand**: Developing a Sense of Self **Standard:** SED2**:** The child will develop self-awareness ✓ SED1.4b – Identifies personal characteristics, preferences, thoughts, and feelings ✓ SED1.4d – Shows independence in his/her own choices **Domain**: Social and Emotional Development (SED) **Strand**: Developing a Sense of Self **Standard:** SED2**:** The child will engage in self-expression ✓ SED2.4a – Effectively uses words, phrases, and actions to communicate needs, ideas, opinions, and preferences
	Domain: Approaches to Play and Learning (APL) **Strand:** Initiative and Exploration **Standard:** APL1: The child will demonstrate initiative and self-direction. ✓ APL1.3a – Initiates new tasks by him/herself ✓ APL1.3b – Makes choices and complete some independent activities **Domain:** Approaches to Play and Learning (APL) **Strand:** Attentiveness and Persistence **Standard:** APL3: The child will demonstrate self-control ✓ APL3.3a – Engages in a structured activity for short periods of time to achieve a goal ✓ APL3.3b – Wants to complete activities and does them well	**Domain:** Approaches to Play and Learning (APL) **Strand:** Initiative and Exploration **Standard:** APL1: The child will demonstrate initiative and self-direction. ✓ APL1.4a – Takes initiative to learn new concepts and tries new experiences. Initiates and completes new tasks by himself/herself. ✓ APL 1.4b – Selects and carries out activities without adult prompting **Domain:** Approaches to Play and Learning (APL) **Strand:** Attentiveness and Persistence **Standard:** APL3: The child will sustain attention to a specific activity and demonstrate persistence ✓ APL3.4a – Engages in a independent activities and continues tasks over a period of time

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✓ CLL1.3a - Listens and responds to conversations and group discussions
✓ CLL1.3b – Listens to and follows multi-step directions with support

Domain: Communication, Language, and Literacy (CLL)
Strand: Receptive Language (Listening)
Standard: CLL2: The child will acquire vocabulary introduced in conversations, activities, stories, and/or books
✓ CLL2.3a – Demonstrates understanding of vocabulary though everyday conversations
✓ CLL2.3b – Listens and understands new vocabulary from activities, stories, and books

Domain: Communication, Language, and Literacy (CLL)
Strand: Expressive Language
Standard: CLL4: The child will use increasingly complex spoken language
✓ CLL4.3a – Speaks clearly enough to be understood
✓ CLL4.3c – Describes activities and experiences using details

Domain: Communication, Language, and Literacy (CLL)
Strand: Early Reading
Standard: CLL8: The child will demonstrate awareness of print concepts
✓ CLL8.3b – Discriminates words from pictures independently</td>
<td>Domain: Communication, Language, and Literacy (CLL)
Strand: Receptive Language
Standard: CLL1: The child will listen to conversations and demonstrate comprehension
✓ CLL1.4b – Listens to and follows multi-step directions with support
✓ CLL1.4c – Extends/expands thoughts or ideas expressed

Domain: Communication, Language, and Literacy (CLL)
Strand: Receptive Language
Standard: CLL2: The child will acquire vocabulary introduced in conversations, activities, stories, and/or books
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Domain: Communication, Language, and Literacy (CLL)
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Standard: CLL4: The child will use increasingly complex spoken language
✓ CLL4.4b – Demonstrates use of expanded sentences and sentence structures to ask questions and/or respond verbally
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Strand: Early writing
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<td>Domain: Cognitive Development: Mathematics (CD-MA)
Strand: Number and Quantity
Standard: CD-MA1: The child will organize, represent, and build knowledge of quantity and number
✓ CD-MA1.3a – Recites numbers up to 10 in sequence
✓ CDMA1.3b – Recognizes numerals and quantities in the everyday environment
✓ CD-MA1.3d – Identifies quantity and comparisons of quantity

Domain: Cognitive Development: Mathematics (CD-MA)
Strand: Number and Quantity
Standard: CD-MA2: The child will manipulate, compare, and describe relationships using quantity and number.
✓ CD-MA2.3c – Recognizes that objects or sets can be combined or separated</td>
<td>Domain: Cognitive Development: Mathematics (CD-MA)
Strand: Number and Quantity
Standard: CD-MA1: The child will organize, represent, and build knowledge of quantity and number
✓ CD-MA1.4b – Recognizes numerals and uses counting as part of play and as a means for determining quantity

Domain: Cognitive Development: Mathematics (CD-MA)
Strand: Number and Quantity
Standard: CD-MA2: The child will manipulate, compare, and describe relationships using quantity and number.
✓ CD-MA2.4c – Practices combining, separating, and naming quantities

Domain: Cognitive Development: Mathematics (CD-MA)
Strand: Measurement and Comparison
Standard: CD-MA3: The child will explore and communicate about distance, weight, length, height, and time
✓ CD-MA3.4a – Uses mathematical terms to describe experiences involving measurement</td>
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Domain: Cognitive Development: Mathematics (CD-MA)
Strand: Measurement and Comparison
Standard: CD-MA3: The child will explore and communicate about distance, weight, length, height, and time

- ✓ CDMA3.3a – Labels objects using size words
- ✓ CD-MA3.3b – Compares two or more objects using a single attribute, such as length, weight, and size and matches items or similar sizes
- ✓ CD-MA3.3c – Uses a variety of standard and non-standard tools to measure object attributes with assistance

Domain: Cognitive Development: Mathematics (CD-MA)
Strand: Measurement and Comparison
Standard: CD-MA4: The child will sort, order, classify, and create patterns

- ✓ CD-MA4.3a – Independently orders objects using one characteristic
- ✓ CD-MA4.3b - Sorts objects by one attribute such as color, shape, or size

Domain: Cognitive Development: Mathematics (CD-MA)
Strand: Geometry and Spatial Thinking
Standard: CD-MA5: The child will explore, recognize, and describe spatial relationships between objects

- ✓ CD-MA5.3a – Follows simple directions which demonstrates an understanding of directionality, order, and position of objects

Domain: Cognitive Development: Social Studies (CD-SS)
Strand: People and Community
Standard: CD-SS2: The child will demonstrate an understanding of his/her community and an emerging awareness of others' culture and ethnicity

- ✓ CD-SS2.3b – Explores traditions and cultural celebrations of his/her own family
- ✓ CD-SS2.3C – Asks simple questions about others' cultures

Domain: Cognitive Development: Social Studies (CD-SS)
Strand: People and Community
Standard: CD-SS4: The child will demonstrate an awareness of economics of his/her community

- ✓ CD-SS4.3b – Recognizes a variety of occupations and work associated with them
- ✓ CD-SS4.3c – Recognizes that people work to earn a living
- ✓ CD-SS4.3d – Explores the uses of technology

- ✓ CD-MA3.4b – Compares objects using two or more attributes such as length, weight, and size
- ✓ CD-MA3.4c - Uses a variety of techniques and standard and nonstandard tools to measure and compare length, volume (capacity), and weight

Domain: Cognitive Development: Mathematics (CD-MA)
Strand: Measurement and Comparison
Standard: CD-MA4: The child will sort, order, classify, and create patterns

- ✓ CD-MA4.4b – Sorts and classifies objects using one or more attributes or relationships

Domain: Cognitive Development: Social Studies (CD-SS)
Strand: People and Community
Standard: CD-SS4: The child will demonstrate an awareness of economics of his/her community

- ✓ CD-SS4.4b – Describes the roles and responsibilities of a variety of occupations
- ✓ CD-SS4.4c – Describes how people interact economically and how goods and services are exchanged
- ✓ CD-SS4.4d – Explores the uses of technology and understands its role in the environment

Domain: Cognitive Development: Science (CD-SC)
Strand: Earth and Space
Standard: CD-SC2: The child will demonstrate knowledge related to dynamic properties of the earth and sky

- ✓ CD-SC2.4b – Explores and begins to describe properties of rocks, soil, sand, and mud
- ✓ CD-SC2.4d – Uses appropriate vocabulary to discuss climate and changes in weather

Domain: Cognitive Development: Science (CD-SC)
Strand: Living Creatures
Standard: CD-SC3: The child will demonstrate knowledge related to living things and their environments

- ✓ CD-SC3.4a – Observes, explores, and describes a variety of animals and plants. Describes their basic needs and life cycles of living things.
- ✓ CD-SC3.4b – Discriminates between living and non-living things.

Domain: Cognitive Development: Science (CD-SC)
Strand: Physical Science
Standard: CD-SC4: The child will demonstrate knowledge related to physical science

- ✓ CD-SC4.4c – Describes materials by their physical properties and states of matter

Domain: Cognitive Development: Creative Development (CD-CR) .
Strand: Visual Arts
Standard: CD-CR2: The child will create and explore visual art forms to develop artistic expression

- ✓ CD-CR2.4a - Uses materials to create original work for self-expression and to express individual creativity

	Domain: Cognitive Development: Science (CD-SC) **Strand:** Earth and Space **Standard:** CD-SC2: The child will demonstrate knowledge related to dynamic properties of the earth and sky ✓ CD-SC2.3a – Investigates and asks questions about the properties of water using adult and child-directed activities ✓ CD-SC2.3b – Investigates properties of rocks, soil, sand, and mud using adult and child-directed activities ✓ CD-C2.3d – Observes and discusses changes in weather from day to day **Domain:** Cognitive Development: Science (CD-SC) **Strand:** Living Creatures **Standard:** CD-SC3: The child will demonstrate knowledge related to living things and their environments ✓ CD-SC3.3a – Observes and explores a variety of animals and plants and their environments and life cycles ✓ CD-SC3.3b – Identifies the physical properties of some living and non-living things **Domain:** Cognitive Development: Science (CD-SC) **Strand:** Physical Science **Standard:** CD-SC4: The child will demonstrate knowledge related to physical science ✓ CD-SC4.3a – Independently investigates objects and toys that require positioning and movement **Domain:** Cognitive Development: Creative Development (CD-CR) **Strand:** Visual Arts **Standard:** CD-CR2: The child will create, observe, and analyze visual art forms to develop artistic expression ✓ CD-CR2.3a - Uses a variety of tools and art media to express individual creativity ✓ CD-CR2.3b – Observes and discusses visual art work ✓ CD-CR2.3c – Shares ideas about personal creative work **Domain:** Cognitive Development: Cognitive Processes (CD-CP) **Strand:** Thinking Skills **Standard:** CD-CP1: The child will demonstrate awareness of cause and effect ✓ CD-CP1.3a – Intentionally carries out an action with an understanding of the effect it will cause ✓ CD-CP1.3b – Expresses beginning understanding of reasoning skills	✓ CD-CR2.4b – Observes and discusses visual art forms and compares their similarities and differences ✓ CD-CR2.4c – Shows appreciation for different types of art and the creative work of others **Domain:** Cognitive Development: Cognitive Processes (CD-CP) **Strand:** Thinking Skills **Standard:** CD-CP1: The child will demonstrate awareness of cause and effect ✓ CD-CP1.4a – Recognizes cause and effect relationships ✓ CD-CP1.4b – Explains why simple events occur using reasoning skills **Domain:** Cognitive Development: Cognitive Processes (CD-CP) **Strand:** Thinking Skills **Standard:** CD—CP2: The child will use prior knowledge to build new knowledge ✓ CD-CP2.4a – Explains how to use objects in new situations ✓ CD-CP2.4b – Uses observation and imitation to transfer knowledge to new experiences ✓ CD-CP2.4c – Uses information gained about familiar objects and people and can apply to a new situation

	Domain: Cognitive Development: Cognitive Processes (CD-CP) **Strand:** Thinking Skills **Standard:** CD—CP2: The child will use prior knowledge to build new knowledge ✓ CD-CP2.3a – Uses objects as intended in new activities ✓ CD-CP2.3b – Uses observation and imitation to acquire knowledge ✓ CD-CP2.3c – Identifies familiar objects and people in new situations	

Lesson #6	**Georgia Early Learning and Development Standards (GELDs)**	
	Domain, Strand, Standards (36-48 months)	**Domain, Strand, Standards (48-60 months)**
Explorer Kit “Sensory Detectives” Activities Mystery Bag (SCIENCE) - Parent will place different vegetables in the drawstring mystery bag. Child will guess which vegetables are in the bag using their five senses. Sensory Detectives Booklet (MATH, ART) - Child will complete an lettuce adventure checklist comparing the colors, sizes, and features of different lettuce varieties Meet the Farmer (ENGINEERING + TECHNOLOGY) - Child will get to “meet” a farmer who grows lettuce, learn how and where lettuce come from, and other fun facts about lettuce. Table Talk Cards (LANGUAGE & LITERACY) - Parent and child will use the cards to have a conversation involving vegetables, colors, and feelings.	**Domain**: Physical Development and Motor Skills (PDM) **Strand**: Health & Well-Being **Standard:** PDM1: The child will practice healthy and safe habits ✓ PDM1.3a – Stays awake except during naptime ✓ PDM1.3b – Actively participates in a variety of both structured and unstructured indoor and outdoor activities for sustained periods of time. **Domain**: Physical Development and Motor Skills (PDM) **Strand**: Health & Well-Being **Standard:** PDM2: The child will participate in activities related to nutrition ✓ PDM2.3b – Distinguishes healthy food choices from less healthy food choices **Domain**: Physical Development and Motor Skills (PDM) **Strand**: Use of Senses **Standard:** PDM4: The child will use senses (sight, touch, hearing, smell, and taste) to explore the environment and process information. ✓ PDM 4.3a - Uses sense purposefully to learn about objects. **Domain**: Physical Development and Motor Skills (PDM) **Strand**: Motor Skills **Standard:** PDM6: The child will demonstrate fine motor skills ✓ PDM6.3a – Refines grasp to manipulate tools and objects ✓ PDM6.3b – Uses hand-eye coordination to manipulate	**Domain**: Physical Development and Motor Skills (PDM) **Strand**: Health & Well-Being **Standard:** PD1: The child will practice healthy and safe habits ✓ PDM1.4a – Stays awake and alert during the day except during voluntary nap time ✓ PDM1.4b – Actively participates in a variety of both structured and unstructured indoor and outdoor activities for a sustained period of time that increase strength, endurance, and flexibility **Domain**: Physical Development and Motor Skills (PDM) **Strand**: Health & Well-Being **Standard:** PDM2: The child will participate in activities related to nutrition ✓ PDM2.4b – Sorts foods into food groups and communicates the benefits of healthy foods **Domain**: Physical Development and Motor Skills (PDM) **Strand**: Motor Skills **Standard:** PDM6: The child will demonstrate fine motor skills ✓ PDM6.4a – Performs fine-motor tasks that require small-muscle strength and control ✓ PDM6.4b – Uses hand-eye coordination to manipulate small object with ease

	smaller objects with increasing control	
	Domain: Social and Emotional Development (SED) **Strand**: Developing a Sense of Self **Standard:** SED1**:** The child will develop self-awareness ✓ SED1.3a – Recognizes self as a unique individual ✓ SED1.3c – Shows sense of satisfaction in his/her own abilities, preferences, and accomplishments ✓ SED1.3d – Shows emerging sense of independence in his/her own choices **Domain**: Social and Emotional Development (SED) **Strand**: Developing a Sense of Self **Standard:** SED2**:** The child will engage in self-expression ✓ SED2.3a – Uses a combination of words, phrases, and actions to communicate needs, ideas, opinions, and preferences ✓ SED2.3b – With adult guidance, uses verbal and non-verbal expressions to demonstrate a larger range of emotions, such as frustration, jealousy, and enthusiasm	**Domain**: Social and Emotional Development (SED) **Strand**: Developing a Sense of Self **Standard:** SED1**:** The child will develop self-awareness ✓ SED1.4b – Identifies personal characteristics, preferences, thoughts, and feelings ✓ SED1.4d – Shows independence in his/her own choices **Domain**: Social and Emotional Development (SED) **Strand**: Developing a Sense of Self **Standard:** SED2**:** The child will engage in self-expression ✓ SED2.4a – Effectively uses words, phrases, and actions to communicate needs, ideas, opinions, and preferences ✓ Sed2.4b – With adult guidance, uses verbal and non-verbal expression o describe and explain a full range of emotions.
	Domain: Approaches to Play and Learning (APL) **Strand:** Initiative and Exploration **Standard:** APL1: The child will demonstrate initiative and self-direction. ✓ APL1.3a – Initiates new tasks by him/herself ✓ APL1.3b – Makes choices and complete some independent activities **Domain:** Approaches to Play and Learning (APL) **Strand:** Initiative and Exploration **Standard:** APL2: The child will demonstrate interest and curiosity. ✓ APL2.3a – Demonstrates an increased willingness to	**Domain:** Approaches to Play and Learning (APL) **Strand:** Initiative and Exploration **Standard:** APL1: The child will demonstrate initiative and self-direction. ✓ APL1.4a – Takes initiative to learn new concepts and tries new experiences. Initiates and completes new tasks by himself/herself. ✓ APL 1.4b – Selects and carries out activities without adult prompting **Domain:** Approaches to Play and Learning (APL) **Strand:** Initiative and Exploration **Standard:** APL2: The child will demonstrate interest and curiosity. ✓ APL2.4a – Demonstrates eagerness to learn about and discuss new topics, ideas, and tasks ✓ APL2.4b – Ask questions and seeks new information. With assistance, looks for new information and wants to know more.

	participate in both familiar and new experiences ✓ APL2.3b – Ask questions about unfamiliar objects, people, and experiences ✓ APL2.3c – Explores and manipulates both familiar and unfamiliar objects in the environment **Domain:** Approaches to Play and Learning (APL) **Strand:** Attentiveness and Persistence **Standard:** APL3: The child will demonstrate self-control ✓ APL3.3a – Engages in a structured activity for short periods of time to achieve a goal ✓ APL3.3b – Wants to complete activities and does them well ✓ APL3.3d – Keeps working on an activity even after setbacks	✓ APL2.4c – Increasingly seeks out and explores unfamiliar objects in the environment **Domain:** Approaches to Play and Learning (APL) **Strand:** Attentiveness and Persistence **Standard:** APL3: The child will sustain attention to a specific activity and demonstrate persistence ✓ APL3.4a – Engages in independent activities and continues tasks over a period of time ✓ APL3.4b – Practices to improve skills that have been accomplished. ✓ APL3.4d – Persists in trying to complete a task after previous attempts have failed
	Domain: Communication, Language, and Literacy (CLL) **Strand:** Receptive Language (Listening) **Standard:** CLL1: The child will listen to conversations for a variety of purposes and demonstrate comprehension ✓ CLL1.3a - Listens and responds to conversations and group discussions ✓ CLL1.3b – Listens to and follows multi-step directions with support ✓ CLL1.3c – Responds to more complex questions with appropriate answers **Domain:** Communication, Language, and Literacy (CLL) **Strand:** Receptive Language (Listening) **Standard:** CLL2: The child will acquire vocabulary introduced in conversations, activities, stories, and/or books ✓ CLL2.3a – Demonstrates understanding of vocabulary though everyday conversations ✓ CLL2.3b – Listens and understands new vocabulary from activities, stories, and books **Domain:** Communication, Language, and Literacy (CLL) **Strand:** Expressive Language **Standard:** CLL3: The child will use non-verbal communication for a variety of purposes ✓ CLL3.3a – Uses gestures actions to enhance verbal communication of needs or wants ✓ CLL3.3b – Communicates feelings using non-verbal gestures and actions	**Domain:** Communication, Language, and Literacy (CLL) **Strand:** Receptive Language **Standard:** CLL1: The child will listen to conversations and demonstrate comprehension ✓ CLL1.4b – Listens to and follows multi-step directions with support ✓ CLL1.4c – Extends/expands thoughts or ideas expressed ✓ CLL1.4d – Extends/expands thoughts or ideas expressed **Domain:** Communication, Language, and Literacy (CLL) **Strand:** Receptive Language **Standard:** CLL2: The child will acquire vocabulary introduced in conversations, activities, stories, and/or books ✓ CLL2.4b – Connects new vocabulary from activities, stories, and/or books with prior experiences and conversations **Domain:** Communication, Language, and Literacy (CLL) **Strand:** Expressive Language **Standard:** CLL3: The child will use non-verbal communication for a variety of purposes ✓ CLL3.4a – Uses more complex gestures and actions to enhance verbal communication of needs and wants ✓ CLL3.4b – Communicates feelings using appropriate non-verbal gestures, body language, and actions **Domain:** Communication, Language, and Literacy (CLL) **Strand:** Expressive Language **Standard:** CLL4: The child will use increasingly complex spoken language ✓ CLL4.4b – Demonstrates use of expanded sentences and sentence structures to ask questions and/or respond verbally ✓ CLL4.4c - Describes activities, experiences, and stories with more detail

	Domain: Communication, Language, and Literacy (CLL) **Strand:** Expressive Language **Standard:** CLL4: The child will use increasingly complex spoken language ✓ CLL4.3a – Speaks clearly enough to be understood ✓ CLL4.3c – Describes activities and experiences using details	
	Domain: Cognitive Development: Mathematics (CD-MA) **Strand:** Number and Quantity **Standard:** CD-MA1: The child will organize, represent, and build knowledge of quantity and number ✓ CD-MA1.3a – Recites numbers up to 10 in sequence ✓ CDMA1.3b – Recognizes numerals and quantities in the everyday environment ✓ CD-MA1.3d – Identifies quantity and comparisons of quantity **Domain:** Cognitive Development: Mathematics (CD-MA) **Strand:** Number and Quantity **Standard:** CD-MA2: The child will manipulate, compare, and describe relationships using quantity and number. ✓ CD-MA2.3c – Recognizes that objects or sets can be combined or separated **Domain:** Cognitive Development: Mathematics (CD-MA) **Strand:** Measurement and Comparison **Standard:** CD-MA3: The child will explore and communicate about distance, weight, length, height, and time ✓ CDMA3.3a – Labels objects using size words ✓ CD-MA3.3b – Compares two or more objects using a single attribute, such as length, weight, and size and matches items or similar sizes ✓ CD-MA3.3c – Uses a variety of standard and non-standard tools to measure object attributes with assistance **Domain:** Cognitive Development: Mathematics (CD-MA) **Strand:** Measurement and Comparison **Standard:** CD-MA4: The child will sort, order, classify, and create patterns ✓ CD-MA4.3a – Independently orders objects using one characteristic ✓ CD-MA4.3b - Sorts objects by one attribute such as color, shape, or size **Domain:** Cognitive Development: Mathematics (CD-MA)	**Domain:** Cognitive Development: Mathematics (CD-MA) **Strand:** Number and Quantity **Standard:** CD-MA1: The child will organize, represent, and build knowledge of quantity and number ✓ CD-MA1.4b – Recognizes numerals and uses counting as part of play and as a means for determining quantity **Domain:** Cognitive Development: Mathematics (CD-MA) **Strand:** Number and Quantity **Standard:** CD-MA2: The child will manipulate, compare, and describe relationships using quantity and number. ✓ CD-MA2.4c – Practices combining, separating, and naming quantities **Domain:** Cognitive Development: Mathematics (CD-MA) **Strand:** Measurement and Comparison **Standard:** CD-MA3: The child will explore and communicate about distance, weight, length, height, and time ✓ CD-MA3.4a – Uses mathematical terms to describe experiences involving measurement ✓ CD-MA3.4b – Compares objects using two or more attributes such as length, weight, and size ✓ CD-MA3.4c - Uses a variety of techniques and standard and nonstandard tools to measure and compare length, volume (capacity), and weight **Domain:** Cognitive Development: Mathematics (CD-MA) **Strand:** Measurement and Comparison **Standard:** CD-MA4: The child will sort, order, classify, and create patterns ✓ CD-MA4.4b – Sorts and classifies objects using one or more attributes or relationships **Domain:** Cognitive Development: Mathematics (CD-MA) **Strand:** Geometry and Spatial Thinking **Standard:** CD-MA6: The child will explore, recognize, and describe shape and shape concepts ✓ CD-MA6.4a –Recognizes and names common, two-dimensional and three-dimensional shapes, their parts and attributes **Domain:** Cognitive Development: Social Studies (CD-SS) **Strand:** People and Community **Standard:** CD-SS4: The child will demonstrate an awareness of economics of his/her community ✓ CD-SS4.4b – Describes the roles and responsibilities of a variety of occupations ✓ CD-SS4.4c – Describes how people interact economically and how goods and services are exchanged ✓ CD-SS4.4d – Explores the uses of technology and understands its role in the environment **Strand:** Scientific Skills and Methods **Standard:** CD-SC1: The child will demonstrate scientific inquiry skills

	Strand: Geometry and Spatial Thinking **Standard:** CD-MA5: The child will explore, recognize, and describe spatial relationships between objects ✓ CD-MA5.3a – Follows simple directions which demonstrates an understanding of directionality, order, and position of objects **Domain:** Cognitive Development: Mathematics (CD-MA) **Strand:** Geometry and Spatial Thinking **Standard:** CD-MA6: The child will explore, recognize, and describe shape and shape concepts ✓ CD-MA6.3a –Recognizes basic, two-dimensional shapes in the environment independently **Domain:** Cognitive Development: Social Studies (CD-SS) **Strand:** People and Community **Standard:** CD-SS4: The child will demonstrate an awareness of economics of his/her community ✓ CD-SS4.3b – Recognizes a variety of occupations and work associated with them ✓ CD-SS4.3c – Recognizes that people work to earn a living ✓ CD-SS4.3d – Explores the uses of technology **Domain:** Cognitive Development: Science (CD-SC) **Strand:** Scientific Skills and Methods **Standard:** CD-SC1: The child will demonstrate scientific inquiry skills ✓ CD-SC1.3a – Uses senses to observe and experience objects in the environment ✓ CD-SC1.3b – Uses simple tools to experiment and observe ✓ CD-SC1.3c – Records observations through drawings or dictations with adult guidance ✓ CD-SC1.3d – Participates in simple experiments and discusses scientific properties **Domain:** Cognitive Development: Science (CD-SC) **Strand:** Earth and Space **Standard:** CD-SC2: The child will demonstrate knowledge related to dynamic properties of the earth and sky ✓ CD-SC2.3a – Investigates and asks questions about the properties of water using adult and child-directed activities ✓ CD-SC2.3b – Investigates properties of rocks, soil, sand, and mud using adult and child-directed activities ✓ CD-C2.3d – Observes and discusses changes in weather from day to day	✓ CD-SC1.4a – Uses senses to observe, classify, and learn about objects and environment ✓ CD-SC1.4b – Uses simple tools correctly to experiment, observe, and increase understanding ✓ CD-SC1.4c – Records observations through dictating to an adult drawing pictures or using other forms of writing ✓ CD-SC1.4d – Experiments, compares, and formulates hypotheses related to scientific properties **Domain:** Cognitive Development: Science (CD-SC) **Strand:** Earth and Space **Standard:** CD-SC2: The child will demonstrate knowledge related to dynamic properties of the earth and sky ✓ CD-SC2.4b – Explores and begins to describe properties of rocks, soil, sand, and mud ✓ CD-SC2.4d – Uses appropriate vocabulary to discuss climate and changes in weather **Domain:** Cognitive Development: Science (CD-SC) **Strand:** Living Creatures **Standard:** CD-SC3: The child will demonstrate knowledge related to living things and their environments ✓ CD-SC3.4a – Observes, explores, and describes a variety of animals and plants. Describes their basic needs and life cycles of living things. ✓ CD-SC3.4b – Discriminates between living and non-living things. **Domain:** Cognitive Development: Science (CD-SC) **Strand:** Physical Science **Standard:** CD-SC4: The child will demonstrate knowledge related to physical science ✓ CD-SC4.4c – Describes materials by their physical properties and states of matter **Domain:** Cognitive Development: Cognitive Processes (CD-CP) **Strand:** Thinking Skills **Standard:** CD-CP1: The child will demonstrate awareness of cause and effect ✓ CD-CP1.4a – Recognizes cause and effect relationships ✓ CD-CP1.4b – Explains why simple events occur using reasoning skills **Domain:** Cognitive Development: Cognitive Processes (CD-CP) **Strand:** Thinking Skills **Standard:** CD—CP2: The child will use prior knowledge to build new knowledge ✓ CD-CP2.4a – Explains how to use objects in new situations ✓ CD-CP2.4b – Uses observation and imitation to transfer knowledge to new experiences ✓ CD-CP2.4c – Uses information gained about familiar objects and people and can apply to a new situation

	Domain: Cognitive Development: Science (CD-SC) **Strand:** Living Creatures **Standard:** CD-SC3: The child will demonstrate knowledge related to living things and their environments ✓ CD-SC3.3a – Observes and explores a variety of animals and plants and their environments and life cycles ✓ CD-SC3.3b – Identifies the physical properties of some living and non-living things **Domain:** Cognitive Development: Science (CD-SC) **Strand:** Physical Science **Standard:** CD-SC4: The child will demonstrate knowledge related to physical science ✓ CD-SC4.3c – Explores and identifies physical properties and states of matter of common classroom objects **Domain:** Cognitive Development: Cognitive Processes (CD-CP) **Strand:** Thinking Skills **Standard:** CD-CP1: The child will demonstrate awareness of cause and effect ✓ CD-CP1.3a – Intentionally carries out an action with an understanding of the effect it will cause ✓ CD-CP1.3b – Expresses beginning understanding of reasoning skills **Domain:** Cognitive Development: Cognitive Processes (CD-CP) **Strand:** Thinking Skills **Standard:** CD—CP2: The child will use prior knowledge to build new knowledge ✓ CD-CP2.3a – Uses objects as intended in new activities ✓ CD-CP2.3b – Uses observation and imitation to acquire knowledge ✓ CD-CP2.3c – Identifies familiar objects and people in new situations	

Lesson #7	**Georgia Early Learning and Development Standards (GELDs)**	
	Domain, Strand, Standards (36-48 months)	**Domain, Strand, Standards (48-60 months)**

"I Spy a Veggie" SAM Activity In this activity, parents will place an assortment of vegetables (preferably unfamiliar ones) on a tray and read riddles (sensory-based descriptions of each vegetable) or show photo clues to see if children can guess which vegetable matches the riddle. After children solve each riddle, pass the vegetable around for children to touch and smell. Have children make up a funny story about the vegetable.	**Domain**: Physical Development and Motor Skills (PDM) **Strand**: Health & Well-Being **Standard:** PDM1: The child will practice healthy and safe habits ✓ PDM1.3a – Stays awake except during naptime ✓ PDM1.3b – Actively participates in a variety of both structured and unstructured indoor and outdoor activities for sustained periods of time. **Domain**: Physical Development and Motor Skills (PDM) **Strand**: Health & Well-Being **Standard:** PDM2: The child will participate in activities related to nutrition ✓ PDM2.3b – Distinguishes healthy food choices from less healthy food choices **Domain**: Physical Development and Motor Skills (PDM) **Strand**: Use of Senses **Standard:** PDM4: The child will use senses (sight, touch, hearing, smell, and taste) to explore the environment and process information. ✓ PDM 4.3a - Uses sense purposefully to learn about objects. **Domain**: Physical Development and Motor Skills (PDM) **Strand**: Motor Skills **Standard:** PDM6: The child will demonstrate fine motor skills ✓ PDM6.3a – Refines grasp to manipulate tools and objects ✓ PDM6.3b – Uses hand-eye coordination to manipulate smaller objects with increasing control	**Domain**: Physical Development and Motor Skills (PDM) **Strand**: Health & Well-Being **Standard:** PD1: The child will practice healthy and safe habits ✓ PDM1.4a – Stays awake and alert during the day except during voluntary nap time **Domain**: Physical Development and Motor Skills (PDM) **Strand**: Health & Well-Being **Standard:** PDM2: The child will participate in activities related to nutrition ✓ PDM2.4b – Sorts foods into food groups and communicates the benefits of healthy foods **Domain**: Physical Development and Motor Skills (PDM) **Strand**: Use of Senses **Standard:** PDM4: The child will use senses (sight, touch, hearing, smell, and taste) to explore the environment and process information. ✓ PDM 4.4a – Discriminates between a variety of sights, smells, sounds, textures, and tastes **Domain**: Physical Development and Motor Skills (PDM) **Strand**: Motor Skills **Standard:** PDM6: The child will demonstrate fine motor skills ✓ PDM6.4a – Performs fine-motor tasks that require small-muscle strength and control ✓ PDM6.4b – Uses hand-eye coordination to manipulate small object with ease
	Domain: Social and Emotional Development (SED) **Strand**: Developing a Sense of Self **Standard:** SED1**:** The child will develop self-awareness ✓ SED1.3d – Shows emerging sense of independence in his/her own choices **Domain**: Social and Emotional Development (SED) **Strand**: Developing a Sense of Self **Standard:** SED2**:** The child will engage in self-expression ✓ SED2.3a – Uses a combination of words, phrases, and actions to communicate needs, ideas, opinions, and preferences ✓ SED2.3b – With adult guidance, uses verbal and non-verbal expressions to demonstrate a larger range of emotions, such as frustration, jealousy, and enthusiasm	**Domain**: Social and Emotional Development (SED) **Strand**: Developing a Sense of Self **Standard:** SED1**:** The child will develop self-awareness ✓ SED1.4b – Identifies personal characteristics, preferences, thoughts, and feelings ✓ SED1.4d – Shows independence in his/her own choices **Domain**: Social and Emotional Development (SED) **Strand**: Developing a Sense of Self **Standard:** SED2**:** The child will engage in self-expression ✓ SED2.4a – Effectively uses words, phrases, and actions to communicate needs,

		ideas, opinions, and preferences ✓ Sed2.4b – With adult guidance, uses verbal and non-verbal expression to describe and explain a full range of emotions.
	Domain: Approaches to Play and Learning (APL) **Strand:** Initiative and Exploration **Standard:** APL1: The child will demonstrate initiative and self-direction. ✓ APL1.3a – Initiates new tasks by him/herself ✓ APL1.3b – Makes choices and complete some independent activities **Domain:** Approaches to Play and Learning (APL) **Strand:** Initiative and Exploration **Standard:** APL2: The child will demonstrate interest and curiosity. ✓ APL2.3a – Demonstrates an increased willingness to participate in both familiar and new experiences ✓ APL2.3b – Ask questions about unfamiliar objects, people, and experiences ✓ APL2.3c – Explores and manipulates both familiar and unfamiliar objects in the environment **Domain:** Approaches to Play and Learning (APL) **Strand:** Attentiveness and Persistence **Standard:** APL3: The child will demonstrate self-control ✓ APL3.3a – Engages in a structured activity for short periods of time to achieve a goal ✓ APL3.3b – Wants to complete activities and does them well ✓ APL3.3d – Keeps working on an activity even after setbacks **Domain:** Approaches to Play and Learning (APL) **Strand:** Attentiveness and Persistence **Standard:** APL4: The child will engage in a progression of individualized and imaginative play ✓ APL4.3a – Uses imagination to create a variety of ideas, role plays, and fantasy situations	**Domain:** Approaches to Play and Learning (APL) **Strand:** Initiative and Exploration **Standard:** APL1: The child will demonstrate initiative and self-direction. ✓ APL1.4a – Takes initiative to learn new concepts and tries new experiences. Initiates and completes new tasks by himself/herself. ✓ APL 1.4b – Selects and carries out activities without adult prompting **Domain:** Approaches to Play and Learning (APL) **Strand:** Initiative and Exploration **Standard:** APL2: The child will demonstrate interest and curiosity. ✓ APL2.4a – Demonstrates eagerness to learn about and discuss new topics, ideas, and tasks ✓ APL2.4b – Ask questions and seeks new information. With assistance, looks for new information and wants to know more. ✓ APL2.4c – Increasingly seeks out and explores unfamiliar objects in the environment **Domain:** Approaches to Play and Learning (APL) **Strand:** Attentiveness and Persistence **Standard:** APL3: The child will sustain attention to a specific activity and demonstrate persistence ✓ APL3.4a – Engages in independent activities and continues tasks over a period of time ✓ APL3.4d – Persists in trying to complete a task after previous attempts have failed **Domain:** Approaches to Play and Learning (APL) **Strand:** Play **Standard:** APL4: The child will engage in a progression of individualized and imaginative play. ✓ APL4.4a – Engages in elaborate and sustained imagined play and can distinguish between real life and fantasy.

	Domain: Communication, Language, and Literacy (CLL) **Strand:** Receptive Language (Listening) **Standard:** CLL1: The child will listen to conversations for a variety of purposes and demonstrate comprehension ✓ CLL1.3a - Listens and responds to conversations and group discussions ✓ CLL1.3b – Listens to and follows multi-step directions with support **Domain:** Communication, Language, and Literacy (CLL) **Strand:** Receptive Language (Listening) **Standard:** CLL2: The child will acquire vocabulary introduced in conversations, activities, stories, and/or books ✓ CLL2.3a – Demonstrates understanding of vocabulary though everyday conversations ✓ CLL2.3b – Listens and understands new vocabulary from activities, stories, and books **Domain:** Communication, Language, and Literacy (CLL) **Strand:** Expressive Language **Standard:** CLL4: The child will use increasingly complex spoken language ✓ CLL4.3a – Speaks clearly enough to be understood ✓ CLL4.3c – Describes activities and experiences using details ✓ CLL4.3d – Uses expanded vocabulary in a variety of situations **Domain:** Communication, Language, and Literacy (CLL) **Strand:** Early Reading **Standard:** CLL5: The child will acquire meaning from a variety of materials read to him/her ✓ CLL5.3b – With prompting and support, retells a simple story using pictures ✓ CLL5.3c – Answers questions about a story	**Domain:** Communication, Language, and Literacy (CLL) **Strand:** Receptive Language **Standard:** CLL1: The child will listen to conversations and demonstrate comprehension ✓ CLL1.4a – Listens and responds on topic to conversations and group discussions for an extended period. ✓ CLL1.4b – Listens to and follows multi-step directions with support ✓ CLL1.4c – Extends/expands thoughts or ideas expressed **Domain:** Communication, Language, and Literacy (CLL) **Strand:** Receptive Language **Standard:** CLL2: The child will acquire vocabulary introduced in conversations, activities, stories, and/or books ✓ CLL2.4b – Connects new vocabulary from activities, stories, and/or books with prior experiences and conversations **Domain:** Communication, Language, and Literacy (CLL) **Strand:** Expressive Language **Standard:** CLL4: The child will use increasingly complex spoken language ✓ CLL4.4b – Demonstrates use of expanded sentences and sentence structures to ask questions and/or respond verbally ✓ CLL4.4c - Describes activities, experiences, and stories with more detail ✓ CLL4.4d – Uses new and expanded vocabulary in a variety of situations **Domain:** Communication, Language, and Literacy (CLL) **Strand:** Early Reading **Standard:** CLL5: The child will acquire meaning from a variety of materials read to him/her ✓ CLL5.3b – Discusses books or stories read aloud and can identify characters and setting in a story. ✓ CLL5.4e – Develops an alternate ending for a story.
	Domain: Cognitive Development: Mathematics (CD-MA) **Strand:** Number and Quantity **Standard:** CD-MA1: The child will organize, represent, and build knowledge of quantity and number ✓ CDMA1.3b – Recognizes numerals and quantities in the everyday environment	**Domain:** Cognitive Development: Mathematics (CD-MA) **Strand:** Number and Quantity **Standard:** CD-MA1: The child will organize, represent, and build knowledge of quantity and number

	✓ CD-MA1.3d – Identifies quantity and comparisons of quantity **Domain:** Cognitive Development: Mathematics (CD-MA) **Strand:** Measurement and Comparison **Standard:** CD-MA3: The child will explore and communicate about distance, weight, length, height, and time ✓ CDMA3.3a – Labels objects using size words ✓ CD-MA3.3b – Compares two or more objects using a single attribute, such as length, weight, and size and matches items or similar sizes ✓ CD-MA3.3c – Uses a variety of standard and non-standard tools to measure object attributes with assistance **Domain:** Cognitive Development: Mathematics (CD-MA) **Strand:** Measurement and Comparison **Standard:** CD-MA4: The child will sort, order, classify, and create patterns ✓ CD-MA4.3a – Independently orders objects using one characteristic ✓ CD-MA4.3b - Sorts objects by one attribute such as color, shape, or size **Domain:** Cognitive Development: Mathematics (CD-MA) **Strand:** Geometry and Spatial Thinking **Standard:** CD-MA6: The child will explore, recognize, and describe shape and shape concepts ✓ CD-MA6.3a –Recognizes basic, two-dimensional shapes in the environment independently **Domain:** Cognitive Development: Science (CD-SC) **Strand:** Scientific Skills and Methods **Standard:** CD-SC1: The child will demonstrate scientific inquiry skills ✓ CD-SC1.3a – Uses senses to observe and experience objects in the environment ✓ CD-SC1.3b – Uses simple tools to experiment and observe **Domain:** Cognitive Development: Science (CD-SC) **Strand:** Physical Science **Standard:** CD-SC4: The child will demonstrate knowledge related to physical science ✓ CD-SC4.3c – Explores and identifies physical properties and states of matter of common classroom objects **Domain:** Cognitive Development: Cognitive Processes (CD-CP) **Strand:** Thinking Skills **Standard:** CD-CP1: The child will demonstrate awareness of cause and effect ✓ CD-CP1.3b – Expresses beginning understanding of reasoning skills **Domain:** Cognitive Development: Cognitive Processes (CD-CP) **Strand:** Thinking Skills **Standard:** CD—CP2: The child will use prior knowledge to build new knowledge ✓ CD-CP2.3a – Uses objects as intended in new activities ✓ CD-CP2.3b – Uses observation and imitation to acquire knowledge ✓ CD-CP2.3d – Uses cluse and sequence of events to infer and predict what will happen next	✓ CD-MA1.4b – Recognizes numerals and uses counting as part of play and as a means for determining quantity **Domain:** Cognitive Development: Mathematics (CD-MA) **Strand:** Measurement and Comparison **Standard:** CD-MA3: The child will explore and communicate about distance, weight, length, height, and time ✓ CD-MA3.4a – Uses mathematical terms to describe experiences involving measurement ✓ CD-MA3.4b – Compares objects using two or more attributes such as length, weight, and size ✓ CD-MA3.4c - Uses a variety of techniques and standard and nonstandard tools to measure and compare length, volume (capacity), and weight **Domain:** Cognitive Development: Mathematics (CD-MA) **Strand:** Measurement and Comparison **Standard:** CD-MA4: The child will sort, order, classify, and create patterns ✓ CD-MA4.4a – independently orders objects using one characteristic and describes the criteria used ✓ CD-MA4.4b – Sorts and classifies objects using one or more attributes or relationships **Domain:** Cognitive Development: Mathematics (CD-MA) **Strand:** Geometry and Spatial Thinking **Standard:** CD-MA6: The child will explore, recognize, and describe shape and shape concepts ✓ CD-MA6.3a –Recognizes and names common, two-dimensional and three-dimensional shapes, their parts and attributes **Strand:** Scientific Skills and Methods **Standard:** CD-SC1: The child will demonstrate scientific inquiry skills ✓ CD-SC1.4a – Uses senses to observe, classify, and learn about objects and environment ✓ CD-SC1.4b – Uses simple tools correctly to

		experiment, observe, and increase understanding ✓ CD-SC1.4d – Experiments, compares, and formulates hypotheses related to scientific properties **Domain:** Cognitive Development: Science (CD-SC) **Strand:** Physical Science **Standard:** CD-SC4: The child will demonstrate knowledge related to physical science ✓ CD-SC4.4c – Describes materials by their physical properties and states of matter **Domain:** Cognitive Development: Cognitive Processes (CD-CP) **Strand:** Thinking Skills **Standard:** CD—CP2: The child will use prior knowledge to build new knowledge ✓ CD-CP2.4b – Uses observation and imitation to transfer knowledge to new experiences ✓ CD-CP2.4c – Uses information gained about familiar objects and people and can apply to a new situation

Lesson #8	**Georgia Early Learning and Development Standards (GELDs)**	
	Domain, Strand, Standards (36-48 months)	**Domain, Strand, Standards (48-60 months)**
In this activity, parents will cut up vegetables and display them on a tray. Children will describe what the seeds look like, how the plant grows, and what part of the plant that we eat by cutting into vegetables and observing the peel, roots, stems, seeds, and flesh and counting them. Children will discuss what makes the vegetables alike and different by drawing them.	**Domain**: Physical Development and Motor Skills (PDM) **Strand**: Health & Well-Being **Standard:** PDM1: The child will practice healthy and safe habits ✓ PDM1.3a – Stays awake except during naptime ✓ PDM1.3b – Actively participates in a variety of both structured and unstructured indoor and outdoor activities for sustained periods of time. **Domain**: Physical Development and Motor Skills (PDM) **Strand**: Health & Well-Being **Standard:** PDM2: The child will participate in activities related to nutrition ✓ PDM2.3b – Distinguishes healthy food choices from less healthy food choices **Domain**: Physical Development and Motor Skills (PDM) **Strand**: Use of Senses **Standard:** PDM4: The child will use senses (sight, touch, hearing, smell, and taste) to explore the environment and process information. ✓ PDM 4.3a - Uses sense purposefully to learn about objects. **Domain**: Physical Development and Motor Skills (PDM)	**Domain**: Physical Development and Motor Skills (PDM) **Strand**: Health & Well-Being **Standard:** PD1: The child will practice healthy and safe habits ✓ PDM1.4a – Stays awake and alert during the day except during voluntary nap time **Domain**: Physical Development and Motor Skills (PDM) **Strand**: Health & Well-Being **Standard:** PDM2: The child will participate in activities related to nutrition ✓ PDM2.4b – Sorts foods into food groups and communicates the benefits of healthy foods **Domain**: Physical Development and Motor Skills (PDM) **Strand**: Use of Senses

	Strand: Motor Skills **Standard:** PDM6: The child will demonstrate fine motor skills ✓ PDM6.3a – Refines grasp to manipulate tools and objects ✓ PDM6.3b – Uses hand-eye coordination to manipulate smaller objects with increasing control	**Standard:** PDM4: The child will use senses (sight, touch, hearing, smell, and taste) to explore the environment and process information. ✓ PDM 4.4a – Discriminates between a variety of sights, smells, sounds, textures, and tastes **Domain**: Physical Development and Motor Skills (PDM) **Strand**: Motor Skills **Standard:** PDM6: The child will demonstrate fine motor skills ✓ PDM6.4a – Performs fine-motor tasks that require small-muscle strength and control ✓ PDM6.4b – Uses hand-eye coordination to manipulate small object with ease
	Domain: Social and Emotional Development (SED) **Strand**: Developing a Sense of Self **Standard:** SED1**:** The child will develop self-awareness ✓ SED1.3d – Shows emerging sense of independence in his/her own choices **Domain**: Social and Emotional Development (SED) **Strand**: Developing a Sense of Self **Standard:** SED2**:** The child will engage in self-expression ✓ SED2.3a – Uses a combination of words, phrases, and actions to communicate needs, ideas, opinions, and preferences ✓ SED2.3b – With adult guidance, uses verbal and non-verbal expressions to demonstrate a larger range of emotions, such as frustration, jealousy, and enthusiasm	**Domain**: Social and Emotional Development (SED) **Strand**: Developing a Sense of Self **Standard:** SED1**:** The child will develop self-awareness ✓ SED1.4b – Identifies personal characteristics, preferences, thoughts, and feelings ✓ SED1.4d – Shows independence in his/her own choices **Domain**: Social and Emotional Development (SED) **Strand**: Developing a Sense of Self **Standard:** SED2**:** The child will engage in self-expression ✓ SED2.4a – Effectively uses words, phrases, and actions to communicate needs, ideas, opinions, and preferences ✓ Sed2.4b – With adult guidance, uses verbal and non-verbal expression to describe and explain a full range of emotions.
	Domain: Approaches to Play and Learning (APL) **Strand:** Initiative and Exploration **Standard:** APL1: The child will demonstrate initiative and self-direction. ✓ APL1.3a – Initiates new tasks by him/herself ✓ APL1.3b – Makes choices and complete some independent activities **Domain:** Approaches to Play and Learning (APL) **Strand:** Initiative and Exploration **Standard:** APL2: The child will demonstrate interest and curiosity. ✓ APL2.3a – Demonstrates an increased willingness to participate in both familiar and new experiences ✓ APL2.3b – Ask questions about unfamiliar objects, people, and experiences ✓ APL2.3c – Explores and manipulates both familiar and unfamiliar objects in the environment	**Domain:** Approaches to Play and Learning (APL) **Strand:** Initiative and Exploration **Standard:** APL1: The child will demonstrate initiative and self-direction. ✓ APL1.4a – Takes initiative to learn new concepts and tries new experiences. Initiates and completes new tasks by himself/herself. ✓ APL 1.4b – Selects and carries out activities without adult prompting **Domain:** Approaches to Play and Learning (APL) **Strand:** Initiative and Exploration

	Domain: Approaches to Play and Learning (APL) **Strand:** Attentiveness and Persistence **Standard:** APL3: The child will demonstrate self-control ✓ APL3.3a – Engages in a structured activity for short periods of time to achieve a goal ✓ APL3.3b – Wants to complete activities and does them well ✓ APL3.3d – Keeps working on an activity even after setbacks **Domain:** Approaches to Play and Learning (APL) **Strand:** Attentiveness and Persistence **Standard:** APL4: The child will engage in a progression of individualized and imaginative play ✓ APL4.3a – Uses imagination to create a variety of ideas, role plays, and fantasy situations	**Standard:** APL2: The child will demonstrate interest and curiosity. ✓ APL2.4a – Demonstrates eagerness to learn about and discuss new topics, ideas, and tasks ✓ APL2.4b – Ask questions and seeks new information. With assistance, looks for new information and wants to know more. ✓ APL2.4c – Increasingly seeks out and explores unfamiliar objects in the environment **Domain:** Approaches to Play and Learning (APL) **Strand:** Attentiveness and Persistence **Standard:** APL3: The child will sustain attention to a specific activity and demonstrate persistence ✓ APL3.4a – Engages in independent activities and continues tasks over a period of time ✓ APL3.4d – Persists in trying to complete a task after previous attempts have failed **Domain:** Approaches to Play and Learning (APL) **Strand:** Play **Standard:** APL4: The child will engage in a progression of individualized and imaginative play. ✓ APL4.4a – Engages in elaborate and sustained imagined play and can distinguish between real life and fantasy.
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