DEVELOPMENT, IMPLEMENTATION, AND EVALUATION OF A GARDENING
BASED CURRICULUM FOR 1ST AND 2ND GRADERS AT COHASSET
ELEMENTARY SCHOOL

A graduate project submitted in partial fulfillment of the requirements
For the Degree of Master of Science in
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By

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DEDICATION

This graduate project is dedicated to:

My committee: thank you for all of your guidance and support throughout this process, it has been instrumental to the success of this project. Thank you for believing in me and bringing me on board for such a rewarding experience.

My mother and father: your love, support, and success have paved the foundation for teaching me the value of hard work and providing me with the tools to believe in myself.

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ABSTRACT

DEVELOPMENT, IMPLEMENTATION, AND EVALUATION OF A GARDENING BASED CURRICULUM FOR 1ST AND 2ND GRADERS AT COHASSET ELEMENTARY SCHOOL

By
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Master of Science
Family and Consumer Sciences

The prevalence of childhood obesity, particularly among disadvantaged children, continues to be a growing public health concern. In an effort to address this problem, the Marilyn Magaram Center at California State University, Northridge was awarded a three-year housing and urban development (HUD) grant to promote healthy lifestyle and eating behaviors among children of lower income households through the implementation of a garden-based program, nutrition education, physical activity, and physical education.

The intention of this project was to develop and evaluate the manual of lesson plans that were created for both the in-class and hands-on gardening education for 1st and 2nd graders at Cohasset Elementary School located in Van Nuys, California. These lessons were evaluated using a pilot qualitative evaluation tool, which was designed to collect educators’ feedback to help make the lessons more teacher centered, and fulfill California mandated academic standards for subjects like English-language arts, health, history-social science, mathematics, physical education, science, visual performing arts, and world language. The ultimate goal of this evaluation was to set the stage for the long-term sustainability of this project, which may help attain the main goal of the larger
project, which was to increase children’s fruit and vegetable intake, with the main objective of decreasing the prevalence of childhood obesity.
CHAPTER 1

INTRODUCTION

Statement of the Problem

The prevalence of childhood obesity, particularly among disadvantaged children, continues to be a growing public health concern. According to the Centers for Disease Control and Prevention, childhood obesity affects 17% of children and teens in America today, triple what it was just one generation ago. Overweight children are more likely to be at an increased risk of developing high blood pressure, high cholesterol, type 2 diabetes, asthma, sleep apnea, joint problems, fatty liver disease, gallstones, social and psychological problems such as discrimination and poor self-esteem (Center for Disease Control (CDC), 2012). Not only does this have an effect on quality of life, but it also has a tremendous impact on overall health care costs.

Many elementary schools across the country are being forced to reduce the amount of time allocated to physical activity, due to decreased budgets and greater emphasis placed on standardized testing (American Heart Association (AHA), 2012). The prevalence of obesity in the Los Angeles area is considerably higher among ethnic/racial groups, with Latinos encompassing the highest rates (Davis, Ventura, Cook, Gyllenhammer, & Gatto, 2011).

Los Angeles is one of the few cities in the United States that can be classified as a multicultural hub. In Los Angeles, 40% to 50% of residents are of Latino descent (Davis, et al., 2011). Cohasset Elementary School is located in an urban section of the community of Van Nuys in Los Angeles County. The school has a total student body of
608, where 89.5% of the population is comprised of Hispanic ethnicity, and 57% are
English language learners (Los Angeles Unified School District (LAUSD), 2012).

According to Urie Bronfenbrenner’s Ecological Perspective, children’s eating
behaviors are determined by both proximal and distal environments (Evans, et al., 2011).
Children are influenced by their home environment, which is generated by parents or
caregivers. The parent convention is affected by the broader environment, and
sociocultural factors (Evans, et al., 2011). Geographic location and financial barriers are
hindering challenges faced by low income Latino families, who have reported that in East
Los Angeles only 18% of markets sold fresh fruits and vegetables (Davis, et al, 2011).
Fruits and vegetables contain essential vitamins and minerals, in addition to fiber and
other substances, which have been shown to help reduce obesity rates and ward off other
chronic diseases (CDC, 2013). The effect of fiber and its protective properties against
excess adiposity has been well established; nevertheless research has shown that children
continue to consume less than half the recommended amounts of dietary fiber (Davis, et
al., 2011). Interventions such as an increase in fruit and vegetable intake would enhance
total dietary fiber consumption (Davis, et al., 2011). Gardening-based programs have
been shown to positively impact children’s knowledge, attitudes, and behaviors about
fruit and vegetable consumption by enhancing school curricular, physical and social
learning environments (Ratcliffe et al., 2009). The current project aims to provide
children with both in-class and hands-on garden-based experiences through a garden-
based curriculum which was developed to adhere to California state mandated academic
standards. Multiple 1st and 2nd grade teachers at Cohasset Elementary School evaluated
the current curriculum. The teachers assessed the effectiveness of these lessons, and the
implementation of revised lesson plans were geared toward the long-term sustainability of the project.

**Purpose**

The purpose of this project is to develop and evaluate the effectiveness of a garden-based curriculum using a pilot evaluation tool. This intent of this curriculum is to be implemented by future facilitators to teach first and second grade students, and to maintain the school garden program at Cohasset Elementary School. The overall goal of this program is to increase children’s fruit and vegetable intake, with the objective of reducing childhood obesity rates.

**Justification**

It may be possible that by exposing children to gardening through a gardening education curriculum, that this could help increase fruit and vegetable consumption, and thus, through programs such as this, we can help to reduce the incidence of childhood obesity.

**Objectives**

The objectives of this project are as follows:

1. To create and implement a qualitative assessment tool for both previously created lesson plans and new lesson plans to support the long-term sustainability of the garden project.
2. To create and implement an assessment tool for the lesson plans to evaluate their alignment with California State mandated academic standards.
3. To develop an all-inclusive manual including both in-class and hands-on lesson plans designed for future facilitators to implement.
4. To assist two teachers at Cohasset Elementary in implementing the completed lesson plans in their classrooms and incorporate this segment as part of the school curriculum.

**Limitations**

1. This curriculum has been developed for first and second graders attending Cohasset Elementary School in Van Nuys California, and consequently is not generalizable.
2. The sample size used to evaluate the effectiveness of the lesson plans was limited to a total of five Cohasset Elementary School teachers.
3. The manual has been geared toward the population of low-income Latino students specifically from the Van Nuys, California community.
4. Measurements assessing children’s direct fruit and vegetable consumption and BMI’s were not collected prior to after the implementation of the current curriculum.

**Assumptions**

1. First and second grade students have a basic understanding of English.
2. Teachers and future facilitators will be interested in implementing the lesson plans provided in the manual.
3. Students will participate and be engaged during lessons.

**Terms and Definitions**

- Adiposity – fatty, consisting of, resembling of, or relating to fat
- Asthma – a respiratory condition marked by spasms in the bronchi of the lungs, causing difficulty in breathing.
• Blood pressure (BP) – the pressure of the blood against the inner walls of the blood vessels, varying in different parts of the body during different phases of contraction of the heart and under different conditions of health, exertion, etc.

• Body mass index (BMI) – a weight-to-height ratio, calculated by dividing one’s weight in kilograms by the square of one’s height in meters and used as an indicator of obesity and underweight.

• Cholesterol – a waxy, fat like, substance found in all cells of the body.

• Fatty liver disease – excess fat is stored in the liver (occurs when someone is overweight) causing inflammation, which can lead to cirrhosis and liver failure.

• Gallstones – small, hard crystalline mass, formed abnormally in the gallbladder or bile ducts from bile pigments, cholesterol, and calcium salts. Gallstones can cause severe pain and blockage of the bile duct.

• Obesity – is defined as a BMI at or above the 95th percentile for children of the same age and sex.

• Overweight – is defined as a BMI at or above the 85th percentile and lower than the 95th percentile for children of the same age and sex.

• Type-2-diabetes (T2D) or diabetes mellitus type 2 (DM2) – a metabolic disorder that is characterized by high blood glucose in the context of insulin resistance and relative insulin deficiency.

• Sleep apnea – a common disorder in which one has one or more pauses in breathing or shallow breaths while sleeping.

• Woolly Pocket® – lightweight, flexible, breathable, modular gardening container. Can be used either indoors, or outdoors on horizontal or vertical surfaces.
CHAPTER II
REVIEW OF LITERATURE

The purpose of this chapter is to review the literature in relation to childhood obesity, contributing factors, the benefits of and integration of gardening-based programs into educational curriculums, and obstacles and solutions involved in the development, implementation and evaluation of elementary school garden projects.

Overview of the Problem

The incidence of childhood obesity continues to increase at alarming rates. The prevalence of obesity in children aged 2-5 years has increased from 5% to 10.4% over the past three decades. In children aged 6-11 years the incidence of obesity has increased from 4.2% to 19.6% over the same time frame (Castro, Samuels, & Harman, 2013). The statistics for children coming from low-income households are even more alarming, according to the CDC’s Pediatric Nutrition Surveillance Survey (PedNSS) 16.4% of the children in this category were overweight and 14.8% were considered obese (Castro, Samuels, & Harman, 2013). Overweight and obesity rates among children continue to be a growing public health concern.

Contributing Factors

In order to develop effective intervention programs it is important to investigate the different factors contributing to the increased incidence of obesity. According to Caprio et al. (2008) the socio-ecological theory provides a platform for prevention efforts through the exploration of children in the context of their families, communities and cultures. The socio-ecological framework characterizes the different interactions of the environment surrounding the individual such as family, culture, and community as well
as how the individual responds to these different surroundings (Figure 1). The socio-ecological model ultimately examines interactions among behavioral, environmental and biological determinants as well as physical, social and cultural surroundings (Caprio et al., 2008).

Figure 1 – The socio-ecological framework. Health behaviors of the individual (inner oval) are influenced by interpersonal, organizational, community, and public policy domains represented by the progressively larger ovals. Many influencers span more than one domain (Caprio et al., 2008)

Program development and intervention efforts can be further enhanced through more rooted understanding of children’s behaviors and the different aspects of their environments. Programs can be tailored towards various demographics taking into account cultural beliefs and socio-economic status. Through advocacy and policy
development, facilitators both now and in the future can work toward promoting healthy learning environments and reducing rates of obesity.

**Environmental Influences**

The increase in obesity rates is the outcome of intricate relationships between diet, physical activity, and the environment. The built environment is defined, as “all that is external to the individual” (Papas et al., 2007). One of the dominant causes of obesity is the fostering of an atmosphere that promotes increased caloric intake and reduced energy expenditure (Papas et al., 2007).

The environment plays an integral role in children and adolescent behavioral responses; from an early age children are influenced by a variety of social factors including their parents, who dictate the child’s physical and social environments. As children become adolescents they transition into a more autonomous lifestyle where dietary patterns and physical activity levels typically begin to decline, resulting in lower intakes of fruits, vegetables and dairy products and an increased consumption of soft drinks (van der Horst et al., 2006).

Neighborhoods also play a fundamental role in obesity rates. The closer children live to parks or recreational areas, the more likely they are to engage in physical activity when compared with children who live in more urban areas with little to no access to parks (Epstein et al., 2012). By the same token children who live in neighborhoods in close proximity to convenience stores that sell high energy density foods may find it challenging to consume healthier low-density foods, which may result in increased body weight status (Epstein et al., 2012). Policy makers, urban planners, community leaders and other health professionals have shifted their focus toward designing homes, schools,
workplaces, neighborhoods, cities, and transportation systems with the target of increasing physical activity levels, improving dietary habits, and improving overall well-being (Rahman, Cushing, & Jackson, 2011).

**Socio-Economic Status**

Obesity rates tend to be higher in lower socio-economic status neighborhoods as they typically have limited access to recreational facilities and markets, which offer healthy food sources (Rahman, Cushing, & Jackson, 2011). In a cross-sectional study conducted by Morland & Filomena (2007) researchers investigated the access and types of produce available in two racially and economically diverse Brooklyn, New York neighborhoods. Researchers concluded that there was in fact a correlation between the types of produce sold in the differing neighborhoods, with an increased accessibility to fresh produce in white neighborhoods over those in racially segregated areas. This study further illustrates the multifaceted impact that the built environment, socio-economic status, and cultural diversity have on individual’s health outcomes. Another study conducted by Kipke et al. (2007) investigated a low-socioeconomic Latino based population in East Los Angeles. Researchers conducted observations on the quality of produce at 62 area grocery stores where they found that only 11 out of 62 stores (18%) sold fresh, refrigerated, high-quality fruits and vegetables. In addition researchers also found that only four (6%) of these stores were within walking distance of a school.

**Disease Risk**

Childhood obesity is a major contributor to the development of chronic diseases, premature illness, and death. Overweight and obese children are at an increased risk of developing hypertension, hyperlipidemia, chronic inflammation, increased blood clotting,
endothelial dysfunction and hyperinsulinemia (Ebbeling, Pawlak, & Ludwig, 2002). In addition to co-morbidities, obesity is estimated to reduce life expectancy of the average American by 2-5 years, unless new policies and programs are implemented to increase awareness and assist in reducing this epidemic (Rahman, Cushing & Jackson, 2011).

Type 2 diabetes was previously known only as “adult onset diabetes,” but has more recently gained prevalence among the pediatric population, particularly among ethnic groups (Ebbeling et al., 2002). Obesity has also been implicated in the development of pulmonary disorders like asthma and sleep apnea. Disorders like asthma have the potential to further hinder physical activity in overweight or obese children, which can continue to impede the weight loss process as well as contribute to more weight gain (Ebbeling et al., 2002).

**Benefits of Elementary School Gardens & Garden-Based Programs**

In recent years garden-based programs have been gaining momentum and are becoming increasingly implemented in elementary schools across the nation as a tool to improve children’s eating behaviors (Wang et al., 2010). These types of interventions among many others are an attempt by health care professionals and policy makers to aid in reducing childhood obesity rates. It has been well established that fruit and vegetable intake is an integral part of maintaining a healthy body weight and warding off chronic disease, however the average American, including children fall short in their consumption of the daily recommendations (Namenek Brouwer & Benjamin Neelon, 2013). School garden projects provide an avenue where children are exposed to a variety of fruits and vegetables, which has been shown to increase intakes amongst children (Namenek Brouwer & Benjamin Neelon, 2013).
Namenek Brouwer & Benjamin Neelon (2013) conducted a randomized controlled trial where they implemented the pilot program Watch Me Grow, a garden-based intervention with the purpose of increasing fruit and vegetable consumption among children enrolled at childcare centers in central North Carolina. This intervention program implemented fruit and vegetable gardens and an educational curriculum. Researchers found that the children enrolled at intervention centers had a slight increase in vegetable consumption, however they also observed a decrease in fruit serving consumption. Due to the smaller sample size (n=4) involved in this study, additional research is recommended.

Garden-based intervention programs targeting children from low-income urban communities are of importance, because many eating behaviors are learned from a young age and continue through adulthood (Ratcliffe, Merrigan, Rogers & Goldberg, 2011). Children from this population are often plagued with chronic preventable diseases that are associated with poor diet and nutritional intakes (Ratcliffe, Merrigan, Rogers, & Goldberg, 2011).

Castro, Samuels, & Harman (2013) evaluated a community intervention called Growing Healthy Kids Program (GHK) with the objective of developing, implementing, and evaluating a garden intervention with the purpose of preventing childhood obesity among low-income families. Researchers concluded that children increased their consumption of fruits and vegetables when their family had increased access within the home. Local community members can have a strong impact on childhood obesity rates by collaborating with one another and providing support to programs of this type.
Technological advances continue to provide the current generation with engaging new devices like video games, smartphones, and the Internet, which have contributed to more sedentary lives. Today’s youth spend more time watching television, than they do engaged in outdoor activities, especially children coming from low-income Latino or African American households (Kumanyika & Grier, 2006). Children from low-income households also spend more time watching media related TV promoting convenience foods over children coming from higher income households (Kumanyika & Grier, 2006).

As the obesity epidemic continues to increase, new initiatives are being implemented to assess and evaluate existing programs. Recently, a federal task force was implemented to increase the accessibility and affordability of healthy foods, but while this task force promotes healthy channels such as farmers markets and gardening, it fails to assess whether they are in fact effective in reducing childhood obesity rates (Davis, Ventura, Cook, Gyllenhammer, & Gatto, 2011). To address this issue Davis, Ventura, Cook, Gyllenhammer, & Gatto (2011) investigated the impact of a 12-week after school gardening, nutrition and cooking program (LA Sprouts) on dietary intake, obesity risk factors (BMI, waist circumference, percent body fat), and blood pressure among fourth and fifth grade Latino students in Los Angeles. Researchers concluded that their intervention program improved dietary intake, reduced blood pressure, reduced BMI and rate of weight gain amongst overweight participants.

Increased consumption of fruits and vegetables has been shown to reduce the risk of chronic diseases like coronary heart disease and cancer; however although the recommended intakes are set to at least 5 fruit and vegetable servings per day, the majority of American’s are not meeting this intake (Lineberger & Zajicek, 2000). It is
recommended that individuals consume 5 servings of fruits and vegetables every day, yet
on average only 6.8% to 20% of children and adolescents meet this recommendation
(Lineberger & Zajicek, 2000). In an effort to encourage increased fruit and vegetable
consumption among children a national campaign called “5 a Day – for Better Health,”
has been instituted (Lineberger & Zajicek, 2000).

Gardening-based programs also have the potential to impact children’s behavioral
actions. The increased exposure children receive through the implementation of
gardening, nutrition education, and cooking has been shown to impact their health
behaviors (Lautenschlager & Smith, 2007). The Theory of Planned Behavior is a
construct that has been used by policy makers and program developers to impact
children’s attitudes and behaviors. An individual’s intent or attitude towards a particular
behavior is dictated by their perceived belief about the consequences of that behavior
(Lautenschlager & Smith, 2007). Lautenschlager and Smith (2007) evaluated the impact
that a garden project could have on children’s eating or gardening behavior through the
implementation of nutrition education, gardening, and cooking classes. Researchers
measured participant’s attitudes and behaviors through surveys and concluded that their
intervention modestly impacted children’s eating and gardening behaviors.

**Curriculum Development and the Integration of School Gardens**

Gardening based education programs have demonstrated nutritional, behavioral,
psychological, and academic benefits for children, so it would be advantageous to
integrate these programs into the elementary school curriculum. Each state has a
Department of Education, which is responsible for setting specific academic subject and
content standards that must be met and integrated in the classroom for each particular
grade level. These content standards are designed to encourage increased performance levels allowing all students to define concepts, knowledge and skills at each corresponding grade level (California Department of Education (CDE), 2014). Specific goals are set for each of the following subjects: English-language arts, health, history-social science, mathematics, physical education, science, visual performing arts, and world language (CDE, 2014). In order to implement a gardening-based curriculum, it must fall in line with the defined criteria for core content.

In order to develop, implement and evaluate effective garden-based programs they must be created using appropriate conceptual frameworks, as combating obesity is a multi-faceted effort (Scherr, Cox, Feenstra, & Zidenberg-Cherr, 2013). Curriculum development is most effective when it covers multiple factors such as income, ethnicity, cultural values, academic content, school settings, and local food retailers (Scherr et al., 2013). Since children spend about 6-8 hours at school five days a week the integration of a garden-based curriculum has the potential to have a positive impression on children’s nutritional and exercise attitudes and behaviors. Garden projects have provided elementary school students with substantial experiences that link education content such as mathematics and science and increase their understanding of these subjects (DeMarco, Relf, and McDaniel, 1999). Environments hosting elementary school gardens to students provide hands-on learning experiences that enhance academic subject learning inside of the classroom (Skelly and Bradley, 2000). Research through standardized testing has also shown that garden projects provide a platform to improve learning and comprehension in underperforming students (DeMarco, Relf, and McDaniels, 1999).
In addition to the potential health benefits associated with the increased nutritional knowledge garnered from garden-based projects, students may benefit on an academic level by consuming well-balanced meals. Low intakes of fruits and vegetables have been associated with lower academic performance and outcomes, increased drug use, violence, and weight anxiety (Ozer, 2007). Through the incorporation of nutrition and gardening education within the academic curriculum, students may increase their fruit and vegetable intake as a part of a peer group activity (Ozer, 2007). Students also have the potential to develop stronger interpersonal skills as they work with one another, utilizing teamwork and the bonding experiences they may gain from outdoor gardening activities.

**Obstacles and Solutions in Garden-Based Program Sustainability**

Elementary schools have the potential to provide an effective platform for increasing children’s nutrition knowledge, physical activity levels, and reducing obesity rates, however schools based in inner cities or low-income communities may lack the appropriate funding to implement gardening and nutrition based programs or to purchase gardening supplies (Kumanyika & Grier, 2006). Additionally school faculty, facilitators, and parents may have other priorities such as drug and violence prevention or implementing rigorous academic standards inside the classroom (Kumanyika & Grier, 2006). Increased teacher, facilitator, and administrative interest in garden-based programs may spark these individuals to pursue grants and other types of funding to support the implementation of elementary school gardens.

In addition to economic factors that may block the development of school gardens, other factors must be taken into consideration. There are many identified
fundamental criteria for the effective implementation and long-term sustainability of elementary school gardens; one is having access to an available location to grow fruits and vegetables (DeMarco, Relf, and McDaniel, 1999). Elementary schools situated in more urban or suburban areas may lack the physical space to develop intricate gardens. Some possible solutions include the use of hanging gardens, such as Woolly Pockets or container type gardens (Woolly Pocket Garden Company, 2014). Cities experiencing rapid population growth require the prompt development of more schools, which may also involve teachers and facilitators lacking gardening experience since they come from an urban environment (O’Callaghan, 2005). Increased involvement and training sessions for teachers, facilitators, and administrators can lead to more effective and sustainable garden-based programs (O’Callaghan, 2005). Surveyed teachers have cited that their knowledge on the subject of gardening impacted their decision on whether or not to implementing school-gardens into their lessons, this may suggest that teachers with less gardening experience may be less inclined to utilize school gardens (DeMarco, Relf, and McDaniel, 1999). Additionally 92% of teachers surveyed indicated that they were interested in expanding their knowledge about gardening and garden based activities (DeMarco, Relf, and McDaniel, 1999). Research has shown that elementary school gardens are more successful amongst communities where teachers, facilitators, and administrators are most involved (O’Callaghan, 2005). Additionally in those instances where a designated individual was responsible for school gardening activities researchers found that school garden programs were more successful (DeMarco, Relf, and McDaniel, 1999).
Another obstacle faced by teachers and facilitators is availability of adequate instructional time. Given the hectic schedule’s faced by teachers during the typical school day with the required curriculum and content standards that must be addressed and implemented, teachers have reported that they struggle to incorporate garden-based activities into their curriculum (DeMarco, Relf, and McDaniel, 1999). Additionally they noted that the effective integration of school gardens into the curriculum could assist in combating this problem (DeMarco, Relf, and McDaniel, 1999).

In a study conducted by Skelly and Bradley (2000), 84.3% of teachers surveyed reported that elementary school gardens and related activities enhanced student learning, however due to many of the perceived obstacles involved in the organization, implementation, and maintenance, elementary school gardens may be neglected as an educational resource. Sixty percent of the teachers surveyed reported that their elementary school gardens were only being used 10% or less than 10% of the time as an instructional tool. Thirty-nine percent of participants reported that they were implementing the use of the gardens 20% of the time as an instructional tool. Even though these schools had the resources and access to the gardens they were not being utilized, potentially due to teachers being unaware about the garden-based resource or lack of incorporation into the existing curriculum. The findings of this study illustrate the increased need of teacher and facilitator awareness toward the effective integration of elementary school gardens and garden based activities into the curriculum.

Research is necessary to investigate potential obstacles and solutions to existing and programs in development. Key factors in the development, implementation, and sustainability of gardens include a site to plant and grow crops, the availability for
funding for garden supplies, water accessibility, and access to volunteers for garden maintenance (DeMarco, Relf, and McDaniel, 1999). In order for the long-term sustainability of gardening based programs to be effective, teachers, facilitators, and administrators must be motivated to make time and devote energy to the programs. School staff might find the energy to engage in these programs if they recognize that gardening can be an effective tool to promote overall child well-being. School garden programs can provide relevant learning experiences that can ultimately improve student learning outcomes, increase fruit and vegetable intake, and decrease the incidence of childhood obesity. (DeMarco, Relf, and McDaniel, 1999).

**Conclusion**

Garden-based programs have the potential to impact children’s nutritional knowledge, increase their physical activity levels, and create a positive learning environment, where children can encounter enjoyable in-class and hands-on learning activities, which serve to combat rising obesity rates. Appropriate integration and implementation of garden-based programs into the current educational curriculum holds the possibility of impacting children’s levels of nutrition knowledge and initiating positive behavioral changes. Ultimately, the purpose of this project and other garden-based programs has been to increase fruit and vegetable consumption among children, especially children coming from low-income and minority households.

It is important that individuals who are responsible for developing, implementing, and evaluating garden-based curricula take a multifaceted approach and consider all components involved throughout the various environments children experience, their economic status, and different learning styles. Finally communication plays a
fundamental role in the long-term sustainability of garden-based programs. The line of communication is most effective when all parties involved; teachers, facilitators, administrators, and parents work with one another to provide optimal learning experiences for children.
CHAPTER III

METHODOLOGY

As the incidence of childhood obesity continues to be a growing problem, the development of gardening based interventions is becoming increasingly critical to combat this disease. Effective in-class and hands-on gardening based curriculums are being implemented nationwide with the goal of increasing fruit and vegetable consumption among children.

The purpose of this project was to develop, implement and evaluate the effectiveness of an in-class and hands-on gardening based curriculum developed for first and second grade students attending Cohassett Elementary School in Van Nuys, California. Each lesson plan was developed in accordance with California State mandated academic standards for English-language arts, health, history-social science, mathematics, physical education, science, visual performing arts, and world language. A needs assessment was conducted to assist in developing an effective evaluation tool. A qualitative evaluation tool was developed and implemented in order to gather assessments from teachers at Cohassett Elementary School in Van Nuys, California. Two evaluation forms were created: the “Overall Project Questionnaire,” intended to provide a comprehensive assessment and provide insights toward potential long-term sustainability of the project, and the “Lesson Plan Specific Questionnaire,” a short individualized lesson plan evaluation, utilizing teacher feedback to rate the effectiveness, relevance, and sustainability of each lesson plan using a Likert ranking scale.
Needs Assessment

The needs assessment for the development of the curriculum and evaluation tools was primarily investigated through Internet research and created based on a review and analysis of existing garden-based program literature. The curriculum was developed by gathering data on subject matter content, learner objectives, learning experiences, resources and assessments. The evaluation tool was constructed by researching potential obstacles and barriers involved in previous gardening projects.

Curriculum Development

Each lesson plan was developed in accordance with California State mandated academic standards incorporating core subjects like English-language arts, health, history-social science, mathematics, physical education, science, visual performing arts, and world language. The lesson plan content included current nutrition and garden education topics, cultural and community based traditions, and engaging activities, such as demonstrations, games, and hands on activities with the intent of increasing student comprehension and interest. Lessons were also designed to accommodate different learning styles such as audio, visual, kinesthetic and English second language learners.

Lesson Plan Content and Implementation

During the Fall 2012 semester, eight lessons were developed and implemented in four 1st and 2nd grade classrooms at Cohasset Elementary School in Van Nuys, California.

The lessons were the following:

1. How Plants Grow
2. What’s on Your Plate
3. How Much Water do Plants Need
4. Parts of the Plant I – Roots, Stems, Leaves, and Flowers

5. Parts of the Plant II – Seeds and Fruits

6. Good Bugs vs. Bad Bugs

7. Describe Your Thanksgiving

8. Eating Food From the Garden

Refer to Appendix C for lessons developed during the Fall 2012 semester.

During the following semester, Spring 2013, two teachers at Cohasset Elementary School were selected to implement and provide an individual assessment of four lesson plans of their choice. These lesson plans were selected from those developed in the Fall 2012 semester as well as lesson previously developed, by other researchers involved in the project.

Previously developed lessons from Fall 2011 and Spring 2012 were:

1. Inside the Seed

2. Parts of the Plant Song

3. Food Safety: Hand Washing

4. MyPlate: Thanksgiving Plate/MyPlate: Healthy Lunch (seasonal lesson)

5. Counting Seeds

6. Planting our Garden in Woolly Pockets

7. Composting and Insect Control

8. Container Gardening

9. Taking Care of our Garden

10. Tasting Delicious and Nutritious Fruits and Vegetables
Teacher #1 selected the following lessons to evaluate and provide feedback for improvement:

1. Good Bugs vs. Bad Bugs
2. Food Safety: Hand Washing
3. How Much Water do Plants Need
4. MyPlate: Healthy Lunch

Teacher #2 selected the following lessons to evaluate and provide feedback for improvement:

1. Food Safety: Hand Washing
2. Parts of the Plant I – Roots, Stems, Leaves, and Flowers
3. Inside the Seed
4. How Much Water do Plants Need

**Lesson Plan Format**

Each lesson was developed with the practical implementation and long-term sustainability of the project in mind. The culmination of this project was to provide the teachers at Cohasset Elementary School with a manual of teacher assessed lesson plans to be used to continue teaching future students about garden-based and nutrition education with the goal of increasing fruit and vegetable consumption and reducing obesity rates.

Each lesson plan followed the template provided:

*Title:* Clear, concise, and descriptive invitation to the lesson.

*Description of Participants:* Provides participant age ranges, duration of time that each lesson will require as well as the setting, in-class or outdoors.

*Objectives of the Lesson:* Describes what the students will be learning from the lesson.
Resources and Materials Needed: List of necessary supplies in order to implement the lesson.

Learning Activities: Detailed instructions for the implementation of each lesson and activity involved.

Assessment/Evaluation: Measurement of whether the learning objectives were adequately achieved.

References: List of resources utilized in the development of lessons, if applicable.

Evaluation Development, Administration & Collection

A comprehensive evaluation tool was developed based on the needs of the overall garden project. The “Overall Project Questionnaire,” was developed in order to assess the project in its entirety, to provide solutions to potential obstacles, and promote the long-term sustainability of the project. This questionnaire included 12 questions covering topics such as limitations, obstacles, project benefits, sustainability issues, and techniques to overcome current logistics. This questionnaire was submitted during the Fall 2012 semester to the four participating teachers, printed on official California State University, Northridge (CSUN) – Marilyn Magaram Center letterhead, and attached to a pre-stamped envelope addressed to the Marilyn Magaram Center at CSUN. A shorter questionnaire, the “Lesson Plan Specific Questionnaire” was developed in order to individually assess the effectiveness of the garden curriculum being implemented in the classrooms through this project. This questionnaire followed a Likert ranking scale, where respondents were to assess the effectiveness, relevance and their likelihood to implement the lessons in the future following a 1-5 scale, where 1 indicated a lower ranking and 5 indicated the highest ranking. This individualized questionnaire was adapted to reflect each of the eight
lessons being taught, although due to logistical complications a few of the initial lessons were not evaluated by teachers. This questionnaire was submitted during the Fall 2012 semester to the four participating teachers, attached to a pre-stamped envelope addressed to the Marilyn Magaram Center at CSUN. All responses maintained confidentiality. Refer to Appendix A and Appendix B for a copy of each questionnaire.

During the Spring 2013 semester two 1st and 2nd grade teachers were selected to personally assess four lessons each. Both teachers were responsible for implementing the lessons in their classrooms and evaluations were performed by the researcher by observation of the implemented lessons. Each of the chosen lessons was modified to reflect the suggested enhancements provided by the teaching faculty.
CHAPTER IV

RESULTS

Chapter IV presents the results and analyses of the data collected for this study. The purpose of this project was to create a comprehensive in-class and hands-on gardening-based curriculum manual and develop a pilot evaluation tool for assessing the effectiveness and long-term sustainability of the curriculum.

Each of the lessons included in the manual were researched, developed, implemented, and evaluated at Cohasset Elementary School in Van Nuys, California during the Fall 2012 and Spring 2013 semesters. The lessons were created with the intent of incorporating core subjects like English-language arts, health, history-social science, mathematics, physical education, science, visual performing arts, and world language, while at the same time emphasizing nutrition through garden-based education. The lessons were also developed taking different student learning styles into account, activities were geared toward audio, visual, kinesthetic, and English second language learners. Each teacher participating in the program received an “Overall Project Questionnaire” at the beginning of the Fall 2012 semester. Each of the teachers also received a “Lesson Plan Specific Questionnaire,” which they would use to evaluate the effectiveness of the content, relevance to the curriculum, and their likelihood to implement each of the lessons in the future.

During the Fall 2012 semester, a total of eight lessons were taught in four different 1st grade classes, one of which was an English second language class. The 20-minute lessons took place either inside of the classroom our outside in the garden area. In the beginning of the semester each of the students were given a journal to use for writing
or drawing what they learned during each of the given lessons. The eight lessons that were taught to the students during the Fall 2012 semester are as follows:

1) The lesson “How Plants Grow – Plant Your Own Seeds” was taught to children in the garden area and incorporated California academic mandated standards for science in the curriculum. This lesson focused on the different factors involved in plant growth primarily the sun, water, soil, nutrients, temperature and time. Visual aids and kinesthetic learning were utilized to help ensure student comprehension. During the discussion watermelon and avocado seeds were utilized to demonstrate the different sizes plant seeds come in. After the discussion portion of the lesson, children were involved in a hands-on learning activity where they planted their own seed in a Dixie cup.

2) The lesson “What’s on your Plate,” was taught both inside and outside of the classroom, and incorporated an academic nutritional and world language curriculum. Students were instructed on how to identify the different components of the United States Department of Agriculture’s (USDA) MyPlate. The initial lesson included a discussion on how our food gets from the farm to our plate. Once students became familiar with the MyPlate they were given food items and were responsible for placing them under the appropriate category on their personalized MyPlate. (i.e. fruits, vegetables, grains, protein, and dairy), which utilized visual and kinesthetic learning. Finally students were able to use their senses to taste, touch and smell the different foods involved in the activity, and commented on which foods they enjoyed and did not enjoy. During this lesson the names of the food groups were translated into Spanish for English second language learners.
3) The lesson “Capacity - How Much Water do Plants Need” was taught both in the classroom and outside in the garden area. This lesson incorporated science and English based academic content. Students were given four vocabulary words and their definitions – absorb, overwater, underwater and amount. This lesson began with a discussion about how much water plants need in order to grow. Students were then involved in a visual and kinesthetic activity where they engaged in a sponge activity. The dry sponge represented a plant that was under-watered; the students then dipped the sponge in a bowl of water and lifted it up to the point that they could visualize water dripping out of the sponge, which represented that the plant was over-watered and a nice balance between the two was needed. Finally a sentence was written on the board and students were responsible for identifying different reasons the plant in the given example did not grow.

4) The lesson “Parts of the Plant I – Roots, Stems, Leaves & Flowers,” was taught inside the classroom and incorporated English and science based academic content. The lesson began with a discussion of the different parts of the plant and their functions. Students were given a handout listing each of the vocabulary words they were responsible for learning. A large flower poster was used as a visual aid in this lesson, so the students could visualize the different parts of the plant. Students were then engaged in an activity where they inserted a celery stem into a cup of water with blue food coloring, they then observed as the food coloring flowed up through the celery stem. Some celery sticks were prepared by the researcher in advance, in order to demonstrate the final appearance of the celery to children, since the experiment occurs over time (refer Appendix C for the complete experiment). A total of four evaluation forms were
submitted to each of the participating teachers for this lesson, however only two
evaluations were returned. This lesson received an average score of 5 for effectiveness
and a 4.5 for relevance to the curriculum and sustainability.

5) The lesson “Parts of the Plant II – Seeds and Fruit,” was taught inside the
classroom and incorporated English and mathematics based academic content. This
lesson began with a discussion of the different parts of the plant and their functions.
Students were given a handout listing each of the vocabulary words they were
responsible for learning. Visual aids, audio examples and kinesthetic learning were all
used in this lesson. Students were each given a handful of pumpkin seeds, and a piece of
paper, where they were instructed to draw a line down the middle. A poem was then read
to each of the students instructing them on how many seeds to move to each side of the
paper. At the completion of the poem students were responsible for counting how many
seeds they were left with. A total of four evaluation forms were submitted to each of the
participating teachers for this lesson, but only two evaluation forms were returned. This
lesson received an average score of 5 for both effectiveness and likelihood for
sustainability and a 4.5 for relevance to the curriculum.

6) The lesson “Good Bugs and Bad Bugs,” was taught to children in the garden
area and incorporated physical activity and English into the lesson. Students were
engaged in a discussion, which explored the advantages of certain insects (ladybugs,
worms, and bees) to the garden, as well as the disadvantages of certain insects
(caterpillars, grasshoppers, and aphids). Students were given a simple definition of the
roles that each of the insects plays in the garden. Finally students were engaged in an
audio, visual and kinesthetic activity. An image with the name of each of the insects was
arranged in a large circle, and the students formed a smaller circle within that larger circle. Students were then read a question pertaining to the lesson and had to either run, hop, or skip to the correct insect. A total of four evaluation forms were submitted to each of the participating teachers for this lesson, but only two evaluation forms were returned. This lesson received an average score of 5 for its effectiveness, and a 4.5 in regard to its relevance to the curriculum and sustainability.

7) The lesson “Describe your Thanksgiving,” was taught to children inside the classroom and incorporated nutrition, language arts and history based academic content into the lesson. Students were engaged in a discussion about the different cultural foods that they incorporate within their households for the Thanksgiving holiday. Students were then reintroduced to the USDA MyPlate they learned about in lesson #2. Students were then instructed to work with one another in groups, where they utilized their interpersonal skills to work with one another and develop a complete Thanksgiving meal, incorporating all of the components of the USDA MyPlate. This lesson utilized visual and kinesthetic learning styles. A total of four evaluation forms were submitted to each of the participating teachers, but only three evaluation forms were returned. This lesson received an average score of 4.67 for effectiveness, 4.33 for relevance to the curriculum, and 4.67 for sustainability.

8) The lesson “Eating Food from the Garden,” was taught to children inside the classroom and incorporated science and nutrition based academic content into the lesson. The objective of this lesson was for children to learn how to identify the different foods that grow in the garden and incorporate them with one another into a recipe. Children were placed into six groups of four students; they were given various ingredients, and
worked with one another to create a salad. Students participated in an activity, which allowed them to explore their five senses: touch, vision, taste, sound, and scent. Students used their sense of touch to feel the different foods like tomatoes, lettuce, black beans, bell peppers, and tortilla bread. Students used their sense of vision to observe and examine the different shapes, colors, and sizes of the various foods. They used their sense of taste to explore the different flavors of foods and identify which foods they find appealing or not appealing. They used their sense of sound to hear the different sounds foods make when eaten, and their olfactory senses to smell the different scents of various foods. Audio, visual and kinesthetic learning styles were used throughout the different activities involved in this lesson. A total of four evaluation forms were submitted to each of the participating teachers, but only three evaluation forms were returned. This lesson received an average score of 5 for both effectiveness and relevance to the curriculum, and a 4.5 rating for sustainability.

The teacher present in each of the classrooms evaluated the lessons. The following data was gathered through the individual evaluations for each of the lessons. Table 1. is a tabular compilation of the perceived effectiveness, relevance, and sustainability of each of the lessons. Table 2. lists the various comments made by the teachers regarding each of the lessons. The evaluation data was a crucial component of this project, since it gave insights into whether each lesson was meeting each facilitator’s expectations for the project.
### Table 1. Average Evaluation Scores for Individual Lesson Plans

<table>
<thead>
<tr>
<th>Name of Lesson</th>
<th>N</th>
<th>Completed Evaluations</th>
<th>Effectiveness</th>
<th>Relevance</th>
<th>Sustainability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parts of the Plant I</td>
<td>4</td>
<td>2</td>
<td>5</td>
<td>4.5</td>
<td>4.5</td>
</tr>
<tr>
<td>Parts of the Plant II</td>
<td>4</td>
<td>2</td>
<td>5</td>
<td>4.5</td>
<td>5</td>
</tr>
<tr>
<td>Good Bugs &amp; Bad Bugs</td>
<td>4</td>
<td>2</td>
<td>5</td>
<td>4.5</td>
<td>4.5</td>
</tr>
<tr>
<td>Describe your Thanksgiving</td>
<td>4</td>
<td>3</td>
<td>4.67</td>
<td>4.33</td>
<td>4.67</td>
</tr>
<tr>
<td>Eating Food from the Garden</td>
<td>4</td>
<td>2</td>
<td>5</td>
<td>5</td>
<td>4.5</td>
</tr>
</tbody>
</table>

*a On a scale of 1-5 (1 = Least effective, 5 = Very effective) rate the effectiveness of this lesson, i.e. were the students engaged?*

*b On a scale of 1-5 (1 = Least relevant, 5 = Very relevant) rate the relevance of this lesson to your current curriculum.*

*c On a scale of 1-5 (1= Least likely, 5 = Very likely) how likely are you to implement this particular lesson to future classes.*

### Table 2. Qualitative Evaluations of Individual Lesson Plans

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Parts of the Plant I – Roots, Stems, Leaves &amp; Flowers</strong></td>
<td></td>
</tr>
<tr>
<td>• I’m glad you added the names of the vegetables, we have many 2nd language learners, and at 1st grade level, “English only” students may not know the names either. Good lesson 😊</td>
<td></td>
</tr>
<tr>
<td>• Will use in Spring</td>
<td></td>
</tr>
<tr>
<td><strong>Parts of the Plant II – Seeds &amp; Fruit</strong></td>
<td></td>
</tr>
<tr>
<td>• Great connection to math and to review left/right</td>
<td></td>
</tr>
<tr>
<td><strong>Good Bugs and Bad Bugs</strong></td>
<td></td>
</tr>
<tr>
<td>• Loved that they got to do the group thing outdoors!</td>
<td></td>
</tr>
<tr>
<td>• The children loved it.</td>
<td></td>
</tr>
<tr>
<td><strong>Describe your Thanksgiving</strong></td>
<td></td>
</tr>
<tr>
<td>• N/A</td>
<td></td>
</tr>
<tr>
<td><strong>Eating Food from the Garden</strong></td>
<td></td>
</tr>
<tr>
<td>• As a single class the students enjoyed eating their own salads and benefited from being told just to put what they liked in a salad</td>
<td></td>
</tr>
<tr>
<td>• They loved making the salads, Very fun and educational!</td>
<td></td>
</tr>
</tbody>
</table>
The “Overall Project Questionnaire” was implemented in order to assess the effectiveness of the garden project on a comprehensive scale. This questionnaire aimed to determine whether teachers and future facilitators would be interested in implementing this project and promoting its long-term sustainability as well as determining potential obstacles and solutions. This evaluation was submitted to four teachers during the Fall 2012 semester. After multiple submissions, a total of two completed evaluations were returned. Table 3 outlines the specific responses from the teachers who submitted questionnaires.

Table 3: “Overall Project Questionnaire” Questions and Responses

<table>
<thead>
<tr>
<th>Question</th>
<th>Response 1</th>
<th>Response 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What limitations do you see in the gardening project?</td>
<td>a) Time constraints</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>b) Shortage of volunteers</td>
<td>Time constraints and Does not tie into curriculum</td>
</tr>
<tr>
<td></td>
<td>c) Logistics (ex. children getting dirty/wet)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>d) Does not tie into curriculum</td>
<td></td>
</tr>
<tr>
<td></td>
<td>e) Topic comprehension</td>
<td></td>
</tr>
<tr>
<td></td>
<td>f) Resources</td>
<td></td>
</tr>
<tr>
<td></td>
<td>g) Children adhering to a consistent maintenance schedule</td>
<td></td>
</tr>
<tr>
<td></td>
<td>h) Other</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Response 1 – N/A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Response 2 – Time constraints and Does not tie into curriculum</td>
<td></td>
</tr>
<tr>
<td>2. Do you feel as though students are engaged during the lessons? If not, what techniques do you suggest to help engage them?</td>
<td>Response 1 – Yes. Hands on and visuals are good</td>
<td>Any focus techniques you have learned to use when students lose focus</td>
</tr>
<tr>
<td></td>
<td>Response 2 – Any focus techniques you have learned to use when students lose focus</td>
<td></td>
</tr>
<tr>
<td>3. Does the school have a system in place for maintaining the garden during the summer and holidays? If not what troubleshooting suggestions do you have?</td>
<td>Response 1 – Not that I know of</td>
<td>No – plant succulents</td>
</tr>
<tr>
<td></td>
<td>Response 2 – No – plant succulents</td>
<td></td>
</tr>
<tr>
<td>4. Were the students engaged in active discovery, problem solving, and questioning? Give examples of how students were engaged in discovery, problem solving and questioning. If not what do you think could help engage them more efficiently.</td>
<td>Response 1 – N/A</td>
<td>They are excited about the planting</td>
</tr>
</tbody>
</table>
5. Are there specific topics that you would like us to incorporate into our lessons?
   - Response 1 – N/A
   - Response 2 – No – all is fine

6. Is the garden project helping to facilitate what is being taught in the classroom? If not, please give suggestions.
   - Response 1 – Yes
   - Response 2 – Yes

7. Since there are multiple aspects to the gardening project – in class vs hands on. Which do you feel has the most impact on the students or gets them the most excited to ultimately reach our goal of building a healthier population? Examples?
   - Response 1 – Hands on – like the activity with the sponges
   - Response 2 – Hands on/planting

8. Based on the current lessons, do you feel as thought this is something you can do without us in the future?
   - Response 1 – Possibly – I would like to, but we don’t have enough time
   - Response 2 – Yes, any plans for lessons are appreciated

9. How do we make this project better?
   - Response 1 – N/A
   - Response 2 – You are doing great

10. In the future, do you see yourself implementing these garden lesson plans yourself, or would you prefer them to be taught by another individual, i.e. a part-time faculty member, PTA member, outside party, etc.?
    - Response 1 – It would be helpful to have another individual do it
    - Response 2 – Prefer outside teacher due to time constraints

11. Academically, what potential benefits do you see for students who participate in a gardening program?
    - Response 1 – This helps them understand the science standards
    - Response 2 – Greater understanding of science involved

Comments:
   - Response 1 – I like what the gardening project does – to enhance their lives. They get excited about where vegetables etc. come from. This encourages them to eat more fruits and vegetables. Maybe even grow their own at home.
   - Response 2 – N/A
CHAPTER V
DISCUSSION

This chapter revisits the problem and purposes of the study and summarizes the methodology. A review of the results from the study is provided in this chapter, as well as a discussion of the relevance and implications of the results. This chapter concludes with recommendations to support the long-term sustainability of the program as well as recommendations for future improvement.

Summary of the Problem and Purposes

The increased prevalence of childhood overweight and obesity rates across the nation is a growing public health concern. Children, especially those coming from low-income and ethnically diverse families, are spending more of their time indoors watching television, playing video games, or on the Internet, than they do outside or in the playground, which has resulted in reduced physical activity levels (Kumanyika and Grier, 2006). As children become more dissociated from the outdoor environment, their physical activity levels decline and convenience foods are increasingly incorporated into diet, rather than fruits and vegetables. It is recommended that children consume five servings of fruits and vegetables, but most children do not meet this daily consumption, rather the average American child consumes 2.13 servings of fruits and vegetables per day, half of the recommendation (Koch, Waliczek, and Zajicek, 2006). The need for early and effective intervention programs addressing lifestyle behaviors, attitudes toward food, and the obesity epidemic continues to be an essential component in our society. Recently elementary school gardens have served as an intervention to address the prevalence of overweight and obesity, by enhancing children’s knowledge of the importance of
increased fruit and vegetable consumption. Elementary school gardens have been shown to provide a beneficial impact on increasing children’s fruit and vegetable intake and improving their eating behaviors (Davis et al, 2011).

The purpose of this project was to develop an inclusive manual containing a garden-based curriculum, which was evaluated using a pilot assessment tool. The curriculum was developed with the intent of being taught to 1st and 2nd grade children attending Cohasset Elementary School in Van Nuys, California. The evaluation component was used to gather feedback in regard to the program’s effectiveness, relevance, and sustainability. This information gathered was used to assist in setting the stage for the long-term sustainability of this project.

**Summary of the Methodology**

The development and implementation of eight in-class and hands-on lessons set the foundation for gathering feedback from teachers through individualized lesson surveys. The lessons incorporated a variety of subjects in addition to gardening, such as English-language arts, health, history-social science, mathematics, physical education, science, visual performing arts, and world language, which are all in accordance with the LAUSD curriculum. Teachers assessed the effectiveness of these lessons, and the implementation of revised lesson plans were geared toward the long-term sustainability of the project. An evaluation of teacher responses was conducted with the goal that future facilitators at Cohasset Elementary School would maintain and sustain regular lessons in the curriculum. During the final semester of the garden program at Cohasset Elementary two teachers were designated to implement the evaluated lessons in their classrooms. The evaluation also addressed the demographics of Cohasset Elementary
School, which is a large urban school with large classroom sizes. Accordingly, the program emphasized container gardening, such as Woolly Pockets, which have been used at the school, as a key component towards influencing children to continue growing plants at home, where many may not have access to land for an in-ground garden.

**Discussion of Results**

Analysis of the “Lesson Plan Specific Questionnaire,” and the teacher-implemented lessons demonstrated that some lessons needed more revisions than others in order to meet the criteria expected from the 1st and 2nd grade teachers at Cohasset Elementary School.

The Parts of the Plant I – Roots, Stems, Leaves & Flowers,” lesson received an overall good ranking and is likely to be implemented in the future. Based on the feedback for relevance to the curriculum and likelihood for sustainability being less than a 5, minor revisions were made to the lesson to make it more applicable. The comments received in regard to this lesson further justified the high rankings “will use in the Spring,” and “I’m glad you added the names of the vegetables, we have many 2nd language learners, and at 1st grade level, English only students many not know the names either, good lesson.” Additionally based on teacher feedback, the addition of the names of common fruits and vegetables in Spanish greatly benefited the English second language learners. This gives further justification to the level of engagement and enjoyment students had during the lesson, for example if they were uninterested, their teacher would not be implementing this lesson again in future semesters.

Based on the results for the “Parts of the Plant II – Seeds & Fruit,” lesson, listed in Tables 1 and 2, teacher feedback was positive with one of the comments stating “great
connection to math and to review left/right.” This comment further justifies the application of core academic subjects into the curriculum, however because this lesson received a 4.5 in the category of relevance to the curriculum, minor modifications were made in the lesson plan to emphasize the curriculum connection. Some studies have indicated that school garden projects have the potential to improve student overall academic achievement, in particular their science scores (Klemmer, Waliczek, and Zajicek, 2005). School garden projects have been implicated as a beneficial strategy to improve student’s academic achievement across a range of different subjects: science, math, history, social studies, and language arts (Skelly and Bradley, 2000).

The “Good Bugs and Bad Bugs,” lesson also received positive comments, where teachers stated: “loved that they got to do the group thing outdoors!” as well as “the children loved it.” These comments suggest that the children were fully engaged in the lesson, however due to the lower rankings in regard to relevance and sustainability minor modifications were implemented toward the future success of this lesson.

The “Describe your Thanksgiving,” lesson received the lowest scores overall and unfortunately none of the teachers provided any comments. The lower scores received for this lesson indicated a need for improvement in this lesson, prior to its inclusion in the final lesson plan manual. The absence of comments received for this lesson proved challenging in relation to providing modifications to the lesson however some revisions were made addressing lesson effectiveness, relevance and sustainability based on additional research and this lesson is included in the final gardening manual.

The comments received from the teachers for the “Eating Food from the Garden,” lesson, indicate that this lesson seemed to engage children in the learning process.
Comments included: “as a single class the students enjoyed eating their own salads and benefited from being told just to put what they liked in a salad,” and “they loved making the salads, very fun and educational!” One of the positive aspects of this lesson was that students were able to become involved in the meal planning process, where they were able to select and determine healthy, nutrient dense foods and incorporate them into a meal that they enjoyed. This was one of the most successful lessons implemented at Cohasset Elementary School, partially because of the incorporation of active and experiential learning styles, where children were able to utilize all of their senses with hands-on activities. These learning styles have been associated with increased student learning and knowledge levels (Skelly and Bradley, 2000).

Overall the feedback received through the “Lesson Plan Specific Questionnaire” provided positive insights into students’ level of engagement, the effectiveness of the lessons, the relevance to the curriculum, and the likelihood that these lessons would be implemented in the future. Teacher’s responses indicated overall levels of enthusiasm, high levels of student engagement, and willingness to implement these lessons in the future. The overall reasons for the low return rate for the “Lesson Plan Specific Questionnaire” is speculative, but potentially related to lack time, lack desire, lack resources, or increased workload.

The “Overall Project Questionnaire” was submitted to four teachers during the Fall 2012 semester, and although the questionnaire was submitted multiple times, only two questionnaires were returned. The lower return rates for the “Overall Project Questionnaire,” may be attributed to the same reasons as the low return rates for the “Lesson Plan Specific Questionnaire,” however this still provided some data for insight.
into the long-term sustainability of this project. In an effort to improve return rates, future researchers may utilize Internet-based evaluation forms that may be emailed to participating teachers. Future researchers may also attempt a one-on-one mini evaluation session with each of the teachers directly after lesson implementation, however this would compromise the confidentiality of responses, which could impact the integrity of the data collected.

Based on the data collected it was determined that teacher’s provided positive feedback, suggesting their overall eagerness and enthusiasm regarding the current garden project. However, they also provided feedback about their concerns related to time constraints, lesson plan integration, garden/Woolly Pocket maintenance, and the possibility of including an outside facilitator to implementing the lessons. One of the instructor’s responses noted that they were unaware of any potential system in place for maintaining the garden over summer or holiday breaks. The other instructor suggested planting succulents, in order to combat potential logistical obstacles. During the term it was discovered that Cohasset Elementary School has a student-based garden maintenance system in place, 4th and 5th grade students participate in rotations where they are responsible for watering all of the Woolly Pockets on campus. This type of system would be necessary for the long–term sustainability of the gardens. As reported by DeMarco, Relf, and McDaniel, 1999 an obstacle faced by teachers and facilitators is availability of adequate instructional time. Given the hectic schedule’s faced by teachers during the typical school day with the required curriculum and content standards that must be addressed and implemented, teachers have reported that they struggle to incorporate garden-based activities into their curriculum (DeMarco, Relf, and McDaniel, 1999).
Through our work with Cohasset teachers it was evident that lack of time to maintain and use the garden might be an obstacle for the future sustainability of the program.

Overall this garden-based project has provided the students at Cohasset Elementary School with positive learning experiences, increased garden and nutrition-based knowledge, and opportunities to work with one another and develop stronger interpersonal skills as well as appreciation for other cultures, values and traditions. The comprehensive manual was designed and effectively evaluated in the hopes of increasing student’s fruit and vegetable intake with the overall intent of reducing childhood obesity rates. In order to ensure the continued effectiveness and support of programs like this, more research collecting both quantitative and qualitative data where statistical significance can be gathered are necessary. A stronger and larger body of research provides justification for policy and legislative development to support the development and implementation of more garden-based projects.
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Conceptualization and Considerations for Maximizing Healthy Development.

*Health Education and Behavior.* 34(6), 846-863.


Greetings, Cohasset Elementary 1st grade teachers! It has been a pleasure working with you and your students this semester developing the gardens at Cohasset Elementary. In order to optimize our time here and provide you with appropriate lesson plans we would appreciate your constructive feedback and input, on our project and activities. Your responses to this survey will help us improve the current program toward long-term sustainability and allow for its manageability in the classroom. We will be completing our program shortly and will provide you with current, updated, easy to implement lesson plans.

Please answer the following questions as openly and honestly as possible. Your results will remain anonymous and confidential. Feel free to use the back of the page and/or attach additional sheets as necessary. You can return this survey in the attached postage paid envelope. Thank you.

1. What limitations do you see in the gardening project?
   a. Time constraints
   b. Shortage of volunteers
   c. Logistics (ex. Children getting dirty/wet)
   d. Does not tie into curriculum
   e. Topic comprehension
   f. Resources
   g. Children adhering to a consistent maintenance schedule
   h. OTHER –
2. Do you feel as though students are engaged during the lessons? If not, what techniques do you suggest to help engage them?

3. Does the school have a system in place for maintaining the garden during the summer and holidays? If not what troubleshooting suggestions do you have?

4. Were the students engaged in active discovery, problem solving, and questioning? Give examples of how students were engaged in discovery, problem solving and questioning. If not what do you think could help engage them more efficiently.

5. Are there specific topics that you would like us to incorporate into our lessons?

6. Is the garden project helping to facilitate what is being taught in the classroom? If not, please give suggestions.

7. Since there are multiple aspects to the gardening project - in class vs hands on. Which do you feel has the most impact on the students or gets them the most excited to ultimately reach our goal of building a healthier population? Examples?
8. Based on the current lessons, do you feel as though this is something you can do without us in the future?

9. How do we make this project better?

10. In the future, do you see yourself implementing these garden lesson plans yourself, or would you prefer them to be taught by another individual, i.e. a part-time faculty member, PTA member, outside party, etc.?

11. Academically, what potential benefits do you see for students who participate in a gardening program?

12. Comments:
APPENDIX B

Lesson Plan Specific Questionnaire

Individual Lesson Plan Evaluation

Name of Lesson:

1. On a scale of 1-5 (1=Least effective, 5=Very effective) rate the effectiveness of this lesson, i.e. were the students engaged?
   1---------2---------3---------4---------5

2. On a scale of 1-5 (1=Least relevant, 5=Very relevant) rate the relevance of this lesson to your current curriculum.
   1---------2---------3---------4---------5

3. On a scale of 1-5 (1=Least likely, 5=Very likely) how likely are you to implement this particular lesson to future classes.
   1---------2---------3---------4---------5

4. Comments/Suggestions:
APPENDIX C

In-Class and Hands-On Gardening Education Manual:

A manual comprised of evaluated lesson plans to assist in supporting the continued nutrition education and implementation of school gardens at Cohasset Elementary School in Van Nuys, California

By: Michele Christopher-Ipaktchian
Title:
How Plants Grow – Plant Your Own Seeds

Description of Participants:
First grade children ranging in age from 6-7 years old will gather at Cohasset Elementary School in Van Nuys, California. The lesson will take place in an outdoor garden setting. This lecture is designed to last for a total duration of 20 minutes.

Objectives of Lesson:
1. Determine what plants need to grow and survive.
2. Plant seeds and seedlings.
3. Introduce Woolly Pockets.

Resources and Materials Needed:

Equipment
• Watering cans
• 24 vegetable, fruit or herb seeds
• Soil
• 24 Dixie cups for planting
• Water
• Sharpie marker
• Large image of a plant
• Avocado
• Watermelon or Cantaloupe

Learning Activities:

Opening Strategy:
Say: We are going to be coming to your school on a regular basis, because we want to teach you about where your food comes from. Today we are going to introduce you to your Woolly Pocket gardens, which are all hanging right outside of your classrooms. Who knows where your plants come from?
Demonstrate: What seeds look like using a precut watermelon/cantaloupe and avocado. Tell children that seeds come in all shapes and sizes.

Say: What do plants need in order to grow? Soil, sun, water, room to grow, the right temperature, air, time and nutrients. Is it possible for plants to have too little water? What about too much water? With Woolly Pockets it is better to perform more frequent watering with less water, rather than less frequent watering with more water.

Lecture:

2. Sun – The sun provides a source of energy so that plants are able to make their own food (Photosynthesis).
3. Water – Water is necessary for our plants so that they can make nutrients and move them through the plant. Humans also need water for similar purposes.
4. Soil – The soil is important for plants, because it anchors the roots that hold our plants up and supplies nutrients to our plants.
5. Nutrients – Plants need nutrients, just like humans. They get their nutrients from the soil, so we want to make sure that our soil is healthy with plenty of nutrients.
6. Temperature – Most plants like the same temperatures that humans like, but some like it to be a little cooler and some like it to be a little warmer. It’s always good to know where plants come from so we can make them feel at home.
7. Room to Grow – Plants need enough space so that their leaves and roots can grow bigger and take good care of the plant.
8. Time – Plants need time to grow, just like children need time to grow into adults.
   • What do seeds need in order to start growing – relate this to what children need to grow. Explain to children that they do not need to rely on a packet of seeds, for example they can use seeds from the inside of a bell pepper or tomato.
      o Most soils have a large supply of nutrients, but when they are continually used to grow foods, those nutrients are taken out of the soil. Ask the class what do we do if our soil has no nutrients? This is why the composting process is so important, so that we can re-feed the soil with nutrients. Just like humans can have nutrient deficiencies, so can plants – because we are all living breathing creatures.
**Final Activity: Planting Seeds**

1. Organize children into a single file line.
2. Hand one Dixie cup to each child (volunteer will write their initials using Sharpie).
3. Send children one by one to the first station where they will fill their Dixie cup with a sufficient amount of soil (a volunteer may assist them if needed).
4. The children will then go to station two, where they will be given a seed to plant.
5. Finally children will visit station three, where they will water their plants.

**Assessment/Evaluation:**

In-garden activity – regroup children and ask them which of the necessary components they just acquired in order to grow their plant.

*Children can start keeping a journal of their bi-weekly garden project activities

**References:**

Title:
What’s On Your Plate

Description of Participants:
First grade children ranging in age from 6-7 years old will gather at Cohasset Elementary School in Van Nuys, California. The lesson will take place in an indoor and outdoor classroom setting. This lecture is designed to last for a total duration of 20 minutes.

Objectives of Lesson:
1. To understand the connection of food delivery from farm to plate or garden to plate.
2. To identify the different food groups they should have on their plates - fruits, vegetables, protein, grains and dairy.
3. To identify and recognize items of differing food groups and place them in their proper designation on the USDA’s MyPlate diagram.
4. To reinforce proper watering techniques for Woolly Pockets.

Resources and Materials Needed:

Materials:
- From farm to market to plate/garden to plate poster
- Fruits and vegetables - real or images on paper small enough to fit on a plate (reusable)

MyPlate Activity:
- 24 USDA MyPlate printouts
- Grain - 1 box of Cheerios (5 Cheerios per child)
- Fruit - 48 grapes (enough for children to have 2 each)
- Vegetables - 24 baby carrots (enough for children to have 1 each), 24 snap peas (enough for children to have 1 each)
- Protein – turkey meatballs or black beans (1 tablespoon per child)
- Dairy – ½ gallon of Milk (to fill Dixie cups)
- 24 white paper plates
Learning Activities:

Opening Strategy:
Start lesson outside with children in front of their Woolly Pockets and ask if they have been caring for their plants properly. Ask children if they have been watering the plants, and have a few children demonstrate how they have been watering. Reinforce from the How Plants Grow lesson the importance of garden maintenance, so that fruits and vegetables will grow.

*Start this portion of the lesson with the children inside the classroom.

Lecture:
Ask the children if they know where the fruits and vegetables they eat come from. Teach children that if they take good care of their Woolly Pockets they will see fruits and vegetables grow from there. Ask the children if any of the plants they took home from the How Plants Grow lesson have sprouted. If any plants have grown, ask the children to describe what their plant looks like.

Where do fruits and vegetables come from? Some possible responses

1. Fruits and vegetables come from the seeds we plant and care for with sun and water.
2. Fruits and vegetables come from farms.
3. Fruits and vegetables come from the market (and they get them from the farm).
4. Fruits and vegetables come from home gardens.
5. Fruits and vegetables come from our Wooly Pockets.

Now that we know where fruits and vegetables come from, how should they look on our plates? Are fruits and vegetables the only thing we should be eating? We need other foods to help sustain our bodies and help us grow into strong healthy adults. Explain a little about each and ask children to give some examples.

1. Fruits - strawberries, grapes, oranges....
2. Vegetables - onions, bell peppers, eggplant, carrots, peas......
3. Grains - rice, tortilla bread, cereal......
4. Protein - beans, chicken, steak, fish......
5. Dairy - milk, cheese, ice cream......

Activity: MyPlate:
Volunteers will pass paper plates and food items to children.
Each child will receive:
1. Five Cheerios.
2. Two grapes.
3. One baby carrot and one snap pea.
4. One Tablespoon of beans.
5. One Dixie cup full of milk.
Children will then be instructed to place each of the items at their proper designation on their paper plate as seen on the USDA Myplate model. Cheerios = grains, grapes = fruit, carrots/snap peas = vegetable, beans = protein and milk = dairy.
Finally ask children how many of their lunch plates resemble this configuration. If they receive school lunch ask them to explain what is different.

Assessment/Evaluation:
Have children take a USDA MyPlate handout home and color in a typical meal they enjoy eating. Ask the children to bring them back in two weeks and for those that do they will get a prize.

*Translate the names of fruits & vegetables into Spanish for children in the English Second Language classes

*Give the children their journals, where they can draw or discuss one thing they learned in lecture today. Their homework or classwork is to draw or write their favorite thing about the lesson.
References:
Title:
Capacity – How Much Water Do Our Plants Need

Description of Participants:
First grade children ranging in age from 6-7 years old will gather at Cohasset Elementary School in Van Nuys, California. The lesson will take place in an in-class and outdoor garden setting. This lecture is designed to last for a total duration of 20 minutes.

Objectives of Lesson:
1. Determine the amount of water plants need.
2. Understand different units of measurement.
3. Demonstrate knowledge on proper watering techniques.

Resources and Materials Needed:

Equipment
• 24 mini sponges
• Water
• 6 Tupperware containers
• 1 gallon, plastic
• ½ gallon, plastic
• 1 pint, plastic
• 1 cup, plastic
• 3 buckets
• Dry soil
• Muddy soil
• Medium soil

Learning Activities:
Lecture:
Ask children if they know how much water plants need.
Relate the amount of water that plants need to the amount of food children need. If children eat too little, they are still hungry; if children eat too much, they feel sick. Demonstrate food/water amounts using the cup, pint, ½ gallon, and gallon.

Teach children vocabulary words:
1. Absorb – To soak up or take in water
2. Overwater – To give a plant too much water
3. Underwater – To give a plant too little water
4. Amount – How much should we give our plants

**Final Activity: Sponge Activity**
1. Split the children off into groups of about 4-5 students.
2. Explain that plants need a certain amount of water to survive, just like humans. If they are under-watered they will wither away and die.
3. Have children touch the dry sponge and explain that this demonstrates dry soil, so the roots are unable to get enough water or nutrients (ask students if they remember what the word nutrients means) to supply the plant with food.
4. Have children take the dry sponge and dip it in the Tupperware container full of water, as they pull the sponge out of the water it will drip.
5. Explain to children that this demonstrates that we have over-watered our soil, this will drown our plants and cause them to die.
6. Have children gently squeeze excess water out of their sponge, this illustrates a happy balance of water capacity, and will make our plants very happy.

*Set up stations 1, 2, 3*
- Teach children about water absorption using soil – Station 1) dry soil is under-watered, Station 2) muddy soil is over-watered, Station 3) soil that sticks to their hands is just right.

**Assessment/Evaluation:**
Reinforce Woolly Pocket watering.
Have the children act out the following sentence as a play.

**Place children into groups of four:**
Child #1 – Gardening Gretchen
Child #2 – Large pot with soil
Child #3 – The sun
Child #4 – Pumpkin Plant

Gardening Gretchen wanted to grow a pumpkin plant in preparation for Halloween. She planted the pumpkin seeds in a large pot with soil and placed it in a warm and sunny spot outside on her balcony. Gardening Gretchen poured a gallon of water on her pumpkin plant every day for 1 month. Gardening Gretchen became sad, because she did not understand why her pumpkin plant did not grow.

Ask children if they can answer why the plant did not grow.

a) The plant did not get enough sun or air.
b) There was not enough space for the pumpkin plant to grow.
c) The temperature was too cold and the plant was snowed on.
d) The plant was overwatered.

*Give the children their journals, where they can draw or discuss one thing they learned in lecture today. Their homework or classwork is to draw or write their favorite thing about the lesson.*
Title:
Parts of the Plant I – Roots, Stems, Leaves & Flowers

Description of Participants:
First grade children ranging in age from 6-7 years old will gather at Cohasset Elementary School in Van Nuys, California. The lesson will take place in an in-class and outdoor garden setting. This lecture is designed to last for a total duration of 20 minutes.

Objectives of Lesson:
1. Understand the different parts of the plant – roots, stem, flower, and leaves.
2. Identify what fruits and vegetables are the various parts of the plant.
3. Learn vocabulary words and put in journal.

Resources and Materials Needed:
Supplies
• 24 copies of plant parts handout
• 24 copies of vocabulary words and definitions
• Celery – 1 regular, 1 pre-prepared with food coloring
• 6 cups
• Water
• Food coloring
• Large image of plant with roots, stem, leaves and flower
• Images of different parts of plants

Learning Activities:
Lecture:
Tell children that today we will be learning about the different parts of the plant. Ask them if they can name any.

Have children glue vocabulary words into their journals. This can be done at the end of the lesson.

Teach children vocabulary words:
1. Seeds (Semillas) – Grows into a plant
2. Roots (Raices) – Soaks up the water from the soil
3. Stem (Tallo) – Takes water to all parts of the plant
4. Leaves (Hojas) – Take in sun and air to make food for the plant
5. Flowers (Flor) – Help the plant make seeds and fruit
6. Fruits (Frutas) – Protects the seed

Note* Seeds and Fruits will be discussed in lesson #5

Roots – Explain that the roots are like a sponge and when it is placed in water it soaks up the liquid, remind them of the lesson we did with sponges last week.

Stem – Explain that the stem is like a straw, when kids drink milk the suck up the liquid and drink it. The stem is soaking up the water from the roots and passing it to the different parts of the body.

Leaves – Explain that the leaves take in the sun and the air and use that to make food for the plant. Children feed themselves using their hands or utensils (forks, spoons, knives), this is how the plant feeds itself.

Flowers – Explain that the flowers help the plant make seeds and fruit, show the children pictures of fruits growing from the flower.

• To check for understanding have children work with a partner and discuss what they have learned.

*Celery Learning Activity:*

Place children into six groups of four children, and instruct them to do the Celery Experiment (children will need to wait until the following day to see what their experiment has produced). Pass regular celery and the celery with food coloring around to different tables. Have children discuss their observations with a partner.

*Celery Experiment (perform experiment on a few celery stalks ahead of time, so that children can see the final product in class)*

1. Cut celery stalks
2. Soak a piece of celery (standing up) in a cup of water with eight drops of red food coloring.
3. Allow celery to soak in water/dye mixture for 24 hours.
4. Record observations.

**Assessment/Evaluation:**
If time permits have children volunteer to come to the front of the classroom and act out the different parts of the plant. Have them explain what they are doing as they represent roots, stems, leaves or flowers.

Give children handout as homework assignment.

*Give the children their journals, where they can draw or discuss one thing they learned in lecture today. Their homework or classwork is to draw or write their favorite thing about the lesson.

**References:**
Title:
*Parts of the Plant II: Seeds & Fruit*

**Description of Participants:**
First grade children ranging in age from 6-7 years old will gather at Cohasset Elementary School in Van Nuys, California. The lesson will take place in an in-class setting. This lecture is designed to last for a total duration of 20 minutes.

**Objectives of Lesson:**
1. Understand the different parts of the plant – seeds and fruit
2. Learn vocabulary words
3. Develop listening and comprehension skills
4. Count pumpkin seeds
5. Learn to add and subtract

**Resources and Materials Needed:**

*Supplies*
- 1 Pumpkin
- Gloves
- 500 pumpkin seeds
- 24 pieces of paper with a black line down the center
- 7 mini pumpkins
- 6 mini decorative corn

**Learning Activities:*

*Lecture:*
Start the lecture by introducing a pumpkin to the class. Ask the children if they have ever carved a pumpkin for Halloween. Teach the children that there are other purposes for pumpkins, than just carving them.

- Pumpkins have seeds on the inside – open the pumpkin and using plastic gloves reach in and pull some of the seeds out to show the children (ask children to
describe pumpkin – yucky, gooey, etc.). Ask them if they have ever tasted pumpkin seeds before? Did they know that they are edible?
  o Seeds are the baby pumpkins. We plant them in the ground and that is where the pumpkin grows from.

  * Pumpkins are also considered fruits – peel away some of the flesh from the inside of the pumpkin and show the children. Ask them if they have ever tasted pumpkin pie, or any other pumpkin flavored food before.
  o Fruit is the flesh on the inside of the pumpkin; the fruit protects the seeds.

**Counting Activity:**
Each of the children will be given a blank sheet of paper and will have to draw a line down the center. Reinforce the left and right sides of the paper as they draw the line (draw a picture of a piece of paper on the board and write the words left and right in their appropriate areas). Each of the children will also be given 15-20 pumpkin seeds. The teacher will instruct the children to place all of their pumpkin seeds on the right side of their piece of paper. They will be listening to a poem and every time they hear a number they will need to move that many seeds over to the left side of their piece of paper.

**Counting Seeds with Farmer Dracula:**
Four (cuatro) pumpkin seeds in the soil, all planted in a line.
Farmer Dracula put in two (dos) more, they were all looking fine.
We will need more pumpkins than that, thought Farmer Dracula.
So three (tres) more seeds he planted, he took them right out of his pack.
Then Farmer Dracula asked,
“How many seeds are here? Are there enough to last us all year?”
Of course not, he knew.
So five (cinco) more seeds he added, and up they all grew.

Ask children how many seeds in total that Farmer Dracula planted.
As a class go over the math problem and write the numbers on the board:
\[ 4 + 2 + 3 + 5 = 14 \text{ pumpkin seeds}. \]
Assessment/Evaluation:
Ask children to solve the following math problem (reinforce addition and subtraction):
Farmer Frankenstein has 3 pumpkins and 2 apples. How many pumpkins does Farmer Frankenstein have? **He only has 3 pumpkins.**

Testing their listening and comprehension skills.
Ask for 3 volunteers to come to the front of the classroom:
Volunteer #1 will hold up 2 mini pumpkins
Volunteer #2 will hold up 1 mini pumpkin
Volunteer #3 will hold up 3 mini pumpkins
Ask the class how many pumpkins their friends are holding up in total = 6.
Do this as many times as time permits.
*This lesson was taught on Halloween, the names can be changed accordingly.*

*Give the children their journals, where they can draw or discuss one thing they learned in lecture today. Their homework or classwork is to draw or write their favorite thing about the lesson.*
Title:
Good Bugs & Bad Bugs

Description of Participants:
First grade children ranging in age from 6-7 years old will gather at Cohasset Elementary School in Van Nuys, California. The lesson will take place in an outdoor setting. This lecture is designed to last for a total duration of 20 minutes.

Objectives of Lesson:
1. Reinforce language skills by teaching children new words and definitions.
2. Reinforce listening and comprehension skills.
3. Understand how to follow instructions
4. Identify the importance of physical activity

Resources and Materials Needed:
Supplies
• 6 posters – with the name of a bug (in both English and Spanish) and an image of the bug – Aphid, Bee, Caterpillar, Grasshopper, Ladybug & Worms

Learning Activities:
Lecture:
Ask children if they like bugs, and then ask them if they can name some of their favorite bugs. Ask children to describe some characteristics of their favorite bugs. Ask children, since they can name bugs; can they tell what bugs are? Are bugs good or bad?
Teach children the following about good/bad bugs – have children say the name of the bug in both English and Spanish.

Bad Bugs (bad for the garden)
• Aphids (Afido) – Eats the leaves and stems of plants
• Caterpillars (Oruga) – Eats the leaves of plants
• Grasshoppers (Saltamontes) – Eats the leaves of plants
**Good Bugs (help the garden)**

- Bees (Abejas) – Pollinates plants
- Ladybug (Mariquita) – Eats Aphids
- Worms (Gusano) – Dig holes in the soil, which helps to loosen it and lets water in

**Assessment/Evaluation:**

Volunteers will stand around in a circle each holding up one of the six bug signs. Students will start out by sitting in the center of the circle. The teacher will ask the students a question about the bugs they have just learned about and the students will carefully stand up and walk/skip/run/different activities toward the bug that they think is the correct answer to the question. Once students have walked (or whichever activity) to the poster, they will have to explain why they chose the particular bug. Once the activity is completed all students

**Questions:**

This bug eats Aphids – Ladybug
This bug helps the put air bag into the soil – Worms
This bug eats both the leaves and stems of plants – Aphid
This bug pollinates plants – Bee
This bug eats the leaves of plants – Caterpillars & Grasshoppers (both correct answers)

**References:**

Lesson #7– Describe your Thanksgiving

Prepared by: Michele Christopher
Cohasset Elementary School

Title:
Describe your Thanksgiving

Description of Participants:
First grade children ranging in age from 6-7 years old will gather at Cohasset Elementary School in Van Nuys, California. The lesson will take place in an indoor setting. This lecture is designed to last for a total duration of 20 minutes.

Objectives of Lesson:
1. Students will learn about the history of Thanksgiving and the traditional foods consumed during the holiday.
2. Reinforce nouns by having children illustrate people, places, and things.
3. Identify and reinforce the USDA’s MyPlate lesson.

Resources and Materials Needed:
Supplies
• 4-6 poster sized drawing pages
• Crayons

Learning Activities:
Lecture:
• Start by asking the children how they enjoyed their Thanksgiving break. Ask children to name some of the foods and traditions they enjoyed with their family.
• Show children image of the MyPlate poster to reinforce the knowledge they learned in lesson #2 – fruits, vegetables, grains and proteins.
• Teach children about the history of Thanksgiving, the traditions associated with the holiday, and how it started.
**Coloring Activity:**
Children will be placed into six groups of four, where each group will be given a blank sheet of poster paper. Children will be instructed to draw different activities they performed, saw, or know in relation to their traditional Thanksgiving meal preparations, as they relate to the USDA’s MyPlate. Children will also be asked to use nouns to describe either the people preparing the meals, the places the meals were eaten, and the various things they used. Each of the groups will have a volunteer assisting them and keeping them on track.

**Assessment/Evaluation:**
Once children are done with their activity, each group will tell a story about what they drew and identify fruits, vegetables, proteins, and grains.

*Give the children their journals, where they can draw or discuss one thing they learned in lecture today. Their homework or classwork is to draw or write their favorite thing about the lesson.

*This lesson was conducted near Thanksgiving and may be modified accordingly.

**References:**

Lesson #8– Eating Food From the Garden
Prepared by: Michele Christopher
Cohasset Elementary School

Title:
Eating Food From the Garden

Description of Participants:
First grade children ranging in age from 6-7 years old will gather at Cohasset Elementary School in Van Nuys, California. The lesson will take place in an indoor setting. This lecture is designed to last for a total duration of 20 minutes.

Objectives of Lesson:
1. Demonstrate that children can follow instructions.
2. Learn and identify different foods from the garden that can be eaten together.
3. Introduce a lesson involving a recipe designed to meet the cultural needs of the majority of the population.
4. Explore the five senses and identify different characteristics associated with each of them.

Resources and Materials Needed:
Supplies (based on groups of four children)
• 1 large bag of lettuce
• 2 cans of black beans (1/3 can per group)
• 6 medium tomatoes (1 per group)
• 3 bell peppers peppers (1/2 bell pepper per group)
• 6 slices of tortilla bread (1 slice per group)
• Salad dressing
• 6 large bowls
• 6 mixing utensils
• 24 forks
• 24 paper plates
• Gloves
• 24 Plastic knives
• 24 paper plates for cutting purposes
• 1 set of measuring spoons
• 1 set of measuring cups

**Learning Activities:**

**Lecture:**
- Ask children if they ever help their parents prepare meals, and if they have what cooking procedures they are familiar with. Tell children that they will be preparing and eating a delicious salad.
- Ask children the different cooking measurements they are familiar with (ounce, cup, Tablespoon, etc.).

**Meal Preparing Activity:**
Children will be placed into six groups of four, where each group will be given one bag of each of the following pre-measured ingredients: lettuce, tomatoes, bell peppers, tortilla bread, black beans, and dressing. Children will be assisted by a volunteer and will be instructed to tear the pieces of lettuce and tortilla bread, and then place them into the bowl. They will also be given a paper plate and a plastic knife, so that they can cut the tomatoes and bell peppers, then place them into the bowl. The black beans and salad dressing will be prepared in advance and be ready to pour into the main bowl. Children will then be instructed to mix the ingredients and the volunteer will serve each of the children an equal portion of their creation.

**Assessment/Evaluation:**
Once children are done with their activity, they will all taste the salad and tell the class what they think. Discuss the different characteristics the children experienced in relation to all of their senses – touch, vision, taste, sound, and scent. The last question to the
students will be what plants do they see growing in the Woolly Pocket gardens at school and how would they combine those foods together to prepare a meal.

*Give the children their journals, where they can draw or discuss one thing they learned in lecture today. Their homework or classwork is to draw or write their favorite thing about the lesson.