

University of Tennessee at Chattanooga  
**UTC Scholar**

---

Honors Theses

Student Research, Creative Works, and Publications

---

12-2014

# Effects of a nutrition education intervention on inner city children

Stephanie P. Windle

University of Tennessee at Chattanooga, [kvk899@mocs.utc.edu](mailto:kvk899@mocs.utc.edu)

Follow this and additional works at: <http://scholar.utc.edu/honors-theses>

 Part of the [Nutrition Commons](#)

---

## Recommended Citation

Windle, Stephanie P., "Effects of a nutrition education intervention on inner city children" (2014). *Honors Theses*.

This Theses is brought to you for free and open access by the Student Research, Creative Works, and Publications at UTC Scholar. It has been accepted for inclusion in Honors Theses by an authorized administrator of UTC Scholar. For more information, please contact [scholar@utc.edu](mailto:scholar@utc.edu).

**Effects of a Nutrition Education Intervention on Inner City Children**

**Stephanie Windle**

**Departmental Honors Thesis  
The University of Tennessee at Chattanooga  
Health and Human Performance**

**Project Director:** Kathy Barry

**Examination Date:** November 5, 2014

**Examination Committee:**

Dr. Caryl Taylor

Melissa Powell RD

Holly Martin

## TABLE OF CONTENTS

<i>Abstract</i> .....	Page 2
<i>Introduction</i> .....	Page 3
<i>The Growing Obesity Problem</i> .....	Page 4
<i>Poverty and Obesity</i> .....	Page 6
<i>Nutrition Education Interventions</i> .....	Page 8
<i>Method</i> .....	Page 10
<i>Class One: Introduction To Recreate Your Plate</i> .....	Page 12
<i>Class Two: Gardening</i> .....	Page 15
<i>Class Three: Snacks</i> .....	Page 17
<i>Class Four: Portion Sizes, Serving Sizes, And Nutrition Labels</i> .....	Page 19
<i>Class Five: My Plate Guidelines</i> .....	Page 21
<i>Class Six: Parent Information Session</i> .....	Page 24
<i>Challenges</i> .....	Page 25
<i>Results</i> .....	Page 27
<i>Discussion</i> .....	Page 28
<i>Recommendations</i> .....	Page 31
<i>Conclusions</i> .....	Page 36
<i>References</i> .....	Page 37
<i>Appendix</i> .....	Page 40

## **Abstract**

This paper focuses on nutrition education research conducted between February and April 2014. The researcher's goal was to determine the effectiveness of a nutrition education intervention on low-income children. The USDA and Academy of Nutrition and Dietetics provided most of the research used to create the intervention. The definition of "healthy" used for this study was defined by the USDA (2014) as "whole foods such as fruits, vegetables, whole grains, fat free or low-fat dairy, and lean meats that are perishable (fresh, refrigerated, or frozen) or canned as well as nutrient-dense foods and beverages encouraged by the 2010 Dietary Guidelines for Americans." Initially, the researcher established a partnership with the Chattanooga Area Food Bank and Inner City Ministry. The nutrition education intervention occurred at Inner City Ministry's afterschool program. Inner City Ministry's director randomly selected seven participants from their fifth grade class. These participants consisted of six girls and one boy. Their height, weight, and physical activity levels varied. The intervention consisted of six classes during the three-month period. Each class lasted forty-five minutes and was comprised of a lecture, an activity, and a healthy snack. The activities included games and hands-on learning activities. The parents were encouraged to participate in the program through handouts and one class. Pre and post surveys were used to determine the effectiveness of the intervention. The results, which are furthered analyzed in this paper, show that the intervention was successful. Future researchers are encouraged to use similar methods to test the effectiveness of their nutrition education programs.

*Keywords:* nutrition, education, intervention, inner city, surveys, snacks

## Introduction

While walking through a grocery store, consumers are confronted with numerous types of messages. Different packaged foods claim to offer low-fat, low-sugar, all-natural, or fresh options. Other brands use friendly-looking characters to attract children to their product. Many consumers are interested in choosing healthy options but are confused by the mixed messages. Other consumers are not concerned about nutrition but only want to purchase the easiest and cheapest option. Children are often not even given a choice about the food products served in their homes. When the audience for nutrition education is so varied, how can an educator provide the information that will cause a change in the health status of the population?

In order to prepare the population for nutrition education, the subjects must understand why it is necessary. Isobel Contento (2011), the author of *Nutrition Education*, explains that improved nutrition “provides people a better quality of life and enhanced functioning so that [people] are able to do the many things in life they value” (p. 5). Simply, a nutritious diet allows one to feel and look good. However, most Americans have developed a habit of destructive eating. With the prevalence of fast food, convenience foods, and frozen dinners, people spend less time and money on food. Often consumers do not realize these foods are detrimental to their quality of life. Sometimes, however, people are interested in changing their eating habits. They will try a fad diet or actually incorporate fruits and vegetables into their meals. Unfortunately, habits are difficult to break, and people generally revert back to their original eating patterns (Contento, 2011). The challenge of a nutrition educator is to find the appropriate motivations and tools to create an effective nutrition education intervention.

## **The Growing Obesity Problem**

The threat of obesity can be used as an effective motivator for dietary habit changes. Currently, more than one-third of Americans are obese (CDC, 2012). Obesity prevents individuals from participating in activities they enjoy. In addition, many diseases are directly related to unhealthy eating patterns. Four of the ten leading causes of death in America are associated with obesity. The likelihood of developing coronary heart disease, many types of cancer, stroke, and Type 2 Diabetes can be reduced with a nutritious diet (CDC, 2012).

Various factors increase the chance that a person will become obese. While geography does not cause obesity, a link exists between the two. As of 2012, eight of the thirteen states with obesity rates of thirty percent or more were southern states (CDC). Food is an important part of culture, and the American south has a rich culinary tradition. Many traditional southern dishes are fried and contain high amounts of fat and sugar. Those who live in the South are surrounded by unhealthy, yet traditional, styles of food. Changing the dietary habits of someone who grew up with typical Southern-style food can mean altering their cultural practices.

In addition to geographic regions, some races are more affected by obesity than others. According to the CDC (2012), “non-Hispanic blacks have the highest age-adjusted rates of obesity, followed by Hispanics, non-Hispanic whites, and non-Hispanic Asians” (Adult Obesity Facts section, para. 4) Race is an important factor to study when determining obesity factors. Different races have different opinions of the ideal weight. Race and culture are related, and, as discussed previously, many culinary traditions are attached to cultures. Some races might not be exposed to the amount of obesity and

dietary information that is available to other groups. When creating a nutrition education program, it is important to consider the race of the audience and understand the statistics and factors related to obesity for the particular group.

Age is also a necessary factor to consider when reviewing obesity trends. As of 2012, seventeen percent of America's children, ages two through nineteen, were obese. This amount has significantly increased over the past fifty years. In 1960, only five percent of America's children were considered obese (CDC). There are numerous contributors to this increase. Today, children entertain themselves with television, video games, cell phones, and the Internet. The majority of food advertisements shown on these outlets focus on nutrient-poor, processed foods. Before these distractions, children often played games outside, allowing them to be physically active. Also, vending machines have been placed in schools allowing children to choose unhealthy foods throughout the day. It has also become more common for both parents to work outside of the home. This decreases the time parents have to prepare healthy meals for their families. As a result, more families are choosing fast food and convenience foods. The CDC (2012) has predicted that fifty-one percent of America's population will be obese by 2030, with children as a large portion of this statistic.

Childhood obesity causes many significant problems. Obese children often develop high blood pressure and high cholesterol, which are risk factors for Cardiovascular Diseases. Type 2 Diabetes, breathing problems, joint problems, and gallstones can also develop as a result of childhood obesity. Obese children are more likely to become obese adults. As obese adults, they can develop more health problems that can lead to a premature death. Adulthood obesity for individuals who were obese as

children is often more severe than those who first become obese as adults. In addition to the severe health problems, obese children are likely to develop social and psychological problems (CDC, 2012). They may be bullied, teased, or excluded from activities. These factors are all major influences for nutrition educators to work to prevent childhood obesity.

### **Poverty and Obesity**

Parents are their children's first teachers. They have the power to influence their children's eating habits and food preferences. Schools and day cares are also some of the earliest influences on food choices. Media, peers, and clubs also play an important role in dietary habits (Contento, 2011). Unfortunately, the quality of information received from these outlets varies greatly. Poor, uneducated families without nutritional knowledge will be unable to provide their children with the tools to choose nutritious foods. These families often live in areas where schools do not place an emphasis on nutrition. The children grow up with peers from similar backgrounds who are accustomed to eating unhealthy foods. Children growing up in this environment develop harmful eating habits they will often maintain for their entire lives (Martin, 1963).

Unfortunately, this is a reality for many people. In 2012, 46.5 million Americans were living in poverty, and 15.9 million children lived in food insecure households (Feeding America, 2014). The USDA describes a family as food insecure when their "consistent access to adequate food is limited by a lack of money and other resources at times during the year" (as cited in Feeding Texas, 2014, para. 2). Food insecurity causes families to eat food that is available or cheap without considering the nutritional implications of the food choice.



Food deserts are also a major problem for many poor Americans. The USDA (2014) defines food deserts as “urban neighborhoods and rural towns without ready access to fresh, healthy, affordable food” (Food Deserts section, para. 1). These neighborhoods might lack grocery stores or only contain high-priced specialty food stores. If affordable grocery stores are available, they are usually located out of a reasonable walking distance. People living in food deserts often have no choice except to shop for food at convenience stores, gas stations, and fast food restaurants. These options generally do not offer fresh, healthy foods. Occasionally, healthy choices can be made in food deserts but the individuals often lack the education and skills necessary to prepare a nutritious meal.

Many areas in Hamilton County, Tennessee, contain families who are under educated, poor, and live in food deserts. The children who live in these areas lack the necessary skills to choose a balanced diet. Examining a sample menu from the Hamilton County Department of Education (2014) showed that students would not learn about a balanced diet from their cafeteria. Breakfast options for January 2014 included breakfast pizzas, cinnamon pancakes, breakfast bars, yogurt, and whole grain cereal. Lunch choices included crispy chicken sandwiches, cheese quesadillas, chicken nuggets, crispy fish, pizza, salad, and tacos. With each lunch the children are able to choose up to two vegetables. The options for vegetables include corn, carrots, refried beans, potato wedges, curly fries, and crinkle fries. Children, especially those who are unaware of the nutritional effects, will often choose the foods that taste best. This menu is deceiving because it places French fries under the vegetable category. When French fries are placed alongside carrots and corn, students will believe they offer similar health benefits. Also, unhealthy

meals like cinnamon pancakes and pizza are offered along with healthier options. This furthers the confusion when the students try to make healthy choices. Only studying the menu, however, does not give the complete representation of Hamilton County's nutrition education. Many schools might discuss nutrition in their classrooms or hang pictures of the MyPlate Guidelines in the cafeterias. When schools fail to discuss nutrition education, or only spend a limited amount of time discussing healthy eating, students do not receive the knowledge necessary to make informed dietary choices. The lack of information from schools, combined with limited useful information from parents, and constant advertisements featuring unhealthy foods can easily lead children to adopt a poor diet (Healthy, 2014).

### **Nutrition Education Interventions**

One way to improve nutritional skills is to conduct nutrition education interventions. Researchers have conducted different styles of nutrition education interventions to test their effectiveness. One intervention from 2013 studied the effects of nutrition education on whole-grain consumption. Four hundred and nine people were chosen to participate in the study. The participants were divided into two groups, a control group and the study group. The study group tasted a chicken and whole grain pasta dish, were given the ingredients, and asked to prepare the dish in their home. The control group did not receive this intervention. The results of this study showed that a nutrition education intervention that allows active participation increased self-efficacy in choosing and preparing foods that include whole grains. This study shows that many people simply need to be empowered to create a healthier diet. The participants might have been interested in nutritious foods but did not know how to prepare them or what

ingredients to purchase. This study allowed the participants to sample the dish to learn that whole grains can taste good. By giving the participants the opportunity to prepare the dish on their own, they learned that they had the ability to prepare a healthy meal. Also, by preparing the meal at home the participants might have shared the food with family. This would allow the family members to also try a whole grain dish and understand many of the lessons the participants experienced. This study highlights the importance of self-efficacy in nutrition education. Effective interventions allow participants to actively engage in the lesson, which allows them to develop necessary skills and confidence in their abilities (Yao, 2013).

In 2011, two researchers conducted a nutrition education intervention for elementary school children. The program focused on three objectives, which were to “increase knowledge of healthy eating among kids, increase knowledge of physical activity among kids, and increase awareness of healthy eating behaviors and physical activity among kids and parents” (Carson & Reiboldt, para. 13). The intervention was conducted on 1,810 kindergarteners in California. The children were given surveys before and after the intervention to determine the effectiveness of the program. During the sixteen-week course, students were introduced to a healthy lifestyle through lessons, games, and food. At the end of the study, parents were also given a survey. The surveys show that both children and parents reported eating healthier as a result of the intervention. Many of the parents also indicated that their increases in physical activity and healthy eating were due to their child’s participation in the intervention (Carson & Reiboldt, 2011). This experiment shows that nutrition education interventions can have positive effects on many individuals, even those not directly included in the program.

The nutrition education intervention for inner city children discussed in this paper was modeled after many successful interventions. This specific intervention included participant surveys conducted at the beginning and end of the program. Lessons were conducted on a variety of introductory nutrition topics. Students were empowered to actively participate in the lessons by preparing the healthy snacks used in each class. Parents were also engaged through weekly handouts and a parent information session at the conclusion of the study. This study's results should be positive for many different reasons. Although the subjects live in a food desert, they should still be interested in learning techniques for eating healthy foods in this environment. Also, the subjects are children so they have not yet formed life-long habits ("Forming Good Habits", 2014). Finally, the lessons were organized in a manner that motivated and engaged the participants.

### **Method**

This project's success was largely due to a partnership with the Chattanooga Area Food Bank. The researcher began working with two Chattanooga Area Food Bank employees, Holly Martin and Heather Cook, in January 2014. They discussed the possibility of working closely together on the project. At the time, the Chattanooga Area Food Bank (2014) had recently changed its mission statement to read, "to lead a network of partners in eliminating hunger and promoting better nutrition in our region" (Mission section, para. 1). Since this project was in line with their new mission statement, Mrs. Martin and Mrs. Cook were interested in offering the Food Bank's assistance to promote nutrition education among area at-risk children. In order to assist, they offered food and supplies from the Food Bank for the nutrition education intervention. Mrs. Martin also

contacted Inner City Ministry to explain the proposal. After meeting with their director, the researcher was given permission to conduct the classes at Inner City Ministry.

Inner City Ministry is an after-school program in downtown Chattanooga, Tennessee, that provides educational, spiritual, and physical development for students in kindergarten through twelfth grade (Inner City, 2014). This is a very structured, safe, and productive environment for the students. From Monday to Thursday the students visit the tutoring room, reading room, and gym. On Fridays educational programs ranging from cooking classes to baton-twirling lessons are offered. The nutrition education classes were added to their Friday schedule.

The nutrition education intervention at Inner City Ministry was established as a six-class program. The classes were titled “Recreate Your Plate,” which is an allusion to the USDA nutritional guidelines entitled “MyPlate Guidelines” (Choose, 2014). The director randomly selected the subjects from Inner City Ministry’s fifth grade students. The subjects, who consisted of seven African American students, included six girls and one boy. These students varied in height, weight, and physical activity level.

Each class followed a standard structure. The researcher arrived at Inner City Ministry at 3:45 to set up the room. Then, she arranged the chairs in two rows and wrote notes on the white board. At 4:20 the students arrived and sat in their seats. Each hour-long class included a lecture, a game or activity, and a healthy snack. At the end of each class the students received a handout detailing the lessons covered that day. A similar handout was sent to each parent, which included information about the class and a recipe for the healthy snack.

In order to track the effects of the classes, a survey was created for the students (see document 1). This eighteen-question survey was completed twice by the students, once before the first class and again after the end of the final class. Pictures, short answer questions, and yes or no questions were included on the survey. The students did not receive any help while completing the surveys. The results of the surveys will be analyzed in a later section of this report. The class format and survey structure used in this study were based on a similar experiment titled the “Food and Fitness Fun Education Program.” This intervention was conducted at a California afterschool program for elementary school students and included a pre and post survey, healthy eating classes, and food games. The topics covered in the “Food and Fitness Fun Education Program” included defining nutrition, healthy snacks, the importance of eating breakfast, and the Food Pyramid, which was the USDA’s food intake guide before MyPlate. Each week the students sampled unfamiliar foods like soy chips and edamame. The parents were included through meetings and a survey. This format proved to be effective and was closely followed in the research with Inner City Ministries (Carson, 2011).

### **Class One: Introduction To Recreate Your Plate**

A lesson plan was created for the Recreate Your Plate course to reflect a unique nutrition topic for each class. Using the example of the “Food and Fitness Fun Education Program,” each session included an activity or game, a lecture, and a healthy snack (Carson, 2011). The first class was a basic introduction class. Following the research of Rick Wormeli, a Nationally Board Certified teacher and educational author, a safe environment was established in the classroom. Wormeli (2001) argued that students only answer questions when they believe the teacher and fellow peers will not ridicule them.

In order to establish this environment, the researcher began the first class by introducing the course and herself. She briefly explained that during the sessions the students would learn more about health and nutrition. Before beginning the formal lesson, the students complete the pre-survey. Again, she created a safe environment by explaining that this survey would not be graded and their answers would remain anonymous.

After the students completed the survey, they were given the chance to express their nutritional knowledge. They were asked to explain the meaning of the title “Recreate Your Plate.” The lecture portion included a basic vocabulary lesson. The words included

- nutrition, the process of providing or obtaining the food necessary for health and growth;
- health, the state of being free of illness or injury;
- calorie, the amount of heat energy needed to heat one liter of water one degree Celsius;
- vitamins and minerals, the nutrients the body needs to work properly;
- MyPlate, the nutrition guidelines which are divided into the five food groups;
- the food groups, which are a collection of foods that share similar nutritional benefits (Nourish, 2014).

The students responded appropriately with comments including “We have the MyPlate guidelines on a wall in our cafeteria” and “We have heard of vitamins and minerals.” While the students understood the rest of the definitions, the term “calorie” was more difficult for them. The researcher followed Bill Nye’s, a scientist and television personality, example by giving the formal definition of a calorie but

also discussing a calorie as fuel (Nye, 1995). When the kids realized that calories are used for walking, running, and sleeping, they began to form a concrete understanding of the concept.

Following the lecture, the students were invited to play a modified version of the game “Red Light/ Green Light.” This version, known as “Go Foods/Slow Foods,” reinforced the topic of healthy foods. Before starting the game, the students were asked to name healthy and unhealthy foods. After naming appropriate foods the students lined up against the wall. Whenever a healthy food was called, the students took one step forward, and if an unhealthy food was named, the students had to remain still. This was a successful game because it reinforced the idea that healthy foods help bodies move and grow, while unhealthy foods provide little, to no, benefit towards activity and growth. The students were receptive and enjoyed the game (Red, 2014).

After the game the students were given apples and peanut butter. This snack was provided for many different reasons. First, research from the USDA showed that kids enjoy dipping their food, and apple slices can easily be dipped into peanut butter (Choose, 2014). Also, apples are high in vitamins and minerals, which allowed the students to be reminded of the vocabulary words previously discussed in the class. Finally, since this snack contained high amounts of protein and fiber, the students could be introduced to new nutrition-related vocabulary. The first class was successful because it accomplished the main goal of establishing a safe and structured environment for the remaining lessons.



## **Class Two: Gardening**

The second class focused on gardening and vegetables. Research has proven that young students learn best with hands-on activities, so the participants were given the opportunity to plant their own seeds (Martin, 1963). The class began with a short introduction to gardening. The students were asked about their experience with gardening and were asked to name foods that can be grown in a garden. After the discussion, the students were given a cup of dirt and a small amount of seeds. Some of the students received basil seeds while others were given parsley. Before planting the seeds, the students were told about each herb. Basil can be used to flavor pesto, marinara sauce, pizza, and salads. It is high in vitamin K, zinc, calcium, magnesium, and potassium. Parsley is often added to soups, sauces, meats, salads, and hummus. This herb contains vitamins C, B12, K, and A. The students then planted the seeds and were given instructions on plant maintenance (Choose, 2014).

Following the gardening exercise, the students learned about vegetables. According to the USDA MyPlate Guidelines, 9-13 year old boys need two and a half cups of vegetables a day and girls in the same age bracket need two cups (Choose, 2014). The male students had trouble comprehending why they needed more vegetables than the girls. After being told that they needed to consume more calories each day, the boys seemed to accept their body's need for more vegetables (Samour & King, 2012). The vegetable lesson mainly focused on salads. The students learned that salads are a healthy meal that can be made from foods in a garden. The lesson focused on creating a healthy salad because their nutritional value can diminish with certain dressings and toppings. The salad's base should consist of dark green leaves such as spinach, kale, or Swiss

chard. These leaves are very high in vitamins A and C. The salad's toppings should include vegetables, fruits, grilled chicken, or grilled fish. The most challenging lesson concerned the salad dressing. Many of the students did not realize that creamy dressings, such as Ranch or honey mustard, contain high amounts of calories, fat, sodium, and sugar. The students learned different ways to replace creamy salad dressings. Vinaigrette dressings, while still not perfect, tend to be healthier than creamy dressings. Serving dressing on the side instead of pouring it directly on the salad can help limit the amount consumed. Also, a lemon could be squeezed over the salad in place of a dressing. While the students were not thrilled to learn about the negative side of salad, they were interested in ways to create a healthy meal (Healthy, 2014).

Hummus and vegetables were served as the healthy snack for the second session. Hummus was a new food for all participants and many were reserved about trying the snack. Before eating, the students learned that hummus is a paste made from chickpeas. It is low in calories and contains high amounts of protein, fiber, vitamin A, vitamin B-6, iron, and phosphorous (Self, 2014). Many foods can be served with hummus, including vegetables and whole wheat pita bread. The students were then given the opportunity to try red pepper hummus with carrots, celery, broccoli, snap peas, and bell peppers. Although many of the students were initially hesitant to try the hummus, the majority of the students enjoyed the snack. At the culmination of the class, the students were asked to complete a short response sheet (see document 3). On this sheet they wrote two facts they learned during the class. The answers will be analyzed along with the surveys in a following section. Before leaving, the students were also given two handouts, one for themselves and one for their parents. Both sheets explained how to care for the plant and

ways to create a healthy salad. The parent sheet also discussed the healthy snack. The students seemed eager to learn during the second class and left excited for the next lesson.

### **Class Three: Snacks**

Snacks were the theme of the third class. To begin the class, the students were asked to name some of their favorite snacks. Many of their answers included high calorie items. After the students named their favorite snacks, the lesson focused on sugar and salt. The students learned that the body either burns sugar for energy or stores it as fat. Excess sugar can lead to diabetes, obesity, heart disease, and acne. They discovered that their diet does not need to include added sugars because carbohydrates provide the body's necessary amounts of glucose. The students then learned that sodium could increase blood pressure and lead to heart attacks, strokes, and kidney failure. According to the MyPlate Guidelines, children and African Americans of all ages should especially reduce their daily sodium intake to 1500mg (Choose, 2014)

In order to reinforce this lesson, the students participated in a sugar and salt activity. A board displaying pictures of a twelve-ounce can of Coca Cola,  $\frac{3}{4}$  cup of Golden Grahams cereal, one strawberry Poptart, a twenty-fluid ounce bottle of Minute Maid Lemonade, and a McDonalds cheeseburger was placed in the front of the room. Bags of sugar were then passed around the room. The students guessed which bag depicted how much sugar was in each product. Minute Maid Lemonade, with 67g, contained the most followed by 39g in Coca Cola, 17g in the Poptart, 12g in the cereal, and 7g in the cheeseburger. Many of the students were surprised by the high amount of sugar in lemonade. Unfortunately, the relatively low amount of sugar in the cheeseburger

caused some of the students to think that cheeseburgers were healthy. They were told that, while the cheeseburger has the least amount of sugar, many other factors contribute to the cheeseburger's low nutritional value. The cheeseburger was used as an example of unexpected sugar-containing foods. The sugar lesson ended with an empty bag reminding the students of how much added sugar they need in their diet (Sugar, 2014).

Following the sugar lesson, the class focused on sodium levels in each item. A display board graphed the amount of sodium in each product. The cheeseburger, with 680mg contained the most, followed by 240mg in the cereal, 170mg in the Poptart, 80mg in the lemonade, and 45mg in the Coca Cola. The sodium lesson reinforced the earlier cheeseburger discussion. Although the cheeseburger contained the least amount of sugar, it contained the highest amount of sodium. A meal at McDonalds could easily exceed the daily sodium limit once a Coca Cola and French Fries are eaten with the cheeseburger. The chart and bags of sugar were effective learning tools. The students were shocked to see and feel how much sugar different products contained. The graph also helped show the daily requirements for sodium compared to the amounts of sodium found in snack items (Self, 2014).

Since the third class focused on snacks, the students enjoyed two healthy snacks following the final activity. The first snack was trail mix, which the students were able to make themselves, and the second snack was peanut butter balls. The trail mix, which was suggested as a healthy snack on the USDA's website, included pretzels, unsalted peanuts, sunflower seeds, raisins and Craisins (Choose, 2014). The students enjoyed scooping out each item and creating their own trail mix. The peanut butter balls, a recipe from the Academy of Nutrition and Dietetics (2014), were a mixture of peanut butter and

cornflakes that were shaped into a ball and rolled in crushed graham crackers. Both snacks were low sugar and high in protein. Following the snacks, the students completed the short response sheet explaining two facts they learned during the class. Before leaving, the students were given the student and parent handouts (See documents 3 and 4). These discussed the sugar and salt activity and included recipes for the healthy snacks. The students were very engaged during the third lesson and seemed eager for the fourth session.

#### **Class Four: Portion Sizes, Serving Sizes, And Nutrition Labels**

During the fourth class the students learned about serving sizes, portion sizes, and nutrition labels. The lesson began with a lecture comparing and contrasting serving sizes and portion sizes. Serving size is a standardized way of measuring food based on nutrition needs and a portion size measures how much food is served or how much food is in a single container. A portion may contain more or less than one serving (USDA, 2014). This is an important lesson because serving sizes deliver a specific amount of calories, sugar, fat, and nutrients. In order to understand how many of these components one is consuming, it is essential to pay attention to serving sizes. When eating out or cooking at home, the serving size might be unknown. Portion sizes then become important because they help control the amount of food consumed.

Following Wormeli's (2001) advice, another game was used to reinforce the lesson. This game allowed students to guess which objects represented the portion sizes for different food items. The objects included a deck of cards to represent three ounces of cooked chicken or meat, a tennis ball for a cup of cooked rice or pasta, one domino for one ounce of cheese, a golf ball to show two tablespoons of peanut butter, a baseball

representing a piece of fruit, a die for one teaspoon of butter or margarine, a fist to represent a potato, and a box of floss for chocolate (USDA, 2014). Each object was placed on its own chair, which were arranged in a circle. The food items were written on the white board. The students were given a worksheet which included columns labeled item, my guess, and actual. After each student visited every station and made their guesses, the class regrouped. The students shared their guesses and then were told the correct answers. This game allowed the students to be very engaged in the lesson. After the game, they participated in a portion size discussion. The students learned that eating oversized portions leads to the consumption of too many calories. Using small plates, bowls, and cups can help reduce portion sizes. The portion size activity culminated in the reminder that portion sizes are the amounts of food that should be consumed during a meal. Serving sizes at a restaurant are usually larger than a portion size. The MyPlate guidelines, which were covered during the fifth class, display how much food should be consumed in one day (Choose, 2014). This guideline combined with knowledge of portion sizes eliminates overeating and helps created a balanced, healthy diet.

After the portion size game, the students learned about nutrition labels. Each child was given a unique nutrition label. The lesson began with an overview of the items displayed on a nutrition label. As each item was discussed, the students were asked a question relating to that topic. When serving sizes were discussed, the students were asked which of their labels contained the highest number of servings per container. For calories the students showed which label had the highest and lowest amounts. Nutrients, fats, sodium, carbohydrates, protein, and percent daily value were also explained and located on the label. A short discussion of the ingredients list followed the label reading

activity. The students were told that the ingredients list displayed the items used to make the food. These items are listed in order from the ingredient used the most to the least used. A long ingredient list with many unfamiliar words usually displays an unhealthy processed food (USDA, 2014).

The healthy snack, a fruit and yogurt parfait, was chosen from a list of healthy snacks from the Academy of Nutrition and Dietetics' (2014) website. This snack included plain Greek yogurt, which is high in protein, calcium, and good bacteria; fruit, which contains nutrients, fiber, and healthy sugar; and granola, which provides fiber. The students were able to assemble their own parfaits and learned that this could be a healthy breakfast or snack. Shortly after the snack, the students completed the short answer sheets. They were also given the parent and student information sheets. These included a list of the objects and portion sizes they represented, nutrition label reading instructions, and the fruit and yogurt parfait recipe. The fourth class was the most engaging because the students were involved in two different activities during the lesson.

#### **Class Five: MyPlate Guidelines**

The fifth class was the final class to follow the regular format. The sixth class would allow the students to prepare healthy snacks for their parents and discuss the many lessons they had learned during the course. The fifth class focused on the MyPlate Guidelines. Upon entering the classroom, the students noticed the MyPlate diagram displayed on the whiteboard. The students were asked to identify the picture and, after a few attempts, it was correctly labeled as the MyPlate guidelines. The students were told that these guidelines display the food groups and show how much of each group is

necessary daily. They were reminded that the food groups are collections of food that contain similar nutrients.

The food group lecture began with fruits. The students learned that the USDA recommends making half of your plate fruits and vegetables. Their age group needs one and a half cups of fruits each day (Choose, 2014). The students were asked to recall which object from the previous class represented one cup of fruit. Many correctly answered that the baseball represented the portion size of one cup. Vegetables were discussed next. The students learned that boys in their age group required two and a half cups while the girls need two cups. Two cups of raw spinach or twelve baby carrots represent one cup of vegetables (Choose, 2014). Next, the students learned about the grain food group. They were told to make half of the grains they eat whole grains. They also learned that the term “whole grain” means the entire grain kernel, which includes the bran, germ, and endosperm, are present (USDA, 2014). Boys require six ounces of grains while the girls need 5 ounces. One half cup of cooked oatmeal or one mini bagel represents one ounce. Protein was then discussed, and the students learned that they require five ounces each day. One ounce of cooked chicken without skin or two tablespoons of hummus represents one ounce of protein. Most of the students recalled that the deck of cards represented the portion size of three ounces of chicken. Dairy was the last food group discussed. Children in their age group require three cups each day. One cup of milk or yogurt provides the equivalent amount of dairy (Choose, 2014). Following dairy, oils were discussed. The USDA does not include oils as a food group but since oils contains some essential nutrients, they recommend a daily amount of five



teaspoons. Two tablespoons of peanut butter, the size of a golf ball, represents four teaspoons of oil.

Once all food group related questions had been answered, the students participated in a game. In the back of the classroom six stations were arranged representing each food group, including oil. Each station contained a list of healthy and unhealthy items. The students divided into groups and were given a handout explaining that their group either represented healthy breakfast, unhealthy breakfast, healthy dinner, or unhealthy dinner. Following these labels, each group would visit the stations and choose one item from each that represented their theme. After completing the game, the menus would be discussed with the entire class (Choose, 2014). The students enjoyed the game and most teams correctly completed their menu. The incorrect answers included labeling canned peaches in heavy syrup, bacon, and V8 juice as healthy options. Although there were a few mistakes, the game was a useful learning tool.

Following the game, each student was given a copy of the recipe for that day's healthy snack. Many of the students had read a recipe before, so only a few minutes were devoted to this lesson. The students were reminded of recipe format and told to read the entire recipe before beginning to cook. After the recipe activity, the students were given the post survey. This was completed during the fifth class since the parents would be present during the sixth class and could provide distractions. The students did not talk or receive any help during the post survey.

Once the surveys were completed, the students tasted the turkey roll up snack. The roll ups, which were recommended by the USDA, consisted of a piece of low-salt

deli turkey rolled around an apple slice. The students were reminded that the turkey fulfills the protein food group and the apple represents the fruit group (USDA, 2014). The students enjoyed the snack and eagerly discussed the final class. They were given a parent and student handout detailing the time and location for the sixth class. The students were told that they would prepare healthy snacks for their parents. They would also discuss several topics they learned during Recreate Your Plate. Many of the students seemed excited to share their experiences with their parents.

### **Class Six: Parent Information Session**

The final class followed a different structure than the previous classes. The students met in the large snack room instead of their normal classroom. The class began with the students answering questions about Recreate Your Plate. With teamwork and some prompting, the students correctly discussed MyPlate, food groups, and nutrition labels. Following the discussion the students began preparing the snacks. During this class the students prepared trail mix, fruit and yogurt parfaits, hummus and vegetable plates, and apples with peanut butter. The students enjoyed preparing all of the snacks themselves. After creating the snacks the students waited for the parents to arrive. Unfortunately, only one of the parents showed up to the class. The sixth class was the only class that did not follow the lesson plan. According to the plan, the students would share the snacks with their parents and explain the topics they learned during Recreate Your Plate. Instead, the students gained experience preparing the snacks and discussed the class among themselves. Although most of the parents were not present, the students did show the researcher that they learned important nutritional information during the course.

The six-class program was successful because the students gained a new appreciation for nutrition and healthy foods. Since the classes followed a structured format, the students knew what to expect for each class and each week they looked forward to participating in an activity and trying a healthy snack. The researcher appropriately combined short lessons, activities, and snacks to effectively introduce the students to a variety of nutrition topics.

Recreate Your Plate was used to increase the participants' knowledge of nutrition and healthy food. The researcher could not assume that the students had any background in nutrition, so the lessons were presented at an introductory level. The researcher worked with Inner City children in an attempt to help them create a healthy lifestyle. The parents were incorporated into the class because the students are not the sole decision makers for their food options.

The students especially enjoyed the activities and snacks. These parts of the classes gave the students the opportunity to be actively involved in the lesson. "Go Foods/Slow Foods" was the most popular game played during Recreate Your Plate (Red, 2014). This game allowed the students to stand up and play a "healthy foods" version of Red Light/Green Light. After the success of "Go Foods/Slow Foods" during the first class, the researcher decided to include an activity during each lesson since it is important to present the material in a way that the students enjoy.

### **Challenges**

While there were many positive aspects of the intervention, the researcher did face some challenges. The main problem encountered by the researcher was parental

support. Since the participants were middle school students who do not make all of their food choices, it was important to involve the parents. By including the parents, the students had a better chance of receiving healthy foods at home. The researcher provided a parent handout for each class and invited the parents to join their students at the final class. During this class the students would prepare healthy snacks for their parents and discuss the lessons they learned during Recreate Your Plate. Unfortunately, only one of the parents showed up to the final class. For future projects it is recommended to try to include the parents. However, this can be challenging and creative methods might be required to gain parental support.

Finding healthy snack recipes was a second challenge the researcher encountered. The snacks used in Recreate Your Plate were chosen from the USDA's (2014) and Academy of Nutrition and Dietetics' (2014) websites. All of the snacks used were healthy alternatives to common, unhealthy snacks. Unfortunately, all of the snacks were not perfect. During the third class, which focused on sugar and salt, the students were given trail mix and peanut butter balls. While these snacks contained a relatively low amount of sugar and salt, these ingredients were still present. The researcher used these snacks as a way for the students to eliminate nutrient-poor snacks in favor of tasty and healthy options. While these snacks should not be consumed every day, they are better than many items eaten by middle school students. The researcher recommends that future projects include snacks from the USDA and Academy of Nutrition and Dietetics, but should not include foods that might send a conflicting message. Since the trail mix and peanut butter balls were used during the class with sugar and salt, the students might assume these snacks did not contain either of these ingredients. Instead, the students should have been

told that these snacks were low in sugar and salt and could be used as replacements for high sugar and salt foods.

Overall, Recreate Your Plate was a successful project. The students enjoyed each class and were actively involved in the lessons. Future nutrition educators are encouraged to follow the format presented in this report because it resulted in an increase in nutritional knowledge for the participants. Pre and post surveys were used to determine the effectiveness of the program. The pre to post survey answers improved, which shows that the students had some background knowledge but also learned new material during the classes. This intervention was successful because it introduced fundamental nutrition information in a format the students enjoyed.

## **Results**

In order to determine the results of the intervention, surveys and short response sheets were used (see documents 1 and 2). The surveys and short response sheets both show that the intervention was effective. Overall, the surveys improved by fifty-five percent (see Table 1 and Graph 1). The questions that increased the most focused on MyPlate, food groups, and reading food labels. These topics were covered during Recreate Your Plate. Thirty-three percent of the responses did not change from the pre to post surveys. These included the questions asking the students to circle the picture of healthy foods and the “yes” or “no” questions about reading a recipe, preparing a healthy snack, and planting a seed. Eleven percent of the responses negatively changed. The calorie question related to the nutrition label and the healthy food question associated with the ingredients list had fewer correct answers in the post survey.

The short response sheets also displayed the effectiveness of the intervention. The students often discussed their positive feelings towards the healthy snack. The responses also showed that they comprehended the complex material. This course might have been the first time many of the students heard “carbohydrate, fiber, protein, saturated fat” and other nutrition-related vocabulary. Of the lessons that contained a short response sheet, the sugar and salt activity seemed to cause the greatest impact. Many of the students wrote about the amounts of sugar and salt in different food products.

The surveys and short response sheets support the fact that the intervention was a success. The students improved more than fifty percent on the surveys and provided specific information they learned on the response sheets. During the classes, it was also apparent that the students enjoyed the activities and were engaged in the lessons. They asked questions, participated in the games, and willingly tried the healthy snacks. These students were in need of a nutrition education program, and the results show that Recreate Your Plate effectively introduced them to many nutrition-related concepts.

### **Discussion**

When preparing a nutrition education intervention there are many factors to consider. Initially, the audience must be selected. For this project the audience was selected based on need and availability. The subjects attended Inner City Ministry everyday after school, so their schedules were predictable. The age group was selected because many adolescents deal with food issues. The Center for Disease Control and Prevention (2014) reported, “ In 2012, more than one third of children and adolescents were overweight or obese” (Childhood Obesity section, para. 1). Unfortunately, this number is only growing. Middle school students deal with peer influence, bullying, and

increased autonomy. These factors influence their food choices. Inner city children were selected because, generally, they lack the parental support and education necessary for creating a healthy diet (CDC, 2014). Inner city children might also live in an area restrictive to a healthy lifestyle. This program was used to determine the effects on an audience with little prior nutrition knowledge.

Class location is an additional factor that must be determined before starting a program. During the planning process, many locations were considered for Recreate Your Plate. Initially, the food bank was chosen to provide the class setting. However, the time and materials needed to transport the students to the food bank was limiting. Inner City Ministry became the location because the students attend this program every day after school. Instead of creating a new education area, it was easiest to bring the program to a preexisting location. For future projects, conducting the program at an afterschool center is recommended. The students are comfortable with the environment and the acceptable behaviors associated with the program. The familiar setting allows the students to engage more with the material since they are not concerned with learning a new location.

Program length must be considered once the audience and location are determined. Recreate Your Plate was developed as a six-session program that spanned three months. The class lengths varied from forty-five minutes to an hour, which allowed enough time for an activity, a lecture, and a snack. The class durations provided enough time for the students to engage with the material without becoming bored or restless. The six-sessions were also an adequate program length. The students were able to develop a relationship with the researcher during this time period. They looked forward to the next

session and had enough time to process the material. The amount of sessions also allowed different topics to be presented at a reasonable pace.

Once the time frame was established, topics were selected. This is a challenging aspect of the planning process because nutrition topics are limitless. It was necessary to select topics with the audience in mind. Regardless of the audience, background information should always be given since the knowledge and skill level cannot be assumed (Contento, 2014). The first Recreate Your Plate class was established as an introductory class. The students were asked to share some of their nutrition knowledge. This helped establish their level so the following classes could be adapted to fit their needs. The topics chosen for the remaining classes were based on various factors. Issues that could include a hands-on activity or game were selected first. Other subjects that provided basic or introductory nutrition information were selected. All selected topics focused on providing nutrition information to children with little prior knowledge. The chosen themes included nutrition knowledge that could help the students make better food choices in their daily lives.

After the topics were finalized, class materials were chosen. While many interesting materials could be used, budget must be considered. In order to maintain a limited budget, only necessary materials can be used. Each Recreate Your Plate class included handouts and a snack. Other materials included the planting supplies, the bags of sugar, and the portion size game items. These materials were relatively inexpensive and did not exceed the budget.



In addition to following the budget, class materials should be limited to increase effectiveness. Classes containing numerous props can overwhelm students and cause the individual materials to lose their educational value. Reducing the material number allows the students to appreciate and understand the purpose of each item. Limiting the number of healthy snacks made the students more receptive to each snack. If a buffet of snacks had been provided at each class, the students would likely avoid the unfamiliar foods. By providing one or two snacks each class, the students were able to focus on that food and were encouraged to try something new (Contento, 2014).

Once the lesson plans were completed, the data collection method was chosen. For Recreate Your Plate, pre and post surveys were used to determine the effectiveness of the course. By using the surveys, the amount of prior knowledge could be determined. The surveys also provide a quantitative measure of improvement. The short response sheets were also used so the students could reflect on the lessons. These sheets provided a qualitative measure of effectiveness. In addition to the formal measures, the researcher studied effectiveness by paying attention to the students. During Recreate Your Plate, the students were engaged and interested in the lessons. This showed that the classes were effective because the students actively participated (Wormeli, 2001).

### **Recommendations**

Recreate Your Plate's successful components are recommended for future nutrition education interventions. The healthy snacks were the students' favorite component. While children are not always interested in trying new foods, if the snacks are presented in an interesting way, they will likely be willing to try the foods. Most of the snacks used in the intervention were found on the USDA's website. This website

provided many handouts discussing healthy snacks for different age groups. The snacks recommended for children included foods that could be dipped, rolled, or easily prepared (USDA, 2014). Recreate Your Plate included two dipping snacks, hummus and peanut butter. These were among the most popular snacks in the class. The students also enjoyed the turkey roll-ups, which consisted of turkey rolled around an apple slice. However, the most popular snacks were those that the students prepared themselves. The students were able to help prepare the yogurt parfaits and trail mix. Preparing the snacks engaged the students in the material. The snack preparation also helped the students gain the necessary skills for making a healthy snack.

The researcher's main challenge for this component is to find healthy snack recipes. The USDA and Academy of Nutrition and Dietetics both provide many healthy recipes on their websites. However, some of these recipes are more nutritious than others. The peanut butter ball snack contained 14g of sugar even though it was found on the Academy of Nutrition and Dietetics' (2014) list of 25 healthy snacks for kids. Also, both the USDA and the Academy include recipes for trail mix, but do not include detailed lists of healthy components for this snack. The trail mix used in this class contained a relatively amount of sugar because it included dried fruits. It is important for future researchers to remember that "healthy" recipes are not always perfect. The snacks used in this class were better than most snacks children eat. It was important for the students in this class to try tasty, healthy snacks because they frequently consume unhealthy foods. In classes that provided a deeper look at healthy foods, some of the snacks used in this class might be avoided simply because they were not all whole foods. The focus of this class was to introduce the students to healthy foods they would enjoy. The snacks helped

the students understand that nutritious foods can be delicious. In general, healthy snacks are recommended for nutrition education interventions because students enjoy this component. Also, when students are able to prepare the snack themselves, they become more invested in the material.

In addition to the snacks, the games were a very popular aspect of the classes. During Recreate Your Plate, three games were played. The games gave the students an opportunity to move around and learn the material in a fun atmosphere. Most of the games were found online and were easily modified to fit the goals of the intervention. The students especially enjoyed the “Go Foods/ Slow Foods” game (Red, 2014). This game was a modified version of Red Light/ Green Light, so many of the students were already familiar with the rules. Since they enjoyed playing the game, the students did not realize they were also learning about healthy foods. However, the game required them to name healthy foods and the students were “frozen” if an unhealthy food was named. This forced the students to learn about different healthy and unhealthy items. The portion size game was also very popular. The students enjoyed guessing which food items corresponded to the different objects. This game will also help the students remember the recommended portion sizes for common foods. The students also enjoyed the “Shop ‘til you drop” game (Mahar et al., 2006). This game allowed the students to demonstrate their skills at choosing items for a healthy meal. While this game helped the researcher determine if the students gained the ability to choose healthy foods, it also helped create self-efficacy in the participants.

In addition to the games and snacks, the activities were a successful component of the class. The sugar and salt activity is especially recommended for future programs.

During this activity, the students were given bags of sugar that corresponded to the amounts in different snack items. The students were able to feel and see how much sugar is in different products. The students were also able to see a graph that depicted the amounts of sodium in the same items. This activity was productive because the students were able to experience information hands-on. In addition to short lectures, it is important to include activities and games so the students can become more involved with the material.

The surveys were another useful component of the study. Surveys similar to the ones used in this study are recommended for future nutrition education interventions. The pre surveys allowed the researcher to determine the amount of prior knowledge the students possessed and the post surveys were used to determine the effectiveness of the intervention. The students could easily understand the material presented on the surveys because it was written at a basic level and included pictures. The surveys took an average of ten minutes to complete, which was an adequate amount of time. Future researchers are encouraged to create similar surveys to determine the effectiveness of their programs.

While many aspects of Recreate Your Plate were successful, a few components are not recommended for future projects. One less productive activity was the label reading exercise. In theory, the researcher would discuss and teach the students how to read the different parts of a nutrition label. After the discussion, the students would answer questions about different aspects of the label. While the activity seemed productive during the lesson, the surveys showed that the students did not retain the information. One question on the survey asked the students to read a nutrition label and list the number of calories in one serving. The correct responses to this answer decreased

by two from the pre to post surveys. In order to improve this activity, the focus should be narrowed. While reading nutrition labels is an important concept, each aspect on the label should not be discussed in an introductory level class. Instead, the researcher should focus on teaching the students how to read a few components, such as the calories, sugar, and salt.

The ingredients list activity should also be improved for future projects. In *Recreate Your Plate*, the researcher briefly discussed how to read an ingredients list. The students were told that the ingredients are listed in order of amount used. The researcher also discussed that fewer ingredients are better, and confusing terms were often unhealthy chemicals. One question on the survey asked the students to look at an ingredients list and determine if the product was a healthy food. The correct answers to the question decreased by one from the pre to post surveys. In order to successfully discuss this topic, the researcher should devote more time to discussing different items in ingredients lists. The students were only exposed to one label and adequate time was not used to ensure the students understood the topic. Ingredients lists might be a topic too complicated to cover in a basic nutrition class. Future researchers should either omit this topic or allow more time to explain ingredient list reading techniques.

Parental support was the final component that should be improved for future projects. The researcher tried to involve the parents in *Recreate Your Plate* in different ways. The parents were required to sign a consent form, which described the project, before the classes started. After each class the students were sent home with a parent handout that detailed the lessons discussed in the class. The parents were also invited to attend the final class. During this class the students prepared healthy snacks to share with

their parents. Unfortunately only one of the parents arrived to participate in the final class. It is important to include the parents because the students are too young to make the food choices for the families. The parents must also be educated in order for a change to be made in the students' homes. While the efforts to include the parents were necessary, they were unsuccessful. Future researchers are still encouraged to include the parents, but should find ways to further their involvement. If possible, the class should contain a component where the parents can attend information sessions related to the nutrition topics. The handouts can also be effective but should be delivered directly to the parents instead of to the students. Involving the parents is an important but challenging aspect of the program.

Overall, Recreate Your Plate was an effective intervention. The results increased by fifty-five percent, showing that the students retained most of the information. The intervention format provided an adequate amount of time for the students to learn and engage with the concepts. Future researchers are encouraged to follow many of the components used in this successful intervention.

### **Conclusions**

These findings suggest that nutrition education is beneficial for middle school aged inner city children. The results indicate that the study was effective in increasing the participants' knowledge of nutrition, but a follow up study would be needed to determine the lasting effects. Future studies should test the benefits of including a parent component in the intervention. Since children in this age group are not the primary food purchasers, parental support might increase the likelihood that the children adopt a healthy lifestyle.

More research is also necessary to determine the specific methods that are most effective in encouraging lifestyle changes in participants.

## References

Academy of Nutrition and Dietetics (2014). In *eatright.org*. Retrieved November 6, 2014, from [www.eatright.org](http://www.eatright.org)

Carson, D. E., & Reiboldt, W. (2011, February 8). An After-School Program on Nutrition and Physical Activity for Elementary School Children. *Family and Consumer Sciences*, 39(3).

*Centers for Disease Control and Prevention*. Retrieved September 3, 2014, from <http://www.cdc.gov>

*Chattanooga Area Food Bank*. Retrieved November 6, 2014, from <http://www.chattfoodbank.org>

*Choose MyPlate*. Retrieved November 6, 2014, from <http://www.choosemyplate.gov>

Contento, I. R. (2011). *Nutrition Education: Linking Research, Theory, and Practice* (2nd ed.). Sudbury, MA: Jones and Bartlett Publishers.

*Feeding America*. Retrieved September 3, 2014, from <http://feedingamerica.org>

Forming Good Habits in Children to Avoid Obesity (2014). In *Purdue University Fact Sheet*. Retrieved September 3, 2014, from <https://www.purdue.edu/enjoyfoodbeactive/factsheets/family/forminggoodhabitsinchildrentoavoidobesity.aspx>

*Healthy Children*. Retrieved October 22, 2014, from <http://www.healthychildren.org>

Inner City Ministry (2014). In *First Centenary United Methodist Church*. Retrieved November 6, 2014, from <http://www.firstcentenary.com/inner-city-ministry>

Mahar, Ed.D, M. T., Scales, M.A.Ed., D. P., Miller, B.A., T. Y., Kenny, M.A.Ed., R. K., & Shields, M.A., A. (2006, July). *Healthful Living Middle School Energizers*. NCDPI.

Martin, E. A. (1963). *Nutrition education in action: A guide for teachers*. New York: Holt, Rinehart, and Winston.

Nutrition Education (2014). In *Nourish Interactive*. Retrieved October 22, 2014, from <http://www.nourishinteractive.com>

Nye, B. (Narrator). (1995). *Nutrition* [Motion picture].

Red Light Green Light (2014). In *NYRR: Active Eating*. Retrieved November 6, 2014, from <http://www.nyrr.org/youth-and-schools/running-start/nutrition-activities/elementary-school/dinner/red-light-green-light>

*Self Nutrition Data*. Retrieved October 22, 2014, from <http://nutritiondata.self.com>

School Menu and Prices (2014). In *Hamilton County Department of Education*. Retrieved September 3, 2014, from <http://www.hcde.org>

*Sugar Stacks*. Retrieved November 6, 2014, from <http://www.sugarstacks.com>

*USDA*. Retrieved September 3, 2014, from [usda.gov](http://usda.gov)



What is Food Insecurity (2014). In *Feeding Texas*. Retrieved November 5, 2014, from <http://tfbn.org/food-insecurity/>

Wormeli, R. (2001). *Meet Me In The Middle: Becoming an Accomplished Middle Level Teacher*. Herndon, VA: Stenhouse Publishers.

Yao, P., Ozier, A., Brasseur, K., Robins, S., Adams, C., & Bachar, D. (2013, May 17). Food Pantry Nutrition Education about Whole Grains and Self-Efficacy. *Family and Consumer Science, 41(4)*.

Appendix

Document 1- Pre and Post Survey

**Inner City Ministries Pre and Post Survey**

**Please circle your answer or fill in your answer when necessary.**

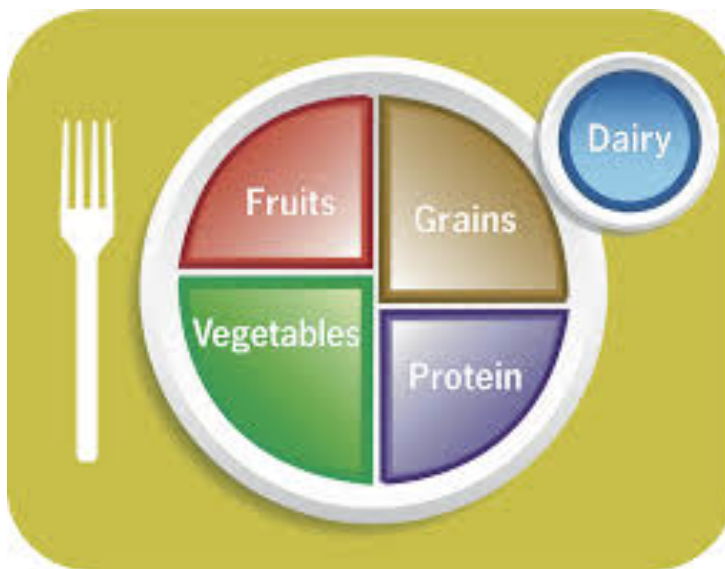
**1. Which picture shows what nutrition is?**



**2. Can healthy food be tasty? Yes / No**

**3. What does this picture show?**

---



**4. What are the food groups?**

---

**5. Which snack is more nutritious?**



**6. Can you name three healthy snacks? Yes / No**

**If you answered yes please list the healthy snacks below:**

- 1.
- 2.
- 3.

**7. Can you name three unhealthy snacks? Yes/ No**

**If you answered yes please list the unhealthy snacks below:**

- 1.
- 2.
- 3.

**8. Do you know how to read a recipe? Yes / No**

**9. Do you know how to prepare a healthy snack? Yes / No**

**10. Do you know how to plant a seed? Yes / No**

11. List three healthy foods that can be grown in a garden.

- 1.
- 2.
- 3.

12. Use this picture to answer the following questions:

<b>Nutrition Facts</b>	
Serving Size 2 crackers (14 g)	
Servings Per Container About 21	
<b>Amount Per Serving</b>	
<b>Calories 60</b> Calories from Fat 15	
	<b>% Daily Value*</b>
<b>Total Fat</b> 1.5g	<b>2%</b>
Saturated Fat 0g	<b>0%</b>
Trans Fat 0g	
<b>Cholesterol</b> 0mg	<b>0%</b>
<b>Sodium</b> 70mg	<b>3%</b>
<b>Total Carbohydrate</b> 10g	<b>3%</b>
Dietary Fiber Less than 1g	<b>3%</b>
Sugars 0g	
<b>Protein</b> 2g	
Vitamin A 0%	• Vitamin C 0%
Calcium 0%	• Iron 2%
* Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:	
	Calories:    2,000    2,500
Total Fat	Less than 65g    80g
Sat Fat	Less than 20g    25g
Cholesterol	Less than 300mg    300mg
Sodium	Less than 2400mg    2400mg
Total Carbohydrate	300g    375g
Dietary Fiber	25g    30g

What does this picture show? \_\_\_\_\_

In the picture shown above how many calories are in one serving? \_\_\_\_\_

In the picture shown above, how many grams of protein are in one serving? \_\_\_\_\_

How many grams of fiber are in one serving? \_\_\_\_\_

13. Use this picture to answer the following questions:



What does this picture show? \_\_\_\_\_

Which item in the list is used most in this product?

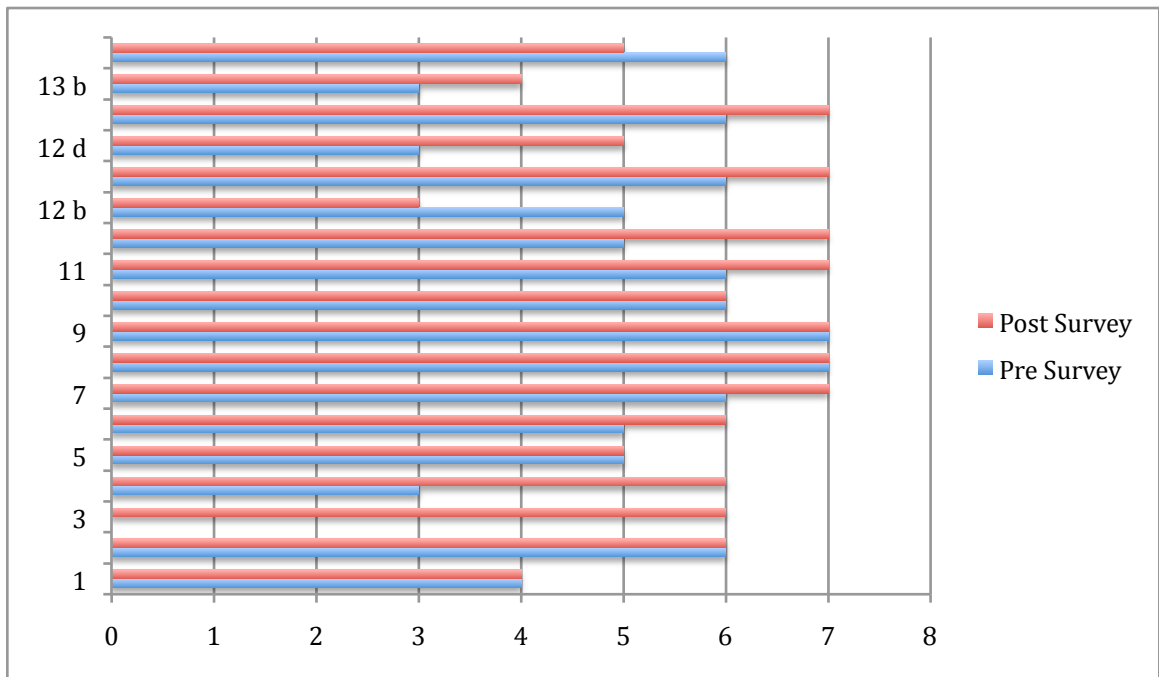
\_\_\_\_\_

Does this picture show a healthy food product? Yes / No

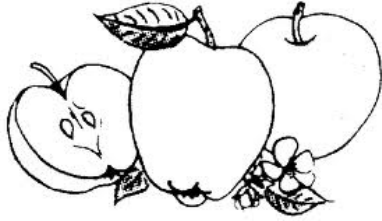
Table 1. Correct Student Responses to Pre and Post Surveys

Question	Pre Surveys	Post Surveys
1	4	4
2	6	6
3	0	6
4	3	6
5	5	5
6	5	6
7	6	7
8	7	7
9	7	7
10	6	6
11	6	7
12 a.	5	7
12 b.	5	3
12 c.	6	7
12 d.	3	5
13 a.	6	7
13 b.	3	4
13 c.	6	5

Graph 1. Correct Student Responses to Pre and Post Surveys



Document 2- Short Response Sheet



Date: \_\_\_\_\_

Name: \_\_\_\_\_

**Today I learned something new!**

Two new facts I learned:

1. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

February 28, 2014

Today we Planted Seeds!

Basil- This is a herb used in many Italian dishes. Basil contains Vitamin K and Zinc.

Parsley- This is a herb can be used to flavor soups and sauces. Parsley contains Vitamin C, Vitamin B12, and Vitamin A.

The seeds need 6-8 weeks to grow. Once the plants are a few inches tall you can transplant them to a garden or a bigger pot.

Try making a salad with many different items that can be grown in a garden. Remember to use dark green leaves such as spinach or kale.

Next time we will discuss:

**SNACKS!**



Document 4- Sample Parent Information Sheet

February 28, 2014

Dear Parent:

Today in Recreate You Plate your child planted a Basil or Parsley seed. They will keep the seed at Inner City until the end of April. When the plant has grown a few inches it should be transplanted to a garden or larger pot. Basil and Parsley can be used to flavor many soups, salads, sauces, or meats.

Your child also learned about different types of salads. I explained that dark green leaves are healthier than light green lettuce. Dark green leaves are high in Vitamin A and Vitamin C. I also explained that too much salad dressing could add unwanted fat and sugar to a salad.

Your child also tried hummus. Hummus is a spread made from chickpeas. Hummus contains high amounts of iron, Vitamin C, Vitamin B6, fiber, and protein. Hummus is a delicious snack that can be eaten with whole-wheat pita bread or vegetables.