A COLLABORATIVE EXTENSION GARDEN-BASED SCHOOL NUTRITION PROGRAM: MEASURING THE INTERESTS, BEHAVIORS, AND SELF-EFFICACY OF THIRD GRADE YOUTH PARTICIPANTS AND THEIR FAMILIES

A Thesis

Submitted to the Faculty

of

Purdue University

by

Matthew James Kararo

In Partial Fulfillment of the

Requirements for the Degree

of

Master of Science

December 2011

Purdue University

West Lafayette, Indiana

To my mother, who gave me the gift of science self-efficacy.

ACKNOWLEDGEMENTS

I thank God every day for my incredibly blessed life. I am merely along for the ride, and that is awesome. He has strengthened me and makes me want to be a better person every day. Johnny Cash (1932-2003) said it best: "The Master of Life's been good to me. He has given me strength to face past illnesses, and victory in the face of defeat. He has given me life and joy where other saw oblivion. He has given new purpose to live for, new services to render, and old wounds to heal. Life and love go on, let the music play."

My Family: I love you all very much. Mom, you are the reason I am a scientist. You carried me on bird walks when I was too small to walk, and spent endless hours reading to me. You set me on the path to higher education with the best home-school experience possible. Dad, you gave me the love of baseball, and thus the love of statistics. Without that, data analysis would have been much more foreign. Jennifer, your love of horses led me and Mom to Glacial Park, another key place in my scientific development. You are the best sister, and an inspiration to do my best, no matter what.

Elizabeth: You are the reason that I was meant to lose my assistantship, my advisor, my department, and my patience with grad school, all so I could wind up in YDAE. You have added so much to my life and make me complete. I love you so much. I will never be able to repay your love, for putting up with my craziness during this process, and believing in me even when I did not.

My Friends: "No man is a failure who has friends" is a quotation from one of my favorite movies, and it could not fit me better. Thank you all for believing in me and encouraging me to follow my goals. I hope that you all do the same!

Dr. Orvis: Thank you so much for being my advisor, and having faith in my abilities. I am honored to be your colleague and friend, and I look forward to working with you in the future. Thank you for being my bridge between the physical and social sciences. Without you, I would not have as strong of a connection to this project. Also, I want to thank you for being a sympathetic ear, no matter what the subject.

Dr. Knobloch: I want to thank you for keeping me at Purdue and adopting me into the YDAE program. I was an orphan without a home, and you took me in, all the while having faith in me and my academic abilities. Even though sometimes it feels like we speak different scientific languages (social and biological), you have immensely

improved my research abilities, and I look forward to learning more from you in the future.

Dr. Prokopy: Thank you so much for being one of my committee members! Your classes are still my favorites, and I will always know how to facilitate a discussion because of you. I also thank you for being the link back to my initial department. You run an amazing program single-handedly while producing some of the most vigorous research, and I look forward to working with you again in the future.

Grad Students: For those of you that were here when I transferred into YDAE, thank you for being the most welcoming and friendly department on campus. I am truly blessed to consider you among my friends. For those of you in the department now, I look forward to having fun with you all. Although grad school can be difficult, keep with it, and no matter how monumental of a task it may seem like, you can do it!

The rest of YDAE: Thank you to Terry for the chocolate breaks, help with paperwork, and encouragement to stick with it. Thanks to Jane for all her help with paperwork and logistics, I don't know how she does it! Thank you to Roger for providing professional educational opportunities. If I have forgotten anyone, don't feel left out, our paths will cross again!

TABLE OF CONTENTS

LIST OF TABLES

Table Page

Table Page

LIST OF FIGURES

Figure Page

ABSTRACT

Kararo, Matthew James. M.S., Purdue University, December 2011. A Collaborative Extension Garden-based School Nutrition Program: Measuring the Interests, Behaviors, and Self-efficacy of Third Grade Youth Participants and their Families. Major Professor: Kathryn Orvis.

Childhood obesity is a growing issue in Indiana and the United States as a whole. One step in reducing caloric intake is increasing consumption of fruits and vegetables. Eat Your Way to Better Health (EYWTBH) was a garden-based school nutrition program offered to third grade classrooms throughout the state of Indiana by the Cooperative Extension Service. The program aimed to increase youth fruit and vegetable consumption by implementing the Junior Master Gardener® curriculum along with supplementary materials and a school garden. The objectives of this study were to describe the relationships that may exist between youth fruit and vegetable consumption, personal variables such as self-efficacy, and environmental variables such as fruit and vegetable availability, as well as possible differences between pre- and post-program data in these variables. Data were collected from Spring 2009 to Fall 2010 using two different versions of the EYWTBH questionnaire, and analyzed by the author to explore the relationships and differences that may have been present. Three conclusions were made from the data analyses. The first conclusion was that there were 3 variables that had relationships with the dependent variable of youth post-program fruit and vegetable

consumption. The 3variables were youth pre-program fruit and vegetable consumption, youth post-program healthy food choice self-efficacy, and family post-program fruit and vegetable consumption. The second conclusion was that there was a statistically significant increase in youth healthy food choice self-efficacy upon completion of the EYWTBH program. The third conclusion was that youth reported an increase in diversity of fruit and vegetable consumption upon completion of the EYWTBH program. Implications for practice are developing the EYWTBH curriculum further to emphasize the dangers of junk food, increasing the volunteer training to maximize program implementation, and increasing parent/guardian involvement to maximize the education potential of EYWTBH. Suggestions for future research are implementation of the EYWTBH program in a quasi-experimental or experimental design so that impact claims can be made from the data analyses, considering additional theoretical frameworks such as the Theory of Planned Behavior, and replicating the study in different contexts to confirm findings.

CHAPTER ONE: INTRODUCTION AND REVIEW OF THE LITERATURE

Introduction

Statement of Problem

The level of fruit and vegetable consumption in America is very low, with only 14% of adults and 9.5% of adolescents consuming 2 or more servings of fruit and 3 or more servings of vegetables per day (*State Indicator Report on Fruits and Vegetables*, 2009). Numbers are even worse in Indiana, where only 8.8% of adolescents meet the 5-a-day recommendations (*State Indicator Report on Fruits and Vegetables*, 2009).

Significance of Problem

Obesity is a national health crisis in the United States. Currently 68% of American adults and 32% of youth are at least overweight (BMI > 85th percentile) (Flegal et al., 2010; Ogden et al., 2010). Insufficient consumption of fruits and vegetables may be a contributing factor in the growth of our cumulative national waistline. One promising intervention strategy that aims to influence multiple factors in youth fruit and vegetable consumption and reduce childhood obesity is garden-based school nutrition

programs. Previous studies have found that garden-based programs may actually increase the fruit and vegetable consumption of students (Cason, 1999; Heim, Stang, & Ireland, 2009; Hilgers, Haynes, & Olson, 2008; Robinson-O'Brien, Story, & Heim, 2009). Eat Your Way to Better Health (EYWTBH) aims to address the childhood obesity epidemic by increasing fruit and vegetable consumption, improving interest in healthy foods, and increasing self-efficacy towards healthy eating habits of third grade students in participating public and private Indiana schools. One of the unique elements of EYWTBH is the curriculum, which has been adapted from the National Junior Master Gardener® (JMG®) curriculum developed by Texas A&M. The JMG® program has a presence internationally because it is offered through Cooperative Extension partnerships, such as 4-H, as well as having established curricular materials that align with educational standards. Another unique aspect of the program is the assessment tool used to evaluate the EYWTBH program. Previous assessments of school nutrition programs in the scientific literature have looked at youth program participant fruit and vegetable consumption (Cason, 1999; Heim, Stang, & Ireland, 2009; Hilgers, Haynes, & Olson, 2008; Robinson-O'Brien, Story, & Heim, 2009), but none were found that evaluated both youth variables that may have a relationship with fruit and vegetable consumption, and parent/guardian variables that may have a relationship with youth fruit and vegetable consumption.

Purpose Statement

The Eat Your Way to Better Health program is an authentic educational and experiential approach that aims to increase youth fruit and vegetable consumption and improve their food choice behaviors. The purpose of this study was to describe differences between pre- and post-program data, as well as any relationships that may explain variance in youth fruit and vegetable consumption.

Research Questions

This study described the differences between pre- and post-program data, as well as relationships that explained variance in youth fruit and vegetable consumption. Data was collected from participants in the Eat Your Way to Better Health (EYWTBH) garden-based school nutrition program from Spring 2009 until Fall 2010 (4 semesters). This was accomplished through the administration of pre- and post-program questionnaires to both the youth participants and their parents/guardians. The study was guided by five research questions:

1. Did youth and family participants report more variety of fruit and vegetable consumption upon completion of the Eat Your Way to Better Health program?
2. Was youth healthy food choice self-efficacy higher upon completion of the Eat Your Way to Better Health program?
3. Did youth report an increase in their preferences to eat fruits and vegetables as snacks upon completion of the Eat Your Way to Better Health program?

4. Were youth more likely to talk to their friends about healthy food choices upon completion of the Eat Your Way to Better Health program?
5. What percentage of variance in youth post-program fruit and vegetable consumption was explained by the following independent variables—youth pre-program fruit and vegetable consumption, youth post-program healthy food choice self-efficacy, youth post-program interest in fruits and vegetables as a snack, youth post-program healthy food social intentions, family post-program fruit and vegetable consumption, and household fruit and vegetable availability.

Conceptual Framework

The conceptual framework for this study was constructed with the influences of Social Cognitive Theory (Bandura, 1977; Bandura, 1986; Bandura, 1989). A visualization of the conceptual framework is shown in Figure 1.

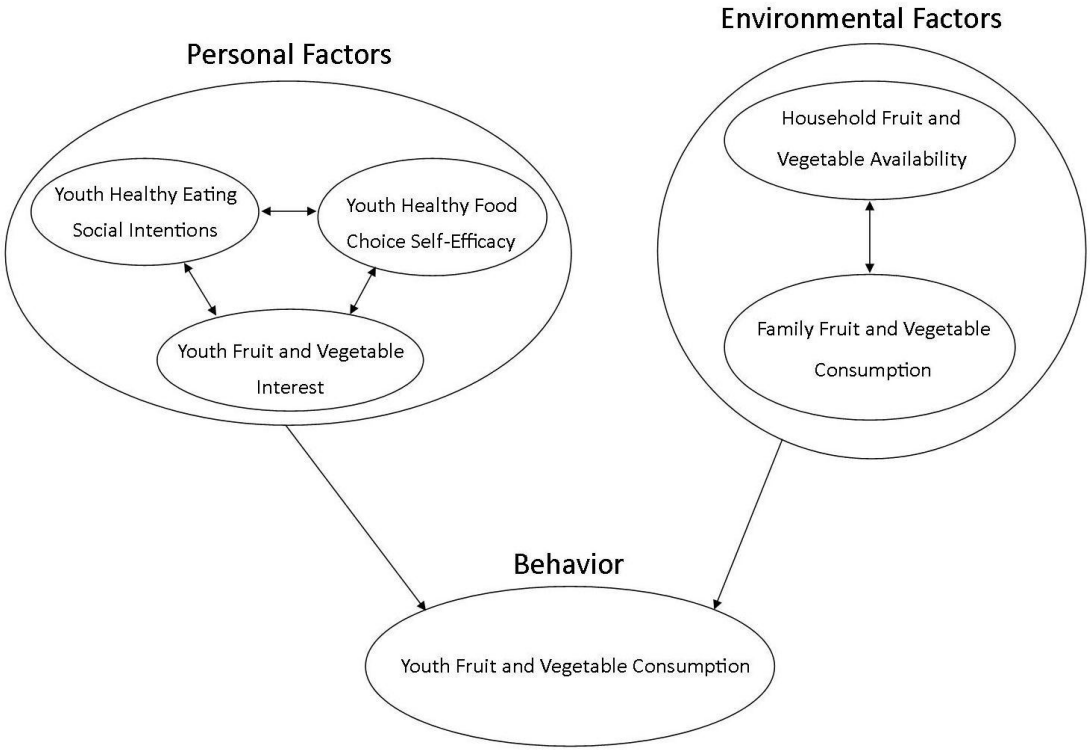


Figure 1. Conceptual framework for the Eat Your Way to Better Health questionnaires.

The researcher posits using the conceptual framework that the behavior of youth fruit and vegetable consumption may be influenced by multiple personal and environmental factors. The personal factors were operationalized as the interest/preferences of the youth with regards to fruits and vegetables, the social intentions of the youth with regards to talking to their friends and families about healthy eating habits, and the self-efficacy of the youth with regards to making healthy food choices. The environmental factors were operationalized as the household availability of fruits and vegetables, and the family fruit and vegetable consumption, both self-reported by parents/guardians. Besides these

variables possibly predicting variation in youth fruit and vegetable consumption, they are also at the same time interacting with one another within the personal and environmental variable groupings. This is by no means a comprehensive schematic of the variables involved in the food and nutrition behavior process; rather, it is a representation of the variables that were measured within the questionnaire administered before and after youth participation in the EYWTBH program.

The variables defined in the conceptual framework were targeted by the curriculum of the EYWTBH program. Fruit and vegetable consumption was directly targeted by the educators having the youth sample different and unusual types of fruits and vegetables that the youth may have never tried previously. The personal factors were targeted by EYWTBH through the use of in-classroom nutrition and plant science education, as well as by conducting hands-on experiments such as having the youth tend to a school garden. The environmental factors were targeted by EYWTBH through take-home nutrition education materials, such as healthy recipe cards, which could encourage dialogue between youth and their parent/guardian about the fruit and vegetable consumption of the parent, as well as the availability of fruits and vegetables in the household.

Theoretical Framework

The main influence on the EYWTBH program and the original questionnaire as well as subsequent versions was Social Cognitive Theory (SCT) (Bandura, 1977;

Bandura, 1986; Bandura, 1989). The main point of this theory is that learning, which is viewed as a change in the personal factor of knowledge, does not necessarily result in the targeted behavior change set out to be accomplished through education. In addition to a transfer of knowledge about how to exhibit a behavior, the person must also have a high enough level of self-efficacy about that behavior, which is a person's belief that they can do an action, to actually perform the behavior. The person must also be in an environment that does not discourage that behavior. For example, a person with unhealthy dietary habits may be educated about how to have a healthy diet, but if that person does not believe that they have the power to improve their eating habits, or is in an environment that does not encourage healthy eating, there may not be a change in their behavior. Therefore, only measuring knowledge differences leaves out critical areas in looking at the effectiveness of a nutrition education program. With this theoretical framework in mind, the questionnaire contained indices which pertained to personal variables, such as self-efficacy, and environmental variables, such as family behavior, and food availability. The parental aspect was one of the unique pieces of this study, because parents can be a major factor in the dietary habits of youth (Benson & Mokhtari, 2011; Benton, 2004; Birch & Fisher, 1998; Boutelle et al., 2007; Gillman et al., 2000; Mushi-Brunt, Haire-Joshu, & Elliott, 2007; Robinson-O'Brien et al., 2009; Scaglioni, Salvioni, & Galimberti, 2008; Taylor, Evers, & McKenna, 2005). However, the author was not able to identify a study that evaluated a program such as EYWTBH, which combined a garden-based school youth nutrition intervention offered through a partnership with the Cooperative Extension Service, and take-home materials that aimed to start discussions and educate parents.

Limitations of the Study

This study cannot be generalized to all youth nutrition education programs. It may only be generalized to programs that are similar to EYWTBH, which is comprised of authentic and experiential classroom nutrition education activities and a hands-on gardening component. Reliability of the survey instrument constructs could suffer if they were used in a different context. Due to the relatively short length of the program (8-10 weeks total), there may have been a threat to validity due to response bias. Also, due to the questionnaires being administered to youth in the classroom possibly by the educator that taught the EYWTBH program, there may have been a threat to validity due to the Hawthorne effect. One of the major limitations of the study was the survey instruments. The fruit and vegetable consumption indices measure weekly consumption, which may have led to inaccurate remembering by participants. The consumption index was also measured on an absolute scale (yes/no) instead of a frequency scale (if yes, how many?). The parent/guardian questionnaires may have also been a limitation. There was no way to know which parent/guardian completed the questionnaire, and if the person completing it was the primary food purchaser/decision-maker of the household. Another limitation is the statewide nature of the program. This may have led to differences in program and assessment implementation due to deviations from the standard protocol. One known limitation is with the parent/guardian data. In some counties, the parent/guardian questionnaires were not offered to the parents/guardians, thus losing their potential contribution to the data set.

Basic Assumptions of the Study

1. Participants provided answers to the best of their ability and knowledge and took the assessment seriously.
2. Participation in the study was voluntary and did not affect the academic grade of any students.
3. There was no control group, so data was interpreted as being collected using a pre-experimental design.
4. Pre-program and post-program assessment took place under equivalent environmental conditions.
5. Research biases were minimized due to the number of experts working on the data set and consulting throughout the analyses process.

Definitions

Effect size: A standardized measure of the magnitude of an observed difference (Field, 2009). This study utilized the Cohen's d measure (Cohen, 1988), which is the difference between means divided by standard deviation, and the r^2 measure, which is the correlation between variables squared.

Family fruit and vegetable consumption: The number of types of fruits and vegetables consumed by the family over the previous week. Answers were self-reported by the parent/guardian.

Healthy food choice self-efficacy: a context-specific measure of self-efficacy when faced with food choices, such as thinking one can make the decision to choose a piece of fruit over a candy bar as a snack.

Household fruit and vegetable availability: Items were selected if they were regularly available in the household to the youth.

Interest/preference in snacks: Items were selected if there was an interest in eating them as a snack, and not selected if there was no interest.

Youth fruit and vegetable consumption: The number of types of fruits and vegetables consumed by the youth over the previous week. Answers were self-reported by the youth.

Youth healthy eating social intentions: Youth were presented with a list of positive and negative statements and asked what they would tell their friends about eating fruits and vegetables.

Review of Literature

Obesity

Obesity, which is defined as having a body mass index (BMI = kg/m^2) above the 95^{th} percentile according to gender, height, and age (Allison et al., 1999; Goran, Ball, & Cruz, 2003), has become a national health crisis in the United States. Rates in the U.S. have increased amongst adults from a level of 13% in the 1960s to 34% in 2008 (Wang & Beydoun, 2007; Flegal et al, 2010). More disturbingly, 68% of American adults are at least overweight (BMI > 85^{th} percentile) (Flegal et al., 2010). Despite these startling statistics regarding adults, data is even more disturbing for the youth of the country, with obesity rates increasing three-fold in only thirty years to its current rate of 17% (Ogden et al, 2010). The current youth population that is at least overweight is 32% (Ogden et al., 2010).

The health problems for adults that are associated with a high BMI are illnesses that include Type 2 diabetes, hypertension, and cardiovascular disease, all of which are being observed in growing numbers in youth (Bloomgarden, 2004; Goran et al., 2003; Luma & Spiotta, 2006; Steinberger & Daniels, 2003). With this alarming trend, it is no wonder that 17.6% of the American Gross Domestic Product (GDP) ($8,086 per capita) was spend on health care expenditures in 2009, as compared to only 5.2% of the American GDP ($147 per capita) being spent on health care in 1960 (*National Health Expenditures Aggregate*, 2009).

The increase in obesity is concurrent with an increase in health care expenditures, which makes obesity not only an issue of physical health, but also economic health, with hospital costs of children relating to obesity reaching $127 million per year in 1999 (Wang & Dietz, 2002) and undoubtedly continuing to rise if trends continue along this same path.

Obesity can be directly attributed to approximately 300,000 deaths per year in adults (Allison et al., 1999). If the trends presented here do not change, this could be the first generation in modern times to have a shorter life expectancy than their parents (Olshansky et al., 2005).

Dietary Habits

Childhood obesity is a difficult and multifaceted issue with no simple solution. There are many factors that may determine the food choices that children make, including, but not limited to, the interest children have in the food (Birch & Fisher, 1998; Bower & Sandall, 2002; Brug et al., 2008; Nanney, Johnson, Elliott, & Haire-Joshu, 2007; Reniscow et al., 1997; Reynolds, Hinton, Shewchuk, & Hickey, 1999; Taylor, Evers, & McKenna, 2005), the availability of foods to children (Benton, 2004; Birch & Fisher, 1998; Blanchette & Brug, 2005; Bower & Sandall, 2002; Brug et al., 2008; Cullen, Bartholomew, Parcel, & Kok, 1998; Nanney, Johnson, Elliott, & Haire-Joshu, 2007; Reynolds, Hinton, Shewchuk, & Hickey, 1999; Robinson-O'Brien et al., 2009; Scaglioni, Salvioni, & Galimberti, 2008; Taylor, Evers, & McKenna, 2005; Vereecken,

Van Damme, & Maes, 2005), the self-efficacy of the children towards eating foods (Brug et al., 2008; Reynolds, Hinton, Shewchuk, & Hickey, 1999; Strecher, McEvoy DeVellis, Becker, & Rosenstock, 1986; Vereecken, Van Damme, & Maes, 2005), and the parental and peer influences on dietary decisions (Benton, 2004; Birch & Fisher, 1998; Blanchette & Brug, 2005; Boutelle et al., 2007; Bower & Sandall, 2002; Brug et al., 2008; Cullen, Bartholomew, Parcel, & Kok, 1998; Johnson, Smith, & Bruemmer, 2007; Libman, 2007; Nanney, Johnson, Elliott, & Haire-Joshu, 2007; Robinson-O'Brien et al., 2009; Scaglioni, Salvioni, & Galimberti, 2008). However, what must be looked at initially is what the dietary habits of American children are, and how they may be contributing to the obesity epidemic.

Calorie consumption by individuals over the age of two increased from an average intake of 1,876 in 1977 to 2,043 in 1995 (Lin, Guthrie, & Frazao, 1999). Also, during that same time period, the percentage of calories consumed away from home increased from 18% to 34%. Out of that 34%, more than a third of the calories consumed were from fast food. One possible reason for this increase in fast food consumption is a time crunch, which can be understood by statistics that showed that in 2002, only 7% of U.S. households were "traditional," meaning one-income homes where the husband works (*Types of U.S. Households*, 2002). The number of dual-income households with children is more than double that amount, being 16% of the total. Having a schedule where either both parents work, or the only parent works, could lead to an increase in consumption of convenient and speedy, albeit unhealthy, fast food. This is a problem in that it has been discovered in a previous study (Gillman et al., 2000) that family meals at

the dinner table are associated with increased consumption of fruits and vegetables as well as fewer unhealthy foods, so there needs to be an emphasis on eating healthier not only on the individual level, but also together at the family level whenever possible.

Availability of Fruits and Vegetables as an Influence on Dietary Habits

One of the possible hindrances to higher fruit and vegetable consumption is availability when compared to less healthy options (Blanchette & Brug, 2005; Brug et al., 2008; Croll, Neumark-Sztainer, & Story, 2001; French & Wechsler, 2004; Larson, Story, & Nelson, 2009; Nanney et al., 2007; Reynolds et al., 1999; Thompson et al., 2010; Winson, 2008). One of the main areas outside the home where healthy food options, such as fruits and vegetables, should be available is in schools. In Indiana, as well as the rest of the nation, school is where third-grade children spend a large part of their days for the majority of the year (*Frequently Asked Questions about Instructional Days and Time Requirements*, 2010). Therefore, a school should be a place that promotes a healthy lifestyle, especially in grade school, which is a crucial time for developing life-long nutritional behaviors and minimizing the risk of adult diet-related diseases (Dzewaltowski, Estabrooks, & Johnston, 2002; Taylor, Evers, & McKenna, 2005). However, this has not always been the case.

In 2007, only 32% of states required schools to prohibit calorie-dense low-nutrition foods in school stores, snack bars, and vending machines (O'Toole et al., 2007), while only one state prohibited advertising for candy, fast food restaurants, and soft

drinks on school property (O'Toole et al., 2007). This lack of policy with regards to the availability of calorie-dense foods was even more egregious when coupled with the statistics about the availability of fruit and vegetables at school meals at that time. In 2007, only two states required that schools offer a choice of two or more fruits or fruit juices for lunch, and, similarly, only two states required that schools offered a choice of two or more vegetables that are not fried for lunch (O'Toole et al., 2007).

In looking at recent developments in school food environments, there is hope that significant improvements are being made. Thanks in part to the "Let's Move" campaign and an overhaul of school food regulation the United States Government is beginning to address the child obesity issue. However, top-down legislative approaches alone cannot eradicate this health risk. There also needs to be grass-roots programs, such as EYWTBH, that are local and personal, to maximize the reduction of childhood obesity.

Benefits of Gardening

Lack of physical activity by children can lead to an unhealthy sedentary lifestyle, and thus, when coupled with an unhealthy diet, a greater risk of obesity and its associated diseases (Manson et al., 2004; Strong et al., 2005). In Indiana, 65.2% of high school youth do not attend physical education class in a typical week (CDC, 2009). The amount of screen time (watching television, movies, or playing video games) also can be seen as an indicator of the risk of leading a sedentary lifestyle. Youth ages 8-18 spend an average of 4.5 hours *per day* watching television, 1.5 hours *per day* on the computer, and

over an hour *per day* playing video games (Rideout, Foehr, & Roberts, 2010). That is an average of over seven hours *per day* of screen time, which, when coupled with a lack of physical education classes in schools, makes it difficult for youth to achieve the CDC's daily recommendation of at least 60 minutes of physical activity per day. That is indeed the case among high school students, with 82% of youth nationally and 77% of Hoosier youth not meeting the daily physical activity recommendation (CDC, 2009).

Gardening is an activity that can have many different impacts, one of the obvious being that it inherently has its participants being physically active. One ancillary benefit that is not trivial is that when students learn in a different context, such as in a school garden, it can increase their self-efficacy in relation to other school activities, and increase their sense of place at school (Hoffman, Knight, & Wallach, 2007). Gardening may have the impacts of increasing physical activity and mental health of participants, but when school or community gardens are coupled with formal classroom nutrition education, they may actually increase the consumption of fruits and vegetables of students (Cason, 1999; Heim, Stang, & Ireland, 2009; Hilgers, Haynes, & Olson, 2008; Robinson-O'Brien, Story, & Heim, 2009). This is why school gardening programs are seen as engaging and beneficial strategies that may increase the fruit and vegetable consumption of participants.

Social Cognitive Theory

The main theory influencing the EYWTBH program and survey instrument was Social Cognitive Theory (SCT) (Bandura, 1977; Bandura, 1986; Bandura, 1989). Bandura posited that behaviors are learned by observation, replication, and repetition. He also described behavior as having a relationship with personal and environmental factors. While the theory views knowledge as a personal factor and something that can be transferred by social means, SCT also states that a limitation in behavior is self-efficacy, or one's self confidence to perform the behavior. This means that even if a person has all the ability necessary to perform a behavior, if they do not think that they can perform the behavior, it is likely to not occur. The main contribution of SCT to this study was the majority of the variables on the survey instrument, including the personal and environmental factors.

Studies of youth fruit and vegetable consumption before and after participating in a garden-based youth nutrition program have been conducted previously using SCT (Blanchette & Brug, 2005; Domel et al., 1996; Dzewaltowski, Estabrooks, & Johnston, 2002; Geller et al., 2009; Morris & Zidenberg-Cherr, 2002; Resnicow et al., 1997; Reynolds et al., 1999; Rinderknecht & Smith, 2004; Stables et al., 2005), but they lack a connection with Extension and a parent evaluation component.

Related Studies

Results of school nutrition education programs in improving fruit and vegetable consumption have been modest. Day et al. (2008) found that a school-based classroom fruit and vegetable education intervention increased the fruit and vegetable intake of youth only .18 servings per day, but cite issues with implementation as the reason for this small increase. Indeed, Thomas (2006) found that the number one challenge to measuring the effectiveness of youth nutrition education programs is the range of doses that participants receive. Despite the challenges, some studies have found positive results. Taylor et al. (2007) studied a two year school nutrition education program longitudinally and found significant decreases in participant body mass a year after program implementation.

Multi-faceted approaches incorporating more than one avenue of education are another option for nutrition education, and their results have been encouraging. O'Brien et al. (2010) researched a whole-school effort to improve the health environment that included both classroom education and a change in food offerings. This study showed that the intervention not only decreased consumption of junk food, but also increased the level of physical activity.

Community-based programs such as the Girl Scouts have also addressed the youth nutrition issue by constructing incentivized programs (Cullen et al., 1998) which have revealed that personal and environmental factors influence fruit and vegetable consumption. Numerous types of youth nutrition programs exist in the literature, but interventions at multiple levels seem to have promise at having an increased impact

(Gentile et al., 2009). One of the most promising interventions is a program that incorporates gardening. Gardening reconnects youth with the natural process of how food is grown, and research on these types of programs have shown prodigious results. Mcaleese & Rankin (2007) studied a garden-based school nutrition program that doubled the fruit and vegetable consumption of participants. The Eat Your Way to Better Health (EYWTBH) program is a version of the latter type of nutrition education intervention, with it being conducted in schools, utilizing the gardening aspect of the intervention, but also having a community component through the connection to the Cooperative Extension Service.

References

Allison, D. B., Fontaine, K. R., Manson, J. E., Stevens, J., & VanItallie, T. B. (1999). Annual deaths attributable to obesity in the United States. *Journal of the American Medical Association*, *282*(16), 1530-1538.

Bandura, A. (1977). *Social learning theory*. Englewood Cliffs, NJ: Prentice Hall.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (1989). Human agency in social cognitive theory. *American Psychologist*, *44*(9), 1175-1184. doi: 10.1037/0003-066X.44.9.1175

Benson, L., & Mokhtari, M. (2011). Parental employment, shared parent–child activities and childhood obesity. *Journal of Family and Economic Issues*, *32*(2), 233-244. doi: 10.1007/s10834-011-9249-0

Benton, D. (2004). Role of parents in the determination of the food preferences of children and the development of obesity. *International Journal of Obesity*, *28*(7), 858-869. doi: 10.1038/sj.ijo.0802532

Birch, L. L., & Fisher, J. O. (1998). Development of eating behaviors among children and adolescents. *Pediatrics*, *101*, 539-549.

Blanchette, L., & Brug, J. (2005). Determinants of fruit and vegetable consumption among 6-12-year-old children and effective interventions to increase consumption. *Journal of Human Nutrition and Dietetics*, *18*(6), 431-443. doi: 10.1111/j.1365-277X.2005.00648.x

Bloomgarden, Z. T. (2004). Type 2 diabetes in the young: The evolving epidemic. *Diabetes Care*, *27*(4), 998-1010. doi: 10.2337/diacare.27.4.998

Boutelle, K., Birkeland, R., Hannan, P., Story, M., & Neumark-Sztainer, D. (2007). Associations between maternal concern for healthful eating and maternal eating behaviors, home food availability, and adolescent eating behaviors. *Journal of Nutrition Education and Behavior*, *39*(5), 248-256. doi: 10.1016/j.jneb.2007.04.179

Bower, J. A., & Sandall, L. (2002). Children as consumers - snacking behaviour in primary school children. *International Journal of Consumer Studies*, *26*(1), 15-26. doi: 10.1046/j.1470-6431.2002.00220.x

Brug, J., Tak, N. I., Te Velde, S. J., Bere, E., & De Bourdeaudhuij, I. (2008). Taste preferences, liking and other factors related to fruit and vegetable intakes among schoolchildren: results from observational studies. *British Journal of Nutrition*, *99*(S1), S7-S14. doi: 10.1017/S0007114508892458

Cason, K. L. (1999). Children are "growing healthy" in South Carolina. *Journal of Nutrition Education*, *31*(4), 235-236. doi: 10.1016/S0022-3182(99)70446-2

Center for Disease Control: Youth online-high school YRBS 2009 results. (2009). *Youth Online: High School Youth Risk Behavior Surveillance System*. Retrieved April 4, 2011, from http://apps.nccd.cdc.gov

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Hillsdale, NJ: L. Erlbaum Associates.

Croll, J. K., Neumark-Sztainer, D., & Story, M. (2001). Healthy eating: What does it mean to adolescents? *Journal of Nutrition Education*, *33*(4), 193-198. doi: 10.1016/S1499-4046(06)60031-6

Cullen, K. W., Bartholomew, L. K., Parcel, G. S., & Kok, G. (1998). Intervention mapping: Use of theory and data in the development of a fruit and vegetable nutrition program for Girl Scouts. *Journal of Nutrition Education*, *30*(4), 188-195. doi: 10.1016/S0022-3182(98)70318-8

Day, M. E., Strange, K. S., McKay, H. A., & Naylor, P. (2008). Action schools! BC-healthy eating effects of a whole-school model to modifying eating behaviours of elementary school children. *Canadian Journal of Public Health*, *99*(4), 328-331.

Domel, S., Thompson, W., Davis, H., Baranowski, T., Leonard, S., & Baranowski, J. (1996). Psychosocial predictors of fruit and vegetable consumption among elementary school children. *Health Education Research*, *11*(3), 299-308. doi: 10.1093/her/11.3.299

Dzewaltowski, D. A., Estabrooks, P. A., & Johnston, J. A. (2002). Healthy youth places promoting nutrition and physical activity. *Health Education Research, 17*(5), 541-551.

Field, A. P. (2009). *Discovering statistics using SPSS: (and sex and drugs and rock 'n' roll)*. Thousand Oaks, CA: SAGE Publications.

Flegal, K. M., Carroll, M. D., Ogden, C. L., & Curtin, L. R. (2010). Prevalence and trends in obesity among U.S. adults, 1999-2008. *Journal of the American Medical Association, 303*(3), 235-241. doi: 10.1001/jama.2009.2014

French, S., & Wechsler, H. (2004). School-based research and initiatives: Fruit and vegetable environment, policy, and pricing workshop. *Preventive Medicine, 39*, 101-107. doi: 10.1016/j.ypmed.2003.10.007

Frequently asked questions about instructional days And time requirements [PDF]. (2010, January 29). Indiana Department of Education.

Geller, K. S., Dzewaltowski, D. A., Rosenkranz, R. R., & Karteroliotis, K. (2009). Measuring children's self-efficacy and proxy efficacy related to fruit and vegetable consumption. *Journal of School Health, 79*(2), 51-57. doi: 10.1111/j.1746-1561.2008.00376.x

Gentile, D. A., Welk, G., Eisenmann, J. C., Reimer, R. A., Walsh, D. A., Russell, D. W., ... Fritz, K. (2009). Evaluation of a multiple ecological level child obesity prevention program: Switch what you do, view, and chew. *BMC Medicine, 7*(1), 49. doi: 10.1186/1741-7015-7-49

Gillman, M. W., Rifas-Shiman, S. L., Frazier, A. L., Rockett, H. R., Camargo, C. A., Field, A. E., ... Colditz, G. A. (2000). Family dinner and diet quality among older children and adolescents. *Archives of Family Medicine, 9*, 235-240.

Goran, M. I., Ball, G. D., & Cruz, M. L. (2003). Obesity and risk of Type 2 diabetes and cardiovascular disease in children and adolescents. *The Journal of Clinical Endocrinology & Metabolism,88*(4), 1417-1427.

Heim, S., Stang, J., & Ireland, M. (2009). A garden pilot project enhances fruit and vegetable consumption among children. *Journal of the American Dietetic Association, 109*(7), 1220-1226. doi: 10.1016/j.jada.2009.04.009

Hilgers, K. R., Haynes, C., & Olson, J. (2008). Assessing a garden-based curriculum for elementary youth in Iowa: Parental perceptions of change. *HortTechnology*, *18*(1), 18-23.

Hoffman, A. J., Morales Knight, L. F., & Wallach, J. (2007). Gardening activities, education, and self-esteem: Learning outside the classroom. *Urban Education*, *42*(5), 403-411. doi: 10.1177/0042085907304909

Johnson, D., Smith, L., & Bruemmer, B. (2007). Small-grants programs: Lessons from community-based approaches to changing nutrition environments. *Journal of the American Dietetic Association*,*107*(2), 301-305. doi: 10.1016/j.jada.2006.11.011

Larson, N. I., Story, M. T., & Nelson, M. C. (2009). Neighborhood environments: Disparities in access to healthy foods in the U.S. *American Journal of Preventive Medicine*, *36*(1), 74-81.e10. doi: 10.1016/j.amepre.2008.09.025

Libman, K. (2007). Growing youth growing food: How vegetable gardening influences young people's food consciousness and eating habits. *Applied Environmental Education & Communication*,*6*(1), 87-95. doi: 10.1080/15330150701319388

Lin, B., Guthrie, J., & Frazao, E. (1999). *Nutrient contribution of food away from home* [PDF]. Washington D.C.: U.S. Department of Agriculture, Economic Research Division.

Luma, G. B., & Spiotta, R. T. (2006). Hypertension in children and adolescents. *American Family Physician*, *73*(9), 1558-1568.

Manson, J. E., Skerrett, P. J., Greenland, P., & VanItallie, T. B. (2004). The escalating pandemics of obesity and sedentary lifestyle: A call to action for clinicians. *Archives of Internal Medicine*, *164*, 249-258. doi: 10.1001/archinte.164.3.249

Mcaleese, J., & Rankin, L. (2007). Garden-based nutrition education affects fruit and vegetable consumption in sixth-grade adolescents. *Journal of the American Dietetic Association*, *107*(4), 662-665. doi: 10.1016/j.jada.2007.01.015

Morris, J., Briggs, M., & Zidenberg-Cherr, S. (2002). Nutrition to grow on: A garden-enhanced nutrition education curriculum for upper-elementary schoolchildren. *Journal of Nutrition Education and Behavior*, *34*(3), 175-176. doi: 10.1016/S1499-4046(06)60088-2

Morris, J. L., & Zidenberg-Cherr, S. (2002). Garden-enhanced nutrition curriculum improves fourth-grade school children's knowledge of nutrition and preferences for some vegetables. *Journal of the American Dietetic Association*, *102*(1), 91-93. doi: 10.1016/S0002-8223(02)90027-1

Mushi-Brunt, C., Haire-Joshu, D., & Elliott, M. (2007). Food spending behaviors and perceptions are associated with fruit and vegetable intake among parents and their preadolescent children. *Journal of Nutrition Education and Behavior*, *39*(1), 26-30. doi: 10.1016/j.jneb.2006.06.004

Nanney, M., Johnson, S., Elliott, M., & Haire-Joshu, D. (2007). Frequency of eating homegrown produce is associated with higher intake among parents and their preschool-aged children in rural Missouri. *Journal of the American Dietetic Association*, *107*(4), 577-584. doi: 10.1016/j.jada.2007.01.009

National health expenditures aggregate, per capita amounts, percent distribution, and average annual percent growth, by source of funds: Selected calendar years 1960-2009 [PDF]. (2009). Centers for Medicare & Medicaid Services, Office of the Actuary, National Health Statistics Group; U.S. Department of Commerce, Bureau of Economic Analysis; and U.S. Bureau of the Census.

O'Brien, L. M., Polacsek, M., MacDonald, P. B., Ellis, J., Berry, S., & Martin, M. (2010). Impact of a school health coordinator intervention on health-related school policies and student behavior. *Journal of School Health*, *80*(4), 176-185.

Ogden, C. L., Carroll, M. D., Curtin, L. R., Lamb, M. M., & Flegal, K. M. (2010). Prevalence of high body mass index in U.S. children and adolescents, 2007-2008. *Journal of the American Medical Association*, *303*(3), 242-249.

Olshansky, S. J., Passaro, D. J., Hershow, R. C., Layden, J., Carnes, B. A., Brody, J., ... Ludwig, D. S. (2005). A potential decline in life expectancy in the United States in the 21st century. *New England Journal of Medicine*, *352*(11), 1138-1145. doi: 10.1056/NEJMsr043743

O'Toole, T. P., Anderson, S., Miller, C., & Guthrie, J. (2007). Nutrition services and foods and beverages available at school: Results from the school health policies and programs study 2006. *Journal of School Health*, *77*(8), 500-521. doi: 10.1111/j.1746-1561.2007.00232.x

Resnicow, K., Davis-Hearn, M., Smith, M., Baranowski, T., & Et al. (1997). Social-cognitive predictors of fruit and vegetable intake in children. *Health Psychology*, *16*(3), 272-276. doi: 10.1037//0278-6133.16.3.272

Reynolds, K. D., Hinton, A. W., Shewchuk, R. M., & Hickey, C. A. (1999). Social cognitive model of fruit and vegetable consumption in elementary school children. *Journal of Nutrition Education*,*31*(1), 23-30. doi: 10.1016/S0022-3182(99)70381-X

Rideout, V. J., Foehr, U. G., & Roberts, D. F. (2010, January). *Generation M2: Media in the lives of 8-to 18-year-olds* [PDF]. Menlo Park, California: Henry J. Kaiser Foundation.

Rinderknecht, K., & Smith, C. (2004). Social cognitive theory in an after-school nutrition intervention for urban Native American youth. *Journal of Nutrition Education and Behavior*, *36*(6), 298-304. doi: 10.1016/S1499-4046(06)60398-9

Robinson-O'Brien, R., Neumark-Sztainer, D., Hannan, P. J., Burgess-Champoux, T., & Haines, J. (2009). Fruits and vegetables at home: Child and parent perceptions. *Journal of Nutrition Education and Behavior*, *41*(5), 360-364. doi: 10.1016/j.jneb.2008.08.003

Robinson-O'Brien, R., Story, M., & Heim, S. (2009). Impact of garden-based youth nutrition intervention programs: A review. *Journal of the American Dietetic Association*, *109*(2), 273-280. doi: 10.1016/j.jada.2008.10.051

Scaglioni, S., Salvioni, M., & Galimberti, C. (2008). Influence of parental attitudes in the development of children eating behaviour. *British Journal of Nutrition*, *99*(S1), S22-S25. doi: 10.1017/S0007114508892471

Stables, G. J., Subar, A. F., Patterson, B. H., & Dodd, K. (2002). Changes in vegetable and fruit consumption and awareness among U.S. adults: Results of the 1991 and 1997 5-a-day for better health program surveys. *Journal of the American Dietetic Association*, *102*(6), 809-817. doi: 10.1016/S0002-8223(02)90181-1

State indicator report on fruits and vegetables, 2009 [PDF]. (2009). Center for Disease Control.

Steinberger, J., & Daniels, S. R. (2003). Obesity, insulin resistance, diabetes, and cardiovascular risk in children. *Circulation*, *107*, 1448-1453.

Strecher, V. J., McEvoy DeVellis, B., Becker, M. H., & Rosenstock, I. M. (1986). The role of self-efficacy in achieving health behavior change. *Health Education & Behavior*, *13*(1), 73-92. doi: 10.1177/109019818601300108

Strong, W. B., Malina, R. M., Blimkie, C. J., Daniels, S. R., Dishman, R. K., Gutin, B., ... Trudeau, F. (2005). Evidence based physical activity for school-age youth. *The Journal of Pediatrics*, *146*, 732-737. doi: 10.1016/j.jpeds.2005.01.055

Taylor, J. P., Evans, S., & McKenna, M. (2005). Determinants of healthy eating in children and youth. *Canadian Journal of Public Health*, *96*(3), S20-S26.

Taylor, R. W., McAuley, K. A., Barbezat, W., Strong, A., Williams, S. M., & Mann, J. I. (2007). APPLE project: 2-y findings of a community-based obesity prevention program in primary school–age children. *American Journal of Clinical Nutrition*, *86*(3), 735-742.

Thomas, H. (2006). Obesity prevention programs for children and youth: Why are their results so modest? *Health Education Research*, *21*(6), 783-795.

Thompson, O. M., Yaroch, A. L., Moser, R. P., Finney Rutten, L. J., & Agurs-Collins, T. (2010). School vending machine purchasing behavior: Results from the 2005 YouthStyles survey. *Journal of School Health*, *80*(5), 225-232.

Types of U.S. households, 2002 [PDF]. (2003, March). AmeriStat, analysis of data from the 2002 Current Population Survey.

Vereecken, C., Vandamme, W., & Maes, L. (2005). Measuring attitudes, self-efficacy, and social and environmental influences on fruit and vegetable consumption of 11- and 12-year-old children: Reliability and validity. *Journal of the American Dietetic Association*, *105*(2), 257-261. doi: 10.1016/j.jada.2004.11.008

Wang, G., & Dietz, W. H. (2002). Economic burden of obesity in youths aged 6 to 17 years: 1979-1999. *Pediatrics*, *109*(5), 1-6. doi: 10.1542/peds.109.5.e81

Wang, Y., & Beydoun, M. A. (2007). The obesity epidemic in the United States gender, age, socioeconomic, racial/ethnic, and geographic characteristics: A systematic review and meta-regression analysis. *Epidemiologic Reviews*, *29*(1), 6-28. doi: 10.1093/epirev/mxm007

Winson, A. (2008). School food environments and the obesity issue: Content, structural determinants, and agency in Canadian high schools. *Agriculture and Human Values*, *25*(4), 499-511. doi: 10.1007/s10460-008-9139-8

CHAPTER TWO: METHODS, RESULTS, AND DISCUSSION

Researcher's Paradigm

The paradigm of the researcher was positivism (Ayer, 1959; Comte, 1868). This paradigm states that there is one true reality, and that it can be observed. Crucial to this paradigm is scientific validity of the study methodology, both internal and external. An objective view is always the goal of the positivist paradigm to go along with minimizing any possible biases that may unknowingly skew the data and its interpretation.

Research Design

The research questions were to (1) determine if youth and family participants reported more variety of fruit and vegetable consumption upon completion of the Eat Your Way to Better Health program, (2) determine if youth healthy food choice self-efficacy was higher upon completion of the Eat Your Way to Better Health program, (3) determine if youth reported an increase in their interests/preferences to eat fruits and vegetables as snacks upon completion of the Eat Your Way to Better Health program, (4) determine if youth were more likely to talk to their friends about healthy food choices upon completion of the Eat Your Way to Better Health program, and (5) determine what percentage of variance in youth post-program fruit and vegetable consumption was

explained by the following independent variables—youth pre-program fruit and vegetable consumption, youth post-program healthy food choice self-efficacy, youth post-program interest/preferences in fruits and vegetables as a snack, youth post-program healthy food social intentions, family post-program fruit and vegetable consumption, and household post-program fruit and vegetable availability.

This was accomplished by assessing the behaviors, interest, and self-efficacy of the youth participants, as well as the behaviors, interest, and knowledge of the participant's parents/guardians, via a pre- and post-program questionnaire administered before and after the EYWTBH program. The questionnaire was developed by experts in the field of evaluation, analyzed for content validity (Light, 2007), and field tested for face validity among 7-10 year old children. This study did not have a true control group and thus was conducted using a pre-experimental design. The study was conducted across three school years (six semesters) from 2008 to 2011. Changes in interest, behaviors, self-efficacy, and knowledge were deemed statistically significant if $p < 0.05$. The lessons and activities for the EYWTBH program were adapted from the National Junior Master Gardener® (JMG®) curriculum originally developed by Texas A&M University. Lessons and activities (including assessments) were tailored to fit one period of classroom time so that applicability across the state could be maximized.

Intervention

The EYWTBH program was offered in third grade classrooms across the state of Indiana through Purdue University and the Cooperative Extension Service. Materials such as lessons and handouts were taken from the JMG® curriculum as originally developed by Texas A&M University, and a previous pilot test (Light, 2007). The EYWTBH program was developed to be an authentic learning experience as defined by Newmann (1996) with construction of nutrition knowledge, disciplined inquiry into nutrition and plant science, and adding value beyond the classroom by connecting food choices and nutrition to the household and family. Knobloch (2003) extends Newmann's definition to include experiential learning through authentic activities. Therefore, due to the authentic activity-based nature of EYWTBH, the program is both experiential and authentic. The greatest emphasis in the EYWTBH curriculum was put on the value of the program beyond school, by connecting the problem of unhealthy eating to the households of the youth, and including an audience beyond the classroom through the use of take-home educational materials targeted at parents/guardians.

Indiana Academic Standards in the areas of third grade Language Arts, Science, Social Studies, and Math were matched by the activities in the program. The specific standards that were matched by activities can be seen in Appendix A. Participation in the program was on a voluntary basis. County Extension Educators that wanted to offer the program signed up through the project coordinator after attending a training session. The Extension Educators then partnered with school principals and classroom educators.

The EYWTBH program took place as part of a normal school day once a week for at least an hour. The classroom educators were required to cover at least six of the topics from which they took their pick of EYWTBH activities. Examples of topics and activities can be seen in Table 1.

Table 1

EYWTBH Chapter Topic and Activity Examples

Chapter Topic	Activity Examples	Activity Descriptions
Plant Growth and Development	Hamburger Plant	Raise awareness of plants as the originator of most food
Soils and Water	Nutrient Variable	Use the scientific method to look at the effects of fertilizer on plant growth
Ecology and Environmental Horticulture	Nature Class Web	Create a web to understand the connectivity of life on Earth
Insects and Diseases	Insect Symmetry	Introduce the concept of symmetry in nature
Landscape Horticulture	Nature Wheels	Build a color wheel from items found in nature
Fruits and Nuts	Fruit and Veggie Lab	Define fruit and exploring cultural and scientific differences in definitions
Vegetables and Herbs	Make Your Pick	Select appropriate crops for planting based on season
Life Skills and Career Exploration	Watch Me Grow	Discuss short-term and long-term goals

The educators then taught the chosen classroom activity curriculum. In addition to classroom activities, a school garden was started as part of the EYWTBH program. The gardening component was either a raised bed outdoor garden or indoor container garden. The variation in gardening occurred due to the program being offered statewide, and thus, a large variation in frost dates and other weather conditions. Youth participants monitored and tended to the garden throughout the week. The EYWTBH program followed this protocol for a length of eight to ten weeks.

Setting and Participants

Eat Your Way to Better Health was a garden-based school nutrition program that was designed to increase fruit and vegetable consumption and healthy eating habits in both youth participants and their families. The program was funded from 2008-2009 and 2010-2011 by a grant from the Indiana State Department of Health (ISDH). Activities and lessons within the program were designed to educate the youth participants about the benefits of eating healthy and gardening. Take-home materials were geared to engage youth in meaningful discussions with their families about meeting recommended daily amounts of fruit and vegetable consumption and minimizing the intake of calorie-dense snack foods.

Youth participants in the EYWTBH program and their parents/guardians were the target audience for this survey-based study. The program was offered in third grade school classrooms across the state of Indiana through a partnership between classroom

educators, school principals, and Purdue University Cooperative Extension Service via county Extension Educators. The program was offered every semester between the Fall of 2008 until the Spring of 2011. Counties had the option of participating each semester, or once per year. The 3rd grade youth were between 7 and 10 years of age.

Demographic questions were only asked in one of the semesters, the fall of 2010, due to an omission in the previous iteration of the survey instrument. Thus, all of the responses to these questions are only from the Fall 2010 semester and Version 3 survey data set.

Out of the total number of youth participants, 222 answered a question that asked them to self-identify their race. Parents/guardians were also asked the same racial demographic question, with 117 responses. The results can be seen in Table 2.

Table 2

Summarized Racial Demographic Responses for Version 3 data

Fall 2010 Semester	African-American	American Indian	Asian	Pacific Islander	Hispanic	White, not Hispanic	More than one race
Youth (N = 222)	10	16	1	3	1	172	19
Parent (N = 117)	0	0	0	0	0	114	3

The results show that the majority (around 78%) of participants self-identified as "white, not Hispanic." This is consistent with the composition of Indiana as a whole, which was around 82% white at the time of the 2010 census.

Parents/guardians were also asked to identify their level of household annual income. Out of the total parent/guardian surveys collected, 108 answered this question. The summarized results for this question can be seen in Table 3.

Table 3

Summarized Household Annual Income Responses for Version 3 data

Fall 2010 Semester Parents/ Guardians (N = 108)	$0-$20,000	$20,001-$40,000	$40,001-$60,000	$60,001-$80,000	$80,001-$100,000	$100,001 and up
	12	22	21	27	13	13

The median household income in the sample was the bracket of $40,001-$60,000. This is consistent with Indiana as a whole, where the median household income is $45,000.

In addition to the income question, parents/guardians were also asked to report their level of education. Out of the total parent/guardian surveys collected, 119 answered this question. The summarized results for this question can be seen in Table 4.

Table 4

Summarized Parent/Guardian Participant Education Level Responses for Version 3 data

Fall 2010 Semester	Grade/middle school	High School	2-year college degree	4-year college degree	Graduate degree
Parents/ Guardians (N = 119)	5	47	26	20	21

The majority of respondents had a maximum education level of high school. One interesting result is that more respondents had graduate degrees than undergraduate degrees.

Both the youth participants and their parents/guardians were asked to describe the location of their residence to obtain another demographic variable. The summarized self-reported statistics can be seen in Table 5.

Table 5

Summarized Location of Residence Demographic Responses for Version 3 data

Fall 2010 Semester	On a Farm	Small Town (<10,000 people)	Medium City (between 10,000 and 50,000 people)	Suburb of a city with >50,000 people	Large City with >50,000 people	Very Large City with >100,000 people
Youth (N = 218)	78	103	16	2	15	4
Parent (N = 119)	33	53	23	3	7	0

The majority of responses from both youth and parents were that they lived in a small town. Another popular response was that that the respondent lived on a farm.

Statistics relating to the response rate for youth with regards to the pre-test are not known. This is due to the fact that although the completion of the questionnaires was not mandated for participation in the program, per IRB regulations, records were not kept by county Extension Educators or their cooperating classroom educators of youth who opted out. Attrition rates are calculated between the pre and post questionnaires for youth. Parental/guardian response rates are also calculated by comparing their amount of response with that of youth. The summarized response statistics can be seen in Table 6.

Table 6

Summarized Number of Participant Responses (N) for EYWTBH Questionnaires

Survey Instrument	Youth Pretests	Youth Posttests	Parent Pretests	Parent Posttests	Matched Youth Pairs (pre-post)	Matched Parent Pairs (pre-post)
Iteration 2 (Spring 2009, Fall 2009, Spring 2010)	919	824	595	407	788	352
Iteration 3 (Fall 2010)	217	177	131	102	168	87

There were more youth respondents in both the Version 2 (N = 919) and Version 3 (N = 217) pre-program data than in both the Version 2 (N = 824) and Version 3 (N = 177) post-program data.

Anonymity of students and parents was achieved through the use of identification codes that allowed for the matching of pre/post and youth/parent surveys without using names. Despite the best efforts of those involved in the program, there was some loss of data due to variables beyond the control of the researcher. Examples include youth switching schools during the program, loss of the survey by parents or youth, incomplete answers on pre or post surveys, lack of parental/guardian participation in the survey, and mistakes in or lack of identification codes on the surveys. Due to the statistical analysis that was performed, any lack of pre-post matching data required that those cases be excluded.

Human Subjects Review

The EYWTBH program protocol has been submitted to and approved by the Purdue University Institutional Review Board, Protocol # 0609004381. This research was classified under the exempt category of human subject research due to the anonymity of the data and the program being used as part of a regular third grade education curriculum.

Procedure

The first step in the implementation of the EYWTBH program was to offer a training session to Extension Educators who were interested in offering the program to

third grade classrooms in their county. Three trainings were offered in the summer of 2008, with one being in the northern part of Indiana and two in the central location of Indianapolis. This was necessary due to the newness of the program. One training session was offered in the summer of 2009 in Indianapolis and one session once again in the summer of 2010 in the same location.

The training sessions were all-day events, beginning in the morning with a presentation about the Junior Master Gardener® program. The potential benefits of the program, such as an increase in nutrition knowledge, and an improvement in learning by being in a contextualized garden environment, were discussed. It was also discussed that the EYWTBH topics are taken from this curriculum, and how the activities that were selected were appropriate for third grade students. Educators were then walked through the use of the survey instrument (including Scantron sheets in 2010 training), both pre and post. This included instructing them to assign identification numbers to each student/parent pair, read each question and all possible answers out loud to the students to minimize confusion, give plenty of time for the students to complete the questionnaire, and offer an incentive of recipe card packs for the parents to complete their questionnaires. The rest of the training session involved the Extension Educators breaking into small groups and participating in possible EYWTBH activities. The educators learned the objectives of the activities, completed the activities, and participated in a group discussion about the strengths and possible issues with each activity. Gardening supplies, such as trowels, raised bed edges, and seeds, were also passed out to educators at the training to save shipping costs.

After attending the training, the county Extension Educators contacted and cooperated with local schools to offer the EYWTBH program either during the following fall or spring semester. Consent forms were signed by the cooperating school principals and classroom educators, and were kept on file at Purdue University.

An example timeline can be seen in Table 7. The pre-program questionnaire was administered to the third grade youth participants prior to the first EYWTBH classroom lesson. The researcher sent out the questionnaires in electronic form to all participating county Extension Educators. Questionnaires were then distributed to the youth participants by the county Extension Educator in conjunction with the classroom educator. Youth were given a reasonable amount of time to complete the questionnaire, and reassured that their class grade would not be affected by their participation. After completion of the youth pre-program questionnaire, the pre-program questionnaire for the parents/guardians was given to the students to take home, along with information about the program, with instructions for the parent/guardian to complete and return the questionnaire to the classroom with the student within the next week.

Table 7

Example EYWTBH Program Timeline

Number of weeks	Portion of EYWTBH program
1	Pre-program questionnaire & start garden
6	EYWTBH classroom and garden-based lessons
1	Post-program questionnaire

The EYWTBH lessons were taught through cooperation between the Extension educators and classroom educators, with at least one hour of classroom time per week for at least six weeks being dedicated to the program. In addition to the authentic and experiential learning taking place during the hands-on activities, each lesson contained take-home activities that aimed to engage the parents/guardians in the learning process by having meaningful conversations with their child about food and healthy living. The classroom gardening component was started at the beginning of the length of the program, whether it was outdoors or in the classroom itself under full-spectrum lighting. Quick growing seeds were used, such as peas, lettuces, beans, radishes and spinach, so that the youth could have the fullest gardening experience, such as planting, watering, weeding, and harvesting, during the length of the program.

The post-program questionnaire for *parents* was given to the youth one week prior to the completion of the program, along with instructions to complete and return the questionnaire within a week. As a bonus, upon returning the post-program questionnaire,

the parents were given a pack of EYWTBH-branded recipe cards containing healthy meal and snack ideas. As per IRB regulations, the non-respondent parents/guardians could also receive a recipe card pack if requested.

After the EYWTBH program was completed, the post-program questionnaire was administered to the youth participants in the classroom during the next week by either the Extension Educators or the classroom educators, or a combination of the two. In an identical manner to the pre-program questionnaire, the youth were given ample time to complete the questionnaire, and were reassured that their class grade was not affected by their participation. After completion of the post-program questionnaire, the students received EYWTBH certificates of completion from Purdue University.

County Extension Educators were instructed to keep together the pre and post program questionnaires for both the youth and parents/guardians so that cases could be assembled. All of the questionnaires were then sent to the researcher so that data could be compiled and analyzed.

Survey Instrument Development

The instruments used for the youth and parent pre- and post-program questionnaires were adapted from previously validated questionnaires (Baranowski, 2003; Domel et al., 1996; Jago et al., 2006; Light, 2007; Watson, Baranowski, & Thompson, 2006; Watson et al., 2006) and the theoretical and conceptual framework described in Chapter One. The original instrument was used for a pilot test of the

EYWTBH program and contained both qualitative and quantitative items (Light, 2007). That instrument was edited by experts in the field of youth development, horticulture, and family services, to create the second iteration that was used from the fall of 2008 to the spring of 2010. The author then edited the previously used second iteration of the questionnaire, adding modifications for ease of use, and used the new questionnaire in its third iteration in the fall of 2010. Modifications included the addition of fruit and vegetable items to previously existing indices to increase the comprehensive nature of the questionnaire, the addition of pictures to each fruit and vegetable item to decrease possible error due to misunderstandings and low literacy issues, and the use of Scantron sheets for questionnaire answers to minimize the labor involved in data compilation and analysis. The use of the different Versions of the survey instrument can be seen in Table 8.

Table 8

Survey Instrument Version Timeline

Survey Instrument Version	Semesters Used
1	Fall 2007 & Spring 2008 (EYWTBH pilot test)*
2	Fall 2008, Spring 2009, Fall 2009, Spring 2010
3	Fall 2010

*Not analyzed in this study (Light, 2007).

The contents of iteration 3 (Fall 2010) of the youth questionnaire (138 total items) are summarized below in Table 9. The current version (iteration 3) of the pre and post program questionnaires for both the youth and parents/guardians can be seen in Appendix B.

Table 9

Version 3 Youth Questionnaire Item Descriptions

Variables	Number of Items
Fruit consumption in the past week	20
Interest in eating and trying different fruits and vegetables	2
Vegetable consumption in the past week	21
Youth perception of parents'/guardians' interest in eating fruits and vegetables	2
Daily fruit and vegetable consumption	1
How often the youth talk to their parents about what they learn in school	1
Self-efficacy pertaining to healthy eating habits	11
What youth have been told by their parents about fruits and vegetables	7
Interest in eating fruits as a snack	20
How much the youth have talked to their parents about the school gardening program (only on post-program)	7
Interest in eating vegetables as a snack	13
What the youth would tell their friends about EYWTBH (only on post-survey)	8
Interest in eating other foods (not fruits or vegetables) as a snack	17
What the youth would tell their friends about eating fruits and vegetables	9
Gardening interest and gardening behavior	12
Demographic information (gender, age, race, size of hometown)	4
Use of fruits and vegetables in the previous night's dinner	1

Student and parent/guardian data were collected before and after the implementation of the Eat Your Way to Better Health garden-based school nutrition program in public and private third grade classrooms across the state of Indiana. A pre- and post-questionnaire was used to garner the data. Over the length of the program, three successive versions of the questionnaires evolved.

The original version of the questionnaires was developed for a thesis project (Light, 2007) and pilot-tested to confirm reliability of the synthesized questions which were a combination of previously existing indices (Baranowski, 2003; Domel et al., 1996; Jago et al., 2006; Light, 2007; Watson, Baranowski, & Thompson, 2006; Watson et al., 2006) and original questions. This version of the survey contained both quantitative and qualitative questions. Due to the fact that the data from this version of the questionnaire was not analyzed by the author, the first iteration will not be discussed in detail.

The second version of the questionnaires was developed in 2009 from the first version by faculty members with expertise in educational psychology and youth motivation (Dr. Neil Knobloch), horticulture (Dr. Kathryn Orvis), food and nutrition (Donna Vandergraff, Laura Palmer, & Angie Abbott), consumer and family science (Karen Zotz), and the Cooperative Extension Service (Dr. Renee McKee) at Purdue University. Face and content validity was established by these experts, and most of the qualitative questions were turned into quantitative questions. This was done to increase the ease of use and data analysis.

Quantitative methods were used to determine the youth interest, self-efficacy, and behaviors pertaining to gardening, fruit and vegetable consumption, and snacking. The same methods were used to determine the parent/guardian knowledge, interest, and behaviors pertaining to gardening, fruit and vegetable consumption, and snacking.

Cronbach's alpha was used to compute reliability coefficients (Table 10). Internal consistency was at least acceptable for all indices except for family fruit consumption and family vegetable consumption, which were mostly at the questionable level. However, when those scales are combined into family fruit and vegetable consumption, the internal reliabilities increase to the acceptable and good range.

Table 10

Index reliability (Cronbach's alpha) for Version 2 and Version 3 survey instruments

Index	Version 2		Version 3	
	Pre	Post	Pre	Post
Youth self-reported fruit consumption behavior	α = .84	α = .85	α = .82	α = .84
Youth self-reported vegetable consumption behavior	α = .82	α = .85	α = .84	α = .80
Family fruit consumption behavior self-reported by parents	α = .62	α = .66	α = .67	α = .66
Family vegetable consumption behavior self-reported by parents	α = .62	α = .63	α = .74	α = .67
Youth self-reported self-efficacy for food choices and habits	α = .86	α = .88	α = .82	α = .86
Youth self-reported fruit snack interest	α = .82	α = .85	α = .89	α = .91
Youth self-reported vegetable snack interest	α = .80	α = .79	α = .82	α = .86
Youth self-reported junk food snack interest	α = .92	α = .91	α = .92	α = .92
Youth self-reported healthy eating social intentions	α = .83	α = .90	α = .87	α = .91
Household fruit and vegetable availability self-reported by parents	α = .84	α = .86	α = .85	α = .79
Family fruit and vegetable consumption self-reported by parents	α = .73	α = .77	α = .81	α = .79

α = Cronbach's alpha. Scale for Cronbach's alpha is .5 > α = unacceptable; .6 > α >.5 = poor; .7 > α >.6 = questionable; .8 > α >.7 = acceptable; .9 > α >.8 = good; α ≥.9 = excellent.

The following description of the questionnaire contents is for the latest version (Version 3), which was used in the fall of 2010. The differences between version 2, which was used in the spring of 2009, the fall of 2009, and the spring of 2010, and version 3, are the addition of more items to fruit, vegetable, and other snack food indices, clarification of the language used in the questions, addition of pictures to all fruit, vegetable, and other snack food items, the formatting change from survey-based answers to the use of Scantron sheets, and the addition of demographic questions. All content on version 2 of the survey is present on version 3, although the vernacular and vocabulary of the self-efficacy items were modified to increase question clarity. Version 2 can be seen in Appendix C. Version 3 can be seen in Appendix B.

Questionnaire items were grouped into five major categories, which are shown in Table 11.

Table 11

Questionnaire item groupings

Item Category	Questionnaires
Youth Fruit and Vegetable Consumption	Youth Pre, Youth Post
Youth Healthy Food Choice Self-efficacy	Youth Pre, Youth Post
Youth Interest/Preferences in Fruits and Vegetables as Snacks	Youth Pre, Youth Post
Fruit and Vegetable Availability in the Home	Parent Pre, Parent Post
Family Fruit and Vegetable Consumption	Parent Pre, Parent Post

The behavior sections of the youth questionnaire were broken down into sections pertaining to fruit, vegetables, gardening, and communication. The fruit and vegetable behavior sections presented youth with rows containing pictures of popular fruits and vegetables. The youth were asked what fruits they had eaten in the last week, then what vegetables they had eaten in the last week, with a "yes" answer being a filled in bubble on the Scantron sheet in the corresponding position and a "no" being an empty bubble. The gardening behavior question asked the youth if they grew fruits and vegetables at home. This was answered by filling in the corresponding bubble for a "yes" or "no" answer. The communication behavior question asked youth what they had learned during

the EYWTBH program that they had talked about with their parents/guardians. Answers were given by selecting the statement(s) that most fit their behavior and filling in the corresponding bubble(s). An example of behavior items can be seen in Figure 2.

Figure 2. Youth behavior items example.

The self-efficacy section of the youth questionnaire contained 11 items, all of which were measured on a four-point Likert-type scale with the possible answers being "disagree a lot", "disagree a little", "agree a little", and "agree a lot" with youth filling in the bubble of the corresponding answer that best fit their feelings. The questions asked were originally adapted from previously validated survey instruments (Baranowski, 2003; Domel et al., 1996; Light, 2007; Watson, Baranowski, & Thompson, 2006; Watson et al., 2006) and have evolved over the three iterations. An example of a self-efficacy item can be seen in Figure 3. The index can be seen in its entirety within the survey instruments which can be seen in Appendices B & C.

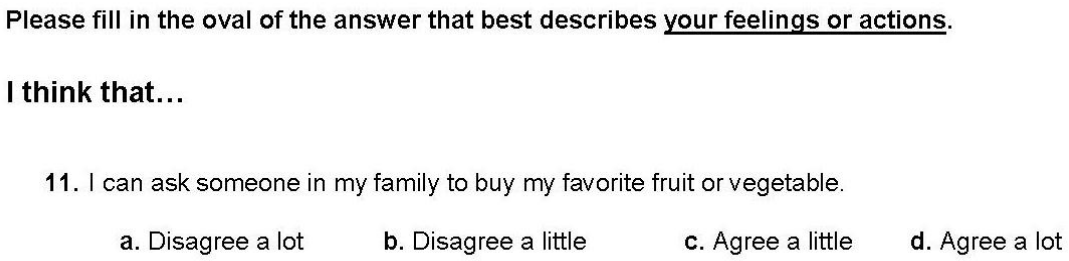


Figure 3. Youth self-efficacy item example.

The interest section of the youth questionnaire was broken down into sections pertaining to fruits, vegetables, and calorie-dense food (in reference to snacking), gardening, and the EYWTBH program. The sections about fruits, vegetables, and calorie-dense food snacking interest presented youth with names (and in the third iteration, pictures) of popular fruits, vegetables, and other snack foods, and asked them whether or not they liked to have those foods as a snack. An example of interest items can be seen in Figure 4.

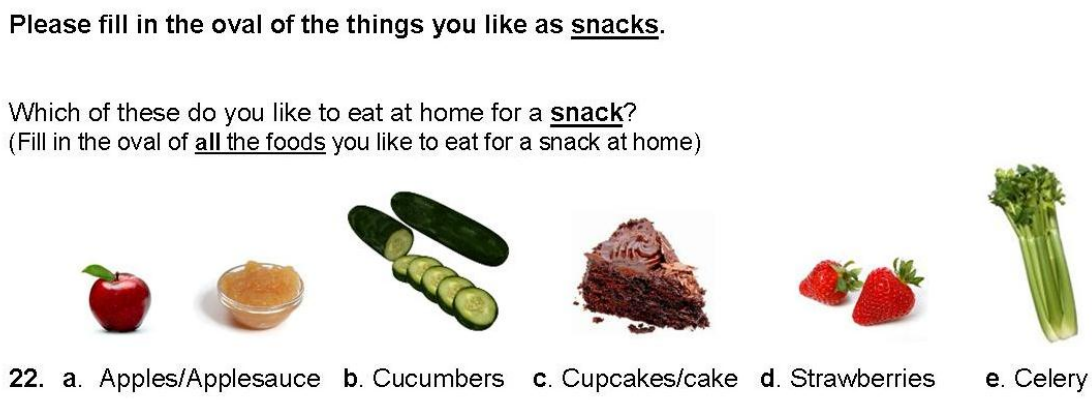


Figure 4. Youth interest items example.

In addition to the groups of major topics, an additional small section pertaining to gardening asked youth if they think it is fun to garden at home, and if they liked visiting their garden. These two questions were answered on a four-point Likert-type scale with the possible answers being "disagree a lot", "disagree a little", "agree a little", and "agree a lot" with youth filling in the bubble of the corresponding answer that best fit their feelings. There was one more question about gardening interest that asked youth why they thought it was fun to garden at home. This question was answered in a multiple choice fashion, with the possible answers being "I like working in the garden", "it's fun to eat what you grow", "I like to get dirty", "I like to pick the vegetables", "I can do it with my family and spend time together", "I like to help my family save money", "I like being helpful", "it gives me something to do", and "I don't think it is fun to garden" with youth filling in the bubble(s) that best described their feelings. The section about youth social intentions pertaining to EYWTBH was a section of the post-program questionnaire

which asked participants what they would tell their friends about the program, with the possible answers being “fruits and vegetables make you healthy”, “they bring good snacks to eat”, “they teach you about fruits and vegetables”, “it is fun to garden and eat what you grow”, “I learned lots of new things”, “it was boring”, “I didn’t like it”, and “nothing” with youth filling in the bubble(s) for the answer(s) that best described their cognitive beliefs.

The parent/guardian questionnaire was completely quantitative and used a Scantron sheet to record answers, in the same vein as the youth questionnaire. The instrument consisted of questions that asked about family dining behaviors, children helping prepare meals, knowledge about the USDA suggested daily fruit and vegetable serving recommendations, fruit and vegetable consumption of the household over the past week, fruit and vegetable consumption of children in the home, the diversity of fruits and vegetables that were consumed, gardening behaviors, gardening interest, snack availability, communication about fruits and vegetables, and demographic information. Instead of the three main groups of items that were present on the youth questionnaire, the parent questionnaire contained two main groups, which pertained to the fruit and vegetable consumption of the household, and the snack availability within the household. The survey instruments can be seen in Appendices B & C .

The behavior section of the parent/guardian questionnaire presented respondents with pictures of fruit and vegetable items and asked which were consumed by their families in the last week. The respondents indicated their answer by filling in the corresponding bubble on the Scantron sheet if their family had consumed that item within

the past week, and left the bubble blank if they did not. An example of the consumption items can be seen in Figure 5.

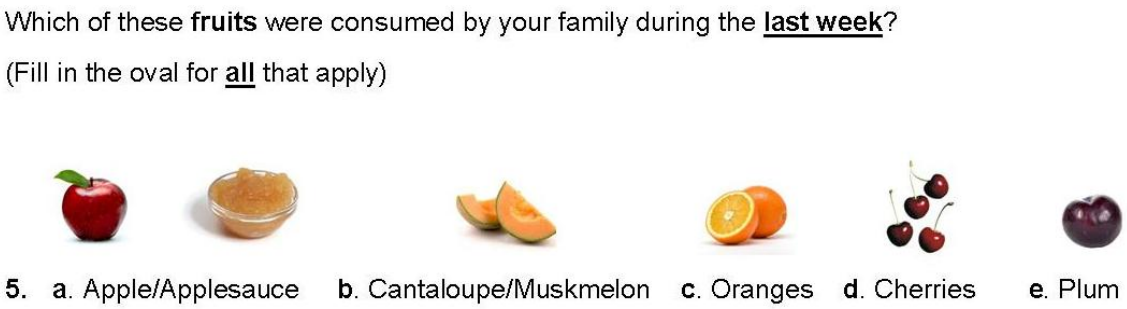


Figure 5. Parent/guardian family consumption items example.

The availability section of the parent/guardian questionnaire was similar to the behavior section. It presented respondents with pictures of various snack food items, such as fruit, vegetables, and calorie-dense snacks, and asked which were regularly available to their children at home. The respondents indicated their answer by filling in the corresponding bubble on the Scantron sheet if their family had consumed that item within the past week, and left the bubble blank if they did not. An example of the availability items can be seen in Figure 6.

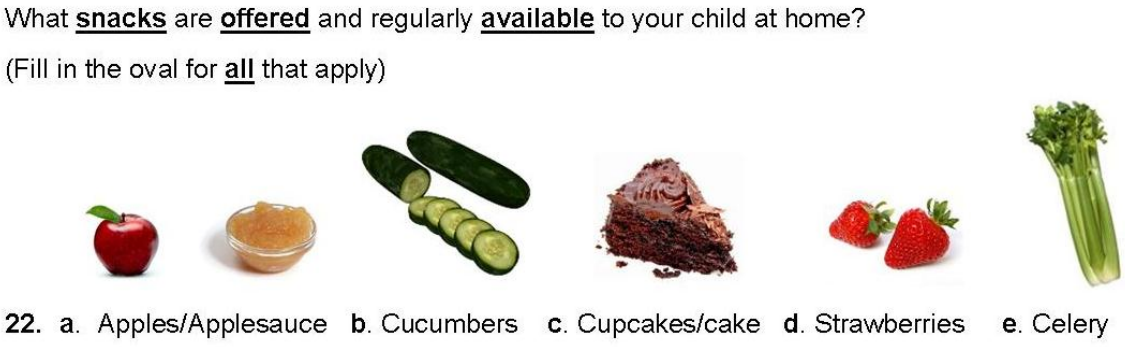


Figure 6. Parent/guardian snack availability items example.

Other items pertained to the parents/guardians knowledge of USDA recommendations for daily fruit and vegetable servings, their child helping them prepare meals, how many meals per week their families eat together, their child's relative fruit and vegetable consumption compared to their own, and demographics. Demographic questions were only asked on the pre-program questionnaire to minimize redundancy.

Statistical Analysis

All data was entered and analyzed using Predictive Analytics Software (PASW) Version 18.0. Version 2 survey data were entered into PASW by undergraduate workers and the researcher. Version 3 survey data were entered into Excel 2010 via the use of a Scantron reader and then imported into PASW software for analysis. Level of measurement, central tendency, and variance were identified for each variable (Table 12). Descriptive statistics that were used included: matched pairs t-tests for interest, behavior,

and self-efficacy responses from youth data, percentages for knowledge questions from parent/guardian data, percentages for gardening behaviors on youth and parent/guardian data, and frequencies for communication behaviors from youth and parent/guardian data. Correlations were computed using Pearson's r. Davis' (1971) conventions were used to describe the magnitude of the associations. Cohen's (1988) *d* and r^2 were used to compute effect sizes of mean differences and relationships, respectively. Simultaneous entry multiple regression was used to determine which independent variables were significantly related to youth post-program fruit and vegetable consumption.

Table 12

Level of Measurement, Central Tendency, and Variance Related to Each Dependent and Independent Variable

Variable	Level of Measurement	Central Tendency	Variance
Gender	Nominal	Frequency	
Youth's Age	Ratio	Sum	Standard Deviation
Parent's Income	Ordinal	Frequency	
Residence	Nominal	Frequency	
Race	Nominal	Frequency	
Parent's Education	Ordinal	Frequency	
Fruit & Vegetable Consumption (Youth & Family)	Ratio	Sum	Standard Deviation
Interest in Fruits & Vegetables as Snacks	Ratio	Sum	Standard Deviation
Healthy Eating Social Intentions	Nominal	Frequency	
Household Fruit & Vegetable Availability	Ratio	Sum	Standard Deviation
Youth Self-efficacy	Item: Ordinal Scale: Interval	Frequency Mean	Standard Deviation

Results

Research Question #1

The first research question asked if youth and family participants reported more variety of fruit and vegetable consumption upon completion of the Eat Your Way to Better Health program. Family consumption variety was reported by the parents/guardians. Matched pairs t-tests and effect sizes were calculated on the fruit and vegetable consumption variety indices for both the youth and parent/guardian data from both the Version 2 (Spring 2009, Fall 2009, Spring 2010) and Version 3 (Fall 2010) questionnaires. Results are shown in Tables 13 & 14.

Table 13

Youth and family fruit and vegetable consumption variety index pretest versus posttest for Version 2 data

Index	*N*	Pretest Mean	Posttest Mean	Mean Difference	*P*-value	Effect Size
Youth fruit consumption variety	780	5.02 *SD* = 3.59	6.09 *SD* = 3.77	1.07 *SD* = 3.75	<0.001[A]	0.29
Youth vegetable consumption variety	775	4.83 *SD* = 3.28	5.34 *SD* = 3.55	0.51 *SD* = 3.40	<0.001[A]	0.15
Family fruit consumption variety	359	4.93 *SD* = 2.63	5.25 *SD* = 2.59	0.32 *SD* = 2.53	0.02[A]	0.12
Family vegetable consumption variety	360	6.68 *SD* = 2.68	6.84 *SD* = 2.72	0.17 *SD* = 2.62	0.22[NS]	0.06

[A] Significant at the alpha = 0.05. *SD* = Standard deviation. Scale is out of 18 possible fruits and 18 possible vegetables. Values are per week. Effect size is Cohen's *d*.

The results from the Version 2 data analysis showed that youth reported eating one more type of fruit per week (1.07/week) and one more type of vegetable every two weeks (0.51/week) after participating in the EYWTBH program. Both of these differences were statistically significant with small and trivial effect sizes (d = .29 & .15, respectively). Parents also reported the family eating an additional type of fruit every three weeks (0.33/week) after their child participated in the EYWTBH program. This was also a statistically significant difference with a trivial effect size (d = .12). Although there were differences in youth fruit and vegetable consumption and family fruit consumption, there

was not a measurable difference in vegetable consumption of the family after youth participation in the EYWTBH program.

Table 14

Youth and family fruit and vegetable consumption variety index pretest versus posttest for Version 3 data

Index	*N*	Pretest Mean	Posttest Mean	Mean Difference	*P*-value	Effect Size
Youth fruit consumption variety	168	5.08 *SD* = 3.96	5.74 *SD* = 4.06	0.67 *SD* = 4.42	0.05[A]	0.17
Youth vegetable consumption variety	168	5.08 *SD* = 3.86	5.85 *SD* = 4.03	0.77 *SD* = 4.17	0.02[A]	0.20
Family fruit consumption variety	87	5.18 *SD* = 2.76	5.00 *SD* = 2.53	-0.18 *SD* = 2.94	0.56[NS]	0.07
Family vegetable consumption variety	87	8.11 *SD* = 3.33	8.37 *SD* = 3.03	0.25 *SD* = 3.73	0.53[NS]	0.08

[A] Significant at the alpha = 0.05. *SD* = Standard deviation. Scale is out of 20 possible fruits and 21 possible vegetables. Values are per week. Effect size is Cohen's *d*.

The results from the Version 3 data analysis show that after participating in the EYWTBH program, youth self-reported eating one more type of fruit about every week and a half (~10-11 days), and one more type of vegetable about every week and a third (~9 days). Both of these differences were statistically significant with trivial and small

effect sizes (d = .17 & .20, respectively). There was no measurable difference in the family fruit or vegetable consumption after youth participation in the EYWTBH program.

Research Question #2

The second research question asked if youth healthy food choice self-efficacy was higher upon completion of the Eat Your Way to Better Health program. Matched pairs t-tests and effect sizes were performed on the self-efficacy indices on the youth data from both the Version 2 and Version 3 surveys. The results of the analyses are presented in Tables 15 & 16.

Table 15

Youth healthy food choice self-efficacy index pretest versus posttest for Version 2 data

Index	*N*	Pretest Mean	Posttest Mean	Mean Difference	*P*-value	Effect Size
Youth healthy food choice self-efficacy	674	3.03 *SD* = 0.69	3.11 *SD* = 0.72	0.08 *SD* = 0.62	0.001[A]	0.11

[A] Significant at the alpha = 0.05. *SD* = Standard deviation. Scale: 1 = disagree a lot; 2 = disagree a little; 3 = agree a little; 4 = agree a lot. Index contains 11 items and number is a grand mean. Effect size is Cohen's *d*.

The results of the Version 2 data analysis show that after EYWTBH participation the self-reported youth self-efficacy for healthy food choices increased from a mean of 3.03 ("agree a little") to a mean of 3.11 ("agree a little"). This was a statistically significant

difference with a trivial effect size. The results can be summarized in that youth were self-efficacious to choose fruit and vegetables both before and after the program. The increase in self-efficacy was trivial, and may be observed by a trained expert.

Table 16

Youth healthy food choice self-efficacy index pretest versus posttest for Version 3 data

Index	*N*	Pretest Mean	Posttest Mean	Mean Difference	*P*-value	Effect Size
Youth healthy food choice self-efficacy	168	2.93 *SD* = 0.73	3.12 *SD* = 0.76	0.19 *SD* = 0.76	0.001[A]	0.27

[A] Significant at the alpha = 0.05. *SD* = Standard deviation. Scale: 1 = disagree a lot; 2 = disagree a little; 3 = agree a little; 4 = agree a lot. Index contains 11 items and number is a grand mean. Effect size is Cohen's *d*.

The results of the Version 3 data showed that after EYWTBH participation youth healthy food choice self-efficacy increased from a mean of 2.93 ("agree a little") to 3.12 ("agree a little"). This difference was statistically significant with a small effect size (d = .27). Similar to Version 2 data, the results can be summarized in that youth were self-efficacious to choose fruits and vegetables both before and after the program. The increase in self-efficacy would likely be observed by a trained expert.

Research Question #3

The third research question asked if youth reported an increase in their preferences to eat fruits and vegetables as snacks upon completion of the Eat Your Way to Better Health program. The questionnaires measured their interest/preferences in fruits, vegetables, and calorie-dense junk food as potential snacks before and after participation in the EYWTBH program. Matched pairs t-tests and effect sizes were performed on the fruit, vegetable, and calorie-dense junk food interest indices on the data from both the Version 2 and Version 3 youth questionnaires. The results of the analyses are presented in Tables 17 & 18.

Table 17

Youth interest/preference in fruits, vegetables, and junk foods as a snack index pretest versus posttest for Version 2 data

Index	*N*	Pretest Mean	Posttest Mean	Mean Difference	*P*-value	Effect Size
Youth interest in fruit as snack	646	7.71 *SD* = 3.86	8.98 *SD* = 4.06	1.27 *SD* = 3.64	<0.001[A]	0.32
Youth interest in vegetable as snack	784	4.84 *SD* = 2.88	5.10 *SD* = 3.02	0.26 *SD* = 2.42	0.002[A]	0.09
Youth interest in junk food as snack	782	6.36 *SD* = 3.45	6.42 *SD* = 3.53	0.06 *SD* = 3.47	0.636[NS]	0.02

[A] Significant at the alpha = 0.05. *SD* = Standard deviation. Scale is out of 16 fruits, 11 vegetables, and 10 calorie-dense foods. Effect size is Cohen's *d*.

The results of the Version 2 data analysis show that, on average, youth were interested in snacking on approximately eight different fruits before the program ($M = 7.71$) and approximately nine different fruits after the program ($M = 8.98$). This was an increase in 1.27 fruits, which was statistically significant with a small effect size. Further, youth were interested in snacking on approximately five vegetables before and after the program. The youth reported an increase of 0.26 regarding their interest in choosing vegetables as a snack. This was significantly different with a trivial effect size. There was no measurable difference in the interest of youth in snacking on calorie-dense junk foods. The effect sizes of the differences in interest eating fruits and vegetables as a snack were small and trivial, respectively.

Table 18

Youth interest/preference in fruits, vegetables, and junk foods as a snack index pretest versus posttest for Version 3 data

Index	*N*	Pretest Mean	Posttest Mean	Mean Difference	*P*-value	Effect Size
Youth fruit snack interest	168	8.29 *SD* = 5.22	9.65 *SD* = 5.72	1.36 *SD* = 5.38	0.001[A]	0.25
Youth vegetable snack interest	168	4.04 *SD* = 3.23	4.75 *SD* = 3.69	0.71 *SD* = 3.17	0.004[A]	0.21
Youth junk food snack interest	168	7.33 *SD* = 4.55	7.02 *SD* = 4.59	0.30 *SD* = 4.81	0.415[NS]	0.07

[A] Significant at the alpha = 0.05. *SD* = Standard deviation. Scale is out of 20 fruits, 13 vegetables, and 13 calorie-dense foods. Effect size is Cohen's *d*.

The results of the Version 3 data analysis show that , on average, youth were interested in snacking on around one and a third more types of fruits and interested in snacking on around three-quarters more types of vegetables after participation in the EYWTBH program. Both of these differences were statistically significant. As in the Version 2 data, the Version 3 data show no measurable difference in the interest of youth in snacking on calorie-dense junk foods. Of the food choices that were presented to the youth upon completion of the program, they were interested in 54% of the calorie-dense junk foods, 48% of the fruits, and 37% of the vegetables as snack choices.

Research Question #4

The fourth research question asked if youth were more likely to talk to their friends about healthy food choices upon completion of the Eat Your Way to Better Health program. This was not measured by an index of different questions, but rather by the youth marking what statements they would say to their friends about fruits and vegetables as a measure of their social intentions. The youth marking only positive statements about fruits and vegetables was regarded as a positive result, while the youth marking only negative statements was regarded as a negative result. Any combination of both types of answers were treated the same as non-answers and not included in this analysis. The change in the amount of positive results was analyzed using matched pairs t-tests. Results of the matched pairs t-tests from the Version 2 and Version 3 questionnaire data are presented in Tables 19 & 20.

Table 19

Youth healthy food choice social intentions pretest versus posttest for Version 2 data

Index	*N*	Pretest Mean	Posttest Mean	Mean Difference	*P*-value	Effect Size
Youth healthy food choice social intentions	763	33%	46%	13%	<0.001[A]	0.27

[A] Significant at the alpha = 0.05. Percentage is of youth who indicated positive healthy eating social intentions. Effect size is Cohen's *d*.

The results of the Version 2 data showed that the number of youth who self-reported that they would talk positively to their friends about healthy food choices increased from 33% (around 250 youth) of valid responses prior to the EYWTBH program to 46% (around 350 youth) of valid responses after the EYWTBH program. This was a statistically significant increase of 13% or around 100 youth. The effect size of this change was small, but the increase of around 100 youth indicating that they would talk positively about fruits and vegetables is a practical difference.

Table 20

Youth healthy food choice social intentions pretest versus posttest for Version 3 data

Index	*N*	Pretest Mean	Posttest Mean	Mean Difference	*P*-value	Effect Size
Youth healthy food choice social intentions	168	45%	51%	6%	0.19[NS]	0.12

[A] Significant at the alpha = 0.05. Percentage is of youth who indicated positive healthy eating social intentions. Effect size is Cohen's *d*.

The results of the Version 3 data analysis showed that the number of youth who self-reported that they would talk positively to their friends about fruits and vegetables increased from 45% (around 75 youth) of valid responses prior to the EYWTBH program to 51% (around 85 youth) of valid responses after the EYWTBH program. This increase of 6%, or about ten youth, was not statistically significant.

Research Question #5

The fifth research question asked what percentage of variance in youth post-program fruit and vegetable consumption was explained by the following independent variables—youth pre-program fruit and vegetable consumption, youth post-program healthy food choice self-efficacy, youth post-program interest in fruits and vegetables as a snack, youth post-program healthy food social intentions, family post-program fruit and vegetable consumption, and household fruit and vegetable availability. This was

determined through a forced entry multiple regression on Version 2 (Spring 2009, Fall 2009, Spring 2010) questionnaire data. A multiple regression was not run on the Version 3 (Fall 2010) questionnaire data due to the limitations of a small data set. Variables were selected for inclusion in the multiple regression from the EYWTBH evaluation based upon an analysis of the research base showing the variables that may possibly account for variance in youth fruit and vegetable consumption.

One of the variables that showed up numerous times in the research base as a possible predictor of youth fruit and vegetable consumption was the **availability of fruits and vegetables** (Benton, 2004; Birch & Fisher, 1998; Blanchette & Brug, 2005; Bower & Sandall, 2002; Brug et al., 2008; Cullen, Bartholomew, Parcel, & Kok, 1998; Nanney, Johnson, Elliott, & Haire-Joshu, 2007; Reynolds, Hinton, Shewchuk, & Hickey, 1999; Robinson-O'Brien et al., 2009; Scaglioni, Salvioni, & Galimberti, 2008; Taylor, Evers, & McKenna, 2005; Vereecken, Van Damme, & Maes, 2005). Thus, the variable of post-program household fruit and vegetable availability as reported by the parents/guardians was included in the multiple regression. The results of a matched pairs t-test analysis on the pre- and post-program variables are presented in Table 21. This analysis was run to determine if there were any differences between pre- and post-program data.

Table 21

Household fruit and vegetable availability pretest versus posttest for Version 2 data

Index	*N*	Pretest Mean	Posttest Mean	Mean Difference	*P*-value	Effect Size
Household fruit and vegetable availability	357	8.73 *SD* = 5.00	9.09 *SD* = 5.11	0.36 *SD* = 4.56	0.14^{NS}	0.07

[A] Significant at the alpha = 0.05. *SD* = Standard deviation. Scale is out of 27 possible fruits and vegetables. Effect size is Cohen's *d*.

The results of the analysis show that there was no statistically significant difference between the parent-reported household availability of types of fruits and vegetables before the EYWTBH program and the parent-reported household availability of types of fruits and vegetables after the EYWTBH program.

Another factor frequently seen in the research base as a possible predictor of youth fruit and vegetable consumption was the **influence of the parents/guardians** (Benton, 2004; Birch & Fisher, 1998; Blanchette & Brug, 2005; Boutelle et al., 2007; Bower & Sandall, 2002; Brug et al., 2008; Nanney, Johnson, Elliott, & Haire-Joshu, 2007; Robinson-O'Brien et al., 2009; Scaglioni, Salvioni, & Galimberti, 2008). As a measure of parental influence, the variables of family fruit and vegetable consumption self-reported by the parents/guardians post-program were included in the multiple regression. The results of a matched pairs t-test analysis on the pre- and post-program data from this variable are presented in Table 22. This analysis was run to determine if there were any differences between pre- and post-program data.

Table 22

Family fruit and vegetable consumption reported by parents/guardians pre-program versus post-program for Version 2 data

Index	*N*	Pretest Mean	Posttest Mean	Mean Difference	*P*-value	Effect Size
Family fruit and vegetable consumption	359	11.60 *SD* = 4.60	12.08 *SD* = 4.63	0.48 *SD* = 4.30	0.04[A]	0.10

[A] Significant at the alpha = 0.05. *SD* = Standard deviation. Scale is out of 33 possible fruits and vegetables. Effect size is Cohen's *d*.

The results of the analysis show that there was a statistically significant increase in consumption of about one type of fruit or vegetable every two weeks between the parent-reported family fruit and vegetable consumption before the EYWTBH program and the parent-reported family fruit and vegetable consumption after the EYWTBH program. The calculated effect size for this difference was trivial. However, the increase of one type of fruit or vegetable being consumed every two weeks is a valuable difference.

The **preferences, interest in, or liking of fruits and vegetables by youth** has also been seen in previous studies as a possible predictor of fruit and vegetable consumption (Birch & Fisher, 1998; Bower & Sandall, 2002; Brug et al., 2008; Nanney, Johnson, Elliott, & Haire-Joshu, 2007; Reniscow et al., 1997; Reynolds, Hinton, Shewchuk, & Hickey, 1999; Taylor, Evers, & McKenna, 2005). Because of this evidence, the variable of youth post-program interest/preference in eating fruits and vegetables was included in the multiple regression.

An additional dimension in possible predictors of youth fruit and vegetable consumption was present in the literature in the form of **social norms pertaining to food habits** (Benton, 2004; Birch & Fisher, 1998; Cullen, Bartholomew, Parcel, & Kok, 1998; Johnson, Smith, & Bruemmer, 2007; Libman, 2007). Due to the presence of this variable in the literature, the variable of youth post-program social intentions pertaining to talking to their friends and family about eating fruits and vegetables was included in the multiple regression.

The final main variable present in the research base as a possible predictor of youth fruit and vegetable consumption was **youth self-efficacy for healthy food choices** (Brug et al., 2008; Reynolds, Hinton, Shewchuk, & Hickey, 1999; Strecher, McEvoy DeVellis, Becker, & Rosenstock, 1986; Vereecken, Van Damme, & Maes, 2005). Due to the presence of this variable in the literature, the variable of youth post-program self-efficacy for healthy food choices was also included in the multiple regression.

The **youth pre-program fruit and vegetable consumption** was also included in the multiple regression. According to the theoretical framework and previous studies (Aarts, Verplanken, & Van Knippenberg, 1998; Ouellette & Wood, 1998), behaviors may not be easily changed with a short intervention, and may be habitual due to prior behaviors in the same situation.

All of the suspected related variables were put through a forced entry multiple regression. The variables entered can be seen in Table 23, the correlations between variables can be seen in Table 24, and the summarized results for the forced entry multiple regression are presented in Table 25.

Table 23

Multiple regression variables from Version 2 data set

Predictor	Variable
1	Household fruit and vegetable availability after program (self-reported by parent/guardian)
2	Family fruit and vegetable consumption after program (self-reported by parent/guardian)
3	Youth fruit and vegetable consumption prior to program (self-reported by youth)
4	Youth fruit and vegetable interest/liking/preferences after program
5	Youth healthy eating social intentions after program
6	Youth healthy eating self-efficacy after program

Table 24

Pearson Correlations (r) for variables included in multiple regression from Version 2 data set

Variable	1.	2.	3.	4.	5.	6.
1.	1					
2.	.54**	1				
3.	.22**	.27**	1			
4.	.23**	.31**	.08	1		
5.	.23**	.28**	.08	.63**	1	
6.	.18**	.20**	.50**	.14**	.11*	1
7.	.02	.07	.36**	.08	.05	.20**

** = Correlation is significant at the 0.01 level (2-tailed). * = Correlation is significant at the 0.05 level (2-tailed). Variables: 1 = Youth pre-program fruit and vegetable consumption; 2 = Youth post-program fruit and vegetable consumption; 3 = Youth post-program healthy food choice self-efficacy; 4 = Family post-program fruit and vegetable consumption; 5 = Household post-program fruit and vegetable availability; 6 = Youth post-program fruit and vegetable interest; 7 = Youth post-program healthy eating social intentions

Relationships were considered practically significant if $r \geq .30$. Substantial relationships were defined as $r \geq .50$, while moderate relationships were defined as $.50 \geq r \geq .30$ (Davis, 1971). There were five relationships that met these criteria. There were substantial relationships between youth pre-program fruit and vegetable consumption and youth post-program fruit and vegetable consumption ($r = .54$), family post-program fruit and vegetable consumption and household post-program fruit and vegetable availability ($r = .63$), and youth post-program healthy food choice self-efficacy and youth post-

program fruit and vegetable interest (r = .50). The effect sizes of these correlations were all small (.29, .40, and .25 respectively). There were moderate relationships between youth post-program healthy food choice self-efficacy and youth post-program healthy food choice social intentions (r = .36), and youth post-program fruit and vegetable consumption and family post-program fruit and vegetable consumption (r = .31). The effect sizes of these correlations were both trivial (.13 and .10 respectively).

Table 25

Youth fruit and vegetable consumption multiple regression for Version 2 data set

Model	Standardized Beta Coefficient	R^2	t	Sig.	Zero-order correlation	Collinearity Statistics	
						Tolerance	VIF
Constant			-1.742	.082			
Youth fruit/ vegetable consumption pre-program	.491***	.241	10.487	.000	.582	.883	1.133
Youth self-efficacy after program	.173**	.030	3.173	.002	.304	.652	1.533
Family fruit/vegetable consumption post-program	.137*	.019	2.432	.016	.298	.614	1.628
Household fruit/vegetable availability post-program	.046	.002	.830	.407	.254	.623	1.605
Youth fruit/vegetable interest post-program	.060	.004	1.164	.245	.262	.721	1.386
Youth social intentions post-program	-.056	.003	-1.177	.240	.055	.848	1.180

Note: R^2 = .404 (* $p < .05$, ** $p < .01$, *** $p < .001$).

The results of the multiple regression show that the self-reported youth fruit and vegetable consumption prior to participation in the EYWTBH program had the strongest relationship with the variance in youth fruit and vegetable consumption after participation in the EYWTBH program, followed by youth healthy food choice self-efficacy after participation in the EYWTBH program, and parent/guardian self-reported family fruit and vegetable consumption after youth participation in the EYWTBH program. The results of the multiple regression showed that these three variables collectively accounted for 39.4% of the variance in youth post-program fruit and vegetable consumption when insignificant variables were excluded. Along with accounting for a significant amount of the variability in the dependent variable, the model had normal residuals, no multicollinearity, linearity, and homoscedasticy.

The multiple regression analyses were only run on the data from Version 2 of the survey instrument. The reason for not attempting multiple regression analyses on the data from the Version 3 survey instrument was the low amount of cases that were present in that data set. The reason for not combining the Version 2 and Version 3 questionnaire data was that the items contained within indices measuring variables were not identical, and the administration of the two questionnaires was in two different formats (Version 2 was a paper-based survey instrument, while Version 3 was a bubble-sheet-based survey instrument).

Conclusions

There were three conclusions from this study. Discussions of the conclusions focus on the contributions to the knowledge base, as well as linking back to the theoretical and conceptual frameworks.

Conclusion #1: Variables Related to Youth Consumption

Youth self-reported fruit and vegetable consumption prior to participation in the EYWTBH program, Youth self-reported healthy food choice self-efficacy after participation in the EYWTBH program, and family fruit and vegetable consumption as reported by the parents after participation in the EYWTBH program were collectively related to nearly one third (29%) of the variance in youth self-reported fruit and vegetable consumption after participation in the EYWTBH program. The value in identifying these variables is that there can be optimization in educational messages in the EYWTBH program going forward as well as in other nutrition education programs. Another value is in confirming the findings of other garden-based school nutrition education studies, albeit in a unique context due to the EYWTBH program being offered through the Cooperative Extension Service.

Self-reported youth healthy food choice self-efficacy after the EYWTBH program was one of the variables related to post-program youth self-reported fruit and vegetable consumption. This makes perfect sense when looking back to the theoretical framework of Social Cognitive Theory (Bandura, 1977; Bandura, 1986; Bandura, 1989) which

focuses on contextualized self-efficacy being a critical component influencing behavior. According to Social Cognitive Theory, behavior is determined by environmental and personal factors, of which self-efficacy is a personal factor. This finding also confirms the findings of previous studies (Brug et al., 2008; Reynolds, Hinton, Shewchuk, & Hickey, 1999; Strecher, McEvoy DeVellis, Becker, & Rosenstock, 1986; Vereecken, Van Damme, & Maes, 2005), which also found that self-efficacy may play a role in youth fruit and vegetable consumption.

The self-reported (by parents) family fruit and vegetable consumption was another variable related to post-program youth self-reported fruit and vegetable consumption. Again, linking back to the theoretical framework of SCT and the conceptual framework of this study, this is logical, since behavior is viewed as being influenced by not only personal factors, but environmental factors, such as this one. In addition, this confirms the findings of previous studies (Benton, 2004; Birch & Fisher, 1998; Blanchette & Brug, 2005; Boutelle et al., 2007; Bower & Sandall, 2002; Brug et al., 2008; Nanney, Johnson, Elliott, & Haire-Joshu, 2007; Robinson-O'Brien et al., 2009; Scaglioni, Salvioni, & Galimberti, 2008), which also found that there may be a connection between family and youth fruit and vegetable consumption.

Eat Your Way to Better Health was a relatively short program (8-10 weeks in length including the pre- and post-program questionnaires), and the strongest relationship in this model (between pre- and post-program fruit and vegetable consumption) shows that it can be very difficult to see a difference in a behavior over a relatively brief period of time, especially a behavior as habitual as food consumption. There are models, such

as the Elaboration Likelihood Model (Petty & Cacioppo, 1986), which posit that behaviors are extremely difficult to change in a relatively short period of time. Indeed, previous studies have also found this to be the case (Aarts, Verplanken, & Van Knippenberg, 1998; Ouellette & Wood, 1998). Thus, the EYWTBH program has a weakness in a short program length that may prevent greater differences in fruit and vegetable consumption from being detected.

Connecting back to the theoretical framework again of Social Cognitive Theory (Bandura, 1977; Bandura, 1986; Bandura, 1989), the relationships present in the model show that the EYWTBH curriculum may have focused primarily on the context of youth trying new kinds of fruits and vegetables and not on improving other personal or environmental factors related to broader fruit and vegetable consumption behavior, such as real-world healthy food choice knowledge and self-efficacy. According to SCT, even if a behavior occurs, if that behavior is not supported by the contextualized personal or environmental factors, and is not made salient enough to the individual, then it can be a one-time behavior event, and may not be repeated independently when presented with the same scenario without the aid of the educator. Thus, it can be said that SCT also supports the statement that behaviors are difficult to change, especially during a relatively short period of time.

Conclusion #2: Youth Self-Efficacy

Youth reported they were self-efficacious to make healthy food choices. Moreover, the small increase in youth self-efficacy to make healthy food choices would likely be observed by a trained expert. This statistical increase may have been due to participation in the EYWTBH program. However, causality cannot be claimed due to this study being descriptive, not an experimental or quasi-experimental design.

The theoretical framework of Social Cognitive Theory (Bandura, 1977; Bandura, 1986; Bandura, 1989) makes any increase, however small it may be, important. If there is an increase in self-efficacy for a particular behavior, then, according to SCT, there is a greater possibility that the behavior will occur. Additionally, according to SCT, self-efficacy is determined by environmental and personal factors. The data support this construct, due to the relationships that exist between youth post-program self-efficacy and both their post-program interest in fruits and vegetables, and their post-program social intentions. Thus, EYWTBH can be viewed as a valuable program, because there is a possibility that personal factors, such as self-efficacy, could be improved.

A relationship between healthy eating self-efficacy and fruit and vegetable consumption has also been seen in previous research, which supports this conclusion. Brug et al. (2008) found a correlation between a positive self-efficacy for eating fruits and vegetables and their consumption in European youth. Reynolds, Hinton, Shewchuck, & Hickey (1999) found that 16% of the variance in the fruit and vegetable consumption of youth was explained by motivation, which included self-efficacy. Vereecken, Van Damme, & Maes (2005) interestingly found a significant correlation between youth

healthy eating self-efficacy in "difficult situations" to be correlated to fruit consumption, but not vegetable consumption. Further research on EYWTBH will need to be constructed with an experimental or quasi-experimental design to add evidence to a causal relationship due to program participation, but this conclusion is significant when put in the context of similar research.

Conclusion #3: Youth Self-reported Fruit and Vegetable Consumption

Youth reported eating more varieties of fruits and vegetables after the EYWTBH program. An increase in the consumption of different types of fruits and vegetables was precisely the goal of the program, and although causality cannot be claimed due to the design of this study, the construct of the curriculum can be viewed as a success. This also confirms the findings of previous research (Cason, 1999; Heim, Stang, & Ireland, 2009; Hilgers, Haynes, & Olson, 2008; Robinson-O'Brien, Story, & Heim, 2009) which showed that garden-based school nutrition programs may increase youth fruit and vegetable consumption.

Despite this encouraging finding, there was not a significant difference in the pre- and post-program household availability of fruits and vegetables as reported by the parents/guardians of youth EYWTBH participants for both the Version 2 and Version 3 questionnaire data.

Availability can be viewed as an environmental factor, and, according to the conceptual framework, a crucial factor in youth fruit and vegetable consumption. Indeed,

previous research confirms that fruit and vegetable availability may be related to youth fruit and vegetable consumption (Benton, 2004; Birch & Fisher, 1998; Blanchette & Brug, 2005; Bower & Sandall, 2002; Brug et al., 2008; Cullen, Bartholomew, Parcel, & Kok, 1998; Nanney, Johnson, Elliott, & Haire-Joshu, 2007; Reynolds, Hinton, Shewchuk, & Hickey, 1999; Robinson-O'Brien et al., 2009; Scaglioni, Salvioni, & Galimberti, 2008; Taylor, Evers, & McKenna, 2005; Vereecken, Van Damme, & Maes, 2005).

A significant increase in household fruit and vegetable availability would have been encouraging to find, because it would have suggested that not only are youth eating more types of fruits and vegetables, but that they are also vocalizing their desire for more fruits and vegetables to their parents/guardians. Despite this, availability needs to be continue to be emphasized in future offerings of the EYWTBH program, because if fruits and vegetables are not available to youth, they will not have a chance to exercise any potential increase in consumption behavior.

Another possibility is that a difference in availability was not measured due to the construct of the survey instruments. The indices of fruits and vegetables were limited by space constraints, as well as being a snapshot measurement. The fruits and vegetables listed on the indices may not have been available at the time the parents/guardians took the questionnaire.

In addition to survey instrument limitations, the length of the program may also be responsible for the lack of a detected difference in household availability. The relatively short nature of the program may not allow for enough opportunities for

dialogue between youth and their parents/guardians to vocalize their possible changes in fruit and vegetable consumption decisions.

Implications for Practice

This research revealed three practical implications for the Eat Your Way to Better Health program: the Eat Your Way to Better Health program developing the nutrition education curriculum, increasing volunteer training, and incorporation of increased involvement of the parents/guardians of youth.

Curriculum Development

The EYWTBH program curriculum stresses the importance of eating healthy and growing fruits and vegetables as a step in leading a healthy lifestyle. An increase in consumption of healthy food should be coupled with a decrease in consumption of unhealthy food to maximize benefits. Despite being a topic of discussion in a few activities, calorie-dense junk foods are not a chapter topic in the current curriculum. There are multiple strengths in the current curriculum, such as the link between growing, tasting, and eating fruits and vegetables; however, further development of the EYWTBH curriculum should also emphasize the dangers of calorie-dense junk food. A real-world activity and application of youth healthy eating decision making would be education about making the best possible decision while eating at restaurants. This would not only have the potential to decrease calorie-dense junk food consumption, but also the potential to increase the healthy food choice self-efficacy of the youth by empowering them with relevant food choice knowledge.

Volunteer Training

The EYWTBH program required that county Extension Educators partnered with classroom teachers and, with university support, implemented an IRB approved protocol. Deviations from protocol did occur, and were seemingly due to misunderstanding or a lack of knowledge about the construct of the program assessments. Although training workshops were offered at least once per school year, the major emphasis in these workshops was on the implementation of the curricular material, and a relatively small amount of time was spent during these workshops on the implementation of the program assessments. Increased training on the assessments should increase the percentage of complete pre-post/youth-parent cases by opening up lines of communication on the topic of assessment implementation not only between the university and the Extension Educators, but also between Extension Educators, where there may be valuable expertise in assessment implementation that could be disseminated between peers.

Increased Parent/Guardian Involvement

According to the theoretical and conceptual frameworks, parents/guardians are a large determinant of environmental factors. Parents/guardians not only have control over the household availability of fruits and vegetables, but also are part of the family, which makes them a part of the family fruit and vegetable consumption. Although household fruit and vegetable availability was not a significant contributor to the variance in youth fruit and vegetable consumption, availability was correlated to family fruit and vegetable

consumption, which was a contributor to youth fruit and vegetable consumption. Therefore, if parent variables are targeted by nutrition education programs such as EYWTBH, they should at the same time also be targeting youth variables through the observed correlations.

Parents/guardians have been a passive target of EYWTBH education thus far. The extent of parent/guardian involvement in the EYWTBH program was completion of the questionnaires, the EYWTBH take-home educational materials, and any dialogue that may have taken place between the parents/guardians and the youth regarding the program.

Moving forward, there must be an increase in parent/guardian involvement in the EYWTBH program to maximize the education potential shown by the correlations between parent/guardian and youth variables. This could occur in a number of different ways, such as through family weekend or after-school workdays in the school garden, where parents would come to school with their children and have a hands-on gardening experience. Another possibility is having youth take home a potted plant such as peas or beans. This would not only give the youth a sense of ownership and pride in growing the plant, but also spark dialogue with a parent/guardian about the nutrition education received at school.

Recommendations for Further Study

Based upon the conclusions, there are three recommendations for further research. The design of future studies should be experimental or quasi-experimental, alternate theoretical frameworks should be considered, and replication should occur to confirm findings.

Study Design

This study was conducted using an exploratory design due to there being no control group. Future research on the EYWTBH program should include control groups to allow stronger claims, such as cause/effect, to be made from the data analyses. Standardization of the program implementation would also increase the strength of claims. This would include beginning and ending all EYWTBH programs across the state on the same dates, as well as administering the pre- and post-program assessments at the same time statewide.

Higher response rates of the parents/guardians would also improve data. Feedback from Extension Educators points to the length of the questionnaire and the fact that youth had to take the questionnaire to and from their parent/guardian as possible barriers to completion. This could be addressed by offering the questionnaires in multiple formats, such as an online version in addition to the traditional paper version.

Theoretical Framework

The theoretical frameworks used in this study were Social Cognitive Theory as well as Theory of Task Motivation and intrinsic and extrinsic motivation. Although those theories contributed to the conceptual framework of this study and the original iterations of the questionnaires, there may be other frameworks that include more variables pertaining to behaviors that may strengthen future research on this program.

The Theory of Planned Behavior (TPB) (Ajzen, 1991) is a framework that could strengthen future analysis of the EYWTBH program by adding the variable of behavioral intentions. The TPB states that a given behavior occurs when there is a positive intention to perform that given behavior. Going deeper into the theory, the behavioral intention, which influences actual behavior, is determined by the underlying personal behavioral attitude, the subjective norms of the situation, and the perceived behavioral control of the individual pertaining to that particular action. The perceived behavioral control is not only part of the equation with behavioral intention, but also influences whether or not that intention is acted upon. Meaning that, even if the person would have a positive behavioral intention excluding perceived behavioral control, that is, a positive attitude and positive subjective norms, if they do not think they can do the action, then the intention may not be acted upon. Perceived behavioral control also directly influences the behavioral action, in that although there may be a one-time action implemented by the person, the perception of the feasibility of continuing that behavior may be low for a repetitive action, so the behavior may not continue (Ajzen, 1991). This theory has been used previously in nutrition education studies (Blanchard et al., 2009; Bogers et al., 2004;

Conner, Norman, & Bell, 2002; Gratton, Povey, & Clark-Carter, 2007; Lautenschlager & Smith, 2007; Sjoberg, Kim, & Reicks, 2004) and could be used with the EYWTBH survey instruments in the future if there is the addition of items that look at behavioral intentions.

Replication

The conclusions of this descriptive study, 1) that relationships between the independent variables of youth pre-program fruit and vegetable consumption, youth post-program healthy eating self-efficacy, family post-program fruit and vegetable consumption, and the dependent variable of youth post-program fruit and vegetable consumption, explain around one-third of the variance in youth post-program fruit and vegetable consumption, 2) that youth self-reported slightly higher levels of healthy eating self-efficacy after participating in the EYWTBH program, and 3) that youth self-reported higher levels of fruit and vegetable consumption after participating in the EYWTBH program, are context specific and not able to be generalized. Indiana is a state with a strong Cooperative Extension Service and agriculture heritage, so the implementation of EYWTBH may differ across states with less Extension funding. The population of this study also is contextualized. The majority of participants lived in rural areas, which is not indicative of Indiana as a whole. Replication of this study could take place with different populations, such as in urban areas, to see if similar conclusions are reached.

Summary

In summary, this study explored a garden-based school nutrition education program offered through the Cooperative Extension Service. There were three conclusions. First, there was a relationship between youth fruit and vegetable consumption, youth healthy eating self-efficacy, and family fruit and vegetable consumption. Second, youth reported higher healthy eating self-efficacy after participation in the EYWTBH program. Finally, youth reported an increase in the types of fruits and vegetables they consumed after participating in the EYWTBH program. Future research should focus on the design of the program to maximize the ability to make claims from the data, as well as expanding the program to other contexts. Based on the conclusions, there are implications for further research on the same program and future garden-based school nutrition programs offered by Extension.

References

Aarts, H., Verplanken, B., & Van Knippenberg, A. (1998). Predicting behavior from actions in the past: Repeated decision making or a matter of habit? *Journal of Applied Social Psychology*, *28*(15), 1355-1374. doi: 10.1111/j.1559-1816.1998.tb01681.x

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*(2), 179-211. doi: 10.1016/0749-5978(91)90020-T

Ayer, A. J. (1959). *Logical positivism*. New York, NY: The Free Press.

Bandura, A. (1977). *Social learning theory*. Englewood Cliffs, NJ: Prentice Hall.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (1989). Human agency in social cognitive theory. *American Psychologist*, *44*(9), 1175-1184. doi: 10.1037/0003-066X.44.9.1175

Baranowski, T. (2003). *Boy Scout project: FJV self-efficiacy and FJV preferences instruments*. Retrieved October 1, 2010, from http://www.bcm.edu/cnrc/faculty/Survey_documents/BoySctsQnrs(03-04)/BS-FJV-SE.pdf

Benton, D. (2004). Role of parents in the determination of the food preferences of children and the development of obesity. *International Journal of Obesity*, *28*(7), 858-869. doi: 10.1038/sj.ijo.0802532

Birch, L. L., & Fisher, J. O. (1998). Development of eating behaviors among children and adolescents. *Pediatrics*, *101*, 539-549.

Blanchard, C. M., Fisher, J., Sparling, P. B., Shanks, T. H., Nehl, E., Rhodes, R. E., ... Baker, F. (2009). Understanding adherence to 5 servings of fruits and vegetables per day: A theory of planned behavior perspective. *Journal of Nutrition Education and Behavior*, *41*(1), 3-10. doi: 10.1016/j.jneb.2007.12.006

Blanchette, L., & Brug, J. (2005). Determinants of fruit and vegetable consumption among 6-12-year-old children and effective interventions to increase consumption. *Journal of Human Nutrition and Dietetics*, *18*(6), 431-443. doi: 10.1111/j.1365-277X.2005.00648.x

Bogers, R. P., Brug, J., Van Assema, P., & Dagnelie, P. C. (2004). Explaining fruit and vegetable consumption: The theory of planned behaviour and misconception of personal intake levels. *Appetite*, *42*(2), 157-166. doi: 10.1016/j.appet.2003.08.015

Boutelle, K., Birkeland, R., Hannan, P., Story, M., & Neumark-Sztainer, D. (2007). Associations between maternal concern for healthful eating and maternal eating behaviors, home food availability, and adolescent eating behaviors. *Journal of Nutrition Education and Behavior*, *39*(5), 248-256. doi: 10.1016/j.jneb.2007.04.179

Bower, J. A., & Sandall, L. (2002). Children as consumers - snacking behaviour in primary school children. *International Journal of Consumer Studies*, *26*(1), 15-26. doi: 10.1046/j.1470-6431.2002.00220.x

Brug, J., Tak, N. I., Te Velde, S. J., Bere, E., & De Bourdeaudhuij, I. (2008). Taste preferences, liking and other factors related to fruit and vegetable intakes among schoolchildren: Results from observational studies. *British Journal of Nutrition*, *99*(S1), S7-S14. doi: 10.1017/S0007114508892458

Cason, K. L. (1999). Children are "growing healthy" in South Carolina. *Journal of Nutrition Education*, *31*(4), 235-236. doi: 10.1016/S0022-3182(99)70446-2

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Hillsdale, NJ: L. Erlbaum Associates.

Comte, A., & Martineau, H. (1868). *Positive philosophy of Auguste Comte*. New York, NY: William Gowans.

Conner, M., Norman, P., & Bell, R. (2002). The theory of planned behavior and healthy eating. *Health Psychology*, *21*(2), 194-201. doi: 10.1037//0278-6133.21.2.194

Cullen, K. W., Bartholomew, L. K., Parcel, G. S., & Kok, G. (1998). Intervention mapping: Use of theory and data in the development of a fruit and vegetable nutrition program for Girl Scouts. *Journal of Nutrition Education, 30*(4), 188-195. doi: 10.1016/S0022-3182(98)70318-8

Davis, J. A. (1971). *Elementary survey analysis*. Englewood Cliffs, NJ: Prentice-Hall.

Domel, S., Thompson, W., Davis, H., Baranowski, T., Leonard, S., & Baranowski, J. (1996). Psychosocial predictors of fruit and vegetable consumption among elementary school children. *Health Education Research, 11*(3), 299-308. doi: 10.1093/her/11.3.299

Gratton, L., Povey, R., & Clark-Carter, D. (2007). Promoting children's fruit and vegetable consumption: Interventions using the theory of planned behaviour as a framework. *British Journal of Health Psychology, 12*(4), 639-650. doi: 10.1348/135910706X171504

Heim, S., Stang, J., & Ireland, M. (2009). A garden pilot project enhances fruit and vegetable consumption among children. *Journal of the American Dietetic Association, 109*(7), 1220-1226. doi: 10.1016/j.jada.2009.04.009

Hilgers, K. R., Haynes, C., & Olson, J. (2008). Assessing a Garden-based Curriculum for Elementary youth in Iowa: Parental perceptions of change. *HortTechnology, 18*(1), 18-23.

Jago, R., Baranowski, T., Baranowski, J., Thompson, D., Cullen, K., Watson, K., & Liu, Y. (2006). Fit for life Boy Scout badge: Outcome evaluation of a troop and internet intervention. *Preventive Medicine, 42*(3), 181-187. doi: 10.1016/j.ypmed.2005.12.010

Johnson, D., Smith, L., & Bruemmer, B. (2007). Small-grants programs: Lessons from community-based approaches to changing nutrition environments. *Journal of the American Dietetic Association,107*(2), 301-305. doi: 10.1016/j.jada.2006.11.011

Knobloch, N. A. (2003). Is experiential learning authentic? *Journal of Agricultural Education, 44*(4), 22-34.

Lautenschlager, L., & Smith, C. (2007). Beliefs, knowledge, and values held by inner-city youth about gardening, nutrition, and cooking. *Agriculture and Human Values*, *24*(2), 245-258. doi: 10.1007/s10460-006-9051-z

Lautenschlager, L., & Smith, C. (2007). Understanding gardening and dietary habits among youth garden program participants using the theory of planned behavior. *Appetite*, *49*(1), 122-130. doi: 10.1016/j.appet.2007.01.002

Libman, K. (2007). Growing youth growing food: How vegetable gardening influences young people's food consciousness and eating habits. *Applied Environmental Education & Communication*,*6*(1), 87-95. doi: 10.1080/15330150701319388

Light, H. A. (2007). *Junior Master Gardener health and nutrition from the garden: An evaluation of a twelve week pilot program* (Unpublished master's thesis). Purdue University.

Nanney, M., Johnson, S., Elliott, M., & Haire-Joshu, D. (2007). Frequency of eating homegrown produce is associated with higher intake among parents and their preschool-aged children in rural Missouri. *Journal of the American Dietetic Association*, *107*(4), 577-584. doi: 10.1016/j.jada.2007.01.009

Newmann, F. M. (1996). *Authentic achievement: Restructuring schools for intellectual quality*. San Francisco, CA: Jossey-Bass.

Ouellette, J. A., & Wood, W. (1998). Habit and intention in everyday life: The multiple processes by which past behavior predicts future behavior. *Psychological Bulletin*, *124*(1), 54-74. doi: 10.1037//0033-2909.124.1.54

Petty, R. E., & Cacioppo, J. T. (1986). The elaboration likelihood model of persuasion. *Advances in Experimental Social Psychology*, *19*, 123-162.

Resnicow, K., Davis-Hearn, M., Smith, M., Baranowski, T., & Et al. (1997). Social-cognitive predictors of fruit and vegetable intake in children. *Health Psychology*, *16*(3), 272-276. doi: 10.1037//0278-6133.16.3.272

Reynolds, K. D., Hinton, A. W., Shewchuk, R. M., & Hickey, C. A. (1999). Social cognitive model of fruit and vegetable consumption in elementary school children. *Journal of Nutrition Education*,*31*(1), 23-30. doi: 10.1016/S0022-3182(99)70381-X

Robinson-O'Brien, R., Neumark-Sztainer, D., Hannan, P. J., Burgess-Champoux, T., & Haines, J. (2009). Fruits and vegetables at home: Child and parent perceptions. *Journal of Nutrition Education and Behavior*, *41*(5), 360-364. doi: 10.1016/j.jneb.2008.08.003

Robinson-O'Brien, R., Story, M., & Heim, S. (2009). Impact of garden-based youth nutrition intervention programs: A review. *Journal of the American Dietetic Association*, *109*(2), 273-280. doi: 10.1016/j.jada.2008.10.051

Scaglioni, S., Salvioni, M., & Galimberti, C. (2008). Influence of parental attitudes in the development of children eating behaviour. *British Journal of Nutrition*, *99*(S1), S22-S25. doi: 10.1017/S0007114508892471

Sjoberg, S., Kim, K., & Reicks, M. (2004). Applying the theory of planned behavior to fruit and vegetable consumption by older adults. *Journal of Nutrition For the Elderly*, *23*(4), 35-46. doi: 10.1300/J052v23n04_03

Strecher, V. J., McEvoy DeVellis, B., Becker, M. H., & Rosenstock, I. M. (1986). The role of self-efficacy in achieving health behavior change. *Health Education & Behavior*, *13*(1), 73-92. doi: 10.1177/109019818601300108

Taylor, J. P., Evans, S., & McKenna, M. (2005). Determinants of healthy eating in children and youth. *Canadian Journal of Public Health*, *96*(3), S20-S26.

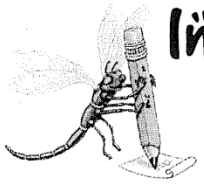
Vereecken, C., Vandamme, W., & Maes, L. (2005). Measuring attitudes, self-efficacy, and social and environmental influences on fruit and vegetable consumption of 11- and 12-year-old children: Reliability and validity. *Journal of the American Dietetic Association*, *105*(2), 257-261. doi: 10.1016/j.jada.2004.11.008

Watson, K., Baranowski, T., & Thompson, D. (2006). Item response modeling: an evaluation of the children's fruit and vegetable self-efficacy questionnaire. *Health Education Research*, *21*(1), 47-57.

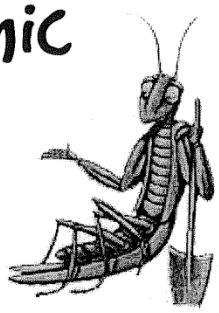
Watson, K., Baranowski, T., Thompson, D., Jago, R., Baranowski, J., & Klesges, L. M. (2006). Innovative application of a multidimensional item response model in assessing the influence of social desirability on the pseudo-relationship between self-efficacy and behavior. *Health Education Research*, *21*(Supplement 1), I85-I97. doi: 10.1093/her/cyl137

APPENDICES

Appendix A: EYWTBH Program Indiana Academic Standards Alignment



Indiana Academic Standards Grade 3



Activity	English/ Language Arts	Mathematics	Science	Social Studies
1. Hamburger Plant – To become aware of dependence on plants as the originator of most food sources.	7	n/a	3.2.6; 3.4.4; 3.4.6	n/a
2. Benefits Mobile – To be aware that all people depend on plants.	7	n/a	3.2.4; 3.2.5; 3.4.4; 3.4.6	n/a
3. Know & Show Sombrero – To show an understanding of the benefits of plants to people.	7	n/a	3.2.4; 3.2.5; 3.4.4; 3.4.6	n/a
4. The Choo-Choo Song – To associate a variety of plants with their food products by learning a song.	7	n/a	n/a	n/a
5. The Medicine Plant – To recognize the medicinal properties of the aloe vera plant.	7	n/a	3.4.3; 3.4.8	n/a
1. Leaves and Seeds Sort Info Chart – To be able to classify leaves and seeds as monocots and dicots.	2; 7	1	3.2.5; 3.2.6; 3.4.1; 3.4.2	n/a
1. Plant Parts Rap – To gain understanding of the main parts of a plant and the role each performs	7	n/a	3.6.1	n/a
2. Touch and Tell – To use information learned about plant parts to identify plant materials by touch.	7	n/a	3.1.2; 3.1.3; 3.1.4; 3.2.7	n/a
3. Plant Parts We Eat – To identify the various plant parts used for food.	7	6	3.1.2; 3.1.3; 3.1.4; 3.2.6; 3.2.7; 3.4.1; 3.4.2	n/a
4. Seed Science – To use the scientific method to determine the effect on plant growth of removing the cotyledons from seeds.	6; 7	1; 5	3.1.1; 3.1.2; 3.1.3; 3.1.4; 3.2.3; 3.2.6; 3.6.4	n/a
5. Flower Dissection – To identify the different parts of a flower	7	n/a	3.1.2; 3.1.3; 3.1.4; 3.6.1; 3.6.2	n/a
1. P.L.A.N.T. Needs – To become familiar with plants' needs.	7	n/a	3.4.6	n/a
2. What's Not the Same? – To become familiar with variables and constants.	6; 7	1; 5; 6	3.1.1; 3.1.2; 3.1.3; 3.1.4; 3.1.5; 3.2.3; .2.6; 3.6.4; 3.6.5	3.3.5
3. Plant People – To show an understanding of plant needs through creative arts.	7	5; 6	3.2.5; 3.5.1	n/a
4. Picture Yourself a Plant – To show an understanding of plant needs through creative arts.	5; 7	n/a	3.2.6; 3.3.7	n/a
1. Coconut Float – To illustrate the different ways seeds are dispersed.	7	n/a	3.1.2; 3.1.4; 3.4.6	n/a
2. Plant Performance – To develop an understanding of plant needs through creative writing.	5; 6; 7	n/a	n/a	n/a
3. Topiary Design – To create living, growing works of art.	7	1; 6	3.2.4; 3.2.5	n/a
4. Power Seeds – To observe the force that seeds exhibit when germinating.	7	n/a	3.1.1; 3.1.2; 3.1.4; 3.6.4; 3.6.5	n/a
1. Oxygen Factory – To illustrate the process of photosynthesis.	n/a	n/a	3.4.6; 3.5.5	n/a
2. Gas Gobblers – To demonstrate the interdependence that people and animals share with plants through the exchange of oxygen and carbon dioxide.	n/a	1; 4	3.1.5; 3.4.6; 3.5.5	n/a
3. Spinning Seeds – To determine the effect of geotropism on plants.	n/a	n/a	3.1.2; 3.1.3; 3.1.4; 3.1.5; 3.5.5; 3.6.4; 3.6.5	n/a
1. Paper Pots – To create recyclable pots and propagate plants by seed.	7	n/a	3.1.2; 3.1.4; 3.2.4; 3.2.5; 3.6.4; 3.6.5	n/a
2. Gallon Greenhouse – To show an understanding of the environment needed to propagate plants.	7	1	3.2.4; 3.2.5; 3.6.4; 3.6.5	n/a
3. Propagation Demonstration – To demonstrate how to propagate plants by direct seeding, stem cuttings, leaf cuttings, root cuttings, division, and layering.	n/a	1; 5	3.2.4; 3.6.4; 3.6.5	n/a

Activity	English/ Language Arts	Mathematics	Science	Social Studies
1. Touchy Feely – To understand soil texture and the properties of different soil types and soil particles.	7	4	3.1.2; 3.1.3; 3.1.4; 3.5.5; 3.6.3	n/a
2. Mud Pies – To feel the difference in soil textures.	7	n/a	3.1.2; 3.1.4; 3.6.3	n/a
3. Shake, Rattle, and Roll – To identify amounts of soil particles that make up a soil's textures.	7	1; 5; 6	3.1.2; 3.1.3; 3.1.4; 3.1.5; 3.2.4; 3.5.1; 3.5.3	n/a
4. Candy Aggregate – To create an edible model illustrating that soil is made up of many different components.	7	4	3.5.5; 3.6.3	n/a
1. Nutrient Variable – To use scientific method to study the effects of fertilizer on plant growth.	7	1; 2; 5; 6	3.1.2; 3.1.3; 3.1.4; 3.1.5; 3.2.2; 3.2.3; 3.2.4; 3.2.6; 3.4.7; 3.5.1; 3.5.3; 3.6.4; 3.6.5	n/a
2. The Numbers on the Bag – To gain an understanding of how nutrients in fertilizer help plants.	7	n/a	n/a	n/a
3. Bumps Below – To become familiar with plants that produce their own nitrogen.	7	n/a	3.1.2; 3.1.4; 3.2.6; 3.4.7	n/a
1. Building Bins and Compost Sandwiches – To build a composting bin for creating organic matter to amend soil.	n/a	1; 4; 5	3.1.8; 3.2.2; 3.2.5; 3.5.5	n/a
2. Composting Critters Page – To identify organisms that are a part of the composting process.	7	n/a	3.1.2; 3.1.3; 3.1.4; 3.2.4; 3.2.6	n/a
3. Compost Sandwich Composition – To compose a paragraph to support the claim that it is important to compost.	4; 5; 6	n/a	3.5.5	n/a
1. Earth Apple – To become familiar with plants' needs.	7	1	3.5.3; 3.5.5; 3.6.3	n/a
2. The Cloud Maker – To demonstrate the process of condensation.	7	n/a	3.1.2; 3.2.5; 3.5.5; 3.6.3	n/a
3. Cycle Song – To gain understanding of the water cycle through music.	7	n/a	n/a	n/a
4. Apple Rings and Banana Chips – To measure the amount of water in fruit.	7	1; 2; 5	3.1.1; 3.1.2; 3.1.3; 3.1.4; 3.2.1; 3.2.3; 3.2.4; 3.5.1; 3.5.2	n/a
1. Out of the Spout – To develop an understanding of how water moves through different soil textures.	7	1; 2; 5	3.1.2; 3.1.3; 3.1.4; 3.2.2; 3.2.4; 3.2.5; 3.5.1; 3.6.3	n/a
2. Where Did It Go? – To demonstrate that water can be held in air spaces in the soil.	7	1; 2; 5	3.1.1; 3.1.2; 3.2.1; 3.2.2; 3.5.1; 3.5.2; 3.6.3	n/a
3. Water Flows, Soil Goes – To demonstrate the effects of water erosion on bare soil.	7	1; 5	3.1.2; 3.1.4; 3.6.3; 3.6.5	n/a

Activity	English/ Language Arts	Mathematics	Science	Social Studies
1. Nature Class Web – To create a web to understand the interrelatedness of life on Earth.	7	n/a	3.2.7; 3.3.7; 3.6.1; 3.6.2; 3.6.3	3.3.5
2. The Food Chain Gang – To play a game representing the interrelatedness of animals and the environment within the food chain.	6; 7	n/a	3.3.7; 3.6.1; 3.6.2; 3.6.3	3.3.5
3. Polluting Your Planet – To observe the effects of pollution on a model of the Earth.	n/a	1; 5	3.1.2; 3.1.3; 3.1.4; 3.1.5; 3.3.7; 3.5.1; 3.6.3; 3.6.4; 3.6.5	3.3.5
4. Exploding Cactus – To demonstrate how cacti can store water.	7	n/a	3.1.2; 3.1.4; 3.1.5; 3.4.2; 3.6.3	n/a
5. Garden Weather Station – To create weather instruments and monitor weather conditions.	n/a	1; 2; 3; 4; 5	3.1.2; 3.1.3; 3.2.1; 3.2.3; 3.2.4; 3.2.5; 3.3.5; 3.5.1; 3.5.3; 3.6.4; 3.6.5	3.3.5
1. The Tree Community – To observe the variety of life supported by a single tree.	6; 7	n/a	3.1.2; 3.1.3; 3.1.4; 3.1.5; 3.2.3; 3.2.4; 3.2.6; 3.2.7; 3.3.6	3.3.5
2. Gourd Bird House – To grow and build habitats for birds using gourds.	n/a	n/a	3.2.5	n/a
3. Our Pocket Park – To beautify an outdoor area.	5; 6	5; 6	3.2.4; 3.2.6	3.3.5
4. Backyard Buddy – To reward environmentally friendly people.	7	2	3.1.2; 3.1.3	3.3.5
5. Visit with a Vet – To understand needs and habitats of animals in your community.	7	n/a	n/a	3.3.5
1. On the Move – To understand how pollution can create many indirect negative effects.	n/a	n/a	3.1.2; 3.1.4; 3.1.8; 3.4.8; 3.6.3	3.3.5
2. Both Sides of the Fence – To voice opinions in a debate format.	5; 7	n/a	3.1.5; 3.1.6; 3.1.8; 3.2.7	3.3.5
3. Weighing Wastes – To measure amount of food wastes produced at a meal and work to reduce wastes for the future.	6	1; 2; 6	3.1.2; 3.1.3; 3.1.4; 3.1.8; 3.5.1; 3.5.3	n/a
4. Let's Try Organic – To implement organic gardening ideas into a garden setting.	n/a	n/a	3.1.2; 3.1.4; 3.2.3; 3.2.4; 3.4.8	3.3.5
5. Xeriscape – To build a garden site using water conservation concepts.	n/a	n/a	3.1.2; 3.1.3; 3.1.4; 3.1.5	3.3.5
1. Vermi-composting – To recycle food wastes with vermi-composting	n/a	1; 5	3.1.2; 3.1.3; 3.1.4; 3.1.5; 3.1.6; 3.1.8; 3.2.3; 3.2.4; 3.2.6; 3.5.1; 3.6.4; 3.6.4	3.3.5
2. Supermowing Machine – To use creativity to invent a new mowing machine.	7	n/a	3.1.6; 3.2.6	n/a
3. Grow Cards – To recycle newspaper to create plantable greeting cards.	5	n/a	3.2.5	n/a
4. Know and Show Sombrero – To make wearable works of art with materials that can be recycled.	n/a	n/a	3.2.5	n/a
1. Plant Pounding – To transfer the likeness of plant parts to fabric.	n/a	n/a	3.2.4; 3.2.5	n/a
2. Let's Dye It – To color eggs or fabrics using dyes created from natural materials.	n/a	n/a	3.2.5	n/a
3. Nature Windows – To create art using natural materials.	n/a	5	3.2.4; 3.2.5	n/a
4. Garden Folk – To build a scarecrow.	n/a	n/a	3.2.4; 3.2.5	n/a
5. Nature Masks – To create wearable art using natural materials.	n/a	n/a	3.2.4; 3.2.5	n/a
6. Mother Nature's Children – To create art using natural materials.	n/a	n/a	3.2.5	n/a

Activity	English/ Language Arts	Mathematics	Science	Social Studies
1. Insect Predictions and Survey – To predict insect characteristics and learn what all insects have in common.	7	1; 6	3.1.2; 3.1.3; 3.1.4; 3.1.5; 3.2.4; 3.2.6; 3.4.1; 3.4.2; 3.5.3	3.3.5
2. Insect Symmetry – To learn and understand the concept o symmetry.	7	1; 4	3.2.5	n/a
3. The Great Cover-Up! – To learn and understand the concept of camouflage.	7	n/a	3.4.1; 3.5.5	3.3.5
4. Designer Bugs – To reinforce concepts learned about insects so far: their characteristics and the concepts of symmetry and camouflage.	5; 7	4	3.2.5	3.3.5
5. Insect Riddles – To reinforce basic concepts learned about insects so far, and to experiment with creative writing concepts by creating riddles.	1; 5; 6; 7	n/a	n/a	3.3.5
6. Secret Smells Game – To discover how insects communicate using pheromones.	n/a	n/a	3.1.2; 3.1.4; 3.1.5; 3.5.5	n/a
1. All in the Family: Insect Flash Cards – To learn that insects are organized in groups based on their characteristics. To learn the characteristics specific to a few groups of insects, called orders.	7	n/a	3.2.4; 3.2.5; 3.2.6; 3.4.1; 3.4.2	3.3.5
2. Ordering Insects – To learn to sort insects based on similarities and differences and to make a basic insect key.	n/a	n/a	3.1.2; 3.1.3; 3.1.4; 3.4.1; 3.4.2	n/a
3. Metamorphosis Bracelets and Belts – To learn the stages of metamorphosis	n/a	n/a	3.2.5; 3.2.6; 3.4.1; 3.4.2; 3.4.3	n/a
4. Morpho Puppets – To learn the stages of complete metamorphosis, and teach them to a younger group.	7	n/a	3.2.5; 3.4.3	n/a
5. JMG Web Activity: Journey North – To gain familiarity with the Internet as a research tool.	5	n/a	3.1.6; 3.1.7; 3.2.4	3.3.3; 3.3.4; 3.3.5; 3.3.6
1. Suck-A-Bug! – To make a simple aspirator and use it to collect and observe small insects.	n/a	n/a	3.1.2; 3.2.5	n/a
2. It's a Small World – To create a Berlese funnel and use it to collect and observe insects living in the ground and soil.	5; 7	1; 5; 6	3.1.2; 3.1.3; 3.1.4; 3.2.4; 3.2.5	3.3.5
3. Insect Nets – To make an insect net and use it to collect samples of insects by sweeping.	n/a	5; 6	3.1.2; 3.1.4; 3.2.4; 3.2.5; 3.5.1	3.3.5
4. By Land or Sea – To compare and contrast the types of insects living in different habitats.	6; 7	1; 6	3.1.2; 3.1.3; 3.1.4; 3.2.1; 3.2.4	3.3.5
5. Ant Lion Farm – To make a living collection of one type of insect and observe it closely as it builds its home.	7	n/a	3.1.2; 3.1.3; 3.1.4; 3.2.4; 3.2.6; 3.6.4	n/a
1. Chew on This! – To learn the four types of insect mouthparts and how they are specialized.	n/a	n/a	3.2.4; 3.2.5; 3.4.1; 3.4.2	n/a
2. School Yard Survey – To survey the school yard for signs of insect damage and to determine the types of insects that caused the damage.	7	6	3.1.2; 3.1.3; 3.1.4; 3.2.4; 3.4.1; 3.4.2	3.3.5
3. Pollinator Puppet Show – To learn the basic process of insect pollination.	7	n/a	3.2.4; 3.2.5; 3.5.5; 3.6.3	3.3.5
4. The Bartering System – To learn how plants and insects trade services, and to become familiar with the concept of an energy exchange.	n/a	1	3.2.1; 3.2.5; 3.4.1; 3.5.5; 3.6.3	n/a
5. The Lone Bee – To learn about solitary bees and create a bee home for them.	n/a	n/a	3.2.5	3.3.5
6. Designer Plants and Insects – To combine previously learned concepts in creating insects and plants that are designed to work together.	5	n/a	3.1.2; 3.1.4; 3.2.4; 3.2.5	n/a

Indiana Academic Standards • Grade 3 – Insects and Diseases (continued)

Activity	English/ Language Arts	Mathematics	Science	Social Studies
1. Garden Friends and Foes – To learn the difference between beneficial and pest insects, and to learn a few examples of each type.	n/a	n/a	3.1.2; 3.1.4; 3.2.4; 3.2.5; 3.4.1	n/a
2. Don't Bug Me! – To identify pest insects of various organisms, and to discover the interrelatedness of all living organisms.	n/a	n/a	3.1.2; 3.1.4; 3.2.4; 3.4.1; 3.4.2	3.3.5
3. Who Goes There? – To learn the basics of Integrated Pest Management (IPM), and to create a classroom IPM charting system.	2	n/a	3.1.2; 3.1.3; 3.1.4; 3.2.3; 3.2.4; 3.2.6; 3.4.1; 3.4.2	n/a
4. Critter Creations – To learn the four types of beneficial insects and why they are considered beneficial.	5	n/a	3.2.4; 3.2.5	n/a
1. Exploratory Fungi – To observe the variety of fungal spores in the air.	5	n/a	3.1.1; 3.1.2; 3.1.3; 3.1.4; 3.4.7; 3.4.9	n/a
2. Yeast Bread – To learn how one fungus – yeast – is used in cooking and what purpose it serves.	7	1; 5	3.1.2; 3.1.4; 3.2.2	n/a
3. Lacy Leaves – To observe organic matter (decaying leaves) being decomposed by fungi.	7	n/a	3.1.2	n/a
4. Likin' those Lichens – To learn about lichens and mutually beneficial relationships.	5; 7	n/a	3.1.2; 3.1.4; 3.1.5	n/a
5. Prescription for Prevention – To learn the components of the disease triangle and the concept of IPM.	3	n/a	3.1.2; 3.1.3; 3.1.4; 3.2.5	n/a
6. There's a Fungus Among Us! – To observe and identify fungi that act as pests in the garden.	2	n/a	3.1.2; 3.1.3; 3.1.4	n/a

Activity	English/ Language Arts	Mathematics	Science	Social Studies
1. Rooms – To understand that areas within a space serve a special purpose and to define those areas.	7	n/a	n/a	n/a
2. People and Places – To understand that different people use yard space differently.	2; 7	n/a	3.2.6	3.3.6
3. Money Trees – To understand that trees help to save energy and money.	7	n/a	3.1.2; 3.1.4	n/a
4. Site Map – To experience an initial step in the landscape design process.	2	1; 2; 4; 5; 6	3.1.2; 3.1.3; 3.1.4; 3.2.4; 3.2.6	3.3.6
1. Nature Wheels – To build a color wheel from items found in nature and understand the relationship of one color to another.	7	n/a	3.1.2; 3.1.3; 3.1.4	3.3.3; 3.3.4; 3.3.5
2. Texture Collection – To understand how the design element, "texture," is used to visually create interest in the landscape.	5; 6; 7	n/a	3.1.2; 3.1.3; 3.1.4	n/a
3. Same Sides – To understand balance, an element of design, using symmetrical and asymmetrical visuals.	7	4	3.1.2; 3.1.3; 3.1.4; 3.2.4	n/a
4. Does It Fit? – To demonstrate understanding of proportion, a design element.	n/a	2; 5; 6	3.1.2; 3.1.4; 3.2.4	n/a
1. Tearing Trees – To learn to identify trees based on their classification and shape.	2; 4	4	3.1.2; 3.1.3; 3.1.4; 3.2.4; 3.2.5; 3.4.1; 3.4.2	n/a
2. How Tall is that Tree? – To measure the height of a large tree.	n/a	1; 2; 5; 6	3.1.2; 3.1.3; 3.1.4; 3.2.4	n/a
3. Learning Your ABPs – To understand plant classifications.	7	n/a	3.4.1; 3.4.2; 3.4.3	n/a
4. Great Green Grass – Selection of grasses should be based on care and maintenance requirements.	7	n/a	3.1.3; 3.1.4; 3.2.6	n/a
1. Arbor Day – Understanding that trees are an important natural resource and ways people celebrate their friend, the tree.	5; 7	n/a	3.2.4	n/a
2. "Do it Right" – To demonstrate through creative dramatics the proper way to plant a tree.	2; 4; 5; 6; 7	n/a	3.1.2; 3.1.4	n/a
3. Seed, Sod and Plugs – To become familiar with different methods used in establishing a lawn.	4; 5; 6; 7	n/a	3.1.2; 3.1.3; 3.1.4;	3.3.5
1. An Inch of Water – To understand lawn mower use, water conservation and money saving through proper use of irrigation systems.	n/a	1; 2; 4; 5; 6	3.1.2; 3.1.3; 3.1.4; 3.1.5; 3.2.1; 3.2.4	n/a
2. Pruning Places – To learn proper pruning techniques and why plants are pruned.	n/a	5	3.2.4; 3.6.4; 3.6.5	n/a
3. More Mulch, More Moist – To study the effects of mulch on conserving water.	7	5	3.1.2; 3.1.3; 3.1.4; 3.2.2; 3.2.4; 3.6.4	n/a
4. Queen Bud – To learn the difference between terminal buds and lateral buds and their effects on plants.	7	n/a	3.1.2; 3.1.4; 3.1.5	n/a

Activity	English/ Language Arts	Mathematics	Science	Social Studies
1. Dr. Fruit – To research origins and relevant information about fruit and nuts.	2; 7	2; 5	3.2.4	n/a
2. Linnaeus' World Wide Names – To become aware of the dependence all people have on plants.	6	n/a	3.4.1; 3.4.2	3.1.4
3. Botanical Wood Prints – To recreate a historical wood press.	7	n/a	n/a	n/a
4. A Bushel and a Peck – To gain understanding of nontraditional measurements.	7	1; 3; 5	3.1.2; 3.1.3; 3.1.4; 3.2.1	n/a
5. Fruit and Veggie Lab – To learn what a fruit is and to explore the difference between technical definitions and social customs.	2; 7	n/a	3.1.2; 3.1.4	3.1.4
1. Snooty Fruit – To identify various fruits and nuts using sense of smell.	7	n/a	3.1.2; 3.1.4	n/a
2. Apple-ing Appearance – To create an instrument to evaluate apples on shape and color, and contrast the results with evaluation based on taste.	6; 7	1	3.1.2; 3.1.4	n/a
3. Taste Test – To evaluate fruit based on color, texture, taste and smell.	2; 7	n/a	3.1.2; 3.1.4	n/a
4. JMG Jam – To use measurements to create a fruit product.	2; 7	1; 5	3.1.2; 3.1.4; 3.2.2	n/a
5. Johnny's Appleslop – To gain understanding of the main parts of a plant and role each perform.	7	1; 5	n/a	3.1.4
1. A Fruit's Life Rhyme – To gain understanding of the life cycle of plants.	7	n/a	n/a	n/a
2. Fruit Frenzy – To become familiar with the way fruits and vegetables develop around seeds.	7	1; 2	3.1.2; 3.1.3; 3.1.4; 3.2.6	n/a
3. The Zones – To identify the appropriate plants for a particular temperature zone.	7	n/a	3.1.2 ; 3.1.4 ; 3.3.1 ; 3.3.3 ; 3.3.5	3.3.1; 3.3.3 ; 3.3.4; 3.3.5
4. Just Chill – To simulate a winter environment to provide the chilling requirement for an apple seed.	7	n/a	3.1.2; 3.1.4	n/a
5. Fruit Factory – To use reference material to choose a fruit or nut tree to plant or transplant.	7	n/a	3.1.2; 3.1.4	n/a

Activity	English/ Language Arts	Mathematics	Science	Social Studies
1. Home Sweet Home – To understand the criteria for selecting a good garden site and to select an appropriate garden site based on those criteria.	7	n/a	3.1.2; 3.1.3; 3.1.4; 3.3.1	3.3.5
2. Make Your Pick – To select appropriate crops for planting based on season.	2; 7	n/a	3.1.2; 3.1.3; 3.1.4; 3.2.4; 3.4.1; 3.4.2	n/a
3. Small and Large – To gain an understanding of space considerations when planting seeds.	n/a	1; 5	3.2.4; 3.2.5; 3.5.1; 3.5.2	n/a
4. Rules are Rules – To establish rules for the garden that make it a safer place to learn.	6; 7	n/a	n/a	n/a
5. Schedule It – To establish a schedule where all learners take part in maintaining the watering and weeding of the garden.	n/a	1; 2; 5	3.1.2; 3.1.3; 3.1.4; 3.2.4	3.3.5
6. Some Like It Hot – To distinguish between warm-season and cool-season crops.	1	n/a	3.4.1; 3.4.2	n/a
1. Cylinder Gardening – To successfully grow vegetables and herbs in containers.	n/a	n/a	3.1.2; 3.1.3; 3.1.4; 3.2.2; 3.2.5; 3.6.4; 3.6.5	n/a
2. Paper Towel Gardening – To create seed mats and transplant templates that will aid in organizing and laying out the garden.	n/a	1; 5	3.2.5	n/a
3. Tender Transplants – to understand the benefits and practice techniques of transplanting.	5; 7	5	3.2.4; 3.5.1	n/a
4. Weed Mats – To create a natural form of weed control.	2; 7	n/a	3.1.5; 3.2.5	n/a
5. Season Extenders – To create an environment for plants.	n/a	n/a	3.1.7; 3.2.6	3.3.4
1. Garden to the Table – To determine harvest time of various garden vegetables.	n/a	n/a	3.2.1; 3.1.3; 3.1.4; 3.1.5; 3.2.7	n/a
2. Beauty Contest – To rank vegetables based on appearance.	5; 7	n/a	3.1.2; 3.1.3; 3.1.4; 3.1.5	n/a
3. Seed Bank – To collect seeds from various fruits and vegetables.	n/a	n/a	3.4.3	n/a
1. The Pyramid – to use the Food Guide Pyramid to plan balanced meals.	n/a	4	3.2.5; 3.4.7; 3.4.8	n/a
2. Food Safety – To understand and practice food safety rules.	7	n/a	3.4.8; 3.4.9	n/a
3. Label Reader – To learn the importance of eating breakfast and how to make healthful food choices by using information from food labels.	2; 3; 7	1; 3	3.4.6; 3.4.7; 3.4.8; 3.5.5	n/a
4. Veggie Taste Test – To evaluate vegetables based on color, texture, taste and smell.	7	n/a	3.1.2; 3.1.3; 3.1.4	n/a
5. Junk Food Blues – To understand the values of healthful eating habits by learning a song.	7	n/a	n/a	n/a
1. Garden Veggie Casserole – To create a casserole with vegetables from your garden.	n/a	1; 2; 5	3.2.2; 3.5.1	n/a
2. Veggie Pizza – To use the Food Guide Pyramid to plan balanced meals.	n/a	1; 5; 6	3.2.2; 3.5.1	n/a
3. Party Confetti Salad – To use the Food Guide Pyramid to plan balanced meals.	7	1	3.1.2; 3.1.3; 3.1.4; 3.4.9	n/a
4. Cultural Cooking – To plan, plant, and harvest a theme garden that will grow ingredients for a recipe from different cultures.	n/a	n/a	n/a	3.5.4
5. Garden Sponges – To grow and harvest a crop of loofa sponges.	n/a	n/a	3.2.6; 3.6.4; 3.6.5	n/a
1. Touch and Smell – To identify herbs based on the sense of touch and smell.	7	n/a	3.1.2; 3.1.3; 3.1.4	n/a
2. Herbal Vinegar – To make and bottle herbal vinegar.	n/a	n/a	3.2.2	n/a
3. Herbal Bath Salts – To prepare herbal bath salts wraps.	n/a	5	n/a	n/a
4. Herb Sachets – To create herb sachets from dried herbs.	n/a	2; 4; 5	3.2.4; 3.2.5	n/a

Activity	English/ Language Arts	Mathematics	Science	Social Studies
1. Who are You? – To understand the many roles we have in life and to begin to understand that each member is a unique and special person.	5; 6; 7	n/a	n/a	n/a
2. "What Are You Like?" – To help members examine their feelings, self-concepts and values as they make choices.	5; 7	n/a	n/a	n/a
3. Know Your JMG Friends – To recognize positive attributes of fellow students.	7	n/a	n/a	n/a
4. Good JMG'ers Wanted Posters – To confirm each student's uniqueness by taking fingerprints.	7	n/a	n/a	n/a
5. How Would You Feel? – To understand that how you treat other people is very important.	7	n/a	n/a	n/a
6. Feeling Bee – To recognize that others have some of the same feelings you do in certain situations.	5; 6; 7	n/a	n/a	n/a
1. Where's My Fruit? – To demonstrate the importance of sharing with your friends.	7	1	n/a	n/a
2. Let's Build It – To learn the importance of cooperation in a group situation.	5; 6; 7	n/a	n/a	n/a
3. JMG Cooperation Roster - To learn the importance of cooperation in a group situation.	7	n/a	n/a	n/a
4. Musical Chairs with a Twist – To learn the importance of cooperation and sharing in a group.	7	n/a	n/a	n/a
5. Over and Under – To illustrate group cooperation in a competitive situation.	7	n/a	n/a	n/a
6. Cooperation Countdown – To demonstrate the importance of cooperation in a group.	7	n/a	n/a	n/a
1. Garden Shed – To develop listening/communication skills.	7	n/a	n/a	n/a
2. Who's On Our Team? – To identify and practice different modes and methods of communication.	5; 7	n/a	n/a	n/a
3. Can You Follow Me? – To identify and practice different methods of communication.	7	4	n/a	n/a
4. Plant a Seed – To demonstrate the importance of clear verbal communication.	5; 6; 7	n/a	n/a	n/a
1. Goal Search – To teach members what a goal is.	5; 7	n/a	n/a	n/a
2. Right On Target – To demonstrate the skills needed for goal setting and to set personal goals.	7	1	n/a	n/a
3. The Class/Club Chronicle – To write appropriate short-term personal goals.	5; 6	n/a	n/a	n/a
4. Watch Me Grow – To discuss the different types of goals: short- and long-term.	7	n/a	n/a	n/a
1. Making A Machine – To teach group cooperation and the importance of each member's role.	7	n/a	3.6.1; 3.6.2	n/a
2. Create A Costume – To simulate creative thinking and to implement the group decision-making process.	7	n/a	3.1.5; 3.2.5	n/a
3. Pass It On – To help group members get to know each other.	2; 4; 5; 6; 7	n/a	n/a	n/a
4. Either/Or – To explain the decision-making process.	7	n/a	3.1.1	n/a
5. Let's Make a Case Out of It – To explain how the decision-making process works in reaching a group decision.	7	n/a	3.1.2; 3.1.4	n/a
6. It's In the Bag – To understand the importance of gathering information for decision making and problem solving.	4; 5; 6; 7	n/a	3.1.2; 3.1.4	n/a

Activity	English/ Language Arts	Mathematics	Science	Social Studies
1. Shared Responsibility – To understand your responsibility to a group and its members.	7	n/a	n/a	n/a
2. Consequences – To understand self-responsibility.	7	n/a	3.1.2; 3.1.4	n/a
3. Touchdown – To set responsibility goals to work toward.	2; 7	1	n/a	n/a
4. Don't Stamp Me – To determine whether stereotypes influence how we act and respond to situations.	7	n/a	n/a	n/a
1. Careers and School – To compare and contrast school and the world of work.	2; 4; 5; 6; 7	n/a	n/a	n/a
2. Career Teams – To analyze various careers in terms of group or individual involvement.	7	n/a	n/a	n/a
3. When I Grow Up – To become aware of the choices to make when choosing a career.	2	n/a	n/a	n/a
4. Dream House – To identify the impact of various careers on the world.	2; 7	n/a	n/a	n/a
5. All For One – To identify careers that operate independently and those that operate as a team.	7	n/a	n/a	n/a

Appendix B: Version 3 EYWTBH Youth & Parent/Guardian Questionnaires

PLEASE DO NOT put your name on this survey. #_____ (please put your assigned number here.)

PURDUE UNIVERSITY

Eat Your Way to Better Health and Junior Master Gardener® Health and Nutrition from the Garden
Youth Pre-Survey

Please answer these questions by filling in the oval of the best answer. We will ask you the same questions at the end of the gardening program you are going to be doing in class for the next 8-12 weeks. This survey will not be part of your school grade.

Which of these fruits did you eat **in the last week**? (Fill in the oval of **all the fruits** you ate)




1. **a**. Apple/Applesauce **b**. Cantaloupe/Muskmelon **c**. Oranges **d**. Cherries **e**. Plum

---






2. **a**. Bananas **b**. Grapes **c**. Pears **d**. Kiwi **e**. Pineapple **f**. Fruit Salad

---





3. **a**. Mango **b**. Peaches **c**. Watermelon **d**. Dried Fruit (raisins, etc.) **e**. Grapefruit

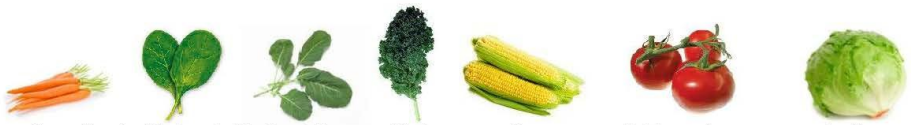
---






4. **a**. Strawberries **b**. Blue/Black/Raspberries **c**. Nectarines **d**. Tangerines (Clementines)

Which of these vegetables did you eat **in the last week**? (Fill in the oval of **all** the vegetables you ate)



5. **a**. Carrots **b**. Spinach/Collard Greens/Kale **c**. Corn **d**. Tomatoes **e**. Lettuce

---

6. **a**. Celery **b**. Baked beans **c**. Radishes **d**. Green Peas **e**. Broccoli **f**. Cabbage

---

7. **a**. Olives **b**. Potatoes **c**. Okra **d**. Green Beans **e**. Sweet Potatoes/Yams

---

8. **a**. Cucumbers **b**. Cauliflower **c**. Asparagus **d**. Green/Red/Yellow Peppers **e**. Beets

Please fill in the oval of the answer that best describes <u>your feelings or actions</u>.

9. **<u>How many</u>** fruits and vegetables do you eat at home **<u>every day</u>**?

a. 0 **b.** 1 **c.** 2 **d.** 3 **e.** 4 **f.** 5 or more per day

---

10. I help prepare meals with my parents/guardians:

a. Once a day **b.** Once a week **c.** Once a month **d.** Less than once a month **e.** Never

---

I think that…

11. I can ask someone in my family to buy my favorite fruit or vegetable.

a. Disagree a lot **b.** Disagree a little **c.** Agree a little **d.** Agree a lot

12. I can ask someone in my family to have **<u>fruits</u>** out where I can reach them.

a. Disagree a lot **b.** Disagree a little **c.** Agree a little **d.** Agree a lot

13. I can ask someone in my family to have **<u>vegetables</u>** out where I can reach them.

a. Disagree a lot **b.** Disagree a little **c.** Agree a little **d.** Agree a lot

---

<u>For a snack</u>, I think that…

14. I can choose my favorite **<u>fruit</u>** instead of my favorite **<u>cookie</u>**.

a. Disagree a lot **b.** Disagree a little **c.** Agree a little **d.** Agree a lot

For a snack, I think that…

15. I can choose my favorite **fruit** instead of my favorite **candy**.

a. Disagree a lot **b.** Disagree a little **c.** Agree a little **d.** Agree a lot

16. I can choose my favorite **vegetable** instead of my favorite **cookie**.

a. Disagree a lot **b.** Disagree a little **c.** Agree a little **d.** Agree a lot

17. I can choose my favorite **vegetable** instead of my favorite **candy**.

a. Disagree a lot **b.** Disagree a little **c.** Agree a little **d.** Agree a lot

18. I can choose my favorite **vegetable** instead of **chips**.

a. Disagree a lot **b.** Disagree a little **c.** Agree a little **d.** Agree a lot

---

I think that…

19. I can eat **2 or more** servings of fruits or fruit juices each day.
(Serving = a handful or glass)

a. Disagree a lot **b.** Disagree a little **c.** Agree a little **d.** Agree a lot

20. I can eat **3 or more** servings of vegetables or vegetable juices each day.
(Serving = a handful or glass)

a. Disagree a lot **b.** Disagree a little **c.** Agree a little **d.** Agree a lot

21. I can eat **5 or more** servings of fruits and vegetables each day.
(Serving = a handful or glass)

a. Disagree a lot **b.** Disagree a little **c.** Agree a little **d.** Agree a lot

Please fill in the oval of the things you like as <u>snacks</u>.

Which of these do you like to eat at home for a **<u>snack</u>**? (Fill in the oval of **<u>all</u>** <u>the foods</u> you like to eat for a snack at home)

22. **a**. Apples/Applesauce **b**. Cucumbers **c**. Cupcakes/cake **d**. Strawberries **e**. Celery

---

23. **a**. Pineapples **b**. Pickles **c**. Candy **d**. Watermelon **e**. Ice Cream **f**. Salad

---

24. **a**. Broccoli **b**. Green/Red/Yellow Peppers **c**. Cereal **d**. Pudding **e**. Fruit Salad

---

25. **a**. Chocolate **b**. Bananas **c**. Popcorn **d**. Oranges **e**. Dried Fruits (raisins, etc.)

Which of these do you like to eat at home for a **snack**? (Fill in the oval of **all** the foods you like to eat for a snack at home)

26. **a**. Kiwis **b**. Pie **c**. Corn **d**. Chips **e**. Tangerines (Clementines) **f**. Pears

---

27. **a**. Blue/Black/Raspberries **b**. Brownies **c**. Yogurt **d**. Cherries **e**. Plums **f**. Grapefruits

---

28. **a**. Cookies **b**. Green beans **c**. Cauliflower **d**. Fruit Snacks **e**. Radishes **f**. Green Peas

---

29. **a**. Peaches **b**. Mango **c**. Nectarine **d**. Carrots **e**. Crackers **f**. Candy Bar

---

30. **a**. Pop-Tarts **b**. Cantaloupe/Muskmelon **c**. Grapes **d**. Popsicles **e**. Tomatoes

Gardening

31. Do you grow fruits and vegetables at home?

a. Yes **b.** No

---

32. Do you think it is fun to garden at home?

a. Agree a lot **b.** Agree a little **c.** Disagree a little **d.** Disagree a lot

---

33. I like to visit our garden.

a. Agree a lot **b.** Agree a little **c.** Disagree a little **d.** Disagree a lot

---

34. Why do you think it is fun to garden at home? (Fill in the oval of **all the reasons** that apply)

a. I like working in the garden.	**f.** I like to help my family save money.
b. It's fun to eat what you grow.	**g.** I like being helpful.
c. I like to get dirty.	**h.** It gives me something to do.
d. I like to pick the vegetables.	**i.** I don't think it is fun to garden.
e. I can do it with my family and spend time together.	**j.** I do not have a garden.

Eating fruits and vegetables.

35. How many different **kinds** of fruits and vegetables did your mom and dad (or guardians) use to make dinner last night?

a. 0 **b.** 1-3 **c.** 4-6 **d.** 7 or more

---

36. I think it is fun to try new fruits and vegetables.

a. Agree a lot **b.** Agree a little **c.** Disagree a little **d.** Disagree a lot

---

37. I like to eat fruits and vegetables.

a. Agree a lot **b.** Agree a little **c.** Disagree a little **d.** Disagree a lot

38. **My mom (or guardian)** likes to eat fruits and vegetables.

a. Agree a lot **b.** Agree a little **c.** Disagree a little **d.** Disagree a lot **e.** Does not apply

---

39. **My dad (or guardian)** likes to eat fruits and vegetables.

a. Agree a lot **b.** Agree a little **c.** Disagree a little **d.** Disagree a lot **e.** Does not apply

---

40. I talk to **my mom and dad or guardians** about what I learn in school.

a. Almost every day (5 or more days/week) **b.** Most days (3-4 days/week) **c.** Once in a while (1-2 days/week) **d.** Occasionally (1-2 days/month) **e.** Never

---

41. What have your **mom or dad or guardians** told you about fruits and vegetables? (Fill in the oval of **all the things** your mom and dad or guardians told you)

a. Fruits and vegetables are healthy and good for me.	**e.** I should try new fruits and vegetables.
b. Fruits and vegetables make me strong and give me energy.	**f.** I should eat fruits and vegetables instead of candy.
c. Fruits and vegetables taste good.	**g.** They don't talk to me about fruits and vegetables.
d. I have to eat fruits and vegetables.	

---

42. What would you tell your **friends** about eating fruits and vegetables? (Fill in the oval of **all the things** you would tell your friends)

a. Fruits and vegetables are better than you think.	**f.** Some of them are yucky.
b. Fruits and vegetables are very healthy.	**g.** Cookies and candy taste better.
c. Some fruits and vegetables are tasty.	**h.** Cookies and candy are better for you.
d. Eat different fruits and vegetables every day.	**i.** Nothing
e. Fruits and vegetables are fun to grow and eat.	

Please tell us a little about you. Please fill in the oval of your answer.

43. Are you: **a.** Girl **b.** Boy

---

44. How old are you? **a.** 7 **b.** 8 **c.** 9 **d.** 10 **e.** 11 **f.** 12

---

45. How do you describe yourself?
(Please fill in the **one** oval that best applies)

a. African-American, not of Hispanic origin	**e.** Hispanic
b. American Indian or Alaskan Native	**f.** White, not Hispanic origin
c. Asian	**g.** More than one
d. Native Hawaiian/Pacific Islander	

---

46. How would you describe the place where you live?
(Please fill in the **one** oval that best applies)

a. On a farm	**d.** A suburb of a city with more than 50,000 people
b. A small town with less than 10,000 people	**e.** A large city with more than 50,000 people
c. A medium sized city with between 10,000 and 50,000 people	**f.** A very large city with more than 100,000 people (South Bend, Evansville, Fort Wayne, Indianapolis)

Thanks for answering these questions! ☺

DO NOT put your name on this survey. #_____ (please put your assigned number here.)

PURDUE UNIVERSITY

Eat Your Way to Better Health and Junior Master Gardener® Health and Nutrition from the Garden Youth Post-Survey

Please answer these questions by filling in the oval of the best answer. We asked you the same questions before beginning this program. This survey will not be part of your school grade.

Which of these fruits did you eat **in the last week**? (Fill in the oval of **all** the fruits you ate)





1. **a**. Apple/Applesauce **b**. Cantaloupe/Muskmelon **c**. Oranges **d**. Cherries **e**. Plum

---






2. **a**. Bananas **b**. Grapes **c**. Pears **d**. Kiwi **e**. Pineapple **f**. Fruit Salad

---





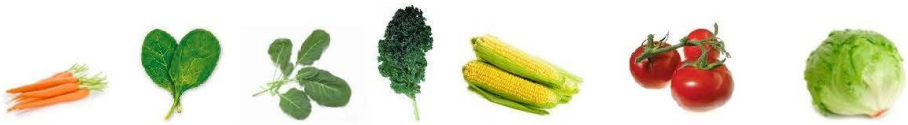
3. **a**. Mango **b**. Peaches **c**. Watermelon **d**. Dried Fruit (raisins, etc.) **e**. Grapefruit

---




4. **a**. Strawberries **b**. Blue/Black/Raspberries **c**. Nectarines **d**. Tangerines (Clementines)

Which of these vegetables did you eat **in the last week**? (Fill in the oval of **all** the vegetables you ate)



5. **a**. Carrots **b**. Spinach/Collard Greens/Kale **c**. Corn **d**. Tomatoes **e**. Lettuce

---

6. **a**. Celery **b**. Baked beans **c**. Radishes **d**. Green Peas **e**. Broccoli **f**. Cabbage

---

7. **a**. Olives **b**. Potatoes **c**. Okra **d**. Green Beans **e**. Sweet Potatoes/Yams

---

8. **a**. Cucumbers **b**. Cauliflower **c**. Asparagus **d**. Green/Red/Yellow Peppers **e**. Beets

Please fill in the oval of the answer that best describes <u>your feelings or actions</u>.

9. **<u>How many</u>** fruits and vegetables do you eat at home **<u>every day</u>**?

a. 0 **b.** 1 **c.** 2 **d.** 3 **e.** 4 **f.** 5 or more per day

---

10. I help prepare meals with my parents/guardians:

a. Once a day **b.** Once a week **c.** Once a month **d.** Less than once a month **e.** Never

---

I think that…

11. I can ask someone in my family to buy my favorite fruit or vegetable.

a. Disagree a lot **b.** Disagree a little **c.** Agree a little **d.** Agree a lot

12. I can ask someone in my family to have **<u>fruits</u>** out where I can reach them.

a. Disagree a lot **b.** Disagree a little **c.** Agree a little **d.** Agree a lot

13. I can ask someone in my family to have **<u>vegetables</u>** out where I can reach them.

a. Disagree a lot **b.** Disagree a little **c.** Agree a little **d.** Agree a lot

---

<u>For a snack</u>, I think that…

14. I can choose my favorite **<u>fruit</u>** instead of my favorite **<u>cookie</u>**.

a. Disagree a lot **b.** Disagree a little **c.** Agree a little **d.** Agree a lot

For a snack, I think that…

15. I can choose my favorite **fruit** instead of my favorite **candy**.

a. Disagree a lot **b.** Disagree a little **c.** Agree a little **d.** Agree a lot

16. I can choose my favorite **vegetable** instead of my favorite **cookie**.

a. Disagree a lot **b.** Disagree a little **c.** Agree a little **d.** Agree a lot

17. I can choose my favorite **vegetable** instead of my favorite **candy**.

a. Disagree a lot **b.** Disagree a little **c.** Agree a little **d.** Agree a lot

18. I can choose my favorite **vegetable** instead of **chips**.

a. Disagree a lot **b.** Disagree a little **c.** Agree a little **d.** Agree a lot

---

I think that…

19. I can eat **2 or more** servings of fruits or fruit juices each day.
(Serving = a handful or glass)

a. Disagree a lot **b.** Disagree a little **c.** Agree a little **d.** Agree a lot

20. I can eat **3 or more** servings of vegetables or vegetable juices each day.
(Serving = a handful or glass)

a. Disagree a lot **b.** Disagree a little **c.** Agree a little **d.** Agree a lot

21. I can eat **5 or more** servings of fruits and vegetables each day.
(Serving = a handful or glass)

a. Disagree a lot **b.** Disagree a little **c.** Agree a little **d.** Agree a lot

Please fill in the oval of the things you like as <u>snacks</u>.

Which of these do you like to eat at home for a **<u>snack</u>**? (Fill in the oval of **<u>all</u>** <u>the foods</u> you like to eat for a snack at home)

22. **a**. Apples/Applesauce **b**. Cucumbers **c**. Cupcakes/cake **d**. Strawberries **e**. Celery

---

23. **a**. Pineapples **b**. Pickles **c**. Candy **d**. Watermelon **e**. Ice Cream **f**. Salad

---

24. **a**. Broccoli **b**. Green/Red/Yellow Peppers **c**. Cereal **d**. Pudding **e**. Fruit Salad

---

25. **a**. Chocolate **b**. Bananas **c**. Popcorn **d**. Oranges **e**. Dried Fruits (raisins, etc.)

Which of these do you like to eat at home for a **snack**? (Fill in the oval of **all** the foods you like to eat for a snack at home)

26. **a**. Kiwis **b**. Pie **c**. Corn **d**. Chips **e**. Tangerines (Clementines) **f**. Pears

---

27. **a**. Blue/Black/Raspberries **b**. Brownies **c**. Yogurt **d**. Cherries **e**. Plums **f**. Grapefruits

---

28. **a**. Cookies **b**. Green beans **c**. Cauliflower **d**. Fruit Snacks **e**. Radishes **f**. Green Peas

---

29. **a**. Peaches **b**. Mango **c**. Nectarine **d**. Carrots **e**. Crackers **f**. Candy Bar

---

30. **a**. Pop-Tarts **b**. Cantaloupe/Muskmelon **c**. Grapes **d**. Popsicles **e**. Tomatoes

Gardening

31. Do you grow fruits and vegetables at home?

a. Yes **b.** No

---

32. Do you think it is fun to garden at home?

a. Agree a lot **b.** Agree a little **c.** Disagree a little **d.** Disagree a lot

---

33. I like to visit our garden.

a. Agree a lot **b.** Agree a little **c.** Disagree a little **d.** Disagree a lot

---

34. Why do you think it is fun to garden at home? (Fill in the oval of **all the reasons** that apply)

a. I like working in the garden.	**f.** I like to help my family save money.
b. It's fun to eat what you grow.	**g.** I like being helpful.
c. I like to get dirty.	**h.** It gives me something to do.
d. I like to pick the vegetables.	**i.** I don't think it is fun to garden.
e. I can do it with my family and spend time together.	**j.** I do not have a garden.

Eating fruits and vegetables.

35. How many different **types** of fruits and vegetables did your mom and dad (or guardians) use to make dinner last night?

a. 0 **b.** 1-3 **c.** 4-6 **d.** 7 or more

---

36. I think it is fun to try new fruits and vegetables.

a. Agree a lot **b.** Agree a little **c.** Disagree a little **d.** Disagree a lot

---

37. I like to eat fruits and vegetables.

a. Agree a lot **b.** Agree a little **c.** Disagree a little **d.** Disagree a lot

38. **My mom (or guardian)** likes to eat fruits and vegetables.

a. Agree a lot **b.** Agree a little **c.** Disagree a little **d.** Disagree a lot **e.** Does not apply

---

39. **My dad (or guardian)** likes to eat fruits and vegetables.

a. Agree a lot **b.** Agree a little **c.** Disagree a little **d.** Disagree a lot **e.** Does not apply

---

40. I talk to **my mom and dad or guardians** about what I learn in school.

a. Almost every day (5 or more days/week) **b.** Most days (3-4 days/week) **c.** Once in a while (1-2 days/week) **d.** Occasionally (1-2 days/month) **e.** Never

---

41. What have your **mom or dad or guardians** told you about fruits and vegetables? (Fill in the oval of **all the things** your mom and dad or guardians told you)

a. Fruits and vegetables are healthy and good for me.	**e.** I should try new fruits and vegetables.
b. Fruits and vegetables make me strong and give me energy.	**f.** I should eat fruits and vegetables instead of candy.
c. Fruits and vegetables taste good.	**g.** They don't talk to me about fruits and vegetables.
d. I have to eat fruits and vegetables.	

---

42. What did you learn during your school gardening program that you have **talked about with your mom and dad or guardians**? (Fill in the oval of **all the things** you have talked about)

a. To eat healthier.	**e.** To eat a rainbow of vegetables.
b. To try new fruits and vegetables.	**f.** How to prepare fruits and vegetables.
c. To eat the right food.	**g.** Nothing, I did not talk to them about the gardening program.
d. To not eat junk food.	

43. **What would you tell your friends** about the **Eat Your Way to Better Health** gardening program that was in your classroom? (Fill in the oval of **all** the things you would tell your friends)

a. Fruits and vegetables make you healthy.	**e.** I learned lots of new things.
b. They bring good snacks to eat.	**f.** It was boring.
c. They teach you about fruits and vegetables.	**g.** I didn't like it.
d. It is fun to garden and eat what you grow.	**h.** Nothing

---

44. What would you tell your **friends** about eating fruits and vegetables? (Fill in the oval of **all** the things you would tell your friends)

a. Fruits and vegetables are better than you think.	**f.** Some of them are yucky.
b. Fruits and vegetables are very healthy.	**g.** Cookies and candy taste better.
c. Some fruits and vegetables are tasty.	**h.** Cookies and candy are better for you.
d. Eat different fruits and vegetables every day.	**i.** Nothing
e. Fruits and vegetables are fun to grow and eat.	

Thanks for answering these questions! ☺

#_____ **DO NOT** put your name on this survey.
Please use the number assigned to you and your child.

PURDUE UNIVERSITY

Eat Your Way to Better Health and Junior Master Gardener® Health and Nutrition from the Garden
Parent Pre-Survey

Your child's teacher and school have agreed to participate in a program called *Eat Your Way to Better Health*, utilizing the *Junior Master Gardener® Health and Nutrition from the Garden* curriculum. This is the survey for you, it is similar to the survey for your child, and will be given prior to and after the program. The program will be presented to your child over an 8-10 week period for an hour at a time, once a week, as a regular part of their 3rd grade classroom curriculum. This survey is voluntary, and will hold no penalty to you or your child in the event you or your child wish to not participate in completing the survey. Thank you for your help!

Please fill in the oval that best represents how you and your family eat fruits and vegetables.

1. How many meals **per week** does your family eat together?

   a. 0 **b.** 1-5 **c.** 6-10 **d.** 11-15 **e.** 16 or more

---

2. My child helps me prepare meals:

   a. Once a day **b.** Once a week **c.** Once a month **d.** Less than once a month **e.** Never

---

3. To meet daily nutrition needs, how many servings of **vegetables** should a person eat each day? (One serving = 1 medium-size or ½ cup raw, cooked, frozen or canned; ¾ cup 100% juice; 1 cup raw, leafy vegetables; ¼ cup dried).

   a. 0 servings
   b. 1 servings
   c. 2 servings
   d. 3 – 5 servings
   e. 6 or more servings

---

4. To meet daily nutrition needs, how many servings of **fruits** should a person eat each day? (One serving = 1 medium-size or ½ cup raw, cooked, frozen or canned; ¾ cup 100% juice; 1 cup raw, leafy vegetables; ¼ cup dried).

   a. 0 servings
   b. 1 servings
   c. 2 servings
   d. 3 – 5 servings
   e. 6 or more servings

Which of these **fruits** were consumed by your family during the **last week**? (Fill in the oval for **all** that apply)

5. **a**. Apple/Applesauce **b**. Cantaloupe/Muskmelon **c**. Oranges **d**. Cherries **e**. Plum

---

6. **a**. Bananas **b**. Grapes **c**. Pears **d**. Kiwi **e**. Pineapple **f**. Fruit Salad

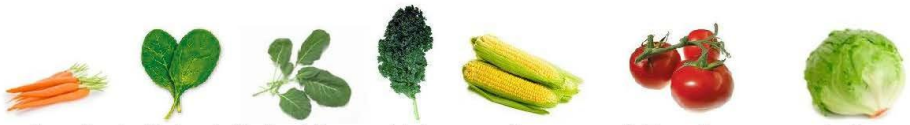
---

7. **a**. Mango **b**. Peaches **c**. Watermelon **d**. Dried Fruit (raisins, etc.) **e**. Grapefruit

---

8. **a**. Strawberries **b**. Blue/Black/Raspberries **c**. Nectarines **d**. Tangerines (Clementines)

Which of these **vegetables** were consumed by your family during the **last week**? (Fill in the oval for **all** that apply)



9. **a**. Carrots **b**. Spinach/Collard Greens/Kale **c**. Corn **d**. Tomatoes **e**. Lettuce

---

10. **a**. Celery **b**. Baked beans **c**. Radishes **d**. Green Peas **e**. Broccoli **f**. Cabbage

---

11. **a**. Olives **b**. Potatoes **c**. Okra **d**. Green Beans **e**. Sweet Potatoes/Yams

---

12. **a**. Cucumbers **b**. Cauliflower **c**. Asparagus **d**. Green/Red/Yellow Peppers **e**. Beets

13. Does your child eat **more, less, or about the same** amount of fruit and vegetables as you do?

a. More **b.** Less **c.** About the same

---

14. How many **different types** of fruits and vegetables are consumed (used in meals/snacks) in a **typical day** in your home?

a. 0 **b.** 1-2 **c.** 3-4 **d.** 5 or more

---

15. I think it is fun to try new fruits and vegetables.

a. Strongly Disagree **b.** Disagree **c.** Agree **d.** Strongly Agree

---

16. Our family eats fruits and vegetables at least once per day.

a. Strongly Disagree **b.** Disagree **c.** Agree **d.** Strongly Agree

---

17. My child shares what he/she learn about in school with me:

a. Almost every day (5 or more days/week) **b.** Most days (3-4 days/week) **c.** Once in a while (1-2 days/week) **d.** Occasionally (1-2 days/month) **e.** Never

---

Gardening

18. Do you have a vegetable and/or fruit garden? **a.** Yes **b.** No

---

19. Do your children work with you in a garden? **a.** Yes **b.** No

---

20. Would you consider gardening with your child? **a.** Yes **b.** No

---

21. If you answered **no** to question 20, please indicate the reason(s) why:

a. No room for garden **b.** Not interested in gardening **c.** No time to garden **d.** Other

What **snacks** are **offered** and regularly **available** to your child at home? (Fill in the oval for **all** that apply)

22. **a**. Apples/Applesauce **b**. Cucumbers **c**. Cupcakes/cake **d**. Strawberries **e**. Celery

---

23. **a**. Pineapples **b**. Pickles **c**. Candy **d**. Watermelon **e**. Ice Cream **f**. Salad

---

24. **a**. Broccoli **b**. Green/Red/Yellow Peppers **c**. Cereal **d**. Pudding **e**. Fruit Salad

---

25. **a**. Chocolate **b**. Bananas **c**. Popcorn **d**. Oranges **e**. Dried Fruits (raisins, etc.)

What **snacks** are **offered** and regularly **available** to your child at home? (Fill in the oval for **all** that apply)

26. **a**. Kiwis **b**. Pie **c**. Corn **d**. Chips **e**. Tangerines (Clementines) **f**. Pears

---

27. **a**. Blue/Black/Raspberries **b**. Brownies **c**. Yogurt **d**. Cherries **e**. Plums **f**. Grapefruits

---

28. **a**. Cookies **b**. Green beans **c**. Cauliflower **d**. Fruit Snacks **e**. Radishes **f**. Green Peas

---

29. **a**. Peaches **b**. Mango **c**. Nectarine **d**. Carrots **e**. Crackers **f**. Candy Bar

---

30. **a**. Pop-Tarts **b**. Cantaloupe/Muskmelon **c**. Grapes **d**. Popsicles **e**. Tomatoes

Using fruits and vegetables in your home.

31. What have you told your child about fruits and vegetables? (Fill in the oval for **all** that apply)

a. Fruits and vegetables help keep them healthy and are good for them.	**f.** Try fruits and vegetables, even if they don't think they will like them.
b. They need to eat fruits and vegetables at each meal.	**g.** Fruits and vegetables are "rabbit food."
c. Fruits and vegetables taste good.	**h.** I don't like vegetables.
d. Eat fruits and vegetables at snack time.	**i.** I don't like fruit.
e. It is important to eat different colors of vegetables.	**j.** Other

32. What, if any, are the **challenges** to purchasing and/or using fruits and vegetables for daily meals in your home? (Fill in the oval for **all** that apply)

a. Fruits and vegetables are too expensive.	**f.** Fast food or take out is easier.
b. Good quality fruits and vegetables are not always available.	**g.** How to choose, store and/or use fresh fruits and vegetables.
c. My child does not like to eat the foods I make using fruits and vegetables.	**h.** None
d. Knowing how to serve fruits and vegetables.	**i.** Other
e. My time is limited for cooking with fruits and vegetables.	

Please tell us a little about you. Please fill in the oval of your answer.

33. How many children are there in your family?

a. 1 **b.** 2 **c.** 3 **d.** 4 **e.** 5 **f.** 6 or more

34. What is your highest level of completed education?

a. Grade/middle school	**d.** 4-year college degree
b. High school	**e.** Graduate degree
c. 2-year college degree	

35. What is your estimated household annual income?

a. $0-$20,000	**d.** $60,001-$80,000
b. $20,001-$40,000	**e.** $80,001-$100,000
c. $40,001-$60,000	**f.** $100,001 and up

36. How do you describe yourself?
(Please fill in the **one** oval that best applies)

a. African-American, not of Hispanic origin	**f.** Hispanic
b. American Indian or Alaskan Native	**g.** White, not of Hispanic origin
c. Asian	**h.** More than one
d. Native Hawaiian/Pacific Islander	

37. How would you describe the place where you live?
(Please fill in the **one** oval that best applies)

a. On a farm	**d.** A suburb of a city with more than 50,000 people
b. A small town with less than 10,000 people	**e.** A large city with more than 50,000 people
c. A medium sized city with between 10,000 and 50,000 people	**f.** A very large city with more than 100,000 people (South Bend, Evansville, Fort Wayne, Indianapolis)

Thanks for answering these questions! ☺

#_____ **DO NOT** put your name on this survey.
Please use the number assigned to you and your child.

PURDUE UNIVERSITY

Eat Your Way to Better Health and Junior Master Gardener® Health and Nutrition from the Garden
Parent Post-Survey

Thank you for your help allowing your child to participate in the *Eat Your Way to Better Health program*, utilizing the *Junior Master Gardener® Health and Nutrition from the Garden* curriculum. As before, this survey is voluntary, and will hold no penalty to you or your child in the event you or your child does not wish to participate. Thanks again.

Please fill in the oval that best represents how you and your family eat fruits and vegetables.

1. How many meals **per week** does your family eat together?

   a. 0 **b.** 1-5 **c.** 6-10 **d.** 11-15 **e.** 16 or more

---

2. Does your child help you prepare meals:

   a. Once a day **b.** Once a week **c.** Once a month **d.** Less than once a month **e.** Never

---

3. To meet daily nutrition needs, how many servings of **vegetables** should a person eat each day? (One serving = 1 medium-size or ½ cup raw, cooked, frozen or canned; ¾ cup 100% juice; 1 cup raw, leafy vegetables; ¼ cup dried).

   a. 0 servings
   b. 1 servings
   c. 2 servings
   d. 3 – 5 servings
   e. 6 or more servings

---

4. To meet daily nutrition needs, how many servings of **fruits** should a person eat each day? (One serving = 1 medium-size or ½ cup raw, cooked, frozen or canned; ¾ cup 100% juice; 1 cup raw, leafy vegetables; ¼ cup dried).

   a. 0 servings
   b. 1 servings
   c. 2 servings
   d. 3 – 5 servings
   e. 6 or more servings

Which of these **fruits** were consumed by your family during the **last week**? (Fill in the oval for **all** that apply)





5. **a**. Apple/Applesauce **b**. Cantaloupe/Muskmelon **c**. Oranges **d**. Cherries **e**. Plum

---






6. **a**. Bananas **b**. Grapes **c**. Pears **d**. Kiwi **e**. Pineapple **f**. Fruit Salad

---





7. **a**. Mango **b**. Peaches **c**. Watermelon **d**. Dried Fruit (raisins, etc.) **e**. Grapefruit

---




8. **a**. Strawberries **b**. Blue/Black/Raspberries **c**. Nectarines **d**. Tangerines (Clementines)

Which of these **vegetables** were consumed by your family during the **last week**? (Fill in the oval for **all** that apply)

9. **a**. Carrots **b**. Spinach/Collard Greens/Kale **c**. Corn **d**. Tomatoes **e**. Lettuce

---

10. **a**. Celery **b**. Baked beans **c**. Radishes **d**. Green Peas **e**. Broccoli **f**. Cabbage

---

11. **a**. Olives **b**. Potatoes **c**. Okra **d**. Green Beans **e**. Sweet Potatoes/Yams

---

12. **a**. Cucumbers **b**. Cauliflower **c**. Asparagus **d**. Green/Red/Yellow Peppers **e**. Beets

13. Does your child eat **more, less, or about the same** amount of fruit and vegetables as you do?

a. More **b.** Less **c.** About the same

---

14. How many **different types** of fruits and vegetables are consumed (used in meals/snacks) in a **typical day** in your home?

a. 0 **b.** 1-2 **c.** 3-4 **d.** 5 or more

---

15. I think it is fun to try new fruits and vegetables.

a. Strongly Disagree **b.** Disagree **c.** Agree **d.** Strongly Agree

---

16. Our family eats fruits and vegetables at least once per day.

a. Strongly Disagree **b.** Disagree **c.** Agree **d.** Strongly Agree

---

17. My child shares what he/she learn about in school with me:

a. Almost every day (5 or more days/week) **b.** Most days (3-4 days/week) **c.** Once in a while (1-2 days/week) **d.** Occasionally (1-2 days/month) **e.** Never

---

Gardening

18. Do you have a vegetable and/or fruit garden? **a.** Yes **b.** No

---

19. Do your children work with you in a garden? **a.** Yes **b.** No

---

20. Would you consider gardening with your child? **a.** Yes **b.** No

---

21. If you answered **no** to question 20, please fill in the oval of the reason(s) why:

a. No room for garden **b.** Not interested in gardening **c.** No time to garden **d.** Other

What **snacks** are **offered** and regularly **available** to your child at home? (Fill in the oval for **all** that apply)

22. **a**. Apples/Applesauce **b**. Cucumbers **c**. Cupcakes/cake **d**. Strawberries **e**. Celery

---

23. **a**. Pineapples **b**. Pickles **c**. Candy **d**. Watermelon **e**. Ice Cream **f**. Salad

---

24. **a**. Broccoli **b**. Green/Red/Yellow Peppers **c**. Cereal **d**. Pudding **e**. Fruit Salad

---

25. **a**. Chocolate **b**. Bananas **c**. Popcorn **d**. Oranges **e**. Dried Fruits (raisins, etc.)

What **snacks** are **offered** and regularly **available** to your child at home? (Fill in the oval for **all** that apply)

26. **a**. Kiwis **b**. Pie **c**. Corn **d**. Chips **e**. Tangerines (Clementines) **f**. Pears

---

27. **a**. Blue/Black/Raspberries **b**. Brownies **c**. Yogurt **d**. Cherries **e**. Plums **f**. Grapefruits

---

28. **a**. Cookies **b**. Green beans **c**. Cauliflower **d**. Fruit Snacks **e**. Radishes **f**. Green Peas

---

29. **a**. Peaches **b**. Mango **c**. Nectarine **d**. Carrots **e**. Crackers **f**. Candy Bar

---

30. **a**. Pop-Tarts **b**. Cantaloupe/Muskmelon **c**. Grapes **d**. Popsicles **e**. Tomatoes

Using fruits and vegetables in your home.

31. What have you told your child about fruits and vegetables? (Fill in the oval for **all** that apply)

a. Fruits and vegetables help keep them healthy and are good for them.	**f.** Try fruits and vegetables, even if they don't think they will like them.
b. They need to eat fruits and vegetables at each meal.	**g.** Fruits and vegetables are "rabbit food."
c. Fruits and vegetables taste good.	**h.** I don't like vegetables.
d. Eat fruits and vegetables at snack time.	**i.** I don't like fruit.
e. It is important to eat different colors of vegetables.	

---

32. What, if any, are the **challenges** to purchasing and/or using fruits and vegetables for daily meals in your home? (Fill in the oval for **all** that apply)

a. Fruits and vegetables are too expensive.	**f.** Fast food or take out is easier.
b. Good quality fruits and vegetables are not always available.	**g.** How to choose, store and/or use fresh fruits and vegetables.
c. My child does not like to eat the foods I make using fruits and vegetables.	**h.** None
d. Knowing how to serve fruits and vegetables.	**i.** Other
e. My time is limited for cooking with fruits and vegetables.	

33. What did your child learn during the school gardening program that they have **talked about with you**? (Fill in the oval of **all the things** they have talked about with you)

a. To eat healthier.	**e.** To eat a rainbow of vegetables.
b. To try new fruits and vegetables.	**f.** How to prepare fruits and vegetables.
c. To eat the right food.	**g.** Other
d. To not eat junk food.	**h.** Nothing, they did not talk to me about the gardening program.

****

Thanks for answering these questions! ☺

Appendix C: Version 2 EYWTBH Youth & Parent/Guardian Questionnaires

DO NOT put your name on this survey. #_____ (please put your assigned number here.)

PURDUE UNIVERSITY

Eat Your Way to Better Health and Junior Master Gardener® Health and Nutrition from the Garden
Youth Pre-Survey

Please answer these questions by circling the best answer. We will ask you the same questions at the end of the gardening program you are going to be doing in class for the next 8-12 weeks. This survey will not be part of your school grade.

1. Which of these fruits did you eat in the last week? (Put an **X** next to **all the fruits** you ate)

Apples		Bananas		Applesauce	
Cantaloupe		Grapes		Raisins	
Oranges		Pears		Peaches	
Plums		Kiwi		Watermelon	
Strawberries		Pineapple		Dried fruit	
Grapefruit		Fruit salad		Raspberries	

2. Which of these vegetables did you eat in the last week? (Put an **X** next to **all the vegetables** you ate)

Carrots		Celery		Cole slaw	
Leafy greens (spinach, collard, turnip, kale)		Cooked beans (pinto, black-eyed peas, pork 'n' beans)		Other white potatoes	
Potato salad		French fried potatoes		Okra	
Corn		Green peas		Green beans	
Tomatoes		Broccoli		Sweet potatoes	
Lettuce		Cabbage		Beets	

Please circle the answer that best describes your feelings.

3. How many kinds of fruits and vegetables do you eat at home every day?

   a. 1 b. 2 c. 3 d. 4 e. 5 or more per day

4. I think I can ask someone in my family to buy my favorite fruit or vegetable?

   a. Disagree a lot b. Disagree a little c. Agree a little d. Agree a lot

5. I think I can ask someone in my family to have fruit and fruit juices out where I can reach them?

   a. Disagree a lot b. Disagree a little c. Agree a little d. Agree a lot

6. I think I can ask someone in my family to have vegetable sticks out where I can reach them?

   a. Disagree a lot b. Disagree a little c. Agree a little d. Agree a lot

7. For a snack, I think I can choose my favorite fruit instead of my favorite cookie?

   a. Disagree a lot b. Disagree a little c. Agree a little d. Agree a lot

8. For a snack, I think I can choose my favorite fruit instead of my favorite candy bar?

   a. Disagree a lot b. Disagree a little c. Agree a little d. Agree a lot

9. For a snack, I think I can choose my favorite raw vegetable with dip instead of my favorite cookie?

   a. Disagree a lot b. Disagree a little c. Agree a little d. Agree a lot

10. For a snack, I think I can choose my favorite raw vegetable instead of my favorite candy bar?

    a. Disagree a lot b. Disagree a little c. Agree a little d. Agree a lot

11. For a snack, I think I can choose my favorite raw vegetable with dip instead of chips?

    a. Disagree a lot b. Disagree a little c. Agree a little d. Agree a lot

12. I think I can eat 2 or more servings of fruit or fruit juice each day?

    a. Disagree a lot b. Disagree a little c. Agree a little d. Agree a lot

13. I think I can eat 3 or more servings of vegetables each day?

    a. Disagree a lot b. Disagree a little c. Agree a little d. Agree a lot

14. I think I can eat 5 or more servings of fruit and vegetables each day?

    a. Disagree a lot b. Disagree a little c. Agree a little d. Agree a lot

Please mark the things you like as <u>snacks</u>.

15. Which of these fruits do you like to eat at home for a snack? (Put an **X** next to <u>all the fruits</u> you can eat for a snack at home)

Apples		Grapes		Tangerines	
Bananas		Strawberries		Peaches	
Oranges		Watermelon		Fruit Salad	
Pineapples		Pears		Raspberries	
Plums		Blueberries		Peaches	

16. Which of these vegetables do you like to eat at home for a snack? (Put an **X** next to <u>all the vegetables</u> you can eat for a snack at home)

Carrots		Tomatoes		Celery	
Cucumbers		Broccoli		Green peppers	
Salad		Corn		Cauliflower	
Pickles		Green beans			

17. Which of these foods do you like to eat at home for a snack? (Put an **X** next to **all the foods** you can eat for a snack at home)

Chips		Cookies		Pudding	
Ice Cream		Popcorn		Cupcakes/cake	
Chocolate		Cereal		Candy	
Brownies		Crackers		Yogurt	
Pie		Candy Bar		Raisins	

Gardening

18. Do you grow fruits and vegetables at home?

a. Yes b. No

19. Do you think it is fun to garden at home?

a. Agree a lot b. Agree a little c. Disagree a little d. Disagree a lot

20. I like to visit our garden.

a. Agree a lot b. Agree a little c. Disagree a little d. Disagree a lot

21. Why do you think it is fun to garden at home? (Put an **X** next to **all the reasons** that apply)

I like working in the garden	
It's fun to eat what you grow	
I like to get dirty	
I like to pick the vegetables	
I can do it with my family and spend time together	
I like to help my family save money	
I like being helpful	
It gives me something to do	
I don't think it is fun to garden	

Eating fruits and vegetables.

22. How many different fruits and vegetables did your mom and dad (or guardians) use to make dinner last night?

a. 0 b. 1-2 c. 3-5 d. 6-10

23. I think it is fun to try new fruits and vegetables.

a. Agree a lot b. Agree a little c. Disagree a little d. Disagree a lot

24. I like to eat fruits and vegetables.

a. Agree a lot b. Agree a little c. Disagree a little d. Disagree a lot

Mom and Dad (or my Guardians)

25. My mom (or guardian) likes to eat fruits and vegetables.

a. Agree a lot b. Agree a little c. Disagree a little d. Disagree a lot

26. My dad (or guardian) likes to eat fruits and vegetables.

a. Agree a lot b. Agree a little c. Disagree a little d. Disagree a lot

27. I talk to my mom and dad or guardians about what I learn in school.

a. Every day b. Most days c. Once in a while d. Never

28. What have your mom and dad or guardians told you about fruits and vegetables? (Put an **X** next **all the things** your mom and dad or guardians told you)

Fruits and vegetables are healthy and good for you	
Fruits and vegetables make you strong and give you energy	
Fruits and vegetables taste good	
I have to eat fruits and vegetables	
I should try new fruits and vegetables	
I should eat fruits and vegetables instead of candy	
They don't talk to me about fruits and vegetables	

29. What did you learn during your school gardening program that you have talked about with your mom and dad or guardians? (Put an **X** next **all the things** you have talked about)

To eat healthier	
To try new fruits and vegetables	
To eat the right food	
To not eat junk food	
To eat a rainbow of vegetables	
How to prepare fruits and vegetables	
Nothing, I did not talk to them about the gardening program	

What would you tell your friends?

30. What would you tell your friends about the Eat Your Way to Better Health gardening program that was in your classroom once a week? (Put an **X** next to **all the things** you would tell your pals)

Fruits and vegetables make you healthy	
They bring good snacks to eat	
They teach you about fruits and vegetables	
It is fun to garden and eat what you grow	
I learned lots of new things	
It was boring	
I didn't like it	
Nothing	

31. What would you tell your friends about eating fruits and vegetables? (Put an **X** next to **all the things** you would tell your friends)

Fruits and vegetables are better than you think	
Fruits and vegetables are very healthy	
Some fruits and vegetables are tasty	
To eat different fruits and vegetables every day	
Fruits and vegetables are fun to grow and eat	
Some of them are yucky	
Cookies and candy are better	
Nothing	

Thanks for answering these questions! ☺

DO NOT put your name on this survey. #_____ (please put your assigned number here.)

PURDUE UNIVERSITY

Eat Your Way to Better Health and Junior Master Gardener® Health and Nutrition from the Garden
Youth Post-Survey

Please answer these questions by circling the best answer. We will ask you the same questions at the end of the gardening program you are going to be doing in class for the next 8-12 weeks. This survey will not be part of your school grade.

1. Which of these fruits did you eat in the last week? (Put an **X** next to **all** the fruits you ate)

Apples		Bananas		Applesauce	
Cantaloupe		Grapes		Raisins	
Oranges		Pears		Peaches	
Plums		Kiwi		Watermelon	
Strawberries		Pineapple		Dried fruit	
Grapefruit		Fruit salad		Raspberries	

2. Which of these vegetables did you eat in the last week? (Put an **X** next to **all** the vegetables you ate)

Carrots		Celery		Cole slaw	
Leafy greens (spinach, collard, turnip, kale)		Cooked beans (pinto, black-eyed peas, pork 'n' beans)		Other white potatoes	
Potato salad		French fried potatoes		Okra	
Corn		Green peas		Green beans	
Tomatoes		Broccoli		Sweet potatoes	
Lettuce		Cabbage		Beets	

Please circle the answer that best describes your feelings.

3. How many kinds of fruits and vegetables do you eat at home every day?

   a. 1 b. 2 c. 3 d. 4 e. 5 or more per day

4. I think I can ask someone in my family to buy my favorite fruit or vegetable?

   a. Disagree a lot b. Disagree a little c. Agree a little d. Agree a lot

5. I think I can ask someone in my family to have fruit and fruit juices out where I can reach them?

   a. Disagree a lot b. Disagree a little c. Agree a little d. Agree a lot

6. I think I can ask someone in my family to have vegetable sticks out where I can reach them?

   a. Disagree a lot b. Disagree a little c. Agree a little d. Agree a lot

7. For a snack, I think I can choose my favorite fruit instead of my favorite cookie?

   a. Disagree a lot b. Disagree a little c. Agree a little d. Agree a lot

8. For a snack, I think I can choose my favorite fruit instead of my favorite candy bar?

   a. Disagree a lot b. Disagree a little c. Agree a little d. Agree a lot

9. For a snack, I think I can choose my favorite raw vegetable with dip instead of my favorite cookie?

   a. Disagree a lot b. Disagree a little c. Agree a little d. Agree a lot

10. For a snack, I think I can choose my favorite raw vegetable instead of my favorite candy bar?

    a. Disagree a lot b. Disagree a little c. Agree a little d. Agree a lot

11. For a snack, I think I can choose my favorite raw vegetable with dip instead of chips?

    a. Disagree a lot b. Disagree a little c. Agree a little d. Agree a lot

12. I think I can eat 2 or more servings of fruit or fruit juice each day?

    a. Disagree a lot b. Disagree a little c. Agree a little d. Agree a lot

13. I think I can eat 3 or more servings of vegetables each day?

    a. Disagree a lot b. Disagree a little c. Agree a little d. Agree a lot

14. I think I can eat 5 or more servings of fruit and vegetables each day?

    a. Disagree a lot b. Disagree a little c. Agree a little d. Agree a lot

Please mark the things you like as <u>snacks</u>.

15. Which of these fruits do you like to eat at home for a snack? (Put an **X** next to <u>all the fruits</u> you can eat for a snack at home)

Apples		Grapes		Tangerines	
Bananas		Strawberries		Peaches	
Oranges		Watermelon		Fruit Salad	
Pineapples		Pears		Raspberries	
Plums		Blueberries		Peaches	

16. Which of these vegetables do you like to eat at home for a snack? (Put an **X** next to **all the vegetables** you can eat for a snack at home)

Carrots		Tomatoes		Celery	
Cucumbers		Broccoli		Green peppers	
Salad		Corn		Cauliflower	
Pickles		Green beans			

17. Which of these foods do you like to eat at home for a snack? (Put an **X** next to **all the foods** you can eat for a snack at home)

Chips		Cookies		Pudding	
Ice Cream		Popcorn		Cupcakes/cake	
Chocolate		Cereal		Candy	
Brownies		Crackers		Yogurt	
Pie		Candy Bar		Raisins	

Gardening

18. Do you grow fruits and vegetables at home?

a. Yes b. No

19. Do you think it is fun to garden at home?

a. Agree a lot b. Agree a little c. Disagree a little d. Disagree a lot

20. I like to visit our garden.

a. Agree a lot b. Agree a little c. Disagree a little d. Disagree a lot

21. Why do you think it is fun to garden at home? (Put an **X** next to **all the reasons** that apply)

I like working in the garden	
It's fun to eat what you grow	
I like to get dirty	
I like to pick the vegetables	
I can do it with my family and spend time together	
I like to help my family save money	
I like being helpful	
It gives me something to do	
I don't think it is fun to garden	

Eating fruits and vegetables.

22. How many different fruits and vegetables did your mom and dad (or guardians) use to make dinner last night?

    a. 0 b. 1-2 c. 3-5 d. 6-10

23. I think it is fun to try new fruits and vegetables.

    a. Agree a lot b. Agree a little c. Disagree a little d. Disagree a lot

24. I like to eat fruits and vegetables.

    a. Agree a lot b. Agree a little c. Disagree a little d. Disagree a lot

Mom and Dad (or my Guardians)

25. My mom (or guardian) likes to eat fruits and vegetables.

    a. Agree a lot b. Agree a little c. Disagree a little d. Disagree a lot

26. My dad (or guardian) likes to eat fruits and vegetables.

    a. Agree a lot b. Agree a little c. Disagree a little d. Disagree a lot

27. I talk to my mom and dad or guardians about what I learn in school.

    a. Every day b. Most days c. Once in a while d. Never

28. What have your mom and dad or guardians told you about fruits and vegetables? (Put an **X** next **all the things** your mom and dad or guardians told you)

Fruits and vegetables are healthy and good for you	
Fruits and vegetables make you strong and give you energy	
Fruits and vegetables taste good	
I have to eat fruits and vegetables	
I should try new fruits and vegetables	
I should eat fruits and vegetables instead of candy	
They don't talk to me about fruits and vegetables	

29. What did you learn during your school gardening program that you have talked about with your mom and dad or guardians? (Put an **X** next **all the things** you have talked about)

To eat healthier	
To try new fruits and vegetables	
To eat the right food	
To not eat junk food	
To eat a rainbow of vegetables	
How to prepare fruits and vegetables	
Nothing, I did not talk to them about the gardening program	

What would you tell your friends?

30. What would you tell your friends about the Eat Your Way to Better Health gardening program that was in your classroom once a week? (Put an **X** next to **all the things** you would tell your pals)

Fruits and vegetables make you healthy	
They bring good snacks to eat	
They teach you about fruits and vegetables	
It is fun to garden and eat what you grow	
I learned lots of new things	
It was boring	
I didn't like it	
Nothing	

31. What would you tell your friends about eating fruits and vegetables? (Put an **X** next to **all the things** you would tell your friends)

Fruits and vegetables are better than you think	
Fruits and vegetables are very healthy	
Some fruits and vegetables are tasty	
To eat different fruits and vegetables every day	
Fruits and vegetables are fun to grow and eat	
Some of them are yucky	
Cookies and candy are better	
Nothing	

Thanks for answering these questions! ☺

#_____ **DO NOT** put your name on this survey.
Please use the number assigned to you and your child.

PURDUE UNIVERSITY

Eat Your Way to Better Health and Junior Master Gardener® Health and Nutrition from the Garden
Parent Pre-Survey

Your child's teacher and school have agreed to participate in a program called *Eat Your Way to Better Health*, utilizing the *Junior Master Gardener® Health and Nutrition from the Garden* curriculum. This is the survey for you, it is similar to the survey for your child, and will be given prior to and after the program. The program will be presented to your child over an 8-10 week period for an hour at a time, once a week, as a regular part of their 3rd grade classroom curriculum. This survey is voluntary, and will hold no penalty to you or your child in the event you or your child wish to not participate in completing the survey. There are 20 questions to answer. Thank you for your help!

Please circle the best answer about eating fruits and vegetables.

1. How many meals **per week** does your family eat together? _____
2. Does your child help you prepare meals:

   Daily Weekly Monthly Never

3. Which of these **fruits** were consumed in your home during the **last week**? (Check **all** that apply)

Apples	☐	Bananas	☐	Applesauce	☐
Cantaloupe	☐	Grapes	☐	Raisins	☐
Oranges	☐	Pears	☐	Peaches	☐
Plums	☐	Kiwi	☐	Watermelon	☐
Strawberries	☐	Pineapple	☐	Dried fruit	☐
Grapefruit	☐	Fruit salad	☐	Raspberries	☐

4. Which of these **vegetables** were consumed in your home during the **last week**? (Check **all** that apply)

Carrots	☐	Celery	☐	Cole slaw	☐
Leafy greens (spinach, collard, turnip, kale)	☐	Cooked beans (pinto, black-eyed peas, pork 'n' beans)	☐	Other white potatoes	☐
Potato salad	☐	French fried potatoes	☐	Okra	☐
Corn	☐	Green peas	☐	Green beans	☐
Tomatoes	☐	Broccoli	☐	Sweet potatoes	☐
Lettuce	☐	Cabbage	☐	Beets	☐

5. What **snacks** are offered and regularly available to your child at home? (Check **all** that apply)

Apples		Grapes		Bananas	
Strawberries		Oranges		Watermelon	
Pineapples		Pears		Plums	
Blueberries		Tangerines		Applesauce	
Peaches		Kiwi		Fruit Salad	
Carrots		Tomatoes		Cucumbers	
Broccoli		Salad		Corn	
Pickles		Green beans		Celery	
Green peppers		Chips		Cookies	
Ice Cream		Popcorn		Chocolate	
Cereal		Brownies		Crackers	
Pudding		Yogurt		Cupcakes/cake	
Pie		Candy		Candy Bar	
Raisins		Raspberries			

6. To meet daily nutrition needs, how many servings of **vegetables** should a person eat each day? (One serving = 1 medium-size or ½ cup raw, cooked, frozen or canned; ¾ cup 100% juice; 1 cup raw, leafy vegetables; ¼ cup dried).

   a. 0 servings
   b. 1 servings
   c. 2 servings
   d. 3 – 5 servings
   e. 6 or more servings

7. To meet daily nutrition needs, how many servings of **fruits** should a person eat each day? (One serving = 1 medium-size or ½ cup raw, cooked, frozen or canned; ¾ cup 100% juice; 1 cup raw, leafy vegetables; ¼ cup dried).

   a. 0 servings
   b. 1 servings
   c. 2 servings
   d. 3 – 5 servings
   e. 6 or more servings

8. Does your child eat **more, less, or about the same** amount of fruit and vegetables as you do?

   a. More b. Less c. About the same

9. How many different fruits and vegetables are consumed (used in meals/snacks) in a **typical day** in your home?

   a. 0 b. 1-2 c. 3-5 d. 6 or more

10. I think it is fun to try new fruits and vegetables.

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

11. Our family eats fruits and vegetables at least once per day.

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

12. My child shares what he/she learn about in school with me:

a. Almost every day (5 or more days/week) b. Most days (3-4 days/week) c. Once in a while (1-2 days/week) d. Occasionally (1-2 days/month) e. Never

Gardening

13. Do you have a vegetable and/or fruit garden? Yes No

14. Do your children work with you in a garden? Yes No

15. → Would you consider gardening with your child? Yes No

16. If you answered **no** above, please state reason(s) why.

Using fruits and vegetables in your home.

17. What have you told your child about fruits and vegetables? (Check all that apply)

Fruits and vegetables help keep them healthy and are good for them	
They need to eat fruits and vegetables at each meal	
Fruits and vegetables taste good	
To eat fruits and vegetables at snack time	
Important to eat different colors of vegetables	
Try fruits and vegetables, even if they don't think they will like them	
Fruits and vegetables are "rabbit food".	
I don't like vegetables.	
I don't like fruit.	
Other, please explain:	

18. What has your child learned about in school that has encouraged you to make a change in your eating habits at home?

19. What, if any, are the **challenges** to purchasing and/or using fruits and vegetables for daily meals in your home? (Check all that apply)

Fruits and vegetables are too expensive	
Good quality fruits and vegetables are not always available	
My child does not like to eat the foods I make using fruits and vegetables	
Knowing how to serve fruits and vegetables	
My time is limited for cooking with fruits and vegetables	
Fast food or take out is easier	
How to choose, store and/or use fresh fruits and vegetables	
None	
Other reasons:	

20. Please list what new fruits and/or vegetables have you purchased in the last 4-6 weeks.

****

Thanks for answering these questions! ☺

#_____ **DO NOT** put your name on this survey.
Please use the number assigned to you and your child.

PURDUE UNIVERSITY

Eat Your Way to Better Health and Junior Master Gardener® Health and Nutrition from the Garden
Parent Post-Survey

Thank you for your help allowing your child to participate in the *Eat Your Way to Better Health program*, utilizing the *Junior Master Gardener® Health and Nutrition from the Garden* curriculum. As before, this survey is voluntary, and will hold no penalty to you or your child in the event you or your child does not wish to participate. Thanks again.

Please circle the best answer about eating fruits and vegetables.

1. How many meals **per week** does your family eat together?

   a. 14 or more b. 10 - 14 c. 5 - 9 d. 1 – 5 e. None

2. Does your child help you prepare meals:

   a. Daily b. Weekly c. Monthly d. Never

3. Which of these **fruits** were consumed in your home during the **last week**? (Check **all** that apply)

Apples		Bananas		Applesauce	
Cantaloupe		Grapes		Raisins	
Oranges		Pears		Peaches	
Plums		Kiwi		Watermelon	
Strawberries		Pineapple		Dried fruit	
Grapefruit		Fruit salad		Raspberries	

4. Which of these **vegetables** were consumed in your home during the **last week**? (Check **all** that apply)

Carrots		Celery		Cole slaw	
Leafy greens (spinach, collard, turnip, kale)		Cooked beans (pinto, black-eyed peas, pork 'n' beans)		Other white potatoes	
Potato salad		French fried potatoes		Okra	
Corn		Green peas		Green beans	
Tomatoes		Broccoli		Sweet potatoes	
Lettuce		Cabbage		Beets	

5. What **snacks** are offered and regularly available to your child at home? (Check **all** that apply)

Apples		Grapes		Bananas	
Strawberries		Oranges		Watermelon	
Pineapples		Pears		Plums	
Blueberries		Tangerines		Applesauce	
Peaches		Kiwi		Fruit Salad	
Carrots		Tomatoes		Cucumbers	
Broccoli		Salad		Corn	
Pickles		Green beans		Celery	
Green peppers		Chips		Cookies	
Ice Cream		Popcorn		Chocolate	
Cereal		Brownies		Crackers	
Pudding		Yogurt		Cupcakes/cake	
Pie		Candy		Candy Bar	
Raisins		Raspberries			

6. To meet daily nutrition needs, how many servings of **vegetables** should a person eat each day? (One serving = 1 medium-size or ½ cup raw, cooked, frozen or canned; ¾ cup 100% juice; 1 cup raw, leafy vegetables; ¼ cup dried).

   a. 0 servings
   b. 1 servings
   c. 2 servings
   d. 3 – 5 servings
   e. 6 or more servings

7. To meet daily nutrition needs, how many servings of **fruits** should a person eat each day? (One serving = 1 medium-size or ½ cup raw, cooked, frozen or canned; ¾ cup 100% juice; 1 cup raw, leafy vegetables; ¼ cup dried).

   a. 0 servings
   b. 1 servings
   c. 2 servings
   d. 3 – 5 servings
   e. 6 or more servings

8. Does your child eat **more, less, or about the same** amount of fruit and vegetables as you do?

   a. More b. Less c. About the same

9. How many different fruits and vegetables are consumed (used in meals/snacks) in a **typical day** in your home?

   a. 0 b. 1-2 c. 3-5 d. 6 or more

10. I think it is fun to try new fruits and vegetables.

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

11. Our family eats fruits and vegetables at least once per day.

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

12. My child shares what he/she learn about in school with me:

a. Almost every day (5 or more days/week) b. Most days (3-4 days/week) c. Once in a while (1-2 days/week) d. Occasionally (1-2 days/month) e. Never

Gardening

13. Do you have a vegetable and/or fruit garden? Yes No

14. Do your children work with you in a garden? Yes No

15. → Would you consider gardening with your child? Yes No

16. If you answered **no** above, please state reason(s) why.

Using fruits and vegetables in your home.

17. What have you told your child about fruits and vegetables? (Check all that apply)

Fruits and vegetables help keep them healthy and are good for them	
They need to eat fruits and vegetables at each meal	
Fruits and vegetables taste good	
To eat fruits and vegetables at snack time	
Important to eat different colors of vegetables	
Try fruits and vegetables, even if they don't think they will like them	
Fruits and vegetables are "rabbit food".	
I don't like vegetables.	
I don't like fruit.	
Other, please explain:	

18. What has your child learned about in school that has encouraged you to make a change in your eating habits at home?

19. What, if any, are the **challenges** to purchasing and/or using fruits and vegetables for daily meals in your home? (Check all that apply)

Fruits and vegetables are too expensive	
Good quality fruits and vegetables are not always available	
My child does not like to eat the foods I make using fruits and vegetables	
Knowing how to serve fruits and vegetables	
My time is limited for cooking with fruits and vegetables	
Fast food or take out is easier	
How to choose, store and/or use fresh fruits and vegetables	
None	
Other reasons:	

20. Please list what new fruits and/or vegetables have you purchased in the last 4-6 weeks.

21. What would you tell other parents about the Eat Your Way to Better Health and Junior Master Gardener® Health and Nutrition from the Garden?

22. Any additional comments you would like to share?

****

Thanks for answering these questions! ☺