

THESIS

SUPER TASTERS AND MIGHTY MOVERS:
EXTENDING *THE FOOD FRIENDS*[®] MESSAGES INTO EARLY ELEMENTARY SCHOOL

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ABSTRACT

SUPER TASTERS AND MIGHTY MOVERS: EXTENDING *THE FOOD FRIENDS*[®] INTO EARLY ELEMENTARY SCHOOL

The prevalence of childhood obesity has been increasing over the last thirty years for preschool aged children, two to five years of age, as well as among early elementary aged children, six to eleven years of age. The epidemic nature of this problem has led to the creation of multiple programs and intervention targeted at preschoolers aimed at preventing these upward trends into early elementary school and adulthood. The preschool years are particularly important for the development of eating habits along with the development of gross motor skills. Behavior change has been seen within this age group following interventions, but retention of such behaviors as the children progress into kindergarten and first grade has not been as well documented.

The overall purpose of this project was to develop “booster” programming for kindergarten and first grade classrooms that extends the messages from *The Food Friends*[®], preschool nutrition and physical activity programs, into early elementary school in an effort to sustain behavior changes made in preschool.

To ascertain the best method for implementing a program into the classrooms, surveys and interviews were conducted with a convenient sample of kindergarten and first grade teachers. Survey questions were mailed; follow-up telephone interviews were conducted with a

subsample of respondents. Findings guided the development and implementation of the “booster” programming in kindergarten classes. Process evaluation surveys were conducted to assess the fidelity of program and guide the development of the second year of programming and modifications to Year 1.

The main themes found from the formative surveys and interviews included: 1) nutrition was not a consistent lesson topic; 2) physical activity was left for gym class and/or recess; and 3) the need for nutrition and activity messages/lessons to be incorporated into academic subject areas. A 5 unit “booster” program, based on Social Cognitive Theory, was developed utilizing *The Food Friends*[®] characters and themes of ‘Super Tasters’ and ‘Mighty Movers’. Classroom-based lessons, with accompanying posters and banners for the cafeteria and gym, were implemented in two schools from December 2011 to April 2012. Process evaluation surveys were conducted online with teachers after each unit for fidelity and overall impressions of lessons/activities; interviews were conducted one-on-one with Extension agents. Findings included: 1) all agreed that they enjoyed the “booster” program; 2) it was helpful to have an Extension agent come to the classroom; and 3) few completed lessons intended to be taught by classroom teachers. Appropriate modifications to Year 1’s program guided the development of Year 2 programming, slated for implementation in 2012-13 school year.

The efficacy of the “booster” programming on behaviors will be evaluated as part of a larger longitudinal study. The ability to resonate messages of trying new foods and being more active within kindergarten and first grade students will contribute to the establishment of healthful behaviors at a young age, building the foundation of lifelong healthy lifestyles.

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CHAPTER ONE: INTRODUCTION

The overall goal of this project was to develop “booster” programming to reinforce and promote behaviors learned in the preschool interventions, *The Food Friends: Fun With New Foods*[®] and *The Food Friends: Get Movin’ With Mighty Moves*[®], throughout kindergarten and first grade. This research project was done as part of the LEAP Study, a longitudinal study to assess if the effectiveness of a preschool nutrition and physical activity program is sustained in elementary school. It is a collaborative study between researchers at Colorado State University (CSU) and University of Colorado at Denver (UCD) that looks at: 1) the measurable outcomes of children maintaining their increase willingness to try new foods and enhance motor performance; 2) if the preschool programs have an impact on reducing the percentage of children who are overweight and obese over a three year timeframe; and 3) if food preference and motor skills directly affect weight status. The present project was designed to meet the following three objectives:

1. To perform formative research with kindergarten and first grade teachers regarding their views on how to incorporate nutrition and physical activity into the classroom; and to review existing curriculum and decide if they can be adapted to fit the objectives of *Food Friends*[®] and *Mighty Moves*[®] programs while being developmentally appropriate for the children’s age.
2. To develop materials for the classroom school environment that reinforce the behavior changes developed in preschool for kindergarten and first grade.
3. To perform process evaluation on the implemented materials, and make necessary adaptations for Year 2 programming.

CHAPTER TWO: REVIEW OF LITERATURE

CHILDHOOD OBESITY

The obesity epidemic has been on a steady incline for the past three decades with 35% of adults within the United States now being classified as obese.¹ The obesity rates are even more staggering when it comes to children, with 12.1% of children aged two to five years of age and 18.0% of children six to eleven years of age now classified as obese. These numbers have stayed constant from 2007-2008 and 2009-2010, but there has been no indication of them declining.^{1,2} Most concerning is the drastic rise in the number of children who have high body mass indexes (BMI) as compared to the past years. Children's weight has increased and the number of obese children, at or above the 95th percentile, has tripled since 1980.² The specific percentages vary state to state, dependent upon the general lifestyle of the state. Colorado is considered the leanest state in the nation with 21% of its adult residents obese. This logic does not transcend into childhood obesity statistics as Colorado is 23rd for the number of obese children at 14% for ages 10-17 and 9.4% for ages 2-4.^{3,4}

Along with the rising BMIs, the occurrence of obesity-related diseases has also increased proportionately, including type 2 diabetes, hypertension, dyslipidemia, sleep apnea and respiratory problems.⁵ Additionally, children who are obese are at higher risk to become obese as adults, with the risk increasing proportionately to the level of obesity (higher BMI) of the child.⁶

The two key risk factors involved in the development of childhood obesity include physical activity and eating behaviors.⁷ The physical activity behaviors of obese children include increased screen time, low levels of physical activity, and short sleep durations.^{7,8} Multiple eating behaviors contributing to increased weight in children include low intake of fruit and vegetables, high intake of energy-dense foods, habitual food away from home consumption, high

intake of sweetened beverages, large portions, frequent snacking and parent's child feeding practices. Additionally, parental overweight status, obesogenic parental eating and activity patterns, low-socioeconomic status, and parental education level are all related. These risk factors are only enhanced by the obesogenic environment that today's society provides that shapes the behaviors of the growing children.

NUTRITION

Taste Preference

Children are genetically predisposed to certain food preferences. These include preferences for sweet and salty flavors and rejection of sour and bitter flavors.⁹ Further, young children will go through a normal developmental stage of rejecting new things, called neophobia. This stage can translate into the rejection of novel foods in preference for more familiar foods, and learning to associate foods with the context in which they are eaten.⁹ Though this is a normal developmental stage, it does not mean that it becomes a problem for every child. The degree to which this occurs in children is on a continuum. Additional factors also affects where a child falls within this continuum, such as the child's temperament and sensory sensitivity. Though a child is born with certain preferences, they do not have to be the preferences that they retain their entire life. After birth, food preferences are influenced by the environment in which a child is exposed to food. Children learn to like the flavors that are available to them and that they become familiar with. The concern with just allowing these innate preferences to dominate is that the sugary and salty foods tend to be more energy-dense foods. This is consistent with the findings that children are overeating energy-dense foods and under eating nutrient-dense foods,

resulting in the rise of the weight status among children.¹⁰ In preschoolers specifically, a dietary pattern that was high in total fat and simple carbohydrates was associated with overweight and obesity.¹¹ On the other hand, the more times that a child is exposed to different flavors of nutrient-dense foods (i.e. vegetables) the more their preferences change to include new flavors.¹² This demonstrates the importance of exposing children to these flavors during the stage when taste preferences are being developed.

As previously mentioned, children's food preferences and behaviors can be influenced by the environment in which they are exposed to new foods. Children learn by observing and modeling their eating behaviors after those around them, which can include parental figures, teachers and peers.¹³ It is important for the parents and caretakers to practice positive role modeling as a way to promote healthful eating. This includes trying a novel food themselves while encouraging the child to try the food without demanding a child to consume something or restricting them from trying it.¹³

Food neophobia is a normal developmental process where children have a fear of new foods. As previously discussed, as children develop they go through a stage of rejecting new, or novel foods. It is minimal during infancy, increases through early childhood and then declines from early childhood through adolescents.⁹ Being that this development occurs on a continuum, the degree at which it affects a child can range from being a phase that passes in a few months to an extreme case with serious effects on nutritional status. At the height of food neophobia, two to five years of age, the degree of food neophobia can be reduced by multiple exposures to a novel food, however the number and consistency of exposures are important. Studies have found that 8-12 exposures to a new food are necessary for a child to accept the item and decide if he or she likes it.¹⁴⁻¹⁶ This length of exposures has been shown to be effective in increasing a child's

willingness to try new (novel) foods due to the fact that the more familiar a child is with a food the more willing they are to try it. Increased exposures to novel food also has shown to effect the willingness to try a food within older children, aged seven to twelve years of age, but not to the same degree as seen in the preschool-age children because they have grown out of the neophobia stage and have a more rigid definition of good and bad foods.¹⁷ Older children's willingness is more influenced by whether or not the novel food is "good-tasting" upon first exposure rather than the total number of exposures to the food.¹⁷ The increase trying of a food leads to a preference for that food, thus creating dietary changes, demonstrates the importance of establishing good eating habits in early childhood so that they are present upon entering elementary school.

Consumption and Dietary Quality

By trying a new food, children's diets have a greater variety, contributing to an overall more healthful diet. Additionally, the preferences established while young stay with a child as they grow. But as previously discussed, children's innate preferences are for sweet and salty flavors.¹⁰ These tend to be the foods that are energy-dense rather than nutrient-dense, which the overconsumption of such is a contributing factor to the rising weight status of children.¹⁰ This is consistent with the findings in three to five year old children who have a preference for high-fat, energy-dense food have higher total fat intakes and greater fat masses.^{18,19} Additionally, it has been shown that energy regulation and caloric compensation are inversely related to the weight of a child, with overweight and obese children being poor compensators.²⁰ The same association of preference and weight also holds true for six to twelve year old children. Obese and overweight children overeat high-fat and high-sugar foods, as well as consume a greater amount

of total calories.^{21,22} Seeing that the preference is a strong predictor of consumption throughout early and into middle childhood, it is even more important to change the preferences while children are still young from being the energy-dense foods, or the innate preferences, to being for the nutrient-dense foods that are developed through exposure to such foods.

PHYSICAL ACTIVITY

Gross Motor Development

Motor development is defined as the sequential, continuous age-related process whereby movement behavior changes.²³ It occurs in both small muscles (fine motor) and large muscle groups (gross motor). One way that gross motor skills can be classified is into different skill sets: locomotor, stability, and object manipulation. Examples of locomotor skills include running, leaping, and skipping, while stability skills include balancing, transferring weight and jumping. Lastly, object manipulation skills encompass such things as throwing and catching objects.²⁴ The more enhanced these gross motor skills become during early development, the more coordinated and more willing a child becomes to participate in activities and be more active in early childhood.²⁵ Findings in the literature shows that young children, aged 5-6, with higher levels of motor proficiency are more active overall when compared to their peers, thus being more likely to reach the recommended amount of physical activity.²⁶

Recommendations

The national physical activity guidelines for preschool aged children up to the age of five are 60 minutes of unstructured and 60 minutes of structured activity every day. For children five

to twelve years of age, it is to accumulate at least 60 minutes of physical activity on all or most days of the week.²⁷ National data has shown that only 42% of children, kindergarten through 12th grade, meet these recommended activity levels.²⁸ Like any individual, the lack of time children spend engaging in physical activity is a contributing factor to the steady rise in the childhood obesity rates. Many factors can influence a child's level of physical activity, including parental influence, physical and social environment and level of developmental coordination.^{29,30} School can serve as a positive influence because when children have the opportunity to be more active through physical education class, recess, and opportunities to move in the classroom they are more likely to reach the recommended 60 minutes of physical activity a day.²⁷ An additional influencer in early-elementary aged children is the level of development of gross motor skills as it can be a determinant of the level of physical activity in a child.²⁷ These are skills whose development can be enhanced through structured activity more so than through free-play.³¹ Movement and music programming improved the qualitative performance of kindergarteners' performance of these skills, specifically running, hopping, leaping, horizontal jump and skipping.³¹

INTERVENTION DESIGN

Educational Standards

The United States Department of Education's mission is "to promote student achievement and preparation for global competitiveness by fostering educational excellence and ensuring equal access."³² The individual states are responsible for implementing state and federal education laws, distributing funds, and holding schools and districts accountable for students'

performance.³³ They do this through the development of standards based off of the state's annual assessment. The Colorado State standards include 7 content areas: Art (further divided into Dance, Drama and Theatre Arts, Music, and Visual Arts), Comprehensive Health and Physical Education, Mathematics, Reading, Writing, and Communicating, Science, Social Studies, and World Languages. Under each content area, it specifically defines how the content area prepares students for life skills and lists the concepts and skills students will master at the completion of each year of competency.³⁴ Over the years, the standards have gone through multiple revisions to ensure that their standards for kindergarten through twelfth grade align with early childhood and higher education expectations. The most recent revision to Colorado's academic standards in December 2008 included the expansion of the physical education standards to include health education.³⁵ The introduction of physical and personal wellness includes healthful eating as part of the goal to teach lifelong habits and patterns for a fit, healthy and optimal childhood.³⁴ This inclusion exhibits the recognition of the importance of teaching nutrition and physical activity starting at a young age.

Social Cognitive Theory

The Social Cognitive Theory (SCT) is one of the most widely used theories for nutrition education and health promotion programs.³⁶ It was developed by Albert Bandura and evolved from his previous work the Social Learning Theory by the addition of self-efficacy, as he considered it to be the most important factor in determining if a behavior change will occur.^{36,37} The theory proposes that personal, behavioral and environmental factors work in a reciprocal fashion to influence health behaviors. It asserts that people do not learn from their own

experience, but by observing the actions of others and the benefits of those actions.³⁷ There are six constructs to this theory that include:

1. Reciprocal Determinism: Interaction of person, behavior and the environment in which the behavior is performed. It asserts that that the environment can affect a person's behaviors, but personal factors, such as cognitive skills and attitudes can impact the environment as well.
2. Behavioral Capability: The knowledge and cognitive, affective and behavioral skills needed to enact the behavior.
3. Expectations: Beliefs about the likelihood and value of physical or material, social and self-evaluative outcomes or consequences that can be expected from a behavior.
4. Self-efficacy: Confidence in one's ability to perform the given behavior that brings the desired outcome.
5. Observational Learning or Modeling: Behavior acquisition that occurs through peer modeling.
6. Reinforcement: Responses to individual's behaviors that increases or decreases the likelihood of reoccurrence.

In addition to self-efficacy, focuses of the SCT are reciprocal determinism and reinforcement. The triangular relationship of reciprocal determinism functions as changing one aspect of a behavior to effect the other two, i.e. by changing personal factors (ones belief they can do a task) it will subsequently change behavioral factors (one's knowledge and skills related to a task) and environmental factors (both physical and social environments external to the individual). Reinforcement consists of providing positive or negative reinforcement that can

either be external or internal to an individual. It can be used as a way to keep messages in the front of people's minds and as a strategy to prevent a relapse of behavior change.³⁶

When applying behavior change theories to working with young children (four to six years of age), SCT is the most commonly used, either as a single model or in combination with other behavior change theories.³⁸ It has also been found that when this theory is used in the development of an intervention, that the interventions had significant changes in at least one of their measurable outcomes.³⁸ When an intervention is being developed that targets young children, these findings show that when the constructs of SCT are used in the basis of intervention design, it sets the program up for success.

Social Marketing

Social marketing is “a process that applies marketing principles and techniques to create, communicate and deliver value in order to influence target audience behaviors that benefit society (public health, safety, the environment and communities) as well as the target audience themselves.”³⁹ Social Marketing is not a behavior change theory by itself, but rather it takes the basic marketing mix to influence a behavior through either accepting a new behavior, rejecting a potentially undesirable behavior, modifying a current behavior, or abandoning an old undesirable behavior.³⁹ The basic marketing mix consists of four constructs, also referred to as the four Ps: product, price, place and promotion. Within social marketing, the product refers to the set of benefits associated with the desired behavior change. It is the objective of marketers to find the behavior that has the greatest appeal to the target audience.⁴⁰ By doing so, the target audience will be more likely to take interest and or participate in whatever is being offered, such as a campaign or program. Price refers to the cost of adopting the desired behavior. This typically is

not a financial cost; instead it encompasses intangible costs such as time constraints, embarrassment, diminished pleasure and psychological struggles of changing ingrained habits. Place includes where and when the target audience will perform the desired behavior or receive tangible material related to the behavior. The last component of the marketing mix, promotion, is the visual component of a marketing campaign or program. It includes all activities, such as advertisement, signage, and events, designed in a way that is intended to influence the target audience.⁴⁰

The development of social marketing campaigns also includes planning for continuous monitoring and revision. Including monitoring within each step of the implantation process of a program assesses the effectiveness and determines if the program can be sustained by identifying areas that need midway revisions. Compared to behavior change theories, social marketing focuses and designates more time and resources to the monitoring process to ensure the success of the program.

Advantages of including the principles of social marketing within existing behavior change theories, such as SCT, is that it allows for a greater usage of mixed methods, more creative audience segmentation and improved evaluation studies. It allows for a better understanding of the factors that influence health behaviors and what modification to the social structure, environmental or individual level determinants are needed to result in social change.⁴⁰

CURRENT INTERVENTIONS

The increased prevalence of childhood obesity has led to the development of interventions to counteract the upward trend. A popular site for many of these interventions to

take place is within the schools because it is the place where children spend large amounts of their time. While they are learning how to count and spell, they are also being influenced, subconsciously and consciously, by their peers and teachers behaviors.^{41,42} The school environment provides the ideal setting for targeting behavior change, as seen by the vast number of interventions done in these locations, but the data on the effectiveness of said programs is limited. A systematic review of the literature on school-based obesity interventions by Brown and Summerbell (2009) concluded that there is insufficient evidence to assess the effectiveness of dietary and physical activity interventions of preventing obesity in school children.⁴³ Though there is some evidence of the effectiveness of simultaneously targeting both nutrition and physical activity behaviors if the interventions were based in health behavior theories.⁴³

Within the limited studies that showed efficacy, few provided follow-up data that extended longer than a year post intervention.⁴³ There are two studies that focused their primary intervention on children and included by a two-year follow-up: Hip-Hop to Health Jr. and APPLE. Hip-Hop to Health Jr is a 14 week healthful eating and exercise intervention within Chicago Head Starts. Three times a week the program has a lesson that introduces a healthful eating concept and a lesson of ongoing physical activity that is led by a set of food group puppets.⁴⁴ At the end of the initial 14-weeks, the intervention was found to have a positive influence on physical activity and screen time but no measurable changes on diet.⁴⁵ When followed-up at one year and two years post, the children in the intervention had significantly smaller increases in BMI when compared to the control children at both time points.⁴⁴

APPLE (A Pilot Program for Lifestyle and Exercise) is a community-based obesity prevention program that focused on getting children age five to 12 years of age to make healthful food choices and be more physically active.⁴⁶ After the completion of the two-year intervention,

children in the program were found to have significantly lower BMI than control children after 1 year, but the difference subsided by the end of the second year, though it was found that children in the intervention did consume significantly more fruits and vegetables at the end of two years.⁴⁶ When followed-up at two years post completion, the children from the intervention had significantly lower BMIs than the controls.⁴⁷

Currently there are no published studies where the primary intervention was followed up with reminder or “light” lessons. Studies that are multiple years, including the studies described above, have the intense primary intervention for all years of the program. Thus there is no data on the effectiveness of reminders over time.

THE FOOD FRIENDS[®] PROGRAMS

The Food Friends[®]

The Food Friends[®] consists of eight characters, six of which were developed as familiar foods: Ollie Orange[®], Tina Tortilla[®], Marty Milk[®], Howie Hamburger[®], Corinne Carrot[®] and Bella Bean[®], and two which were “new friends” or novel foods: Gertie Gouda[®] and Rudy D. Radish[®]. They live, work and play in the imaginary of Healthadelphia[®]. Each character has a personality, a Super Power (i.e. elasticity) and a Mighty Move[®] (i.e. lightning quickness). The Food Friends and their characteristics were developed as part of *The Food Friends* programs (*The Food Friends: Fun With New Foods*[®] and *The Food Friends: Get Movin’ With Mighty Moves*[®]) in an effort to address behaviors related to childhood obesity – increase willingness to try new foods and enhancing gross motor skills. The two programs are complementary and have successfully shown to result in behavior change.^{48,49}

The Food Friends: Fun With New Foods[®]

The Food Friends: Fun With New Foods[®] (*FWNF*) program (formerly *The Food Friends: Making Foods Fun For Kids*[®]) is focused on improving preschoolers nutrition via decreasing food neophobia (picky eating). It was developed in 1997 by researchers at Colorado State University as a nutrition education program to promote healthful food choices among low-income Coloradans, and was based in the Social Cognitive Theory.⁵² Through results from formative work, three to five year old low-income children were selected as the primary target audience. The theme of “try new foods” was selected for the intervention because research suggests that children tend to experience a period of food neophobia during these preschool ages and it has been shown that children who eat a variety of foods have greater the nutritional quality⁵⁰. The program consists of 12 weeks and 24 lessons. Each week there is a 15-20 minute nutrition activity and opportunities to try new foods two times.⁵⁰ In addition to the lessons that are provided in the teacher guide, puppets of the eight characters, and all materials needed to teach the lessons are included as part of the program kit. Further, a bilingual parent component was developed to educate and encourage parents to persistently offer new foods to their children in the home environment. This component of the program was developed based on the SCT constructs and originally consisted of newsletter articles, handouts, activity tips with recipes, and family fun night activities.⁵¹ It now consists of a placemat, activity book, and handouts

An assessment of the program was done through a quasi-experimental study conducted in four Head Start Centers in Colorado. It showed that the exposure to *FWNF* significantly decreased the number of refusals to novel foods when compared to children in a control group.^{50,52}

The Food Friends: Get Movin' With Mighty Moves[®]

Since the development of healthful habits in childhood involves more than just nutrition, the complementary physical activity program, *The Food Friends Get Movin' With Mighty Moves*[®] (MM), was created in 2006.⁵³ Formative work with the target audience resulted in the development of the Mighty Moves[®] program that included each of the Food Friends[®] characters participating in a physical activity that represented a category of gross motor skills (their “Mighty Move”) and a superpower. For example, to work on stability, Marty Milk’s Mighty Move is strength and he is able to shift his weight from one foot to the other. The Super Powers relate to personality and community awareness. At the introduction to each program, there is a summary of all of the characters that include a picture of the character, their name, Super Power, Mighty Move and favorite place in Healthadelphia. These characteristics are used in the programs lessons, which are led by the individual characters.

Materials developed included a musical CD, a teacher activity binder, activity mats, beanbags, scarves, and puppets with superpower outfits.⁵³ The program consists of 18-weeks and 72 lessons with four 15-20 minute lessons a week. The lessons are made up of multiple teacher-led activities that focused on one of the gross motor skills (stability, locomoter and manipulative). In a randomized intervention study, eight Head Start Centers (who had previously implemented FWNF) were assigned to receive Mighty Moves intervention (n=132 across 18 classrooms) or the control (n=131 across 13 classrooms). Children receiving the Mighty Moves intervention demonstrated significant changes in gross motor skills when compared to the control, including a significant increase on Gross Motor Quotient (GMQ) of Peabody Developmental Motor Scales, second edition.⁵⁴ Regression analysis showed that the lower the child’s BMI at the outset of the intervention, the greater changes they made in gross motor skills

when compared to children of higher BMIs. No significant changes to BMI throughout the intervention were seen.⁴⁸ The original *FWNF* did not include the superhero theme, *Bella Bean*[®], and *Healthadelphia*. After the creation of *MM*, *FWNF* was modified to include the changes.

THE LEAP STUDY

Both of *The Food Friends*[®] programs have proven to be effective in eliciting behavior change from the beginning to the end of the programs. To ascertain if behaviors developed in *FWNF* and *MM* are sustained beyond preschool, United States Department of Agriculture (USDA) funded a longitudinal study to assess if the effectiveness of these programs are sustained in elementary school.⁵⁵ The study, known as the LEAP study (Longitudinal Eating And Physical activity study), is a collaborative study between researchers at Colorado State University (CSU) and University of Colorado at Denver (UCD) that looks at three measurable outcomes:

1. Do children who have demonstrated increased willingness to try new foods and who developed enhanced motor performance by participating in Food Friends and Mighty Moves during preschool maintain those behaviors through early elementary school?
2. Do Food Friends and Mighty Moves programs have an impact on reducing the percentage of children considered overweight and obese over three year timeframe?
3. Does food preference and motor performance directly affect child weight status or are they mediators to dietary intake and physical activity?

The study follows children from five rural Colorado communities for three years starting in preschool and continuing on through kindergarten and first grade. The study is comprised of three cohorts, with cohort 1 (C1) starting preschool in Fall 2010 in Leadville, Buena Vista, Iliff

and Salida, Colorado, cohort 2 (C2) starting preschool in Fall 2011 in Leadville, Buena Vista, Iliff and Brush, Colorado and cohort 3 (C3) starting preschool in Fall 2012 in Brush, Colorado . The research design calls for children who are in the intervention schools (Leadville, and Iliff) to receive both Food Friends[®] and Mighty Moves[®] in preschool and additional “booster” programming during kindergarten and first grade. Children who are in control schools (Buena Vista, Salida and Brush) will not receive any intervention programming in preschool or “booster” in the subsequent years.

The data on the longitudinal effectiveness of a nutrition and physical activity intervention in preschool-aged children is limited, but it is known that applying the Social Cognitive Theory and reinforcement of key messages needs to occur for behavior change to happen. The “booster” programming for kindergarten and first grade students will be designed to reinforce the Food Friend and Mighty Moves messages and behaviors. This project’s objective was to develop the “booster” programming for kindergarten and first grade students based on the Food Friends’ characters and themes utilized in preschool. This paper will discuss the development, implementation and process evaluation of the booster for kindergarten and first grade.

CHAPTER THREE: METHODS

FORMATIVE RESEARCH

Formative research for this project consisted of two components: 1) a survey and 2) telephone interviews. The first step of formative research was to conduct a mailed survey with kindergarten and first grade teachers of schools that were already recruited to participate in the LEAP study. The inclusion criteria for survey participants were to be a current kindergarten or first grade teacher at a participating LEAP study school. The schools included Margaret J. Pitts Elementary (Leadville, CO), Salida Early Childhood Center (Salida, CO), Thompson Elementary (Brush, CO), Avery-Parsons Elementary (Buena Vista, CO), and Ayres Elementary (Sterling, CO). The procedures for this study were approved by the Institutional Review Board at Colorado State University (Appendix A). There were a total of 36 surveys that were delivered to the participating schools. In accordance with the IRB protocol, the surveys were delivered to the school or via mail in a packet containing a cover letter outlining the purpose of the project, a three-page summary of the LEAP study, the seven-page survey for the teachers to voluntarily complete, a self-addressed stamped envelope, and an availability form for a follow-up telephone interview (Appendix B). An incentive of being entered into a drawing for \$100 cash prize was offered to those who chose to complete the survey and returned the entry form. Teachers provided implied consent to participate in the study by returning a survey. A subsample of those who returned completed surveys returned telephone interviews availability forms and participated in a telephone interview. Interviews further probed about the lessons and activities done in the classroom surrounding nutrition and physical activity and to gather their input about the project design. Data collection occurred during the spring and summer semesters of 2011.

Survey

The survey consisted of seven sections and 33 questions. Part 1 of the survey (four questions) assessed demographics of the classroom (e.g. grade level and number of students in the classroom) Additionally, it gathered information on the teachers' perceptions of their students' nutrition and physical activity status by using close-ended statements (e.g. "My students have the knowledge to make healthy food choices"). The response options included a 5-point Likert scale ranging from strongly agree to strongly disagree. Part 2 (five questions) assessed what is currently being done in the classroom surrounding food and nutrition. It included a mixture of multiple choice questions, Likert scale probability questions, with the scale ranging from definitely to definitely not, and open-ended questions. Part 3 (four questions) assessed what is currently being done in the classroom surrounding physical activity. It collected the amount of time that students participate in various forms of physical activity (e.g. recess, physical education class, structure and unstructured physical activity). The section also included a Likert scale probability question and open-ended questions, mirroring the questions in Part 2. Part 4 and 5 (3 questions each) assessed the cafeteria and physical education classes, respectively. They collected insight on the amount of time that students spend in the respective activities (e.g. how much time children spend in the cafeteria and the average length of physical education classes) during the school day. Part 6 (eight questions) was designed to gauge the teachers' opinions and reactions to the proposed project. The section was prefaced with a short summary of the goal of the larger project. Six of the questions were multiple choice to see what the teachers would prefer and two of the questions used 5-point Likert scale (definitely to definitely not) to assess the best locations within the school to reinforce the proposed programs messages. The last section, Part 7, consisted of five basic demographic questions (e.g. age,

race/ethnicity). Items in the survey were developed and face and content validity were assessed by experts in childhood nutrition and physical activity programs and appropriate changes were made.

The Flesch-Kincaid Grade Level test was performed in order to assess the survey's readability. The survey tested with a 9.9 reading level, indicating that an average 9th to 10th grader should be able to read and understand written material. It is recommended that the written material be at an 8th grade reading level or below, or a Flesch-Kincaid score of 8.0.⁵⁶ This survey contained multiple usages of polysyllabic words, such as nutrition, physical activity, integrate and probability, increasing the reading level. Since the purpose of the survey was to assess what teachers are currently implementing in regards to nutrition and physical activity in the classroom to learn how to best integrate lessons into their classrooms, these words are an integral part of the survey instrument and unable to be changed or removed. Additionally, the target audience of the survey were teachers, who all have higher education levels than ninth grade so the inclusion of the polysyllabic words probably did not affect the participants understanding of the survey questions.

The Statistical Package for the Social Sciences Software (SPSS version 20.0, 2011, IBM SPSS Inc, New York, NY) was utilized for analyzing the survey scores.

Interviews

There were 10 participants that returned surveys expressing interests in a follow up telephone interview. The telephone interview used a semi-structured format in order to further explore the findings that emerged from the survey results (Appendix C). The areas of focus included examples of the food, nutrition and physical activity lessons that they currently do in

the classroom, examine what subject areas program lessons could be incorporated into and how, and to assess the needs and barriers to them incorporating the program.

One interviewer asked 13 open ended questions that were developed after the results from the surveys were gathered to fill in the gaps of information that was not able to be obtained from the paper survey. Like the survey, the interview script was tested for face and content validity with experts in the fields of childhood nutrition and physical activity programming. Probes were used to gain additional detail and information when needed. Prior to each interview, the interviewer reviewed the major consent points orally at a level the participant could understand in order to ensure the participant recognized their voluntary participation in the study and that would receive an incentive of \$20 for completing the phone interview. Each interview took approximately 20 minutes and was conducted in July of 2011.

BOOSTER DEVELOPMENT

The Food Friends[®] Program curriculums were reviewed to be used as a model for the development of future lessons. Specifically, the lesson structures, tone of writing and use of characters. The “booster” curriculum is an extension of the current Food Friends programs so consistency between the different curriculums is essential for the reinforcement of social marketing and social cognitive theory constructs to be effective with the children.

A “booster” curriculum for the kindergarten and first grade classrooms was developed using the teacher input generated from the surveys and phone interviews, along with input from experts in the field of childhood nutrition and physical activity programming. The structure, lessons and characters were modeled off of the existing preschool *The Food Friends: Fun With*

New Foods[®] and *The Food Friends: Get Movin' With Mighty Moves*[®] programs and used the Social Cognitive Theory constructs as a framework for the development. The booster consists of two years of lessons (Year 1 and Year 2), with different set of lessons and activities each year. The two years of programming are independent of each other so the order in which the students received them does not impact the effectiveness of the lesson. Cohort 1 received Year 1 in kindergarten in 2011-12 school year. In 2012-13 school year, Year 2 will be conducted in first grade with cohort 1 and in kindergarten with cohort 2. Cohort 2 will receive then receive Year 1 in first grade in the 2013-14 school year. Year 2 of the program has been developed in the same way as Year 1 with appropriate modifications being made for the results of the process evaluation (described later). The rationale behind why cohort 2 received year 2 programming in kindergarten instead of Year 1 (such as cohort 1 did) was due to the fact that cohort 1 and 2 are in the same school buildings. As not to overwhelm the school environment with signage from two separate programs, implementing the same “Year” of programming to both cohorts occurred in the same calendar year.

Table 1: “Booster” Program Implementation

	2011-12	2012-13	2013-14
Cohort 1	Year 1 program	Year 2 program	
Cohort 2		Year 2 program	Year 1 program

IMPLEMENTATION AND PROCESS EVALUATIONS

Implementation

Year 1 of the program was implemented in December 2011 at Margaret J. Pitts Elementary, Leadville, Colorado and Ayres Elementary, Sterling, Colorado. Prior to implementation, teachers and Extension agents attended a 45 minute training session

Process Evaluation Survey

To gain input into the implementation of the booster, teachers received an electronic link via email to a monthly evaluation survey at the completion of Unit 1 (December 2011), Unit 2 and 3 (February 2012), and Unit 4 and 5 (April 2012). The survey link was contained in an email that was sent from the researchers to the principals of the schools. The principals then forwarded the email to their kindergarten teachers. Items in the surveys were developed using Survey Monkey[®] and assessed if teachers were conducting the components of the monthly lesson and to assess if there are any changes that need to be made to the program. Face and content validity of the survey instrument was conducted by experts in childhood nutrition and physical activity programs and appropriate changes were made.

Unit 1 evaluation survey which assessed Unit 1 lessons was sent to both elementary schools on January 25, 2012. It consisted of 12 questions:

- 3 questions assessed demographics (school, grade, classroom);
- 3 close-ended questions assessed what lessons were performed;
- 1 open-ended questions for suggestions;

- 2 5-point Likert scale questions. Strongly Agree to Strongly Disagree to assess the teachers' level of agreement with enjoyment statements ("I enjoyed teaching all of the month's activities"). A Great Deal to Never to assess the teachers' view of students' interest in the message ("How interested were your students in the message(s)?");
- 3 open-ended questions about supporting materials and additional information.

Unit 3 evaluation survey assessed Unit 2 and 3 lessons and was sent out to Margaret J. Pitts Elementary on February 20, 2012 and Ayres Elementary on February 27, 2012. It consisted of 12 questions, same as in Unit 1.

Unit 5 evaluation survey was sent out to both elementary schools on April 30, 2012 to assess Unit 4 and 5 lessons and overall impressions. It consisted of 15 questions, 9 of which mirrored questions from the previous months and six questions focused on the program as a whole and potential modification for Year 2 lessons. The additional six questions were the open-ended questions about the supporting materials and additional information. Questions added to the final survey included:

- 3 5-point Likert scale questions using Strongly Agree to Strongly Disagree to assess the level of agreement with concluding statements such as "The length of the activities (approximately 20 minutes) worked for my classroom", "I liked the flexibility of being able to incorporate them (Food Friends[®] characters/messages/themes) into everyday subject areas", and "Overall, I enjoyed having the Food Friends program in my classroom".
- 1 closed-ended question about the likelihood of them recommending the program to other teachers
- 2 open-ended questions about additional materials needed and any additional comments

The Flesch-Kincaid Grade Level test was performed in order to assess the survey's readability. The survey tested with a 9.0 reading level. As explained in formative research, the reading level of the survey is higher than the recommended 8.0 due to the use of polysyllabic words, such as integration, nutrition, physical activity and curriculum. Since the purpose of the survey was to assess what parts of the nutrition and physical activity curriculum teachers are integrating into their classrooms, these words are an integral part of the survey instrument and unable to be changed or removed.

Frequencies of results were provided by SurveyMonkey.com.

Interviews

Face-to-face interviews were conducted with the Extension agents from Logan and Chaffee counties who taught the first lesson of each month. Interviews were unstructured and used to gather input on changes and recommendations to the lessons from sources that had firsthand experience teaching the lessons.

Modifications

After implementation of Year 1 program, Year 2 program lessons were designed and structured in the same manner. Findings from the results of process evaluation surveys, interviews and implementation from Year 1 were incorporated into Year 2 lessons.

CHAPTER FOUR: RESULTS

FORMATIVE RESEARCH

Survey

A total of 22 out of 36 of the kindergarten and first grade teacher surveys were returned, a 61.1% response rate. The majority of the surveys returned were from kindergarten teachers (77.3%) and teachers that taught full day class (81.8%). The age of the teachers filling out the surveys were under 25 years of age (n=1), 25-34 (n=9), 35-44 (n=7), 45-54 (n=3) and 55-64 (n=1) and all participants had at least a bachelor's degree, with one third of participants having obtained an advanced degree. All participants were white.

Table 2 presents the teachers attitudes about their students' nutrition and physical activity. Only twenty-eight percent of the teacher agreed with the statement that their students have the knowledge to make healthy food choices and 100% did not agree that their students get enough physical activity at home.

Table 2: Teachers' attitudes towards students' nutrition and physical activity levels

Survey Variable	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
My students eat well overall	9.5% (n=2)	47.6% (n=10)	14.3% (n=3)	28.6% (n=6)	0%
My students have the knowledge to make healthy food choices	0%	28.6% (n=6)	47.6% (n=10)	23.8% (n=5)	0%
My students get enough physical activity at school	4.8% (n=1)	52.4% (n=11)	9.5% (n=2)	33.3% (n=7)	0%
My students get enough physical activity at home	0%	0%	38.1% (n=8)	52.4% (n11)	9.5% (n=2)

Forty percent of the respondents reported having no nutrition lessons or activities in an average month and an additional 55% percent reported only conducting one to two lessons or

activities a month. When nutrition lessons or activities were performed, 64.7% were less than 15 minutes in length and none were longer than 30 minutes. When teachers were asked if they incorporated nutrition topics into other academic subject areas, over half of the respondents reported that they did incorporate nutrition, with the most common subject areas being reading and language arts (84.6%), science (76.9%) and mathematics (61.5%). For the respondents that reported not incorporating nutrition topics into other subject areas, they were additionally asked which subject areas they saw potential for incorporation into. The most frequent responses were reading and language arts (66.7%), science (90%), and social studies (50%).

Table 3: Academic subject areas to incorporate nutrition into

Subject Areas	Already Incorporate Into		See Potential for Incorporation	
	Percent (%)	Frequency (n)	Percent (%)	Frequency (n)
Reading and language arts	84.6	11	66.7	6
Mathematics	61.5	8	20	2
Social Studies	38.5	5	50	5
Science	76.9	10	90	9
Music	0	0	11.1	1
Art	7.7	1	11.1	1
Dramatic Play	38.5	5	30	3

In reference to the classroom activities surrounding physical activity, teachers were asked to write down the number of minutes spent in various activities (Table 4).

Table 4: Amount of time spent in physical activities

Activity	Mean (SD) amount of Time (minutes per week)	Frequency (n)
Physical Education Class	65.16 (44.0)	22
Recess, structured (teacher-led) activities	26.25 (59.5)	16
Recess, unstructured (student-led) activities	145.25 (85.0)	21
Classroom, structured (teacher-led) activities	61.25 (77.4)	20
Classroom (student-led) activities	56.88 (73.0)	16

Though 40.9% of the teachers reported that they did not have adequate space to perform physical activities within the classroom, the total amount of time spent in classroom physical activity was 118 minutes per week when structured (61 minutes) and unstructured (57 minutes) are combined. An additional 67 minutes was spent in physical education class, where the students go either 1-2 times a week (52.4%), 3-4 (14.3%) or 5 times per week (33.3%) depending upon the school, but it was found that less than 10% of the teachers frequently or very frequently reinforce the skills learned in PE class in their classrooms.

Regarding the potential program, 42.9% of teachers reported being willing to devote only 1-20 minutes a month to a nutrition/food activity and 1-10 minutes a week to structured physical activity lesson (Table 5 and Table 6). For the structure of the potential program, 75% of the respondents preferred the nutrition and physical activity lessons to be separated into two sessions (one focused on nutrition and one focused on physical activity) and 66.7% preferred that the lessons be taught by a combination of the teacher and an outside instructor. When asked about other locations in the schools where the program lessons and messages could be incorporated, the majority of respondents thought that the cafeteria and gym would “definitely” be areas for reinforcement, 52.4% and 57.1% respectively. For the other areas, art, music, library and computer, the majority of teachers that reported “maybe” were potential locations for reinforcement (45%, 57.1%, 40.9%, and 47.6%, respectively).

Table 5: Amount of time teachers are willing to devote to nutrition lessons each month

Nutrition/food Lessons Per Month					
Time	1-20 minutes	20-40 minutes	60 minutes	Several hours	Don't know
Percent	42.9	28.6	19	0	9.5
Frequency	9	6	4	0	2

Table 6: Amount of time teachers are willing to devote to physical activity lessons each week

Physical Activity Lessons Per Week						
Time	Zero	1-10 minutes	10-20 minutes	20-40 minutes	Greater than 40 minutes	Don't know
Percent	9.5	42.9	28.6	14.3	4.8	0
Frequency	2	9	6	3	1	0

For the method of training for the program, 80% of the teachers preferred the training sessions to take place on a staff in-service day and 68.2% preferred for it to take place in one long session. When looking at the potential program as a whole, 86% of the teachers reported “definitely” or “probably” implementing it in their classroom as shown in Table 7.

Table 7: Probability of teachers implementing the booster program

	Definitely	Probably	Maybe	Probably not	Definitely not
If provided with lesson plans and materials to perform nutrition and food activities in the classroom, how likely would be to conduct them?	36.4% (n=8)	31.8% (n=7)	22.7% (n=5)	4.5% (n=1)	4.5% (n=1)
If you were provided with lesson and materials to perform structured (physical) activities in the classroom, how likely would you be to conduct the lessons?	36.4 (n=8)	31.8% (n=7)	31.8 (n=7)	0	0
If lessons and activities were created for nutrition and physical activity, how likely would you be to implement it in your classroom?	36.4 (n=8)	50% (n=11)	4.5% (n=1)	9.1% (n=2)	0

Interviews

Out of the 10 survey participants that indicated interest in the telephone interviews by returning telephone availability forms with their surveys, five completed an interview, four could not be reached, and one declined. Of the five participants that completed an interview, all were

female, four were kindergarten teacher and one was a first grade teacher. Three worked in Sterling, Colorado, one worked in Brush, Colorado and one worked in Leadville, Colorado.

The results from the interviews reinforced the survey findings. The main summary points were:

- Little nutrition is taught in the classroom.
- Teachers commonly incorporate movement into lessons because their students have short attention spans.
- Teachers thought that the idea of incorporating nutrition and physical activity into academic subject areas was a good idea. They indicated that reading and language arts would be the most difficult to work with, while mathematics would be the easiest.
- Teachers preferred the idea of having lesson guides packaged in a binder over the idea of using more of a recipe box format.
- Teachers indicated that they would need the supporting materials provided for them because of a limited budget.
- Students get excited when an outside person comes into the classroom.
- Suggested that posters accompanying the program go on the lower walls because the students notice minut changes.
- Preferred the idea of a one-time training.

BOOSTER DEVELOPMENT

The preschool Food Friends[®] curriculums are divided into weekly lessons that are led by individual characters. Each lesson begins with an objective session that gives an overview of

what the lesson will cover along with a side box that lists the materials needed to perform the lessons. Each lesson includes step-by-step directions for each separate activity. Additionally, throughout the lessons there are highlighted “tip” boxes that supply hints for the teachers for performing the lesson more efficiently.

The resulting “booster” program is entitled *The Food Friends[®] Elementary School: Super Tasters and Mighty Movers*. The five-month long program consists of short reminder activities and lessons that reinforce the messages learned in the preschool *The Food Friends: Fun With New Foods[®]* and *The Food Friends: Get Movin’ With Mighty Moves[®]* programs. The characters, themes, and logos were all maintained from the original programs. A single Food Friend character is featured each month for four months and then one month the four characters are featured as a group, making the booster five months long. The four characters selected to be featured during Year One are Bella Bean[®], Tina Tortilla[®], Rudy D. Radish[®] and Ollie Orange[®]. The remaining characters, Gertie Gouda[®], Howie Hamburger[®], Corinne Carrot[®] and Mary Milk[®], will be featured during Year Two.

Each of the characters’ personalities, superpowers and Mighty Moves were kept the same as in the preschool program and used to develop the theme for the “booster” to be “Super Taster” and “Mighty Mover” and the taglines of “Are you a Super Taster?” and “Are you a Mighty Mover?” A response to these questions was developed for each character, which became the theme for each month (Table 8 and Table 9). These themes guided the development of the lessons and additional information for each unit. An example of the full developmental matrix can be found in Appendix D.

Table 8: Year 1: Unit taglines for characters

	Group (Unit 1)	Bella Bean (Unit 2)	Tina Tortilla (Unit 3)	Ollie Orange (Unit 4)	Rudy D. Radish (Unit 5)
"Are you a supertaster? I am because . . ."	We are because we help each other try new foods.	I know new foods taste great.	I get wrapped up in new foods.	it's cool to try new foods.	I like to watch new foods disappear off my plate.
"Are you a mighty mover? I am because. . ."	We are because we have fun playing together.	I like to dance. Shake, rattle and roll.	I like to jump for joy, leap for laughs and hop for health.	being fast makes me hip and gives me zip.	I have a ball kicking and throwing.

Table 9: Year 2: Unit taglines for characters

	Group (Unit 1)	Howie Hamburger (Unit 2)	Marty Milk (Unit 3)	Corinne Carrot (Unit 4)	Gertie Gouda (Unit 5)
"Are you a supertaster? I am because . . ."	We are because we help each other try new foods.	Trying new foods is an adventure.	Trying new foods helps me learn.	I wonder what new foods taste like and I find out all the time.	New foods are fun to try with friends.
"Are you a mighty mover? I am because. . ."	We are because we have fun playing together.	Playing outside is fun.	It makes me strong.	Twisting and turning makes me smile.	I love stretching my muscles.

Teacher Guide

The resulting *The Food Friends*[®]: *Elementary School* Year 1 program teacher guide consisted of 82 pages divided into 10 sections described in Table 10.

Table 10: Table of context for the booster

Sections	Number of pages
Introduction	1
Background of <i>The Food Friends</i> [®] programs	4
Picky Eating and Food Neophobia	3
Physical Activity and Motor Development	4
LEAP Study Overview	1
The Food Friends: Elementary School Overview	1
How to Use the Program Guide	1
Meet the <i>Food Friends</i>	1
Monthly Lessons	59
Appendix	2

Each of the units consists of a title page, Food Friends Facts, Fast Facts and three week units (Week 1, Week 2, and Week 3). Week 1 was designed to be taught by an Extension agent or student and lasted approximately 30 minutes. The lesson structure included an introduction to the month’s featured character and their Super Taster and Mighty Mover messages. The introduction was followed by a Fast Fact which provided talking points about nutrition and food topics related to the month’s featured character. The main part of Week 1 lessons were the Be A Super Taster and Be A Mighty Mover sections. The Be A Super Taster involved a hands-on food tasting activity, such as a citrus tasting or making hummus, related to the monthly character. The Be A Mighty Mover involved a activity related to the *Mighty Move* of the character. Week 2 is designed to have the teacher incorporate the messages and themes of the “booster” into classroom subject areas. A list of suggested ways to incorporate into various subject areas was provided that were loosely based off of Colorado State Standards for kindergarten and first grade. Additionally, Week 2 included sections titled Brain Breaks and *Food Friend Fridays*. Brain Breaks were short movement activities that could be used as transitions from one subject to the next or for the students “to get the wiggles out.” *Food Friend Fridays* were topics designed to get the students talking about how they were going to continue to be active and/or try new foods over the weekend when they were at home with their families. Week 3 is designed to

be a teacher-led activity that takes approximately 10 to 20 minutes and all of the materials needed to perform the lesson were provided. An example of lesson components is provided in Tables 11 and 12. Additionally an example of a complete unit is provided in Appendix E.

Table 11: Example of monthly lesson

Component	Example: Bella Bean[®]
Food Friends Fact	See Table 10
Fast Facts <i>Additional information about the monthly topic</i>	<ul style="list-style-type: none"> ○ Beans are a good source of nutrients as they are high in folate, potassium, iron and magnesium and are high in fiber ○ The United States Department of Agriculture (USDA) recommends that children 4 to 8 years of age have 4 ounces of protein a day and ½ cup of beans counts as 2 ounces of protein
Week 1 Lesson <i>Extension agent led 20-30 minutes activity</i>	The activities for this week will be focused on learning more about Bella Bean and different types of beans. Additionally, the students will make their own hummus!
Week 2 Lesson <i>Incorporated the featured Food Friend's messages and personality into classroom subject areas</i>	<ul style="list-style-type: none"> ○ Bella Bean's dried bean relatives can be used in: ○ Mathematics for counting, graphing, patterning or sorting ○ Being the mayor of Healthadelphia, Bella Bean is involved in civics: <ul style="list-style-type: none"> ○ Talk about how the leader of a city or country (such as the mayor or the president) leads people in deciding what to do by voting <p>Brain Break – Have the students get up and shake and dance like Bella Bean</p> <p>Food Friend Friday – Talk about what new way the students are going to try beans when at home with their families, such as in soups or tacos</p>
Week 3 Lesson <i>Teacher led 10-15 minute activity</i>	This week's activities will be growing a bean sprout.

Table: 12: Example of Food Friends Facts

Character Name	Bella Bean [®]
Birthdate	January 20 th (the date of United States Presidential Inauguration)
Hometown	Healthadelphia [®]
Personality	Bella is the sassy and confident mayor of Healthadelphia
Superpower	Mind Reading. Bella Bean always knows why you're smiling or why you're sad. You never need to explain why you're crying or laughing to Bella because she has the amazing power to understand what you're thinking and what you're thinking and feeling. Bella's always the first friend to give you a hug when you're having a bad day because she'll know about it before you even say a word. She's also the first friend to give you a snack because she'll know when you're hungry even before you do!
Mighty Move	Bella Bean has great rhythm and loves to dance. Dancing to different kinds of music is her favorite thing to do. Bella knows her body parts and can move all of them in a variety of ways. She is the queen of space, giving herself and those around her space to move.
Family History	Bella's family tree is full of legumes of all different shapes and sizes. Her dad is a kidney bean so he is tall and is a dark red color while her mom is tiny little black bean. She has identical twin cousins who are white and flat, but one is called a lima bean and the other a butter bean. Her spotted aunt, the pinto bean, can be seen hanging out at fiestas near the refried bean dip. Then there is the grandpa, black-eyed pea, who looks tough because he has a single black ring around his eye but is really just a big softy. The family gatherings always get exciting when her exotic cousin, the garbanzo bean, flies in from the Mediterranean region and shares with them stories about the dishes and spices that she has discovered!
Favorite Place in Healthadelphia	Bella loves to garden where she moves her body while planting new foods
Favorite Subject	Civics and Social Studies
What she wants to be when she grows up	President of the United States of America
Favorite type of music	Anything that has a good beat so she can dance all day long!

Teacher Kit

The teacher kit that was provided to each of the kindergarten teachers (n=9) at Margaret Pitt Elementary in Leadville, Colorado and Ayers Elementary in Sterling, Colorado. The kit included:

- Teacher Guide (as described above)
- 1 set of the *The Food Friends*[®] puppets*
- 1 *Mighty Move* CD*
- 3 activity pads*
- 2 containers of a mixture of dried beans
- 1 packet of *Food Friends* stickers*
- 1 copy of *Move* by Steve Jenkins and Robin Page
- 12 *Food Friends* beanbags of assorted colors*
- 1 box of sandwich sized zip-topped bags
- 1 roll of paper towels

*material originally from *The Food Friends: Fun With New Foods* and *The Food Friends: Get Movin' With Mighty Moves*[®]

Supporting Materials

To accompany the classroom lessons and to reinforce the messages, each school was provided with 20 13"x18" glossy posters for each month to be placed throughout the school, e.g. hallways, cafeteria, gym. The posters pictured the month's featured character and their Super Taster and Mighty Mover messages. 10 of the 20 posters had the tagline "Are you a Super Taster? I am because" and 10 had "Are you a Mighty Mover? I am because" followed

by the characters response. In addition to the smaller posters, two 3'x5' vinyl banners each month, one for the Super Taster message and one for the Mighty Mover message, were provided with poster stands. The “life-sized” posters were designed to be placed in the cafeteria and gym, respectively.

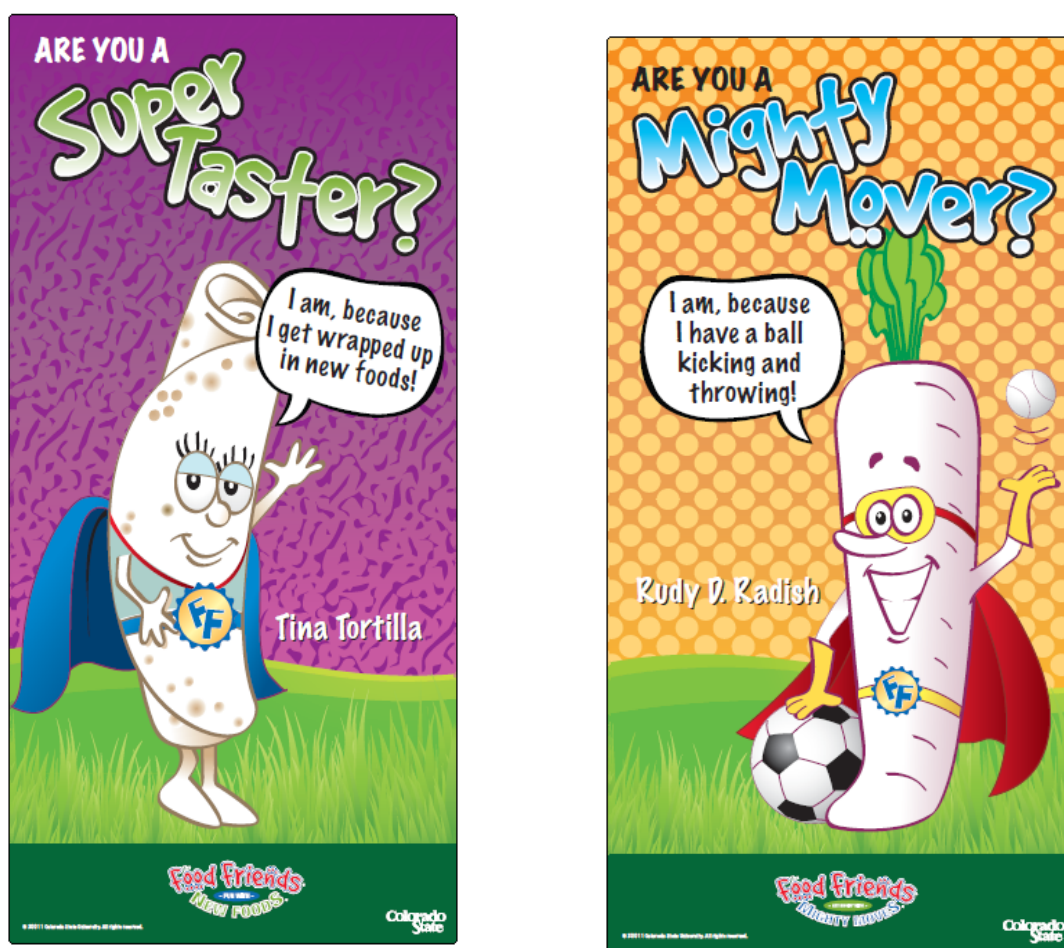


Figure 1: Super Taster and Mighty Mover Poster examples

Teacher Training

Teacher and Extension agent training took place on October 5th, 2011 at Ayers Elementary and October 13th, 2011 at Margaret J. Pitts Elementary. The sessions were led by either a graduate student or research staff member. The topics covered were an overview of the

LEAP study, how to use the booster teacher guide, the school's involvement and planning of when Week 1 lesson of each month would take place. At the training session, each teacher received a teacher kit, with an additional one provided for each school and all of the posters for the all of the months.

Application of the Social Cognitive Theory

The development of the booster used the constructs of the Social Cognitive Theory, as the preschool Food Friends[®] programs did. The development of the booster relied heavily on the reinforcement construct to keep the messages of the preschool programs in front students. This was accomplished through using the same characters and central themes of trying new foods and being more active. Application of SCT constructs were used throughout the program development and described in Table 13.

Table13: Application of Social Cognitive Theory constructs

Construct	Application
Reciprocal Determinism	Children were provided with materials and opportunities in the classroom (environment) to participate in physical activity and nutrition lessons, applying what they have learned in the lessons (behavioral) adding to their knowledge of how to eat healthfully and be physically active (person).
Behavioral Capability	Developmentally appropriate activity that builds upon skills learned in preschool.
Expectations and expectancies	The “booster” was built upon the existing <i>Food Friends</i> [®] programs so the components need to continue to resonate with the target audience the same way. The characters continue to promote fun with food and engage students in activity.
Self-efficacy	Allow the students to make/try their own food and participate in the actions
Observational Learning/Modeling	Learn by watching adults and peers role model the activities
Reinforcement	Activities and lessons are reinforcing the overarching themes of the preschool <i>Food Friends</i> of increasing willingness to try new foods and enhancing gross motor development. The theme of ‘Super Taster’ and ‘Mighty Mover’ are reinforced within the weekly lessons, posters and signage throughout the school.

Application of Social Marketing

This project focused on the stages of formative research outcomes, program development and implementation. Since the program is an extension of pre-existing programs, *FWNF* and *MM*, the product and place have already been established. The formative research outcomes revealed the price (barriers) that the teachers viewed there to be in implementing a nutrition and physical activity program in their classroom. The three main costs were time, space and equipment. Teachers are limited for all three, which shaped how the developed program would be promoted. The program was designed in a way for the messages to be incorporated into academic subject areas. Additionally, the lessons were designed to be short in duration so that they would be able to be incorporated into the time constraint classroom. Lastly, lessons were designed to be conducted within the limited space of a classroom. All of the materials needed to perform the lessons were provided in the teacher kit and the outside instructor brought and prepared all food for Week 1 lessons to eliminate the equipment and cost barriers.

The promotion of the booster was done throughout multiple stages of development. The program builds upon the existing characters and messages and uses them to develop the theme of “Super Tasters and Mighty Movers.” The Super Taster part uses the characters’ superpowers from *The Food Friends: Fun With New Foods*[®] to promote trying new foods, while the Mighty Mover part uses the Mighty Moves[®] from *The Food Friends: Get Movin’ With Mighty Moves*[®] to promote increasing activity. The specific Super Taster and Mighty Mover messages are used on the visual banners and posters, in addition to being written into the lessons. The promotion of the program as a whole was done through providing trainings for the teachers where they receive a teacher kit and a curriculum that included weekly lessons and suggestions on how to incorporate the themes into academic subject areas.

Table 14: Application of Social Marketing constructs

Marketing Mix	1.Initial Planning	2.Formative Research Outcomes	3.Strategy Development and Refinement Outcomes	4.Program Development Outcomes	5.Implementation	6.Evaluation
Product	Short term - Maintain behavior change made.					
	Long term – Establish healthful eating habits and physical activity patterns.					
Place	LEAP kindergarten and 1 st grade classrooms and schools					
Price		Time- Teachers follow strict curriculums. Lessons written with flexibility to be incorporated into subject areas and outside instructors to co-taught				
		Space – Activities designed for small spaces, i.e. classroom				
		Equipment- All materials needed for the activities were provided in the teacher kit.				
Promotion			Utilize existing Food Friends [®] characters	Lessons designed to be incorporated into academic subject areas	Posters featuring the characters with the program messages in the school cafeteria, halls, and gym	Ascertain students’ visibility and understanding of messages
			Super Taster and Mighty Mover themes	Provide trainings for teachers		
				Provide program kit		
				Developed posters and banners		

IMPLEMENTATION AND PROCESS EVALUATION

Implementation

Year 1 of the program began in December of 2011 and continued through April 2012. The specific start dates of each month were decided by the teachers and county Extension agent (Chaffee County for Margaret J. Pitts Elementary and Logan County for Ayers Elementary).

Margaret J. Pitts Elementary Start Dates:

- Unit 1 – November 30, 2011
- Unit 2 – January 1, 2012
- Unit 3 – February 1, 2012
- Unit 4 – February 29, 2012
- Unit 5 – March 28, 2012

Ayers Elementary Start Dates:

- Unit 1 – December 6, 2011
- Unit 2 – January 10, 2012
- Unit 3 – February 7, 2012
- Unit 4 – March 13, 2012
- Unit 5 – April 10, 2012

At Margaret J. Pitts Elementary, the first lesson of every unit (Week1) was taught within the individual kindergarten classrooms by either the Chaffee County Extension agent or a Colorado State University graduate student. There were a total of five classrooms with 15-20 students in each. At Ayers Elementary, all of the kindergarteners were gather together (four classrooms with approximately 80 students total) in the cafeteria where the Logan County Extension agent taught the lesson.

Process Evaluation Survey

The first evaluation survey was sent out after the completion of Unit 1 on January 25th, 2012. There were a total of 7 respondents (3 from Margaret J. Pitts, 4 from Ayers). The second evaluation survey was sent out after the completion of Unit 3 on February 27th, 2012. There were

a total 8 respondents (4 from Margaret J. Pitts, 4 from Ayers). The third and final evaluation survey was sent out after the completion of Unit 5 on April 5th, 2012. There were a total of 5 respondents (2 from Margaret J. Pitts, 3 from Ayers). The findings from the surveys are summarized below:

- Many respondents skipped questions.
- There were no reports of completing *Food Friend Fridays*.
- Teachers reported incorporated the program's messages into reading, science and math most frequently.
- As the months progressed, response rate for completing Week 3 activities dropped.
- Commonly reported overall curriculum being too packed to do anything extra.
- Ayres Elementary teachers commented on there being too many children gathered together for Week 1 lessons for the lessons to be effective (as all of the students were gathered together for the lesson teaching).
- Suggestion to incorporate program into snack time, books and videos.
- Some respondents checked 'disagree' statements in reference to the "easy to do the lessons."
- Half of respondents checked 'undecided' on in reference to "enjoyed the teaching of the lessons."
- Reported students only 'somewhat' asking about messages or had interest in the messages.

Additional findings from final survey

- Majority of respondents ‘undecided’ on if length and time of lessons and program as a whole was adequate.
- Most agreed that the Extension agent was helpful and that the materials provided were adequate to implement the program.
- All ‘undecided’ on preferring flexibility or structure for Week 2 lessons.
- All ‘strongly agree’ or ‘agree’ that both they and the students enjoyed the booster program.
- Some ‘possibly’ would recommend program and one ‘probably not’ recommend it.

Interviews

Onsite interviews were conducted with the Extension agents from Logan County who taught lessons at Ayres Elementary and Chaffee County who taught lessons at Margaret J. Pitts Elementary. The results from the interviews focused on modifications to the lessons that would make the teaching and flow of the lessons. The main suggestions that came from the Logan County Extension agent was that the group of students was too large to effectively teach the lesson while keeping the attention of the students. Consistent from both counties was that some of the lessons required large amounts of prep time and some of the ingredients were not available in their rural communities, such as dried currents and jicama. Additionally, both Extension agents commented on the content of Unit 1 lesson. It was centered on teaching MyPlate and the food groups to the students. Both of the Extension agents reported that as they taught the lesson, the students did not connect the MyPlate image with food from the food groups. Suggestion were made to add pictures of the Food Friends[®] to their respective spot on MyPlate, such as an image

of Ollie Orange would go in the fruit portion of the plate instead of the word “fruit.” Additional suggestions for Year 2 lessons included having food purchasing guidelines for lessons by providing quantities per child of ingredients needed for each food activity. The food lessons during Week 1 were either recipes that the students put together or tasting lessons. It was suggested that there be more activities where the students get to “cook” and less tasting because the students had a difficult time distinguishing between similar food items.

The information gathered from the implementation and process evaluation surveys and interviews guided the modification to the development of Year 2 lessons.

Modifications

The main changes to the structured of the booster were made to Week 2 lessons. The monthly evaluation surveys with the teachers showed little to no reported conduction or use of Food Friend Fridays, so the section was eliminated. The original intent of *Food Friend* Fridays was to get the students thinking and talking about ideas of nutrition and physical activity that they could do at home with their families to extend what is happening in the classroom to the home environment. To replace this aspect in Year 2, simple send homes were developed that the Extension agent or graduate student would pass out when teaching the Week 1 lesson. They consist of a picture of the feature character that month and a sentence of the activity that the students did that day with space for them to fill in the blanks. The bottom half of the same page provided a recipe for the food activity that was done in the classroom (Appendix F).

There were also changes to the content of Week 2 lessons. Instead of providing suggestions for all subject areas that the booster messages could potentially be incorporated into, examples will only be given for the subjects of science, mathematics and reading and language

arts because they were the three subject areas that teachers consistently reported incorporating the monthly themes into. These subject areas matched the results from the formative research performed with the teachers where they were asked what areas do they or potentially see incorporating nutritional topics. The top three responses were science, mathematics and reading and language arts. In the process evaluation surveys there was no consensus on whether the teachers preferred more structured or more flexible lesson suggestions for Week 2. By limiting the subject areas suggestions to the ones that the teachers actually used (science, mathematics, and reading and language arts), it allows for more detailed examples of these subjects, giving a balance between structured and flexible lessons.

Additional modifications were made to Unit 1, Week 1 lessons. It is the first lesson of the entire program and serves to introduce the characters and concepts of “Are You a Super Taster?” and “Are You a Mighty Mover?” to the students along with learning the food groups via MyPlate. The comment that this lessons concept was not grasped by the students came out in the process evaluation interviews with the Extension agents. To rectify this, the suggestion made by the Extension agents to use the Food Friend images as pictorial representations of the food groups on the MyPlate template will replace Year 1 method of teaching the food groups.

To increase the fidelity of how the Week 1 lessons are taught, the format of implementation for Year 2 will change. A team of researchers and graduate students at Colorado State University will take the lead on teaching the lessons and preparing the food. This will lessen the burden put on the Extension agents and allow for consistency of how the lessons are taught at the different study sites. Implementation of Year Two program will occur in the winter of 2012 and run through early spring of 2013.

CHAPTER FIVE: DISCUSSION

The purpose of this study was to develop “booster” programming that reinforced the messages learned in the preschool programs *The Food Friends: Fun With New Foods*[®] and *The Food Friends*[®]: *Get Movin’ With Mighty Moves*. These programs have shown to be effective in eliciting behavior changes of increasing willingness to try new foods and enhancing gross motor performance.^{48,49} Purposely targeting preschool aged children combats the issue of the increasing number of children in this age group, two to five years of age, that are overweight and obese at the developmental stage for taste preferences and motor skill acquisition.^{1,2,9,25} The establishment of these healthful behaviors during the first five years of life is made even more important as the weight status increases for of six to eleven years olds, where it becomes harder to change behaviors surrounding nutrition and physical activity.^{1,21,22,26} The information obtained from the LEAP study, including this project, will contribute to whether behavior change is maintained through the transition from preschool to first grade.

While several classroom-based nutrition education programs targeted towards preschoolers exist, few include follow-up data and to our knowledge none include just reminder lessons for two years post.^{43,44,47} Social marketing principles show that reinforcement of messages is key to the successful adoption of a program.³⁹ This project accomplished this principle by having all of the lessons written in a way that reinforces the preschool program messages and themes. In addition, through the promotion of the booster, its themes were reinforced by the banners and posters that were placed throughout the school.

Two interesting points came out of the formative research and were fulfilled through the implementation of the “booster.” The first being that the three subject areas that the teachers said they would most likely incorporate nutrition topics into were mathematics, science, and reading

and language arts. In the process evaluation surveys, it was found that the only subjects that the teachers reported incorporating the booster lessons into were the same three: mathematics, science, and reading and language arts. This shows that teachers themselves are the best source for predicting what will be done in the actual programming and it highlights the importance of getting input from the target audience. This finding was also taken into consideration when making modifications to Year Two lessons. So instead of providing suggestions on how to incorporate the booster topics into all academic subject areas for Week 2 lessons, suggestions are only provided for those three specific areas. This change will predictably make the suggestion more specific to what the teachers need, therefore potentially increasing the frequency of which the lessons are performed.

The second point that is of interest is the amount of time that teachers reported spending in various forms of physical activity in an average week. The total amounts to students participating in physical activity for 71 minutes a day through the combination of time spent in structured and unstructured classroom activity, physical education classes, and recess. This number seem unrealistic when compared to the national data that shows only 42% of children, kindergarten through eighth grade, reach the recommended 60 minutes of physical activity a day.²⁸ At the same time, this is not to say that the number is inaccurate because it does come from self-reported data from the teachers. It could simply be explained by there being a misinterpretation of the survey question as a whole or just the division of structured and unstructured activity, potentially leading to the double reporting of certain times spent in activity. Further, research into what specifically is being done within the classroom in relations to physical activity is needed to answer these questions.

The implementation process resulted in differences by site even though both locations received the same teacher training, teacher kit, and lesson guide. The main difference was that at Ayres Elementary in Sterling all four kindergarten classrooms were gathered together for the teaching of Week 1 lessons by the Extension agent. This is in contrast to Margaret J. Pitts Elementary in Leadville where the booster was taught to each of the five kindergarten classrooms individually. The difference between teaching 80+ kindergarteners at once, as at Ayres, compared to 20 at Margaret J. Pitts significantly affects the ability of the educator to facilitate learning amongst the students. It additionally makes it more difficult to keep the students attention, requires more outside assistance, and creates a greater quantity of materials that need to be prepped beforehand. These sentiments all came forward in the process evaluation interviews with the Extension agent. In an effort to eliminate the difference in how the booster is implemented during Year Two, the modification of having CSU take the lead on food preparation and assisting the Extension agents with the teaching of Week 1 lessons at both site has been made.

Only three process evaluations surveys were done for the five unit booster. This was a result of the monthly units only being three weeks in duration creating two units to begin within the same calendar month. Combining units 2 and 3 as well as 4 and 5, allowed for the best flow of implementation and evaluation. It was also found that the monthly evaluation survey did not provide any additional information that could not be obtained from just doing a single evaluation survey after the last unit has been implemented.

The teacher training that occurred before implementation were also different amongst the two sites. At Ayres Elementary, the teachers, principal and local Extension agent gathered to learn how the program works and decided on date for when each “month” would start.

Comparatively, at Margaret J. Pitts Elementary the training was very quick and was done just with the teachers. Retrospectively, having all of the key participants in one place from the beginning helped with the communication throughout the entire length of the program as well as contributed to school-wide commitment to the program. Communication can be improved for Year 2 by establishing the dates for all months of the booster initially and establishing direct communication with the teachers via monthly reminder emails of when the graduate students and Extension agents are coming to the schools. This could additionally serve to increase the fidelity of the program as a whole because the emails hypothetically could keep the teacher on track as to what week they should be on in the programming.

The sustainability of the booster is potential issue. The first problem is that a large portion of the programming relies on work of CSU graduate students and Extension agents. It is not feasible to have students be able to go out each month to teach lessons to multiple schools for an extended length of time. Additionally, they are responsible for preparing the food for the Week 1 activities. To have the booster become sustainable, a restructuring of responsibilities would need to occur in which the classroom teachers lead all of the lessons. To accomplish this there would have to be a more extensive initial training on all components of the booster.

Another key change that would need to occur in order to ensure sustainability would be the school-wide commitment to the program because the teacher would have to draw on different resources at the school to complete the program, specifically the food service department. They could assist with the acquisition and preparation of the food for the Week 1 lessons that CSU previously has done. Though it may be a more difficult sell to the teacher to fully lead the booster, it is designed in such a way that draws on the state academic standards and has been

written to be incorporated into different subject areas. These aspects should allow for the lessons to be sustained as a teacher-led program.

Strengths

A strength of this project is that target audience input was used throughout the development, implementation, and evaluation of the booster program. A main construct of any behavior change theory, but especially the Social Cognitive Theory and social marketing, is to make a program audience specific and input from the target audience is key to making this occur³⁶. This project did formative work with the teachers who would be teaching the program to find out key characteristics for the booster, such as how they would like the format of the lessons be presented, how much time they would devote to a new program, and what their biggest barriers were to implementation of said program. By taking into consideration these findings, it increases the likelihood that the teachers (target audience) would teach the lessons (perform desired behavior).³⁹ An example of how the teachers' input was used for the development and implementation of the lessons is the use of Extension agents and graduate students to teach the first week of lesson for every unit. This was something that came out in the process evaluation surveys as the teacher reported as being helpful. Additionally, posters and banners were displayed in the locations that the teachers noted to be the most visible to students. Teacher input also drove the modification of Year Two programming. For example, program areas that they reported seldom to never utilizing were either modified, as in Week 2 lessons, or eliminated completely, as in *Food Friend Fridays*.

Another strength is that the booster was developed based off of the constructs of Social Marketing as well as the Social Cognitive Theory. A main focus of Social Marketing is

promotion of the message. The “booster” has applied this construct in multiple aspect of the programming. The programming as a whole promotes the message of the preschool *The Food Friends*[®] programs of try new foods and be more active. Promotion can also be seen in banners and the posters that were displayed throughout the school. Use of the Social Cognitive Theory contributes to the potential success of the program because the use of this theory in the development of programs has shown to increase the likelihood of desired behavior change occurring.³⁸ Research has found that the Social Cognitive Theory is the best theory to use when designing programming for young children because it implements the construct of reinforcement. The “booster” does this by focusing on the two simple messages that came from the preschool program (try new foods and be more active) and reinforce them throughout each lesson and by having Super Taster and Mighty Mover messages as the taglines for each unit.

Lastly, another strength of this project is that it is based off of *The Food Friends: Fun With New Foods*[®] and *The Food Friends: Get Movin’ With Mighty Moves*[®], two programs that have shown to be successful in eliciting behavior change.^{48,49} By using proven programs to model lesson structures and themes off of, it increases the potential for success of the booster itself.

Limitations

There are several limitations associated with this project. The first of which has to do with the limited number of respondents to the formative surveys and interviews. This could have been due to the research being conducted in the late spring/summer when the teachers are on vacation, making it difficult to get in contact with them. This additionally introduces a selection bias because the teachers that had an interest in the topics of nutrition and physical activity were

the ones that took the time to participate in the surveys and interviews and are most likely the ones that would perform the potential program regardless because of said interest. The sample size for the interviews was even smaller due to its voluntary participation. Of the five respondents, four were kindergarten teachers and only one was a first grade teacher. The booster programming will be implemented in both kindergarten and first grade classroom, so to have greater input from one grade level could sway the whole program to be more fitting for a kindergarten classroom instead of a first grade classroom. Another limitation with the interview respondents was that three of the five were from the same school, Ayres Elementary. This could also sway the program to be more tailored to that specific location and not be generalizable to all schools. The reason for the high response rate from the one particular school is unknown, but the same school also had the higher response rate for completion of process evaluation surveys. Theories to why it occurred could include selection bias and/or greater school buy-in as a whole.

For the surveys used in this study consisted mainly open-ended and opinion questions to gain perspective on how the teachers viewed the booster programming. For both of these types of questions reliability testing cannot be performed.

Another major limitation of this project was the use of *The Food Friends*[®] characters as the central component of the booster. Though it is a strength that the characters and their messages were developed through the use of the Social Cognitive Theory, social marketing and being research tested, the findings were all done with preschool-aged children and now are being used in kindergarten and first grade without any research to support such usage.^{48,49} During the timespan between when a child is in preschool to when they are in first grade, they are developing rapidly, which includes developing the ability to distinguish between fantasy and reality.⁵⁷ This could potentially be a limitation because *The Food Friends*[®] programs are heavily

reliant upon imagination with the personification of food items living in a fantasy land of Healthadelphia[®]. If children are not as susceptible to fantasy play, it is unknown if the children will still want to emulate *The Food Friends*[®] and if they are able to elicit the same degree of behavior change.

An additional limitation is that the concepts of “Super Taster” and “Mighty Mover” were not tested with children prior to implementation. The messages were an expansion upon existing concepts, but the exact language used for the “Super Taster” and “Mighty Mover” messages were not tested. This introduces the possibility that the children may not connect with the messages, but during the process evaluation the teachers did not report the children having a problem understanding the messages.

Recommendations

A recommendation to improve the effectiveness of the program would be to enhance the presence of the themes “Are You a Super Taster?” and “Are You a Mighty Mover?” within the lessons. The phrases are printed on the banner and the themes and concepts behind the messages are reinforced in every lessons, but the actual phrases are not. By using the messages throughout the lessons and programming, it would make them become more like catch phrases that could resonate with students even after the booster is completed.

This leads into a second recommendation of creating an evaluation tool to be used with the students after the completion of the program to see if the “Super Taster” and “Mighty Mover” messages are being retained. This could be done by administrating a survey to gauge message retention. Process evaluation work done with teachers found that from their perspectives, the students enjoyed the program and were excited for the characters. This suggests

that the characters and themes still resonate with kindergartners the same way that they did with the preschoolers. Since research has not been done with the students themselves, no conclusions can be made. This is an area that needs additional work in order for research staff to confirm the appropriate ages to use *The Food Friends*[®] messages with.

The final recommendation is to expand the classroom-based lesson so to include other locations throughout the schools, such as the library and gym. By doing so, it would allow for the concepts of nutrition and physical activity to be incorporated into a greater number of subject areas and promote entire school buy-in to the program. Targeting specific subject areas will become more important within first grade as the academic standards are more defined and rigorous than the ones for kindergarten.³⁴ Addressing specific standards that the booster programming lessons met would also increase the likelihood of the teachers actually performing the lessons because it would eliminate the barrier of their curriculum being too full.

CHAPTER SIX: CONCLUSION

The benefit of this project was that it showed an example of how an already established program can be extended into other grade levels. While maintaining the original characters, messages, and themes, the “booster” made the lessons developmentally appropriate for children of an older age. By expanding the characters’ personalities, it provided more opportunities to tie in academic subject areas. As learned through the formative and process evaluation, the tie to specific subject areas and state academic standards is an important element in getting teachers to commit to incorporating a new program into their already full curriculums. Knowing that these teachers seldom incorporate nutrition and physical activity topics into their current curriculum makes it all the more important to provide lessons that the teachers are more willing to incorporate.

Along with the booster lessons being written with academic standards in mind, the program was developed on the constructs of the Social Cognitive Theory and social marketing principles. Use of such theoretical frameworks has shown to be effective in eliciting behavior change among school-based interventions. Most notably to this project, *The Food Friends: Fun With New Foods*[®] and *The Food Friends: Get Movin’ With Mighty Moves*[®]. In conclusion, the booster programming that was developed from this project is meant to reinforce the behavior changes made in preschool. The ability to resonate the messages of trying new foods and being more active within kindergarten and first grade students will contribute to the establishment of healthful behaviors at a young age, building the foundation of lifelong healthy lifestyles, and making a small difference in the childhood obesity epidemic.

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APPENDIX A

INSTITUTIONAL REVIEW BOARD LETTER OF APPROVAL



Research Integrity & Compliance Review Office Office of the Vice President for Research 321 General Services Building -Campus Delivery 2011 Fort Collins, CO TEL: (970) 491-1553 FAX: (970) 491-2293

Knowledge to Go Places

NOTICE OF APPROVAL FOR HUMAN RESEARCH

DATE: April 06, 2011 TO: Bellows, Laura, 1571 Food Sci and Human Nutrition Melby, Chris, 1571 Food Sci and Human Nutrition, Roach, Julie, 1571 Food Sci and Human Nutrition, Davies, Patricia, 1573 Occupational Therapy FROM: Barker, Janell, , CSU IRB 1 A Longitudinal Study to Assess if the Effectiveness of a Preschool Nutrition and Physical Activity Program is Sustained

The CSU Institutional Review Board (IRB) for the protection of human subjects has reviewed the protocol entitled: A Longitudinal

PROTOCOL TITLE: in Early Elementary School
FUNDING SOURCE: US Department of Agriculture : 90899
PROTOCOL NUMBER: 10-1891H
APPROVAL PERIOD: Approval Date: April 06, 2011 Expiration Date: June 24, 2011

Study to Assess if the Effectiveness of a Preschool Nutrition and Physical Activity Program is Sustained in Early Elementary School. The project has been approved for the procedures and subjects described in the protocol. This protocol must be reviewed for renewal on a yearly basis for as long as the research remains active. Should the protocol not be renewed before expiration, all activities must cease until the protocol has been re-reviewed.

If approval did not accompany a proposal when it was submitted to a sponsor, it is the PI's responsibility to provide the sponsor with the approval notice.

This approval is issued under Colorado State University's Federal Wide Assurance 00000647 with the Office for Human Research Protections (OHRP). If you have any questions regarding your obligations under CSU's Assurance, please do not hesitate to contact us.

Please direct any questions about the IRB's actions on this project to:

Janell Barker, Senior IRB Coordinator -(970) 491-1655 Janell.Barker@Colostate.edu Evelyn Swiss, IRB Coordinator -(970) 491-1381 Evelyn.Swiss@Colostate.edu

Barker, Janell

Handwritten signature of Janell Barker followed by the name Barker, Janell

Includes:

The amendment is to use a simplified consent packet for parents; to recruit up to 100 teachers to take surveys and phone interviews (about 50 interviews) using the email recruitment, cover letter, interview questions and survey and to add a Food Access Questionnaire. Documentation of consent for the teacher survey and interviews is waived through 117(c)(2).



Research Integrity & Compliance Review Office Office of the Vice President for
Research 321 General Services Building -Campus Delivery 2011 Fort Collins, CO

Knowledge to Go Places

Approval Period: April 06, 2011 through June 24, 2011
Review Type: EXPEDITED
IRB Number: 00000202
Funding: US Department of Agriculture : 90899

**TEL: (970) 491-
1553 FAX:**

(970) 491-2293

Page: 2

APPENDIX B

SURVEY PACKET

Cover Letter

April 2011

Dear Teacher,

Researchers at Colorado State University are working on a project to assess children's eating and physical activity behaviors in early childhood. We are following children from preschool through 1st grade. In preschool, children have been participating in nutrition and physical activity programs, Food Friends and Mighty Moves. We are interested in learning if the behaviors that change due to these 2 programs are sustained in kindergarten and 1st grade. Additionally, we are interested in kindergarten and 1st grade teachers' opinions, attitudes, and programming around nutrition, food, physical activity and gross motor development. We are seeking your input on the enclosed survey.

TITLE OF PROJECT: *A Longitudinal Study to Assess if the Effectiveness of a Preschool Nutrition and Physical Activity Program is sustained in Elementary School (LEAP Study)*

NAME OF PRINCIPAL INVESTIGATOR: Laura Bellows, PhD, MPH, RD

CO-INVESTIGATORS: Patti Davies, PhD, OTR

CONTACT NAME AND PHONE NUMBER FOR QUESTIONS/PROBLEMS: Laura Bellows, 970-491-1305

SPONSOR OF PROJECT: USDA Agriculture and Food Research Initiative (AFRI)

Enclosed you will find a survey asking for your input on a nutrition and physical activity programming in early elementary school. By completing the survey you will help staff at Colorado State University identify needs and potential programming efforts designed to improve the health of young children. Please note that completing the survey is entirely voluntary. There are no known direct risks or benefits to you for completing the survey. The survey should take approximately 10-20 minutes to fill out. If possible, please complete and return the survey in the envelope provided. For completing the survey, you will be entered into a drawing for \$100.

Your name will not be used in any way. All surveys will be kept in a locked cabinet at Colorado State University in the Department of Food Science and Human Nutrition. All information provided by you will be fully confidential and used for research purposes only. Your information will be assigned a number instead of using your name.

The Colorado Governmental Immunity Act determines and may limit Colorado State University's legal responsibility if an injury happens because of this study. Claims against the University must be filed within 180 days of the injury.

If you have any questions about the study, please do not hesitate to contact Laura Bellows at 970-491-1305. If you have any questions about your rights as a volunteer in this research, contact Janell Barker, Administrator of Human Research at 970-491-1655.

Thank you for your time and participation in this study.

Sincerely,

Laura Bellows, PhD, MPH, RD
Assistant Professor and Study Director

Evaluation

Researchers from CSU and UCD will visit schools one time each year to evaluate Kindergarten and 1st grade children whose parents have consented to participate in the study. Researchers will examine nutrition behaviors such as foods children are willing to consume; foods children choose to consume in the cafeteria; gross motor skills and fitness; height/weight; and self-concept. The research team will visit each school to evaluate kindergartener students in the winter of 2012 and 2013 and 1st grade students in the spring of 2013 and 2014. In addition to studying children at school, parents will be asked to complete several surveys on their child's eating and activity habits at home. These surveys are available in both English and Spanish.

Participating Schools

Brush: Brush Head Start & Thompson Primary School

Buena Vista: Buena Vista Preschool Program & Avery Parsons Elementary School

Iliff/Sterling: Iliff Head Start & Ayers Elementary School

Leadville: The Center Preschool & Pitts Elementary School

Contact

This project is a joint effort among Colorado State University's Departments of Food Science and Human Nutrition, Human Development and Family Studies, and Occupational Therapy and the University of Colorado at Denver's Department of Pediatrics, Section of Nutrition.

For questions on this study, please contact:

Laura Bellows, PhD, MPH, RD

(Principal Investigator)

Phone: 970.491.1305

Email: laura.bellows@colostate.edu



Teacher Survey | [LEAP]

Colorado State University® has received a grant to determine if preschool children participating in *The Food Friends: Fun with New Foods*® & *Food Friends: Get Movin' with Mighty Moves*® intervention maintain their increased willingness to try new foods and enhanced motor skills through early elementary school as compared to the children who were not exposed the programs.

We are developing educational materials which will help to reinforce the messages that were learned during the preschool intervention. To do this, we are trying to gain information on how such messages would best be integrated into the classroom and school environment. This survey seeks to learn about what you currently do in your classroom as well as your thoughts on how lessons/activities would best be implemented and who would teach the lessons.

Fun with New Foods is a nutrition education program to overcome picky eating and *Mighty Moves* is a program that incorporates physical activity to enhance the development of gross motor skills.

First, we would like to know a little about you and your classroom

1) What grade do you teach?

- Kindergarten
- First grade

2) How many students do you have in your class?

_____ students

3) Is class considered full day or half day?

- Full day
- Half day

4) What is your level of agreement with the following statements?

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
My students eat well overall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My students have the knowledge to make healthy food choices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My students get enough physical activity at school	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My students get enough physical activity at home	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Now, we would like to know about your classroom activities surrounding food and nutrition

6) In a month, how many lessons or activities do you teach that are related to nutrition or food?

- 0 1-2 3-4 5 or more

7) On average, how long are these lessons?

- Less than 15 minutes
 15 – 30 minutes
 30 – 60 minutes
 Longer than 60 minutes

8) Do you integrate your nutrition lessons into other subject areas?

- Yes
 No

8a) If YES, in which other subjects do you incorporate nutrition topics? (check all that apply)

- | | |
|----------------------------------------------------|----------------------------------------|
| <input type="checkbox"/> Reading and language arts | <input type="checkbox"/> Music |
| <input type="checkbox"/> Mathematics | <input type="checkbox"/> Art |
| <input type="checkbox"/> Social studies | <input type="checkbox"/> Dramatic play |
| <input type="checkbox"/> Science | <input type="checkbox"/> Other _____ |

8b) If NO, in what subject area(s) do you see nutrition topics possibly fitting in to? (check all that apply)

- | | |
|----------------------------------------------------|----------------------------------------|
| <input type="checkbox"/> Reading and language arts | <input type="checkbox"/> Music |
| <input type="checkbox"/> Mathematics | <input type="checkbox"/> Art |
| <input type="checkbox"/> Social studies | <input type="checkbox"/> Dramatic play |
| <input type="checkbox"/> Science | <input type="checkbox"/> Other _____ |

9) If you were provided with lesson plans and materials to perform nutrition and food activities in the classroom, how likely would you be to conduct them?

- Definitely
 Probably
 Maybe
 Probably Not
 Definitely Not

10) Is there anything else that you would like to share with us about the activities and lessons around nutrition and food that you do in your classroom?

Now we would like to know about your classroom activities around physical activity

11) During an average week, how many minutes do your students participate in the following activities?

Physical Education (PE) Class	_____	Minutes
Recess, structured (teacher-led) activities	_____	Minutes
Recess, unstructured (student-led) activities	_____	Minutes
Classroom, structured (teacher-led) activities	_____	Minutes
Classroom, unstructured (student-led) activities	_____	Minutes
Other (please specify) _____	_____	Minutes

12) Do you feel that you have adequate space in your classroom to do physical activities?

- Yes
- No

13) If you were provided with lessons and materials to perform structured activities in the classroom, how likely would you be to conduct the lessons?

- Definitely
- Probably
- Maybe
- Probably Not
- Definitely Not

14) Is there anything else that you would like to share with us about the activities and lessons around physical activity that you do in your classroom?

We would now like to find out information about the cafeteria

15) How long do your students have in the cafeteria for lunch?

- 1-15 minutes
- 16-30 minutes
- 31-45 minutes
- 46-60 minutes
- 0, the students do not eat lunch in the cafeteria
- 0, the students are not at school during lunch

16) How much time per week do your students spend in the cafeteria outside of lunch?

_____minutes

17) On average, how many of your students bring their lunch from home?

- More than half
- Approximately half
- Less than half
- None

Now, we would also like to know about physical education (PE)

18) On average, how many times per week do your students have PE class?

- 0
- 1-2
- 3-4
- 5

19) What is the average length of a PE class?

- 1-15 minutes
- 16-30 minutes
- 31-45 minutes
- 46-60 minutes
- Not applicable

20) How often do you reinforce skills and concepts learned in PE during recess or other physical activity opportunities?

- Very frequently
- Frequently
- Occasionally
- Rarely
- Never

We are trying to create lessons and activities for kindergarten and first grade classrooms that will reinforce nutrition and physical activity messages of the preschool interventions *Fun with New Foods* and *Mighty Moves*. The focus will be promoting healthy eating and physical activity behaviors. The following questions are in reference to the programs implementation, location and training.

21) On a monthly basis, how much time could you devote to a nutrition/food activity?

- 1-20 minutes
- 20-40 minutes
- 60 minutes
- Several hours
- Don't know

22) On a weekly basis, how much time could you devote to a structured physical activity lesson?

- Zero
- 1-10 minutes
- 10-20 minutes
- 20-40 minutes
- Greater than 40 minutes
- Don't know

23) What is the probability that the following areas would be a place to reinforce specific key messages about nutrition and physical activity learned in the classroom?

	Definitely	Probably	Maybe	Probably Not	Definitely Not	Not Applicable
Cafeteria	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Art	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Music	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Library	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Computer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (please specify) _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

24) How would the nutrition and physical activity topics best fit into your schedule?

- Separated into two sessions, one focused on nutrition and one focused on physical activity, taking place on two separate days of the week or month
- Combined into one large session
- Other (please specify) _____

25) Would you prefer for these nutrition and physical activity topics to be taught by_____.

- Yourself
- An outside instructor who comes to the classroom
- A combination of the two

26) When would be the best time for you to attend a training session for the nutrition and physical activity programs?

- After school
- A weekend day
- Staff in-service day
- Other (please specify)_____.

27) What method of training would you prefer?

- One long session
- Multiple shorter sessions
- Online webinar format
- Other (please specify)_____

28) If lessons and activities were created for nutrition and physical activity, how likely would you be to implement it in your classroom?

- Definitely
- Probably
- Maybe
- Probably Not
- Definitely Not

Please tell us a bit about yourself

29) How many years have you been teaching your current grade?
_____years

30) How long have you been employed at your current school?
_____years

31) Your age (Please check the box that indicates your age range)

- < 25 25 – 34 35-44 45-54 55-64 ≥ 65

32) Your race/ethnicity (Please check all that apply)

- American Indian or Native Alaskan American
 - Asian or Pacific Islander
 - Black or African
 - Hispanic or Latino
 - White
 - Other _____

33) What is the highest level of education that you have completed?

- Associate's or 2 year college degree
- Bachelor's or 4 year college degree
- Advanced degree (Masters, Doctorate)

Thank you for taking the time to complete this survey

APPENDIX C

INTERVIEW QUESTIONS

Name _____

Survey Code _____

Date Called _____

Hello, my name is Anna D’Hooge and I am calling on behalf of Colorado State University and the Leap Study. Last month you completed a survey about your classroom lessons and activities surrounding nutrition and food and physical activity. When you returned your completed survey, you also return a telephone availability form for this follow up interview. Are you still interested in an interview? [If yes] Is this a good time or would you rather set up another time that would work better for you? [If no] Thank you for your time in filling out the survey. Your input was very helpful to us. *The goal of today’s conversation is to gain a deeper understanding of the lessons and activities and also to get input on our project design.*

<p>1. How is your summer going so far?</p> <p>a. Probe for trip plans</p>	
<p>2. As you know, we’re interested in learning more about what kindergarten and 1st grade teachers are doing for nutrition and physical activity in their classroom and school. Could you please describe the activities that you do in your classroom surrounding food and nutrition?</p>	
<p>3. Could you describe how you support physical activity in the classroom?</p> <p>a. You wrote down that you do _____minutes (<i>from #11</i>) of structured and _____ minutes of unstructured activities in the classroom on an average week. Could you describe for me what that includes.</p>	

The Food Friends booster that we are developing will consist of short reminder activities/lessons that reinforce the program messages learned in preschool. We have some ideas on how this might look and would appreciate your input. We are not looking for large time commitments for individual lessons, but rather ways to incorporate programs messages, characters and graphics into things that you may already be doing with your students as well as use other venues in the school to support the messages, such as the cafeteria and recess. Our thoughts are that the classroom teachers will introduce a booster message in a brief lesson (~15 minutes) monthly (for 4-5 months) and then reinforce the monthly message throughout the curriculum. There will be one Food Friend character, such as Tina Tortilla, featured each month that will highlight the characters personality, superpower, and behaviors that he or she supports. We will also provide suggestions about how that character’s activities and messages can be incorporated into various subject areas. *[Additionally, the monthly character will lead what we are currently calling Food Friends Fridays, which will be where the teacher discusses with the children activities they can do and foods they can try at home with their families that are related to the monthly Food Friend character and their “superpower.” The second part of the booster would include posters of the Food Friend and their message in the cafeteria and other locations around the school and incorporating activities and/or messages into recess. These messages would then be reinforced by cafeteria and recess aides.]*

Example – Tina Tortilla

<p>4. What are your initial reactions to this idea?</p> <p>a. Do you find the <u>classroom</u> portion as something that you could fit into your schedule?</p> <p>b. If they answered YES to survey #8: On the survey that you</p>	
------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--

completed, you checked that you incorporate nutrition into the following subjects, can you tell me how you incorporate nutrition into___?

OR

If they answered NO to survey #8: On the survey that you completed, you checked that you do not currently incorporate nutrition into other subjects, but suggested that it could potentially fit into other subject areas. Could you give me an example of how you see it fitting into_____.

a. ___Reading and language arts

b. ___Mathematics

c. ___Social studies

d. ___Science

e. ___Music

f. ___Art

g. ___Dramatic play

h. ___Other_____

c. What are things that we should consider in designing materials:

<ul style="list-style-type: none"> • Ideal length of suggested activities? • Level of detail needed? Will teachers take suggestions and make it their own or would you want it written as a specific lesson plan? • Are there monthly themes that you already do in your classroom that you think could be related to the Food Friends? Such as transportation, animals, seasonal, etc. 	
<p>5. How do you envision the supporting messages and activities, i.e. the teacher guides to the monthly Food Friend, being packaged?</p> <ul style="list-style-type: none"> a. Recipe box b. Binder c. 3 ring clip 	
<p>6. What types of supporting materials would you need to support the characters and messages?</p>	

<p>a. Set of Food Friend puppets?</p> <p>b. Posters</p> <p>c. Bulletin Board materials</p> <p>d. Other</p>	
<p>7. In addition to weaving messages into subject areas, would you see a use for activities that could be used for transition times?</p> <p>a. Do you have suggestions for types of transition activities? <i>(e.g. hop on one foot 5 times as a break between subject areas) an activity that will allow you 3-5 minutes to prepare for the next subject (pick 3 letters of your names and list as many foods as you can that start with that letter).</i></p>	
<p>8. For conducting these lessons, what role, if any, do you see an outside instructor, such as an Extension agent, playing in the teaching of the lessons?</p>	
<p>9. How do you see the messages being reinforced in the cafeteria?</p> <ul style="list-style-type: none"> • Posters 	

- Table tents
- Decals on the windows
- Food service line
- Bulletin board
- Other

b. Are there other areas in the school that you think would be a good place to support messages?

- Hallways – which ones
- Gym
- Bathrooms
- Other

c. Who would be the best person to support what goes on the cafeteria?

- Food Service staff

<ul style="list-style-type: none"> • Cafeteria aide • School administrators (e.g. principal, dean of students, nurse teachers) 	
<p>10. <u>Recess</u> would be the ideal location to reinforce the physical activity messages. Do you see this as being a good place for messages?</p> <ul style="list-style-type: none"> • Probe: If there are recess aides that would need to be trained on the messages • Probe: Types of equipment that the students have access to at recess <p>11. <i>To ensure that the messages are appropriate and consistent, who do you see as needing background information – Teacher aides, food service, others?</i></p>	
<p>12. What would be the best method to communicate the program information to teachers and other staff (food service, cafeteria/recess aides)?</p> <ul style="list-style-type: none"> • Trainings 	

<ul style="list-style-type: none">• Ongoing communication	
13. Do you have any additional thoughts or input you would like to share?	

We really appreciate and value your input. Thank you for your time.

APPENDIX D

SUMMARY OF *FOOD FRIENDS*[®] CHARACTERS' MESSAGES, PERSONALITIES, AND LESSONS

Year 1 Characters

	Group	Bella Bean®	Tina Tortilla®	Ollie Orange®	Rudy D. Radish®
"Are you a supertaster? I am because . . . "	We are because we help each other try new foods	I'm not afraid to try new foods, I know they taste great	I get wrapped up in new foods	It's cool to try new foods	I like to watch new foods disappear off my plate
"Are you a mighty mover? I am because. . . "	We are because we have fun playing together	I like to dance. Shake, rattle and roll	I like to jump for joy, leap for laughs and hop for health	Being fast makes me hip and gives me zip	I have a ball kicking and throwing
Personality	-	Bella is the mayor of Healthadelphia® and is sassy and confident. She has great rhythm and loves to dance.	Tina is joyful and enthusiastic. She spreads joy and brings happiness to everyone around her.	Ollie is a cool dude who is fearless and laid back. He uses his chef skills to put together meals with all sorts of new foods that he is willing to try.	Rudy D. is determined and focused. He works hard to do a good job on everything he does.
Superpower	-	Mind Reading: Bella Bean always knows why you're smiling or why you're sad. You never need to explain why you're crying or laughing to Bella because she has the amazing power to understand what you're thinking and what you're thinking and feeling. She's also the first friend to give you a snack because she'll know when you're hungry even before you do!	Flying: Tina can fly through the skies of Healthadelphia, sometimes even carrying a few friends along with her. She can soar and swoop and make sure that everyone is having fun trying new foods and practicing their Mighty Moves!	Lightning Quickness: Ollie's a citrus-shot of speed. He may look like ordinary produce when he stops and when he drops, but when this round guy rolls, watch out! Ollie's so phenomenally speedy, you just see a blur of orange when he zip by. When he hangs out in the sunshine - on the beach or around the neighborhood - he gets even faster. Once Ollie gets rolling, he's pure juiced lightning!	Invisibility: You'll never beat Rudy D. at hide and seek, because this veggie can make himself invisible. It's a good thing Rudy like to whistle all the time; otherwise, his friends would always wonder whether or not he's around. This disappearing Daikon can make some pretty funny scenes: when he kicks his ball when he's invisible, it looks like it's flying!

	Group	Bella Bean®	Tina Tortilla®	Ollie Orange®	Rudy D. Radish®
<i>Mighty Move®</i>	-	Bella has great rhythm and loves to dance. Dancing to different kinds of music is her favorite thing to do. Bella knows her body parts and can move all of them in a variety of ways. She is the queen of space, giving herself and those around her space to move.	Tina is great at jumping on, off, or over things, high or low, and either on one foot or two feet. She can also move her weight from one side to another.	Ollie can skip, skate, side step, and hop. He can move fast or slow, by himself or with a partner and follow a straight, zing zag, or curved path. Ollie takes on different roles. He leads, follows, and does mirror images. He can move by himself (solo), with a partner, or as part of a group	Rudy D. can throw, catch, dribble and kick. He loves to play with baseball, soccer, basketball, tennis and other sports. Rudy also makes comparisons like higher, lower, smaller, bigger, faster, slower, greater, and less than
Birthdate	-	January 20th <i>The date of U.S. Presidential inauguration</i>	December 17th <i>The date that the Wright brothers made the first flight</i>	March 14th <i>The date (3/14) is National Pi Day, the mathematical constant π, 3.14</i>	October 5th <i>The date that the first James Bond film, Dr. No, premiered</i>
<i>Favorite place in Healthadelphia®</i>	Everywhere	Bella loves to garden where she moves her body while planting new foods	Tina goes to the orchard where she can climb up in to trees, crawl under fences looking for new fruit to try	Ollie helps Chef Charlie prepare new foods for everyone in Healthadelphia to try.	Rudy goes to the carnival where he shows off his skills at throwing the balls at the pins.
Favorite subject	All subject	Civics/ Social Studies	Reading	Math	Geography
Family history	-	Beans	Tortillas	Citrus fruit	Look a likes (peaches/nectarines)
Future job	Super Tasters and Mighty Movers!	President	Teacher	Chef	Spy/ double agent
What makes them happy	Helping kids try new foods and new ways to move their bodies.	Music and dancing (band, teach dancing)	walking to the library to get a new book	cooking with friends and family	trying new foods from different parts of the world

	Group	Bella Bean®	Tina Tortilla®	Ollie Orange®	Rudy D. Radish®
Unique Question	-	Favorite type of music	Favorite summer vacation	Favorite animal	Favorite place in the world
Extension activity	MyPlate/ food group lesson	Hummus	Veggie wrap	Citrus tasting	Food detective
Classroom lesson	Practicing Mighty Moves	Grow a bean sprout	Classroom book about favorite food/activity	Read the book Move	Play I Spy/Food Pictures

Year 2 Characters

	Group	Howie Hamburger®	Marty Milk®	Corinne Carrot®	Gertie Gouda®
"Are you a supertaster? I am because . ."	we help each other try new foods	trying new foods is an adventure	trying new foods help me learn	I wonder what new foods taste like and I find out all the time	new foods are fun to try with friends
"Are you a mighty mover? I am because.."	we have fun playing together	playing outside is fun	it makes me strong	twisting and turning makes me smile	I love stretching my muscles
Personality	-	Howie can easily adapt to any situation. He makes the best of what he's got by always seeing something positive	Marty is a problem-solver. He works hard to complete and finish even the most difficult of projects	Corrine is curious and inquisitive. She is always asking questions to try and figure things out.	Gertie is loving and affectionate. She is always there to offer a hug or a kind word when you need it most
Superpower	-	Transforming: This burger is more than "meats" the eye. In a flash, Howie Hamburger can turn himself into just about anything you need. He can leap off the highest cliff and float slowly to the ground using his lettuce as a parachute. He can ride the wildest rapids, using his bun as a boat. He can toss his tomato like a super-powered Frisbee. Howie's the most creative sandwich you'll ever meat!	Super Strength: The muscleman of the dairy aisle, Marty Milk, is super strong. He gets his powers from his homeland, populated by a magical herd of very strong cows. He is able to lift cars with one hand and toss them out of the way as if they were tennis balls.	X-ray Vision: There's nothing in the universe that Corrine can't see through because she has x-ray vision. Her x-ray vision enables her to see what's in the fridge and what's in your lunchbox without ever having to open them. She can tell you how many spots are on a leopard from miles and miles away, even at night! The only thing Corinne can't see is the future.	Elasticity: Gertie Gouda has such incredible powers of elasticity that next to this piece of cheese, rubber bands seem like a bunch of stiffs. She can also make her arms so long that she can hug all other friends at once. Gertie can not only touch her toes with her super-stretchy arms, but she can also touch your toes too!

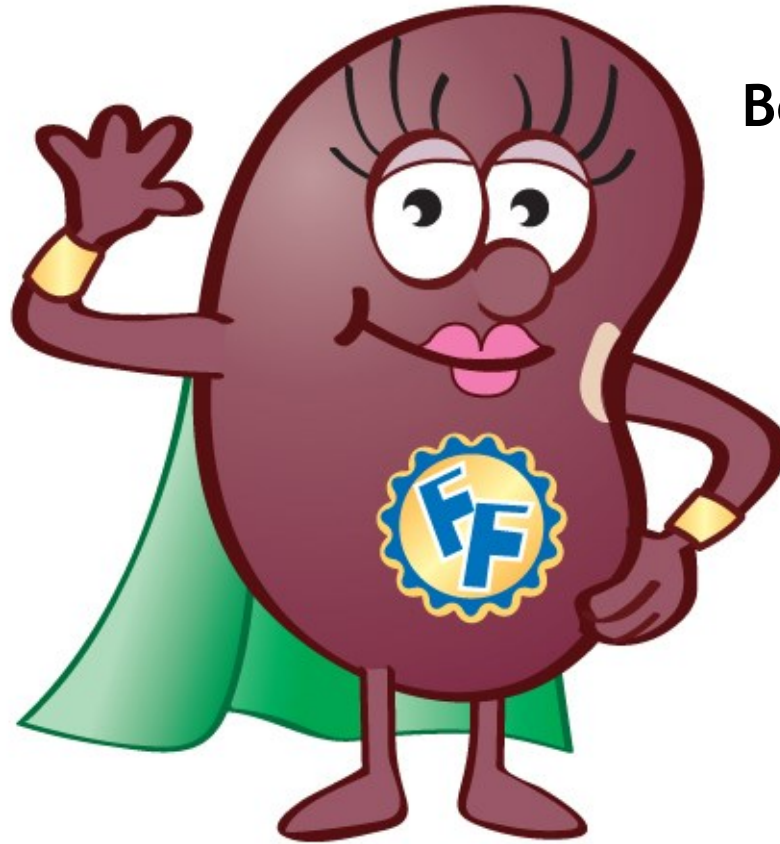
	Group	Howie Hamburger®	Marty Milk®	Corinne Carrot®	Gertie Gouda®
Mighty Move®	-	Howie likes to be outside where he can ride his bike, swim, play at the park and climb around the playground. Howie moves to new places in various ways: near, far, under, over, on, off, in front, behind, together, apart, facing, side-by-side, around and through.	Marty is very strong. He can move with different forces-strong, medium and light. He is also good at balancing while staying in one place. He can move his weight from one body part to another. Marty shows us that eating good food makes us strong and healthy.	Corrine is good at balancing and making her body into different shapes by twisting, stretching, turning and bending. Corinne is also good at balancing, especially while she moves.	Gertie is good at walking, running, marching and galloping. She knows when to stop and go and can move in different directions. Gertie moves backward, up, down, right, left, sideways, clockwise and counter clockwise. She can also move her body at different levels: high, middle and low.
Birthdate	-	March 1 st <i>The date Yellowstone became the first national park</i>	October 23 rd <i>The date the Got Milk? Campaign started in 1993</i>	July 5 th <i>The date the Wall Street Journal was founded in 1889</i>	November 7 th <i>The date the Museum of Modern Art opened in 1929</i>
Favorite place in Healthadelphia®	Everywhere	Howie is the outdoor junkie and likes to bike all over town. He loves having picnics with his friends in the park, where they always try new foods.	Marty loves going to the supermarket, where he always selects a new food to try.	Corrine loves to go to the Farmer's Market where she learns about and tries new foods, her favorite are purple potatoes!	Gertie goes to the farm with the kids where they learn about different farm animals and the foods we get from the farm
Favorite subject	All subject	Gym/PE	Science	Writing	Art
Family history	-	Sandwiches	Milk	Root vegetables	Cheeses of the world
Future job	Super Tasters and Mighty Movers!	Park Ranger (because he can walk anywhere)	Scientist	Reporter	Artist

What makes them happy	Helping kids try new foods and ways to move their bodies.	playing outside	experimenting with new foods	writing about my outdoor adventures	making new friends
	Group	Howie Hamburger®	Marty Milk®	Corinne Carrot®	Gertie Gouda®
Unique Question	-	Favorite place to ride bike	Favorite piece of clothing	Favorite place to play	Favorite season
Extension activity	Trail Mix	Popcorn	Ice cream	Potato and carrot salad	Cheese and grape kabob
Classroom lesson	Practicing Mighty Moves	Read Popcorn Book	Make Food Friend puzzle	Fill out own bio/practice interview	Draw a new food friend

APPENDIX E

EXAMPLE OF MONTHLY UNIT: BELLA BEAN[®]

JANUARY



Bella Bean®

Monthly Highlights

- Learn about Bella Bean
 - Mayor with political aspirations
 - Gardener
 - Dancing queen
- Make Hummus
- Dance party
- Grow a bean Sprout

Monthly Messages

- Are you a Super Taster?
 - "I am because I **know** new food taste great"
- Are you a Mighty Mover?
 - "I am because I like to dance. Shake, rattle and roll!"



JANUARY

Food Friends Facts

Bella Bean®

Character Name: Bella Bean

Birthdate: January 20th
(The date of United States Presidential Inauguration)

Hometown: Healthadelphia®

Personality: Bella is the sassy and confident mayor of Healthadelphia.



Superpower: Mind Reading. Bella Bean always knows why you're smiling or why you're sad.

You never need to explain why you're crying or laughing to Bella because she has the amazing power to understand what you're thinking and what you're thinking and feeling. Bella's always the first friend to give you a hug when you're having a bad day because she'll know about it before you even say a word. She's also the first friend to give you a snack because she'll know when you're hungry even before you do!

Mighty Move: Bella Bean has great rhythm and loves to dance. Dancing to different kinds of music is her favorite thing to do. Bella knows her body parts and can move all of them in a variety of ways. She is the queen of space, giving herself and those around her space to move.

Family History: Bella's family tree is full of legumes of all different shapes and sizes. Her dad is a kidney bean so he is tall and is a dark red color while her mom is tiny little black bean. She has identical twin cousins who are white and flat, but one is called a lima bean and the other a butter bean. Her spotted aunt, the pinto bean, can be seen hanging out at fiestas near the refried bean dip. Then there is the grandpa, black-eyed pea, who looks tough because he has a single black ring around his eye but is really just a big softy. The family gatherings always get exciting when her exotic cousin, the garbanzo bean, flies in from the Mediterranean region and shares with them stories about the dishes and spices that she has discovered!



JANUARY

Food Friends Facts

Bella Bean®

Favorite Place in Healthadelphia®: Bella loves to garden where she moves her body while planting new foods

Favorite Subject: Civics and Social Studies

What they want to be when they grow up: President of the United States of America

What makes her happy: Music and dancing

Favorite type of music: Anything that has a good beat so she can dance all day long!



JANUARY

Fast Facts

Beans

- Beans are considered legumes, which also includes peas and lentils
- Beans are a good source of nutrients as they are high in folate, potassium, iron and magnesium and are high in fiber
- Beans can count as protein source
- The United States Department of Agriculture (USDA) recommends that children 4 to 8 years of age have 4 ounces of protein a day and ½ cup of beans counts as 2 ounces of protein
- There is no difference between a chickpea and a garbanzo bean. The word chickpea is from the French translation and garbanzo is from the Spanish translation for the type of bean



Pinto Bean



**Lima Bean
(Butter Bean)**



**Garbanzo Bean
(Chickpea)**



Black-eyed Pea



Black Bean



Kidney Bean



JANUARY

Bella Bean[®] Makes Hummus

Week 1

Overview

The activities for this week will be focused on learning more about Bella Bean and different types of beans. Additionally, the students will make their own hummus!

Materials

- Assorted dried beans
- Zip top plastic bags
- Canned garbanzo beans
- Lemon juice
- Carrots (sliced)
- Celery (sliced)
- Crackers
- *Mighty Moves*[®] CD

Introduction

1. Begin by asking the students “*Who remembers Bella Bean?*”
 - What makes her a Super Taster?
She is not afraid to try new foods because she knows they’ll taste great!
 - What makes her a Mighty Mover?
She likes to dance. Shake, rattle and roll!

Fast Facts: Bean Backstory

1. Begin by talking about all the different types of beans.
 - Read Bella Bean’s family history (from Food Friends Facts on page 35) as a way to introduce the different types of beans
Hold up each type of bean as you are talking about it and then pass them around for all the kids to look at each of the variety
2. Talking points:
 - Beans are a full of protein and fiber. Protein makes our muscles strong and fiber fills us up.



JANUARY

Bella Bean[®] Makes Hummus

Week 1

Be A Mighty Mover: Stomp To The Beat

1. Stomp around the room like you are smashing the beans with your feet.
 - Medium speed at first
 - Now fast
 - Slow
 - Fast, fast, slow. Fast, fast, slow
2. Add rhythm to the stomping by clapping your hands
 - Medium speed at first
 - Now fast
 - Slow
 - Fast, fast, slow. Fast, fast, slow
3. Now put it all together and dance like Bella Bean

Helpful Hint

Dancing is a great way to get children to move and for families to be more active together. Encourage the students to show their parents their dance moves when they get home



Bella Bean's messages and themes can be incorporated into different subject areas. Based off of Bella Bean's Food Friend Facts, here are some ways to incorporate her messages into activities:

- Bella Bean's **dried bean** relatives can be used in:
 - Mathematics for counting, graphing, patterning or sorting
- The **garden** is Bella Bean's favorite place. When there she can:
 - Work on classification with the different fruits and vegetables of the garden
 - Write a story about different fruits and vegetables
 - Spot different shapes, like round vegetables and square plots
- Being the mayor of Healthadelphia, Bella Bean is involved in **civics**:
 - Talk about how the leader of a city or country (such as the mayor or the president) leads people in deciding what to do by voting
- Bella Bean's relatives come from all around the **world**:
 - Use a map to show students where Bella Beans relatives come from – the Mediterranean area (Spain, France, Greece, Italy, Turkey, Northern Africa)

Food Friends Friday
Talk about what new way the students are going to try beans when at home with their families, such as in soups or tacos

Brain Break
Have the students get up and shake and dance like Bella Bean

Feel free to use your creative talents to incorporate Bella's messages and personality traits into other curriculum areas. We'd love to hear what you do – Please use the space on the back of the page to jot down your ideas.



JANUARY

Bella Bean[®] Sprout

Week 3

Overview

This week's activities will be growing a bean sprout.

Materials

- Dried beans
- Water
- Paper towels
- Plastic bags
- Sunlight

Activity

1. Give each student a plastic bag (with their names on it), a paper towel and a dried bean
2. Have the students wet their paper towel
3. Have the students place a dried bean in the paper towel
4. Place the towel and bean inside the plastic bag and place it by the window
5. Check back and in 2-3 days and observe the bean sprouting roots
6. To end, get moving! Have the students stand up and practice growing like a flower.
 - Squat down low and slowly stand up
 - Reach tall for the sun
 - Wiggle your leaves (hands)
 - Move your stem (legs and torso)
 - Shake your roots (feet)
 - Blow in the wind

Additional Related Activities

- Have the students keep a log of their bean growing. Draw their bean on day 1 and add to the drawing as they observe the sprouting process
- Talk about what plants need to grow – sun, water, and food.
- Have the students draw the different parts of the plant

APPENDIX F

EXAMPLE OF MONTHLY SEND HOME – BELLA BEAN[®]

Character of the Month



Marty Milk®

Today The Food Friends came to our classroom and Marty Milk helped us make yogurt parfaits! In my parfait I put:

Today Marty Milk taught us a new Mighty Move! It was:

“I am a Super Taster because trying new foods helps me learn!”

“I am a Mighty Mover because it makes me strong!”

Ice Cream In A Bag

What You Do:

1. Put the milk, sugar, and vanilla in the sandwich bag and seal TIGHTLY.
2. Place the sandwich bag in the gallon bag. Cover with ice and salt and seal TIGHTLY.
3. Shake the bag for about 15 minutes or until there is ice cream!!
4. Add your favorite toppings, like fruit or nuts, and enjoy!

What You Need

- 1 sandwich zip-top bag
- 1 gallon zip-top bag
- ¼ cup milk
- ½ tablespoon sugar
- ½ teaspoon vanilla extract
- Ice
- ¼ cup salt