





# BODY QUEST ACCOMPLISHMENTS

Childhood obesity in Alabama is being addressed by the Nutrition Education Program (NEP) with *Body Quest: Food of the Warrior*. This initiative encourages obesity prevention through positive dietary and physical activity practices. Body Quest is a theory-driven, evidence-based initiative that has successfully achieved positive dietary and physical activity behavior changes in youth during the past year. Because of the significant accomplishments of Body Quest, it has been recognized in FY14 through awards, publications, presentations and abstracts.

## AWARDS AND NATIONAL RECOGNITION

**1<sup>st</sup> Place, National:** *Increasing Fruit and Vegetable Consumption in Third Graders in a 17-week, Extension Childhood Obesity Prevention Program.* National Extension Association of Family and Consumer Sciences, 2014.  
Award recognizes exemplary research findings that improve existing or new Extension programs.

**1<sup>st</sup> Place, Southern Region:** *Increasing Fruit and Vegetable Consumption in Third Graders in a 17-week, Extension Childhood Obesity Prevention Program.* National Extension Association of Family and Consumer Sciences, 2014.

**1<sup>st</sup> Place, State Affiliate:** *Increasing Fruit and Vegetable Consumption in Third Graders in a 17-week, Extension Childhood Obesity Prevention Program.* National Extension Association of Family and Consumer Sciences, 2014.

**National Recognition:** *Best Practices in Nutrition Education for Low-income Audiences.* National Institute of Food and Agriculture, USDA, 2014.  
<http://snap.nal.usda.gov/snap/CSUBestPractices.pdf>



Thank you so much for the healthy tips.  
My daughter loves the program.



Parent of a 3rd grade Body Quest student

## PUBLICATIONS

### Journal Article:

Struempler BJ, Parmer SM, Mastropietro LM, Arsiwalla D, Bubb RR. Changes in Fruit and Vegetable Consumption of Third Grade Students in Body Quest: Food of the Warrior, a 17-class Childhood Obesity Prevention Program. *Journal of Nutrition Education and Behavior*, 2014; 46(4): 286-292.

### National Publications:

Struempler BJ, Parmer SM. *Impact 2014: Childhood Obesity*. National Extension Association of Family and Consumer Sciences. NEAFCS National Office, Boca Raton, FL.

Struempler B, Parmer SM. Body Quest: Food of the Warrior: Combating childhood obesity through nutrition education. *Auburn Speaks*, 2014:250-258. Office of the Vice President for Research and Economic Development, Auburn University, AL.

### Alabama Cooperative Extension System Publications:

Struempler B, Parmer SM, Mastropietro LM, Smith SM, Griffin JB. *Body Quest Protocol, 2013-2014*. Auburn, AL: Alabama Cooperative Extension System; 2013.

Parmer SM, Smith SM, Struempler B. *Body Quest Clicker Instructions, 2013-2014*. Auburn, AL: Alabama Cooperative Extension System; 2013.

Mastropietro LM, Struempler B, Parmer SM. *Body Quest What's for Lunch Directions, 2013-2014*. Auburn, AL: Alabama Cooperative Extension System; 2013.

Struempler B, Parmer SM. *Body Quest: Food of the Warrior: iChallenge, 2013-2014*. Auburn, AL: Alabama Cooperative Extension System; 2013.

Struempler B, Parmer SM. *Nutrition Education Program FY13 Report: Auburn University*. Auburn, AL: Alabama Cooperative Extension System; 2013.

## NATIONAL AND INVITED PRESENTATIONS

*Using iPad Apps to Teach Extension Nutrition Education*  
National Extension Association of Family and Consumer Sciences  
Lexington, Kentucky, 2014

*Increasing Fruit and Vegetable Consumption in Third Graders*  
National Extension Association of Family and Consumer Sciences  
Lexington, Kentucky, 2014

*Developing iPad Apps for Nutrition Education*  
National Extension Technology Conference  
Manhattan, Kansas, 2014

*Body Quest Food of the Warrior: Combating Childhood Obesity through Nutrition Education*  
Research Week 2014  
Auburn, Alabama, 2014

*Developing iPad Apps for Nutrition Education*  
iTeach 6: w/iPads!  
Auburn, Alabama 2014

## ABSTRACTS

*Using iPad Apps to Teach Extension Nutrition Education*  
National Extension Association of Family and Consumer Sciences  
Lexington, Kentucky, 2014

*Increasing Fruit and Vegetable Consumption in Third Graders*  
National Extension Association of Family and Consumer Sciences  
Lexington, Kentucky, 2014

*Developing iPad Apps for Nutrition Education*  
National Extension Technology Conference  
Manhattan, Kansas, 2014

### SNAP-Ed Recognition

“Results of this impact evaluation provide confidence of intervention success as it is implemented in other settings.”

*Best Practices in  
Nutrition Education for  
Low-income Audiences*

# THE CHALLENGE

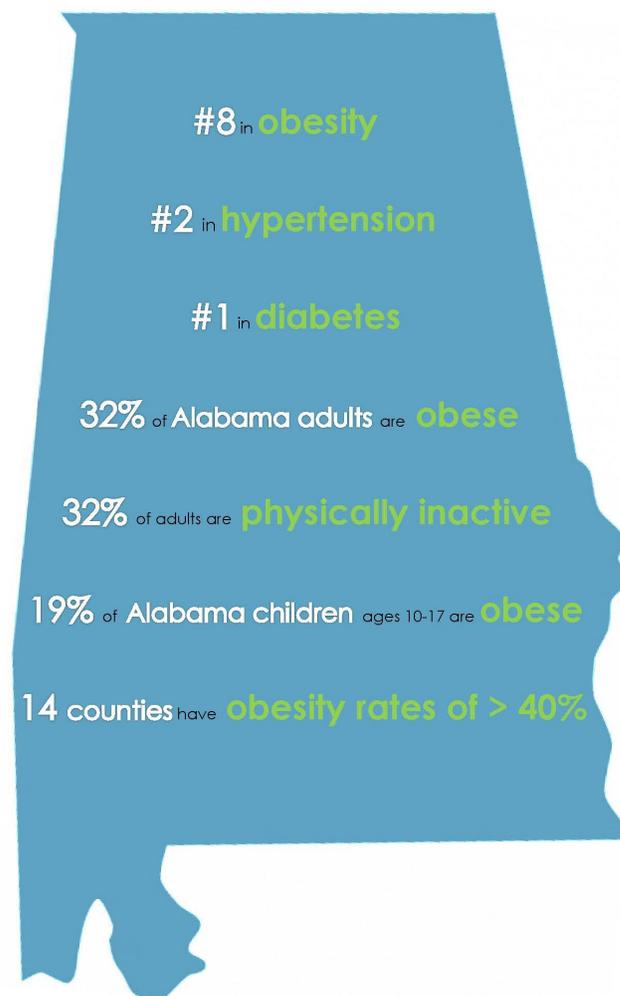
Alabama has among the highest obesity rates and obesity-related disease rates in the nation. Limited-resource individuals, such as Supplemental Nutrition Assistance Program (SNAP) recipients, are disproportionately affected by these diseases. Reaching the SNAP population through SNAP-Education (SNAP-Ed) is a key strategy for tackling Alabama's obesity and health issues.

# THE SOLUTION

All corners of the state are touched with an innovative, youth program as part of the Nutrition Education Program (NEP). The flagship, school-based initiative of NEP is *Body Quest: Food of the Warrior*. Body Quest is a childhood obesity prevention program for elementary youth, particularly third graders in schools with 50% or more of students receiving free or reduced lunches. Third graders across the state are empowered to make healthier choices during a 17-week impact evaluation intervention.

Goals of Body Quest students are to:

- Eat more fruits and vegetables.
- Drink more water and less soda.
- Participate in more physical activity.
- Encourage their families to be more active.
- Watch less TV.
- Eat breakfast.



The Body Quest curriculum consists of a battery of interactive, colorful and anim -style materials that include seven nutrition iPad apps. All materials, traditional and non-traditional, are theoretically-based, behaviorally-focused and developmentally appropriate. They are based on the Experiential Learning Theory. Traditional Body Quest materials consist of a leader's guide, posters, card deck, vow card, power band, stickers, t-shirt and scrolling banners. Non-traditional materials include seven iPad apps. Each app is directed by one of the six anim  characters who teach balanced meals, food groups, food nutrient function and healthy snacks. Although these nutrition education topics are traditional, iPad apps allow youth to be reached and energized in new ways.

# THE RESULTS

## Body Quest in Action

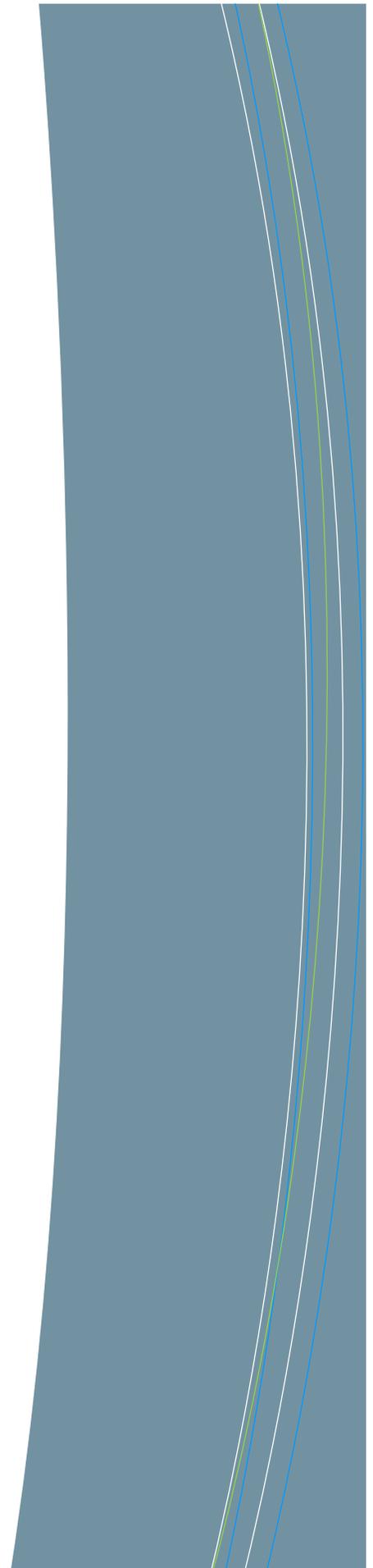
In FY14, each SNAP-Education Extension, full-time, nutrition educator (n=24) worked with 10 third grade classes. The classes were designated as either treatment or control. Treatment students were in different schools from control students. Schools were randomly assigned with one to five classes per school. Students were recruited using standardized scripts; parents of participating third graders signed an informed consent. An Institutional Review Board approved this study.

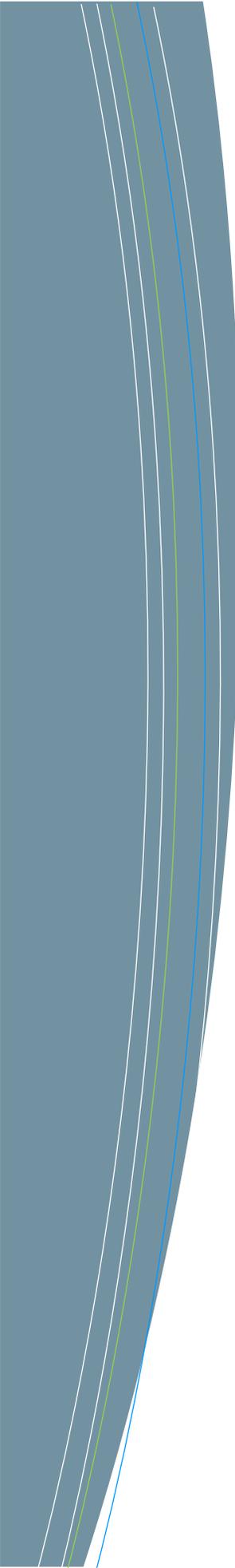
Students were third graders (n = 3,568) from 47 Alabama counties. Treatment students (n = 2,126) were 52% male, 39% black and 61% non-black, predominately white. Control students (n = 1,442) were 49% male, 35% black and 65% non-black, predominately white. The retention rate was 94%. All students came from schools with 50% or more students receiving free or reduced school lunches.

The *Body Quest: 2013-2014 Protocol*, an internal tool, was developed to help Extension educators manage the activities in each Body Quest class. It provided weekly step-by-step instructions for implementing a Body Quest class.

During the 2013-2014 school year, educators provided 17 weekly, 45-minute Body Quest classes to treatment students. During intervention, six nutrition topics were sequentially taught: trying new foods, food groups, balanced meals, food nutrients, healthy snacks and extending the fruit and vegetable message to others. At every intervention class, fruits and vegetables were emphasized. During the six, educator-led lessons, instruction included lectures and interactive activities. In the following week, a reinforcement lesson was taught via one of seven iPad apps. For treatment students only, vegetable tastings were provided at alternating classes and family members received weekly take-home activities. Control students completed the assessments, but had no intervention, fruit and vegetable tastings or family take-home messages.

Tastings were integral as they exposed treatment students to vegetables and removed accessibility barriers students may face at home. Vegetables were chosen based on accessibility in local grocery stores and also by frequency of use in the School Lunch Program. Tastings consisted of six raw vegetables and included: bell peppers, broccoli, carrots, cauliflower, spinach and tomatoes. A one-ounce cup of ranch dressing was distributed with vegetables.





## Instrumentation and Data Analyses

Two assessments were conducted during Body Quest for treatment and control students. Assessments included a *What's for Lunch* checklist and an *iChallenge* assessment. *What's for Lunch* was administered at six time points. The *iChallenge* was administered at four time points, with data reported for pre- and post-assessments only. Between the two assessments, students' knowledge, intentions and behaviors for dietary and physical activity changes were documented.

*What's for Lunch* was developed to assess fruit and vegetable consumption of students eating a school lunch at six collection periods. Criteria for the checklist were to be easy-to-use and time-efficient for students and classroom teachers, yet monitor consumption change. Students' self-reported consumption was defined as eating the portion or serving of each food provided by the School Lunch Program. Students completed *What's for Lunch* immediately after lunch for five consecutive days during each of the six assessment periods.

Only fruit and vegetable information from the *What's for Lunch* checklist was analyzed. Fruits were collapsed into one category, as were vegetables. Changes in student fruit and vegetable consumption were analyzed using a repeated measures ANCOVA. Changes were examined within and between treatment and control groups.

*What's for Lunch* data are reported as a percentage using the number of self-reported fruits and vegetables consumed through the School Lunch Program for six, five-day periods. Level of significance is reported at  $p < 0.001$ .

An *iChallenge* assessment was developed to assess knowledge, intention and behavior of dietary and physical activity characteristics of students. The 34-questions were easy-to-read with yes/no and multiple choice answers. Questions were read aloud by educators; students answered questions using a hand-held clicker device.

*iChallenge* data were analyzed using a series of Pearson independent-samples chi-square tests. *iChallenge* data are reported as a percentage of student responses. Level of significance is reported at  $p < 0.001$ .

## Significant Findings and Conclusions of Body Quest

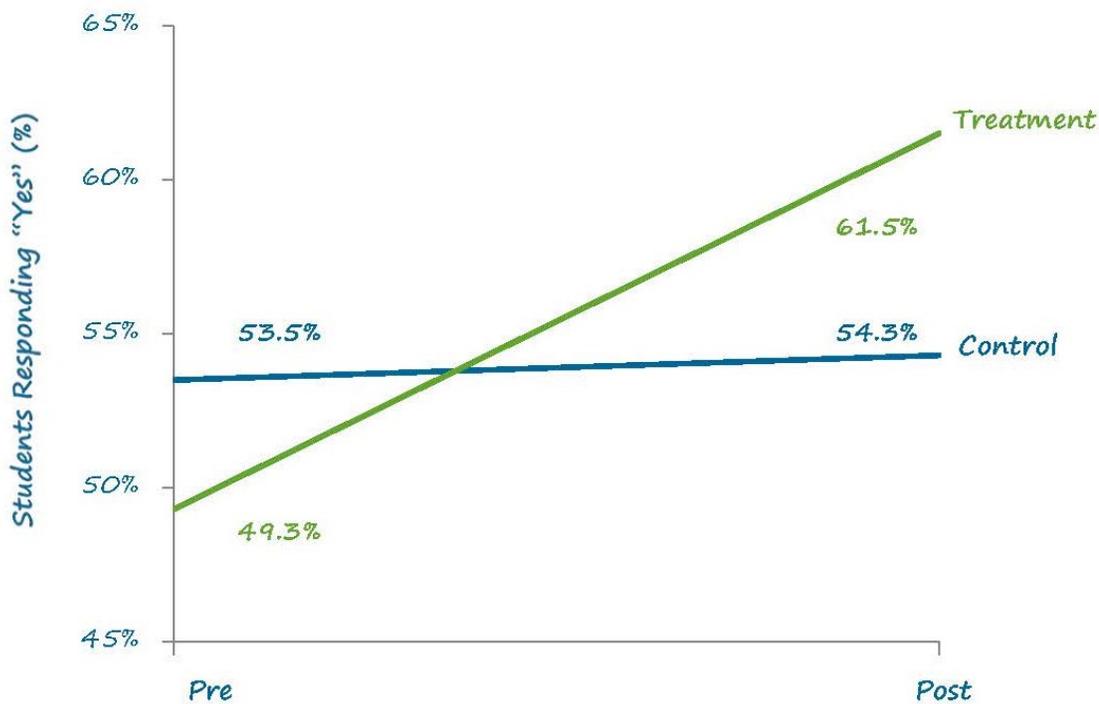
Body Quest resulted in six key findings that document success as a childhood obesity prevention initiative: (1) increased fruit and vegetable consumption, (2) increased water consumption with decreased soda consumption, (3) increased physical activity of children (4) increased physical activity of families, (5) decreased screen time and (6) increased breakfast consumption. These findings support current recommendations for preventing childhood obesity.

## Fruit and Vegetable Consumption

Eating fruits and vegetables is a positive recommendation for youth to follow for obesity prevention. Current USDA guidelines recommend eating 4.5 cups of fruits and vegetables combined per day.

**Behavior Change:** Body Quest students eat more fruits and vegetables. Students self-reported daily fruit and vegetable consumption through the School Lunch Program on a *What's for Lunch* checklist for six, five-day periods. Learning to eat fruits and vegetables early in life is an important dietary behavior to adopt for lifelong good health and body weight management. Because of Body Quest, students eat fruits and vegetables at an early age.

*What's for Lunch? Student Fruit and Vegetable Consumption at Pre- and Post-Assessments*

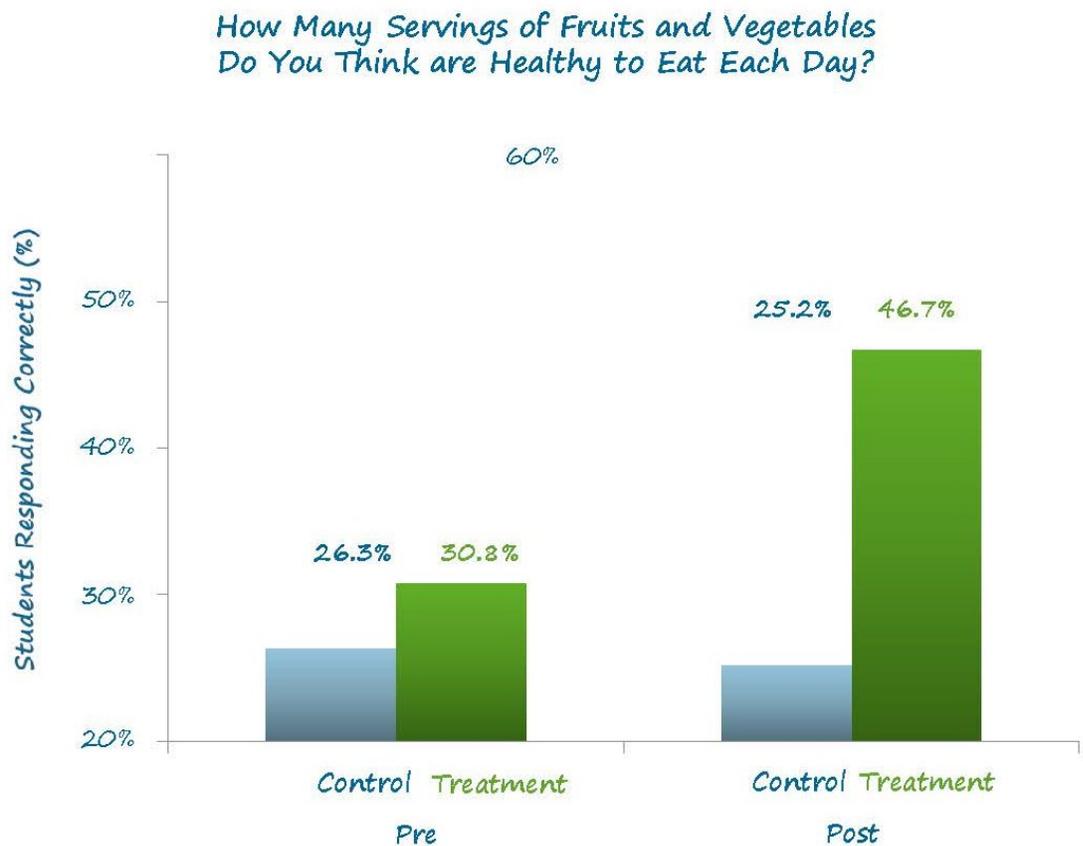


**Figure 1:** There was a significant interaction between the treatment type and the six assessment time points ( $F(4.83, 9293.6) = 22.137, p < 0.001$ ). The control group had a higher percent consumption than the treatment group at pre-assessment ( $F(1, 198.216) = 5.904, p = 0.016; \eta^2 = 0.029$ ); however at post-assessment the treatment group had a higher percent consumption than the control ( $F(1, 193.739) = 13.46, p < 0.001; \eta^2 = 0.065$ ). In the treatment condition, there was a significant increase in the percent of fruits and vegetables consumed across the six time points and a medium effect size ( $F(4.769, 5398.172) = 76.354, p < 0.001; \eta^2 = 0.063$ ).

Body Quest  
students eat  
fruits and  
vegetables.

## Fruit and Vegetable Knowledge

**Knowledge Change:** Body Quest students know how many fruits and vegetables to eat every day for good health. On the *iChallenge*, students were asked, “How many servings of fruits and vegetables do you think are healthy to eat each day?” Response options were “1 serving,” “2 servings,” “3-4 servings” or “5 servings or more.” Because of Body Quest, students know they need 5 servings or more of fruits and vegetables every day.

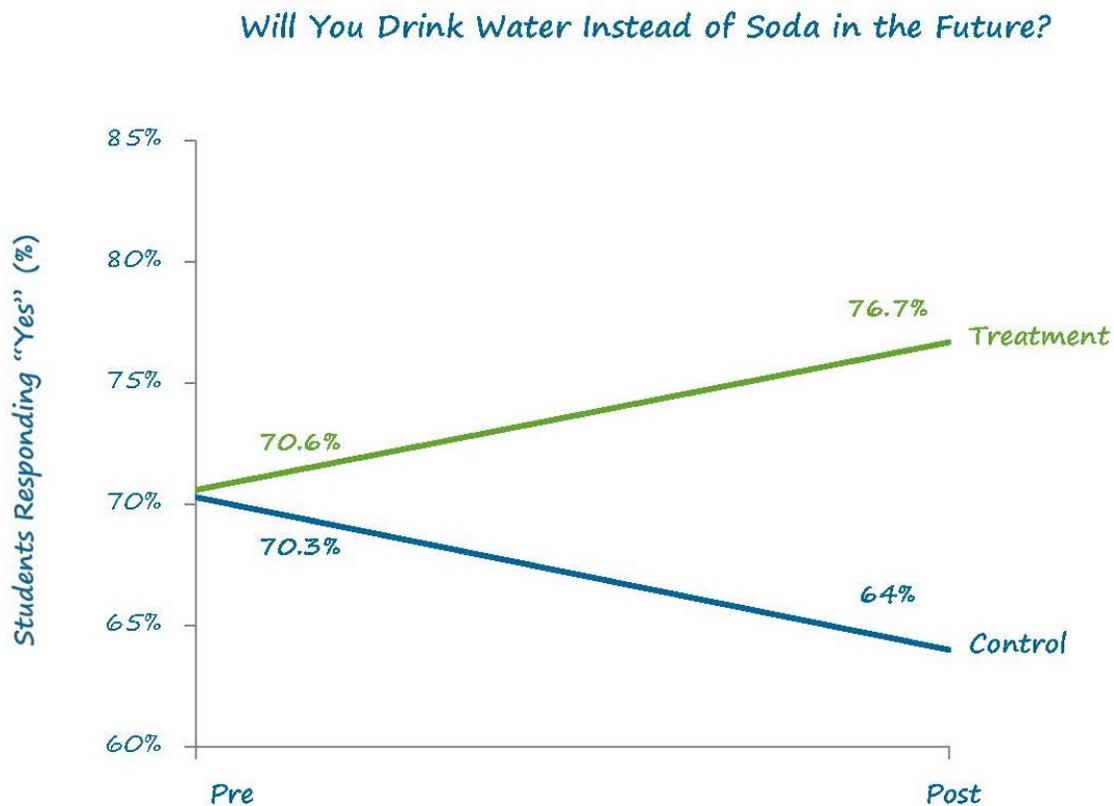


**Figure 2:** At pre- and post-assessment, the treatment condition demonstrated a higher percent of correct responses by students than the control condition ( $\chi^2(1, N = 3530) = 8.257; p = 0.004$ ;  $\chi^2(1, N = 3316) = 154.355; p < 0.001$ ); however the treatment condition was significantly higher at post- than pre-assessment ( $\chi^2(1, N = 1776) = 34.698; p < 0.001$ ).

## Beverage Consumption

Nutrition experts recommend all Americans to replace sugar-sweetened beverages with water. This positive dietary habit is beneficial for obesity prevention.

**Intention Change:** Body Quest students drink water instead of soda. On the *iChallenge*, students were asked, “Will you drink water instead of soda in the future?” Because of Body Quest, more third graders intend to drink water instead of sugar-sweetened beverages.



Body Quest  
students  
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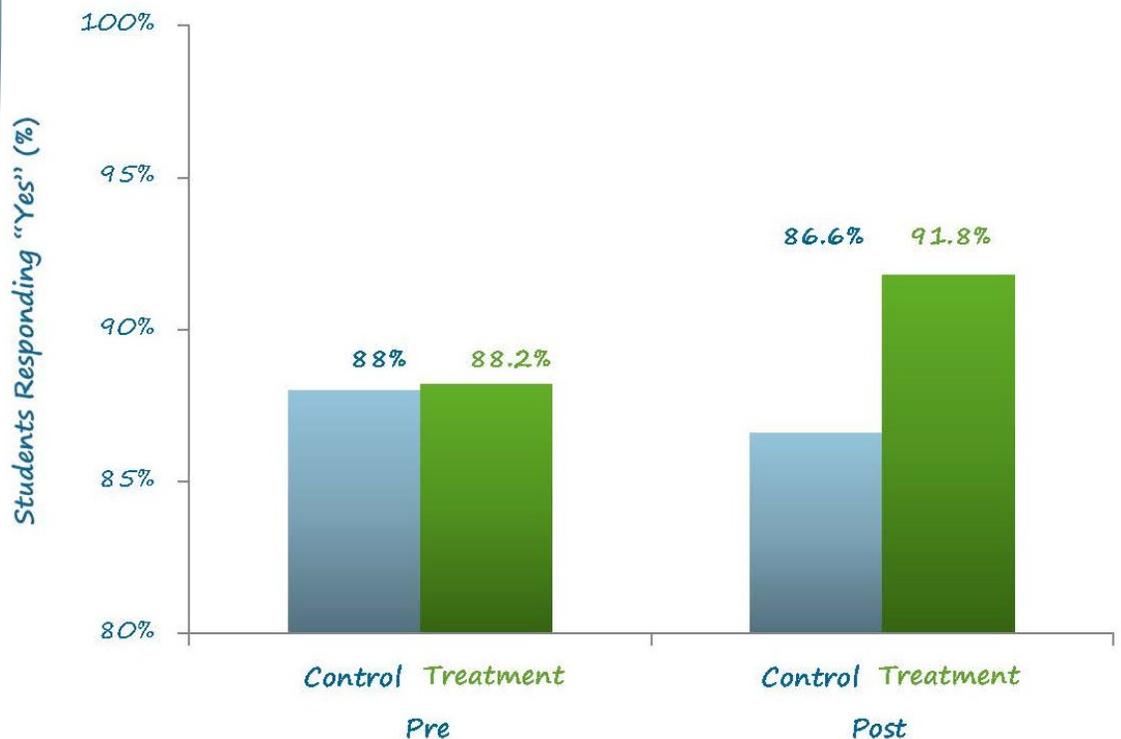
**Figure 3:** At pre-assessment, there was no statistical difference between control and treatment conditions ( $\chi^2(1, N = 3567) = 0.03$ ; n.s.); however at post-assessment, the treatment condition demonstrated a higher percent of students planning to drink water in the future than the control condition ( $\chi^2(1, N = 3332) = 62.783$ ;  $p < 0.001$ ). In the treatment condition, a higher percentage of students reported that they will drink water instead of soda at the post-assessment than at the pre-assessment ( $\chi^2(1, N = 1809) = 69.197$ ,  $p < 0.001$ ).

## Physical Activity

It is well recognized that physical activity and good nutrition go hand-in-hand. These two elements are needed for healthy body weight management. Not only is physical activity important for third graders, but parents who engage in physical activity are more likely to raise physically active children.

**Behavior Change of Students:** Body Quest gets kids moving. On the *iChallenge*, students were asked, “Are you physically active?” Because of Body Quest, more third graders are physically active.

### Are You Physically Active?

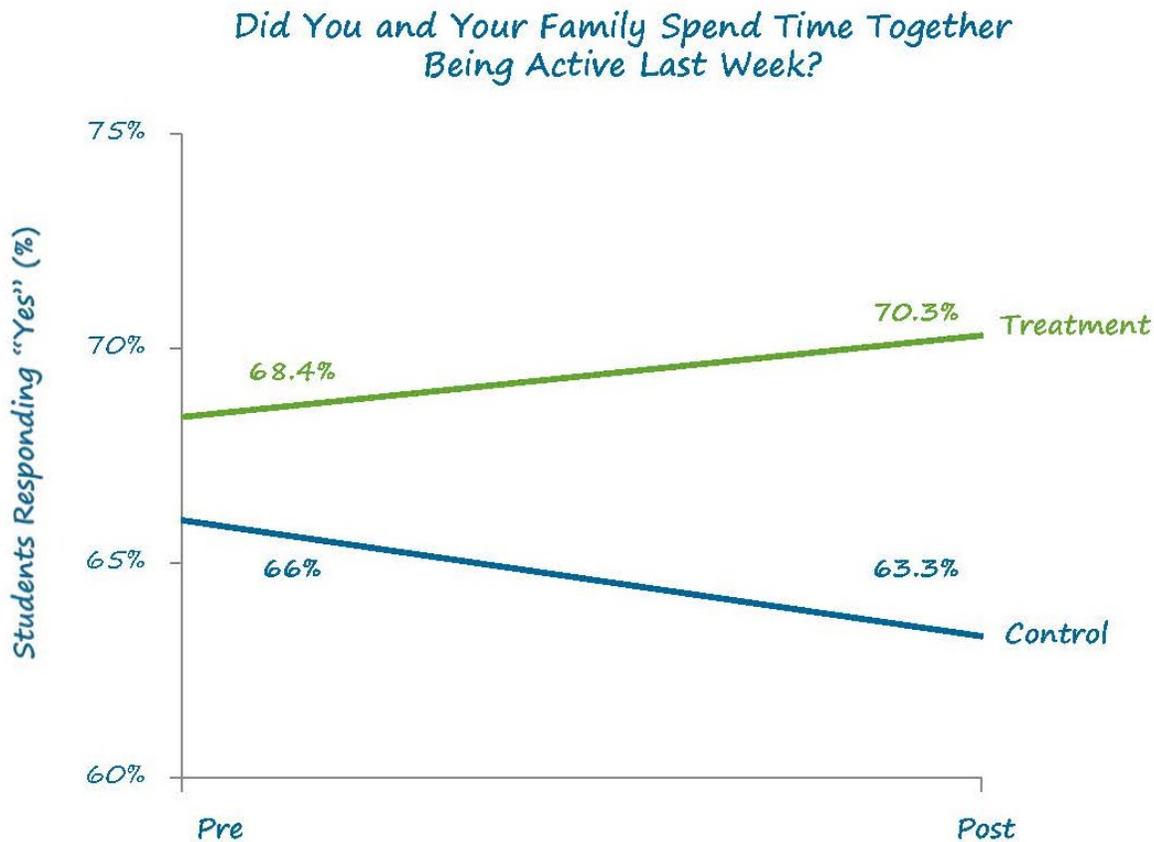


**Figure 4:** At pre-assessment, there was no statistical difference between control and treatment conditions ( $\chi^2(1, N = 3560) = 0.023$ ; n.s.); however at post-assessment, the treatment condition demonstrated a higher percent of students being physically active than the control condition ( $\chi^2(1, N = 3328) = 23.182$ ;  $p < 0.001$ ). In the treatment condition, a higher percentage of students reported being physically active at the post-assessment than at the pre-assessment ( $\chi^2(1, N = 1801) = 34.665$ ,  $p < 0.001$ ).

Body  
Quest  
gets kids  
moving.

## Physical Activity

**Behavior Change of Families:** Body Quest families are active families. On the *iChallenge*, students were asked, “Did you and your family spend time together being active last week?” Because of Body Quest, students spread the message to be active to their families.



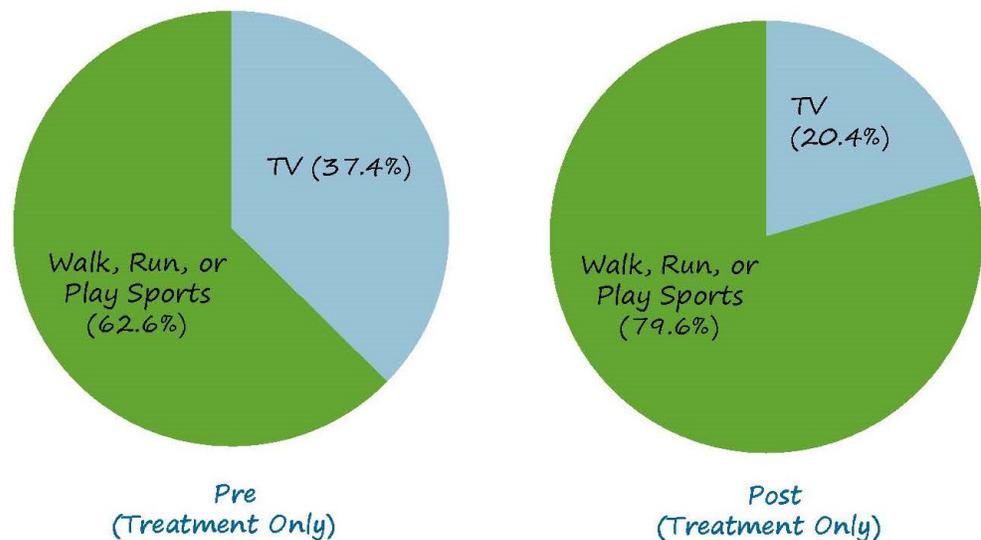
**Figure 5:** At pre-assessment, there was no statistical difference between control and treatment conditions ( $\chi^2(1, N = 3551) = 2.235$ ; n.s.); however at post-assessment, the treatment condition demonstrated a higher percent of students indicating that their family was active than the control condition ( $\chi^2(1, N = 3300) = 17.394$ ;  $p < 0.001$ ). In the treatment condition, a higher percentage of students reported that their family was physically active at the post-assessment than at the pre-assessment ( $\chi^2(1, N = 1771) = 101.046$ ,  $p < 0.001$ ).

## Screen Time

Excess time spent watching television has been associated with decreased physical activity and increased intake of empty calories. It is recommended to decrease screen time and replace it with physical activity to reduce the risk of childhood obesity.

**Behavior Change:** Body Quest kids are watching less television after school. On the *iChallenge*, students were asked, “What activity do you do more often when you get home from school?” Because of Body Quest, kids replaced watching television after school with physical activity.

*What Activity Do You Do More Often After You Get Home from School?*

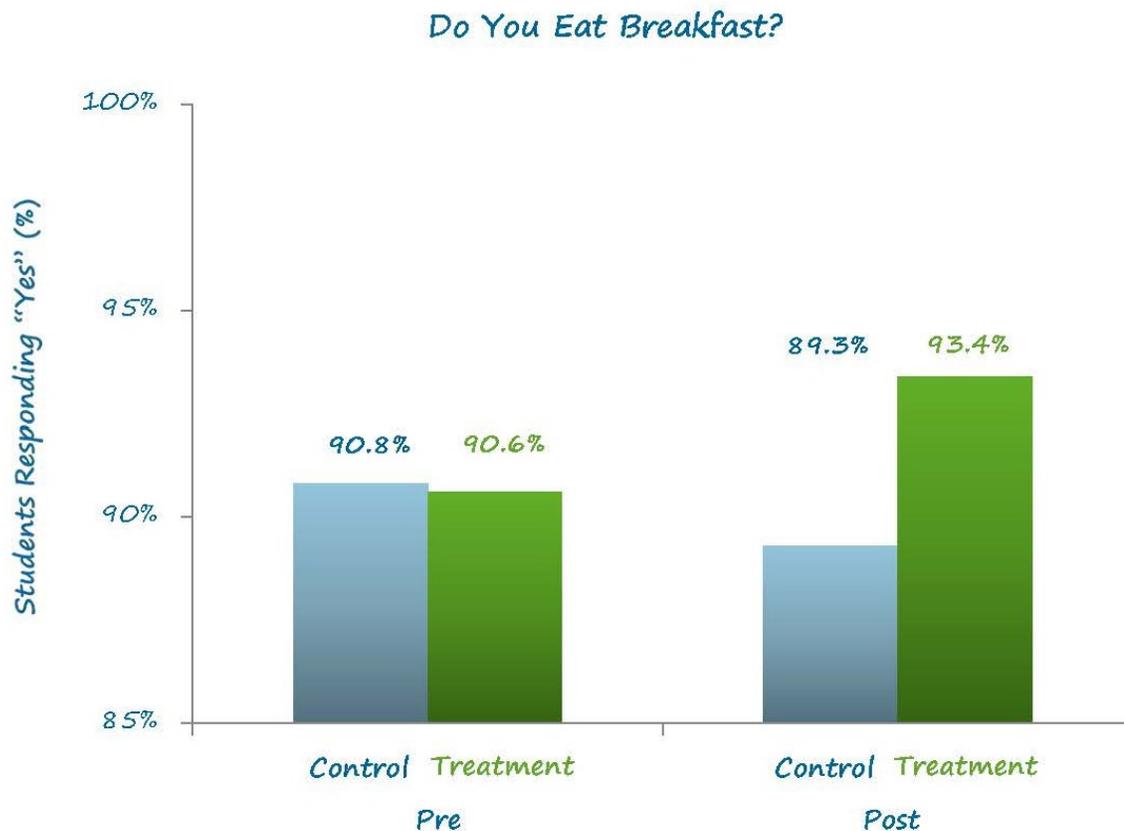


**Figure 6:** At pre-assessment, there was no statistical difference between control and treatment conditions ( $\chi^2(1, N = 3557) = 1.419$ ; n.s.); however at post-assessment, the treatment condition demonstrated a lower percent of students watching TV than the control condition ( $\chi^2(1, N = 3323) = 99.068$ ;  $p < 0.001$ ).

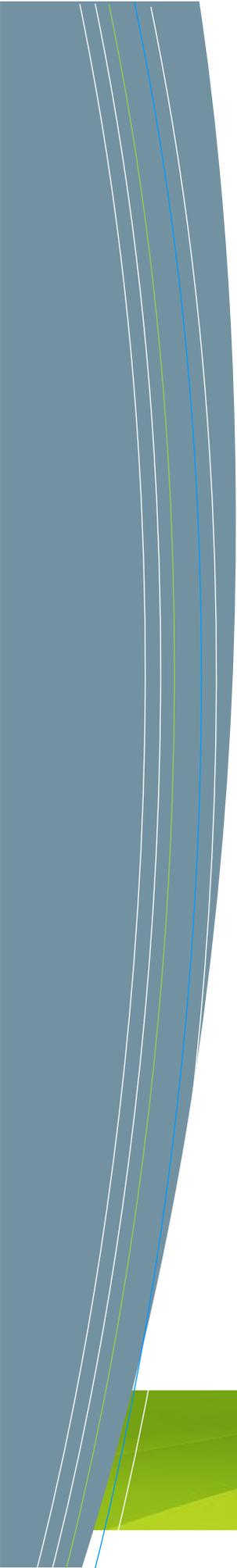
## Breakfast Consumption

A common theme of nutrition education for youth is the importance of eating breakfast. Kids who eat breakfast perform better at school. Breakfast fuels the body and gets the day off to a good start.

**Behavior Change:** Body Quest kids eat breakfast. On the *iChallenge*, students were asked, "Do you eat breakfast?" Because of Body Quest, more kids began eating breakfast.



**Figure 7:** At pre-assessment, there was no statistical difference between control and treatment conditions ( $\chi^2(1, N = 3564) = 0.033$ ; n.s.); however at post-assessment, the treatment condition demonstrated a higher percent of students eating breakfast than the control condition ( $\chi^2(1, N = 3342) = 17.535$ ;  $p < 0.001$ ). In the treatment condition, a higher percentage of students reported that they eat breakfast at the post-assessment than at the pre-assessment ( $\chi^2(1, N = 1810) = 45.77$ ,  $p < 0.001$ ).



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## In Summary

Body Quest was successful in increasing positive dietary and physical activity behaviors, intentions and knowledge for obesity prevention in a third grade population. Positive changes centered on fruit and vegetable consumption, water consumption, physical activity, physical activity with family members, screen time and breakfast consumption. These findings highlight that Body Quest can motivate a younger population to adopt healthy behaviors that, when maintained into adulthood, will aid with weight management.

Body Quest is beneficial to SNAP-Ed and the Cooperative Extension System. For SNAP-Ed, Body Quest effectively changed behaviors, intentions and knowledge of a young, at-risk audience. For Extension, Body Quest highlights a successful program that can be implemented in a real-world setting.

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## PARTNERSHIPS

During FY14, Body Quest continues to open doors to strengthen valuable partnerships for SNAP-Ed. The strengthening of existing partnerships is due to the high-quality of Body Quest and that it is addressing an escalating health problem in Alabama. Hence, it is a very visible program and is in high demand to Alabama's youth through public schools. SNAP-Ed educators also are working more closely with schools' Child Nutrition Program personnel and school wellness committees. Finally, other productive partnerships include (1) Head Start Advisory Committees, (2) 21<sup>st</sup> Century Advisory Councils, (3) Children Policy Councils, (4) Community Health Councils, (5) JOBS Task Forces, (6) Alabama Obesity Task Force and (7) End Child Hunger Task Force.

## BODY QUEST MULTI-STATE INITIATIVES

Body Quest is currently being replicated in its entirety throughout Louisiana. This partnership between LSU and AU Extension has been formed to support the benefits of Body Quest on childhood obesity prevention. Other states also use Body Quest components in nutrition education efforts, including Rhode Island, Utah and Montana.



## TECHNOLOGY

Body Quest drives technology use in NEP. In FY14, NEP educators used technology to engage students and conduct effective assessments.

**iPads:** Body Quest was technology-driven by using iPads as the pedagogical vehicle. County educators have a mobile iPad laboratory for teaching Body Quest. Students learn nutrition education from their favorite Body Quest characters as they interact directly with apps containing direct narrative and gaming. Educators are responsible for managing iPads, including software updates, app updates and routine maintenance.

**Clickers:** Clickers were used to electronically collect student responses to *iChallenge* evaluation questions and transfer these responses to NEP state staff. Clickers have many advantages. For students, clickers provide an easy, confidential and engaging way to “take a test.” For Body Quest educators, clickers have saved untold amounts of money in terms of time because educators do not have to “grade the test.”

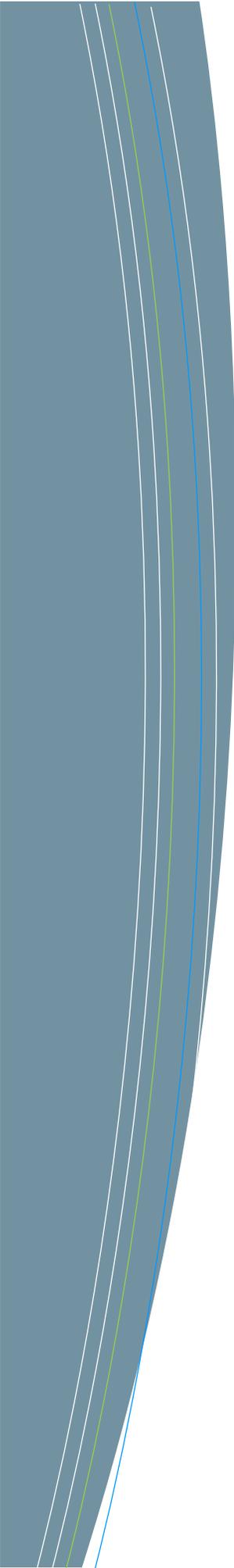
**What’s for Lunch:** Data from the *What’s for Lunch Student Forms* were entered by NEP educators into spreadsheets on shared network space. These extensive spreadsheets required significant understanding of spreadsheet use, data entry, file management and other technology-based skills needed to work in an electronic environment.

## MARKETING

**Body Quest Website:** The website contains a wealth of information on Body Quest content and use of Body Quest in the classroom. Designed for external users, the website includes: development history, goals, team members, action photos, ordering information, app and tasting descriptions, how to get started and contact information. [www.BodyQuest.aces.edu](http://www.BodyQuest.aces.edu)

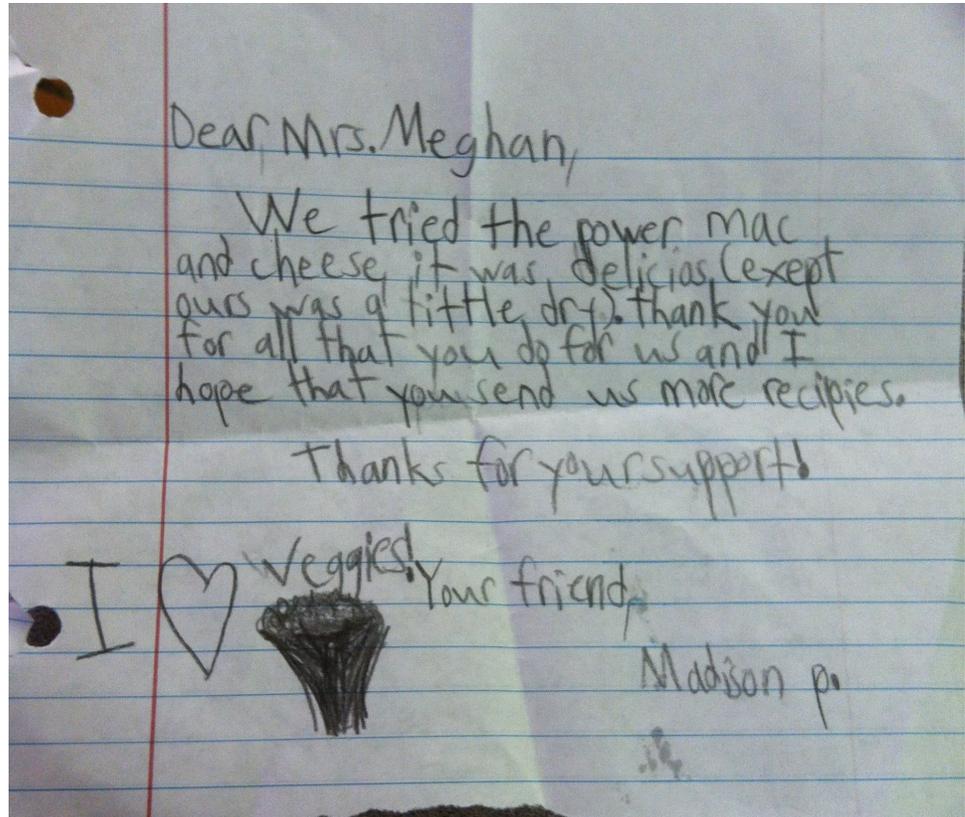
## BODY QUEST REPLICABILITY

Body Quest is easy to replicate as all materials are free at [www.BodyQuest.aces.edu](http://www.BodyQuest.aces.edu) and the iPad apps through the Apple App Store. If iPads are not available, pencil-paper activities that parallel the apps are found in the curriculum. Body Quest traditional and non-traditional materials are theoretically-based, behaviorally-focused and developmentally appropriate. Access to these resources allows anyone to use Body Quest to prevent childhood obesity and make it part of the cultural fabric of their state.



## Nutrition Education Program Educators

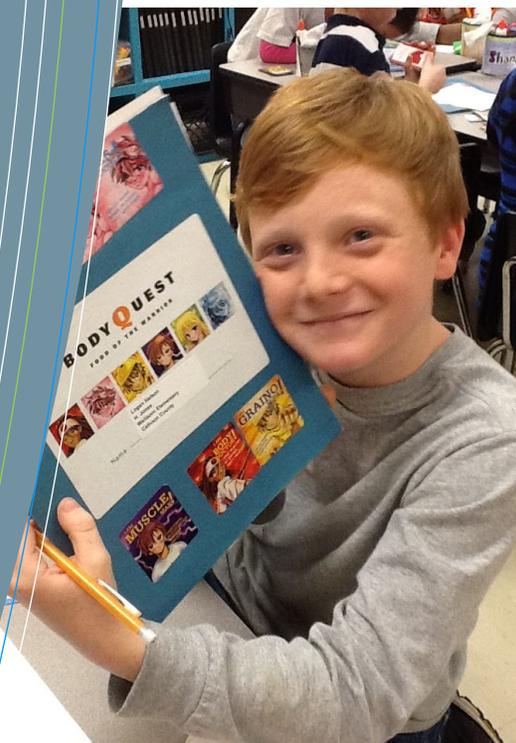
Angie Woods	Randolph and Chambers Counties
Annette Casteel	Winston and Franklin Counties
Carolyn Rothschild	Monroe and Wilcox Counties
Charity Battles	Chilton and Bibb Counties
Chasity Little	Jackson and DeKalb Counties
Danielle McGrew	Washington and Clarke Counties
Debbie Beverly	Conecuh and Covington Counties
Demetrius Scott	Butler and Lowndes Counties
Dominguez Hurry	Bullock and Macon Counties
Emma Thornton	Cullman and Marshall Counties
Emma Anne Hallman	Marion and Walker Counties
Gladys Blythe	Dallas and Perry Counties
Helen Melton	Hale and Greene Counties
Kathy Johnson	Lamar and Fayette Counties
Lea Huddleston	Calhoun County
Lisa Wood	Pike and Crenshaw Counties
Loretta Carr	Marengo and Choctaw Counties
Mary Shewmaker	Cherokee and Cleburne Counties
Meaghan Robertson	Clay and Talladega Counties
Mozelle Dixon	Pickens and Sumter Counties
Sheila Dorriety	Geneva and Coffee Counties
Sue Pemberton	Tallapoosa and Coosa Counties
Tawnya Kirkland	Barbour and Henry Counties
Velma Dowdell	Lee and Russell Counties



My son came home after one Body Quest lesson and asked me to buy some bell peppers. He had tried it at school and really liked it.



Parent of a 3rd grade Body Quest student



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USDA is an equal opportunity provider and employer. This material was funded by USDA's Supplemental Nutrition Assistance Program – SNAP, which provides nutrition assistance to people with low income. It can help you buy nutritious foods for a better diet. To find out more, contact a county Department of Human Resources office.

Published by the Alabama Cooperative Extension System (Alabama A&M University and Auburn University), an equal opportunity educator and employer.

[www.BodyQuest.aces.edu](http://www.BodyQuest.aces.edu)

[www.aces.edu/nep](http://www.aces.edu/nep)

November 2014

