

Investigating the Food Detectives: Beecher's Pure Food Kids Workshop-A Program Evaluation

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Abstract

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Introduction The Institute of Medicine recommends partnerships between government agencies and outside partners, such as a health care delivery system or public school, as a strategy to meet public health goals. These partnerships, called intersectoral relationships, could strengthen efforts to address health crises, such as childhood obesity. Childhood obesity is a serious public health concern with rates remaining stagnant at 17% according to the most recent National Health and Nutrition Examination Survey. Katz and others have explored the importance of nutrition education in solving this crisis. One such nutrition education program, the Beecher's Pure Food Kids (PFK) workshop is administered through Beecher's Flagship Foundation to fourth graders in the Puget Sound area. This interactive 2.5 hour workshop has a curriculum that aligns with Washington State's Common Core learning objectives for students and includes five content areas: recognizing marketing tactics, how to understand a food label, how to decode an ingredient list, improve cooking skills through preparation and recognizing food additives. Methods A formative evaluation of the PFK workshop was conducted to determine if the workshop led to increases in students' knowledge in Common Core learning areas and the Flagship Foundation priorities. Pre and post-workshop quizzes were administered to 206 fourth-grade students in nine classrooms. In addition, teacher evaluations served as another evaluation of program quality and assessed student knowledge gain. Results There were significant gains in knowledge in all areas

assessed by the quizzes ($p < 0.0001$). In addition, students reported high levels of satisfaction. Teachers had a similar positive response to the workshop and most planned to repeat the workshop in the next academic year. Discussion The results of this study support this intersectoral relationship as an effective strategy to increase access to quality nutrition education within schools.

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Introduction

The health and safety of the public can be thought of as a governmental responsibility but this is an unnecessarily limited view. The Institute of Medicine (IOM) states “Creating conditions for people to be healthy should be... a shared social goal” (Institute of Medicine, “The Future of the Public’s Health in the 21st Century,” page 2). Greater, more deliberate use of “intersectoral relationships” is one of six recommendations of the IOM to improve public health while maintaining an appropriate level of government involvement. Intersectoral relationships include a government agency and one or more of five categories of partners including: academia, the media, employers and businesses, health care delivery systems and community organizations such as schools. They are most successful when benefitting all involved parties and fulfilling one of ten public health services such as informing, educating and empowering people about health issues (Institute of Medicine, page 32). The potential value of intersectoral relationships was discussed in a previous report of the IOM, in 1988, but even greater emphasis is placed on this strategy for public health improvement now.

Efforts to achieve public health goals face challenges, including different opinions in response to the question: “How can society balance the individual desire to pursue the pleasures of life (e.g., food) with scientific evidence about health risk” (Institute of Medicine, Page 24). Childhood obesity is one of the main areas of concern for public health today. The most recent National Health and Nutrition Examination Survey (NHANES) of 2011-2012 found rates to be unchanged among 2-19 year olds from data collected in 2003-2004 data; the prevalence remains at 17% (Ogden, Kit and Flegal, 2014). While this alone is striking, this number does not consider comorbid conditions. The Bogalusa Heart Study, by Freedman et al, found a significant correlation between increasing childhood body mass index (BMI) and increasing intima-media thickness, a proxy for generalized atherosclerosis (Freedman, Patel, Srinivasan, Chen, Tang, Bond et al, 2008). Type II Diabetes, previously referred to as “Adult Onset Diabetes” due to its infrequent diagnosis in childhood, has grown more common. The prevalence of Type II Diabetes in

children is now greater than that of Type I Diabetes, 4.1/1000 and 1.7/1000, respectively (Daniels Arnett, Eckel, Giddings, Hayman, Kumanyika et al, 2005). Childhood obesity also increases the risk of depression, asthma and hypertension (Daniels Arnett, Eckel, Giddings, Hayman, Kumanyika et al, 2005). Katz et al. suggest nutrition education as one way to reduce and prevent childhood obesity and recommends that successful strategies will require many partners including schools, clinics, communities and families (Katz, O'Connell, Niike, Yeh, Nawaz, 2008). Recently childhood obesity has gained the attention of healthcare professionals and First Lady Michelle Obama. The "Let's Move" and "Drink Up!" Campaigns (Office of the First Lady) have brought national attention to this health crisis.

There have been innumerable studies evaluating school and afterschool childhood nutrition education programs. Taken together, evaluations of these programs document some beneficial changes in knowledge and self-reported behaviors. The following examples are relevant to the research described here as they took place in a school setting, student participants were of similar age to those in this study, and the studies assessed gains in students' knowledge as evaluated through pre and post-tests. In addition, the instructional methods of the nutrition education were similar to the program studied in that they included a food preparation component. For example, the Coordinated Approach to Child Health (CATCH) curriculum, was delivered as ten-90 minutes lessons which included an interactive nutrition lesson, preparation and tasting of a healthy snack, and physical activity (Werner, Teufel, Holtgrave, Brown, 2012). Lesson content taught how to read a food label and the importance of fruits and vegetables. Results showed a significant increase in self-reported fruit and vegetable consumption and a significant increase in students reading the nutrition facts label after program completion.

Keihner et al tested ten 50-minute nutrition and physical activity lessons delivered to low-income fourth and fifth graders in a randomized controlled trial (Keihner , Meigs, Sugarman, Backman, Garbolino, Mitchell, 2011). The effect of the curriculum, administered by the classroom teacher over 8 weeks, was

compared to a control curriculum which did not contain any of the nutrition and activity content. The intervention curriculum was modeled after California Content Standards for English Language Arts and Mathematics and its primary focus was on fruit and vegetable consumption. Results revealed a significant increase in knowledge of daily servings of fruits and vegetables and the necessary number of servings of vegetables for good health in the intervention group. This study did not specifically evaluate how well the intervention aligned with the California Content Standards for English Language Arts and Mathematics.

A quasi-experimental study by Prelip and colleagues had three conditions: intervention+, intervention and a comparison group (Prelip, Kinsler, Thai, Toller Erasquin, Slusser, 2012). Students in the intervention+ group received a nutrition curriculum as well as one of three additional curricula, teacher training and parent workshops; the intervention group received the same nutrition education curriculum and teacher training; whereas the comparison group received the nutrition education without any additional material or specific teacher training. The intervention+ group had significant increases in food group knowledge and students' attitudes and beliefs towards vegetables after adjusting for group demographic differences. A "hands on" farm to school intervention that included two nutrition classroom lessons and a visit to a local farm also showed a significant increase in understanding of the importance of fiber and that fruits and vegetables contain vitamins and minerals (Moss, Smith, Null, Roth, Tragoudas, 2013).

Katz et al tested a school-based intervention of one-45 minute session and found that it too was effective (Katz, Treu, Ayettey, Kavak, Katz, Njike V, 2014). They showed an overall 16.2% increase in food-label literacy and healthy food choices knowledge. The magnitude of effect was similar to that achieved by the 90-minute program also tested by Katz.

While there is evidence of benefits from brief school-based interventions, little is known about whether, or not, they are sustained beyond the period of active research. Given competing demands on teachers' time and limited budgets, it is possible even effective health and nutrition curricula could be displaced or discontinued once research-funded programs have run their course. Integration of nutrition education within the basic curriculum is one possible way to prevent this. And, a partnership with business, could bring new resources to schools to assure effective programs are sustained.

The purpose of this study was to adapt a brief classroom-based nutrition education curriculum to support new Washington State learning standards for 4th grade students in primary school and test the effect of the curriculum on students' gains in knowledge of math and science concepts, as well as their knowledge of nutrition. The curriculum, the "Pure Food Kids" workshop was designed by Beecher's Flagship Foundation, a not-for-profit foundation. The workshop has been delivered to numerous school districts over the past eight years, but to date there has been no systematic study of program outcomes.

This study is novel in that it tested the proposition that an intersectoral relationship, here between schools and a not-for-profit foundation, can benefit each partner. Empirical evidence of this can be used to sustain the partnership, and disseminate the program through new partnerships in the future.

Methods

Study Design and Setting

The study was a formative program evaluation of the Pure Food Kids (PFK) workshop.

It was conducted with fourth-grade students and teachers in eight public schools in Washington State where the Common Core Learning Standards are being put into full implementation by the 2014-2015 academic year (State of Washington: Office of Superintendent of Public Instruction).

Curriculum

The Washington Common Core Learning Standards have two focal areas, language arts and mathematics, and specific learning objectives for each grade level. For the purposes of this study, the PFK workshop was adapted to support the specific standards related to multiplication, fraction equivalence and ordering and grade-appropriate language.

The 2.5-hour workshop presented information about how to recognize marketing tactics, understand a food label, decode an ingredient list, improve cooking skills through preparation of a vegetarian chili and how to recognize food additives (See table 1). Student groups were given one of five food products to “investigate” and this created a highly participative workshop. An example of an investigation activity was for students to determine if there are any “red light fats” in their products. During this activity, groups identified trans fats listed on their nutrition facts label and in the ingredient list as indicated by the word “hydrogenated”. They applied each workshop concept introduced in a similar way.

Table 1. Workshop Topics and Example Content and Activities

Topic	Example Content and Activities
Marketing	-How manufacturers gain child and parent attention for products, e.g. “made with whole grains”
Food label	-Function of each of the label components
Ingredient list	-Indications of list length and order -Identification of unfamiliar ingredients
Cooking	-Preparation and tasting of vegetarian chili -Gain measurement and knife safety skills
Additives	-Reviews natural and artificial sweeteners, coloring and preservatives.

In addition to knowledge areas tested in the pre- and post-workshop student quizzes, there are several other areas in which the program aligns with the Common Core objectives. Students participate in teacher-led and group discussions in which they must report their findings back to the class. This fulfills the Common Core objective to “come to discussion prepared, having read or studied required material; explicitly draw[ing] on that preparation and other information known about the topic to explore ideas under discussion.” (Office of Superintendent of Public Instruction: Common Core Standards for English Language Arts & Literacy in History/Social Science and Technical Subject, page 24) Students are also given an opportunity to practice their public speaking skills during this report out. This supports the Common Core objective to “Report on a topic...in an organized manner, using appropriate facts, relevant descriptive details to support main ideas or themes, [and] speak clearly at an understandable pace.” (Office of Superintendent of Public Instruction: Common Core Standards for English Language Arts & Literacy in History/Social Science and Technical Subject, page 24)

Data Collection

Two Foundation instructors, trained to deliver the workshop curriculum, also administered the pre and post workshop quizzes and teacher surveys. Data were collected on the day of the workshops. The paper-and-pencil quizzes were collected and placed in a bag in the classroom. Data entry and coding was done in large batches at a later time. It was not possible to match forms to individual participants because students were given a random number to write on their pre- and post-quiz forms. Students were given both the pre- and post-quiz at the beginning of the workshop to ensure the same number was written on both. Pre-quizzes were collected prior to beginning to the lesson portion of the workshop and post-quizzes were stored in desks and out of reach during the workshop.

The quizzes contained 10 multiple choice questions and one 10-point Likert scale question assessing student’s self-reported nutrition knowledge in which the response options ranged from 1 (no

knowledge) to 10 (the most knowledge) (Appendix A and B). Four of the 10 multiple choice questions assessed objectives associated with the Common Core learning standards and six evaluated topics that were priorities of Beecher's Flagship Foundation (Appendix C and D). One additional question on the post-quiz asked students to rate how much they enjoyed the workshop; response options ranged from 1 (didn't like it at all) to 10 (loved it!). The workshop instructor read each quiz question and answer choices aloud to ensure students of all literacy levels were able to complete the quiz.

The teacher evaluation survey included questions about prior nutrition education in the classroom and teachers' perception of student knowledge gain in each of the five workshop topic areas (recall Table 1). Additional questions asked about teacher satisfaction with the workshop and with the instructor (Appendix E). Teachers ranked instructor knowledge, clarity, engagement and classroom management. A final question asked the teachers about their intention to repeat the workshop. All questions had Likert-scale response options that ranged from 1 (strongly negative) to 10 (strongly positive).

The researcher collected one piece of information about the school as a whole: specifically, the percent of students served by the free or reduced price school lunch program. This was used to approximate the income level of the school population.

This research was determined to meet the definition of exempt status from the University of Washington Institutional Review Board as it was an evaluation of an existing school-based curriculum program in which no identifying information was collected from study participants.

Participants

Study participants included 206 fourth-grade students in nine public school classrooms. In addition, nine classroom teachers completed workshop evaluations.

Statistical Considerations and Data Analysis

Data from a sample of 800 pre- and post-workshop quizzes from previous workshops showed an improvement of 25-68% depending on the question. The sample size for the present study was determined based on an expected increase of 25% in scores from pre to post quiz. With this assumption, power calculations determined a sample size of 206 would be more than adequate to determine significance at $p < 0.05$.

The PFK workshops were scheduled and delivered in cooperation with Beecher's Flagship Foundation, similar to the arrangements over the prior eight years, and thus no recruitment was required for this study. All students in classrooms that received the workshops, who completed both a pre and post-workshop quiz, were included in the analyses.

Students' responses to the multiple choice questions were scored as either correct or incorrect. All data were entered by an independent research team member into REDCap (Harris, Taylor, Thielke, Payne, Gonzalez, Conde, 2009) and exported into STATA/IC 13.0 for analyses. McNemar's tests were used to analyze proportional differences between pre and post-workshop quiz scores, using $p < 0.05$ to indicate statistical significance. In addition, the change in the number of correct responses between the pre and post-workshop quiz as well as the change in self-reported nutrition knowledge were calculated after the same time points and Spearman's rank correlation evaluated an association between these two variables. Summary statistics, means and standard deviations, were calculated for the average hours of prior classroom nutrition education as well as the teacher and student satisfaction scores.

Results

All 206 students were included in the analyses of the data but some items were skipped by some students. There was no discernable pattern in the items skipped and the item skipped most frequently was the self-reported nutrition knowledge, missing for 14 of 206 students (7%).

The workshops were taught to nine classrooms, in eight schools, by either of two instructors. The percentage of students receiving free or reduced price lunches ranged from 3.8% to 75.7% per school (State of Washington: Office of Superintendent of Public Institution). One instructor taught at least 121 students and the other taught at least 82 students. The instructor’s number was missing from the quizzes of three students (1.5%) and thus we are unable to determine the exact number of students taught by each instructor. All 206 students completed pre and post-quizzes. Likewise, all nine participating teachers completed the evaluation forms.

Changes in Students’ Knowledge

McNemar’s test revealed highly significant increases in knowledge on each of the 10 multiple choice questions. Tables 2 and 3 present the percentage of students who answered the question correctly on the pre- and post-workshop quiz and the test statistics (McNemar’s chi statistic). The greatest increases in knowledge were reflected in the questions regarding artificial food coloring, identifying sugars and how an ingredient list is organized. The questions that showed the smallest increases in students’ knowledge were how to determine the sugar content in a whole container and how to measure the same amount of a spice using two different types of measuring spoons.

Table 2: Proportion of Students who Answered Common Core Specific Questions Correctly on Pre- and Post-Workshop Quizzes

Quiz Question	Pre-Quiz % correct	Post-Quiz % correct	McNemar’s chi ²	P-value
Please look at the following nutrition facts label. How much sugar is in the entire container?	6.8%	26.3%	33.33 ¹	<0.0001
A calorie is a measurement of (multiple choice responses)	22.9%	71.2%	86.73 ¹	<0.0001
Ingredients on a food label are listed in (multiple choice responses)	11.7%	72.7%	114.05 ¹	<0.0001
What are two ways to measure ¼ teaspoon of a spice in a recipe?	20.0%	38.3%	27.94 ²	<0.0001

Note. ¹n = 205, ²n=201. Sample sizes are less than 206 due to missing data.

Table 3: Proportion of Students who Answered Flagship Foundation Specific Questions Correctly on Pre- and Post-Workshop Quizzes

Quiz Question	Pre % correct	Post % correct	McNemar's chi ²	P-value
What is the difference between a whole and processed food?	52.7%	75.6%	35.06 ¹	<0.0001
A nutrition facts label can be found on which of the following?	22.1%	66.7%	81.99 ²	<0.0001
Sugar has many names, what is one way you can tell if an ingredient is sugar?	11.7%	71.7%	119.13 ¹	<0.0001
What role do preservatives play in food?	37.3%	75.0%	68.15	<0.0001
Hydrogenated fats, otherwise known as trans fats, are (multiple choice responses)	16.5%	67.5%	94.23	<0.0001
FD&C Red #40 is made from (multiple choice responses)	14.3%	77.8%	121.47 ²	<0.0001

Note. ¹n = 205; ²n = 204. Sample sizes are less than 206 due to missing data.

Both instructors were effective in the classroom. Students' scores increased significantly when taught by either instructor. The largest difference between instructors was evident in students' responses to the quiz question that asked about two ways to measure ¾ teaspoons, and yet both groups showed highly significant gains on this question (Instructor 1: p<0.0001 vs. Instructor 2: 0.0075).

The correlation between changes in self-reported knowledge and the increase in the number of correct responses from pre to post-quiz was also statistically significant (Spearman r = 0.25; p=0.0005).

Students (n=202) reported a high level of overall satisfaction with the workshop; the mean score was 9.2 (SD =1.7) on a 10-point scale, where 1 corresponds to "didn't like it at all" and a score of 10 corresponds to "loved it!"

Teachers' Evaluation of the Workshop

Teachers reported spending an average of 1.4 hours of classroom time per school year on nutrition lessons (Mean (SD) = 1.4(1.7); range from 0 to 5 hours). Evaluations provided by the nine participating teachers supported students' self-report that the curriculum increased in students' knowledge in each of the five key workshop content areas: marketing tactics, improving cooking skills, understanding ingredient lists, understanding nutrition facts labels and food additives (Table 4). Response options for questions about each area ranged from 1 (gained the least knowledge) to 10 (gained the greatest knowledge). Teachers reported students' knowledge increased the most regarding understanding a nutrition facts label and the least for marketing, Mean(SD) = 9.4(0.5) and 8.7(1.6), respectively.

Table 4: Teachers' Report of Increases in Students' Knowledge in Each Workshop Content Area

Workshop Content Area	Mean (SD)	Range
Marketing	8.7(1.6)	5-10
Cooking skills	9.2(0.8)	8-10
Ingredient list	8.9(1.1)	7-10
Nutrition facts	9.4(0.5)	9-10
Food additives	8.8(1.6)	5-10

Note. Teacher ratings in each content area could range from 1 (gained the least knowledge) to 10 (gained the greatest knowledge)

Teachers also reported an increase in their personal knowledge of nutrition; the average rating was 6.6 (SD = 3.3) with scores that ranged from 1 (didn't learn anything new) to 10 (learned many new things). This data is not presented in table format.

Finally, teachers had very positive opinions about the workshop instructors' delivery of the program. The average ratings, presented in Table 5 below, indicate very high satisfaction; all means were above 9 points on a Likert scale that ranged from 1 (worst) to 10 (best).

Table 5: Teacher Evaluation of Workshop Instructor Quality

Teachers' Evaluation of Workshop Instructor	Mean (SD)	Range
Instructor knowledge	9.9(0.3)	9-10
Instructor clarity	9.9(0.3)	9-10
Instructor engagement	9.6(0.7)	8-10
Instructor's class management	9.3(0.7)	8-10
Likelihood of repeating workshop	9.8(0.7)	8-10

Note. Teacher ratings in each area of instructor evaluation could range from 1 (worst) to 10 (best)

Discussion

Many nutrition education interventions and programs with school-age children have reported positive effects on knowledge that is specific to the experimental curricula (e.g., Cunningham-Sabo et al, 2014, Keihner et al, 2011, Lakshman et al, 2010 Moss et al, 2013, Prelip et al, 2012 and Werner et al, 2012).

This study is the first we are aware of to examine impact on broader learning objectives, i.e., Washington State's Common Core learning objectives. We found students demonstrated knowledge gains in each of the content areas tested; Common Core learning standards as well as Foundation priorities. Our strong positive findings are especially impressive given that they were achieved in one 2.5-hour workshop and with great satisfaction from the students and teachers.

While successful overall, findings from this formative evaluation identified ways to improve the PFK curriculum further. For instance, the questions associated with the smallest increases in correct knowledge suggest specific areas in need of revision. One example is how to determine the amount of sugar in an entire package. This proved to be challenging for students but it is an important skill to master as people do not always eat only one serving and thus must understand that the numbers in the nutrition facts only reflect the one serving. Several more examples of this calculation will be added to

the workshop to give students additional practice with this concept. For the measuring spoon question, it seems that response options “a” ($1/4+1/4+1/4$ or $1/4+1/2$) and “c” ($1/4+1/4+1/4$ or a little less than one teaspoon) may have been too similar for students to differentiate. Many students chose option c instead of the correct option. It was stated in the workshop that it was important for recipe measurements to be precise, however students may have interpreted “a little less than a teaspoon” to be interchangeable with $3/4$ teaspoon. It is possible that these two questions reflected both knowledge and applied mathematics whereas other questions required simply remembering a fact or definition. Because the applied tasks reflect Common Core learning objectives, we recommend this information is emphasized even more when the curriculum is delivered in the future.

We found a significant correlation between the increase in individual students’ pre-to-post scores and self-reported knowledge. This is a welcome result that seems to indicate that students perceived their knowledge increased and it was indeed, a fact.

Several studies have demonstrated positive effects of hands-on cooking experience on food preference; this may explain, in part, the success of PFK (Cunningham-Sabo and Lohse, 2014). For example, Cunningham-Sabo and Lohse (2014) studied a nutrition intervention delivered to fourth-grade students. One group, which cooked and tasted the food they prepared, was compared with a group that only prepared the food. They found a significant increase in fruit and vegetable preference among those who cooked and tasted their food and this effect was even more pronounced among males. They also found positive effects, in both groups, with regard to increasing cooking self-efficacy, especially among those with no prior cooking experience students and improved cooking attitudes. Finally, participants of the farm to school intervention (Moss, Smith, Null, Roth, Tragoudas, 2013) also showed an increase in the number of students who self-reported vegetable consumption at school. Thus it seems that if students are directly exposed to food items and/or cooking and tasting of food products that they may be more

likely to increase their acceptability of those foods. This is important for the PFK workshop as it includes these components and these may be responsible for increasing students' increased preference for the vegetables included in the cooking and tasting activity.

Prelip et al (2012) found that the most effective form of their evaluation included teacher training. PFK workshop instructors underwent extensive training in preparation for teaching in the classroom. This may explain some of the success of this program. In addition, similarly to Moss et al (2013), the PFK workshop includes a tangible experience with food, specifically vegetables which may also have improved knowledge gain.

Along with strong positive results, there are several limitations to the study that must be considered. This was a one-time pre and post-quiz assessment and lacked assessment of nutrition knowledge retention over time. In addition, it is well established that gains in knowledge gain do not necessarily lead to behavior change in food choices. A study by Lakshman et al addresses both of these limitations (Lakshman, Sharp, Ong, Forouhi, 2010). In this study of 1133 fifth and sixth graders in the United Kingdom, intervention classroom teachers were given a nutrition education curriculum which included lessons on the food label and making healthy food choices. Control classrooms used existing nutrition education curriculum. Students had a significant increase in nutrition knowledge scores between baseline and a follow-up survey nine weeks after. In addition, participants in the intervention group reported significantly higher rates of eating a healthy diet (39.6 vs. 34.4%) or intention to try eating healthy (35.7 vs. 31.7%). This study shows it is possible to achieve longer-term benefits from classroom intervention. It is relevant to be reported here also because the design was quite similar to that of the PFK workshop. Future research should also focus on whether knowledge gains were maintained over time and if they led to behavior change.

A third limitation of this study was the inability to collect demographic data on our participants. The lack of information about participants prevents us from determining if there were any differences in the effect of the program on subgroups of students. For instance, it is possible that program made more of an impact on one gender over another or one ethnicity. Future research should consider collecting this information. However, we were able to report school level data for the free and reduced lunch program and from this can learn that this program is effective at all socioeconomic levels.

This intersectoral relationship has proven to be highly successful! Significant student knowledge gains show the value of the program which is especially critical in an era where classroom time is precious and little or no time is devoted to nutrition education.

The IOM report described characteristics of successful intersectoral partnerships and two are illustrated by this project. First, intersectoral relationships are most successful when they achieve community buy-in and are sustained over the long-term. BFF has achieved both through its eight year involvement in local schools and we believe the new tie-in to the Common Core objectives supports sustainability in the future. In addition, the Executive Director of BFF has immersed herself in community collaboratives including the Seattle School District Wellness Taskforce, and the Washington State Office of Superintendent of Public Instruction Health and Fitness Cadre of Advisors.

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Study data were collected and managed using REDCap electronic data capture tools hosted at the University of Washington. REDCap (Research Electronic Data Capture) is a secure, web-based application designed to support data capture for research studies, providing 1) an intuitive interface for validated data entry; 2) audit trails for tracking data manipulation and export procedures; 3) automated export procedures for seamless data downloads to common statistical packages; and 4) procedures for importing data from external sources.

Appendix A: Student Pre-Workshop Quiz

Pre-test

ID number: _____

Date: _____

1.) From 1-10, please circle the number that shows how much nutrition knowledge you have now:

No knowledge

The most knowledge

1 2 3 4 5 6 7 8 9 10

Please circle one answer for each of the following multiple choice questions:

2.) What is the difference between a whole and processed food?

- a. Whole foods are when you eat the whole piece of food
- b. Processed foods are better for you
- c. Whole foods are unchanged from how they are found in nature
- d. Don't know

3.) A nutrition facts label can be found on which of the following?:

- a. All foods
- b. Processed foods
- c. Only foods that are in boxes or cans
- d. Don't know

4.) Please look at the following nutrition facts label. How much sugar is in the entire container?

Nutrition Facts	Amount Per Serving		% Daily Values*		Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs.
Serving Size 1 oz (5g) Serving Per Container 4 Calories 80 Calories from Fat 5	Total Fat 0g	0%	Sodium 100mg	4%	Calories 2,000 2,500
	Saturated Fat 0g	0%	Total Carbohydrate 12g	4%	Total Fat Less than 65g 80g
	Trans Fat 0g		Dietary Fiber 0g	0%	Sat Fat Less than 20g 25g
	Cholesterol 0mg	0%	Sugars 10g		Cholesterol Less than 300mg 300mg
	Potassium 10mg	0%	Protein 0g	0%	Sodium Less than 2400mg 2400mg
	Vitamin C 10%				Total Carbs 300g 375g
					Dietary Fiber 25g 30g

- a. 40 grams of sugar
- b. 10 grams of sugar
- c. 20 grams of sugar
- d. Don't know

5.) A calorie is a measurement of:

- a. Fat found in food
- b. Energy found in food
- c. A vitamin
- d. Don't know

6.) Ingredients on a food label are listed in:

- a. Randomly, no special order
- b. In order of least amount to greatest amount
- c. In order of greatest amount to least amount
- d. Don't know

7.) Sugar has many names, what is one way you can tell if an ingredient is sugar?

- a. If it is a long word that I don't recognize
- b. If the word ends in "ose"
- c. If the word ends in "ar"
- d. Don't know

8.) What are two ways to measure $\frac{3}{4}$ teaspoon of a spice in a recipe?

- a. $\frac{1}{4} + \frac{1}{4} + \frac{1}{4}$ or $\frac{1}{4} + \frac{1}{2}$ teaspoon
- b. $\frac{1}{4} + \frac{1}{4} + \frac{1}{4}$ or $\frac{3}{8}$ teaspoon
- c. $\frac{1}{4} + \frac{1}{4} + \frac{1}{4}$ or a little less than 1 teaspoon
- d. Don't know

9.) What role do preservatives play in food?

- a. They help food stay fresh for longer
- b. They make food more nutritious
- c. They improve the flavor of food
- d. Don't know

10.) Hydrogenated fats, otherwise known as trans fats, are:

- a. Just as good as other kinds of fats
- b. Better than other kinds of fats
- c. Hard on your heart
- d. Don't know

11.) FD&C Red #40 is made from:

- a. Beets
- b. Coal tar
- c. Flowers
- d. Don't know

Appendix B: Student Post-Workshop Quiz

Post-test

ID number: _____

Date: _____

1.) From 1-10, please circle the number that shows how much nutrition knowledge you have now:

No knowledge

The most knowledge

1 2 3 4 5 6 7 8 9 10

Please circle one answer for each of the following multiple choice questions:

2.) What is the difference between a whole and processed food?

- a. Whole foods are when you eat the whole piece of food
- b. Processed foods are better for you
- c. Whole foods are unchanged from how they are found in nature
- d. Don't know

3.) A nutrition facts label can be found on which of the following?:

- a. All foods
- b. Processed foods
- c. Only foods that are in boxes or cans
- d. Don't know

4.) Please look at the following nutrition facts label. How much sugar is in the entire container?

Nutrition Facts Serving Size 1 oz (5g) Serving Per Container 4 Calories 80 Calories from Fat 5	Amount Per Serving	% Daily Values*	Amount Per Serving	% Daily Values*	*Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs.
	Total Fat 0g	0%	Sodium 100mg	4%	
	Saturated Fat 0g	0%	Total Carbohydrate 12g	4%	
	Trans Fat 0g		Dietary Fiber 0g	0%	
	Cholesterol 0mg	0%	Sugars 10g		
	Potassium 10mg	0%	Protein 0g	0%	
	Vitamin C 10%				

- a. 40 grams of sugar
- b. 10 grams of sugar
- c. 20 grams of sugar
- d. Don't know

5.) A calorie is a measurement of:

- a. Fat found in food
- b. Energy found in food
- c. A vitamin
- d. Don't know

6.) Ingredients on a food label are listed in:

- a. Randomly, no special order
- b. In order of least amount to greatest amount
- c. In order of greatest amount to least amount
- d. Don't know

7.) Sugar has many names, what is one way you can tell if an ingredient is sugar?

- a. If it is a long word that I don't recognize
- b. If the word ends in "ose"
- c. If the word ends in "ar"
- d. Don't know

8.) What are two ways to measure $\frac{3}{4}$ teaspoon of a spice in a recipe?

- a. $\frac{1}{4} + \frac{1}{4} + \frac{1}{4}$ or $\frac{1}{4} + \frac{1}{2}$ teaspoon
- b. $\frac{1}{4} + \frac{1}{4} + \frac{1}{4}$ or $\frac{3}{8}$ teaspoon
- c. $\frac{1}{4} + \frac{1}{4} + \frac{1}{4}$ or a little less than 1 teaspoon
- d. Don't know

9.) What role do preservatives play in food?

- a. They help food stay fresh for longer
- b. They make food more nutritious
- c. They improve the flavor of food
- d. Don't know

10.) Hydrogenated fats, otherwise known as trans fats, are:

- a. Just as good as other kinds of fats
- b. Better than other kinds of fats
- c. Hard on your heart
- d. Don't know

11.) FD&C Red #40 is made from:

- a. Beets
- b. Coal tar
- c. Flowers
- d. Don't know

On a scale from 1-10, please circle the number that shows how much you enjoyed this class:

Didn't like it at all

Loved it!

1 2 3 4 5 6 7 8 9 10

Appendix C: Student’s Pre-Workshop Quiz with Common Core Content Areas

Pre-test

ID number: _____

Date: _____

1.) From 1-10, please circle the number that shows how much nutrition knowledge you have now:

No knowledge

The most knowledge

1 2 3 4 5 6 7 8 9 10

Please circle one answer for each of the following multiple choice questions:

2.) What is the difference between a whole and processed food?

- a. Whole foods are when you eat the whole piece of food
- b. Processed foods are better for you
- c. Whole foods are unchanged from how they are found in nature
- d. Don’t know

3.) A nutrition facts label can be found on which of the following?:

- a. All foods
- b. Processed foods
- c. Only foods that are in boxes or cans
- d. Don’t know

Common core standards: multiply a whole number up to 4-digits by a 1-digit whole number:

4.) Please look at the following nutrition facts label. How much sugar is in the entire container?

Nutrition Facts	Amount Per Serving	% Daily Values*	Amount Per Serving	% Daily Values*	*Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs.
	Serving Size 1 oz (5g) Serving Per Container 4 Calories 80 Calories from Fat 5	Total Fat 0g	0%	Sodium 100mg	
	Saturated Fat 0g	0%	Total Carbohydrate 12g	4%	80g 25g 300mg 2400mg 375g 30g
	Trans Fat 0g		Dietary Fiber 0g	0%	30g
	Cholesterol 0mg	0%	Sugars 10g		
	Potassium 10mg	0%	Protein 0g	0%	
	Vitamin C 10%				

- a. 40 grams of sugar
- b. 10 grams of sugar
- c. 20 grams of sugar
- d. Don’t know

Common core standards: Acquire and use grade-appropriate general academic and domain-specific words and phrases, including those that signal precise actions, emotions, or states of being and that are basic to a particular topic (eg. Wildlife conservation and endangered when discussing animal preservation) Note: calorie is one of the vocabulary words that is expected to be acquired by 5th grade.

5.) A calorie is a measurement of:

- a. Fat found in food
- b. Energy found in food
- c. A vitamin
- d. Don't know

Common core standards: Extend understanding of fraction equivalence and ordering:

6.) Ingredients on a food label are listed in:

- a. Randomly, no special order
- b. In order of least amount to greatest amount
- c. In order of greatest amount to least amount
- d. Don't know

7.) Sugar has many names, what is one way you can tell if an ingredient is sugar?

- a. If it is a long word that I don't recognize
- b. If the word ends in "ose"
- c. If the word ends in "ar"
- d. Don't know

Common core standards: Extend understanding of fraction equivalence and ordering: decompose a fraction into a sum of fractions with the same denominator in more than one way:

8.) What are two ways to measure $\frac{3}{4}$ teaspoon of a spice in a recipe?

- a. $\frac{1}{4} + \frac{1}{4} + \frac{1}{4}$ or $\frac{1}{4} + \frac{1}{2}$ teaspoon
- b. $\frac{1}{4} + \frac{1}{4} + \frac{1}{4}$ or $\frac{3}{8}$ teaspoon
- c. $\frac{1}{4} + \frac{1}{4} + \frac{1}{4}$ or a little less than 1 teaspoon
- d. Don't know

9.) What role do preservatives play in food?

- a. They help food stay fresh for longer
- b. They make food more nutritious
- c. They improve the flavor of food
- d. Don't know

10.) Hydrogenated fats, otherwise known as trans fats, are:

- a. Just as good as other kinds of fats
- b. Better than other kinds of fats
- c. Hard on your heart
- d. Don't know

11.) FD&C Red #40 is made from:

a. Beets

b. Coal tar

c. Flowers

d. Don't know

Appendix D: Student’s Post-Workshop Quiz with Common Core Content Areas

Post-test

ID number: _____

Date: _____

1.) From 1-10, please circle the number that shows how much nutrition knowledge you have now:

No knowledge

The most knowledge

1 2 3 4 5 6 7 8 9 10

Please circle one answer for each of the following multiple choice questions:

2.) What is the difference between a whole and processed food?

- a. Whole foods are when you eat the whole piece of food
- b. Processed foods are better for you
- c. Whole foods are unchanged from how they are found in nature
- d. Don’t know

3.) A nutrition facts label can be found on which of the following?:

- a. All foods
- b. Processed foods
- c. Only foods that are in boxes or cans
- d. Don’t know

Common core standards: multiply a whole number up to 4-digits by a 1-digit whole number:

4.) Please look at the following nutrition facts label. How much sugar is in the entire container?

Nutrition Facts Serving Size 1 oz (5g) Serving Per Container 4 Calories 80 Calories from Fat 5	Amount Per Serving	% Daily Values*	Amount Per Serving	% Daily Values*	*Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs.	
	Total Fat 0g	0%	Sodium 100mg	4%		
	Saturated Fat 0g	0%	Total Carbohydrate 12g	4%		
	Trans Fat 0g		Dietary Fiber 0g	0%		
	Cholesterol 0mg	0%	Sugars 10g			
	Potassium 10mg	0%	Protein 0g	0%		
	Vitamin C 10%					
			Total Fat	Less than 65g		Calories 2,000
			Sat Fat	Less than 20g		80g
			Cholesterol	Less than 300mg		300mg
		Sodium	Less than 2400mg	2400mg		
		Total Carbs	300g	375g		
		Dietary Fiber	25g	30g		

- a. 40 grams of sugar
- b. 10 grams of sugar
- c. 20 grams of sugar
- d. Don’t know

Common core standards: Acquire and use grade-appropriate general academic and domain-specific words and phrases, including those that signal precise actions, emotions, or states of being and that are

basic to a particular topic (eg. Wildlife conservation and endangered when discussing animal preservation) Note: calorie is one of the vocabulary words that is expected to be acquired by 5th grade.

5.) A calorie is a measurement of:

- a. Fat found in food
- b. Energy found in food
- c. A vitamin
- d. Don't know

Common core standards: Extend understanding of fraction equivalence and ordering:

6.) Ingredients on a food label are listed in:

- a. Randomly, no special order
- b. In order of least amount to greatest amount
- c. In order of greatest amount to least amount
- d. Don't know

7.) Sugar has many names, what is one way you can tell if an ingredient is sugar?

- a. If it is a long word that I don't recognize
- b. If the word ends in "ose"
- c. If the word ends in "ar"
- d. Don't know

Common core standards: Extend understanding of fraction equivalence and ordering: decompose a fraction into a sum of fractions with the same denominator in more than one way:

8.) What are two ways to measure $\frac{3}{4}$ teaspoon of a spice in a recipe?

- a. $\frac{1}{4} + \frac{1}{4} + \frac{1}{4}$ or $\frac{1}{4} + \frac{1}{2}$ teaspoon
- b. $\frac{1}{4} + \frac{1}{4} + \frac{1}{4}$ or $\frac{3}{8}$ teaspoon
- c. $\frac{1}{4} + \frac{1}{4} + \frac{1}{4}$ or a little less than 1 teaspoon
- d. Don't know

9.) What role do preservatives play in food?

- a. They help food stay fresh for longer
- b. They make food more nutritious
- c. They improve the flavor of food
- d. Don't know

10.) Hydrogenated fats, otherwise known as trans fats, are:

- a. Just as good as other kinds of fats
- b. Better than other kinds of fats

c. Hard on your heart

d. Don't know

11.) FD&C Red #40 is made from:

a. Beets

b. Coal tar

c. Flowers

d. Don't know

On a scale from 1-10, please circle the number that shows how much you enjoyed this class:

Didn't like it at all

Loved it!

1

2

3

4

5

6

7

8

9

10

Appendix E: Teacher Post-Workshop Evaluation

Beecher’s Flagship Foundation: Pure Food Kids Workshop

Thank you for participating in our workshop. Please take a moment to evaluate this class. We appreciate your comments!

Teacher: _____ Date: _____ School: _____ Grade: _____

This school year, how many hours did you spend on nutrition in this classroom prior to today? _____

How would you rate the overall content of this workshop (circle one):

Too Elementary				Just Right				Too Advanced	
1	2	3	4	5	6	7	8	9	10

On a scale from 1-10 (1=gained the least knowledge and 10=gained the greatest knowledge)

Please rate the amount of knowledge gained by students on each of the following workshop topics

Food marketing: 1 2 3 4 5 6 7 8 9 10

Nutrition facts label: 1 2 3 4 5 6 7 8 9 10

Ingredient lists: 1 2 3 4 5 6 7 8 9 10

Cooking skills: 1 2 3 4 5 6 7 8 9 10

Food additives: 1 2 3 4 5 6 7 8 9 10

Please provide any feedback about the workshop content:

Is this the first year you have included the workshop in a classroom? Yes No

Do you feel you learned something new about food labels, food additives or whole foods?

Didn’t learn anything new			Learned a few new things				Learned many new things		
1	2	3	4	5	6	7	8	9	10

Workshop instructor name: _____

Please rate the instructor on a scale of 1 to 10 (1=worst and 10=best)

Knowledgeable 1 2 3 4 5 6 7 8 9 10

Engaging 1 2 3 4 5 6 7 8 9 10

Clear 1 2 3 4 5 6 7 8 9 10

Classroom management 1 2 3 4 5 6 7 8 9 10

Other comments about the instructor:

How likely are you to repeat this workshop?(1=not likely and 10=Definitely) 1 2 3 4 5 6 7 8 9 10