FORMATIVE EVALUATION OF A STEAM AND NUTRITION EDUCATION SUMMER PROGRAM FOR LOW-INCOME YOUTH

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FORMATIVE EVALUATION OF A STEAM AND NUTRITION EDUCATION SUMMER PROGRAM FOR LOW-INCOME YOUTH

BY

JACQUELYN POTVIN

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN NUTRITION AND FOOD SCIENCES

UNIVERSITY OF RHODE ISLAND

2021
MASTER OF SCIENCE THESIS

OF

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2021
Objective: To conduct an expert content review of the Project stRIde curriculum to assess the content, cultural sensitivity, feasibility, and curriculum standard adherence to inform revisions to the curriculum. Design: A formative evaluation was conducted from May-July 2020. Data from online surveys and virtual interviews were collected from an expert review panel. Setting: Surveys and interviews were completed virtually. Participants: Nine experts spanning the fields of nutrition education, cultural competency, elementary education, summer youth programming, and STEM outreach were recruited to participate in the survey and virtual interviews. Main Outcome Measures: Experts completed a 63-item questionnaire containing open- and closed-ended questions covering the lessons followed by virtual interviews. Questions spanned from content correctness and age-appropriateness, cultural sensitivity, feasibility for time, and other strengths and limitations. Analysis: Interviews were recorded, transcribed, and coded in NVivo by two coders. An inductive approach was used to create a codebook and identify themes from the surveys and interviews. Quantitative data from the surveys are expressed as percentages. Results: All nine experts contacted completed the survey and interview. Core themes were identified: effectively promoting youth engagement, increased lesson guidance or support needed, activity difficulty for age, time, confidence in teaching lessons, cultural appropriateness, strengths of curriculum in promoting STEAM education and innovation. Reviewers agreed that the lessons were accurate, incorporated STEAM concepts, and were culturally appropriate for the population. Conclusions and Implications: A content review by a diverse panel was an effective way to develop an engaging, age-appropriate STEAM and nutrition education curriculum.
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PREFACE

This thesis was prepared according to the University of Rhode Island graduate school Manuscript Thesis Format and follows the author guidelines for The Journal of Nutrition Education and Behavior. Upon submitting this thesis to the graduate school, the manuscript may be submitted for publication.
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CHAPTER 1

MANUSCRIPT

“Formative Evaluation of a STEAM and Nutrition Education Summer Program for Low-Income Youth”

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INTRODUCTION

Project Science and Technology Reinforced by Innovative Dietary Education (Project stRIde) intends to reach low-income and racially and ethnically diverse youth from urban areas. In its pilot year, incoming 4th and 5th grade students that attend a summer camp program at the Boys and Girls Club (BGC) of Providence and Newport, RI are the target population for Project stRIde. Many of these students face inequities in education and health due to their socioeconomic status and/or their race or ethnicity. The students of Providence Public School District (PPSD) and Newport Public School District (NPSD) are diverse and a high proportion are eligible for free or reduced-priced lunches (FRPL) (Table 1).1-3 Students from Providence and Newport are considered at risk for not meeting academic achievement standards in STEM subjects and at risk for diet-related chronic diseases as evidenced by academic achievement data and health outcomes in this population.4-7

Academic achievement data from the 2018-2019 Next Generation Science Assessment (NGSA) and RI Comprehensive Assessment System (RICAS) mathematics section were assessed in fifth grade students in Providence and Newport. The scores from these assessments show that the majority of fifth graders in PPSD and NPSD are partially meeting expectations or not meeting expectations in both the NGSA and RICAS mathematics exams.8,9 The student proficiency levels from PPSD and NPSD are substantially lower than the state average.10 Considering Rhode Island’s statewide population is 83.6% white,11 the data are consistent with academic achievement disparities among low-income, racially and ethnically diverse students.6,12
Racially and ethnically diverse and low-income students not only experience disparities in academics, but in health outcomes as well. Racial and ethnic minority groups in the U.S. are more likely to experience poorer health and higher morbidity and mortality rates. A high incidence of overweight and obesity is one of the main conditions seen in these populations, which can increase risk for cardiovascular disease, hypertension, Type II diabetes, and other chronic diseases. In RI, 45% of Hispanic children experience overweight or obesity, followed by 37% of non-Hispanic Black children, as compared to 30% of all RI children. Obesity and overweight affect 40% of children in Providence and 36-40% in Newport, overall.

Project stRIde was designed to target underserved populations. A formative evaluation of Project stRIde was conducted to obtain valuable feedback from a diverse group of experts from several fields. Several studies found a diverse group of experts useful in reviews of programs containing several different domains such as nutrition education and physical activity. These experts were especially beneficial in identifying changes to feasibility of the program in a certain setting and time period, availability of resources, and accuracy of the program.

Methods of garnering feedback vary in the literature, though many determined either in person, phone, or virtual interviewing to be effective compared to surveys. Experts in this study participated in a content review of the curriculum by means of surveys and virtual interviews, which methods have been supported by the literature. A common protocol used in research to evaluate curricular materials is developing interview questions, using the strategy of member checking, transcribing interviews, developing a codebook, and coding interviews. Similarly, members of
the Project stRIde research team designed a few broad interview questions with specific probes for individuals in each area of expertise. Luesse and Contento used online surveys to assess attitudes towards each lesson in a curriculum, a strategy adopted by Project stRIde researchers and outlined in this paper.\textsuperscript{14} Qualitative data analysis in this study followed a similar method, where a codebook was established, the interviews were transcribed and coded, and several main themes were developed.\textsuperscript{14-16}

Many programs have successfully implemented science, technology, engineering, arts, and mathematics (STEAM) and nutrition interventions in the past.\textsuperscript{17-20} STEAM education connects the five concepts and allows students to learn the ways in which they naturally intersect with each other.\textsuperscript{21} STEAM education is important for critical thinking, problem solving, and creativity.\textsuperscript{21} Very few programs have incorporated both STEAM and nutrition education in interventions designed for low-income and racially and ethnically diverse youth.\textsuperscript{19,20} Further, no known STEAM and nutrition education programs are delivered in a summer camp setting. Previous studies of programs that target a low-income, racially/ethnically diverse population with STEAM intervention programs show positive effects on STEAM subject knowledge.\textsuperscript{17,18} Roseno, et al. and Carraway-Stage, et al. found increases in nutrition knowledge and four areas of mathematics skills compared to a control group with no intervention in a food-based science curriculum.\textsuperscript{19,20} Overall, while successful, these programs do not specifically address both the academic and health disparities in this population.

Academic focused summer enrichment programs are important for students
from low-income families because they reinforce information learned over the school year. Summer learning loss, the losing of information obtained during the school year over summer vacation, has been observed in all school-age populations but particularly in students from low-income and racially/ethnically diverse families. Studies show that the summer between 5th and 6th grade accounts for the largest deficit in summer learning loss in math, with 84% of students experiencing information loss. The risk of weight gain and fitness loss is increased along with learning loss during the summer months.

Overall, educational and health disparities are apparent in low-income, racially and ethnically diverse youth. While there are multiple STEAM and nutrition education interventions delivered to this population, studies that combine the two in a summer setting are lacking. These programs are important to inform and establish healthy eating habits while reinforcing information learned during the school year. Therefore, the aim of this study was to conduct an expert content review of the Project stRIdE curriculum with experts from various fields. The expert content review was expected to provide valuable feedback about the content, cultural sensitivity, overall feasibility, and curriculum standard adherence that would inform necessary revisions to the curriculum. This paper describes the expert content review process and the outcomes.
METHODOLOGY

Study Design and Overview

A formative evaluation of the Project stRIde curriculum was performed using a diverse expert content review panel consisting of university professionals, teachers, and community partners. The Project stRIde curriculum contains six, 1.5-hour lessons incorporating STEAM and nutrition concepts. Lessons aim to both introduce and reinforce concepts that align with U.S. Common Core math and Next Generation Science Standards for fifth and sixth grades. Project stRIde will be piloted at Boys and Girls Clubs (BGC) summer camps in Providence and Newport, Rhode Island. The pilot of Project stRIde will take place during the second year of a 5-year USDA Children, Youth, and Families at Risk (CYFAR) grant. Due to COVID-19 social distancing restrictions, Project stRIde will pilot Summer 2021 instead of its intended start date of Summer 2020. STEM knowledge and self-efficacy for asking for fruits and vegetables will be measured through surveys, and fruit and vegetable consumption will be measured through the Veggie Meter in the Project stRIde pilot and compared to a control group. The research team conducted this formative evaluation to strengthen the program design in the first year of the CYFAR grant before the pilot of the study takes place this summer with a quasi-experimental study taking place in subsequent years. The program will be facilitated by a CYFAR Nutrition Educator and a URI 4-H Outreach Specialist. The University of Rhode Island’s Institutional Review Board granted approval of this research study. A timeline of the main components of this study is outlined below.
**Participants and Recruitment**

Nine experts were identified to complete a review of the Project stRIde curriculum by online survey and virtual interview. Teachers and education specialists were selected through previous relationships with URI Supplemental Nutrition Assistance Program- Education (SNAP-Ed) from schools across the state. These schools ranged from charter schools, Catholic schools, and public schools in low-income areas. Community partner experts were recruited via email by members of the research team to participate in the study. Community partners hold positions in fields related to STEAM or nutrition outside of the education setting. All reviewers were offered a $50 e-gift card upon completion of both survey and interview as a “thank you” for their time. Before interviews began, each reviewer provided oral consent to be included in a research study and to have their careers identified. Table 2 shows the professions of each expert and if they were identified as a teacher/education expert or community partner.

**Curriculum Development**

The Project stRIde curriculum development began in October 2019 with a draft
completed in April 2020. Curriculum development was led by two Nutrition Educators (Registered Dietitian Nutritionists) along with a 6th grade NPSD science teacher with over nine years of experience that worked closely with members of the research team. The six hands-on, technology-enhanced lessons were designed to align with U.S. Common Core Standards and Next Generation Science Standards for fifth and sixth grade. Each lesson aims to combine STEAM content with nutrition education through a different theme each week. A time frame of 1.5 hours was decided on after consultation with camp staff. The curriculum development team created STEAM and nutrition education materials including handouts, science experiments, hands-on activities, and technology-based activities to properly convey the information being taught in the program and to cater to the target population. The lessons provide innovative and unique teaching strategies such as videography, gardening, building, and cooking.

An example of one of the lessons is Lesson 3: Hydration and Think Your Drink. Activities in this session teach the importance of water in the body and benefits of decreasing sugar sweetened beverage consumption. Youth learn the functions of water in the body and hydration states. Math is incorporated through an activity in which participants calculate the sugar intake from these beverages over one week, month, and year. A full description of lessons is provided in Table 3.

After the pilot year, the BCG camp staff will be trained on the curriculum and offered support by members of the research team. The program was designed to be adaptable for administration by instructors without a STEAM or nutrition background.

*Expert Review Survey Development*
Upon completion of the curriculum, the expert content review survey was designed in May 2020 and a cognitive interview was performed with one member of the research team and one Nutrition Educator from URI SNAP-Ed. Following a similar method used by Baker, McGirr, and Auld, the online survey contained 57 closed-response items rated on a 4-point Likert scale (Strongly Disagree=1, Disagree=2, Agree=3, Strongly Agree=4) with 6-10 questions per lesson. The questions address material adequacy, feasibility for time restraints, adherence to lesson objectives, teaching strategies, STEAM concept incorporation, correctness of material, and cultural appropriateness (Appendix B). Each question has the option for reviewers to add comments. Lastly, reviewers provided their overall rating of the lesson on a scale of 1 (Poor) to 4 (Excellent) and were invited to comment on its overall strengths, areas for improvement, or pose questions.

The reviewers were recruited by email in early May 2020 requesting their participation in the expert content review and were provided an overview of expectations. Once the reviewers confirmed they were willing to participate, they were sent the content review package through email. This package consisted of an informational welcome letter, instructions for completing and submitting the survey, the survey itself, and the six lesson plans including ancillary materials such as video links, handouts, and parent newsletters. The latest day for survey submission was set at June 10th, 2020.

**Interview Facilitation**

After the reviewers completed their surveys and sent back the completed version to the research team, one-hour virtual Zoom interviews were scheduled with
two members of the research team during July 2020. Both community partners and education professionals were asked the same four questions with additional probing, which are available in Table 4.

These questions were designed to expand on areas of curriculum development that the survey lacked, or the research team sought more information about. Along with the general questions, experts were asked more specific questions in response to their answers to the survey. For example, one teacher noted in the survey that a particular handout in Lesson 3 may not be age-appropriate for the intended population. The interview facilitators asked if she had any ideas to make this activity more rigorous and age appropriate. In order to ensure the accuracy and validity of the feedback from the survey, the interview facilitators completed member checking with the main ideas from each reviewer’s survey. The main points from each reviewer’s survey were summarized and experts were asked questions based on this summary to ensure the research team was interpreting information correctly.28

After the interview, the experts were thanked for their time and were asked if they would like to be provided with an updated curriculum once all of the revisions are made. Experts were provided an e-gift card upon completion of the interview.

Data Analysis

Quantitative scores from the surveys were synthesized as the first step of the data analysis process. Participant scores were expressed as means (possible range=1-4) with standard deviations and are categorized for analysis by survey domain: learning objectives addressed, lesson activities relate to learning objectives, material adequacy for 5th grade level, material feasibility for time frame, incorporation of
STEAM concepts, lesson/material adequacy, variety of teaching/learning strategies used, and cultural appropriateness. Certain domains that did not directly relate to specific lessons were not included in the survey. For example, Lesson 6 is not content-heavy and therefore domains such as incorporation of STEAM concepts were not included as items on the survey.

The virtual interviews were initially audio- and video-recorded before being sent to a professional transcription service to allow for more accurate coding. Once the interviews concluded, a codebook was established using both deductive and inductive approaches based on the topics discussed in the interviews and information gathered from surveys before analysis of interview data began. Many codes were originally established based on feedback derived from surveys, however members of the research team had to add several codes after observing the participant feedback from the interviews which the original codes did not cover. Two of the interview transcripts were coded by two members of the research team in order to identify any significant differences in coding. As the two members of the research team began coding, they added in several codes to the original codebook to expand on themes and topics discussed. After each coder worked in independent documents to assign codes to the two interviews, the documents and codebook were transferred to NVivo (QSR, Release 1.3.2) for analysis. After agreement was reached, one member of the research team coded the remaining interview transcripts within NVivo.

Analysis for the qualitative data within this study was completed primarily using a deductive content analysis. Researchers constructed the codebook mainly based on predetermined ideas or concepts that may have arose during data collection,
though several codes were added in after reviewing the data. A content analysis allowed the research team to identify trends in the qualitative portions of survey and interviews through coding of transcripts. It is important to note that intercoder reliability tests were run to establish validity of the codebook and coding methods. This study analyzed the manifest content of the text since direct quotes were pulled from the transcripts and used in data presentation. The content analysis approach helped to shape themes from qualitative data until seven final themes were decided on.
RESULTS

To provide background information, participant recruitment strategy and demographics are explained in this section. Feedback from the experts is categorized by themes constructed after collecting data from the surveys and virtual interviews. When applicable, the distinction between community partner and teacher/education specialists was made to separate the differing points of few of the two types of professions. Quantitative data from the surveys are explained first, followed by qualitative data from the interviews. Data from the survey is found in Table 5. Main supporting quotes from interviews and survey along with key takeaways from these quotes are found in Table 6.

**Participant Recruitment and Demographics**

Out of the nine experts recruited all of them completed both the online survey and the virtual interview. Participant professions are reported in Table 2. For purposes of the analysis, experts were categorized as community partners (n=4) or teachers or education specialists (n=5). Teachers and education specialists were all familiar with Common Core and Next Generation Science Standards for Rhode Island due to experience teaching locally in elementary and middle schools. At the time of the study, three of the teachers worked in schools with large numbers of racially and ethnically diverse students and/or students from low-income households. Three of the community partners also held professions that involved working with the program target population. Years of experience among the experts ranged from 1.5 years to 17 years. Overall, the participants had a combined total of 77 years of experience.

**Inter-Rater Reliability**
An inter-rater reliability test was run using a coding comparison in NVivo (QSR, release 1.3.2). One member of the research team ran the analysis by completing a coding comparison in NVivo using two separately coded interview transcripts. The inter-rater reliability test assessed the two coder’s reliability, in which the overall unweighted kappa value was calculated to be 0.83, indicating strong agreement.

Survey Data

All nine participants ranked their agreement to the statements provided in the survey for each lesson on a 4-point Likert scale (Strongly Disagree=1, Disagree=2, Agree=3, Strongly Agree=4). Therefore, the possible range of mean scores was 1-4. Written responses and comments from the survey were coded and included in theme generation. This section presents the results of the quantitative data from closed-response questions. Several domains pertaining to the lesson material were excluded from select lessons in the survey because these activities have been previously used with similar audiences as part of the SNAP-Ed curriculum. They underwent minor changes to incorporate STEAM concepts, therefore feedback was not needed on these items. Several domains are excluded from lesson 6 because this lesson does not introduce new concepts. Instead, this lesson focuses on a ‘showcase’ of a culmination of all concepts learned throughout the other lessons. Eight domains included in the survey were analyzed, categorized by domain, and expressed as mean values with standard deviations (Table 5). The questions pertained to learning objectives addressed, how lesson activities relate to learning objectives, material adequacy for 5th grade level, material feasibility for time frame, incorporation of STEAM concepts, lesson/material adequacy, variety of teaching/learning strategies used, and cultural
Learning Objectives Addressed

The statement, ‘The three learning objectives are clearly addressed throughout this lesson’ was the first statement on the survey reviewers were asked to indicate their agreement with. This question was asked about all six lessons. Many reviewers strongly agreed or agreed to this statement with high mean scores of 3.89 (SD=0.33) and 3.78 (SD=0.44) for lessons 3 and 4, respectively.

Lesson Activities Relate to Learning Objectives

To explore the relationship between learning objectives and activities within the lessons, reviewers were asked if the specific lesson activities related to the learning objectives for Lessons 1-5. The lowest scoring lesson was lesson 4 (3.47 ± 0.72), in which reviewers rated if two of the activities within the lessons related to learning objectives. Overall, this category scored highly among reviewers.

Material Adequacy for Fifth Grade Level

To gauge the age appropriateness of the lessons, experts were asked to rank their agreement to the statement, ‘The material in this lesson is adequate for a 5th grade academic level. (Ex. Meets Common Core and Next Generation Science Standards, appropriate for reading level, etc.)’ on the survey. The responses to this question varied by lesson. For Lesson 2 (3.33 ± 0.71), one reviewer selected Disagree with the remaining choosing Agree or Strongly Agree. Lesson 4 showed the largest variance with several reviewers selecting Disagree for this question and scored a mean value of 3.22 (SD=0.97). These questions surrounding material adequacy for a 5th grade level were not included for lessons 3 and lessons 5 because several of the
activities have been practiced before with this age group through SNAP-Ed programming.

Material Feasibility for Time Frame

The statement, ‘The material (activities, lesson, handouts, videos) is feasible for 1.5 hours of program time’ was presented to reviewers in all six lessons. This category showed the lowest mean values of all domains. The lowest mean scores were for lessons 1 (3.22 ±0.67) and lesson 2 (3.22 ±0.82). Lesson 6 scored highly (3.67 ± 0.50); however, this is the only lesson that doesn’t introduce new concepts.

Incorporation of STEAM Concepts

For the five content lessons (excluding lesson 6), experts were asked if each lesson incorporated one or more STEAM concepts. This statement received the highest proportion of reviewers that chose Strongly Agree than any other survey item. For all five lessons, the same high mean and standard deviation of 3.78 (SD=0.44) was reached, indicated very strong agreement among reviewers.

Lesson and Material Accuracy

Reviewers were asked if the materials, concepts, and lessons taught in the program were correct to the best of their knowledge. This domain was assessed for lessons 1-5, since lesson 6 does not introduce any new concepts. This was another high-scoring survey item in which lessons 2,3 and 5 all achieved a mean value of 3.78 (SD=0.44).

Variety of Teaching and Learning Strategies

To address student engagement in the survey, the experts were asked to respond to the statement ‘A variety of teaching and learning strategies are used in this lesson.'
(Ex. Kinesthetic, spatial, audiovisual, verbal)’ for all six lessons. Experts responded similarly to this question, with only one expert that chose Disagree for lesson 1. The remaining reviewers chose Agree or Strongly Agree.

Cultural Appropriateness

The last question experts were asked for each lesson is if the lessons were appropriate for a racially/ethnically diverse group (primarily Hispanic or Latinx) group of students. Scores for this domain varied with lesson 2 (3.33 ± 0.05) being the lowest scoring lesson and lessons 3 and 4 (3.67 ± 0.50) the highest.

Themes Generated from Interviews

After transcription and coding, seven main themes were derived from the interviews and survey: (1) effectively promoting youth engagement, (2) increased lesson guidance or support needed, (3) activity difficulty for age, (4) time, (5) confidence in teaching lessons, (6) cultural appropriateness, and (7) strengths of curriculum in promoting STEAM education and innovation.

Effectively Promoting Youth Engagement

The importance of student engagement in summer programs through group work, variety, and student choice was emphasized by many of the experts. Both community partners and teachers agreed that incorporating more group work would be an effective way to establish responsibility, autonomy, and engagement of all participants. This may be especially important for shy students or students that learn English as a Second Language (ESL).

It's just giving each individual kid an opportunity to be a leader, and talk about what the content is because inevitably, when you have a large group, there's
going to be a few kids that take over the attention of everybody. And then those
kids who are a little shyer don't end up speaking up. So, the focus of doing
those small group activities is so that you have everyone engaged and be part
of the conversation as much as possible. -Community Partner

Both teachers and community partners found this curriculum engaging since it
includes a wide variety of subjects. Between the STEAM and nutrition education
concepts, it has areas that will attract students with a multitude of interests.

Another important element of engagement mentioned by several community
partners is student choice. Allowing students to choose what they would like to spend
more time on can strengthen the program design. Reinforcing the previous lessons and
the purpose of the overall program can further contribute to student engagement. Due
to the content-packed lessons in the curriculum, some community partners believed
this area could use improvement.

*I think it's just reinforcing what the purpose intention of the program is. I
really think it's important for kids to buy in, why am I doing this program?
What am I getting out of it? And for the teacher to reinforce each week that this
is what we learned last week, this is how it's going to connect to what you're
learning this week. This is why it's important to learn it. And do you feel like
you learned that? -Community Partner*

**Increased Lesson Guidance or Support Needed**

Instructors and students should feel that they have enough material and
understanding to deliver or receive this curriculum. Most teachers felt that
supplemental materials, such as instructional videos or pictures, would be beneficial.
These instructional materials would be especially useful for instructors on harder to teach lessons, such as the ‘Reaction Difference Between Baking Soda and Baking Powder with Vinegar’ experiment in lesson 5. Teachers also mentioned that providing lesson support would save time and cater to students with visual learning styles.

*I think if you could do a recorded video, um, for anyone who might be taking this on who doesn't necessarily feel comfortable, I think it would help a lot.*

-Teacher

*We work with quite a few science curriculums and they have what they call teacher prep videos with somebody teaching the lesson and doing, here's how you set this up and here's how you pour this container in. And here's some questions you might ask. I find those very helpful.*

-Teacher

Varying responses were obtained from community partners; one community partner agreed on the importance of including supplemental videos for the lessons, while another deemed them unnecessary due to the clarity of the lessons.

**Activity Difficulty for Age**

In order to gauge the age appropriateness of the lessons, experts were asked questions about specific lessons and the overall curriculum. Though there were several lessons flagged as not appropriate for this age group, the overall curriculum was deemed age appropriate by reviewers.

Teachers were expected to comment on RI math and science standards in interviews since they are knowledgeable about the standards in this population, however only one teacher expressed her opinion on standard adherence, stating that the curriculum met the standards for this population. Only one community partner
commented on the activity difficulty for this age group in an interview. Some concepts communicated by teachers as potentially being too advanced for this age group included multiplication, division, and some science and nutrition skills.

_A lot of them might not even have background knowledge that are necessary to talk about more like upscale topics of nutrition._ - Teacher

Specific activities, such as the chemical bonding activity in lesson 4, were discussed multiple times by reviewers.

_I think especially the chemical bonds one. I teach some of that in 6th grade, but then they go into more like more structured in 7th grade so an introductory thing might be helpful._ - Teacher

**Time**

Project stRIde will be allotted 1.5 hours once per week at the Boys and Girls Clubs. Overall, the experts believed that the amount of material in each lesson would be difficult to fit into this time period. Experts warned that activities often take longer than expected and that giving the students ample amounts of time to “dive into” activities they are interested in is important. Most agreed that 1.5 hours may not be enough time for participants to absorb and understand the content.

_I think that the biggest red flag that I noticed would be the time. I think you guys had a lot of really good ideas and activities in there. But it seemed like you wouldn't have enough time to do most of the activities._ - Teacher

_I just don’t know if one hour or an hour and a half is really going to be enough time for kids to digest all of it._ - Community Partner

Some suggestions for time management from the experts included practicing
activities beforehand, keeping the students on track, creating supplemental videos for students, and spending more time on the activities that will engage students the most. Having extra tasks for students that may finish before the majority of the class is another effective strategy mentioned. Time is a concern moving forward with this project, since original creators of the curriculum will not be present in future years. Many reviewers suggested ordering the lessons by importance for future facilitators but making sure none are labeled as “optional.”

_Instead of wording it as optional, you could say that ‘These are the order that you have to complete the activities.’ And you rank them from the most important ones. That way they feel an importance to get it done._ - Teacher

**Confidence in Teaching Lessons**

This program is designed to be taught by non-nutrition or STEAM professionals in future years, therefore the teacher and community partner input on their confidence teaching the lessons was vital. Overall, all of the reviewers expressed that they would feel confident delivering the program themselves, although two community partners would prefer extra training or an extra set of hands. Teachers primarily responded with “Yes, definitely” or “Yes, absolutely” when asked if they would be confident delivering the program. While some community partners also gave concrete, affirmative answers, the two that required extra assistance stated the following:

_I would. I definitely would not feel comfortable teaching alone just because the activities are very elaborate in a good way. It just means that you need to have the prepared support to further enforce the messages that you're teaching in_
the curriculum. But I would feel ready. I would feel comfortable. I would just need to make sure that I have enough support with my staff. - Community Partner

I think with some training. I mean I feel pretty confident, but there’s just a few parts where I don’t know exactly what I would do at this point, especially with the science experiment one…. - Community Partner

**Cultural Appropriateness**

The cultural appropriateness of the curriculum was an important consideration because Project stRIdE aims to target students from low-income, racially and ethnically diverse families. Experts mainly agreed the curriculum was culturally appropriate, with a few suggestions to improve this area. A teacher that works with English Language Learners (ELL), commented:

...*You had a lot of what the DOJ is suggesting be done with working with kids who have English as a second language.* - Teacher

Several reviewers commented on the cultural appropriateness of the curriculum in interviews. Members of the research team specifically chose one reviewer that specializes in cultural competency to provide insight. She recommended providing sample careers in STEAM fields that children from racially and ethnically diverse backgrounds may not commonly be exposed to. She also suggested providing more representation of different ethnicities in photos and giving the students the opportunity to discuss the different cultural foods and beverages they consume at home.

*And especially if you can (see it) from like the cultural perspective, because you have kids coming from a wide range of different environments and places.*
Getting them to talk about why they don't have sugar in their household, or why sugar isn't as important, just it's a conversation amongst kids and maybe it'll open up something that kids can think about. - Community Partner

**Strengths of Curriculum in Promoting STEAM Education and Innovation**

Two of the main strengths of this curriculum that were commented on by reviewers was the incorporation and promoting of STEAM education and the innovative design of the program. The experts also acknowledged the innovative and exciting format of the program. The curriculum was described as “relevant,” “fun,” and “informed.”

*It was just exciting to see like another element brought to it. I think it’s the new way to teach everything. I think it’s very new, exciting, and relevant.*

- Community Partner
DISCUSSION

This study aimed to conduct an expert content review of the Project stRIde curriculum with experts from various fields. Project stRIde is a 6-week, 1.5 hours per week summer program for 4th and 5th graders that will be piloted in summer 2021 as part of a 5-year CYFAR grant. Through a questionnaire and virtual interview, the nine experts were able to provide beneficial feedback that informed revisions to the curriculum before the pilot. These revisions are highlighted at the end of this discussion. Saturation of comments by experts was easily reached and used to generate themes because the same topics and concerns were generally discussed by each reviewer. Overall, results showed that the main concern was the length of the program given the 1.5-hour time frame. Experts expressed the importance of incorporating more opportunities for youth engagement and the need for increased support in some of the lessons. They agreed that they would feel confident teaching the curriculum and that the curriculum can be considered culturally appropriate for the intended, primarily Hispanic population. While some experts declared some specific activities within the lessons as inappropriate for the intended audience, the program was highly rated overall, especially relating to the promotion of STEAM education and innovation.

There is a lack of research surrounding the formative evaluation process of a program related to STEAM and nutrition. Due to the unique nature of this program and the methods used in the formative evaluation process, this study is important to exemplify how an expert content review can successfully inform future programming. Though research is lacking in this area, the study showed connections to several other studies.

Several of the themes constructed after the expert review of the curriculum are
seen throughout the literature such as promotion of student engagement, age-appropriateness of activities, time, confidence in teaching lessons, and cultural competency. In a review of the Project stRlde curriculum, the promotion of student engagement and student choice was commonly mentioned by teachers and community partners in this study. Experts emphasized the idea of allowing students to choose where the most time was spent and promoted group work where possible. Similar themes were established in two other studies, performed by Luesse and Contento, and Baker, McGirr, and Auld.\textsuperscript{14,16} In these studies, panels of experts commented on the emphasis of participant responsibility for learning, therefore promoting engagement in the review of the \textit{In Defense of Food} and \textit{Eating Smart-Being Active} curriculums.\textsuperscript{14,16}

Though the literature supporting the effect of student engagement and group work on students that learn English as a second language is mixed,\textsuperscript{31} many teachers comment on the effectiveness of engagement in this population for language development.

Another important topic discussed by reviewers in other studies was materials, often in the form of handouts, pictures, videos, or those used for activities.\textsuperscript{15,16,32} It has been found that materials can strengthen student engagement as well as curriculum delivery, therefore are extremely important to a program.\textsuperscript{16} For example, providing more engaging methods of delivering content such as photographs and visuals will keep students motivated and engaged.\textsuperscript{16} In a study conducted by Franzen-Castle et al., experts were recruited to evaluate a nutrition education program in several different phases after its pilot year.\textsuperscript{32} After receiving feedback about the current materials, researchers added in updated graphics and online accessibility to the curriculum, stating the main purpose of the graphics is to keep information relevant, engaging, and
appealing to students with various learning strategies.\textsuperscript{32} Lisson and colleagues found that materials were a main concern for pre-school \textit{Head Start} instructors.\textsuperscript{15} Instructors often wished they had more or updated books relating to the curriculum.\textsuperscript{15} Graphics and materials were not commonly referenced in our study, possibly due to the materials already being designed to appeal to a wide variety of learning strategies and to engage students. The learning style category scored highly on the expert review survey, indicating that the materials were engaging to a variety of learners and teachers. Likewise, the survey category on correctness of material content was high scoring across lessons. In other studies, age-appropriateness of lessons was not identified as an important theme.\textsuperscript{15,16} This may be due to a few of the studies evaluating curriculums previously validated for age groups, such as \textit{Head Start} and \textit{Eating Smart- Being Active}.\textsuperscript{15,16}

Activity duration was referenced by reviewers in many previous studies.\textsuperscript{14-16} In some studies, such as one performed by Luese and Contento, time was one of the main themes.\textsuperscript{14} Similar to our study, several reviewers warned of how fast time can pass when facilitating a program.\textsuperscript{14} They stated that 20 minutes is ideal to spend on one lesson or activity.\textsuperscript{14} This concept of limited time was reflected by experts on our review panel that explained shorter lessons, with time for introductions, wrap ups, and questions, is ideal. Programs should ensure that enough time is allotted to account for student choice of lesson time and hands-on priority is given precedence.\textsuperscript{16} Some studies show time being an important factor, but not a main concern for reviewers. Baker and colleagues found that evaluation paperwork such as demographics and questionnaires were extremely time consuming.\textsuperscript{16} However, the Project stRIde
intervention aims to administer evaluation paperwork outside of the program itself, therefore reviewers were not invited to comment on this since it would be outside of lesson time. Though time was the lowest scoring category on the expert content survey and one of the most discussed topics in the interviews, modifications will be made to the curriculum to ensure the program will be delivered within its time constraints.

The opinions of reviewers on their confidence to teach these lessons was valuable information since this curriculum will not be taught by STEAM or nutrition professionals in future years. Though most reviewers stated they would be extremely confident delivering the lessons, a few believed they would need extra support in the form of training or another facilitator alongside them helping to deliver the program. This is consistent with results found in the literature. Program instructors often find that training opportunities or training resources would benefit them in delivering the curriculum. In some cases, facilitators prefer training in the form of workshops or required employee training. This way, extra training resources are an option if facilitators wish to partake. In other studies, facilitator training videos were created to assist educators in facilitating certain activities. In the review of the Eating Smart-Being Active curriculum, facilitator training videos were created for the physical activity lessons because curriculum creators wanted to ensure these lessons were delivered correctly and the educators felt confident with the material. In development of the Project stRIde curriculum, the research team and curriculum developers intended for the curriculum to contain enough information to be taught by instructors without background in STEAM or nutrition.

Project stRIde intends to reach low-income and racially and ethnically diverse
students from urban areas. Therefore, cultural appropriateness was an important domain included on the survey and was further discussed multiple times throughout the interviews. The question of lesson appropriateness for a primarily Hispanic group of students scored highly on the expert review survey, in which all reviewers agreed that each lesson was culturally appropriate. Several reviewers explained that the lessons are adequate for this population, though one reviewer stated the food and beverages within in the lessons could be more culturally inclusive. This prompted reviewers to include more opportunities for student discussion of different foods/beverages found in their homes, which is explained in more detail in the next section of this discussion. Expert review panels in a few other studies suggest similar revisions, such as including more cultural and regional recipes in the curriculum.\textsuperscript{14,16} However, this depends on where the study is being conducted and the target population. Many other studies do not incorporate discussions of cultural competence or inclusion if they are intended for a more homogenous audience.\textsuperscript{15,32}

Other popular topics identified in similar curriculum revisions such as funding, adequate staffing, and space constraints did not surface in expert surveys or interviews most likely because they are not especially applicable to the program.\textsuperscript{14,15} Finances were extensively planned as part of the CYFAR grant proposal, ensuring sufficient budgeting for five years of program delivery. Since the program will be taught by a nutrition educator this summer and camp staff in future years, there is no need for outside personnel such as dietitians or Cooperative Extension specialists. The program will be delivered on site at the Boys and Girls Clubs, therefore adequate space will not be a concern.
Changes Made to Curriculum

After reviewing the results from the expert content review surveys and interviews, members of the research team met to discuss possible revisions to the curriculum. Specifically, revisions related to time, student engagement, cultural inclusivity, and activity age-appropriateness. Similar to other studies, time was an extremely prominent concern among reviewers.\textsuperscript{14-16} In order to guarantee program delivery within the given time frame, activities from the lessons will be practiced beforehand to estimate length before piloting. Due to the many planned activities within the lessons, the curriculum activities will be presented in an ordered list to future facilitators instead of most important to least important. This way, facilitators will feel motivated to complete all activities, but have a buffer if they cannot deliver each activity. This method also leaves room for student choice of lessons, which relates to student engagement. This way, students can drive the lessons and choose which topics they want to spend more time learning about. The revised curriculum will contain more opportunities for open discussion among students to promote engagement and reinforce important concepts.

Though rated as overall culturally inclusive and appropriate for this population, experts suggested involving more food and beverages from different cultures. To incorporate this suggestion, the facilitators will open the discussion of common foods and beverages up to students. For example, in Lesson 2, participants will now be asked to write down their favorite drinks and share in Lesson 3, instead of being provided with a list of sample drinks. This not only includes beverages from different cultures but will again increase student engagement in this lesson.
Lastly, in the activities rated as too difficult for this age group in either the surveys or interviews, materials will be revised to provide more information or to simplify some of the concepts. In one activity rated as too easy, the activity will be kept the same to make sure all students can grasp the content. This activity is in Lesson 1, so it may also help as a warm-up activity to the program and to assist with the facilitator’s comfort to teach this lesson. For some of the activities, members of the research team have discussed creating videos to strengthen student understanding, further cut back time, and assist with facilitator training. However, these videos have not been created or incorporated into the curriculum at this time.

Overall, after reviewing quantitative and qualitative data from the experts, the main revisions to the curriculum included incorporating time management skills and preparation for lesson delivery, creating opportunities for group work and student choice, creating more culturally relevant activities, and modifying lessons to reach this age group. A formative evaluation in the first year of this grant was important to program development and should be included in future pilot studies.

**Strengths and Limitations**

Due to the unique nature of the Project stRIdE curriculum that incorporates STEAM and nutrition education, this formative evaluation is one of the very few of its kind. Few formative evaluations have been performed on similar programs, which is a strength of this study.\(^{14-16}\) Another strength is the diversity of the expert panel we were able to recruit. The nine experts came from backgrounds across nutrition, nutrition education, summer camp programming, cultural competency, and elementary education. Lastly, the two methods of data collection, survey and interview, can be
seen as a strength since several previous studies use only one method.\textsuperscript{14,15}

The small sample of experts may be considered one limitation to this study; however, themes were easily generated due to the saturation of comments by experts. Secondly, although an IRR test was run between the two coders and reached high agreement, a single coder was responsible for coding the remaining interview transcripts, a possible bias that may affect the trustworthiness of the data. Another limitation is the participant burden of the content review. Experts were asked to read through all six lessons, fill out a 57-question survey, and complete a virtual interview. This may have led to experts skimming over some components of lessons. In the future, providing less content for review, such as three lessons, may be more beneficial. Furthermore, demographic data besides career and years in position were not collected on experts, which could have been useful to provide context, especially surrounding race, ethnicity, and sex.
IMPLICATIONS FOR RESEARCH AND PRACTICE

Expert content reviews are often not performed before piloting an intervention.\textsuperscript{19,20,25,26} This study was one of the first of its kind to incorporate and expert content review into revisions of a STEAM and nutrition education curriculum. Results of this study correspond to the results of content reviews previously found in the literature.

Project stRIde will pilot in Summer 2021 after a rigorous formative evaluation that informed revisions to the curriculum. The curriculum is innovative, as it is one of the first of its kind to incorporate STEAM and nutrition education in a summer program.\textsuperscript{19,20} The summer camp curriculum has implications for future nutrition education practice in this population because of the fusion of STEAM and nutrition within a program designed for low-income, racially and ethnically diverse youth that are at risk for disparities in both dietary behaviors and academic achievement.

Shifts in the study timeline because of COVID-19 provided the opportunity to amplify the formative evaluation to ensure the curriculum was rigorously developed and met the needs of the target population. The initial survey sent to reviewers provided important quantitative information and helped to shape interview questions. The two methods of data collection, survey and interview, helped to derive more accurate, robust feedback from reviewers and may be especially useful for future programs with multi-disciplinary approaches. The diverse group of experts included on the panel provided a wide variety of feedback in areas spanning age-appropriateness of activities, activity duration, cultural appropriateness, and facilitator support. Project stRIde will be stronger and more appropriate for its target population.
in its pilot year because of this formative evaluation. Formal, in depth formative evaluations are not commonly performed on interventions but should be included before piloting to establish stronger program delivery.
Table 1: Demographic Information of Students in Providence and Newport Public School Districts as Percent of All Students

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>Providence Public School District</th>
<th>Newport Public School District</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hispanic</td>
<td>68.0</td>
<td>32.1</td>
</tr>
<tr>
<td>Non-Hispanic Black</td>
<td>15.0</td>
<td>19.7</td>
</tr>
<tr>
<td>Non-Hispanic White</td>
<td>6.5</td>
<td>39.3</td>
</tr>
<tr>
<td>Asian/Multi-racial</td>
<td>9.5</td>
<td>4.2</td>
</tr>
<tr>
<td>Native American</td>
<td>1.0</td>
<td>4.5</td>
</tr>
<tr>
<td>Qualify for Free or Reduced-Priced Lunches</td>
<td>91.0</td>
<td>68.0</td>
</tr>
<tr>
<td>Reviewer</td>
<td>Job Title</td>
<td></td>
</tr>
<tr>
<td>---------</td>
<td>---------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Grade 5 teacher at a charter school in Providence, RI</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Executive Leader, Boys &amp; Girls Clubs</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>4-H Program Coordinator</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Grade 5 teacher at an elementary school in Providence, RI</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Program Coordinator, SNAP-Ed</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Assistant Director, Math and Science School Support Network</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Middle school science teacher at an elementary school in Pawtucket, RI</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Community Nutrition Educator, SNAP-Ed</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Grade 3 science teacher at a private, Catholic elementary school in Portsmouth, RI</td>
<td></td>
</tr>
<tr>
<td>Lesson Title</td>
<td>Lesson Objectives</td>
<td>NGSS, Common Core, and RI Health Framework Standard Alignment</td>
</tr>
<tr>
<td>------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| **Lesson 1: Fruits & Veggies and the Environment & Me** | 1. State the recommendations for fruit and vegetable intake and what they do for the human body  
2. Learn the life cycle of a plant and a plant’s relation to the human diet  
3. Learn how to utilize recycled items to create art | Science: 3-LS1-1, 3-LS3-2, 5-LS1-1  
Mathematics: MP.5,3.MD.B.4, 6.SP.B.5.A  
Health: Standards 1, 2, 3 |
| **Lesson 2: Experiments and Engineering with Food Groups** | 1. Identify the food groups on the MyPlate  
2. List “Go”, “Slow” and “Whoa” foods  
3. Observe scientific experiments that utilize food items  
4. Engineer a structure out of food items | Science: MS-ETS1-1, MS-ETS1-2, MS-ETS1-4  
Mathematics: N/A  
Health: Standards 2, 3 |
| **Lesson 3: Hydration and "Think Your Drink"** | 1. Understand why water is essential for the body and the concept of input and output of fluids  
2. Read the Nutrition Facts label and determine grams and teaspoons of sugar in different drinks  
3. Understand the difference between natural and added sugar in a drink | Science: N/A  
Mathematics: 3.MD.A.2, 4.MD.A.1, 4.MD.A.2  
Health: Standard 3 |
| **Lesson 4: The Human Body: Fat Needs and Fast-Food Choices** | 1. Name foods that have healthy fat and unhealthy fat  
2. Understand why fat is important for our body and how it can hurt our body  
3. Determine healthier meal choices at fast food restaurants  
4. Understand the chemistry behind fat | Science: MS-LS1-5, MS-PS1-2  
Mathematics: N/A  
Health: Standards 2, 3, 4, 6 |
| **Lesson 5: Your Kitchen is a Science Lab** | 1. Understand how engineering is involved with kitchen utensils  
2. Learn how to do a science experiment  
3. Determine acid and base pH in household substances | Science: 5-PS1-2, 5-PS1-3, 5-PS1-4  
Mathematics: MP.2, MP.4  
Health: Standard 3 |
| **Lesson 6: Wrap Up and Get Ready!** | 1. Gain confidence to describe Showcase station activity and science behind it  
2. Create invitations for family and friends to come to Showcase event (if time permits) | Science: N/A  
Mathematics: N/A  
Health: N/A |
Table 4: Virtual Interview Questions and Probes for Community Partners and Education Experts

<table>
<thead>
<tr>
<th>Question Number</th>
<th>Question</th>
<th>Probes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Overall, what was your impression of the curriculum?</td>
<td>What were some pros and cons of the curriculum overall?</td>
</tr>
<tr>
<td>2</td>
<td>What did you like about the curriculum?</td>
<td>Were there any activities or lessons that stood out to you for any reason?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Was the curriculum written clearly and easy to understand?</td>
</tr>
<tr>
<td>3</td>
<td>What do you think will be challenges to the curriculum?</td>
<td>Were there any red flags noticed as you read through the curriculum?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Is the time restraint or lesson appropriateness for this age group an issue for you?</td>
</tr>
<tr>
<td>4</td>
<td>After reviewing this curriculum, would you feel confident teaching it?</td>
<td>Not confident: What would you need to feel confident to teach this curriculum?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Confident: What about the curriculum makes you feel confident to teach it?</td>
</tr>
</tbody>
</table>
Table 5: Means and Standard Deviations of Likert Scale Scores from Expert Content Review Survey

<table>
<thead>
<tr>
<th></th>
<th>Lesson 1 Mean</th>
<th>Lesson 2 Mean</th>
<th>Lesson 3 Mean</th>
<th>Lesson 4 Mean</th>
<th>Lesson 5 Mean</th>
<th>Lesson 6 Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Learning Objectives Addressed</strong></td>
<td>3.56 (0.53)</td>
<td>3.56 (0.53)</td>
<td>3.89 (0.33)</td>
<td>3.78 (0.44)</td>
<td>3.56 (0.73)</td>
<td>3.67 (0.5)</td>
</tr>
<tr>
<td><strong>Lesson Activities Relate to Learning Objectives</strong></td>
<td>3.67 (0.49)</td>
<td>3.56 (0.62)</td>
<td>3.78 (0.43)</td>
<td>3.47 (0.72)</td>
<td>3.69 *</td>
<td></td>
</tr>
<tr>
<td><strong>Material Adequacy for 5th Grade Level</strong></td>
<td>3.78 (0.44)</td>
<td>3.33 (0.71)</td>
<td>*</td>
<td>3.22 (0.97)</td>
<td>*</td>
<td>3.78 (0.44)</td>
</tr>
<tr>
<td><strong>Material Feasibility for Time Frame</strong></td>
<td>3.22 (0.67)</td>
<td>3.22 (0.83)</td>
<td>3.56 (0.53)</td>
<td>3.5 (0.76)</td>
<td>3.33 (0.87)</td>
<td>3.67 (0.5)</td>
</tr>
<tr>
<td><strong>Incorporation of STEAM Concepts</strong></td>
<td>3.78 (0.44)</td>
<td>3.78 (0.44)</td>
<td>3.78 (0.44)</td>
<td>3.78 (0.44)</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td><strong>Lesson/Material Accuracy</strong></td>
<td>3.67 (0.5)</td>
<td>3.78 (0.44)</td>
<td>3.78 (0.44)</td>
<td>3.67 (0.5)</td>
<td>3.78 (0.44)</td>
<td>*</td>
</tr>
<tr>
<td><strong>Variety of Teaching/Learning Strategies Used</strong></td>
<td>3.56 (0.73)</td>
<td>3.78 (0.44)</td>
<td>3.78 (0.44)</td>
<td>3.4 (0.53)</td>
<td>3.78 (0.44)</td>
<td>3.67 (0.5)</td>
</tr>
<tr>
<td><strong>Cultural Appropriateness</strong></td>
<td>3.44 (0.53)</td>
<td>3.33 (0.5)</td>
<td>3.67 (0.5)</td>
<td>3.67 (0.5)</td>
<td>3.56 (0.53)</td>
<td>3.56 (0.53)</td>
</tr>
</tbody>
</table>

*Question not asked about this lesson on survey because lessons were adapted from previously used SNAP-Ed activities, or this lesson does not introduce any new material, mean score and standard deviation not provided.
### Table 6: Key Quotes and Takeaways from Virtual Interviews and Survey

<table>
<thead>
<tr>
<th>Themes</th>
<th>Teachers/ Education Experts</th>
<th>Community Partners</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Effectively Promoting Youth Engagement</strong></td>
<td>&quot;And if you have kids working in groups, having them assign jobs to each other. So one person is the direction person – the one that's reading directions. One person is the timekeeper. One person is the note-taker. So giving them responsibilities. And especially in fifth and sixth grade, they're more than capable of handling that responsibility.&quot;</td>
<td>&quot;It's just giving each individual kid an opportunity to be a leader and talk about what the content is because inevitably, when you have a large group, there's going to be a few kids that sort of take over the attention of everybody. And then those kids who are a little shyer just don't end up speaking up. So, the focus of doing those small group activities is so that you have everyone engaged and be part of the conversation as much as possible.&quot;</td>
</tr>
<tr>
<td><strong>Increased Guidance or Support needed</strong></td>
<td>&quot;You have, you know, auditory learners, and you have visual learners. So, just with what we've gone through with the pandemic I do realize the importance of having both. Just to basically – even if it's just reinforcing concepts that kids can go back and be able to look at it again. And if it's something they can access at home, I mean, that's something that's even then shareable for them with their families or siblings.&quot;</td>
<td>&quot;I think some of the staff who are newer, or maybe not as experienced, may be a little overwhelmed by the amount of stuff that needs to be put into it. But it all depends on that level comfort. Some people will be great. Others may need some support.&quot;</td>
</tr>
<tr>
<td><strong>Activity Difficulty for Age</strong></td>
<td>&quot;You just don’t want to assume a 6th grader knows certain skills.&quot; &quot;A lot of them might not even have background knowledge that are necessary to talk about more upscale topics of nutrition.”</td>
<td>&quot;But overall, I think the content, especially for this age group, was perfect. So that was good&quot;</td>
</tr>
<tr>
<td>Confidence in Teaching Lessons</td>
<td>&quot;Yes. Definitely. I would love to teach this.&quot;</td>
<td>&quot;I think with some training. I mean I feel pretty confident, but yeah, there’s just a few parts where I’m like I don’t know exactly what I would do at this point, especially with the science experiment one… I think with training, yeah.&quot;</td>
</tr>
<tr>
<td>Time</td>
<td>&quot;I think that the biggest red flag that I noticed would be the time. I think you guys had a lot of really good ideas and activities in there. But when I – some of them, it seemed like you wouldn’t have enough time to do most of the activities.&quot;</td>
<td>&quot;And I think giving kids the opportunity to sort of dive into it if time allows is important. So, prioritizing, this is the core activity we want kids to do, and this is why it’s important first.&quot; &quot;I just don’t know if one hour or an hour and a half is really going to be enough time for kids to digest all of it.&quot;</td>
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<td>Cultural Appropriateness</td>
<td>&quot;And most of what you guys were doing seemed to follow the DOJ recommendations when dealing with children of another language other than English.&quot;</td>
<td>&quot;And especially if you can from like the cultural perspective, because you have kids coming from a wide range of different environments and places. So, getting them to talk about why they don’t have sugar in their household, or why sugar isn’t as important, it’s a conversation amongst kids and maybe it’ll open up something that kids can think about.&quot;</td>
</tr>
<tr>
<td>Strengths of Curriculum in Promoting STEAM</td>
<td>&quot;I thought that, overall, the curriculum was excellent. I think that the kids will really enjoy doing a lot of the activities. They were</td>
<td>&quot;It was just exciting to see like another element brought to it. It’s like the new way to teach everything. I think it’s very relevant, so I think it’s, yeah, new and exciting and</td>
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<tr>
<td><strong>Education and Innovation</strong></td>
<td>engaging. They were hands-on. They addressed various team concepts. Some of them, I would love to use in my own classroom.&quot;</td>
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<td>relevant.&quot; innovativeness of the lessons is a major strength. The lessons are thorough, straightforward, and clear.</td>
<td></td>
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</tbody>
</table>
Figure 1: Providence, Newport, and Rhode Island Students Exceeding, Meeting, Partially Meeting, or Not Meeting Expectations on RICAS Math Exam\textsuperscript{8,9}
Figure 2: Providence, Newport, and Rhode Island Students Exceeding, Meeting, Partially Meeting, or Not Meeting Expectations on Next Generation Science Assessment Exam\textsuperscript{8,9}
REFERENCES


APPENDIX A
EXTENDED LITERATURE REVIEW

Introduction

This literature review aims to provide justification for formative evaluation to strengthen the design of a youth summer camp curriculum focused on decreasing the academic achievement gap of low-income, racially and ethnically diverse youth. The Project Science and Technology Reinforced by Innovative Dietary Education (Project stRIde) curriculum focuses on science, engineering, art, and math (STEAM) in combination with nutrition. This intention of this review is to show disparities present in the youth target audience and the importance of addressing summer learning loss. This review will describe the population and the educational and health disparities they face. It will describe the approaches used to conduct and analyze the qualitative data collected for this type of formative research, including selecting an expert review panel. The review will touch on several previously successful nutrition interventions combining STEAM and nutrition education and the importance of summer camp programs on reducing summer learning loss. Lastly, it will highlight the gap in programming of STEAM and nutrition education interventions combined in a summer camp setting for 4-5th grade youth.

Target Population Demographics

Understanding the target population is a key component when designing and revising a curriculum. Project stRIde intends to reach 4th and 5th grade students from Providence and Newport, Rhode Island that attend a summer camp program at the Boys and Girls Club of Providence and Newport County. Both Providence Public
School District (PPSD) and Newport Public School District (NPSD) consist of diverse, primarily low-income populations. The majority of students in the PPSD identify as Hispanic (65%) and Black (16%). The school district represents students from 91 countries of origin, and 31% of students are multilingual. In 2019, the district served about 24,000 students throughout 22 elementary schools, seven middle schools, ten high schools, and two public charter schools. In this school district, approximately 91% of students are eligible for free or reduced-priced lunches. In 2019, the NPSD population was 39% white, 32% Hispanic, 19.7% Black, and 4.5% Native American. This district serves about 2,200 students, containing one high school, one middle school, one elementary school, and one pre-K program. About 68% of students in NPSD are eligible for free or reduced-price lunches. Populations such as the racially/ethnically diverse and low-income students from Providence and Newport are considered at risk for decreased achievement in STEM subjects and diet-related chronic diseases. This is exemplified in the data surrounding academic achievement and health outcomes in this population.

**Educational Disparities**

Two state assessments, the 2018-19 Next Generation Science Assessment (NGSA) and RI Comprehensive Assessment System (RICAS) were assessed in fifth grade public schools in Providence and Newport. The data from these assessments, available in Figures 2 and 3, show that Providence and Newport public schools are primarily partially meeting expectations or not meeting expectations in both the NGSA and RICAS exams. Thirty-seven percent of fifth grade PPSD students are not meeting expectations in the NGSA. In NPSD, about 30% of students fall into this
category for the NGSA. The number of fifth grade students not meeting expectations on this exam is much lower for Rhode Island fifth graders as a whole, at 20%.

RICAS assesses mathematics and English/language arts performance in fifth grade students. Combined together, 24.5% of Providence and Newport 5th grade students were meeting or exceeding expectations for the mathematics portion, compared to the state average of 29.9%. This means that PPSD and NPSD fifth graders are receiving half the amount of high scoring grades than the rest of Rhode Island. Less than 0.5% of PPSD and 0.0% of fifth grade students in NPSD were exceeding expectations in the mathematics portion of RICAS. Considering Rhode Island’s statewide population is 83.6% white, the data are consistent with the finding that low-income, racially and ethnically diverse students are more likely to experience disparities in academic achievement.

**Health Disparities**

Racially/ethnically diverse and low-income students not only experience disparities in academics, but in health as well. Those who identify as part of a racial or ethnic minority group in the U.S. are more likely to experience poorer health and higher incidence of morbidity and mortality rates. A high incidence of overweight and obesity is one of the main conditions seen in these populations, which can increase the risk for developing cardiovascular disease, hypertension, Type II diabetes, and other chronic diseases. In RI, 45% of Hispanic children experience overweight or obesity, followed by 37% of non-Hispanic Black children, as compared to 30% of all RI children. This is a widespread problem throughout children of all races in Providence and Newport. In Providence, over 40% of children experience overweight
or obesity. In Newport, 36-40% of children fall into this category. These statistics show the diet-related disparities occurring both by race/ethnicity and income level.

Several nutrition education programs, such as Supplemental Nutrition Assistance Program- Education (SNAP-Ed), successfully work to increase healthy dietary behaviors among youth across the state, especially in underserved populations. Project stRIde was designed to target similar underserved groups, keeping in mind the diversity and socioeconomic status of this population. Culturally appropriate foods and beverages, materials in Spanish, and low-cost foods are features of the curriculum designed to promote inclusivity.

**Formative Evaluation Design**

**Recruiting an Expert Panel**

The formative evaluation of Project stRIde consisted of two parts: and expert content review of the curriculum by survey and subsequent virtual interviews with reviewers. In order to get valuable feedback, a diverse group of experts from several different fields were recruited. This method of surveying and interviewing diverse expert panels is supported by the literature.

Several studies enlisted experts from various fields that could provide advantageous feedback to their curricula. Luesse and Contento, in development of the *In Defense of Food* curriculum, aimed to gain insight on the perspective of education experts. Since the program was designed to be delivered at after-school programs, they recruited current teachers that had at least one year working in an after-school setting, or were currently working in an after-school setting. A total of 12 experts participated in interviews about the curriculum; four classroom teachers and eight
after-school program staff.\textsuperscript{15} The teachers that participated in the interviews had background in teaching English, history, science and math.\textsuperscript{15} From these experts, researchers were able to generate main themes from the interviews and make revisions to the curriculum.\textsuperscript{15} Teachers provided valuable feedback pertaining to the content of the curriculum, teaching strategies, and duration, while after-school program staff highlighted strengths and weaknesses of the program in an after-school setting.\textsuperscript{15}

Lisson et al. also recruited education professionals to serve on their panel to identify perceptions of the nutrition education resources in \textit{Head Start} programs.\textsuperscript{16} Members of the research team reached out to all \textit{Head Start}-funded organizations in North Carolina in order to recruit both health/nutrition coordinators and teachers employed at these locations.\textsuperscript{16} Researchers sought out to obtain feedback from those directly working with children (teachers) and lesson and policy creators (health/nutrition coordinators).\textsuperscript{16} Overall, 31 health/nutrition coordinators and 32 teachers were interviewed, which represented 60\% of all \textit{Head Start}-based organizations in the state.\textsuperscript{16} It was found that teachers and coordinators had similar feedback, mostly surrounding funding, time constraints, lack of training, and lack of materials.\textsuperscript{16}

Lastly, Baker et al. contained the most diverse group of experts, which is most similar to this study.\textsuperscript{17} In revision of the \textit{Eating Smart- Being Active} curriculum, educators who had previously taught the curriculum participated in focus groups and completed an online survey to provide feedback on the curriculum.\textsuperscript{17} After original edits were made, the curriculum was then sent to ten experts in nutrition, nutrition education, food safety, physical activity, learning theory, and adult learning
principles.\textsuperscript{17} This expert panel reviewed the lessons for accuracy and feasibility using a curriculum review form.\textsuperscript{17} Some of the revisions made to the curriculum included adding in supplemental physical activity instructions/materials for instructors, re-ordering of lesson activities for time concerns, and adding hands-on food preparation activities and materials to all of the lessons to engage participants.\textsuperscript{17}

Overall, it was found that a diverse sample of experts was useful in programs containing several different domains such as nutrition education and physical activity. Feedback from experts is especially useful to determine the feasibility of the program in a certain setting and time period, availability of resources, and accuracy of the program.\textsuperscript{15-17} Since the Project stRIde curriculum incorporates STEAM and nutrition education, the recruitment of experts focused on those with backgrounds in nutrition, elementary education, community outreach, and summer programming.

\textit{Expert Content Review}

Once an expert panel is identified, the method of garnering feedback about the curriculum must be established. Experts from the \textit{In Defense of Food} curriculum revision panel underwent interviews by the research team.\textsuperscript{15} An interview script was created which encompassed six open-ended, broad interview questions with several probes and follow-up questions.\textsuperscript{15} Interviews were held either over the phone or in person by one member of the research team.\textsuperscript{15} They lasted no longer than 45 minutes and included member checks throughout the discussion for accuracy.\textsuperscript{15} Although the process of member checking varies across different studies, it is an established technique for assessing the accuracy of qualitative data.\textsuperscript{18} Recordings of the interviews were transcribed by an outside source and coded by two members of the research
A codebook was developed after reviewing the interviews and themes were derived from responses across these codes. Experts involved in the revision of the Head Start program also completed interviews. These interviews were administered over the phone by four members of the research team to the 63 different professionals. Researchers developed open-ended, broad questions and specific probes that were individualized to either administrators or teachers. The final interviews lasted 90 minutes at the most, ending with member checking to assure answers received from participants were correct. Transcripts of the interviews were initially coded and sorted into final codes at the end of analysis. After the final codes were assigned, three main themes and related quotes from the interviews were identified.

The revision process for the Eating Smart-Being Active curriculum began with focus groups and a 53-question online survey completed by the initial group of reviewers that taught the curriculum. Afterwards, the ten experts from the separate review panel assessed each lesson using a curriculum survey form. The survey was administered online to assess the reviewers’ attitudes towards each lesson included in the program. Researchers commend the focus groups and surveys as essential parts in identifying revisions to be made in the curriculum.

Due to COVID-19 precautions, the expert curriculum review for Project stRId was completed completely online. In this study, experts were sent a 63-question online survey before completing virtual interviews. Similar to the In Defense of Food and Head Start curriculum reviews, interviews in this study consisted of several broad questions with specific probes for individuals in each expertise area. Member
checking was a strategy used in the interview process because of its efficacy in previous studies. Qualitative data analysis followed a similar method as these studies, where a dynamic codebook was established, the interviews were transcribed and coded, and several main themes were developed.

**Successful Interventions**

*Combining STEAM and Nutrition Education*

While studying the feasibility and revisions to be made to the Project stRIde curriculum, it was essential to observe previous successful interventions. Though there are no known programs that have combined STEAM and nutrition education aspects together during a summer camp program, there is some evidence that suggests aspects of these programs are beneficial to elementary-aged students, particularly in low-income and culturally diverse areas.

The FOODMaster curriculum, which was implemented in 18 fourth grade classrooms, used food and nutrition concepts to teach mathematics and science.\(^{19,20}\) Before piloting the program, the curriculum was reviewed by an expert review panel, whose feedback informed revisions to the curriculum.\(^{19}\) After the updates, a final curriculum was developed, consisting of 24 lessons on food safety, vegetables, meat, grains, fats, and other nutritional concepts.\(^{19,20}\) The lessons were taught by participating teachers in classrooms during the school day.\(^{19}\) Each lesson included science and mathematics aspects, such as unit conversions.\(^{19}\)

Nutrition knowledge and mathematics knowledge were among the outcomes measured using pretest and posttest surveys.\(^{19,20}\) Between the intervention group and a control group with no intervention, there were increases in both nutrition knowledge
and all four areas of mathematics skills \((p< 0.001)\) and all four areas of mathematics skills \((p< 0.00, p<0.02, p<0.00, p<0.00)\). These findings suggest the combination of STEM and nutrition materials have positive effects on elementary-level learning.

Though advances in knowledge were observed in the FOODMaster curriculum, out-of-school approaches to learning may also benefit students. Some students, particularly those from low-income families, often face struggles that cause them to be absent from traditional in-school or after-school activities. High-performing students from low-income and culturally diverse families may face a disadvantage that their higher-income peers do not. To test this, researchers examined data from the HOPE project, which provided high-performing, elementary-aged students with scholarships to attend summer programming. To qualify for the scholarship, students had to participate in their school’s free and reduced-price lunch program.

Scores from a statewide standardized mathematics and English/language arts exam were used to track participant progress over a course of four years. Results from the exams show that HOPE project participants scored 48 points higher than the average across their grade level. Students that fit the inclusion criteria for this study but did not participate in the curriculum did not see this increase. Due to the similar population of Project stRlde, results from the HOPE project affirm that a summer program will be beneficial to reaching students from low-income and culturally diverse families.

**Importance of Summer Programs**

While summer programs are important for students from low-income families, these
programs are also important to reinforce information retention over the summer. It has been found that students often lose some of what they learn over the school year in the 2–3-month summer vacation, referred to as summer learning loss.\textsuperscript{6,24} Mathematics is the subject that experiences the greatest losses.\textsuperscript{24} During the vacation, students can lose an average of up to 1-3 months of learning, and the losses seem to increase with grade level.\textsuperscript{24} The start of the following school year often begins with a review of the past year’s teachings, which can take away from new information teachers must provide.\textsuperscript{24} These findings are amplified in students from low-income and racially and ethnically diverse families.\textsuperscript{6,24}

In one study, researchers analyzed data from the Northwest Evaluation Association Measures of Academic Progress (NWEA MAP) standardized exams, which contain reading and mathematics portions aligned with Common Core standards.\textsuperscript{25} This exam is administered in both the fall and spring each school year to students in kindergarten to 8\textsuperscript{th} grade.\textsuperscript{25} When comparing the knowledge gained in these two exams, a disproportional amount of information was lost in the fall exam.\textsuperscript{25} It was found that 78\% and 62–73\% of students lost some information around math and reading in the summer, respectively.\textsuperscript{25} The summer between 5\textsuperscript{th} and 6\textsuperscript{th} grade showed the largest deficit in learning loss over the summer, which usually marks the switch from elementary to middle school.\textsuperscript{25} This article states that students who have access to summer school or summer learning programs are less likely to experience learning losses than those who do not attend these programs.\textsuperscript{25}

On top of learning loss, several studies indicate that students are at higher risk for weight gain and fitness loss over the summer compared to the school year.\textsuperscript{26,27} Two
studies sought to reverse this affect by providing nutrition education and physical activity interventions over summer vacation months.\textsuperscript{26,27} One study evaluated findings from the Healthy Eating and Activity Time (HEAT) program, a physical activity intervention program implemented into summer day camps.\textsuperscript{26} Using accelerometers, researchers found that boys and girls participating in these interventions were 2.04 ($p=0.02$) and 3.84 ($p<0.001$) times more likely to meet the daily 60-minute physical activity guidelines, respectively.\textsuperscript{26} This program accounted for a 10.6\% increase in the proportion of boys and 12.6\% increase in the proportion of girls meeting this guideline.\textsuperscript{26} The other program, titled Healthy Lifestyle Fitness Camp (HLFC) included a 6-week summer program aimed at youth experiencing overweight and obesity.\textsuperscript{27} The program combined three hours of physical activity with three hours per week of nutrition education.\textsuperscript{27} It was found that with this combined approach, significant pre-post weight loss ($p<.001$) and weight-to-height ratio ($p<0.001$) were observed in participants as compared to a control summer camp that had no emphasis on nutrition education or fitness.\textsuperscript{27}

These studies reflect how summer may be a dangerous time for elementary-aged students regarding learning loss, weight gain, and fitness loss. There is a disproportionate loss of learning in those from low-income and racially/ethnically diverse families, which should be addressed by summer programs.\textsuperscript{6,24,25} Revisions made to Project stRIde exhibit these concepts, and the program seeks to level some of these losses.

\textit{Conclusion and Gaps}

Educational and health disparities are apparent in low-income, racially and
ethnically diverse youth. These students are more likely to receive lower scores on standardized tests than their white peers and are more likely to experience overweight or obesity. This population is also susceptible to summer learning loss, which can further affect academic achievement. While there have been multiple separate STEAM and nutrition interventions in the past, the two are rarely combined. Even fewer are designed as a summer program curriculum. These programs are important to inform and establish healthy eating habits while reinforcing information learned during the school year. Due to the uniqueness of Project stRlde, a formative evaluation was essential to strengthen the curriculum design. This study will address the gap in the literature surrounding formative research on STEAM and nutrition summer camp curriculums for low-income, racially and ethnically diverse youth.
REFERENCES


APPENDIX B
EXPERT CONTENT REVIEW SURVEY

StRIde Curriculum Review Questionnaire

Name: _______________________________

Date: __________________

Job Title: _____________________________

Years in this position: _________________
Lesson 1: Fruits & Veggies and the Environment & Me!

Please answer the following questions by checking a single box for each item.

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<tr>
<th></th>
<th>1 Strongly Disagree</th>
<th>2 Disagree</th>
<th>3 Agree</th>
<th>4 Strongly Agree</th>
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<tr>
<td>The three learning objectives are clearly addressed throughout this lesson.</td>
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<td>Comments:</td>
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<tr>
<td>The “Fruit and Vegetable” video and lesson clearly relates to one or more of the learning objectives.</td>
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<td>The “Plant Life Cycles” lesson and gardening activity clearly relates to one or more of the learning objectives.</td>
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<td>The material in this lesson is adequate for a 5th grade academic level. (Ex. Meets Common Core and Next Generation Science Standards, appropriate for reading level, etc.)</td>
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<td>The material (activities, lesson, handouts, videos) is feasible for 1.5 hours of program time.</td>
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<tr>
<td>This lesson incorporates one or more STEAM concepts.</td>
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<tr>
<td>The material in this lesson is accurate to the best of my knowledge.</td>
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</table>
# Comments:

A variety of teaching and learning strategies are used in this lesson.  
(Ex. Kinesthetic, spatial, audiovisual, verbal)  
Comments:  

This lesson is appropriate for a racially/ethnically diverse (primarily Hispanic or Latino) group of students.  
(Ex. Language used during program, food used in activities, newsletters and handouts)  
Comments:  

### Overall, how do you rate this lesson?  
1 2 3 4  
Poor Fair Good Excellent  

Comments on this lesson’s overall strengths, areas for improvements, or questions:  

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Lesson 2: Experiments and Engineering with Food Groups

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<tr>
<td>The four learning objectives are clearly addressed throughout this lesson.</td>
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<td>Comments:</td>
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<tr>
<td>The URI Nutrition “Go, Slow, Whoa” video and activity sheet clearly relates to one or more of the learning objectives.</td>
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<tr>
<td>The “Did you Know? Fun Food Group Scientific Explanations” and related worksheet clearly relates to one or more of the learning objectives and is engaging.</td>
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<td>The material in this lesson is adequate for a 5th grade academic level. (Ex. Meets Common Core and Next Generation Science Standards, appropriate for reading level, etc.)</td>
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<td>The material (activities, lesson, handouts, videos) is feasible for 1.5 hours of program time.</td>
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<td>This lesson incorporates one or more STEAM concepts.</td>
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<td>The material in this lesson is accurate to the best of my knowledge.</td>
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A variety of teaching and learning strategies are used in this lesson.
(Ex. Kinesthetic, spatial, audiovisual, verbal)
Comments:

This lesson is appropriate for a racially/ethnically diverse (primarily Hispanic or Latino) group of students
(Ex. Language used during program, food used in activities, newsletters and handouts)
Comments:

<table>
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<th>Overall, how do you rate this lesson?</th>
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<td></td>
<td>Poor</td>
<td>Fair</td>
<td>Good</td>
<td>Excellent</td>
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Comments on this lesson’s overall strengths, areas for improvements, or questions:

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Lesson 3: Hydration & “Think Your Drink”

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<th>The three learning objectives are clearly addressed throughout this lesson.</th>
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<td>Comments:</td>
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<tr>
<td>The “Think Your Drink” math worksheet and activity clearly relate to one or more of the learning objectives.</td>
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<tr>
<td>The “Water is Wonderfull” PowerPoint clearly relates to one or more of the learning objectives and is engaging.</td>
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<td>Comments:</td>
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<td>The material (activities, lesson, handouts, videos) is feasible for 1.5 hours of program time.</td>
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<td>This lesson incorporates one or more STEAM concepts.</td>
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<td>The material in this lesson is accurate to the best of my knowledge.</td>
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<tr>
<td>A variety of teaching and learning strategies are used in this lesson. (Ex. Kinesthetic, spatial, audiovisual, verbal)</td>
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Comments:

This lesson is appropriate for a racially/ethnically diverse (primarily Hispanic or Latino) group of students. (Ex. Language used during program, food used in activities, newsletters and handouts)

Overall, how do you rate this lesson?  

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<tr>
<td></td>
<td>Poor</td>
<td>Fair</td>
<td>Good</td>
<td>Excellent</td>
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Overall comments on this lesson’s strengths, areas for improvements, or questions:

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Lesson 4: The Human Body: Fat Needs and Fast Food Choices

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<th>3 Agree</th>
<th>4 Strongly Agree</th>
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</thead>
<tbody>
<tr>
<td>The four learning objectives are clearly addressed throughout this lesson.</td>
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<td>Comments:</td>
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<tr>
<td>The chemical bond structure activity clearly relates to one or more of the learning objectives and is engaging.</td>
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<td>The clogged artery activity clearly related to one or more of the learning objectives.</td>
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<tr>
<td>The material in this lesson is adequate for a 5th grade academic level. (Ex. Meets Common Core and Next Generation Science Standards, appropriate for reading level, etc.)</td>
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<tr>
<td>The material (activities, lesson, handouts, videos) is feasible for 1.5 hours of program time.</td>
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<td>Comments:</td>
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<tr>
<td>This lesson incorporates one or more STEAM concepts.</td>
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</tbody>
</table>
| A variety of teaching and learning strategies are used in this lesson.  
[Ex. Kinesthetic, spatial, audiovisual, verbal] |  |  |  |
| Comments: |  |  |  |
| This lesson is appropriate for a racially/ethnically diverse (primarily Hispanic or Latino) group of students.  
(Ex. Language used during program, food used in activities, newsletters and handouts) |  |  |  |
| Comments: |  |  |  |

Overall, how do you rate this lesson?  
1 2 3 4  
Poor  Fair  Good  Excellent

Overall comments on this lesson’s strengths, areas for improvements, or questions:

____________________________________________________________________
____________________________________________________________________
____________________________________________________________________
### Lesson 5: Your Kitchen is a Science Lab

<table>
<thead>
<tr>
<th></th>
<th>1 Strongly Disagree</th>
<th>2 Disagree</th>
<th>3 Agree</th>
<th>4 Strongly Agree</th>
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<td>The three learning objectives are clearly addressed throughout this lesson.</td>
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<tr>
<td>The “Kitchen Tools Card Sort” activity clearly relates to one or more of the learning objectives for this lesson.</td>
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<td>The “Black Bean as a pH Indicator” activity clearly relates to one or more of the learning objectives and is engaging.</td>
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<td>The “Reaction Difference between Baking Soda and Baking Powder with Vinegar” experiment clearly relates to one or more of the learning objectives and is engaging.</td>
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Overall, how do you rate this lesson? 1 2 3 4

Poor Fair Good Excellent

Overall comments on this lesson’s strengths, areas for improvements, or questions:

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Lesson 6: Wrap Up and Get Ready!

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<th>4 Strongly Agree</th>
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<td>Comments:</td>
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<td>The &quot;Showcase&quot; is a cohesive and engaging way to display student progress in the program.</td>
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<td>The program is adequately wrapped up (all activities finished; all lessons tied together).</td>
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<tr>
<th>Overall, how do you rate this lesson?</th>
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<th>4</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Poor</td>
<td>Fair</td>
<td>Good</td>
<td>Excellent</td>
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</table>

Overall comments on this lesson’s strengths, areas for improvements, or questions:

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________________________________________________________________________
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APPENDIX C
IRB APPENDIX - WAIVER OF SIGNED CONSENT

This form should be used for waiver of signed consent for anonymous research.

Complete this form to request a waiver of signed consent for the proposed research. DHHS regulations permit waivers of signed consent if the research meets certain conditions. DHHS and FDA regulations differ regarding when an IRB may waive the requirement to document the informed consent process.

Do not complete this form to request a waiver or alteration of the entire consent process, use Appendix M1.

Principal Investigator:  Sarah Amin, PhD, MPH

Protocol Short Title:  Project stencil

1. Is the research subject to FDA regulations (e.g., involves use of a food, drug, biologic, device)?
   - Yes
   - No

   If Yes, only section (2) may be used to request waiver of signed consent.
   If No, either section (2) or (3) may be used to request waiver of signed consent.

Signed consent cannot be waived under the conditions of the last section below if the research involves a product regulated by FDA or the results of the research may be submitted to FDA as part of a marketing application.

2. Both answers below (2a and 2b) must be No for a waiver of signed consent:
   a. Does the research present greater than minimal risk?
      - Yes
      - No
   b. Does the research involve procedures for which written consent is normally required outside the research context?
      - Yes
      - No

   If No → explain how the research meets both (2a and 2b) of the conditions above.

   The research study involves a program/curriculum evaluation of a summer camp nutrition & STEM program that is being delivered to youth (ages 9-13) entering 5th and 6th grade at the Boys & Girls Club of Providence and Boys & Girls Club of Newport County. Project stencil is being offered as a program series during the camp day.

3. Both answers below (3a and 3b) must be Yes for a waiver of signed consent:
   a. Would the only record linking the participant and the research be the consent document?
      - Yes
      - No
   b. Would the principal risk to the participant be potential harm resulting from a breach in confidentiality?
      - Yes
      - No

   NOTE: The participant should be asked whether he/she wants documentation linking the participant with the research; the participant's wishes will govern.

   If Yes → explain how the research meets both (3a and 3b) of the conditions above.

   All research instruments will have unique alphanumeric identifiers on them so that they cannot be linked to the research participant. The consent document itself would be the only document individually identifiable information.