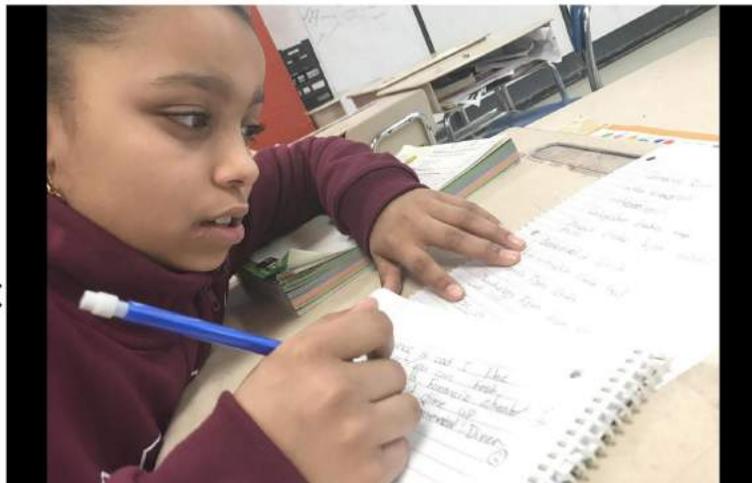


STEAM Engagement Program Administered by #STEAMtheStreets Carney Academy - Case Study 2017-18

STEAM program helps New Bedford kids see the Big Picture



In the spring/summer of 2017, we held several meetings with Carney Academy staff to build a comprehensive program that would raise the awareness, exposure, engagement, and attainment levels of the 5th grade students. We started the program in September of 2017 by administering a pre-survey to the 5th graders to gauge their awareness, interest, attitudes, and confidence levels around STEM and STEAM. (*see survey results at conclusion of this report*) Next, on October 6th, we held our first assembly at Carney. This was presented by Angel Diaz, also an instructor at Our Sister School.

Later in October, we started the guest speaker series. The goal of this series is to expose students to various STEAM careers, connect relatable, diverse faces to these careers through sharing their stories, and connect math and science to the real world by speakers talking about how those subjects are involved in what they do. We constructed this series in the following manner: speakers would make a twenty minute presentation, and then our staff would help facilitate a discussion where students would ask a myriad of questions of the speakers. Staff consistently started and ended each session with motivating words related to their academics and working towards their futures in the present.

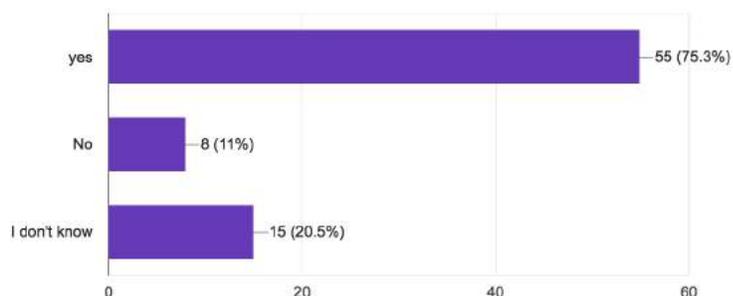


We brought in one speaker per month. Speakers included a quality assurance food scientist, an escalation engineer, two software engineers, a graphic designer, a computer programmer, a product development food scientist, and a data research consultant. They talked about the benefits of having a STEAM career, and what an average day looks like for them. Some were able to do demonstrations, and all used slides as visual aides to help communicate concepts and connect to the students with relatable imagery. Guest speakers came from the following companies: America's Test Kitchen, Blount Seafood, CarGurus, EF Tours, Ocean Spray, Riverbed Technologies, MetLife Insurance, and the New Bedford YMCA.

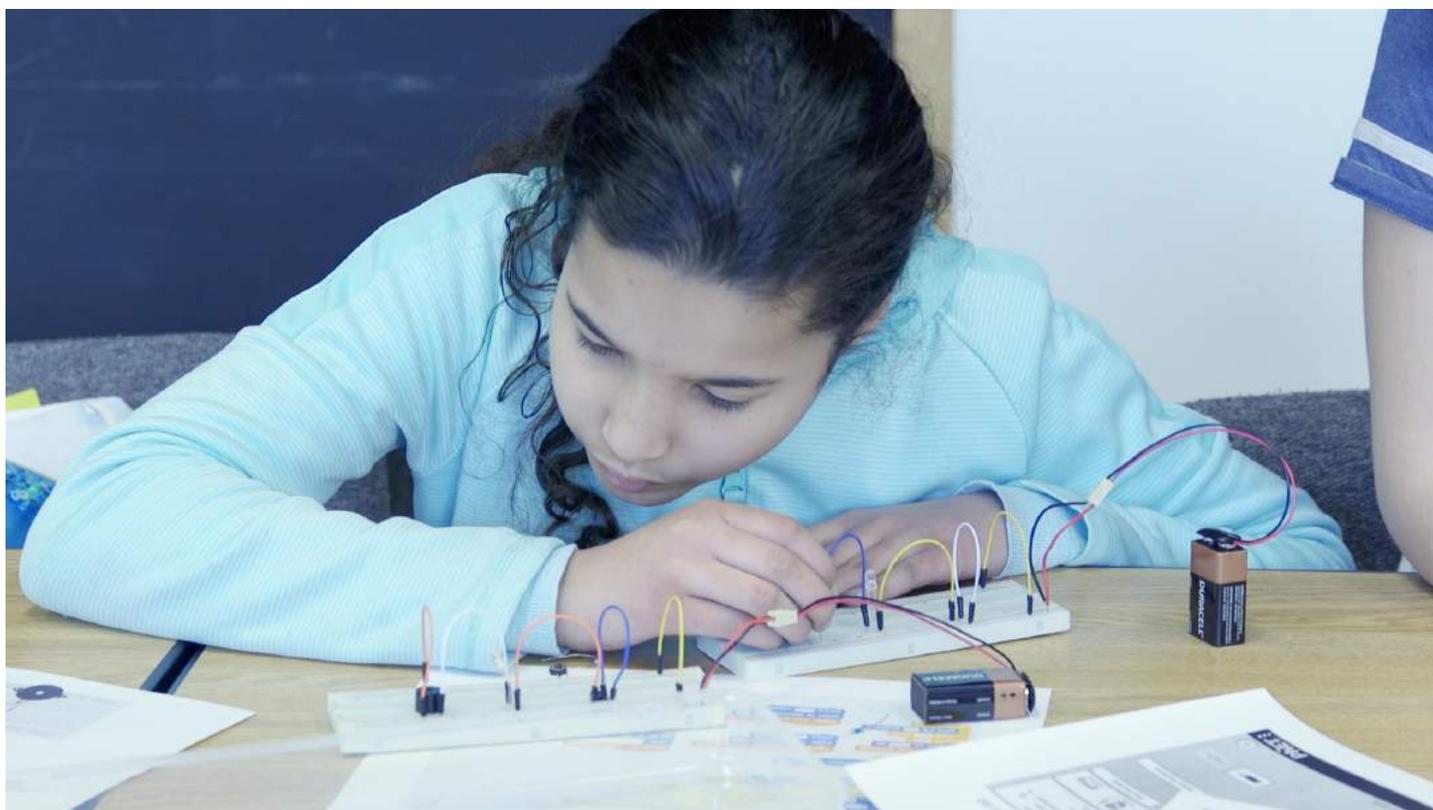
Has this program made you think more about what your career might be?



73 responses



Starting in December, 2017, we began to hold several after-school workshops that engaged fifth grade students in STEAM. These include a hands-on electricity and electronics course, video production, songwriting & performing, and dance choreography. The goal of having various program opportunities for students is to shift their perspective on STEAM fields, and bring them closer to the notion that they can be successful. We theorized that if they showcase their skills, they would also bring their 5th grade peers closer to that notion. The first programs held in December were the dance choreography and first leg of the video production program. We brought in a dance choreographer who worked with students after school for four weeks to develop a dance to the song “Black Made That,” an anthem that we produced about Black inventors.



In January, 2018, we started the electronics and electricity after-school program led by instructor Richard Leary. Mr. Leary worked with students teaching them about utilizing these tools. He and was able to offer consistent hands-on lessons on electrical current, bread-boards, coding, and more. This program went on after school for ten weeks and had a total of 14 students.



In March, 2018, we started the songwriting and performing program. We worked with six students to write a song exposing their peers to various STEAM careers. Each student chose a letter of STEAM to write about, and then researched careers under that specific letter. Our staff coached the students through the writing process, using best practices learned from years of artistic youth development. After the song was written, we brought in a mobile recording studio, and worked with the students to record the song. After mixing the song, we brought in video equipment to film a music video for the song. Students performed their verses in front of the STEAM mural and in the classroom. We

then edited the video and screened it at the final assembly. Students also wrote an additional song encouraging their peers to learn more about STEAM.

In March, we held our second assembly for the program. This was strategically placed directly before MCAS math testing, as to act as a motivating rally for MCAS. The assembly included a screening of a profile video of Pandora's Director of Engineering speaking about the many uses of Math in the real world. It also included a performance by the students of the songs that they had written.

In April, 2018, we started the video program component. The objective was to train our group to produce their own profile video of a diverse STEAM professional. We worked with fourteen students for five weeks on how to conduct interviews, how to setup and break down for a video shoot, how to frame camera shots, as well as lighting, audio, and behind the scenes photography. As a culmination of the program, we brought students on a field trip to the e-commerce and technology company Wayfair, where they conducted a profile video interview with a senior marketing analyst named Jen Patten. Students took turns at six positions including asking the interview questions of our subject. The other benefits of the field trip was our students being exposed to a technology company that we learned has 1,500 engineers on staff. Students were given a tour, and were excited to see the company's virtual reality room, as well as their 3D modeling area. Students had an amazing time and learned about how a large tech. company operates.



In early June, we held our culminating assembly. This event was important as the program came full circle and many of the final products were showcased. The program was recapped by staff, as Mr. Gilbarg mc'ed the assembly and brought the microphone out to the crowd and asked students which careers they learned about that involved math and science. Students were knowledgeable about various career paths, and were excited to participate. The electronics and electricity club came on stage and talked about some of the highlights of the program and what they took away from it. The music video filmed with the songwriting students was screened as a premiere.

The video profile filmed on the field trip to Wayfair was screened. Students from the video program were called onto stage to talk about their experiences and what they learned from the Wayfair trip. Dance and songwriting



students both performed. This was a final opportunity for our staff to address the fifth graders and spread motivational words and next steps that students can achieve. The message was: try things, and if you like them, keep going and building those skills, and if you don't like that activity, than try a different one, because everything is so accessible to learn online.

Pre & Post Survey

At the beginning of the school year, we surveyed 5th graders from Carney Academy in on their knowledge of STEM and STEAM fields. The students were given turns on

several computers to fill out a Google Form. This survey contained several questions that varied from multiple choice, checkbox, and short answer format. After the first survey which took place in late September, there was an initial school assembly which took place in October and then one guest speaker per month after the initial assembly. The post survey was taken at the end of the school year in June, and the only difference in the questions examined were references to speakers that held STEAM jobs included in the survey.

Survey Findings

At the beginning of the school year, 56.31% of students were able to correctly identify the elements in the acronym STEAM (Science, Technology, Engineering, Art, Math). The students are in the 5th grade and thus made some spelling errors, but each individual entry was looked at manually to deduce whether the student was actually comprehending the subject matter. At the time of the final survey, 72.6% of students were able to properly identify the acronym. An important element of the presentations is trying to bridge the gap between students and the actual careers that the presentations are focused on. In the pre-survey, 50.49% of students felt that they could see themselves in a STEAM career. The program was successful, getting 57.53% to see themselves in a STEAM career by the end of the year.

Students were also asked as part of the survey to describe the roles of people in different STEAM positions. 29.73% of students were able to describe the role of a software engineer in the beginning, and that figure rose to 37% in the post survey. 21.6% of students were able to describe the role of a data analyst in the beginning, and that figure rose to 37% in the post survey as well. Finally, 40.54% of students were able to describe the role of a food scientist at first, and that figure rose to 50.68% in the post survey. In their short response to the question “why is math important?”, the beginning survey responses were for the most part very vague and made little reference to actual jobs. Typically, the bulk of the responses referenced how “knowing math makes you smart”, and “helps you solve equations” etc. In the post survey, students made many more references to specific applications of math and careers. For example,

List some careers where people use math in their jobs:

73 responses

car machanics, Elevator engineer, robotic engineer carpentre

food sientist,chemist

Game developer,artist,teacher,scientist,engineering and technoligy

construction worker

carpenter teacher

teacher,computer worker,game develepor,carpenter,scientist

sientest, teacher, doctor

teacher, Marketing anelist, video game maker

Sientist, Teacher and Engineer

Counting money to give people their change back. Or if you are a boss you have to pay bills which include numbers and math.

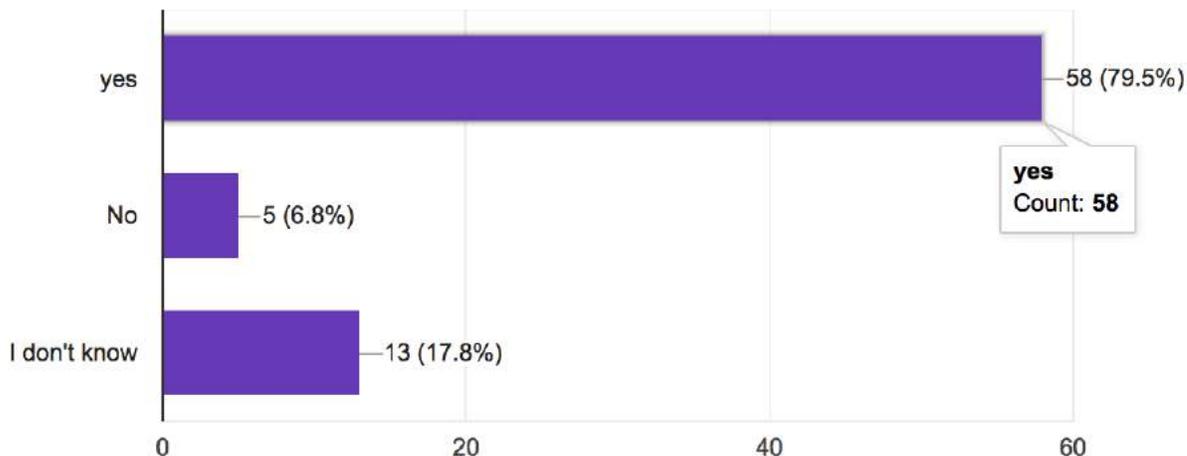
Video game maker, computer technicians, and scientists.

students named carpenters, accountants, architects, and even referenced filing taxes as reasons why math was important. Across the board, in the pre-survey the students gave generic answers as to why math was important, but in the post-survey they were able to make several connections to how it is actually applied in the real world.

Has this program made you more confident in your self?



73 responses



In addition to these findings, the fifth grade teaching team reported higher levels of interest and engagement in Math and Science as well as increased awareness of the plethora of STEM careers. Generally, students were more knowledgeable about options for their future, and more confident that they too have the ability to pursue STEAM career paths. We truly believe that we are shifting the culture as to how students view education, and appreciate the opportunity to conduct our program.

Teacher Surveys

Throughout the school year we worked directly with Carney Academy's five 5th grade teachers. We surveyed them after the program concluded to get their input about the program and how it affected their students.

Describe any changes you observed in students as a result of this overall year-long program?

5 responses

More interest in STEAM. When given projects to research a famous African American during Black History month or a famous woman during Women's history month, many students focused on scientists.

The student spent some more time thinking about some of their future job possibilities and how they related to what they were learning now.

students have become more engaged and participated in the extra school activities.

Higher level of interest in STEAM related activities.

Student engagement increased during the presentations and students became more aware of various STEAM occupations.

Do you think the after-school STEAM programs had a big impact on your students? Please explain what you've observed in your students as a result of being involved in the after school program(s):

5 responses

- Absolutely. The students often spoke highly of the programs.
- The students absolutely loves all of the after school programs. They really brought to life some of the topics that were being discussed.
- Yes. They were eager to attend and they found a new passion for technology and science.
- Yes, they provided opportunities to students in STEAM related fields that students in inner cities would have never had that chance to do.
- YES! The students learned an incredible amount of information and they are eager to pursue the STEAM opportunities.

Do you have an anecdote or story about a particular student or students that lends credence to the effectiveness of this program?

5 responses

- The program makes careers in STEAM feel like a real possibility for our students, many of which love math and science. Finally, my kids loved the after school programs.
- My student was in the music writing program and she's not always the most motivated when it comes to academics. She loved the music writing program and was able to learn some things in the science math and used her passion for music to relate them to something academic.
- loved watching my students excitement and confidence in STEAM after going to the after school clubs
- Luis, a student in my class began the year a shy 11 year old. By the end of the year he was writing and performing raps in front of hundreds of people. His confidence grew an all areas, socially, and academically.
- Students that appeared to be shy and reserved, were able to get up and sing in front of the entire school.

Did this program inspire or encourage you to try new approaches?

5 responses



Would you recommend this program to colleagues / other schools?

5 responses



Funders of the program:

This program was funded by BayCoast Bank, Bristol County Savings Charitable Foundation, Carney Family Foundation, SouthCoast Business Association and individual donors.

Press for the program:

<http://www.southcoasttoday.com/news/20180510/steam-program-helps-new-bedford-kids-see-big-picture>

<http://www.southcoasttoday.com/news/20180201/black-made-that-video-features-new-bedford-students>

Final Products created during the program:

(click on each video link to view)

[Music Video about STEAM Careers - written by 5th grade students as part of the after-school songwriting and performing program](#)

[Carney 5th graders talking about how the program had impacted them \(filmed in Dec. 2017\)](#)

[Slideshow of Carney 5th graders in action throughout the 2017-18 program](#)

Comments from participants about the program:

Carney Academy's principal Karen Treadup: "The STEAM initiative provides Carney students the opportunity to explore various facets of technology related fields. Students have been able to participate in technology, video-production, and the arts. Guest speakers have been brought in to share knowledge and expertise with our students, opening their minds to a plethora of possibilities."

Abigail Lima, a fifth grader involved in the after school video production program commented on the impact that the program had on her: "I've learned that no matter where you come from, you can still accomplish anything."



Guest Speaker Nicole Pupillo, software engineer, America's Test Kitchen: "It was great to be involved in a program that is actively bridging the skills that kids are learning in school to real world career paths by demystifying what people do for a living."

