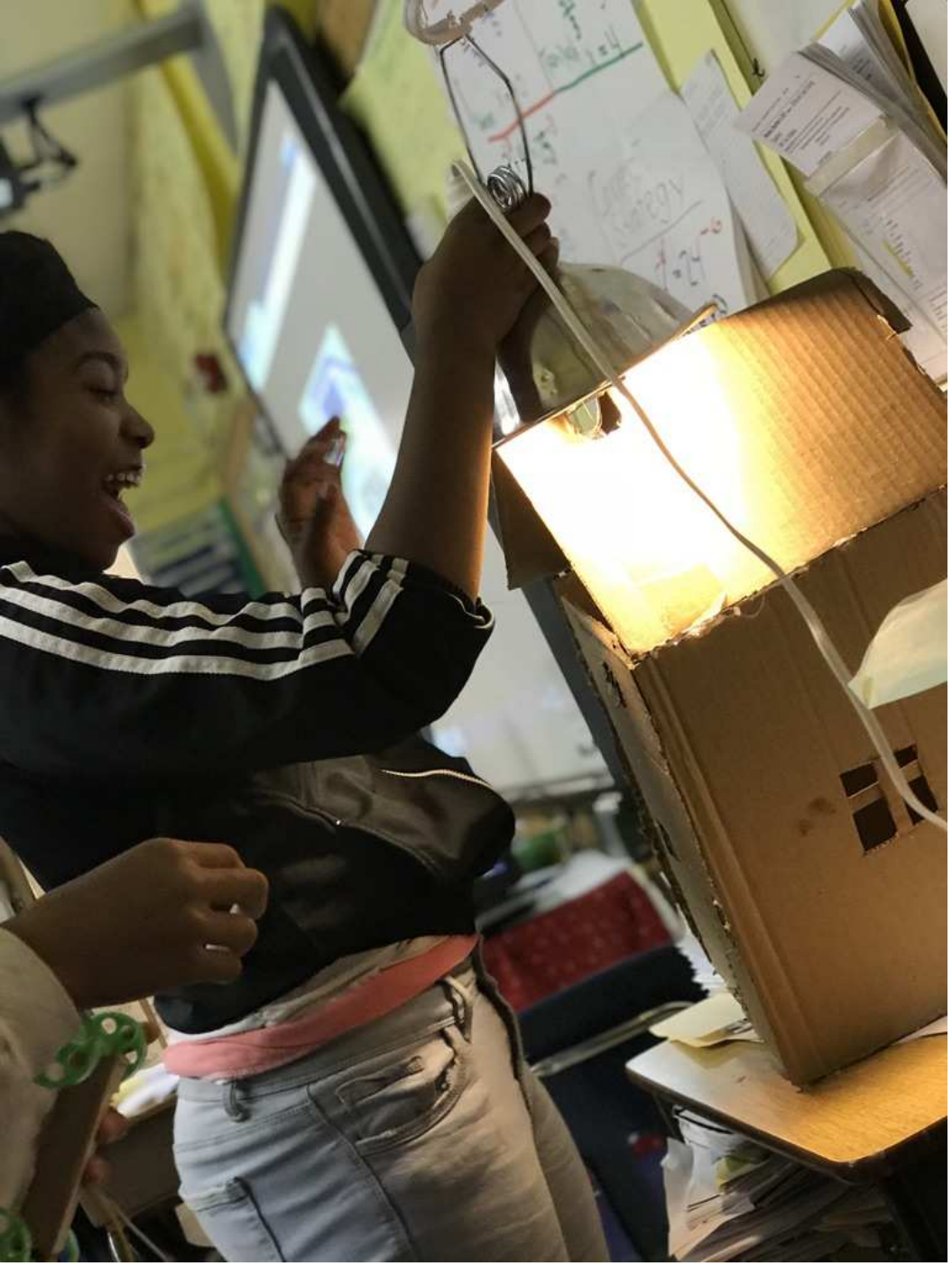


Hefferan STEAM Elementary

Chicago, Illinois

Title: Seeing STEAM and Energy in a New Way

Advisor: Dr. Heather Hampton

2017-2018 School Year

Abstract: At Hefferan Elementary School, we wanted to make sure that the 2017-2018 would have the most impact of any year that we have ever had. We started by developing eight goals to help us plan for the year. We needed to make sure that the stakeholders were also on the same page. We communicated all aspects of our goals to all of our community partners. We held our STEAM Energy Fair earlier this year in December and secured the help of people in the industry, such as engineers and scientists, to serve as mentors to the students. These mentors worked along side the students and helped them to develop and execute their Energy project plans. During this time, we also made sure that we started early to plan out specific field trips that aligned to our goals. We visited the Museum Of Science and Industry (MSI), Dusable Museum, The Alvin Ailey Company of Performance Arts to name a few. The rationale was to make sure that students understand that STEAM comes with Arts embedded. We also wanted to make sure that students increased the technology within their projects. We included a program called The West Side Media Project to help students learn how to use audio equipment, video cameras, and speak in front of a camera. This relates strongly to energy because as we learned the curriculum, we also created a show that showcased what we had learn in our energy curriculum. This brought us to the curriculum. We utilized the curriculum and also developed small STEAM challenges that helped students to understand energy even more. For example, we created roller coasters to understand potential and kinetic energy. We also brought in a nutritionist to help explain how energy works in your body with the foods that you eat. We ended the year with an energy audit of the entire school.

Goals

Goal #1: Research and Understand the Fundamentals of Energy using advanced STEAM practices.

Goal #2: Use our understanding of energy and alignment of STEAM to create, simulate, and innovate new projects or redesign an older project.

Goal #3: Step into the community and participate in activities that enhance our scientific knowledge as well as build our capacity to share our findings with others.

Goal #4: Continue to attend STEAM content rich field trips with external partners.

Goal #5: Engage in energy sharing practices with major stakeholders.

Goal #6: Bring in Scientists and Engineers to assist students to develop ideas and see them through

Goal #7: Participate in an Energy Audit and then Audit the school and our homes

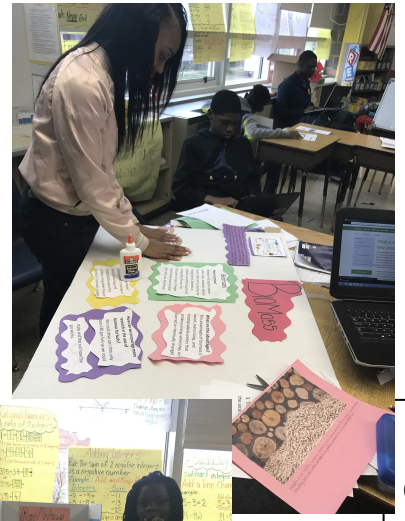
Goal #8: Showcase our learning through a STEAM Energy Fair

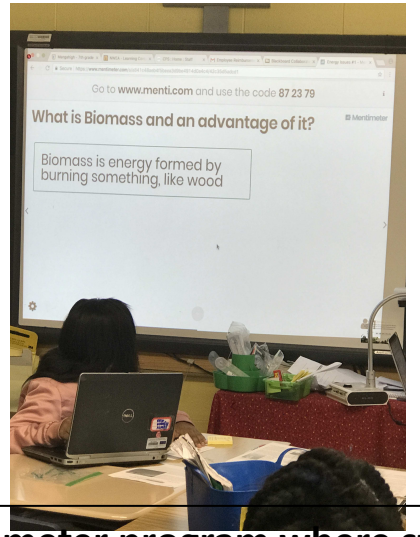
Goal #1: Research and Understand the Fundamentals of Energy using advanced STEAM practices.

Hefferan STEAM Elementary School engaged energy in STEAM this year. The year started off with us taking a deep dive into the different types of energy. We used a program called Mentimeter to discuss energy through a technological discussion. This program supported our learning because students felt comfortable reading the information, digesting it and explaining what they knew about the topic. This approach also help to clear up misconceptions about the learning.

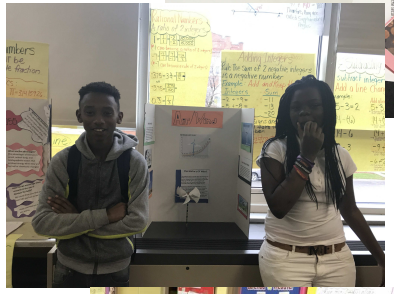
Mentimeter aligned to our goal of increasing STEAM and Energy education because as students learned about energy they were able to share their learning through technology, but also learn more through reading some of their friends ideas.

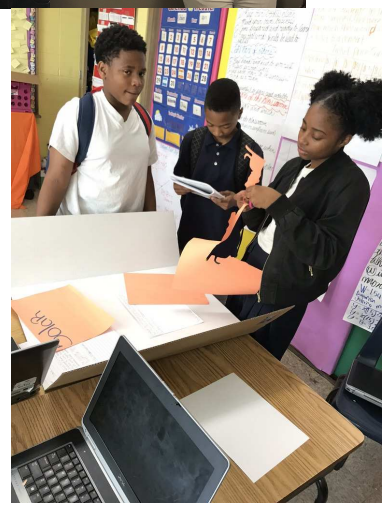
Students in the middle grades researched specific topics in energy and developed a presentation both on poster board and via a PowerPoint, to tell the story of energy.

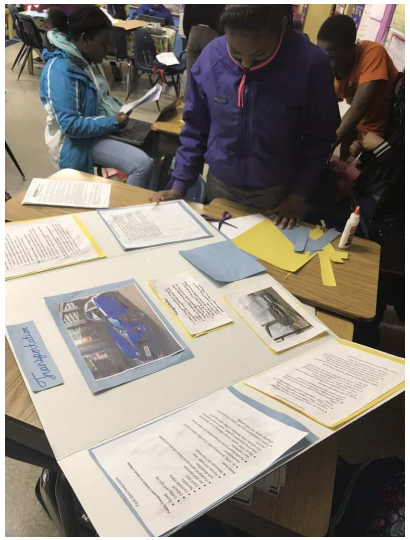


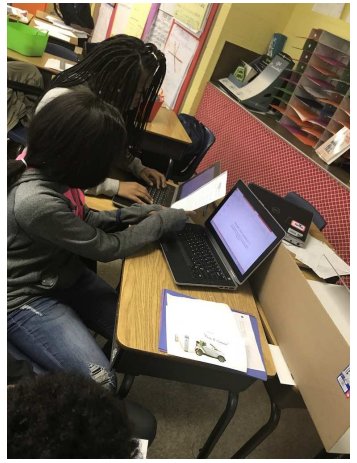


Mentimeter program where students can interact with peers and their research of concepts.



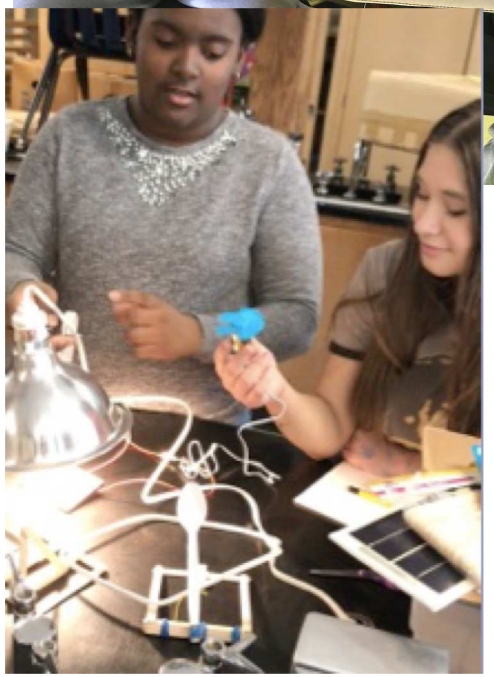




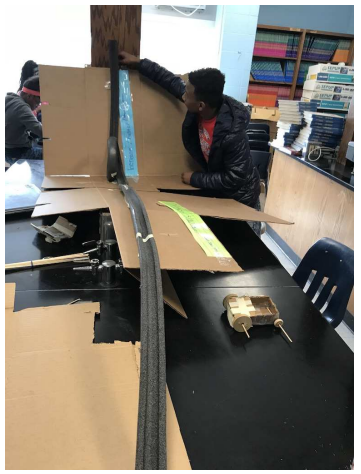


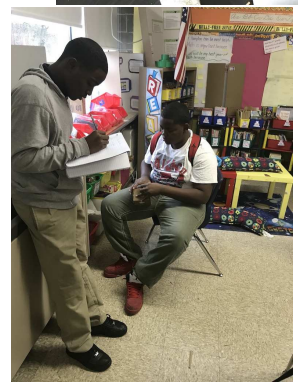
Goal #2: Use our understanding of energy and alignment of STEAM to create, simulate, and innovate new projects or redesign an older project.

We noticed that in previous years, we would learn about energy and then when it was time to have our Energy Fair at the end of the year, there would be a few projects to draw from. Our task was to increase the number of projects that we had at the STEAM fair. The only way to do this is to “own” a project. We set the perimeters for project. It could be a project from the Need Kit or a project that the student designed on his/her own. We used the knowledge from Energy and STEAM to develop new types of energy based questions that we could test or new ideas that we had.



We started with the goal of using the information that we learned to apply it to either new projects for enhancing an older project. The students above enhanced a project from last year. He designed a community that could withstand the devastation of a tornado.





Goal #3: Step into the community and participate in activities that enhance our scientific knowledge as well as build our capacity to share our findings with others.

We took time to participate in many of the science and technology activities around the Chicagoland area. We competed in the Invention Convention Challenge at Westinghouse, ChiArts STEAM program, Magnet Schools of America, Dusable Museum and Google Technology Launch, Network 5 Science Fair. On top of that, we were included in the Black Googler Network and Dusable Museums VR device that helps visitors to the museum engage in Black History through technology. This event was televised on the news, YOUTUBE, and in the Patch Newspaper. We also learned how to showcase our learnings by creating a video. We learned how to create energy videos that can teach other students about energy.

Dusable VR Event

Invention Convention and Science Fair

Westside Media Project helped us to share our learning of energy through media.

Goal #4: Continue to attend STEAM content rich field trips with external partners.

We attended many different field trips that helped to enhance our STEAM and knowledge base. We attended MSI for the STEAM Robotics Event and Black Creativity. We were able to continue to learn more about Energy and the impact of how energy effects our lives.

One of the things that were really important to us this year was being able to share our knowledge to others around the Chicagoland area. We provided energy content to other students in the Suburbs of Chicago. Our teacher traveled to Joliet and provided energy education to to elementary and middle school students. Under the partnership with Sigma Gamma Rho Sorority, Inc., she worked with the students of Evergreen Apartments. We were able to develop the lesson that she used to share our knowledge of Energy to the students within the area. We have met State Representative, Senator, as well as the Central Region President of Sigma Gamma Rho.

Goal #5: Engage in energy sharing practices with major stakeholders.

In December, we held our annual Science Energy Fair; however, this year it was different. We understood that it was important to change the way we looked at the science energy fair. Students needed the opportunity to showcase their ideas of energy. So, we took action. Students learned about energy, digested it, and then were able to design their own experiments to showcase. This aligned with the application of the concepts learned throughout the Need Curriculum. In addition to this learning, we worked with the Westside Media Project to learn how to create a newscast that displays what is happening in the classroom and at school. Students used this time to learn how work the camera, audio, and speak in front of the camera about topics that they learned in school.

(Above) The State Representative Melissa Conyears-Ervin, who was a judge at the Science Fair as well as a key speaker for the event.

Goal #6: Bring in Scientists and Engineers to assist students to develop ideas and see them through

Students were given the opportunity to be assigned a mentor to assist them with their energy ideas. We joined forces with engineers from Abbott Labs and the STEAM Department in CPS. They worked with our students to understand and develop their ideas through the design cycle. Students worked side by side with the mentor to develop their ideas. Through their enhanced knowledge of energy, most students chose projects that were centered around enhancing energy or using energy to make something work. Some examples of the work was a motorized circle maker which used their knowledge of a closed circuit, a solar house with heated flooring, and enhanced solar oven for developing countries. The idea that we could get outside partnerships to help mentor the students helped the students to gain more capacity of the content. We also had access to a nutritionist to help us understand about how energy is supported by calories and activity.

We learned so much from the Engineers and Scientists that mentored us this year. Above are photos of just two of the mentors we had.

Goal #7: Participate in an Energy Audit and then Audit the school and our homes

Thanks to the energy audit, we were able to learn what to look for in terms of energy conservation and efficiency. 15 students took this knowledge and taught it to the other students in the building. Students worked in afterschool and audited other classrooms. They provided additional opportunities to teachers and students to change their rating by offering additional suggestions for energy efficiency.

Goal #8: Showcase our learning through a STEAM Energy Fair

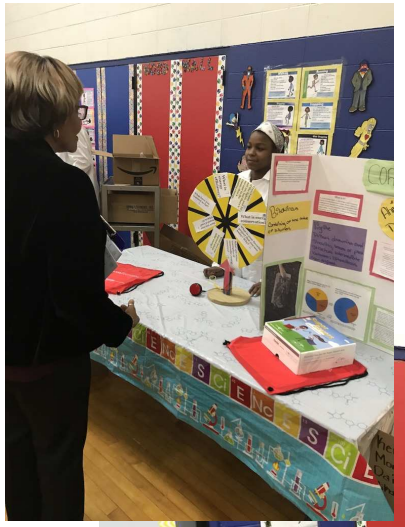
Students took evidence of their learnings and presented their projects during a STEAM fair. In previous years, there were a small number of project presented this year, all students owned a project and saw it through. On this day, we had an excellent turnout. 500 students and parents attended the Energy Fair in 2016-2017 school year increased to 700 students and parents. We even had a strong partnership turnout.

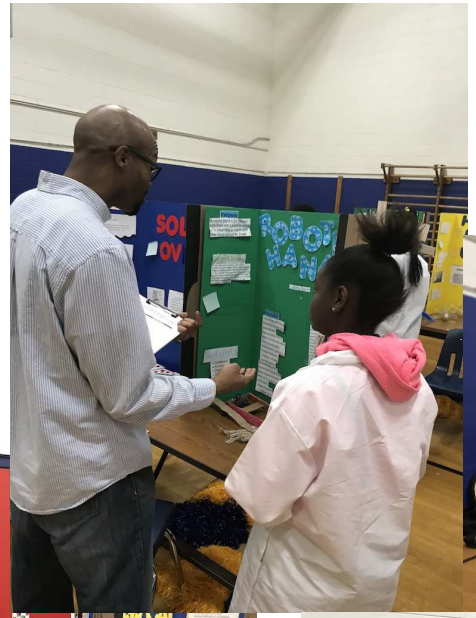
Our outside partnership attendance was at an outstanding rate from 2016-2017 school year. There were 20 outside partners from Network Representatives including Chief of Network (6), STEAM department members (5), mentors (3), RUSH Hospital Representatives in Department of STEAM Outreach and Education (3), ComEd and Peoples Gas Representative (2), Alderman Ervin and State Representative Conyears-Ervin and Illinois State University STEAM department (1) in 2017-2018 school year.

This is a photo of the Alderman and State Representative as well all members from ComEd/Peoples Gas/ Exelon Gas Team.

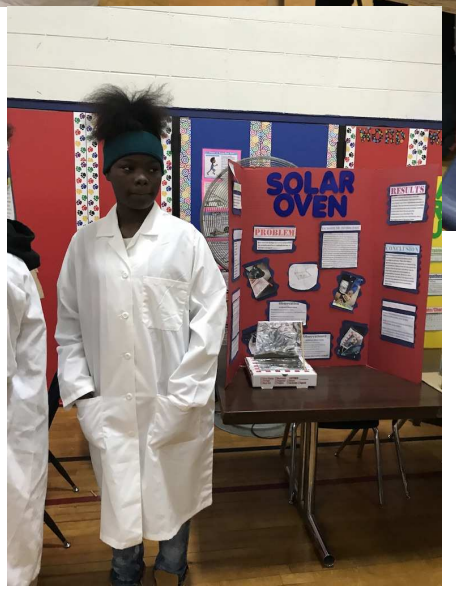
Evidence of Goal #8: Showcase our learning through a STEAM Energy Fair

In the photo to the left, is the Alderman Ervin listening to the hydropower experiment.

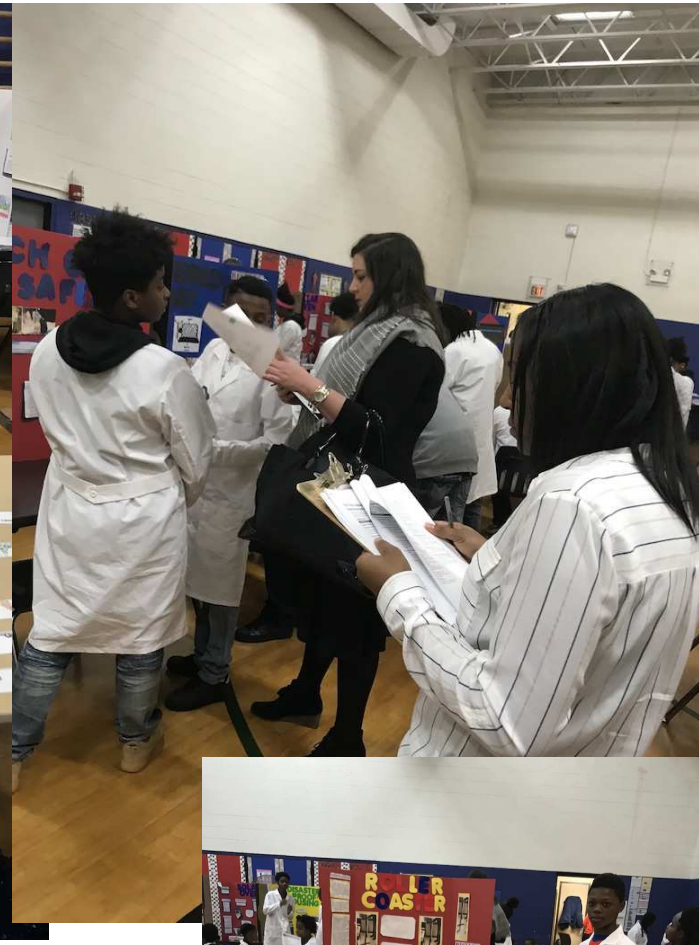


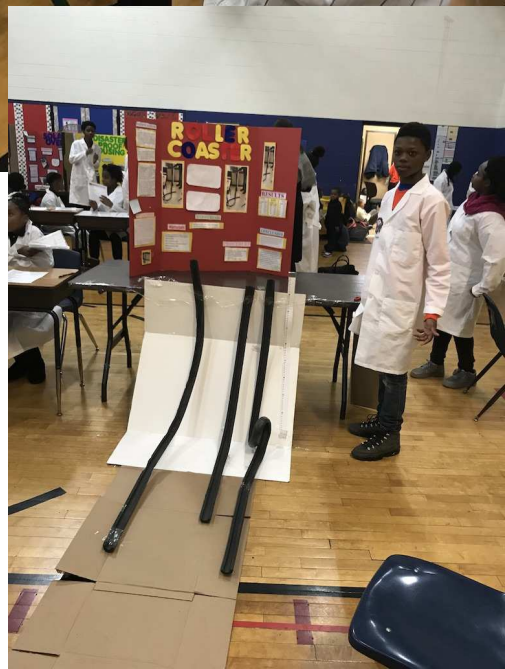


We embedded the arts at the fair. The cheerleaders cheered as a cheerleader played the flute.



More Science Energy Fair





2017-2018 Community and School Impact

- 500 students and parents attended the Energy Fair in 2016-2017 school year increased to 689 students and parents
- Outside Partnerships Attendee: 20 outside partners from Network Representatives including Chief of Network (5), STEAM department members (5), mentors (3), RUSH Hospital Representatives in Department of STEAM Outreach and Education (3), ComEd and Peoples Gas Representative (2), Alderman Ervin and State Representative Conyears-Ervin and Illinois State University STEAM department in 2017-2018 school year.
- 6 students competed in CPS Network 5 Science Fair
- 10 Students participated in the Invention Convention
- 15 students worked on the First Lego League Competition.
- 90 students attended the Magnet Schools of America STEAM Showcase
- 90 students participated in the DuSable Museum/Black Googler Network and Google VR Launch and 3 students were featured on the video/TV with was shown on the ABC News.
- 124 Middle School Students directly involved in STEAM Energy Science fair Showcasing energy projects and Fair games

2017-2018 Community and School Impact (Continued)

- 15- Students conducted an energy audit of the school in grades Pre-K through 8th grade
- 60 students participated in the Meet-One-Teach-One activity continued in K-5 grade. Students explain what electricity is and how to conserve it.
- 40 students traveled to different areas in Chicago to showcase their experiments and inventions (invention convention, STEAM University of Illinois Junior Scholars Program.
- 15 students learned how to audit for energy waste/conservation.
- 15 students participated in the school audit program.
- 15 students participated in ChiArts STEAM program with one student participating in the program since kindergarten.
- 90 students were impacted by the engineering mentor and STEAM Department mentoring.
- 90 students were introduced to how energy ties into living a healthy life program which allows students to understand energy on another scale. (Energy, Calories, and Food)
- Teacher traveled to Joliet, Illinois to share Energy to students in Evergreen Terrance. Participated in STEAM challenges embedded in energy. Aligned a partnership with the housing community to share energy conservation with parents and students.
- 30 students worked with the Westside Media Project to learn how to embed our learnings into a newscast.
- We won the “Get into Energy Illinois” Classroom Grant this year.

On Behalf of the Students and Staff at Hefferan STEAM Elementary School, we Thank You for Energizing Hefferan Students Potential! All of the partnerships that we have developed over the years have helped us get to this point. Thank you for believing in our school, our teachers vision, and making all of our dreams come true.

-The Students and Teachers at Hefferan School