



Community Environmental Science, August 2018

# The Phelps Library STEAM Initiative

*If your vision is for a year, plant wheat.  
If your vision is for 10 years, plant trees.  
If your vision is for a lifetime, plant people.*

~ Chinese Proverb

**It is our vision at the Phelps Library to plant seeds of inspiration, curiosity, and success within our young people through STEAM, which stands for science, technology, engineering, arts, and math.**

**The Phelps Library STEAM Initiative** aims to foster professional skills and interest in STEAM Careers beginning in pre-school through seventh grade. We work to bridge our region's science, technology, and trade skills gap by teaching advanced manufacturing classes to 8-12 year olds, to introduce K-12 students as well as formal and informal educators to STEAM activities and careers, to unite over 500 inventors, manufacturers and makers at our annual FLX Maker Fest, and to advance our local economy through community partnerships and education.

The following STEAM Initiative Report details the various aspects of our STEAM Initiative, along with the impact of our advocacy for STEAM education within our community and throughout the State of New York, including:

- I. STEM Explorers: Teaching Advanced Manufacturing**
- II. STEAM Camps: The Phelps Community Center School Age Program & the Personalized Learning STEM Camps at Midlakes Elementary School**
- III. FLX Maker Fest: A Celebration of STEAM**
- IV. STEAM-ing Up Your Library Programs: Inspiring Libraries & Schools Statewide**
- V. The Phelps Library STEAM Scholarship: Empowering Future STEAM Careers**

We at the Phelps Library believe so deeply in our small community of Phelps that we have worked tirelessly to be an award-winning center for STEAM education, experimentation, creativity, and collaboration, redefining the entire concept of small and rural libraries in our region. We work to pair our local industries with talented recruits and to help students find inspiring careers, stimulating our local economy and encouraging community growth.

## The Phelps Library

- Association Library
- Chartered to serve a population of 7,100
- 1 FT Director, 4 PT staff
- STEAM Programming Budget of \$2,000
  - STEAM Lab Makerspace available for free to all ages, regardless of residency or library card standing, open during library hours (see list of tools and technologies here: <https://www.phelpslibrary.org/steam-lab>)
- All STEAM Classes taught by talented, motivated community volunteers and library staff
- **Contact Information:** Leah Hamilton, Executive Director  
8 Banta Street, Suite 200, Phelps, NY 14532  
Phone: 315.548.3120 Website: [www.phelpslibrary.org](http://www.phelpslibrary.org)



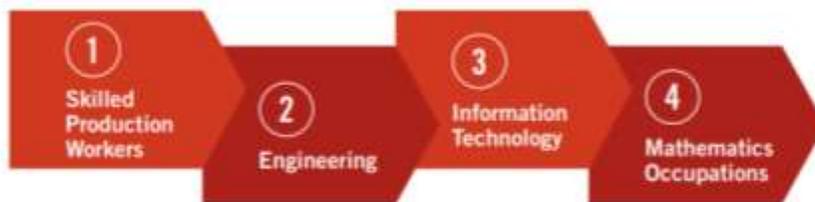
According to the 2017 report, *Bridging the STEM Skills Gap: Employer/Educator Collaboration in New York*, issued by The Public Policy Institute of New York State,<sup>1</sup> employers reported having the most difficulty filling positions in engineering, skilled production, and information technology. The skills job candidates lacked most were scientific, technical, and engineering skills. The Education Commission of the States reports that STEM jobs in New York have the lowest rate of unemployment and are the fastest growing at 14%, as compared with non-STEM jobs at 10%.<sup>2</sup>

Locally in our Finger Lakes region, manufacturers and industry leaders struggle to stay in business not because of a lack of community need for their services but rather because of a scarcity of job applicants with the skills required to perform the job. Business owners wait outside the doors of local BOCES programs for their most recent graduates; many students have already been hired prior to their graduation ceremony. Our region, according to our interviews with these business owners, also struggles to find talented workers who can pass the mandatory drug screening.

Regions experiencing most difficulty filling jobs



STEM jobs hardest to fill currently, and projected to have shortages over the next 5-10 years



<http://www.ppiny.org/reports/2017/PPI-Skills-Gap-Report.pdf>, page 3

The Phelps Library not only works to connect skilled job seekers with these businesses-in-need, but we aim to inspire our younger students to pursue careers they are passionate about and to make them workforce ready. We work to bring awareness that libraries are centers for education both inside and outside the walls of the library, increase our role and partnerships in economic development, and ensure sustainable funding for the library.

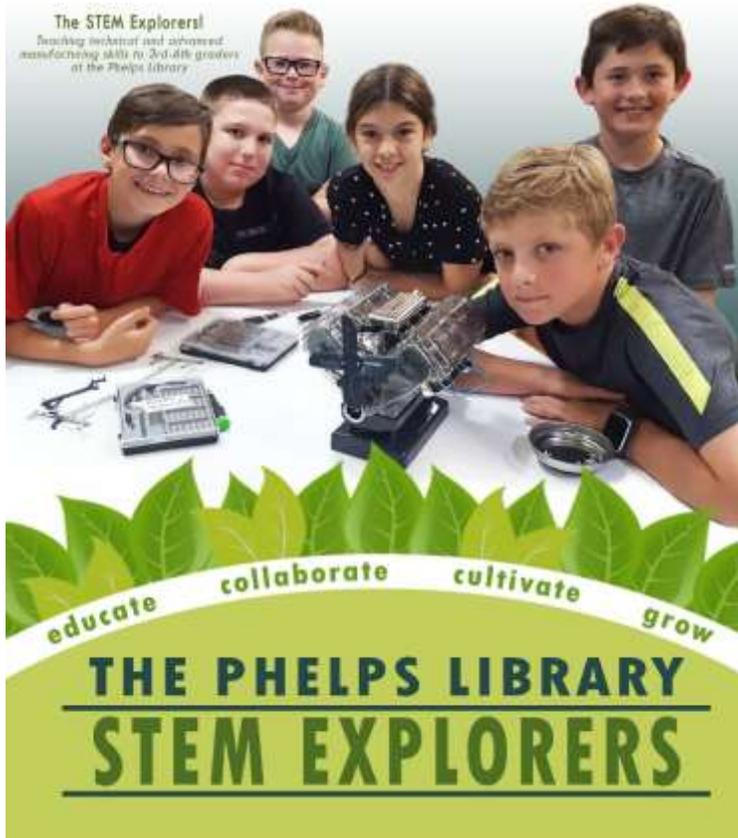
<sup>1</sup> <http://www.ppiny.org/reports/2017/PPI-Skills-Gap-Report.pdf>

<sup>2</sup> <http://vitalsigns.ecs.org/state/new-york/demand#fields-growing>

## I. STEM Explorers: Teaching Advanced Manufacturing and STEM Skills

The first aspect of the Phelps Library STEAM Initiative is the STEM Explorers (see page 10). At the Phelps Library, we believe in providing to our communities innovative educational opportunities. Our library partners with manufacturers and schools in unique ways because we believe that we can only be stronger together. We believe that education must be redefined.

Why? Because there a need that is greater than any of us individually: our region is suffering economically from a STEM and technical skills gap. Our region’s manufacturers struggle to succeed not because of a lack of need for their products and services but rather because of a scarcity of workers with technical skills required for the job. At the Phelps Library, we teach those STEM and technical skills in our STEM Explorers program.

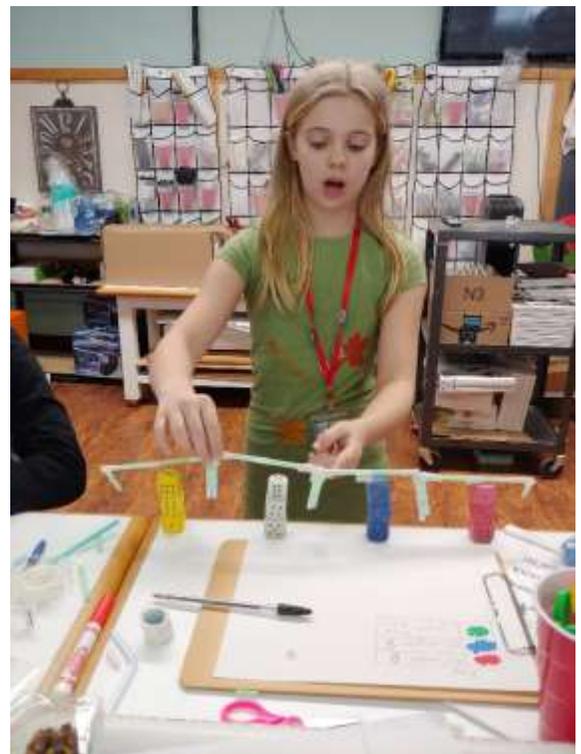


Why should a library partner with manufacturers instead of simply shelving books? Why does the Phelps Library have scroll saws and drill presses and why do we teach welding? Because libraries are redefining education in order to meet the technical and economic needs of our communities.

We teach advanced manufacturing skills to 8-12 year olds in our STEM Explorers Program to inspire kids to pursue STEM and technical careers from a young age. These kids learn about electronics, mechanical and electrical engineering, drawing, measuring, and assembly, lean and advanced manufacturing, environmental science, and the basic use hand tools, all while developing personal and professional skills. They take apart machines, build V8 engines, build augmented reality sandboxes, travel to STEM events like Imagine RIT, Maker Faire Rochester, and University of Rochester's Raspberry Pi Jam that they wouldn't otherwise be able to access, and learn coding and programming. The Phelps Library takes the STEM Explorers on field trips to local manufacturers like OptiPro, where the students perform tests on optical equipment and learn about different technical applications and occupations. They learn about environmental science at our local Flint Creek, where they collect and identify aquatic insects to determine the health of the stream to

aid scientists in their research, as a partnership with the Finger Lakes Institute. Student interests drive the class because we want to help them to discover what they love to do. We at the Phelps Library aim to foster professional skills and interest in STEM and to teach the personal and professional technical skills that these students will need to make informed decisions about future STEM careers.

In our most recent class, the students designed a whisper tube for our children's room. First, we learned about the history of speaking tubes over one hundred years ago in ships and large homes. Since we are going to make ours from PVC pipe, we learned about plastics manufacturing, from injection molding and extrusion, to vacuum forming and blow molds. We looked at various plastic items around the room and determined how each item was manufactured. Then we talked about the environmental impact of plastics and what happens with manufacturing waste and regrinding. We discussed our disposable society and how they could effect change in mindset, practice, and recycling. As scientists, the students took clipboards and went to the children's room to sketch a design and with measuring tapes, to do some space planning and to calculate the length of PVC pipe we'd need and how many elbows would be required for their design. They built their designs from drinking straws and tape presented their design to the class, describing the unique features they had incorporated. One of the students chose to use red striped straws for 45 degree elbows and blue striped straws for 90 degree elbows, and green straws for the straight pieces in her design. (A future engineer perhaps?) Finally, with safety glasses on, we taught the students how to use a measuring tape. They measured 1" lengths of PVC pipe, tightened the pipe in a vice, and used a hand hacksaw to cut the 1" piece of PVC.



These classes are cross curricular, incorporating both STEM and non-STEM integration through personalized, project-based learning. In this whisper tube class, in the span of two hours, the STEM Explorers learned about history, plastics manufacturing, environmental science, and both technical and scientific careers. The students were scientists and space planners. They mechanically and creatively engineered their own design, presented it to the class, and assessed the benefits and challenges of each design. They learned how to measure, performed calculations, and learned to use hand tools. Some of the students chose to work collaboratively and some opted to work alone, so they were learning delegation, job sharing, responsibility, social skill, and the benefits and challenges to working solo or as a team.

After each class, the students earn STEM pins to add to their own STEM Explorers lanyard. Pins are awarded for both STEM skills, including: Innovation Sharing, Microscopic Investigation, Communication, Helping Others, Safety Skills, Problem Solving, Observation, Planning Skills, Building, Robotics, Programming, Experimentation, and Exploration, among many others.

Why do we target 3<sup>rd</sup>-6<sup>th</sup> grade? This technical skills gap is an issue nationwide: In 2011 there were 600K unfilled technical jobs due to skills gaps. Right here, right now, our manufacturers are fighting each other for skilled workers, and the smaller businesses lose. By the time our 12 year olds hit the workforce in 2025, this number will rise to 3 million. At the library, we have the power to change that statistic through STEM education.

We transform education at the Phelps Library to best fit our community's needs and to nurture cross sector partnerships so that our young STEM Explorers will better understand the world around them and how it was created. Numerous community partners, from manufacturers to K-16 educators to local volunteers and organizations make this program truly enriching for the STEM Explorers, preparing them for future/potential careers in STEM and technical fields.



If we, as a community, nurture and encourage our little ones who LOVES to take things apart at home just because they are curious how it's put together maybe one day they will become engineers or scientists or pursue another STEM career to create new, beneficial things every single day. Perhaps one day these STEM Explorers will have the transformative power within their hands to make a positive difference in our community. I love to see the kids in our STEM Explorers program so inspired and excited about these projects. I heard one of my students say to his mom last class when she mentioned coming back for another class, "YES! I would do ANYTHING at the Phelps Library!"

Following are some examples of the STEM classes and field trips we've offered through the year-round STEM Explorers Program:



- Attend Raspberry Jam to learn about Raspberry Pi and the world of IOT (Internet of Things)! There are endless opportunities with the Raspberry Pi from controlling lights, to creating your own retro-game emulator, to building your own robot and so much more! This event will be held at the University of Rochester.
- Each participant will receive a free tool box with tools. Learn about the mechanics of household items by taking them apart to see how they work. Items include computers, fans, televisions, kitchen appliances, digital cameras, and cell phones. (In this class, we pay close attention to see who gravitates toward the digital and to the mechanical, so we can offer them more activities in that direction).
- Learn about tooling! We will use hardware like nuts, bolts, and screws, quality control, and measuring by investigating the treasures we dismantled in the first class.
- Attend Maker Faire Rochester. Much like the FLX Maker Fest, MFR is a gathering of fascinating, curious people who enjoy learning and who love sharing what they can do. From engineers to artists to scientists to crafters, Maker Faire is a venue for these "makers" to show hobbies, experiments, projects. Entry fees will be paid by the Phelps Library.
- Build an Augmented Reality Sandbox! Using a computer, 3D projector, and special sand, pushing the sand into mountains will change the topography projection in real time! Hold your hand over the sand to make it rain! We will learn about electricity and volts. Learn about our region's watershed and our impact on water quality.
- Use the AR Sandbox and program the equipment with software to learn about our region's watershed and our impact on water quality. Test out Virtual Reality technologies.
- Take field trips to some of our local, innovative manufacturers! We will travel to OptiPro in Ontario, NY, to learn about STEM and technical careers, test optical equipment, learn about the optics, ceramic and metals industries, and much more!



- Visit Flint Creek on Ontario Pathways to collect water and aquatic insect samples to monitor our local water quality. Use microscopes to investigate the insects. Speak with a member of NYS Environmental Conservation to learn more about environmental science. The data collected will be entered into a regional database to aid scientists in their research (a collaboration with Hobart & William Smith College's Finger Lakes Institute).
- Learn about the science of science by designing and building a whisper tube for our Children's Room! Learn about plastics manufacturing, the plastics in your world, and the environmental impact of plastics. Learn how to calculate and measure, and build a model of your design.
- Tackle engineering with the James Dyson Foundation Engineering Box. Using screwdrivers to discover design clues and learn how machines work, the Engineering Box to challenges more students to think like engineers. The Engineering Box is a reverse engineering kit that takes students through the design process by disassembling a Dyson machine – understanding how a machine works by taking it apart.

**IMPACT:** Eight students ages 8-12 per semester as well as their parents, up to three local manufacturers per semester, environmental scientists across the State, two community organizations, one college.

<p>ay</p> <p><b>TODAY I LEARNED</b></p> <p>that not every slimes the same and I learned how to make magnetic slime and it is more funer than you think.</p>
<p><b>AT THE PHELPS LIBRARY!</b></p> 

“Today I learned that not every slime is the same and I learned [sic] how to make magnetic slime and library is more funer [sic] than you think.”  
~Jay (4<sup>th</sup> grade)



Using a D Net to collect aquatic insects  
Stream Monitoring on Flint Creek, August 2017

## II. STEAM Camps: Finger Lakes P-TECH, The Phelps Community Center School Age Program & the Personalized Learning STEM Camps at Midlakes Elementary School

The Phelps Library is located within a municipal building which also houses the Phelps Community Center (PCC). Starting in September 2017, the Library began providing weekly STEAM Camps to two school age groups, K-2<sup>nd</sup> and 3<sup>rd</sup>-7<sup>th</sup> grades. The students learn about the scientific method and the engineering design process through hands-on STEAM activities. Led by the Library Director and the Education & Outreach Specialist, the students design and test roller coasters from foam insulation, learn about circuitry, robotics, and electronics, build and test boats that carry cargo, perform scientific experiments, engineer LEGO zip lines, and create structures from various materials, such as jelly beans, toothpicks, and spaghetti, to fulfill a specific function. The kids absolutely love this program and look forward

to it each week. They ask what our project will be next week and make special requests for what they would like to learn. They are building social skills, working in teams with success dependent on communication and collaboration. There are approximately 80 children and 10 teachers in the program. The image to the above is from a 4<sup>th</sup> grader who made magnetic slime during one of our classes.

The word about our STEAM Initiative has travelled. Our STEAM Camps have been requested by the Clifton Springs YMCA, 7 school districts and 7 public libraries in neighboring Wayne County, and our local school district at Midlakes. With the full support of the Midlakes Superintendent, in June 2018, our STEAM Lab Makerspace was the destination of a third grade field trip. Over the course of a day, we provided a STEAM camp to 120 third graders, 4 teachers, and numerous parent chaperones.

The following week, the Phelps Library was invited by the Midlakes Elementary School to participate in their four-day Personalized Learning STEM Camp. We provided staff and resources to 17 classes of Kindergarteners through 5<sup>th</sup> graders, with the kids designing and building roller coasters with foam insulation, bamboo skewers, and marbles. Students learned about momentum, velocity, distance, and

angles while developing engineering, design, and social skills. This activity is used in architectural programs at technical universities, but we at the Phelps Library believe that students benefit from learning these skills at a younger age.

In 2018, the Library partnered with the Village of Phelps and the Community Center to win a grant to replace the community playground. The Library's role was to select equipment that promoted STEM education, which will influence our community's children for years to come!

In late 2018, the Phelps Library developed a partnership with the Wayne-Finger Lakes P-TECH Program, where part of the students' assessment takes place in our library's makerspace. W-FL Pathways in Technology Early College High School (P-TECH) offers students who may not have considered college an option the opportunity to obtain a college degree and pursue a career in the STEM fields. P-TECH students are provided an advanced education over a multi-year pathway of study leading to an Associate's degree and an exciting and rewarding career. W-FL P-TECH is a multi-year (grades 9-14) school and commitment; students start in 9th grade and continue with P-TECH and FLCC for up to six-years. At the beginning of their P-TECH career, students are enrolled in both Regents level and college level courses. At the conclusion of their education, each student receives both their high school diploma and an Associate's degree from Finger Lakes Community College.

The P-TECH students come to the library in groups of three to six students to learn about virtual and augmented reality, develop hands-on skills like carpentry, engineering and design, forensics, and environmental science. Each field trip last two and a half hours a day, up to four times per week throughout the school year. The students will be working collaboratively with the Phelps Library on projects such as the development of virtual reality apps, designing and building the augmented reality sandbox, programming and hand-sewing Adafruit Flora components with wearable LEDs, environmental science projects, forensics, and much more. The projects are tailored to student interests to better prepare them for future STEM and technical careers.

**IMPACT:** Annually: 77 students in the P-TECH program, 80 students and their parents and 10 teachers at the Community Center, 17 classes at Midlakes Elementary School in grades K-5<sup>th</sup>, Midlakes school teachers and administrators, 70 kids at the Clifton Springs YMCA, current and future children of all ages in the community of Phelps.



Roller Coaster Challenge at the Rochester Mini Maker Faire, November 2017



Kids at STEAM Camp engineer LEGO Zip Line vehicles, June 2018



Light Painting at the  
FLX Maker Fest, April 2018



Teaching electronics soldering in the STEAM Lab  
Makerspace for the FLX Maker Fest, April 2018

### III. FLX Maker Fest: A Celebration of STEAM

The FLX Maker Fest, the dream of Library Director, Leah Hamilton, is a one day event that was first held in 2017, to unite makers, manufacturers, inventors and entrepreneurs in a celebration of science, technology, engineering, arts, mathematics, and technical skill building. The purpose is to bring awareness to the local businesses and community organizations who do innovative things, such as starting recycling initiatives, building parts for the SpaceX program, or creating with thermoplastics. In 2018, collaborating with the Geology Department of Hobart & William Smith Colleges, we had the tornado-chasing Doppler-on-Wheels, and HWS faculty shared information on environmental science. After visiting the Doppler-on-Wheels at the FLX Maker Fest, a nine year old exclaimed, “I want to be a meteorologist!” A FIRST Robotics Team inspired younger students to build and create, and local educators and entrepreneurs taught electronics soldering, blockprinting, jewelry making, felting, and so much more! One of the presenters at the FLX Maker Fest, the daughter of a local sustainable plastics company called Harbec, was so inspired by the Phelps Library’s passion for STEAM that she decided to change careers, returning to grad school to pursue her degree in Education.

Manufacturers have commented that they did not realize that the community was unaware of what their company actually does. By attending the FLX Maker Fest, not only did the community benefit from learning technical skills at each table, but the businesses learned how they can better connect to the community. When educators, non-profit organizations, and businesses for cross-sector partnerships, we all become stronger working together.

**IMPACT:** 520+ community members of all ages annually, makers, educators, innovators, entrepreneurs, inventors, and manufacturers throughout the region.

For more information:  
<https://www.phelpslibrary.org/flxmf-home>



#### IV. STEAM-ing Up Your Library Programs: Inspiring Libraries & Schools

Libraries and schools throughout the State regularly seek out the Phelps Library for advice on how to make a great impact with STEAM education utilizing very few resources. In the past year, there has been a significant amount of interest, particularly with smaller, rural libraries, in turning craft programs into STEAM programs, and the Phelps Library has been asked to guide that transition.

In March of 2018, Wayne-Finger Lakes BOCES asked the Phelps Library to lead a professional development workshop on the importance of STEAM Education in libraries. Attended by School Library System representatives from 25 public school districts in two counties, we trained media specialists on how to incorporate STEAM education within their libraries. In December 2018, we had the opportunity present ideas to 25 regional school principals about innovative and future ready school libraries. We have led to lead professional development days for teachers in two school districts on how to set up makerspaces and incorporate STEAM into the curriculum. We have also been invited to work with high school students directly to inform them about CTE pathways, or career and technical skills.

Visiting the Clinton-Essex-Franklin Library System and the Mid York Library System in June 2018, Director Leah Hamilton trained and inspired public library staff on how to STEAM Up Library Programs, offering resources for classes and collaboration, providing hands-on training, ideas for potential collaborations, Libraries learn how to provide opportunities for students of all ages to develop skills in communication, creativity, problem solving, critical thinking and analysis, all while instilling transferable skills and delving into basic scientific concepts.

In July 2018, Library Director Leah Hamilton guided school educators on a STEAM curriculum at SUNY Alfred at the NYS STEMx Conference, and in September, presented on STEAM Education in public libraries at the national Association of Rural and Small Libraries in Illinois. It has been such an honor to work with so many inspirational library staff and educators!

The Phelps Library pays very close attention to the needs in our community. For example, the Phelps Library owns the only dissecting microscope in the school district. We loan our equipment to the school so that the students have the opportunity to have a well-rounded experience at school. In the 7<sup>th</sup> grade biology class when they perform dissections, they don't have the equipment to study what is right in front of them. I once had a student arrive at our library after school, right after dissection day, with a squid eyeball and a spine shoved in his pocket because he wanted to see what they looked like under the microscope and he couldn't do it at school. Those are the kinds of needs we really pay attention to, and we are more than willing to share our tools and technologies for the betterment of the community.



**Future Polymer & Fiber Engineer?**  
Let's help her find out!

In total, the Phelps Library has worked with about 60 school districts and approximately 115 public libraries across New York State. We've given Makerspace tours for many local colleges and even the Strong National Museum of Play. The guidance that they are seeking includes how to use and incorporate new technologies, how to set up makerspaces, how to take a traditional curriculum and incorporate STEAM; how to apply the Next Generation Science Standards; and how to nurture cross-sector community partnerships.

To do all this, we at the Phelps Library have to continually educate *ourselves* in the educational needs of the community so that we can develop a STEAM curriculum to offer in the makerspace, design classes to offer to all ages, and create step-by-step projects appropriate to particular age groups which we then teach in and outside the lab. We must always be informed and aware of what's going on in the schools, whether it is in the classroom or at the State level, when and how the school standards are changing and how school districts are interpreting them, so that we can meet the educational levels of all students or have critical conversations with administrators and legislators. All of this is so that we can be recognized as equal partners in education, to ensure the highest quality services and classes, and equity in funding.

**IMPACT:** Three Library Systems, 118 public libraries, one BOCES district, 25 public school districts and all of the patrons and students within those libraries and districts, attendees of statewide and national conferences

## 1 2 7

**1+2+7 equals 10. Out of every 10 jobs available, 1 requires a Master's degree or higher, 2 require a Bachelor's, and 7 require technical skills. That means that only 30% of the jobs out there require a Bachelor's degree or higher yet, according to the NYS Ed Dept, we're send 82.7% of our graduating high school seniors to degree granting institutions! What happens when they graduate from college and they are drowning in debt, in a saturated job market, where only 30% of the jobs require the degree that they have? We are setting our kids up for financial, emotional, and mental stress before they even begin adulthood.**

**We must show our students that they can find success in other ways. There are many STEM and technical employers who provide education for their employees. For instance, there is the Corning Technician Pipeline program where Corning, the glass company, will pay students \$25,000 a year while they go to a two year program at Corning Community College or Monroe Community College, with full tuition, books, fees, all covered by Corning, and the students have job placement at the end of the program. How do you say no to that? The problem is, when schools don't know about these opportunities, students are not aware of them. We want to make sure that students are fully aware of all of their options so that they can make informed decisions about their future.**

(1 2 7 reference: <https://vimeo.com/67277269>)

## V. The Phelps Library STEAM Scholarship: Empowering Future STEAM Careers

At the FLX Maker Fest and in the spring of 2018, the Phelps Library fostered the first annual Phelps Library STEAM Scholarship, a \$1,000 award collected through targeted donations from the community and given to a Midlakes graduating senior who demonstrates curiosity, innovation, and creativity, to empower them to pursue certification or education. The successful recipient need not attend a 4-year college, as not all students thrive in that pathway, but rather the intention of the scholarship was for those students who want to attend technical school, an apprenticeship, or certification in a STEAM career. The award was presented by the Phelps Library Director to a full house at the 2018 Midlakes Commencement Ceremony. Not only did the award support the student, but the presentation also advocated for regional STEAM careers and promoted the library as a center of education.

The community response to the STEAM Scholarship was so overwhelming that the Library collected well over the needed \$1,000 and now have a healthy start to the next award. We have had brilliant conversations with parents whose children are not thriving in the traditional foreign language Regents tract and enthusiastically and monetarily support the STEAM initiative. A local family started their own marketing campaign among 34 family members to support the STEAM Initiative (see below) in memory of their grandmother. In June 2018, the Library was asked by the community to set up a web page specifically for monetary donations toward our STEAM programs and the STEAM Scholarship.

**IMPACT:** One award winner annually, 133 High School Graduates and their families, teachers and administrators of Midlakes High School, 300 Recipients of the Phelps Library Digital Newsletter, readers of 17 regional publications/new outlets, the 520+ attendees of the FLX Maker Fest, as well as anyone who drove through the Town of Phelps in March and April of 2018!

For more information: <https://www.phelpslibrary.org/steam-initiative>

### IN SUMMARY:

How do we, as educators, empower community success through collaborative STEAM education to help students of all ages achieve their personal and professional goals and discover their passion? By taking creative action with the STEAM Initiative, the Phelps Library strives to nurture each and every individual within our community by inspiring them to Make, Create, and Innovate. With the goal of fostering future STEAM careers, we provide the time, space, and resources for Making and makerspace activities. We consistently connect with others to get the entire community involved, from parents to manufacturers to community organizations. We transform traditional hands-on activities into a STEAM curriculum in ways that all students will feel the freedom to thrive. We explore tangible and unique ways to integrate Making into traditional educational settings and cultivate the STEAM innovators of the future.



Third Grade field trip, building an electric guitar with littleBits.

## RESULTS OF OUR STEAM INITIATIVE OVER THE PAST YEAR:

- **Increased the number of classes & events** that we offered by 300%
- **Increased program attendance** at these classes and events by 200%, at over 20,000 attendees (not counting the 100,000 visitors to our STEAM booth at the NYS State Fair!)
- **Increased book circulation at our library by almost 20%**, particularly in Non-Fiction, where nationally, book circulation is dropping (We believe this is due to the library's STEAM Initiative.)
- **More than doubled our online presence** with over 70,000 hits on our website & social media.
- **Secured grant funding** for an additional part-time position – STEAM Coordinator – at the Phelps Library to support STEAM Education
- **Nurtured healthy and mutually beneficial partnerships** with countless individuals, libraries, community organizations, schools, and businesses locally, regionally, statewide, and nationally, for which we are grateful!
- **Successfully advocated** along with other out-of-school community organizations to open up Summer STEM Institute training to community educators; this program was only open to K-12 teachers since its inception, until 2018, when libraries et al. were invited to attend.
- Other partnerships that resulted from our STEAM Initiative: The Phelps Library serves on a) the New York State Fair Advisory Council for the annual STEAM Exhibit in the Science and Industry Building (reaching 100,000 attendees per day); b) the Maker Faire Rochester Regional Summit Planning Team (reaching 5,000+ attendees in Rochester, NY); c) the Steering Committee of the FL STEM Hub, a statewide, community-led collaborative to advance STEM education; and d) the Finger Lakes Advanced Manufacturing Enterprise; and e) the Making and STEAM Round Table Board of Officers of the New York Library Association (currently President).
- A local family started their own marketing campaign among 34 family members to support the STEAM Initiative (see page 8) in memory of their grandmother. Furthermore, in June 2018, the Library was asked by the community to set up a web page specifically for monetary donations toward our STEAM Initiative.

For more information: <https://www.phelpslibrary.org/steam-initiative>



**Leah Hamilton**

*Executive Director of the Phelps Library*

**Do you have questions or comments  
about the STEAM Initiative at the  
Phelps Library?**

**Are there skills you would like to learn?**

**Let us know, and help us  
be the best we can be!**

Please contact Director Leah Hamilton at  
315.548.3120 or [pcmldirector@gmail.com](mailto:pcmldirector@gmail.com).

## Honoring the Legacy of Judith Lambert Watson

Hello family!

In anticipation of the upcoming birthday, I have been working over the last months with the Executive Director of the Phelps Library. We developed a fundraising opportunity specifically for the Watson family to honor the library work and literary legacy of your mom (grandmother to me & cousins).

The Phelps Library has a wonderful STEAM initiative with a tiny budget in great need of being substantially grown so that they can serve far more youth.

Our family's donation page has been created for us to each provide what we can to reach a total goal of \$2,000 for this incredible local library.

Our family's legacy fundraiser will double the budget and strongly grow this wonderful STEAM program's ability to reach far more children with their award winning innovative work!

A recognition plaque for Judith Lambert Watson will be designated at the library to publicly acknowledge her work and love of books.

Please join me in this awesome family fundraising event in honor of a woman who gave generations a true love of reading and knowledge. By contributing to the library we carry on her legacy of sharing the love of books with generations to come.

This is a great time to encourage all generations of our family to give as they can - \$20 is as important a gift as \$500 dollars.

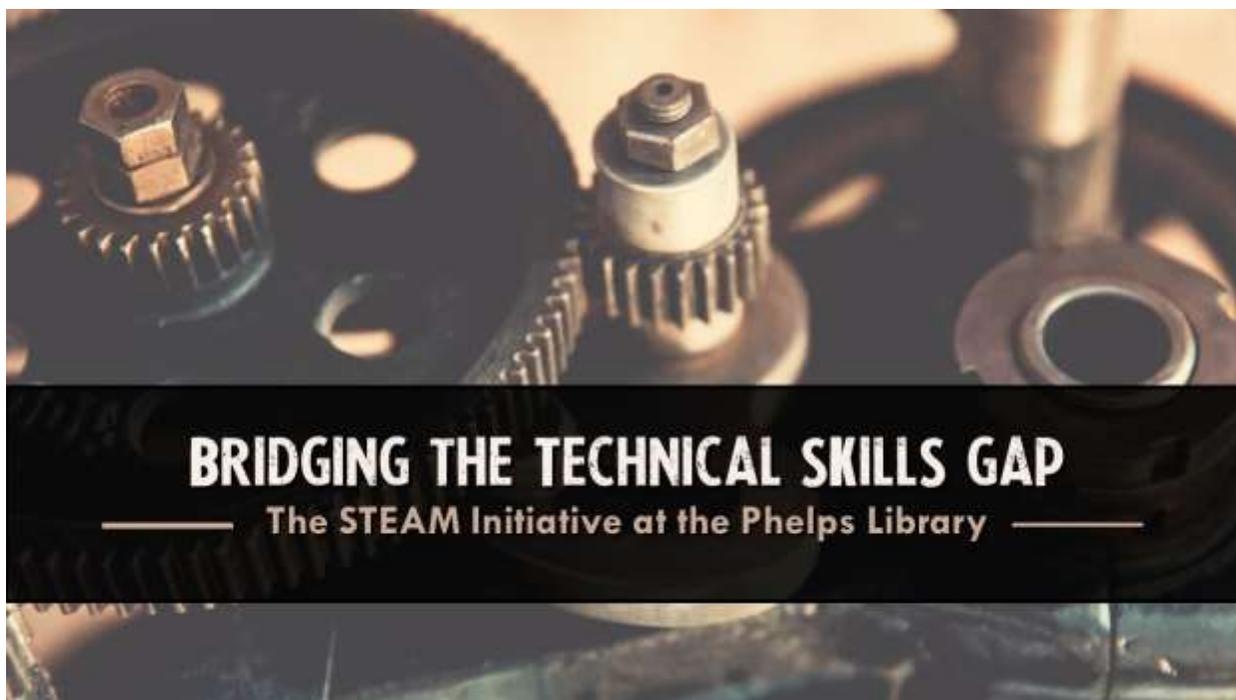
Thank you all in advance for what is going to be a hugely successful \$2,000 family gift to the Phelps Library!

I will send out updates as we get all the way to our goal by July 9, 2018! Go Family! You can also speak directly with Ms. Leah Hamilton Executive Director of the library for more information about the library's fantastic work and our family's fundraiser to expand the library's impact in Phelps.

And please feel welcome to share this email with other friends and family members who will want to be part of the honoring work we're doing together.

~ The Family of Judith Lambert Watson





See the video at:

[www.youtube.com/watch?v=NatIoNUByqk&t=7s](http://www.youtube.com/watch?v=NatIoNUByqk&t=7s)

*“I have personally attended a number of these STEM Explorers workshops and I am consistently impressed by the level of quality and enthusiasm this program generates. The first event we attended together was a Raspberry Pi Jam at the University of Rochester. My girls had an amazing time learning about how to integrate Raspberry Pi, discovering computer programming basics, and saw an awesome presentation by Women in Computing that I know Lena & Evelyn appreciated. Since that first meeting they have enjoyed one great class to the next: creating an augmented reality sandbox, plastics manufacturing, designing the libraries PVC whisper tube system, virtual reality, tooling, and computer programming. They have an ongoing collection of STEM ‘merit’ badges they earn during every session. They eagerly await each class the whole week before it occurs and afterwards they come home in a creative frenzy, talking about and recreating what they have learned. It has become the highlight of our month!*

*Phelps is a small rural community and I am so exhilarated we have access to such a quality STEM program. It is a free program in a community that really appreciates the opportunity it creates. It is local and there is nothing like it in any of the surrounding towns. It is a hidden gem of our community that shows unique commitment to the cutting edge yet practical education of our youth. Nick & Leah bring expertise and energy to every class and the student response has been tremendous. My family is extremely grateful to be part of the STEM Explorers!”*

*~ M. Cooley*

Porter, Susan Clark. (2018, December 23). A Big Effort at a Small Library. *Finger Lakes Times*, p. 1D, 5D. [https://www.fltimes.com/lifestyle/a-big-effort-at-a-small-library/article\\_b7d4731e-4c7e-5aba-b09b-5f57974cfc19.html](https://www.fltimes.com/lifestyle/a-big-effort-at-a-small-library/article_b7d4731e-4c7e-5aba-b09b-5f57974cfc19.html)

PHELPS — It seems unlikely that a contingent of Belarusian educators and scientists would want to pay a visit to a small library in upstate New York.

But that's exactly what happened this fall when a group from Belarus toured the Phelps Library's STEAM initiative in order to bring back ideas on how to bolster science and technology education in their home country.

For three weeks in October the group of 10 from Belarus visited Rochester-area organizations like the Rochester Museum and Science Center and Rochester Institute of Technology to learn how to implement STEM-based education for school-age children. But they also spent an afternoon at the Phelps library learning about its STEAM program.

The Belarusians listened as Leah Hamilton, the library's executive director, explained how the library has been working to create an innovative and imaginative space for students young and old to explore and learn about science and technology.

And those efforts are not limited to a few bookshelves of science-related books.

The group watched customer service specialist Alex Dennis make buttons with a manual button maker, observed STEAM coordinator Deb Dennis lead a class of after-school youngsters in a science experiment and — probably most fun of all — tried their hands at the virtual reality station in the community room. After Hamilton demonstrated how to use the device, several of the Belarusian visitors donned the headset and took a stab at painting with Google Tilt Brush.

"Push the button and start painting," said Hamilton, but at first it was not that easy. One young man, with his head set on, bumped into Hamilton and the room erupted in laughter. His colleague tried and had more success ... as a smiley face in purple script appeared on the television monitor in front of her.

So how did the Phelps library become a destination for an international group of visitors?

It started with the arrival of Hamilton in 2013. Hamilton brought with her a varied background, including a history degree and experience in the University of Rochester's rare books division. But as the daughter of Dan LaGasse, owner of Lagasse Iron Works in Lyons, Hamilton (who even welds herself) has an appreciation for the needs of area manufacturers who are experiencing a huge technological skills gap.

"I know G.W. Lisk has lines shut down because they can't find skilled workers," she said. "We want to keep our companies in business."

When she arrived in Phelps, the library also had \$10,000 in New York state aid at its disposal. She and the board gauged community interest and need and generated the idea of The STEAM Lab Makerspace, which is not a physical space per se but a philosophy of education, collaboration, cultivation and growth in the science and technology realm, Hamilton explained.

The Makerspace includes the 1,200-square-foot "dirty technology" room where particulates can be created and participants can get wet. The "clean technology" area is near the circulation desk and includes a wall Lego board and shelving full of hands-on activities like simple machines and force and motion activities. The community room houses the virtual technology center, where on that day in October the visiting Belarusians "painted." Hamilton also envisions that technology being used for job seekers who want to simulate interviews.

Hamilton said it has been an evolution to develop the STEAM Initiative, whose mission is to foster professional skills and interest in STEAM careers beginning in pre-school through seventh grade.

“We aim to bridge our region’s science, technology, and trade skills gap by teaching advanced manufacturing classes to 8- to 12-year-olds, to introduce K-12 students as well as formal and informal educators to STEAM activities and careers, to unite over 500 inventors, manufacturers and makers at our annual FLX Maker Fest, and to advance our local economy through community partnerships and education,” its mission states.

The library hosts a STEAM Explorers Group for 8- to 12-year-olds in collaboration with local engineer Nick Hargarther, runs STEAM camps and hosts the FLX Maker Fest: A Celebration of STEAM, a one-day event uniting makers and manufacturers in celebration of science, technology, engineering, arts and mathematics. This year’s is set for May 4.

The library also works with the Midlakes school district twice a week with high school students in the P-Tech program, who come to the library and have recently been working with the virtual reality system.

“That’s really where we’re going with education,” Hamilton said. “The classroom walls are coming down in my opinion.”

As are the cultural ones.

The Belarusians were happy to be visiting a rural location in addition to their Rochester city stops, Hamilton heard, but were curious why they were heading to a library.

“Their libraries don’t do this type of thing in Belarus,” she said.

Lauren Moore, executive director of the Pioneer Library System of which Phelps is a member, said libraries are more than books; they are in the education business — in all of its forms — for all ages. She added that the STEAM initiative in Phelps is an inspiration, especially because its budget is small. Hamilton said the library is able to provide the services it does because 65 percent of its staff is dedicated to STEAM activities, volunteers help and grants fund materials.

“The Phelps library takes that concept (of lifelong education) many steps further ... what they are doing is truly state of the art STEM education for adults and children,” said Moore, pointing out that a library’s small size doesn’t matter when the staff and board are willing to take bold steps to deliver services.

“The fact that Phelps is training other libraries and schools how to initiate STEM is something that brings me much joy,” she said.

Also impressed is Eric Russell of Siemens USA and a fellow member of the Finger Lakes STEM hub.

“I would love to see how we could possibly replicate what she does on a large scale,” he said, noting Hamilton and her staff really engage community members of all ages in their STEAM programs. And that’s important for older folks who may be leery of new technology.

“It’s not just kids,” he said. “As important as the youth pipeline is, I do see how especially it’s being rolled out in Phelps it’s multi-generational.”

Hamilton is still in touch with the visitors from Belarus and hopes to strengthen that international partnership. A thank you letter from one of the participants especially moved her and reinforces that she and the library are on the right track.

“Regardless of the government efforts, everything depends on each individual working at a school, a museum, a library. And that’s what we see and experience in our own country, too, where smaller initiatives in small towns with dedicated people can work miracles.”

June 29, 2018

To the Public Libraries Section of NYLA-

Today I am writing in support of the Phelps Library's STEAM Initiative for the PLS Innovative Program Award.

I have been working with the Phelps Library and Director Leah Hamilton for the past year to develop the STEM Explorers program at the Phelps Library. The STEM Explorers and the Phelps Library's STEAM Initiative programs are so important to the community as well as our children. Currently, schools have a curriculum that tend to label our children and stifle their creativity. School success focuses on left brain youth; for some, it comes naturally while for others, it does not. I have personally seen how this type of standardized education makes our right brain children feel that they are not normal or inadequate for educational standards. The STEAM programs provided at the Phelps Library give children the ability to be creative and provide a positive outlet for self-expression that help them believe that they have something amazing to offer the world. The library's STEAM programs show these kids that they are smart, imaginative, bright, and so much more, I cannot even put it into words. With resources like the Phelps Library's STEAM Initiative in our community, our children have a chance to invent and imagine, all while growing into happier, more confident adults. It is because of this program that both our future and that of our children look a lot brighter.

Director Leah Hamilton makes the dreams of many children and young adults possible, I am thankful for her direction and hard work, and I am blessed to have the opportunity to work with her and the kids in the STEM Explorers program. Just looking at the smiles in the photos that we've taken of them, you can tell that, to the kids, this program is everything they want to be: it is future dreams, inventions, happiness, and the ability to do something that some may have told them was impossible to do.

I could write all day about how great the Phelps Library's STEAM Initiative is and how thankful I feel more people should be. We need to remind our youth that it is alright to be different, to have their own dreams, and that, yes, they can make these dreams come true. The STEAM programs at the Phelps Library gives these kids the chance to shine.

Thank you for considering the Phelps Library's STEAM Initiative for this Innovative Program Award.

Nicholas Hargarther

Hargarther Design and Engineering

-Helping your company move forward.

# STEM EXPLORERS!

Do you know a child that loves to take things apart? Are they curious about how things work? Do they love to build and create? Whether it's robotics, coding and programming, engineering, nature, video games, or science, the STEM Explorers is for them!

The STEM Explorers is a fun monthly class for 3rd-6th graders where they will learn about electronics, mechanical engineering, environmental science, assembly and manufacturing, tools and more! Student interests will drive the class because we want to help them to discover what they love to do. These are free classes that meet at the Phelps Library's STEAM Lab Makerspace in 6 month sessions on the 4th Saturday of the month from 12pm-2pm.

**MARCH 24:** Each participant will receive a free tool box with tools. Learn about the mechanics of household items by taking them apart.

**APRIL 28:** Learn about tooling! We will use hardware like nuts, bolts, and screws, quality control, and measuring by investigating the treasures we dismantled in the first class.

**MAY 26:** Build an augmented reality sandbox! Using a computer, 3D projector, and special sand, pushing the sand into mountains will change the topography projection in real time! Hold your hand over the sand to make it rain! We will learn about electricity and volts.

**JUNE 23:** Continue building the AR Sandbox and program the equipment with software. Learn about our region's watershed and our impact on water quality.

**JULY 28:** Take field trips to some of our local, innovative manufacturers!

**AUGUST 25:** Visit Flint Creek on Ontario Pathways to collect water and aquatic insect samples to monitor our local water quality. Use microscopes to investigate the insects. Speak with a member of NYS Environmental Conservation to learn more about environmental science.

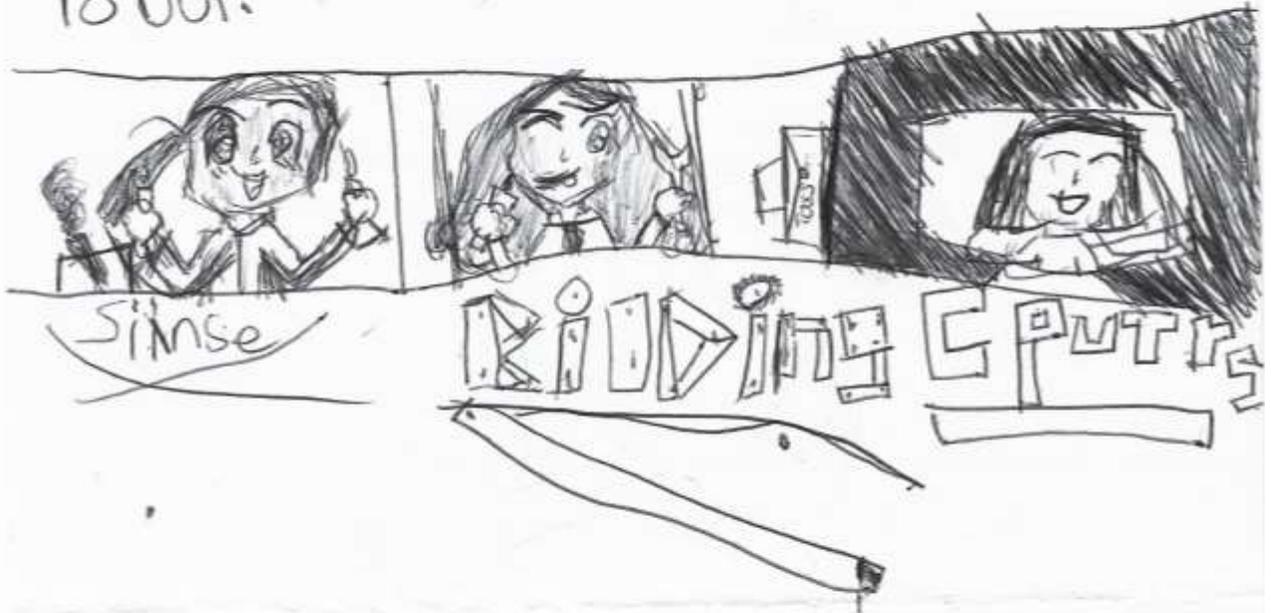


This class will be led by Nick Hargather with assistance by Leah Hamilton, Library Director. Students must be registered by calling 315.548.3120 or signing up at the library. We have 4 spots for girls and 4 spots for boys. If the class is full, please sign up on our waiting list as we will be repeating this class at the end of the six month session and your child will receive first priority next semester.

8 BANTA STREET, SUITE 200  
PHELPS, NY 14532  
315.548.3120  
WWW.PHELPSLIBRARY.ORG



I love stem explorers & bouse I  
think since is rely cool and inchresting  
Also ~~my~~ dream is to make a  
robot.



I love the STEM Explorers because I  
think science is really cool and interesting.  
Also my dream is to make a robot.

Science      Building      Computers

Tess Moore, Age 8

Tess Moore