



The STEM Explorers, March-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, developed in 2017, aims 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 8-12 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



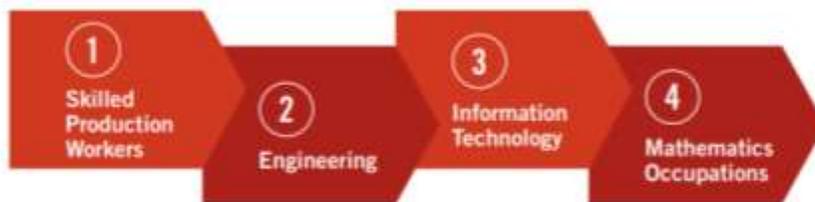
According to the 2017 report, *Bridging the STEM Skills Gap: Employer/Educator Collaboration in New York*, issued by The Public Policy Institute of New York State,¹ employers reported having the most difficulty filling positions in engineering, skilled production, and information technology. The skills 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%.²

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.

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

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

I. STEM Explorers: Teaching Advanced Manufacturing

The first aspect of the Phelps Library STEAM Initiative is the STEM Explorers (see page 10). Designed in partnership with local engineer, Nick Hargarther (see letter of recommendation on page 9), the STEM Explorers teaches hands-on skills to 8 to 12 year olds in the areas of mechanical and electrical engineering; drawing, measuring, and assembly; lean and advanced manufacturing; and the basic use of hand tools. Taught in six month semesters once a month, each of the eight students received their own tool kit with a screwdriver set and measuring tape. The young students built and tested a V8 engine, explored an augmented reality sandbox, learned to read a technical process manual, travelled outside of Ontario

County to 2018 Imagine RIT, an event featuring 438 interactive exhibits in science, technology, engineering, the arts, and mathematics, and to local optics manufacturers (OptiPro, Optimax, and Harbec) where the students performed tests on optical equipment, and learned about environmental science at local Flint Creek, where they collected and identified aquatic insects to determine the health of the stream. That data was entered into a regional database to aid scientists in their research (a collaboration with Hobart & William Smith College's Finger Lakes Institute).



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

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

II. STEAM Camps: The Phelps Community Center School Age Program & the Personalized Learning STEM Camps at Midlakes Elementary School

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

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-2nd and 3rd-7th grades. The students have learned 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 left is from a 4th grader who made magnetic slime during one of our classes.

“Today I learned that not every slime is the same and I learn[d] [sic] how to make magnetic slime and library is more funer [sic] than you think.”

~Jay (4th grade)

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 5th 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.

(Recently, 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!)

IMPACT: 80 students and their parents and 10 ten teachers at the Community Center, 17 classes at Midlakes Elementary School in grades K-5th, 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

III. FLX Maker Fest: A Celebration of STEAM

The FLX Maker Fest, the dream of Library Director, Leah Hamilton, was a one day event held in April 2018, uniting makers and manufacturers in celebration of science, technology, engineering, arts, and mathematics. The purpose was 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. 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.



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

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



Light Painting at the FLX Maker Fest, April 2018



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

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.

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.

The Phelps Library acts as STEAM consultant for libraries within the Pioneer Library System as well. In July 2018, Library Director Leah Hamilton will present on this topic to educators at SUNY Alfred at the NYS STEMx Conference, and in September, she will present 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!



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

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

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 form of education, but rather the intention of the scholarship was for those students who want to attend technical school 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 next year's 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, 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 4%**, 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 – Education and Outreach Specialist – at the Phelps Library to support STEAM Education
- **Developed 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.

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



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

