STEAM (Science, Technology, Engineering, Arts, Math)

STEAM Habits of Mind

Q&A with STEAM Staff

STEAM Academy

Out of School STEAM

STEAM Scholars

STEAM Internships

CAMBRIDGE STEAM INITIATIVE

Fostering Equity & Access to Quality STEAM Education

A Historic Landmark to become Innovative Makerspace

We believe that STEAM (Science, Technology, Engineering, Arts, and Math) habits of mind are critical to engagement, identity formation, and self-efficacy in young people. The Cambridge STEAM Initiative has aligned the Next Generation Science Standards (NGSS) science and engineering practices, math habits of mind, and artist habits of mind to create the STEAM Habits of Mind.

STEAM HABITS OF MIND	WHAT DOES THIS LOOK LIKE?
DEVELOP CRAFT	• Learn how to use appropriate technologies in your work. • Intentionally select appropriate materials to produce an intended aesthetic. • Freely explore how various materials work. Select appropriate materials to create a specific design.
ENGAGE & PERSIST	• Develop curiosity by asking questions and defining problems that are meaningful. • Plan and carry out investigations to learn more about the question. • Work with and learn from others. • Consider multiple approaches to a challenge without giving up.
EXPRESS	• Use creativity and imagination to create designs and representations that also convey an idea, feeling, or personal meaning. Develop and use models to prototype designs. • Select materials intentionally. Be able to describe the idea, feeling, and/or personal meaning behind your design or representation.
OBSERVE	• Make close observations of things that otherwise might not be noticed. • Find rules and patterns in your observations. • Collect visual, audible, tactile, and written data with attention to precision. • Make close observations in investigations.
REFLECT	• Think critically about your plan/design. Share design and the process of making it with others. • Use what you have learned and apply it to approach new problems. • Explain the process of making with others.
STRETCH & EXPLORE	• Ask questions, explore playfully, and embrace the opportunity to improve as you learn from mistakes and accidents. • Learn from testing and others

City Manager's Message

With the world-class institutions of higher education and the science and tech businesses located in our City, we want to do everything we can to ensure that all young people, particularly our underserved students, are prepared to take advantage of the incredible opportunities in their home city.

The Cambridge STEAM (Science, Technology, Engineering, Arts, and Math) Initiative is a partnership between the City of Cambridge, Department of Human Service Programs (DHSP), Cambridge Public Schools (CPS), and Cambridge Public Library (CPL) created in 2016. STEAM is an integrated approach to learning that fosters knowledge of these topics while nurturing essential skills such as innovation, critical thinking, problem-solving, and communication to meet the needs of the 21st century economy and citizenry.

The City's effort to increase quality STEAM educational experiences for all residents is grounded in the shared principles of access & equity; focus on families and residents; collaboration with the community; facilitating innovation; teaching and learning; and data and research.

In this edition of *The Cambridge Life*, we are highlighting the many STEAM initiatives that are taking place across our departments. I want to thank DHSP, CPS, and CPL for their collaboration and dedication to expanding this education to all residents. I also want to thank the City Council for their commitment and leadership on the City's STEAM initiatives.

Our success is a direct result of how our departments, leadership, and staff work collaboratively with our elected officials and the community to make Cambridge the unique and special place that

City Manager Louis A. DePasquale

it is today. I am fortunate to have a strong and dedicated team to carry out the policy initiatives of the City Council and the day-to-day operations that deliver the high-quality City services and programs our community expects.

As always, you are welcome to send me your feedback or ideas by calling my office at 617-349-4300 or emailing me at citymanager@cambridgema.gov.

Louis DePasquale

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Q & A
Cambridge STEAM Initiative

Q and A with Sharlene Yang, Director of Cambridge STEAM Initiative, and Sue Walsh, Asst. Director, Adult & Family Services, Dept. of Human Service Programs.

What is the Cambridge STEAM Initiative?

Sharlene: The Cambridge STEAM (Science, Technology, Engineering, Arts, and Math) Initiative is a partnership between the City of Cambridge, Cambridge Public Schools, and Cambridge Public Library created in 2016 to ensure that, through equitable access to high quality STEAM programming and resources, all Cambridge residents, regardless of social and economic barriers, are STEAM literate and possess the 21st Century Skills necessary to be successful, engaged, and responsible citizens in a rapidly changing world.

We believe that by engaging families in quality STEAM programs and by creating purposeful partnerships across our community, we can achieve that goal.

It's pretty unique for a city to have its own initiative focused on STEAM—how did this come about?

Sue: The Initiative really started with an equity lens. Several years ago, there was recognition from a broad coalition of community leaders and City Council members that, although our higher ed institutions and businesses were at the center of technological innovation that was and is having worldwide impact, there were families and students who lived here—particularly those who are under-resourced, Black, Hispanic, people with disabilities, and/or women— who did not see themselves represented in this world.

We realized that we needed to create more access for all students to participate in a range of STEAM learning experiences that were fun and interactive, and grounded in quality standards.

There is a lot of national talk about adding Arts into the mix? Why is it STEAM and not STEM?

Sharlene: That's a frequently asked question. The Arts provide an accessible entry point to STEM and offer the creative lens that traditional STEM programming can appear to lack.

We know that true innovators can evaluate the world and solve problems through the multiple lenses of scientist, technologist, engineer, mathematician, and artist. And we would like to inspire and cultivate our young people to think innovatively and fluidly by using all of their skills and knowledge from all areas of STEAM.

In fact, we are creating a STEAM curriculum that puts Art at the forefront and have hired two educators to develop a series of lessons that will focus on how artists use STEM as part of their creative process.

CAMBRIDGE STEAM INITIATIVE VISION

1. All residents will have equitable access to quality STEAM learning experiences;
2. All students will graduate with high levels of STEAM literacy, empowered to make decisions about what they want to do, and able to be engaged and responsible citizens in an increasingly technologically-driven society;
3. The local pipeline to Cambridge's STEM workforce will reflect the diversity of the community (gender, ethnic, individuals with disabilities, etc.); and
4. Cambridge will be recognized nationally as an innovative city that is a leader in both STEM industry and STEAM education.

How does the STEAM Initiative work with partners to reach its goals?

Sharlene: The Initiative doesn't run any direct service programs – we work to strengthen, support, and connect existing programs and identify any gaps through partnership with others. In my role, I serve as the School District Liaison for the Biogen STAR Initiative, a network of community-based and higher education programs funded by $10 million from the Biogen Foundation to work with Cambridge and Somerville Public Schools. I help find ways to better integrate our work through shared data and evaluation goals, program alignment, and purposeful outreach to others in the local STEAM ecosystem.

We also foster partnerships through an Advisory Committee led by Cambridge City Manager, Louis A. DePasquale and Cambridge Public Schools (CPS) Superintendent, Kenneth Salim. This group includes leaders in industry, higher education, the Library, school administrators, and community-based organizations. Last year, our work focused on computer science and computational thinking, and finding ways for younger students to see themselves in this area of STEAM through near peer mentoring. Based on this work, the Educational Technology Department at CPS is going to pilot a Coding Buddies program where students in 5th grade will mentor 2nd graders in coding.

This year, the Advisory Committee is focusing on students' exposure to STEM professionals who mentor them, and building a system where professionals are connected to students through various avenues, such as the new spaces and programming at the library and its branches, through in school and out of school time programs, and eventually, through the Foundry makerspace (see pg 6-7).

We are bringing to this conversation a race and equity lens by examining, with business and higher education partners, how we can create a training system to ensure that every adult volunteer who engages with our diverse population of young people does so with a culturally conscious lens.

Sue: There is such rich knowledge and expertise to tap right here in Cambridge and our system will be looking for volunteers from business, higher education, and the community to share their excitement, stories, and skills with our young people. The library system, schools, and out of school time programs need this engagement. And, we are asking ourselves some hard and necessary questions. If the STEM workforce is overwhelmingly white and male, and with people who are not the first in their family to attend college, then how do we open the conversation about cultural competence so that the experience with our students can be rich and generative for everyone?

What is an example of the Initiative's current work in the community?

Sharlene: The STEAM It Up! event is held in October during Massachusetts STEM Week. It is a K-8 Family STEAM night that grew out of a series of smaller neighborhood STEAM events. Currently, the event brings in over 30 partners from industry, higher education, City and community-based out of school time programs, and CPS's Science, Technology, and Math departments to engage students and families in hands-on STEAM activities.

Q & A
Cambridge
STEAM Initiative

Sharlene: We support out of school time (OST) programs in the City through the work that my fantastic colleague, Barb MacEachern, Cambridge STEAM Initiative's Program Quality Manager, oversees. We support OST program providers with professional development workshops on topics such as Facilitating Curiosity and Demystifying STEAM. Barb has also been collaborating with the Agenda for Children Out of School Time to create an integrative coaching model to support OST program providers through observation and reflective meetings about teaching practice.

The STEAM Quality Working Group (28 child, youth, and teen serving professionals) keeps the work grounded and relevant as they continue to engage in thoughtful action-oriented conversations around quality programming and partnerships.

We also evaluate STEAM-focused programs, such as those offered through the Mayor's Summer Youth Employment Program and Glocal, to measure their impact on student attitudes and interests towards STEM subjects, their feelings of self-efficacy in science and math, and their interest in STEM careers. (See more on pg. 10-11).

Sue: Sharlene supports programs at CPS by working with the District's Science and Math Curriculum Coordinators and the Assistant Director of Education Technology to connect them with relevant resources from our outside partners. (See more on pg. 12). In addition, she also helps manage the collaboration between partner programs such as CPS Math Department's *Morning Math* and Moore Youth Center's *Mission Possible: Solve It!*, a collaboration between CPS and Cambridge Youth Programs that serves middle schoolers.

How did Cambridge STEAM Initiative's partnership with the Cambridge Public Library form?

Sue: The work that the Library has undertaken is so exciting! It was clear from the start that the vision that Library leaders outlined in 2018 to transform the physical spaces at the Main Branch, and to expand STEAM offerings at Main and Neighborhood Branches, was deeply aligned with the goals and vision that the Cambridge STEAM Initiative was created to serve. Libraries are all about free access to technology, resources, and training.

The STEAM Initiative team has been deeply involved in all aspects of the HIVE launch, meeting regularly with the Library STEAM staff to add their expertise and perspective. It has been important to root conversations about staffing, outreach, and programming in our shared Guiding Principles: access and equity, focus on families, collaboration, teaching and learning, facilitating innovation, data, and research. This is a hugely important expansion of our community's resources in support of STEM literacy.

The Cambridge STEAM Initiative now has the strength of the City entities that serve the most youth and families: the Department of Human Service Programs, Cambridge Public Schools, and Cambridge Public Library. (See more on pg. 8-9).

The current focus seems to be with school-aged children, youth, and teens—is there a plan to connect with younger children and their families and adults to help these groups gain access to STEAM resources?

Sharlene: One of the biggest ways to impact children who are underserved is by supporting parents and caregivers, so they feel comfortable doing STEAM activities at home. We plan to work with the Center for Families and Baby U team to support staff in their work with Cambridge families and residents so that STEAM activities are integrated into the offerings during playgroups and parent workshops.

The STEAM Initiative has also begun discussions with the Birth to 3rd Grade Initiative at Cambridge Public Schools, and the CPS Science Department to figure out how we can collaborate to support teachers in STEM practices and content. We hope to create a series of aligned professional development experiences that will engage preschool teachers in STEM activities they can implement with their students to build developmentally appropriate foundations in STEM practices.

There is so much we can do to ensure we are serving families at all points along their child's and their own educational journey. We are just getting started!

Sue: There was a great deal of attention from the start in opening more doors to STEM and STEAM internships and other work-based learning experiences for teens. There are a few really excellent examples now – Innovators For Purpose and the Science Research Internship Mentorship Program (through Harvard Smithsonian Institute for Astrophysics), where the wages of the youth are supported through the STEAM Initiative and administered by the Office of Workforce Development.

The challenge is ensuring that a diverse range of youth have an opportunity to participate in these experiences.

In terms of STEAM and adults, our community partner, Just A Start, runs an excellent free Biomedical

Careers Training program for residents 18 and older that is partially funded by the City. They also run an IT training program for adults, with academic support provided by the Community Learning Center.

There are new technical training programs that have recently come to Cambridge, such as Per Scolas in Kendall Square. There is definitely a need for more training, as not one size fits all. The local and regional economies are driven by STEM employers. Growth in these sectors is expected to continue and so it is essential for everyone who lives and works here to understand the larger forces that are driving the labor market, as well as the technology we use every day.

Historic Landmark to be Repurposed for Makerspace/ STEAM Training

Rendering of new Foundry Building. Courtesy of CambridgeSeven.
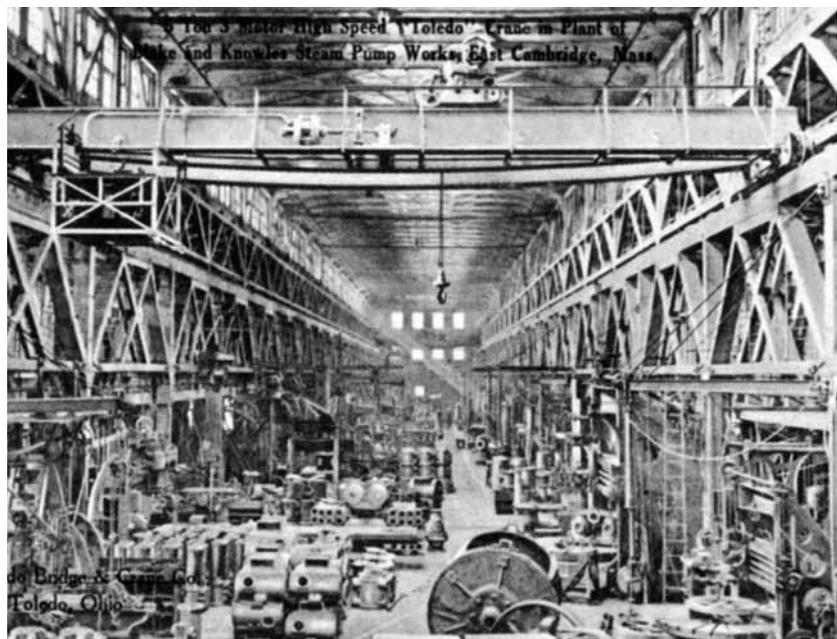
The Foundry Building

The transformation of the historic Foundry Building at 101 Rogers Street has begun. This massive brick building, constructed as an iron foundry, is a physical reminder of Cambridge's history as a center of heavy manufacturing that once employed thousands of first-generation immigrants. The Cambridge Landmark, expected to reopen in summer 2021, is being renovated for community use as a makerspace and for job training in STEAM (Science, Technology, Engineering, Arts, and Math) fields. It will also include a performance space, a space for artists, a café, classrooms, and more.

History of the Foundry

George F. Blake (ca. 1819-1904) was a skilled mechanical engineer and inventor. In 1864, he patented an innovative steam-powered pump designed to keep brickyard clay pits free of water. By 1875, his Boston firm was manufacturing pumps of all sizes for various industries. In 1889, the firm relocated to East Cambridge and moved into a newly built complex of foundry, storage buildings, and offices.

A massive wooden craneway dominates interior of Blake's Machine Shop. No date. Postcard collection.

Drawing of George F. Blake Manufacturing Co. Cambridge Busy & Beautiful, 1908-1909. CHC

The 1890 foundry (red arrow) consists of a single brick building with a footprint approximately 200' deep and 125' wide. Blake's pumps were fabricated from iron castings, putting the foundry at the heart of operations. The high central hall, flanked by single-story side aisles, was a completely open space with two furnaces. Traveling cranes carried tubs of molten metal to the molds; a clerestory with windows and louvers running the length of the roof provided ventilation. The dirt floor would absorb spilled molten iron and minimize splashing.

What is a foundry?

A foundry is an industrial facility that produces metal castings from Pig iron melted in a furnace. When the furnace is tapped, the molten metal flows into a ladle that is lifted by a crane and poured into a mold. When cool, the iron part is removed from the mold, cleaned, and machined for assembly. In Cambridge, this labor-intensive and hazardous work was done by both men and women.

The operation expanded rapidly. By World War I, it occupied 27 buildings on Binney and Rogers streets and employing 2,600 hands. The Cambridge plant closed in 1927 and the buildings were sold for industrial uses. A 1983 renovation adapted the building for office use by constructing two cement floors in the once lofty space. The craneway framing was left in place and is still the most prominent feature of the interior.

Painting of Iron Foundry of Burmeister and Wain, 1885. Detail. Peder Severin Krøyer. National Museum of Art, Copenhage

Demolition of Foundry Interior, 2020. Courtesy of CambridgeSeven.
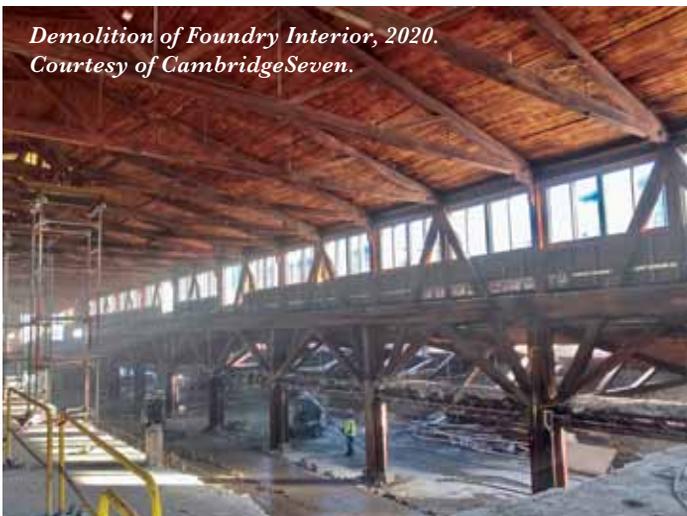
By 2009, ownership of the building passed on to a group that had assembled about 12 acres of land nearby for a life sciences development. As a condition of City approval, the group agreed to transfer ownership of the Foundry to the City of Cambridge, with the stipulation that at least 10,000 square feet of the building be dedicated to community use.

The City leased the property to the Cambridge Redevelopment Authority in 2015. In September 2017, the Cambridge City Council approved a plan to create a self-sustaining operation that would accommodate maker spaces and other public spaces as mentioned above, as well as 15,000 square feet of commercial office space.

STEAM FOR ALL AGES

at Cambridge Public Library

"The Cambridge Public Library is a key partner of the Cambridge STEAM initiative, offering free classes for all ages, resources for checkout such as STEAM kits — and coming in March 2020 – exciting new spaces and tools for hands-on creativity and learning!"

STEAM Learning

"The Cambridge Public Library (CPL) is committed to nurturing the growth and learning of all community members, from birth through adulthood," said Library Director Maria McCauley. *"STEAM programs at the Library support a wide range of skills, building opportunities and career pathways through City, school, nonprofit, and industry partnerships in Cambridge."*

STEAM Learning Lab

In September 2019, the Library celebrated the opening of the STEAM (Science, Technology, Engineering, Arts, and Math) Learning Lab, a flexible event space with classroom-scale web conferencing capabilities. Robotic cameras and ceiling microphones

CPL STEAM Academy

In January 2020, the Library launched the CPL STEAM Academy, which provides free, immersive programs to Cambridge teens and middle schoolers, prioritizing underserved youth. The Academy's first partner, local non-profit, Innovators for Purpose (iFp), uses an integrated and creative problem-solving process that blends art and science to prepare youth for the innovation economy. Students work with real-world customers and professionals to design complex projects, while developing technical skills and becoming immersed in the local innovation economy. For example, the Creative Doers Internship Program even includes paid stipends from the Department of Human Services for participants ages 14-18. The Academy hopes to expand its partnerships later this year to support programs for emerging adults.

The Hive and Tech Bar Opening in Spring 2020

The Hive is the new STEAM creativity zone opening at the Main Library in March. The Hive consists of a "makerspace" stocked

The Hive is Cambridge's first free public makerspace.

The Tech Bar, a device checkout station and technology advice center, will also debut at this time. Patrons will be able to check out equipment like Chromebooks, GoPro cameras, computers, and more, for use beyond the Library walls.

STEAM at the Branches

The "take out" technology won't be limited to the Tech Bar at the Main Library—each branch library will have its own stock of devices available as well. STEAM kits with take-home activities to explore topics as varied as bird-watching and bridge-building made their debut last spring with new kits being regularly added to CPL's collection. Branch libraries host STEAM programs for patrons of all ages, including digital literacy classes, workshops on DNA testing and genealogy, themed Storytime, Family Nights, Science Club for Girls, and more.

Funding for STEAM at the Library is generously provided by the City of Cambridge, Cambridge Trust, CPL Foundation, Friends of CPL, the Margret and H.A Rey Curious George Fund, Eric and Jane Nord Family Fund, Verizon, Google, and the Massachusetts Board of Library Commissioners.

For more information on STEAM at the Library, visit **CambridgeMA.gov/ CPLSTEAM**.

Photo left: *Making a prosthetic, robotic arm for a fencer.* **Photo above:** *Mural for new Hive space by Cambridge artist Daniela Gamba, depicting a young STEAM creator.*

STEAM programs at the Library support a wide range of skills, building opportunities and career pathways...

allow instructors and classrooms around the globe to virtually lead or participate in courses. Flexible furniture and laptop charging carts support a wide range of teaching activities and events, from coding classes to mural painting, to 3D design.

with digital and traditional fabrication tools, including laser cutters, 3D printers, sewing and embroidery machines, hand tools, and more. It is also home to two recording studios for creating audio and video content, and an Extended Reality Lab for experiencing and experimenting with virtual and augmented reality.

STEAM in Out-of-School Time (OST) Programs

Opportunities for learning do not end with the school day—especially in Cambridge, where OST offerings are rich through many youth-serving programs. From City-run programs, to those provided by community-based organizations and industry partners, Cambridge has a variety of STEAM (Science, Technology, Arts, Engineering, & Math) learning opportunities for grades K-12. The Cambridge STEAM Initiative team is committed to ensuring that all OST programs can support high quality STEAM

to STEM. SCFG started with one kindergarten club and has grown and served thousands of girls over the years, to become a leader in providing experiential STEM and girls' mentoring programs. In Cambridge, there are SCFG clubs at King Open Extended Day, Amigos School, and Margaret Fuller Neighborhood House. Over the past 10 years, over 90% of participants have gone on to college and over 55% of these college-bound young women go on to major in STEM-related and allied health disciplines.

community centers and schools in the Greater Boston area to propose implementation of math literacy workshops for elementary and middle school students. Workshops are facilitated by high school and college math literacy workers, low-income teens ages 14-22, giving youth and young adults the chance to participate in paid employment while also helping younger students improve in math. Their outreach emphasizes the benefits of learning math in sessions led by youth who come from the same neighborhoods and

From City-run programs, to those provided by community-based organizations and industry partners, Cambridge has a variety of STEAM learning opportunities for grades K-12.

learning experiences. Below are some of the quality programs supported by the Cambridge STEAM Initiative.

Science Club for Girls

The Science Club for Girls (SCFG) seeks to foster excitement, confidence, and literacy in science, technology, engineering, and mathematics (STEM) for girls from underrepresented communities, by providing free, hands-on programs and maximizing meaningful interactions with adult mentors in STEM fields. This organization was created in Cambridge 25 years ago at the King Open School by two mothers, Beth O'Sullivan and Mary McGowan, in an effort to give girls of color and girls from low-income families better access

Young People's Project

The Young People's Project (YPP) uses Math Literacy Work to develop the abilities of students to succeed in school and in life, and in doing so, involves them in efforts to eliminate institutional obstacles to their success. Even though most people understand the importance of being able to read and write, the importance of math literacy has not been similarly emphasized. However, research shows that students who do well in math early on tend to be more successful in school. This is one of the reasons why YPP has traditionally served young people who live in urban settings and students who perform in the bottom quartile. To recruit students, YPP reaches out to

communities as younger students. In Cambridge, YPP is funded by the Biogen STAR Initiative Grant to work with students at all five upper schools, engaging hundreds of young people, building both skills in and love of mathematics!

Innovators for Purpose

Innovators for Purpose (iFp) is a Cambridge-based nonprofit that inspires high-potential diverse young people, especially those from under-resourced communities to discover their passions, develop innovative mindsets, and cultivate skills to solve problems they care most about. Using a hands-on multidisciplinary approach that integrates art, design, and humanities with STEM, iFp has reimagined how to engage today's learners. Over the past six years,

holistic approach is creating learning experiences that provide our most vulnerable youth with the conditions for success. iFp has been partnering with the City of Cambridge and Cambridge Public Library since 2017 to bring high quality out-of-school time programming to those who need it most.

Cambridge Youth Programs

As a division of the City's Department of Human Service Programs, Cambridge Youth Programs (CYP), which includes

understood the marginalization of both our young people and staff when thinking about access to STEM and STEAM professions. Additionally, CYP wanted to think innovatively about how STEAM is embedded in it's programs and not to view STEAM learning solely through the development of a final product or learning concepts, but how to build consistent habits of mind around STEAM-based learning and the transferability of these habits.

As CYP continues building its STEAM-based capacity both as an

Using a hands-on multidisciplinary approach that integrates art, design, and humanities with STEM, iFp has reimagined how to engage today's learners.

iFp has worked with over 300 students and dozens of collaborators. In their programs, from initial introduction through high school graduation, students work intensively with professionals doing hands-on, real-world projects.

iFp Labs introduces 7th-8th grade students to design, science, technology, and entrepreneurial mindsets in a non-intimidating manner. In iFp Studios, a youth-powered design and innovation studio, students from 9th-12th grade employ design thinking and creative problem-solving strategies as well as graphic design, multimedia production, and web technologies to solve real problems for real clients.

As our nation becomes more diverse, it is imperative that we produce a more inclusive talent pool knowledgeable and interested in developing innovative approaches to our greatest challenges. iFp's

the Frisoli, Gately, Moore, Moses and Russell Youth Centers, serves youth ages 9-19. CYP is committed to offering young people a just, joyful, and caring community where they forge healthy relationships, discover who they are, and develop new skills.

This past year CYP built a strong partnership with Lesley University's STEAM Learning Lab through the Biogen Star Initiative Grant. This partnership has helped CYP be strategic in how it structures and views STEAM with the lens of those who participate in the programs and the staff who support them. CYP's participants are 80% young people of color and the teen program is 82% young men of color, with the staff also reflecting this percentage. It was important for CYP to forge a partnership with a team who

organization and as individual professionals, our goal is to offer young people the opportunity to explore and be curious about STEAM fields.

Ultimately, CYP want its young people to see themselves in these fields and professions, while also building confidence and a sense of possibility for their future in the world of STEAM and beyond.

The Next Generation of STEAM Scholars

Adiverse group of young people program music on a computer, connected to conductive tape and a cardboard guitar. Two girls translate a colorful grid into computer code, surrounded by friends who take apart laptops to peer inside. Interactive stations supported by community partners, including Harvard, MIT, Audible and Unruly Studios illuminate career pathways in STEAM (Science, Technology, Engineering, Arts, Math). Welcome to the Computer Science Playground.

The Playground is just one of many efforts underway in Cambridge Public Schools (CPS) that aim to overcome historic inequities in STEAM education. *"What we think of as an achievement gap is actually an opportunity gap,"* says Superintendent of Schools Kenneth Salim. *"Cambridge is a world-class hub of innovation, but not all students are equally immersed in all that the community has to offer."*

To combat opportunity gaps, the district is building learning environments where every student feels challenged, supported, and equipped to explore. Newly redesigned curricula tap into the innate curiosity of students, promoting awareness of problem-solving as a process rather than relying on rote memorization.

For example, in the *My Cambridge* Science Unit, Kindergarteners write to the Mayor about a problem, brainstorm design solutions, and

A video produced by Cambridge Street Upper School (CSUS) documents the impact of this approach, particularly for girls and students of color. In addition to addressing academic concerns, the approach seeks to undo harmful cultural stereotypes about what a "math person" or "scientist" looks like.

One student on the video describes overcoming her habit of worrying about making mistakes or looking dumb in front of "better" math students. She says, *"Math's gotten*

> "What we think of as an achievement gap is actually an opportunity gap," says Superintendent of Schools Kenneth Salim. "Cambridge is a world-class hub of innovation, but not all students are equally immersed in all that the community has to offer."

create models to display at City Hall. Third graders combine writing and scientific observation to craft their own *Charles River Field Guides*. And 4th Grade *Mammal Detectives* examine evidence such as bones or tracks to identify mammals common to our region.

Alongside curriculum changes, CPS is applying research demonstrating that "tracking" has a negative impact on learning by expanding and strengthening supports for mixed-ability classrooms. In 7th-8th Grade mathematics, students benefit from the richness of student diversity while engaging in hands-on and collaborative learning that treats risk-taking and mistakes as part of the process.

easier — It's not the curriculum that has gotten easier — it's definitely gotten harder. But it's easier to say your opinion. Everyone respects your voice. It's easier to be wrong."

Ultimately, the goal of these efforts is to equitably prepare students for 21st Century careers and opportunities. There are signs that equity-driven improvement efforts are paying off. MCAS scores are up, rising at higher rates among students of color and low-income students.

In the CSUS video, one African American scholar explains, *"Math keeps getting harder, but then I ask questions. I feel brave as a mathematician because I learned that when we work together, and our teachers help us, we become better as mathematicians."*

STEAM Internships

The Cambridge economy is dominated and driven by industry sectors that fall under the STEAM (Science, Technology, Arts, Engineering, & Math) umbrella. Employment in the city is concentrated primarily in Health Care, Education Services, and Professional and Business Services, the largest sub-sector of which is Scientific Research and Development. Most occupations within these industries require some form of post-secondary education or training.
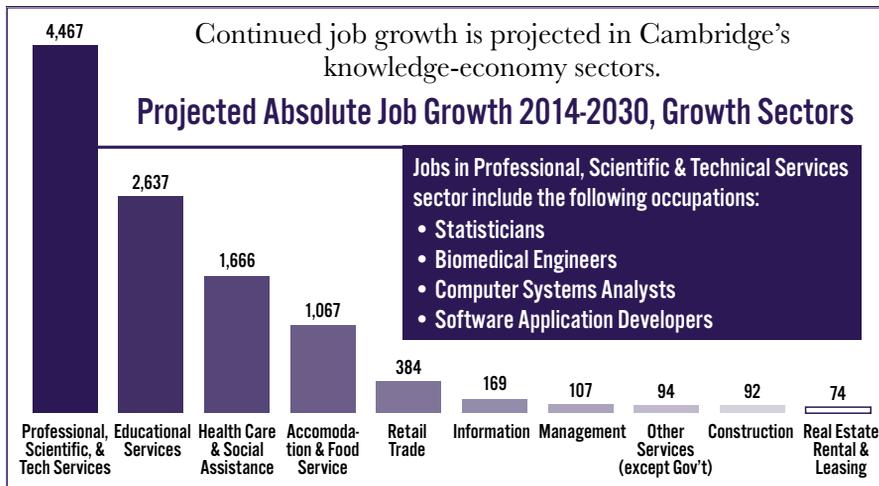
It is critical that students gain exposure to these working environments and have an opportunity to develop the skills, education, and habits of mind that are required to succeed in these industries. To create more opportunities for teens, the City's Office of Workforce Development (OWD) is working with the Cambridge STEAM Initiative on multiple fronts. OWD prioritizes STEAM programs that apply for resources through the **Mayor's Summer Youth Employment**
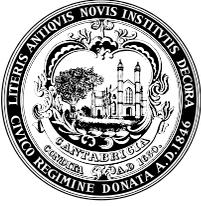
Program. OWD also administers the wages (funded by the STEAM Initiative) of Cambridge Rindge and Latin students enrolled in two internship programs – the **Science Research Mentoring Program**, a collaboration with The **Smithsonian Center for Astrophysics** where students conduct real, front-line research with a Harvard astrophysicist, and **Innovators for Purpose** (see pg. 11), which engages students in relevant real-world projects in collaboration with industry professionals to demonstrate how Design + STEM skills are used in practice. OWD staff also assists with recruitment so that these opportunities can reach a wider and more diverse audience. Staff has increased outreach to STEM employers to identify new partners interested in creating meaningful internships.

The City's Community Development Department supports a contest-based internship program, the **EF Glocal Challenge**, in partnership with EF Education First and

Cambridge Public Schools, to help high school students learn critical 21st Century Skills, gain global competence, and receive real-world STEAM experience. Program participants are asked to solve a challenge locally that also has global implications. The 2019-20 challenge was the global water crisis. Student teams researched the topic and developed creative solutions they presented at several competitions. The winning teams received a trip to Costa Rica and Panama on a STEM-related educational tour focused on the global water crisis, as well as seed funding from the City of Cambridge to kick-start their projects, and paid summer internships through the Mayor's Summer Youth Employment Program. All participants earn 25 community service hours. Learn more at **CambridgeMA.gov/Glocal**.

Adult residents interested in STEM professions can apply for two, free training programs operated by Just A Start, the **Biomedical Careers Training Program** and the **Information Technology Training Program**. Both programs include technical training, case management, and help with job placement. In a partnership with the Community Learning Center, participants also receive ongoing academic support to ensure successful completion. For more information, contact Just A Start at 617-918-7520 or workforcetraining@ justastart.org.

Continued job growth is projected in Cambridge's knowledge-economy sectors.

Projected Absolute Job Growth 2014-2030, Growth Sectors

Jobs in Professional, Scientific & Technical Services sector include the following occupations:
- Statisticians
- Biomedical Engineers
- Computer Systems Analysts
- Software Application Developers

Sector	Value
Professional, Scientific, & Tech Services	4,467
Educational Services	2,637
Health Care & Social Assistance	1,666
Accomodation & Food Service	1,067
Retail Trade	384
Information	169
Management	107
Other Services (except Gov't)	94
Construction	92
Real Estate Rental & Leasing	74

City Manager Louis A. DePasquale
Deputy City Manager Lisa C. Peterson

Cambridge City Council:

Mayor Sumbul Siddiqui
Vice Mayor Alanna M. Mallon
Councillor Dennis J. Carlone
Councillor Marc C. McGovern
Councillor Patricia M. Nolan
Councillor E. Denise Simmons
Councillor Jivan Sobrinho-Wheeler
Councillor Timothy J. Toomey, Jr.
Councillor Quinton Y. Zondervan

2020 US CENSUS

It's quick, safe, and easy to complete online.

What to expect:
Every household in Cambridge will receive a postcard in March asking you to fill out your Census form.

What to do:
Complete your Census form online for everyone in your household– that means kids, parents, roommates– anyone living at your address.

Need help?
Complete your Census form over the phone in 12 languages, on computers in libraries, or at kiosks in public buildings around the city.

Complete Your Annual City Census & 2020 US Census

In February, you will receive the Annual City Census, which we ask you to complete and return. If you have no changes, it can be completed online at **CambridgeMA.gov/Census**. In March, you will receive the first of several mailings asking you to fill out your 2020 US Census form. The US Census only happens every 10 years, so make sure you're counted for Cambridge to ensure fair and accurate representation in Congress as well as federal funding for programs you and your community rely on.

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