

2019 STEAM It Up! Event

On October 24th, we celebrated Massachusetts STEM Week with the STEAM It Up! an event for K-8 students and their families at the brand new Cambridge Street Upper School (CSUS).

An estimated 300 students and their families attended and engaged in over 30 different hands-on, STEAM activities—from creating phytoplankton mandalas to designing lightboxes to investigating spinning tops. Also, for the first time, students from our host school also participated in helping to support the event—a CSUS youth guitarist performed as we opened our doors to the public, a CSUS musical group performed during the event, and other students volunteered to help us set up and oversee our prize table. We also had CRLS teens from the Broadening Engagement through Engineering at MIT program running two very popular activity tables. One of our goals is to engage even more youth and teens to participate by sharing their passion for and knowledge of STEAM through this event.



Students engaged in hands-on activities from MIT Media Lab, MIT's Koch Institute, and Cambridge Public Library.

(STEAM) Internships: Cambridge Teens' Perspectives

The STEAM Initiative, Office of Workforce Development and CPS have been collaborating around bolstering internship opportunities that create potential pathways for future employment in STEM fields. One discovery that came from our discussions was that we were missing the perspective of the young people in our design. During the spring of 2019 the STEAM Initiative partnered with students from the Harvard Graduate School of Education (HGSE) with the main goal of incorporating youth voice into our thinking and design.

The partnership design positioned the STEAM Initiative as the client and the HGSE students as the researchers. We worked together for a month to design methods of data collection that would allow them to investigate the interests, needs and prior internship experiences of high school teens in the city. Their methods included surveys, in-person focus groups, and interviews with Out of School time staff. The HGSE students submitted a final report which included several key findings that we will incorporate into the work of the internship-focused collaboration. We will also use these findings to inform additional communication, data collection, and action around incorporating the needs of the high school students. We will also put the findings in front of the Cambridge Youth Council to seek additional recommendations around action steps.

Key findings:

- Youth expressed a desire for authentic job experiences that would let them learn more about a particular job and what it entails.
- There was a general consensus that the current internship offerings were not meeting

this criteria of authenticity, save notably for the limited opportunities offered by the RSTA program at Cambridge Rindge and Latin School.

- Youth were highly interested in healthcare, sports, entertainment, and teaching professions.
- Aside from the dearth of authentic internship opportunities in their field of interest, youth were unsure of where they could acquire information on internships, relying instead on informal networks of friends, parents, youth center directors and teachers that each held only part of the information.
- There was also a lack of shared definition on what constitutes an internship.
- Many internships required skills that students did not have opportunities to build.

Key recommendations:

Role of the city:

- Compile a comprehensive list of internships that meets diverse student interest and are authentic. Specify necessary skills for all internships, in order for schools and youth centers to train interested students accordingly.
- Circulate this list of internships to teachers, parents, youth center directors and youth themselves via email. Focus especially on teachers and youth center directors.

Role of youth centers and school:

- Using internship list, circulate information among students, especially those that may be interested in a particular internship.
- Support students' skill-building so that they can get accepted to, and learn more from, the internship.
- Assess students' interests directly and convey to city.

Role of Cambridge Rindge and Latin School:

- Help youth centers pick up where RSTA ends; meet with youth center directors so that they can support student skill-building

STEAM Professional Development for OST Educators

The STEAM Initiative works in collaboration with the Agenda for Children Out of School Time (AFCOST) with the goal of developing and supporting high quality, equitable, and accessible professional development that responds to the needs of the youth-serving professionals in the city. These professional development opportunities help bolster two of the goals of the STEAM Initiatives core purpose:

- ALL residents in Cambridge (and those who serve all residents of Cambridge) are STEM literate and possess 21st Century Skills to be successful, engaged, and responsible citizens in a rapidly changing world.



Cambridge Public Library's STEAM Petting Zoo Workshop at the AFCOST Symposium.



Lesley STEAM Learning Lab's workshop on Social Movement Kinetic Sculptures at AFCOST.



- Expanded opportunities are available for learners in STEAM education.

There are two avenues for professional development within the AFCOST system, an ongoing training calendar and a yearly, week long symposium.

This year the AFCOST Symposium hosted eight workshops that were under the STEAM umbrella. These workshops were facilitated by Young People's Project, Cambridge Public Schools Math Dept, Cambridge Public Library, Farrington Nature Linc, Lesley

STEAM, CCTV, and STEAM Initiative staff. The workshops covered diverse topics from demystifying STEAM to nature exploration to supporting math as a social justice lever to social movement kinetic sculptures to an exploration of STEAM activity kits to technology as a powerful tool for youth voice.

The theme of this year's AFCOST Symposium was Seeing Possibilities: Racial Justice, Equity and Access. We hold these possibilities at the core of our vision as we engage in STEAM work and conversation across the city. We strive to create opportunities for all youth-serving professionals in Cambridge to engage in quality STEAM learning experiences regardless of economic and social barriers. The Symposium allowed for STEAM Initiative to be more broadly seen as grounded in and connected to ongoing racial justice, equity and access work across the OST community. The Symposium platform also allowed us to work with the facilitators and their support coaches to understand where the STEAM Habits of Mind (see chart at end of Update) were explicitly and implicitly living within the content they were delivering. We were able to include the Habits of Mind in all of the workshop descriptions and they served as a through line, connecting all STEAM workshops, regardless of content specifics.

The STEAM initiative has several training opportunities upcoming for the 2019-2020 school year focused on:

- How to STEAMify Your Program: An Introduction to STEAM
- Demystifying STEAM and Fostering Curiosity

Each training has been designed specifically for the Cambridge community as introductory spaces and are responsive to the needs of youth serving staff as they solidify their STEAM identities with the goal of better supporting young people in STEAM learning and thinking. As with the Symposium, all of the STEAM habits of mind are pulled through all of the trainings so language and practices are reinforced.

We will continue to collaborate and build upon community needs as we design/identify more content specific trainings in the coming year.

STEAM Advisory Working Group:

Computer Science, Computational Thinking, and Peer Mentoring Ideas

The Computer Science/Computational Thinking STEAM Advisory Working Group reconvened on October 30th to discuss next steps towards moving forward the three program ideas we have been focusing on. These ideas are:

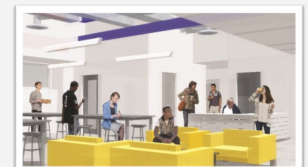
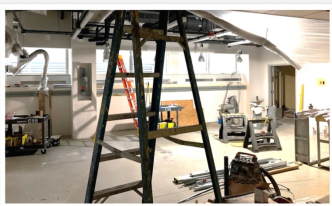
- Computational Thinking for Tots: A CS/Early Childhood Education Collaboration
Students in RSTA's early childhood strand collaborate with students in computer science to develop Computational Thinking curriculum and activities appropriate for grades K – 2. Students are then placed in a practicum with an elementary school teacher/preschools/OST program to co-teach curriculum with an educator.
- Creative Computing Collaboration
Through mentorship from Harvard Graduate School of Education students in a Spring K-12 Computer Science education course, high school students in a Mayor's Summer Youth Employment program develop curriculum and implement lessons in Community School summer camps.
- Coding Buddies
At elementary schools, create a version of Reading Buddies that would focus on coaching 5th grade students to teach and mentor children in earlier grades in computer science and computational thinking projects.

Our next steps are to up vote or down vote each of these ideas as a way to focus our collective efforts on one idea by further developing the idea into a detailed plan with a timeline, engaging outside partners, and eventually implementing the idea in as a pilot later this year. We will vote based on the following criteria:

- Alignment with CPS CS and Computational Thinking Goals
- Systemic challenges
- Available resources and our collective ability to procure needed resources
- Interest level of essential partners and alignment with partner's goals

STEAM at the Cambridge Public Library

Construction at the Hive, Cambridge Public Library's upcoming makerspace, is moving along! The space's opening celebration is scheduled for Wednesday, February 12, 2020. Stay tuned!





| Artist Habits of Mind | Science and Engineering Practices | Math Practices | STEAM Habits of Mind |
|--|---|--|--|
| <p>Develop Craft: Learning to use tools and materials. Learning the practices of an art form.</p> | <p>Planning and carrying out investigations</p> | <p>I can use math tools and tell why I chose them.</p> | <p>Develop Craft: Youth plan and carry out investigations to learn how to use appropriate tools and materials. Youth select appropriate tools and materials to identify solutions.</p> |
| <p>Engage & Persist: Learning to take up subjects of personal interest and importance within the art world. Learning to develop focus and other ways of thinking helpful to working and persevering at art tasks.</p> | <p>Asking questions Defining problems (Ask step of Engineering Design Process (EDP))</p> | <p>I can solve problems without giving up. I can use what I know to solve new problems.</p> | <p>Engage & Persist: Youth ask questions and define problems that are meaningful to them. Youth find solutions without giving up.</p> |
| <p>Envision: Learning to picture mentally what cannot be directly observed, heard or written and to imagine possible next steps in making a piece.</p> | <p>Designing solutions (<i>Imagine and Plan</i> steps of EDP)</p> | | <p>Envision/Imagine: Youth can envision multiple ways to approach solving a problem.</p> |
| <p>Express: Learning to create works that convey an idea, feeling or personal meaning.</p> | <p>Developing and using models Designing Solutions (<i>Create</i> step of EDP) Engaging in argument from evidence</p> | <p>I can show my work in many ways.</p> | <p>Express: Youth design solutions that also communicate an idea, feeling, or personal meaning. Youth develop and use models to prototype their designs.</p> |
| <p>Observe: Learning to attend to visual, audible and written contexts more closely than ordinary “looking” requires; learning to notice things that otherwise might not be noticed.</p> | <p>Asking questions Analyzing and interpreting data (quantitative and qualitative observations)</p> | <p>I can solve problems by looking for rules and patterns.</p> | <p>Observe: Youth make close observations and collect visual, audible, tactile, and written data.</p> |



| Artist Habits of Mind | Science and Engineering Practices | Math Practices | STEAM Habits of Mind |
|--|---|--|--|
| <p>Reflect: Learning to think and talk with others about one’s work and the process of making it. Learning to judge one’s own and others’ work and processes in relation to the standards of the field.</p> | <p>Analyzing and interpreting data Constructing explanations Obtaining, evaluating, and communicating information</p> | <p>I can explain my thinking and try to understand others. I can use what I know to solve new problems.</p> | <p>Reflect: Youth think and talk to others about their work and the process of making it. Youth can use what they have learned and apply it to additional art pieces.</p> |
| <p>Stretch & Explore: Learning to reach beyond one’s supposed limitations, to explore playfully without a preconceived plan and to embrace the opportunity to learn from mistakes and accidents.</p> | <p>Asking questions <i>(Improve step of EDP)</i></p> | <p>I can show my work in many ways.</p> | <p>Stretch & Explore: Youth ask questions, explore playfully, and embrace the opportunity to learn from mistakes and accidents.</p> |
| <p>Understand Art World: Learning about the history and practice of the art form. Interacting with other artists and the broader arts community.</p> | <p>Obtaining, evaluating, and communicating information</p> | | <p>Understand Art World: Youth learn about the history and practice of the art form. Youth interact with other artist and the broader arts community.</p> |
| | <p>Using mathematics and computational thinking</p> | <p>I can solve problems by looking for rules and patterns. I can think about numbers in many ways. I can work carefully and check my work.</p> | <p>Mathematical Thinking: Youth use math to solve problems by looking for rules and patterns.</p> |