Introducing Mass STEM Hub

October 10, 2019
Our MISSION is to provide schools with access to and support for applied learning and STEM education that builds knowledge and skills students need to succeed in a rapidly-changing, high-tech world.
Our WORK focuses in three areas:

- Best in class applied learning + STEM education
- Dedicated educator support & resources
- Authentic partner engagement
We work with over 320 schools in Massachusetts across three different programs

2019-20 MSH School Footprint
Connecting students and teachers to STEM careers & professionals is a key component for student success

*Curriculum-aligned experiences allow students & teachers to expand programming beyond the four walls of the classroom, by*

- Highlighting real world applications of coursework
- Providing an authentic audience & expert feedback
- Demystifying STEM careers
- Building confidence in using current industry tech

“The coolest part is that they give you feedback, and later on you can go back and fix your idea and make it even better... and possibly the best thing ever!”

-Student
PLTW increases student preparedness for and interest in STEM by offering high-quality applied learning K-12

* Results for PLTW students are for students who completed 3+ PLTW courses, statistically significant impact was also found for students who completed only 1 course.


PLTW Students v. Non-PLTW Peers*

- Persist in college: 1.6x
- Major in STEM: 6.4x
- Study engineering: 8.3x

Example problem-based student projects:
- App to detect concussions
- Therapeutic toy for child with CP
- 3D printed hand for a classmate
We partner with orgs to create meaningful experiences to increase students’ STEM mastery and excitement

Student Showcase
Co-development, in-kind donations, and recruitment of volunteers to host a showcase event where students present their work and receive feedback from an authentic audience

Online Industry Challenge
Expert feedback by industry professionals provided on student work submitted online and sponsorship of industry prizes, such as site visit field trips and virtual informational interviews

Sponsorships
Financial sponsorship, underwriting events and new or expanded school programming.
Examples: GE Foundation, National Grid, BNY Mellon
Civil Engineering and Architecture students presented Habitat for Humanity houses to Utile architects.

@utile_boston welcomed students from @ehmsmass to the office last week as part of an ongoing partnership with @pltworg and @mass_stemhub. It was great to see such young designers engaged in the problem solving that surrounds design, from programming and design concepts to site constraints and budgets!
MA STEM Week is a great opportunity to start getting involved, in-person and virtually

Grade-specific Challenges

K-2: Food Waste - designing a device to preserve food
3-5: Energy Waste - designing a solar powered device
6-8: Plastic Waste - designing a device to extract microplastics from bodies of water
9-12: E-waste - design campaigns to educate communities on e-waste reduction

Sign up at stemweekchallenge.org

Showcase judge: Volunteer as a judge for the STEM Week culminating event where over 600 students will present their work to leaders and industry professionals at the Reggie Lewis Center, Boston | Morning of Friday, Oct 25 | 2.5 hour (9:30am-12:00pm) commitment + travel.

Virtual project judge: After STEM Week, review project work submitted online by students across the state to help us choose winners in several categories! Project reviews will be guided by a brief rubric and all be completed online. Oct 28 - Nov 8 | 3 hour commitment, anytime over the two weeks.
STEM is all year long – your organization can get involved today for opportunities throughout SY 2019-20

Sponsor an Online Industry Challenge

Commitment
• Recruit ~10 employee volunteers to judge 30-60 student projects over a 2 week period (10-15 min/project)
• Sponsor prizes for the winners (company tour for a class + transportation stipend, virtual conversation with judge, swag, etc.)

Planned Engineering Challenges (details in appendix):
• Manufacturing a Box (High School; December)
• Automation and Robotics Tasks (Middle School; January)
• Reverse Engineering & 3D Modeling (High School; March)
• Bridge and Truss Designs (High School; March)
• Control Systems Recycling Sorter (High School; May)
• Civil Engineering & Architecture (High School; TBD spring)

Judge a student showcase

Share your expertise with students by connecting with them in-person at a student showcase, learning about their prototype, asking questions about their design process, and providing feedback

Commitment
• Individual: 2-5 hours, including travel time, to connect with students during the showcase and (sometimes) over lunch
• Organization: be recognized as a volunteer sponsor by committing 10+ volunteers

Planned Showcases
• Jan 29 in Cambridge: Middle School Computer Science
• May 6 in Salem: Middle School Automation & Robotics (video)
• End of May in Boston: High School Capstone Showcase & STEM Signing Day (video)
• June 3 in Boston: Middle School Design & Modeling (video)
• June 9 in Boston: Elementary School Showcase (video)

Host an Onsite Teacher Industry Experience

A hands-on experience for 5-12 Project Lead The Way teachers to learn from STEM professionals and each other, increasing confidence and connections between their teaching and opportunities for their students. Taking this experience back to their classrooms, the teacher session has the potential to impact hundreds of students.

Commitment: 3-7 volunteers, 2-4 hours of teacher time onsite

Host a high school industry workshop

February – Opportunity for 100-200 high school students to share projects and troubleshoot with 50 industry professionals.

Contact Andreina (aparisiamon@mass-stemhub.org) to coordinate

Contact

MASS
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Appendix
Select Online Challenge Project Details

Automation through Programming Challenge – PLTW Automaton and Robotics Unit

| Grade level: | Middle School |
| Timing: | January |
| Description: | After students learn about mechanical systems, energy transfer, machine automation, and computer control systems, they apply that knowledge to build and program an automated device that completes one of ten tasks with minimal human intervention using the VEX Robotics® platform. Each student is designated as the team’s mechanical, electrical, or computer engineer, with the responsibilities for the task respective to their role. You’ll be judging: Student documentation of their process: mechanical engineer’s design sketch, electrical engineer’s inputs/outputs schematic, computer engineer’s code; Photos/video of the developed device |

Control Systems Challenge – PLTW Principles of Engineering Course

| Grade level: | High School |
| Timing: | May |
| Description: | After learning about mechanisms, strength of structure and materials, automation, and control systems, students apply that knowledge to design, model, and test a device that will separate recyclable materials, combining VEX materials with control and 3D modeling software. You’ll be judging: Student sorting system design sketch; Process flow and pseudocode/code driving the system; pictures/video of developed sorting system |

Reverse Engineering Challenge – PLTW Principles of Engineering Course

| Grade level: | High School |
| Timing: | March |
| Description: | After learning about engineering design and manufacturing, they apply that knowledge to reverse engineer an everyday item of their choosing, breaking it down into the component parts needed to build it, using Autodesk Inventor® to create 3D CAD designs for each part, and performing functional analyses of the parts. You’ll be judging: product description; project poster with rendered drawings, complete product, descriptions of functional and structural analysis findings |
We need the today’s STEM professionals to inspire the next generation of problem solvers

Engineers, scientists, architects, designers, project managers can all help students understand what it means to be a STEM professional and how they can have an impact in the future, serving as judges and mentors, in-person and online.
Meet the Mass STEM Hub team!

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