HIGH SCHOOL REIMAGINED. . . **STEAM STUDIO** offers high school students an exciting approach to learning. Our curriculum blends the mind of a scientist/technologist with that of an artist, enabling students to explore the captivating area where STEM, the Arts, and the future intersect.

STEAM STUDIO creates a new approach to learning that is more tinkerable, more meaningful, and showcases diversity. We're collaborating with vocational/technical schools and districts to implement STEAM Studios as academies within their existing schools – in Massachusetts & throughout the nation.

Our Focus

Emma Kelley, Andover, MA

- **Open students' eyes to a world of possibilities and interests.** We want to expose students to an expanding number of opportunities so they can uncover aspects of intellectual life that excite them and make well-informed college and career decisions
- **Create lifelong learners** who are undaunted by the world around them, who can adapt to the changes they will face, and who will flourish in a world that constantly creates new opportunities for employment and science and technology exploration.
- **Give students critical thinking habits, problem-solving skills, and creative abilities** that will prepare them for college and accelerate them on paths to exciting lives and thrilling careers.

STEAM STUDIO infuses the learning principals from MIT's Edgerton Center and Media Lab to create the next generation engineers, scientists, and innovators:

Projects
Students learn best when actively working on engaging projects – generating ideas, designing prototypes, making improvements, and creating final products

Peers
Learning flourishes as a social activity – with people sharing ideas, collaborating on projects, and building on one another's work

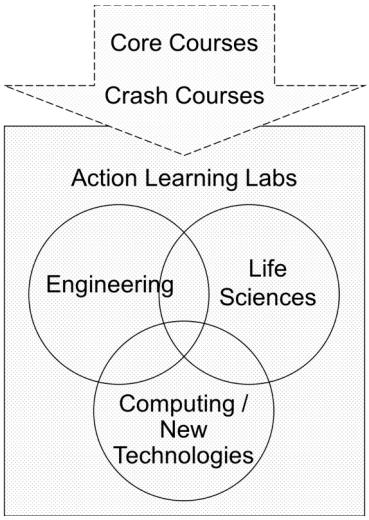
Passion
When focusing on meaningful tasks, people work longer and work harder, persist in the face of challenges, and learn more in the process

Play
Learning involves playful experimentation – trying new things, tinkering with materials, testing boundaries, taking risks, and iterating again and again

MIT Media Lab

Our Curriculum

Our college and career curriculum includes a strong foundation in STEM, Humanities, and the Arts:



Integrated Core Courses (year-long) unite academic subjects with industry and career pathways. Students apply academic concepts to real-world challenges. Example: Physics & Engineering, where students apply principles of physics and engineering to an iterative cycle of product design. Course culminates with competition-ready, semi-autonomous devices presented as marketable products designed to serve a specific purpose in the students' local community.

Crash Courses (6-12 weeks long) introduce a variety of short courses that give students the knowledge and skills needed to explore exciting fields (e.g. computational thinking, bioengineering, internet of things, design thinking, coding Amazon Echo & Google Home, electronics, creative writing, making wearables, architecture, bio-inspired robotics).

Action Learning Labs (3 hours, every other day). Modeled after MIT Sloan's Action Learning methodology, students participate in three labs, where they apply classroom learnings and engage in real-life projects: deep dives into current topics that provoke imagination, ignite passion, and improve their lives and the lives of others – in their communities and across the world.

The Engineering Lab, a "maker space" where students leverage science and technology to engineer solutions that lead to better lives for our citizens and society

The Life Sciences Lab, where students tackle exciting projects at the forefront of science, including biological engineering, new media medicine, wireless health, bio-design, genetics, brain and cognitive sciences, and computational biology

The Computing / New Technologies Lab, where students get immersed in the exciting world of computing – and explore how new technologies will shape our world (e.g. cloud computing, internet of things, data science, virtual reality, machine learning, cybersecurity)

How do Action Learning Labs work? We start with a question, an idea, or a technology. And to make the experience as rich as possible, **we aim for big questions, stimulating ideas, and emerging technologies** that can lead students in many productive directions – within and across labs.

Students tackle projects that explore the convergence of scientific and artistic creativity. They're also encouraged to collaborate across disciplines. Action Learning Labs help students grow as creators, critical thinkers, and entrepreneurs – and prepare students to excel in higher education and careers in high-growth fields.

Core Elements

Creativity and Discovery as Teachable Processes. Students will be introduced to various types of creative expression and imaginative thinking. Students will gain an understanding of their own mental processes that lead to innovation, and experience and practice creative thinking. Students will examine methods of supporting, nurturing, and cultivating creativity such as the design school process, startup incubators, and artists and writers studios.

On-Demand Learning System fosters personalized learning and provides a place where content, resources, and lectures from staff and outside experts are available 24x7. Students can draw from it to learn whenever and wherever they like, contribute to projects, or add to it to build their portfolios.

The Studio Environment is designed to facilitate collaboration between students and is where Action Learning Labs happen. Students work with teachers, other students, technology, and with industry experts in a design studio and lab environment. Studios are places of cross-fertilization where idea-sharing between students with different learning styles and different approaches to the creative process can lead to new ideas, new ways of perceiving the world, new artistic creations, and scientific discoveries.

Performing Arts are integral in our learning environment. Classes and workshops are year-round, with a focus on instrumental instruction and performance, computational thinking in music and computer-based composition.

The Spark Coding Initiative is STEAM Studio's commitment to boost computer literacy and spark an interest in the exciting world of computing – a field that many students wrongfully imagine as dry and tedious. *We approach the subject from a human-centered perspective*, and show programming to be fascinating, fun, and life-enhancing.

The Future Accelerator is designed to foster entrepreneurship, and is modeled after student-centered Innovation Labs at Harvard and MIT. The program helps students develop entrepreneurial traits and provides them with the tools and support needed to nurture new ideas and create new ventures. Students engage in master classes with entrepreneurs and receive mentorship from area startups. Students are also shown how their courses relate to establishing new businesses: English for marketing, Math for finance, Science and Technology for product development, History for perspective, and Foreign Language for global reach.

Typical School Week

Students follow rotating "Week 1" and "Week 2" schedule. Classes meet 5 times over 10 school days.

Week 1: Students take interdisciplinary core courses on Monday, Wednesday, Friday.
On Tuesday and Thursday, students take Performing Arts classes/workshops (90 min) and work on engineering, life sciences, and computing/new tech projects in the Action Learning Labs (3 hours).

Week 2: Students take core courses on Tuesday and Thursday. Monday, Wednesday, Friday are devoted to Performing Arts and Action Learning Labs.

WEEK 1					
	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Period 1	Phys Ed / Wellness	Coaching/Advising	Phys Ed / Wellness	Coaching/Advising	Phys Ed / Wellness
Period 2	Foreign Language	Performing Arts	Foreign Language	Performing Arts	Foreign Language
Period 3	Technology of Biology	**Action Learning Labs** - Engineering - Life Sciences - Computing/NewTech *with integrated Crash Courses*	Technology of Biology	**Action Learning Labs** - Engineering - Life Sciences - Computing/NewTech *with integrated Crash Courses*	Technology of Biology
Period 4	Engineering America		Engineering America		Engineering America
Period 5	Functional Design Through Algebra		Functional Design Through Algebra		Functional Design Through Algebra
Period 6	English & Digital Media Arts		English & Digital Media Arts		English & Digital Media Arts

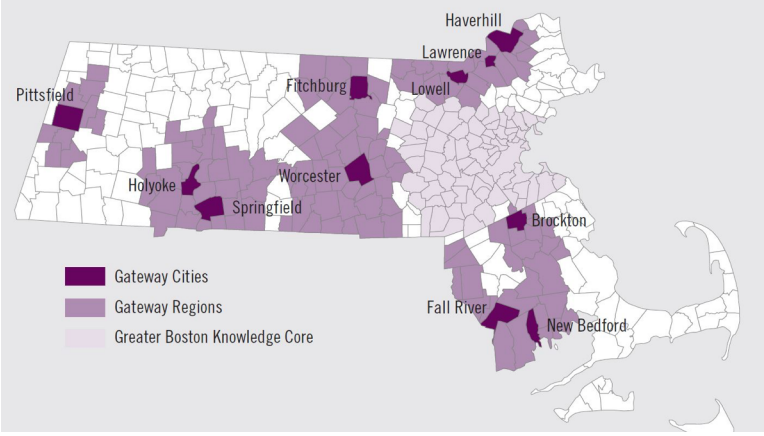
WEEK 2					
	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Period 1	Coaching/Advising	Phys Ed / Wellness	Coaching/Advising	Phys Ed / Wellness	Coaching/Advising
Period 2	Performing Arts	Foreign Language	Performing Arts	Foreign Language	Performing Arts
Period 3	**Action Learning Labs** - Engineering - Life Sciences - Computing/NewTech *with integrated Crash Courses*	Technology of Biology	**Action Learning Labs** - Engineering - Life Sciences - Computing/NewTech *with integrated Crash Courses*	Technology of Biology	**Action Learning Labs** - Engineering - Life Sciences - Computing/NewTech *with integrated Crash Courses*
Period 4		Engineering America		Engineering America	
Period 5		Functional Design Through Algebra		Functional Design Through Algebra	
Period 6		English & Digital Media Arts		English & Digital Media Arts	
After School	Athletics, Community Service, Optional Studio / Learning Lab Time				

Qualities We Will Develop in Students

In addition to helping students become engaged learners, STEAM STUDIO is focused on helping students develop these qualities:

- **Self-confidence** to effectively explain, demonstrate, and promote their original ideas in writing and orally
- **Curiosity** to explore and learn in a variety of environments
- **Perseverance** to overcome challenges despite inevitable roadblocks
- **Adaptability** to changing circumstances and new ways of thinking
- **Creative confidence** to approach new challenges fearlessly
- **Ability to work collaboratively** with diverse teams, and treat others with kindness and respect
- **Independence** and in control of their own learning
- **Can move seamlessly between the physical and digital worlds**

Our Plan: Create a Collaborative Network of STEAM Studios in Existing Schools



STEAM STUDIO is a model for a new generation of **academies in existing vocational / technical schools and public high schools** located in Gateway Cities in Massachusetts, and throughout the nation.

Note: The Massachusetts Innovation Schools initiative signed into law in January 2010, provides educators and other stakeholders across the state with the opportunity to create new in-district and autonomous schools that can implement creative and inventive strategies, increase student achievement, and reduce achievement gaps while keeping school funding within districts.

ABOUT STEAM STUDIO FOUNDATION

STEAM STUDIO EDUCATION FOUNDATION is a Massachusetts-based 501(c)(3) non-profit organization. Foundation members and advisors are experienced in K12, higher education (Harvard, MIT, Tufts, UMass Lowell), industry, and the Arts.

We are collaborating with vocational / technical schools and school districts to create STEAM STUDIO academies within their existing high schools - in Massachusetts and throughout the nation.

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