Grades 11-12

CAREER & TECHNICAL EDUCATION

Brooklyn STEAM Center

The Brooklyn STEAM Center is a career and technical education model that immerses high school scholars into industry workplaces where they learn through distinct pathways and real-world, project-based learning experiences.

OVERVIEW

Scan QR code with your phone's camera to access this content online.

The Brooklyn STEAM Center is located within the Brooklyn Navy Yard, a robust industry ecosystem with over 400 businesses that span manufacturing, technology, food, fashion, and media. At the STEAM Center, 11th and 12th grade scholars engage in high-quality professional work, develop robust and real industry networks, and explore tangible pathways to economic opportunity within industries such as Construction Technology, Culinary Arts & Hospitality Management, Cybersecurity, Design & Engineering, Film & Media, and Full-Stack Development.

The STEAM Center's mission is to create a diverse, skilled pipeline for careers within the creative, technology, and manufacturing industries, with a focus on economically stable career pathways. Scholars at STEAM come from a diverse range of demographic and academic backgrounds, including race, socioeconomic status, gender, abilities, and academic performance, to name a few. Participating scholars graduate with technical, professional, career, and financial skills that they can use to create their own futures. The Brooklyn STEAM Center serves 325 high school scholars across 8 schools in Brooklyn, New York. ▸ Overview of the Brooklyn STEAM Center

What Makes This Model Innovative?

Relevance

Scholars at STEAM choose an industry pathway that most aligns with their interests and postsecondary goals, ensuring learning is engaging and feels relevant.

High Expectations with Unlimited Opportunities

The STEAM Center provides rich learning opportunities for all scholars, who receive equal support and are each encouraged to pursue their diverse passions and goals.

Anytime, Anywhere Learning

STEAM's proximity to industry experts allows scholars to engage in learning experiences throughout Brooklyn and NYC, making learning possible anywhere.

DESIGN

Goals

Part of Brooklyn STEAM's mission is to support historically underserved scholars in gaining the 21st-century knowledge, skill sets, and experiences necessary to navigate the postsecondary world of their choosing, which will also diversify talent pipelines and improve the academic and economic outcomes for more young people.

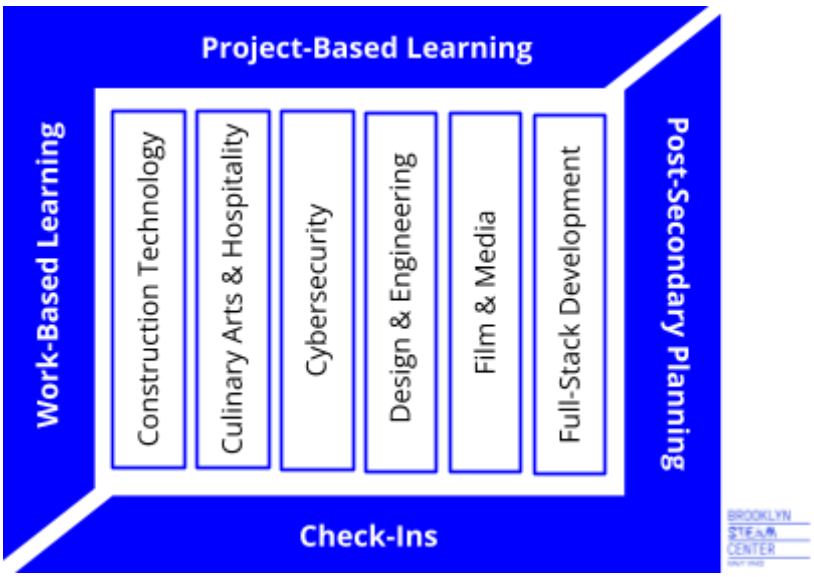
The goals below are Brooklyn STEAM's graduate aims: what they have deemed most essential in terms of knowledge, skills, habits, and mindsets for scholars to demonstrate in order to prepare them for the postsecondary pathway of their choosing. 🖥️ Skill Building Blocks - MHA Labs

Industry Skills	Scholars learn, practice, and earn credentials and college credits in a wide range of technical skills relevant to their industry pathways.
Professional Skills	Scholars practice 35 social, emotional, and cognitive skills critical to college, career, and life success in the 21st century (MHA Lab).
Identity Formation	Scholars develop deep awareness of who they are, what they value, and what interests them, as well as what their strengths are.

Agency	Scholars develop self-efficacy in their ability to navigate the world and chart their roadmap for the future.
Social Capital	By the time scholars graduate, they have a portfolio of work reflective of the demands of their industry and reviewed by industry professionals, an industry based credential, work experience, a professional network that includes at least one professional reference they can reach out to for support in the future, and a set of "work-ready" competencies that will equip them to thrive in workplaces or future higher education.

Experience

The student experiences at Brooklyn STEAM are rooted in the model's design principles of Learning by Doing, Workplace Immersion, With Not For, and Equitable Access. When combined, these principles translate into rigorous and immersive learning experiences grounded in real-world work that support learners in reaching the model's goals. 📄 STEAM's Design Principles



Pathways in Career and Technical Education

Scholars' main learning experiences at the STEAM Center are grounded in one of five industry Pathways. In these, scholars receive career and technical education knowledge and skills, access to a large network of nearby professionals, mentorships, and often internships or extended projects. Scholars get to choose their Pathway when they apply to participate in the STEAM Center at the end of their 10th grade year of high school.

Each industry Pathway offers a range of projects, curricula, and credentials aligned to technical and professional skills that mirror real-world work:

1. **Construction Technology Pathway** prepares scholars for a career in the construction and sustainability industries. Scholars study the foundations of carpentry, masonry, residential building, and electrical, as well as plumbing. They gain certifications in OSHA 30, NCCER Core & Construction Technology, NABCEP Solar Heating Associate (SHA), and others.

2. **Culinary Arts & Hospitality Pathway** prepares scholars for a career in the food and hospitality sector. Scholars study and develop skills around food safety and sanitation, food and beverage preparation, and event planning. They gain certifications such as the NYC Food Handler License, ServSafe Food Handler, and NOCTI Prep Cook I.
3. **Cybersecurity Pathway** prepares scholars for a career in information technology, support, and services. Scholars study and develop skills around the fundamentals for information technology, as well as ethical hacking and digital forensics. They gain industry certifications in CompTIA ITF+, Certiport IT Specialist in Networking, Network Security, and Cybersecurity, among others.
4. **Design & Engineering Pathway** prepares scholars for a flexible understanding of computer-aided drawing and design, 3D modeling and printing, and fabrication. Scholars develop skills like drafting and model making, as well as problem-solving using engineering design processes. They gain certifications for 3D modeling software such as Rhino Level 1 and Fusion 360, among others.
5. **Film and Media Pathway** prepares scholars for the technical and creative demands of careers in film and media. Scholars study video production, post-production, audio engineering, and storytelling, among others. They gain certifications in Adobe Premiere Pro and AVID Pro Tools, while also mastering industry-grade tools like Adobe After Effects and Davinci Resolve.
6. **Full-Stack Development Pathway** prepares scholars for a career in information technology, programming, and software development. Scholars study the fundamentals of IT, front- and back-end development, and full-stack integration. They gain industry certifications in Certiport IT Specialist Python, HTML & CSS, as well as the Python Institute PCEP, among others.

Project-Based Learning

Scholars at STEAM learn primarily through inquiry-based projects that occur over the course of the program. The topics and activities scholars engage in depend largely on their chosen industry, as well as the skill sets and knowledge required to succeed in each.

- **Construction Technology**: Projects range from building furniture and tiny homes to managing electrical and plumbing systems while working in authentic wood and metal shops. Scholars work with expert fabricators, electricians, and construction managers on these projects.
- **Culinary Arts & Hospitality:** Projects consist of preparing for and participating in culinary competitions, event catering, and running a pop-up restaurant. Scholars work with chefs, servers, and event planners on these projects.
- **Cybersecurity:** Projects consist of building risk management practices and leading vulnerability scans for organizations. Scholars work with hackers, university faculty, and counter threat experts on these projects.
- **Design & Engineering:** Projects range from building robots to 3-D printing and designing

products. Scholars work with architects, engineers, and mechanics on these projects.
- **Film and Media:** Projects range from designing and creating visual podcasts and films to working in film and media studios. Scholars work with directors, producers, and media managers on these projects.
- **Full-Stack Development:** Projects range from developing websites like admissions and social media sites to building web applications. Scholars work with developers to lead these projects.

Work-Based Learning

Each pathway includes work-based learning experiences that immerse scholars in real-world industry settings and offer a chance to network and build relationships, as well as participate in paid internships.

Scholars in every pathway go on:

- **Workplace Tours**: Scholars explore the Brooklyn Navy Yard's industry offerings by going to company offices, research laboratories, and kitchens and learning from experts.
- **Informational Interviews:** Scholars attend a wide range of networking opportunities and get to chat 1:1 with leaders in the fields that interest them.
- **Career Exploration Events:** Scholars explore what industry pathways have to offer by attending curated tours and social events crafted for their learning and involvement.
- **Job Shadowing:** Scholars experience professions first-hand by spending time with one or a few industry experts in their chosen fields.
- **Showcases**: Scholars present their projects to industry experts and get feedback from professionals in the field as well as network and build relationships with local experts.

Additionally, scholars can also embark on **Expansion Projects**, which are longer, paid experiences. These include:

- **Internships:** Scholars participating in internships have included working at local restaurants, companies, and organizations. Scholars can also participate in after-school or weekend internships in the fall and spring semesters and full-time internships during the summer. Interns are paid either through the NYCDOE CTE Industry Scholars Program or through the Brooklyn Navy Yard internship programs. 🖥️ NYCDOE CTE Industry Scholars Program
- **Extension Projects:** These longer projects are often stipended group projects for scholars to tackle real-world problems alongside—and with direction from—a partner company. Pathways have sometimes taken on projects that allow scholars to work on projects at the STEAM Center *for* clients. These projects offer real-world accountability with lots of embedded support.

Workplace Immersion

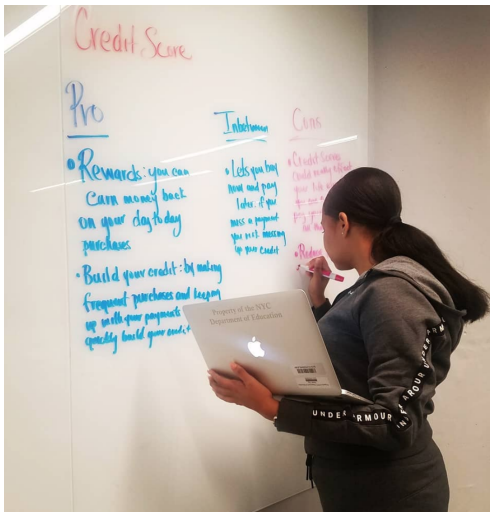
The STEAM Center's location and partnerships with nearby industry experts offers scholars immersion into professional and technical experiences within their chosen pathways.

The STEAM Center is co-located on the third floor of a high-rise that houses nearly 100 businesses and sits within an ecosystem of 400+ companies. Within each Pathway, STEAM scholars get to participate in state-of-the-art workplace environments.

- **Construction Technology:** Scholars work in authentic metal and wood shops and meet with fabricators, electricians, and construction managers.
- **Culinary Arts & Hospitality Management**: Scholars work in professional-grade kitchens and collaborate with nearby chefs, servers, and event planners.
- **Cybersecurity:** Scholars work in environments at the STEAM Center that feel like co-working spaces instead of classrooms, and network and collaborate with hackers, university faculty, and counterthreat experts, among others.
- **Design & Engineering:** Scholars work in fabricator labs and co-working spaces located throughout the STEAM Center.
- **Film & Media**: Scholars work in a state-of-the-art film and media studio, sound stage, and control room. They get to work with directors, producers, and media managers based in NYC.
- **Full-Stack Development:** Scholars work in co-working spaces at the STEAM Center, go on professional tours of workplaces, and shadow industry experts at their workplaces. Scholars get to network and collaborate with leaders in the field and faculty at universities.

The STEAM Center will soon extend its immersion programming to nearby hospitals, airports, and possibly other industry centers.

Post-Secondary Planning



During their senior year, scholars participate in a year-long course that helps hone their goals and interests beyond high school.

This experience happens once a week. The PSP course consists of lessons, instruction, and activities that directly complement their Pathway's instruction by offering dedicated time to planning and reflecting on their past and future goals.

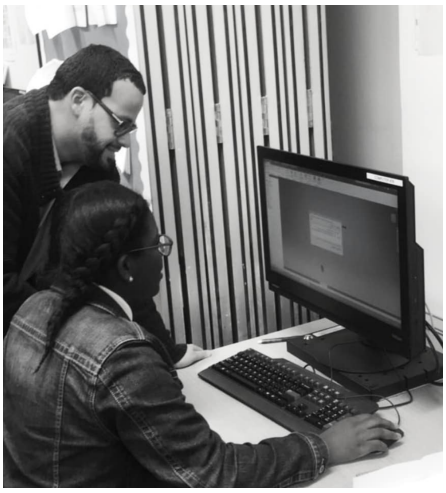
During the PSP class, seniors prepare and reflect on work-based learning experiences in order to begin identifying their strength and growth areas. Scholars also develop financial literacy skills and knowledge, as well as create a personalized post-secondary plan. STEAM leverages the New York State Career &

Financial Management Curriculum Framework for this course. 📑 Career & Financial Management Curriculum Framework

Check-Ins

Scholars meet with a mentor teacher once a month for ten minutes in order to track their progress through their Pathway and work through challenges with an adult.

This experience helps build a sense of belonging at STEAM. These check-ins encourage scholars to reflect on their learning and ability to direct their progress. Each session leverages a theme that is aligned to scholars' development through their STEAM Pathway and their life plan.



Supporting Structures

The Brooklyn STEAM Center model benefits from its proximity to an industry-rich location and strong relationships with community partners and participating schools. The following additional supporting structures are essential to making a model like the one used at the STEAM Center work in your community.

CURRICULUM, INSTRUCTION, & ASSESSMENT

Each Pathway must leverage project-based learning and instruction on professional and technical knowledge and skills and offer CTE credentialing as well as graduation and college credits.

The STEAM Center's curriculum is grounded in project-based learning. Scholars in almost every Pathway (with the exception of Culinary) engage in a culminating Capstone project. Learning sessions are structured like "mini-lessons" that provide scholars with open-ended Essential Questions to spark curiosity and student-centered discovery. Instruction generally prioritizes inquiry and self-direction through real-world work. Scholars benefit from instruction around self-direction and progress monitoring. 📄 STEAM Look Fors 📄 CTE Pathways Brief

The STEAM Center's work-based and workplace immersion experiences

benefit from the Brooklyn Navy Yard's accessibility to industry experts. Industry professionals actively engage in scholars' projects and offer scholars a chance to present their projects and receive critical feedback. This hones scholars' technical skills and knowledge through real-world collaboration.

This program is the first state-approved CTE program in NYC that offers a "shared instruction" option between traditional schools and an off-campus learning hub. Scholars earn college credits, receive professional credentialing and certificates, and fulfill graduation requirements through their STEAM coursework. Within New York State specifically, Brooklyn STEAM scholars have the option to leverage alternative assessment pathways or earn career-ready designations on their diplomas such as a CTE Technical Endorsement or a CDOS Commencement Credential. 🖥️ New York State Multiple Pathways

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Team-teaching is a critical component of STEAM's instructional model—each Pathway is supported by multiple staff members who support internal and external partnerships.

ADULT ROLES, HIRING, & LEARNING

Each Pathway has two learning facilitators who support scholars' projects and progress during their STEAM courses. One of the learning facilitators is always a NYSED certified CTE teacher employed by the NYCDOE who has a blend of industry and either formal or informal teaching experience. Candidates for a teaching position at STEAM can apply through the city's Transitional A Certification and/or can be hired through the Success Via Apprenticeship Program 🖥️ Transitional A Certification. STEAM also offers a "learn and earn" program to their alumni. Recent STEAM graduates can work at the Center as Teaching Assistants while also pursuing a college degree in a pathways-affiliated major.

Teachers at STEAM participate in weekly professional development around student-centered pedagogy and how to support scholars with project-based learning. Teachers also receive support in the form of training, professional development, or additional time to stay up-to-date in their respective fields.

Additionally, a Work-Based Learning Coordinator works alongside site-specific Directors and Internship Coordinators to ensure scholars' learning experiences are operationally sound. They manage the operations, scheduling, buses, and finances across STEAM and its industry partners.

SCHEDULE & USE OF TIME

Scholars must have access to their home high school and the STEAM Center during their 11th and 12th grade years, spending half the day at each location.

Participating seniors spend the hours of 8:30 AM to 11:00 AM at the STEAM Center. By 12:30 PM, buses drop off seniors at their home high schools and pick up participating juniors, who attend their STEAM Center sessions from 12:30 PM to 3:00 PM.

Scholars spend the full 2.5-hour block in one class. Seniors spend one day a week in a Post-Secondary Planning (PSP) course instead of their Pathway course. This shared model allows home high schools and the STEAM Center to take advantage of both learning environments' resources and strengths.

FAMILY & COMMUNITY PARTNERSHIPS

As a New York City public school, STEAM must maintain strong partnerships with all eight partner high schools. It also benefits from maintaining its own Advisory Council.

The STEAM Center is guided and enabled by a partnership between the NYC Department of Education (NYCDOE) and the Brooklyn Navy Yard Development Corporation (BNYDC). NYCDOE operates the STEAM Center and employs STEAM staff, while BNYDC leases the space to STEAM and brings access to an ecosystem of 400+ manufacturing, creative, and tech companies.

The STEAM Center's eight partner high schools provide scholars with traditional high school coursework to fulfill graduation requirements, while the STEAM Center oversees the delivery of rigorous career and technical education programming and provides the infrastructure, workplace learning, and industry partnerships.

Additionally, a BNYDC-based Advisory Council supports the networking and partnership side of the STEAM Center. This council of influential professionals supports organizing workplace learning opportunities for STEAM scholars, serves as a league of advisors from businesses inside and outside of the Navy Yard and higher education institutions, and opens doors to student visits so that scholars learn the most relevant hard and soft skills. 📄 Advisory Council Overview and Expectations 📄 Advisory Council Structure

Each Pathway must have access to state-of-the-art learning equipment, industry-specific studios, and makerspaces that support scholars' real-world, project-based learning.

SPACE & FACILITIES

The STEAM Center sits within the Brooklyn Navy Yard, a 400+ industry ecosystem that puts scholars in daily contact with and in close proximity to industry professionals. This allows professionals to visit the Center frequently and makes it easier for scholars to attend their internships after school.

The 30,000-square-foot environment of the STEAM Center itself mirrors each pathway's real-world work environment. The spaces were designed with industry engagement that helped define space specifications and architectural plans as well as select equipment. The result is a learning environment that brings industry to scholars.

A STEAM Center classroom can include: a full sound stage, control room, editing booth, screening room, a fabrication lab, a construction workshop, and a professional-grade kitchen, to name a few.

Each Pathway requires access to industry-grade equipment and software, as well as access to 1:1 devices and software.

TECHNOLOGY & INFRASTRUCTURE

By equipping the STEAM Center with the highest quality equipment and programs, scholars gain unrestricted access to the best in their chosen fields and Pathways. This is especially significant when access to these has been disproportionately restricted to low-income youth of color.

Additionally, STEAM Center access to NYCDOE tech infrastructure is key for operating in a shared instructional model as a hub for scholars from eight different high schools.

The STEAM model benefits from strong partnerships with private and public funding streams to continuously provide scholars with the highest quality CTE education and maintain its innovative learning hub.

BUDGET & OPERATIONS

The STEAM Center is primarily funded through NYCDOE and does not receive per-pupil funding. It is also supported by the grant writing and fundraising team at the Brooklyn Navy Yard Development Corporation (BNYDC), which collaborates on raising private funding to support student

afterschool and summer programming, internship stipends, teacher training, industry engagements, and consumable and infrastructure needs.

STEAM is working with the State of New York to identify more sustainable revenue and funding streams for the program. It is currently funded by the NYCDOE through a tax levy through the School Allocation Memorandum (SAM).

IMPLEMENTATION

Supports Offered

The Brooklyn STEAM Center offers the following supports to help you implement their approach.

STEAM Center Events

Free

The Brooklyn STEAM Center offers an opportunity for community members to come together for a variety of virtual and in-person events. These include:

- **Public Showcases** that feature student work and final Pathways projects.
- **Design Days** that showcase how scholars take ownership over their learning and design their projects and future learning.

Sign Up

Inspiration Visits and Curated Tours

Cost Associated

The Brooklyn STEAM Center offers curated and personalized inspiration visit experiences. These are often offered to potential partners seeking to learn about STEAM's model in an effort to replicate it elsewhere or gain inspiration from it. These tours are longer experiences and can include:

- **STEAM Center Overview** where visitors go on a tour of the Center's unique learning and creation spaces and the Brooklyn Navy Yard.
- **Curriculum Deep Dive** where visitors explore a design cycle with scholars, review learning materials, and experience live instruction.
- **Systems Deep Dive** where visitors explore the admissions process, view how the Center monitors progress, experience Progress Check-Ins, and learn more about the Advisory Council.
- **Policy Deep Dive** where visitors learn about the details of the

Center's partnerships with the NYCDOE as well as what NYS CTE Programs entail.

- **Interviews** where visitors can conduct surveys and interviews of the Center's Leadership Team, faculty, scholars, and more.
- **Innovations Deep Dives** where visitors learn about upcoming programs such as additional credentialing and program expansions.

Get in Touch

Advisory and Consultancy Services

Cost Associated

The Brooklyn STEAM Center also offers advisory and consultancy services around the logistics, operations, and specifications of running the Center for those seeking support around similar CTE models.

Get in Touch

Reach

8	650+	16%	65%
Partner Schools	Scholars Served	Scholars with IEPs	Scholars with F/RL

Impact

Scholars who attend the STEAM Brooklyn Center achieve higher postsecondary and career and technical education results than non-STEAM scholars at partner schools.

- Scholars who attend the STEAM Center are **14% more likely to be on track for graduation** than non-STEAM students at their partner schools.
- On average, scholars at STEAM have a **10% higher attendance rate** when compared to non-STEAM students at their partner schools.
- In 2021-2022, 100% of STEAM scholars **were accepted into a 4-year college**.
- In 2021-2022, 100% of STEAM scholars **had a fully developed postsecondary plan**.

- In 2021-2022, 95% of STEAM scholars **enrolled in a 4-year college**, with the remainder enrolling in the armed forces or apprenticeship programs.
- In 2021-2022, 100% of STEAM scholars **participated in work-based learning opportunities.**
- In 2021-2022, 83% of STEAM graduates **earned one or more industry credentials and/or licenses**.

All data are reported directly by the Brooklyn STEAM Center for the 2021-2022 academic year.

Contact

Damiano Mastrandrea, Ed.D.
CTE Director
dmastrandrea@brooklynsteamcenter.org

RESOURCES

Overview of the Brooklyn STEAM Center

An overview of what the Brooklyn STEAM Center is doing for young scholars to advance in both academics and career.

Skill Building Blocks - MHA Labs

A website that explains the 35 habits and skills on which STEAM bases the professional goals for its students.

STEAM Playbook

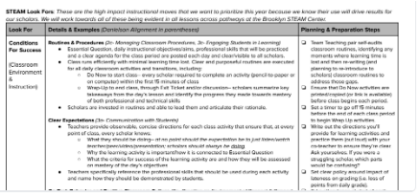
A detailed description of the STEAM Center's school design.

[Mayor's Office of Youth Employment]
A hub for related employment opportunities for STEAM students in NYC.

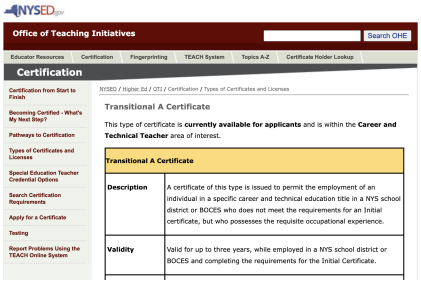
[New York State Career & Financial Management Curriculum Framework Preliminary Release June 2018]
A NYSED framework for career and technical education curriculum.

[Multiple Pathways | New York State Education Department]
A NYSED website that details the CTE requirements for students in the state.

[Enrollment CTE Pathway Brief]
A detailed overview of STEAM's CTE Pathways.

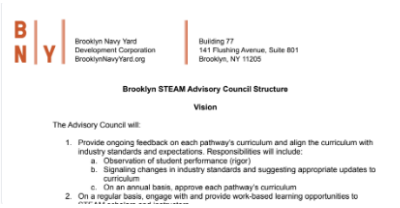


[STEAM Look Fors]
An overview of what instruction looks like and what to expect in STEAM classrooms.



[Transitional A Certificate: Types of Certificates and Licenses]
A NYSED website with information on how industry experts can transfer their experience into a teaching certificate.

[Advisory Council Overview and Expectations]
An overview of how the Brooklyn STEAM Advisory Council partners with industry



[Brooklyn STEAM Advisory Council Structure]
A description of how the Brooklyn STEAM Advisory Council is structured and

[Highlights from Reinventing CTE: Workplace Immersion at Brooklyn STEAM Center]
A video that shows what workplace immersion looks and feels like at STEAM.

professionals.	organized.	