



ISAAC NEWTON
MIDDLE SCHOOL
FOR MATH AND SCIENCE



A PARTNERSHIP TO EXPAND STEM LEARNING

Citizen Schools' Expanded Learning Time model expands the learning day in science, technology, engineering, and math (STEM).



CITIZEN SCHOOLS AT ISAAC NEWTON MIDDLE SCHOOL

Isaac Newton Middle School for Math and Science is “dedicated to developing mathematically and scientifically knowledgeable students who make connections between what they learn and the world in which they live.” A small school, Isaac Newton occupies one floor of a building that also houses the Manhattan Center High School for Science and Math in New York City’s East Harlem neighborhood. Isaac Newton students come from a community where 41% of children live in poverty, 18% of residents age 20 to 64 are unemployed, and 21% did not graduate from high school.

Founded in 1995, **Citizen Schools** is a national nonprofit organization that partners with middle schools to expand the learning day for children in low-income communities. Citizen Schools mobilizes a team of AmeriCorps educators and volunteer professionals to teach real-world learning projects, called “apprenticeships,” and provide academic support in order to help all students discover and achieve their dreams. Through Citizen Schools’ Expanded Learning Time (ELT) program, all students in a grade or school participate in Citizen Schools-led activities in the afternoon as part of an extended day.

Principal Lisa Nelson first brought Citizen Schools to Isaac Newton in 2009 as part of an overall plan to improve student progress and performance, but a district progress report for the 2010-11 academic year indicated that most Isaac Newton students were still struggling. The school was in the bottom 10 percent of New York City middle schools with an overall Progress Report grade of D; its Student Progress score (a measure of how much students improved on state tests in English and Math) was 8.6 out of a possible 60, barely above the F (bottom) range; and its Closing the Achievement Gap score (a comparison measure with peer schools indicating exceptional gains by students) was a mere 1 point out of a possible 15.

Beginning with the 2011-12 academic year, Principal Nelson asked Citizen Schools to move to a full ELT program, serving the entire 6th grade, and in 2012-13 the program expanded to include all students in the 7th grade. In 2013-14, Citizen Schools serves 220 Isaac Newton students. Results from the first two years of ELT are impressive: Isaac Newton’s overall Progress Report following the 2012-13 year had risen to a strong C grade; its Student Progress score increased by 26%; and its Closing the Achievement Gap score was nearly 4, a 17% percent gain.

Citizen Schools shares Isaac Newton’s math and science focus, offering 52% of its apprenticeships in STEM fields and academic support in math, science, and English Language Arts. According to Citizen Schools Campus Director Shane Morris, Isaac Newton “provides more science instruction during the day than any other comparable middle school [in New York City]”, recognizing that “with the increased focus on test scores in ELA and math, science oftentimes loses some of its heat.” At Isaac Newton, where the vision is “for students to have a really strong general education” and develop a “love for learning,” this interest in promoting science learning during the school day is reinforced in Citizen Schools’ ELT STEM learning program.

ISAAC NEWTON STUDENT BODY

Middle School (6-8) Enrollment: 321

Citizen Schools ELT Enrollment: 220

Economically Disadvantaged: 98%

Limited English Proficient: 12%

Hispanic: 73%

Black or African American: 23%

Asian or Pacific Islander: 3%

White: 1%



STEM LEARNING AT ISAAC NEWTON MIDDLE SCHOOL

STEM Learning Model

Academic Support

Daily “Academic Block” sessions led by Citizen Schools AmeriCorps members and staff focus on math, science, and English Language Arts (ELA), and students complete lessons that are mapped to state and Common Core standards. In the course of their six-year partnership, Isaac Newton and Citizen Schools have developed a dynamic collaboration between school day and extended day teachers. In the three core disciplines – math, science, and ELA - Isaac Newton teachers co-deliver lessons in the afternoon with Citizen Schools teachers, called Team Leaders (TLs). When the Isaac Newton teacher leaves for the day, Citizen Schools staff facilitate independent student work based on that day’s lesson, and the class ends with an “exit ticket” for each student indicating their level of understanding of the lesson. Citizen Schools’ TLs review and grade the exit tickets, and enter the information in a tracker. The tracker is shared with Isaac Newton teachers, and they use that data to plan for the next lesson. This collaborative teaching model provides Isaac Newton teachers with current data about their students from the tracker, allowing them to see where individual students may need additional help and adjust lesson plans

accordingly. Co-teaching lessons with Isaac Newton teachers helps Citizen Schools staff gain a deeper understanding of each day’s lesson, identify which students are struggling, and follow up with targeted support during the extended day Academic Blocks.

Apprenticeships

Apprenticeships are the cornerstone of Citizen Schools’ STEM learning program at Isaac Newton. Apprenticeships – hands-on, project-based learning experiences in which students explore new fields and career opportunities alongside community volunteers – are designed to help students see the connection between current learning and future opportunity and become more motivated to learn. Isaac Newton students select two apprenticeships



	Monday	Tuesday	Wednesday	Thursday	Friday
8:10- 2:30	Isaac Newton Regular School Time				
2:30- 2:35	Transition to Citizen Schools				
2:30-3:15	Advisory	Advisory	Advisory	Advisory	Citizen Schools Staff Time: Meetings, Training, Professional Development (9:00-12:00) Friday Clubs for Students (3:00-4:30)
3:15-4:15	Academic Block	Academic Block	Academic Block	Academic Block	
4:15-4:30	Snack	Snack	High School and College Curricula	Snack	
4:30-5:00	Apprenticeships	Academic Block		Choice Time	
5:00-5:30		ELA Academic Block			
5:30-6:00		Circle (in Teams)	Choice Time		



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Isaac Newton students select two apprenticeships each semester, with each meeting for 90 minutes weekly. Apprenticeships culminate in a public presentation, called the WOW!, where students teach back what they have learned to their peers, families, and community. Volunteer experts, called “Citizen Teachers,” teach apprenticeships selected from the growing curriculum library curated by Citizen Schools staff, or work with staff to design a new apprenticeship with the goal of building both content knowledge and 21st century skills. In the STEM learning model, all students have the chance to experience a STEM apprenticeship, and many choose to participate in several during their time in the program.

STUDENT IMPACT IN STEM AT ISAAC NEWTON

- **80%** of students beginning the year with an A or B grade in Math maintained or improved their grade
- **77%** of students showed improvement in 21st Century skills
- **75%** of students reported a high level of belief in themselves and the importance of education
- **Estimated 3 additional months of math learning** in an academic year according to a national external evaluation of Citizen Schools' ELT programs being conducted by Abt Associates



STEM Apprenticeship Examples

Lego Robotics with Google

In this apprenticeship, students worked alongside Google volunteers to learn about basic robotics, a rapidly growing field in computer science. The Google Citizen Teachers designed the apprenticeship to culminate in a judged competition that included a teamwork interview, research presentation, and robot demonstration. Working in teams, students learned basic robot design and, through applied knowledge of computer programming (NXT), research and design, and intense collaboration with team members, constructed their own robots and a research presentation that resulted in a unique solution to a problem related to the competition's challenge theme. During their presentations, students demonstrated their knowledge of how and why such robots operate the way they do. The apprenticeship curriculum also provided explicit connections to educational pathways and career options in robotics design.

Neuroscience with New York University School of Medicine

Working with New York University School of Medicine students, Isaac Newton apprentices learned appropriate vocabulary to identify the parts of the brain, the functions of the frontal lobe, and the symptoms of two neurological disorders (Broca's Aphasia and frontal lobe dementia). They also practiced the steps of the scientific method specific to clinical studies (hypothesis, research, and results) in order to complete a case study.

Running a Small Business with Capital One

Students worked with a volunteer Citizen Teacher from Capital One to learn how to start and run their own small business. After choosing a product and business concept, the students broke into three teams:



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Production, Marketing, and Finance. Each team took responsibility for its part of the business plan and other responsibilities of the business, such as: securing a loan, packaging the product, marketing the product, and selling it at a sales event. The profits of the business were donated to a charitable organization in the community chosen by the students at the beginning of the class. Along the way, students deepened their understanding of entrepreneurship; learned about business plans; calculated profit and loss; and built their writing, math, public speaking, and teamwork skills.

Citizens Schools gave me the opportunity to teach a class about something I am passionate about to kids at an important time in their lives. At first, I didn't think that the kids were listening or picking up anything that I was trying to teach them. At about Week 5, we played a jeopardy game where we put some tough questions up, and most of the kids knew the answers! Seeing that I was actually teaching them something that I feel passionate about, and that I believe will be important for about 80% of the kids in the classroom, was one of the most rewarding experiences of my life and showed me that I can really make a difference.

BRETT MURPHY

CAPITAL ONE EMPLOYEE AND CITIZEN TEACHER
'RUNNING A SMALL BUSINESS' APPRENTICESHIP

hypothesis about how a crime occurred, and identify the suspect they believe committed the crime. In their WOW! presentations, students reconstructed the events of the crime and explained how the evidence supported their conclusions.

Over the course of the year, my son developed skills to improve himself personally and academically. He began taking his school work seriously, developing better study skills, being accountable for his homework and taking pride in his work. He learned new skills in the apprenticeships that kept him interested and motivated. He began making better choices about his behavior and not giving in to negative peer pressure.

Excerpt from a Citizen Schools Parent Letter

Crime Scene Investigation with Rockefeller University

Students from Rockefeller University in New York City helped students learn about the five categories of evidence (fingerprints, footprints, hair and fiber, DNA, and witness testimony), develop a





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As Citizen Schools establishes STEM programming and Expanded Learning Time in partnership with high-need schools like Isaac Newton across the country, one key lesson learned is that these challenging endeavors, to be successful, require a long-term commitment from all constituents – deep and lasting partnerships among districts, schools, providers, funders, and the community at large. Citizen Schools and its partner schools are proving that when that time and commitment exist, we are able to ignite moments of discovery for our students that lead to significant academic achievement, change students’ trajectories for the better, and close the opportunity gap.



While there's this emphasis on science, budget constraints prevent Isaac Newton from providing the technology and other resources that the school really needs. During the first part of the day, students interact very little with technology; they have very little time in the computer lab. Though teachers have Smart Boards, the interaction that kids have with technology isn't on the level that you would hope for in a 21st century school. Our partnerships with Google and other organizations are so important because they bring in a lot of technology-related materials so students can build robots, create architectural designs, and create video games.

SHANE MORRIS

CITIZEN SCHOOLS CAMPUS DIRECTOR
ISAAC NEWTON MIDDLE SCHOOL

NATIONAL LEADERSHIP PARTNERS

