



A Biogen Foundation Initiative

SCIENCE | TEACHER SUPPORT | ACCESS | READINESS

YEAR 2: ANNUAL REPORT

October 2020

A **Citizen Schools** Teaching Fellow guides a student in a science experiment.



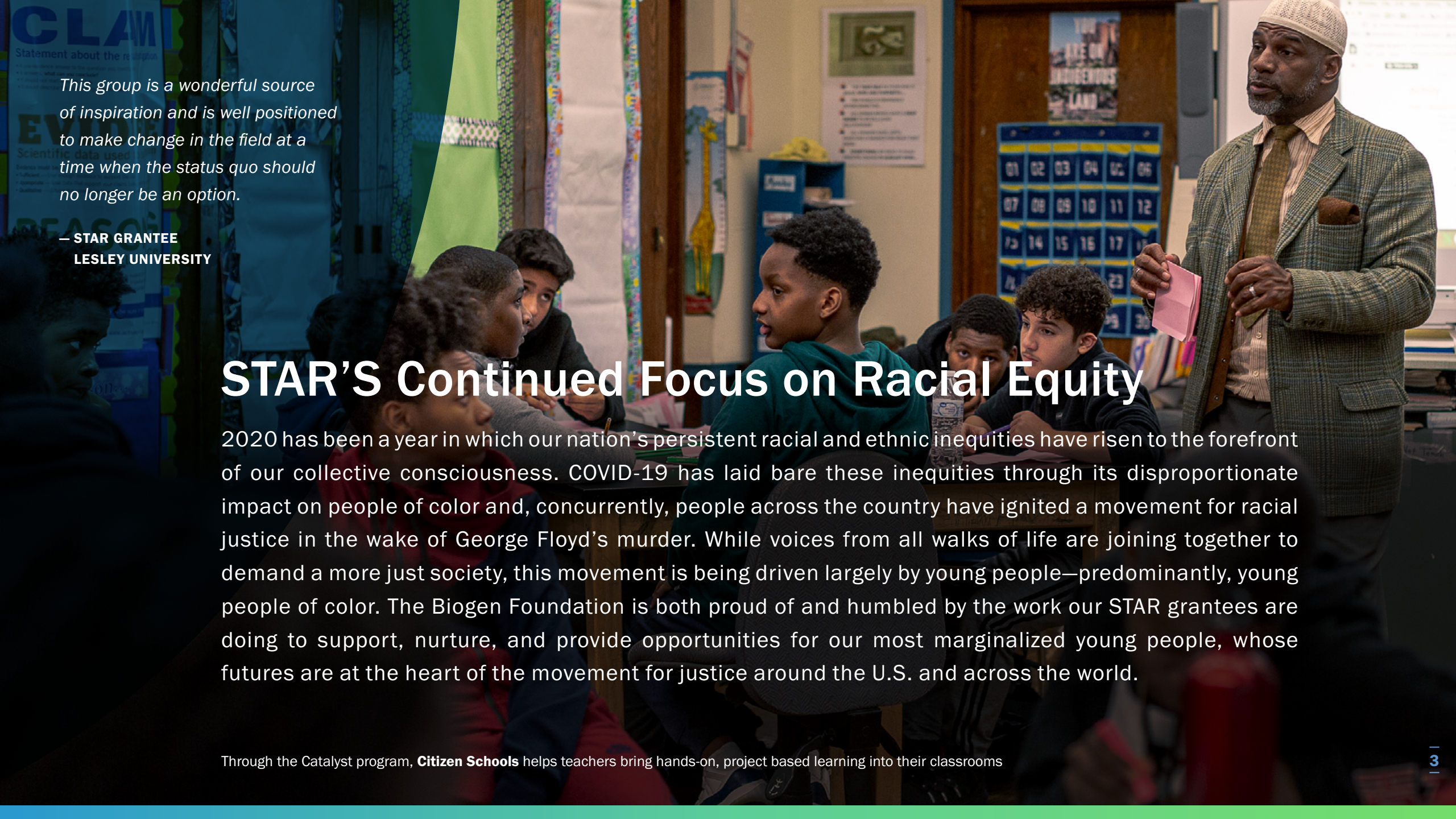
STAR Initiative Year 2 Report

Launched in 2018 by the Biogen Foundation through a 4-year, \$10 million investment, the STAR Initiative drives STEM education equity in Cambridge and Somerville, MA. Through STAR (Science, Teacher support, Access & Readiness), the Biogen Foundation is investing in six high performing nonprofits and coordinating a multi-stakeholder network that centers students historically underrepresented in STEM college and career pathways—notably, students of color.



SCIENCE / TEACHER SUPPORT / ACCESS / READINESS

Enroot students from the Cambridge Rindge and Latin school experimenting with fluorescent protein expressions at MIT



This group is a wonderful source of inspiration and is well positioned to make change in the field at a time when the status quo should no longer be an option.

— STAR GRANTEE
LESLEY UNIVERSITY

STAR'S Continued Focus on Racial Equity

2020 has been a year in which our nation's persistent racial and ethnic inequities have risen to the forefront of our collective consciousness. COVID-19 has laid bare these inequities through its disproportionate impact on people of color and, concurrently, people across the country have ignited a movement for racial justice in the wake of George Floyd's murder. While voices from all walks of life are joining together to demand a more just society, this movement is being driven largely by young people—predominantly, young people of color. The Biogen Foundation is both proud of and humbled by the work our STAR grantees are doing to support, nurture, and provide opportunities for our most marginalized young people, whose futures are at the heart of the movement for justice around the U.S. and across the world.

Through the Catalyst program, **Citizen Schools** helps teachers bring hands-on, project based learning into their classrooms

Adapting & Innovating in Response to COVID-19

STAR grantees advance STEM education equity by engaging students typically underrepresented in STEM college and career pathways, particularly students of color. Through programs that range from student-designed math literacy projects to STEM-focused internships for students who are new immigrants, they serve low-income students grades 6-14 in Cambridge and Somerville and support STEM teacher training and curriculum development.

The challenges presented by COVID forced schools and nonprofits to figure out how to quickly adapt their ability to engage students, particularly those already falling behind. STAR grantees demonstrated the resilience and strength of the network in their rapid collaborations that enabled programs to reach and support more students throughout the prolonged period of school closures last spring. These collaborations are continuing in the new school year.

This community crowdsourcing and ideation is more important now than ever given the pandemic's disproportionate impact on students and families of color.

STAR grantees all pivoted to helping students and families with basic needs such as food and internet access as well as social emotional and academic needs.

- Partnered to create April vacation week activities for students in Somerville.
- Immediately compiled online resources to share with each other and with their students and families.
- Designed and participated in online workshops to help educators rapidly adapt to remote teaching and learning.

Many of these adaptations have been made possible by the Biogen Foundation's ongoing support. At the onset of the pandemic, the Biogen Foundation designated all STAR funding as unrestricted for the rest of Year 2 in order to best support grantees in their emergency responses.





STAR Initiative Grantees: Year 2

Although COVID-19 disrupted the world in the second semester of the 2019-2020 school year, STAR grantees accomplished tremendous successes both prior to and throughout the pandemic.

The liaison meetings have been a great space for collaboration, especially with the addition of the committees. The structure has provided time to build both personal and professional relationships. I have the opportunity to hear about the work happening with other grantees and brainstorm ways that we can collaborate.

— STAR GRANTEE
CITIZEN SCHOOLS

Citizen Schools students visited the Google office to get hands-on coding training copy



Breakthrough Greater Boston (BTGB) prepares low-income students for success in college by providing them with academic support—including in STEM subjects—and college preparation and application support, from middle school through high school. Additionally, it trains the next generation of urban teachers using a unique Students Teaching Students model.

In Year 2:

- BTGB Increased the number of students they serve in Cambridge and Somerville to **over 400 students in grades 7-12** (98% are students of color, 82% low-income, 50% English Language Learners).
- BTGB Trained **91 teaching fellows** (68% are teachers of color)
- Students who participated in BTGB's summer programming made an average of **two months growth** in math (vs. 2 months regression that other students experience during summer months).
- Students made statistically significant gains in interest and engagement towards STEM.
- Student participation in BTGB's year round STEAM Ahead curriculum—which provides academic skill building and hands on workshops—**led to increased performance in STEM subjects:** 100% of students who took biology, 98% of students who took chemistry and 100% of students who took physics increased their understanding of concepts in those areas.



400

students served
in grades 7-12

68%

of teaching fellows are
teachers of color

2 months

the average growth for summer
school student participants



Breakthrough Greater Boston hosts After School Experiential STEM Learning Trips 8th grade students take part in weekly trips within the community to build their understanding of real world applications of STEM and explore potential career paths. A number of key partners such as The Novartis Community Lab, the MIT Museum, Moderna and Biogen supported this work. Students take the Common Instrument Assessment at the end of the semester to demonstrate their growth in STEM engagement and learning.



Citizen Schools closes the opportunity and achievement gaps for students by expanding the school day with project-based learning; 21st century, social-emotional, and STEM skill-building; and high school, college and career preparation.

Citizen Schools' signature program for students is its Expanded Learning Time program. During the school day, Americorps Teaching Fellows offer targeted academic support to students. After school, Teaching Fellows coordinate and implement apprenticeships with volunteer career mentors to support the development of students' social-emotional skills and their interest in future college and career pathways.

In Year 2:

- **Citizen Schools served 444 6th-8th grade students** across Somerville middle schools.
- Citizen Schools expanded their **Extended Learning Time (ELT) program for middle school students to an additional school** in Somerville-Argenziano, and grew the new programs they launched in Year 1 at East Somerville Community School and Winter Hill Community Innovation School.
- **79% of students who completed an apprenticeship indicated interest in pursuing advanced education and/or careers in STEM fields.**
- On average, students who participate in Citizen Schools program are 30% more likely to pursue a STEM degree.



444

students served
in grades 6-8

79%

of students who completed
programs indicated interest
in careers in STEM

30%

of students who participate are more
likely to pursue a degree in STEM

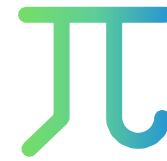




Enroot empowers immigrant youth in high school by providing academic support, including STEM subjects, and inspiring out-of-school experiences such as internships in STEM-related businesses. **STAR funding has helped Enroot grow the number of students it serves by 30% already, with more growth expected in Year 3.**

In Year 2:

- **Enroot infused its STEM curriculum into all aspects of programming** including applying a design thinking approach and increasing opportunities for students to participate in visits, internships and work-shops at STEM businesses and labs in Cambridge and Somerville.
- **Enroot developed a new partnership with STAR grantee Lesley University to build students' math skills.** The new program, called "Math Circles" provides extra academic support to the most recently arrived English Language Learner students in Somerville and helps them develop a "math identity" —a strategy Lesley has designed.



30%

growth, plus more to come!

40

students have submitted college applications

21

students participated in STEM related internships



Enroot students from the Cambridge Rindge and Latin school experimenting with fluorescent protein expressions at MIT Museum's interactive labs on February 12th.



Lesley University contributes to the “Teacher Support” component of the STAR Initiative. Lesley supports teachers to increase student engagement, particularly in STEM subjects, through formal and informal professional development and by co-designing and using more hands-on, student-centered learning activities.

In Year 2: Lesley provided professional development support to 165 educators across Somerville and Cambridge. This included

- Mentoring middle school math teachers and coaches in Cambridge and Somerville in the adoption and implementation of the new Illustrative Math curriculum.
- Building a new relationship with Cambridge Ringe & Latin High School (CLRS) math department which included designing a Geometry workshop.
- Hosting interactive field trips to the University’s new Biology Labs and Maker Space for students and educators from Somerville public schools and Cambridge Youth Programs.
- Ongoing support to grades 9–12 educators at CLRS to develop Climate Action projects including growing their access to a network of university faculty, citizen scientists, and organizations.
- Partnering with STAR grantee Enroot to pilot a new program to support recently arrived English Language Learners in math at Somerville High School.
- Lesley leveraged its expertise in remote teaching and learning **when COVID-19 hit: They mobilized to serve 110 educators in an online learning workshops designed to strengthen their ability and confidence to teach remotely.**



165

educators received professional development support.

110

educators participated in Lesley’s newly designed online teaching and learning workshops when COVID-19 hit

partnerships

were developed amongst partners, educators, teachers and students.



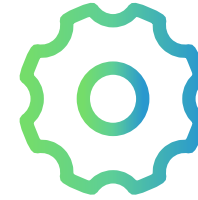


PREPARE ★ AFFORD ★ SUCCEED

uAspire ensures that low-income students have the financial information and resources necessary to find an affordable path to and through college. uAspire serves high school students in Cambridge and Somerville. **STAR funding has enabled uAspire to expand their services to include college persistence support.** They now continue supporting students in their first two years of college. Being in the STAR grantee network enables uAspire to better connect with and serve students interested in STEM education and career pathways.

In Year 2:

- **uAspire helped nearly 400 high school seniors** with financial aid and financial planning as part of their preparation for college.
- **75%+ of uAspire students** in Cambridge & Somerville (Class 2019) **enrolled in college vs. 54% at similar schools nationwide.**
- uAspire increased the number of students it served by 17% from Year 1 to Year 2.
- **80%+ of uAspire students** in Cambridge and Somerville (Class of 2018) who received postsecondary advising **persisted to the fall of their second year in college.**



75%

of students enrolled in college

400

high school seniors were served

17%

increase of student participants in Year 2



uAspire manager of training and technical assistance working with a Bunker Hill Community College student.



Young People's Project

The Young People's Project uses Math Literacy Work to develop the abilities of elementary through high school students to succeed in school and in life, and in doing so involves them in efforts to eliminate institutional obstacles to their success. **STAR funding is helping YPP expand their student-driven math literacy programs from Cambridge to Somerville.**

In Year 2:

- **YPP served 120 Cambridge and Somerville middle school students in their signature (math) Flagway program/league** that helps students master earlier grade math content necessary for success in 6th-8th grade, and gain mastery of key middle school math concepts.
 - **YPP expanded their Flagway program to two new Cambridge schools**, Vassal Lane Upper School and The Amigos School, while continuing to run programs at Cambridge Street Upper School.
 - **Over 260 students in grades 6-8**—and their math teachers—in Cambridge Street Upper School **participated in a full day Math**
- Festival run by YPP Math Playbook scholars** (students).
- YPP launched a partnership with STAR grantee Citizen Schools to bring an after-school Flagway program to the Argenziano School in Somerville.
 - YPP co-designed with students three math-focused elective courses at Putnam Avenue Upper School.
 - **100% of students** who participated in YPP's after school Math Playbook program when surveyed **said "When I'm at YPP I get to use my ideas in different ways and in different places."**



260

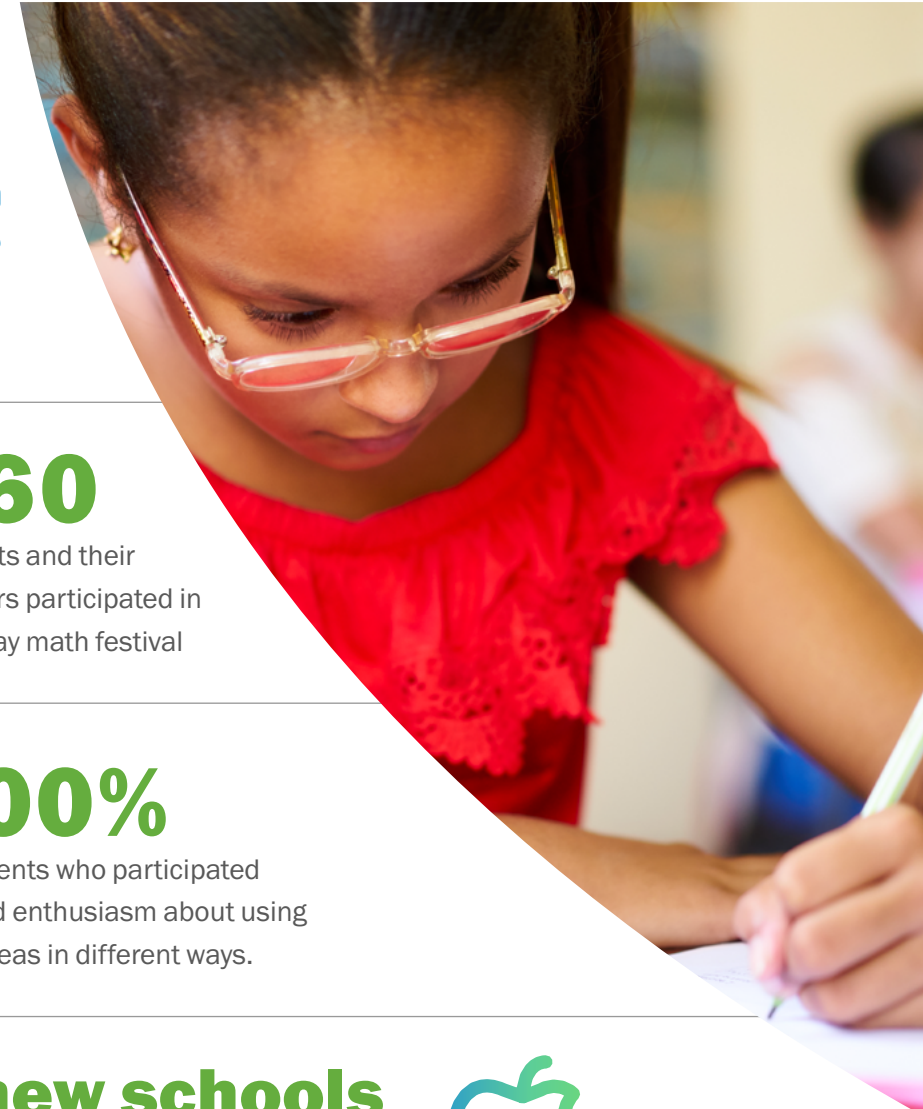
students and their teachers participated in a full day math festival

100%

of students who participated showed enthusiasm about using their ideas in different ways.

2 new schools

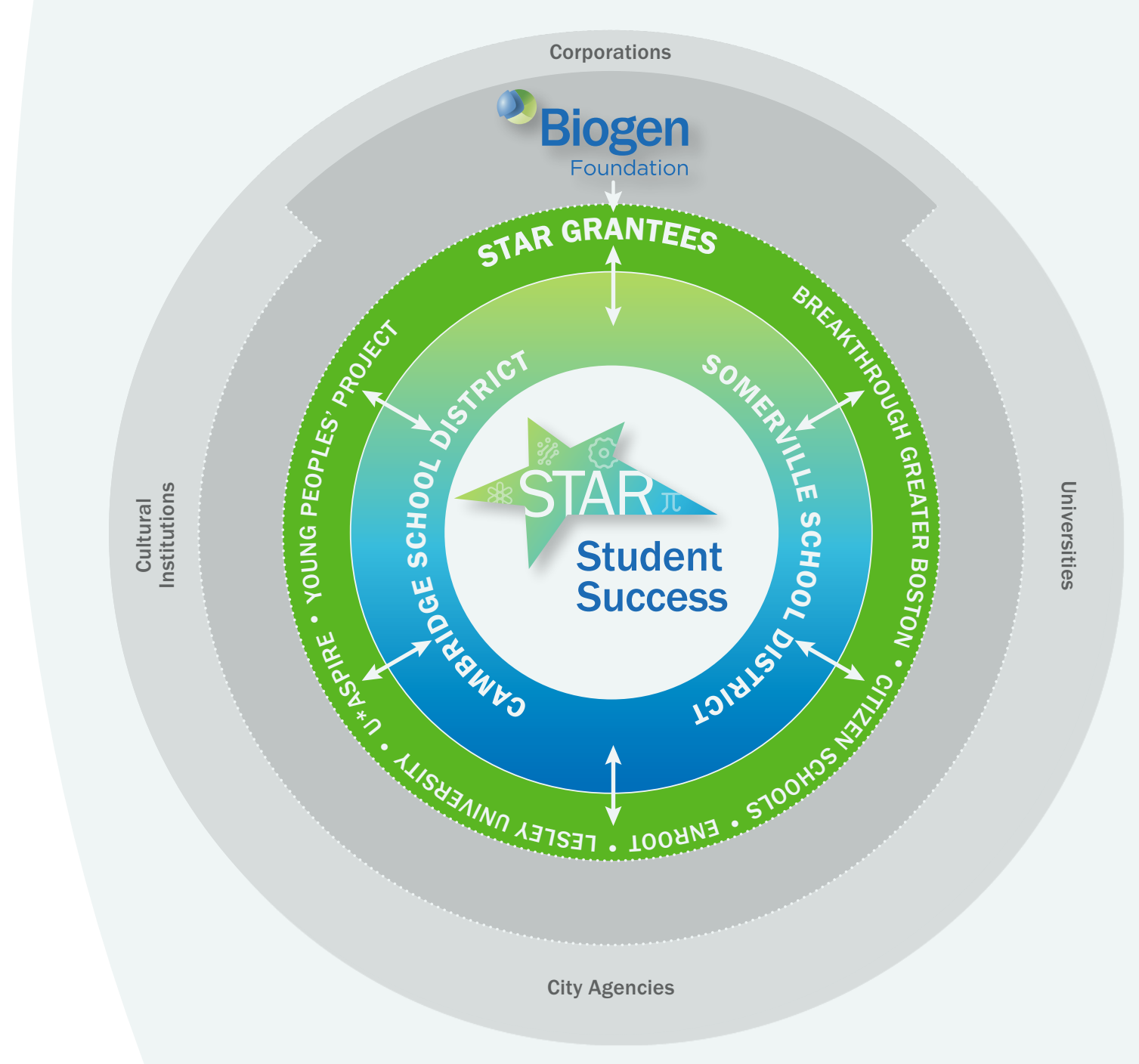
benefited from the expansion of the Flagway program



STAR'S Collective Action

The STAR Initiative has helped grantee organizations and schools build and deepen relationships as a foundation for a coordinated, sustainable network whose collective impact is greater than the sum of its partners.

STEM ecosystems cultivate relationships that maximize each stakeholder's unique contribution to ensuring all students have equitable access to STEM resources and opportunities. Typically, these networks have one backbone organization, or network manager (Root Cause in the case of STAR), that facilitates collective action amongst stakeholders. These can include: schools and districts, out-of-school-time programs, leading STEM institutions (i.e. higher education, industry leaders, science centers, etc.), the private sector, public agencies, and other community-based organizations, young people, and their families. There is no better place poised to lead the way in building a strong local STEM education ecosystem than the Greater Boston area, home to Kendall Square—one of the world's most powerful life sciences and technology hubs.



Measuring STAR's Impact

The Biogen Foundation is leading the way in supporting innovative approaches to measuring impact.

In Year 2, STAR Initiative coordinator, Root Cause, facilitated a process to help the network collaboratively develop shared initiative outcomes that would represent their collective action.

As part of this process, the network developed a recommendation for the Biogen Foundation to support new staff positions in Cambridge and Somerville school districts dedicated to measuring STAR's progress and impact through streamlining data sharing and conducting multiple forms of data analysis.

- Increase in number of Cambridge and Somerville Students, historically underrepresented in STEM careers, participating in and gaining deeper STEM exposure and learning opportunities/activities.
- Increased number of Cambridge and Somerville students, historically underrepresented in STEM careers, expressing interest in and persisting in, and are prepared for pursuing STEM education and/or career pathways.
- Increase in educator confidence in teaching STEM related subjects.
- Increase in educators' development and use of hands on/experiential activities/curriculum to help connect STEM subjects to real world applications.
- STAR grantee programs are more effectively aligning with and complementing school districts' goals as part of a unified effort to build STEM education ecosystems that effectively serve all students.



As a testament to the Biogen Foundation's commitment to listening and responding to the needs of its grantees, the Biogen Foundation has made grants to support part-time positions in both school districts. Embedding STAR measurement capacity in the school districts maximizes the ways impact on students can be measured, and demonstrates the Biogen Foundation's collaborative approach to working with school districts.

Both STAR Data and Evaluation positions have recently been hired.

Looking Ahead to Year 3

With Year 3 already underway, the Biogen Foundation continues to support grantees as their operational needs and programming remain in flux in response to an evolving set of student, educator, and school needs. The STAR network continues to evolve its practices to maximize collective impact as a network in supporting students and educators this year.

High level goals for Year 3 include:

- Use the STAR Initiative network as a learning community focused on adapting, strengthening, and developing new forms of COVID-era student engagement and educator support;
- Solidify and advance the initiative's ability and capacity to collect, analyze, and track data across the network with the addition of a STAR Data Specialists in each school district; and
- Explore additional collaborations that can advance, strengthen, grow and sustain STAR over the long term.



We are looking for partners to join us in growing the scope and impact of the STAR Initiative. If you're interested in getting involved, please contact us at BiogenSTAR@rootcause.org with questions, comments or ideas and we'll get back to you as soon as possible.



A **Citizen Schools** Teaching Fellow helps out a student programming a robot.

[We] have benefited greatly from more frequent contact with STAR partner organizations. Learning of the work they are doing both inspires new ideas for our own programming and also brings to the surface new opportunities to collaborate.

— **STAR GRANTEE**
ENROOT



Biogen, one of the oldest biotechnology companies, founded in 1978, specializes in complex neurological and neurodegenerative conditions. Biogen contributes to its focus communities through three primary vehicles: the Biogen Foundation; Community Labs in the company's host cities of Cambridge, MA and Durham, NC; and an employee volunteer program which engages thousands of employees annually in community service and mentorship.

The Biogen Foundation supports access to science education and to essential human services for children and their families in the communities in which Biogen facilities are located. The Biogen Foundation is committed to sparking a passion for science and discovery, supporting effective science education initiatives, and strengthening efforts to make science education and science careers accessible to diverse populations.

Through STAR the Biogen Foundation is supporting the development of an equitable STEM education ecosystem that bridges the gap between the area's most marginalized students and the science and tech capital of the east coast, Kendall Square, Cambridge, Massachusetts.



Root Cause is a purpose-driven consulting group that exists to enable more people and families to achieve lifelong success. Root Cause partners with foundations, nonprofit organizations, businesses, school districts, and public agencies to develop, implement, and measure strategies that improve people's lives.

Since 2004, the Root Cause team has pioneered evidence-driven approaches to strategy, measurement, learning and improvement, and collective action to ensure more people achieve lifelong success. We have helped more than 400 partners improve people's health and well-being, increase education and youth development outcomes, and strengthen the economic security of people and families nationwide.

[Learn more at rootcause.org](https://www.rootcause.org)

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This report was produced by Root Cause in collaboration with the Biogen Foundation.