

Center for Educational Outreach



ANNUAL IMPACT REPORT 2024-2025



JOHNS HOPKINS
WHITING SCHOOL
of ENGINEERING

Center for Educational Outreach



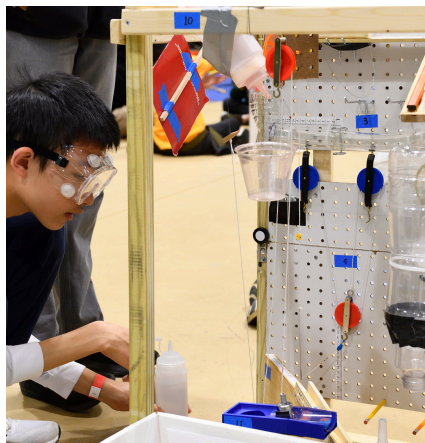
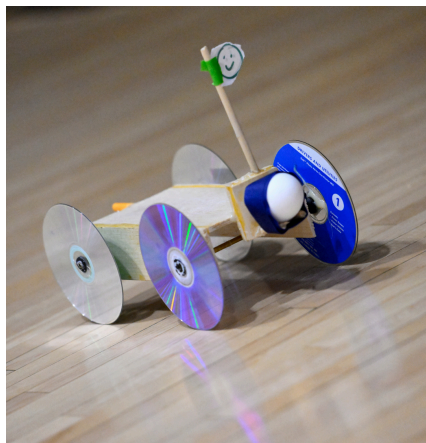
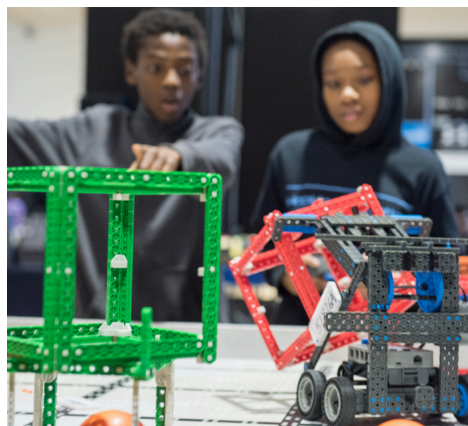


Table of Contents

04	About Us
05	Annual Community Impact
06	About Our Community and Where We Serve
08	Our Programs Math Acceleration Tutoring with Hopkins Program (MATH) Barclay Hopkins STEM Partnership Whiting Internships in Science and Engineering (WISE) Baltimore Online Algebra for Students in Technology (BOAST) Charm City STEM League (CCSL) STEM Achievement in Baltimore Elementary Schools (SABES)
17	One-Day Events
18	Awards and Honors
20	Meet Our Team
21	Partners and Sponsors
22	Acknowledgements



About Us

The Center for Educational Outreach strives for all students to have a love of science, technology, engineering and math (STEM). We believe STEM education is good for the student, valuable to society, and important for the future.

Vision

Our vision is to increase the number of underresourced youth pursuing STEM careers.

Mission

Our mission is to engage JHU faculty and students to inspire and prepare PK-12 students in STEM education and careers.

Principles for Community Engagement

These principles for community engagement, informed by consultations with community-engaged colleagues and community leaders, guide the university's collective work in equitably and authentically engaging in community-campus partnerships:

- Shared Visions and Values
- Mutuality and Respect
- Transparency and Communication
- Shared Decision Making
- Commitment

Goals



Engage PK-12 Students in Baltimore City in High-Quality STEM Programming

We strive to design, host, and/ or support hands-on programs and projects that provide opportunities for PK-12 students to explore STEM inside and outside of the classroom.



Engage JHU Faculty, Staff, and Students in Community Centered STEM Outreach & Partnerships

We strive to create pathways for the JHU community to share their passions and research with the next generation of STEM professionals utilizing our principals for community engagement.



Provide Resources and Professional Learning Opportunities for PK-12 STEM Educators

We create access points for educators to stay abreast of research-based pedagogy and leverage resources to make STEM learning more accessible in their classrooms or programs.

2024 - 2025 COMMUNITY IMPACT



JOHNS HOPKINS
WHITING SCHOOL
of ENGINEERING

Center for Educational Outreach

OUR MISSION & VISION

The Center for Educational Outreach strives for all students to have a love of science, technology, engineering, and math (STEM). We engage JHU faculty, staff and students in STEM outreach and programming that addresses the opportunity gap in Baltimore City and engages our local community in quality STEM outreach.



62

**TOTAL PK-12
SCHOOLS REACHED**

PK-12 STUDENT IMPACT



1,200

BALTIMORE CITY
STUDENTS



811

NON-BALTIMORE CITY
STUDENTS



2,011

**PK-12
STUDENTS**

PK-12 STUDENT IMPACT



38

BALTIMORE CITY
SCHOOLS



24

NON-BALTIMORE CITY
SCHOOLS

4,399

TOTAL

VOLUNTEER HOURS



VOLUNTEER HOURS

We engage JHU faculty, staff, and students, as well as community volunteers, in a variety of STEM programming. Together, we provide and support quality STEM learning opportunities to PK-12 students through hosting events like one of the Maryland Science Olympiad State Tournaments and math tutoring.



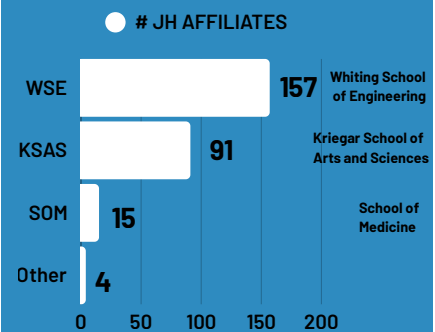
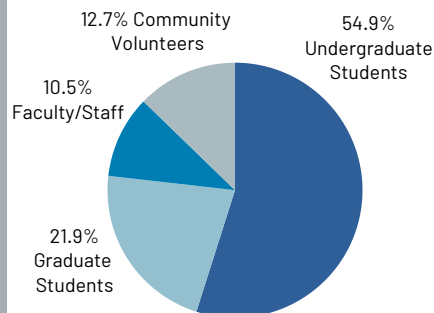
\$153,041.21

**VOLUNTEER
ECONOMIC IMPACT***



306

**VOLUNTEERS &
EMPLOYEES ENGAGED**

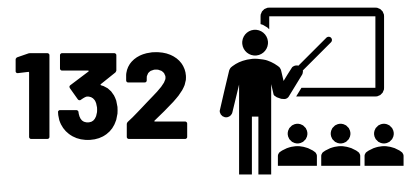


34,028

**K - 5 STUDENTS
REACHED THROUGH
SABES CURRICULUM**

TEACHERS & CURRICULUM

Our SABES curriculum is the K-5 science curriculum for Baltimore City Public Schools (City Schools) and reaches students in school. We also support teachers through our long-term programs, professional development opportunities, and through resource support like providing STEM material kits.



132

**TEACHERS ENGAGED
IN PROGRAMMING**

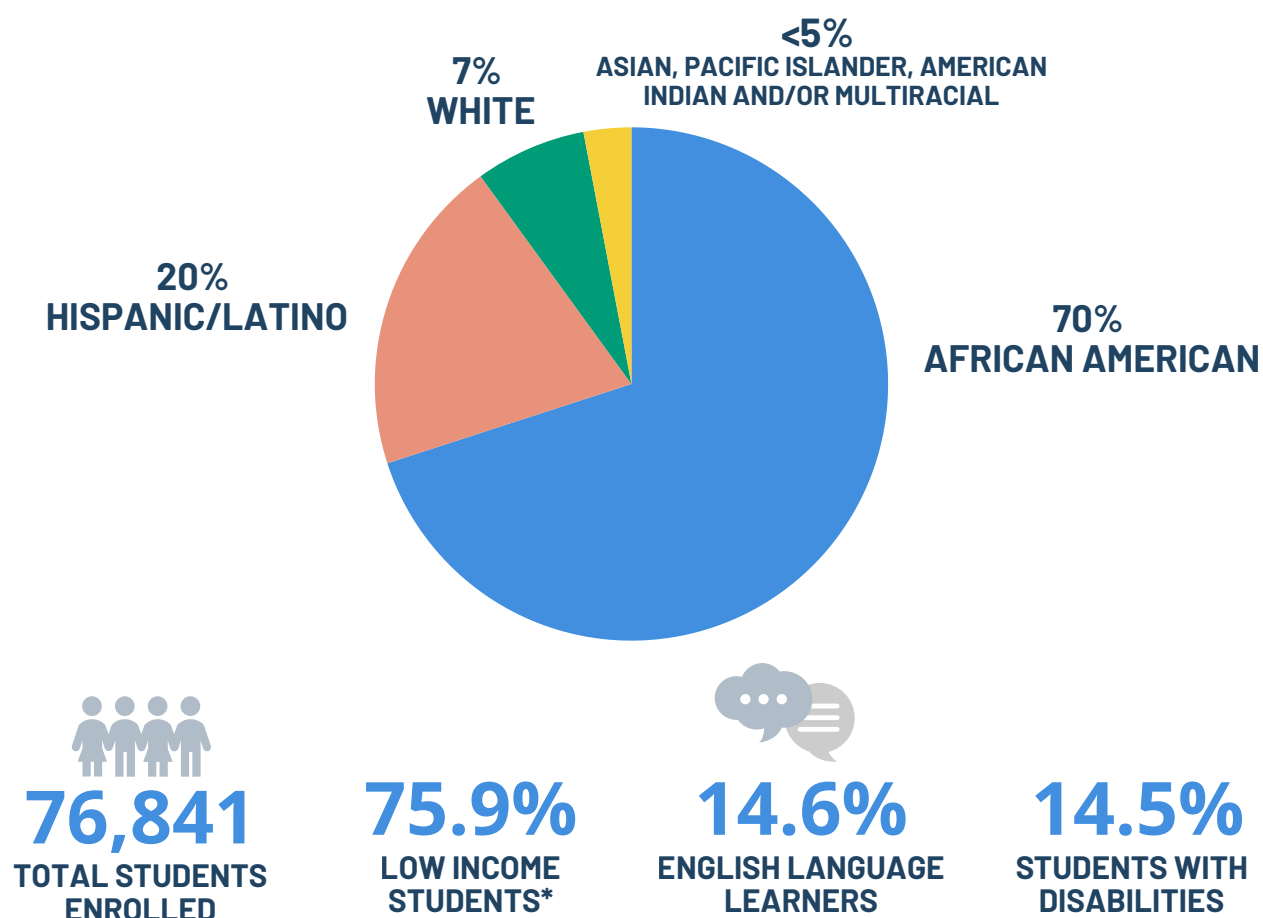
*SOURCE: Economic Impact of Volunteer Hours Based on Independent Sector and Do Good Institute Rate of \$34.79/hr - <https://independentsector.org/resource/value-of-volunteer-time/>

About Our Community

We aim to leverage resources and create bridges for underresourced students often excluded from opportunities to explore and excel in STEM education. The communities we serve are full of students who are eager to learn and flourish when provided access to opportunities and tools to succeed in STEM.

In particular, our office focuses our efforts on engaging and impacting students and families in the greater Baltimore City community. Many of our long-term programs directly serve students from the Baltimore City Public Schools district while some one-day events have a broader reach to include students across Maryland.

2024 - 2025 BALTIMORE CITY PUBLIC SCHOOLS STUDENT DEMOGRAPHICS



**
* Baltimore City Public Schools provides free breakfast and lunch to all students and does not collect applications for free or reduced lunch. This percentage is calculated based on which students are homeless, in foster care, or participating in low-income family resources like Temporary Assistance for Needy Families (TANF) or Supplemental Nutrition Assistance (SNAP). Medicaid participation is excluded.

SOURCE: Baltimore City Public Schools - <https://www.baltimorecityschools.org/district-overview>; Maryland State Department of Education - <https://reportcard.msde.maryland.gov/Graphs/#/Demographics/Enrollment/3/14/6/30/XXXX/2023>

Baltimore City Program Sites



SOURCE: Baltimore Neighborhood Indicators Alliance Map Gallery - <https://bniaifi.org/mapgallery/>

OUR PROGRAMS

IN SCHOOL

BARCLAY HOPKINS STEM PARTNERSHIP:

The Barclay Hopkins STEM Partnership brings faculty and students from JHU's Whiting School of Engineering to engage with youth and teachers of Barclay Elementary/Middle School, a Baltimore City PK-8 public school. The goal is to stimulate interest in STEM education and STEM careers. The 2024-2025 academic year marks the 10th and final year of this partnership. The Center is working to expand some of the programming created for Barclay to make it available to other schools in the district.

GRADES:
K - 8

MATH ACCELERATION TUTORING WITH HOPKINS (MATH) PROGRAM

Formerly known as the Henderson-Hopkins Math Tutorial Program, MATH is a high-quality, high-dosage, in-school math tutoring program. Paid Johns Hopkins University graduate and undergraduate students provide small group tutoring to more than 160 4th - 8th grade students in mathematics.

GRADES:
4 - 8

STEM ACHIEVEMENT IN BALTIMORE ELEMENTARY SCHOOLS (SABES):

The SABES curriculum developed originally through an NSF-grant project is used at the elementary science curriculum in the Baltimore City Public Schools district and serves over 34,000 students annually.

GRADES:
K - 5

OUT OF SCHOOL

GRADES:
11 - 12

WHITING INTERNSHIPS IN SCIENCE & ENGINEERING (WISE):

WISE is a paid research opportunity for Baltimore City high school students who are mentored by Johns Hopkins University (JHU) researchers. WISE aims to increase the access of students pursuing STEM in college by developing their knowledge of a specific STEM field and fostering connections with STEM professionals.

GRADES:
9 - 12

BALTIMORE ONLINE ALGEBRA FOR STUDENTS IN TECHNOLOGY (BOAST):

The Baltimore Online Algebra for Students in Technology (BOAST) Program is an afterschool program and research study for 9th-11th grade students with a burgeoning interest in STEM fields who want to apply their algebra skills to solve real-world challenges.

GRADES:
3 - 12

CHARM CITY STEM LEAGUE (CCSL):

CCSL is a STEM mentoring program that pairs over 60 JHU undergraduate and graduate student mentors with Baltimore City based Science Olympiad teams. Mentors engage over 240 K-12 students through weekly, hands-on after school sessions at over 20 school sites & support students and coaches at local tournaments.

GRADES:
3 - 5

STEM ACHIEVEMENT IN BALTIMORE ELEMENTARY SCHOOLS (SABES):

The SABES after-school program uses curriculum and student driven STEM projects to engage students in grades 3-5 at local schools. Their student-driven projects to create solutions to address areas of improvement in their local community.

Partnership Sites

**HENDERSON
HOPKINS**

Math Tutorial Program Site



STEM School Partnership



SABES After-School Sites

BOAST Program

Digital Harbor High School
Forest Park Senior High School



WISE Program

Baltimore City College
Baltimore Polytechnic Institute
Baltimore School for the Arts
Digital Harbor High School
Paul Laurence Dunbar High School
Western High School

Charm City STEM League (CCSL) Program

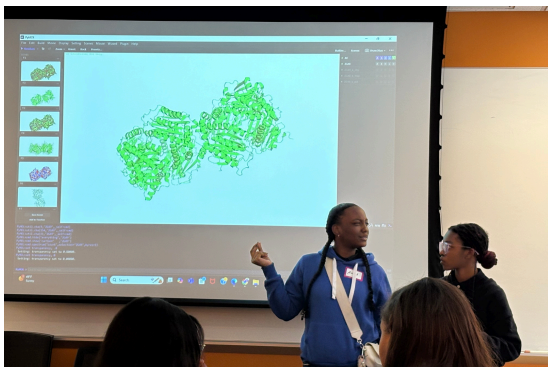
Baltimore City College
Baltimore Collegiate School for Boys
Baltimore International Academy East
Baltimore Polytechnic Institute
Barclay Elementary Middle School
Bard High School Early College Baltimore
Calvin M Rodwell EMS
Cherry Hill ES/MS
Curtis Bay Elementary School
Digital Harbor High School
Edmondson-Westside High School
Fallstaff Elementary/Middle School
Federal Hill Preparatory School
Forest Park High School
Franklin Square Elementary Middle School
Graceland Park O'Donnell Heights EMS
Green Street Academy
Hamilton Elementary Middle School

Hampstead Hill Academy
Lakeland Elementary Middle School
Liberty Elementary School
Lillie May Carroll Jackson Charter School
Maree G. Farring Elementary/Middle School
Mercy High School
Mergenthaler Vocational Technical High School
Montebello Elementary Middle School
Paul Laurence Dunbar High School
Roland Park Elementary Middle School
Sinclair Lane Elementary
Southwest Baltimore Charter School
St. Francis of Assisi School
Thomas Jefferson Elementary Middle School
Western High School
Westport Academy
William Paca Elementary School

Barclay Hopkins STEM Partnership



Since 2015, the Barclay Hopkins STEM Partnership has engaged faculty and students from JHU's Whiting School of Engineering with youth of Barclay Elementary/Middle School – a Baltimore City PK-8 public school – in curricular-aligned STEM activities and projects. The goal is to stimulate interest in STEM education and STEM careers. The 2024-2025 academic year marks the tenth and final year of this 10-year partnership. Collaborating with faculty, staff and students from JHU, the partnership hosts City Schools curriculum-aligned campus visits, field trips, and school-day and out-of school-time STEM enrichment programs. We also run special engineering challenges throughout the year: Family Engineering Day at the JHU campus, and at Barclay School, Engineers Week and the Barclay Science and Engineering Expo.



HIGHLIGHT FROM JHU FACULTY PARTICIPANT:

"I enjoyed being able to teach kids about some of the cool, microscopic machines that help keep us alive"



In two special days of programming, Professor Jamie Spangler guided 31 grade 8 students in understanding why proteins in our body matter. Professor Spangler presented the key roles proteins perform in the body, and how all 20,000 of them are made from a small number of amino acids. Students made multiple models of proteins – using Lego pieces for amino acids – demonstrating the range of proteins possible using only a few amino acids. Students also toured key buildings and labs on the JHMI campus to learn the story of how therapeutic drugs are developed and tested.



242

ELEMENTARY
STUDENTS



135

MIDDLE SCHOOL
STUDENTS



105

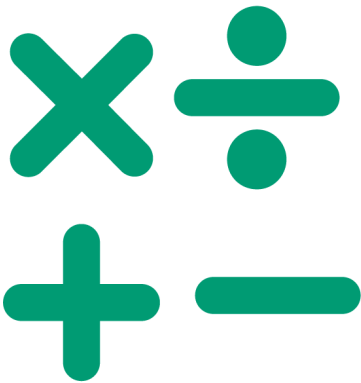
JHU VOLUNTEERS



762

VOLUNTEER
HOURS

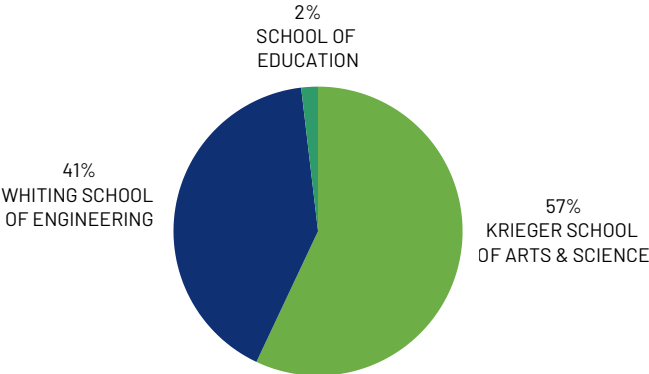
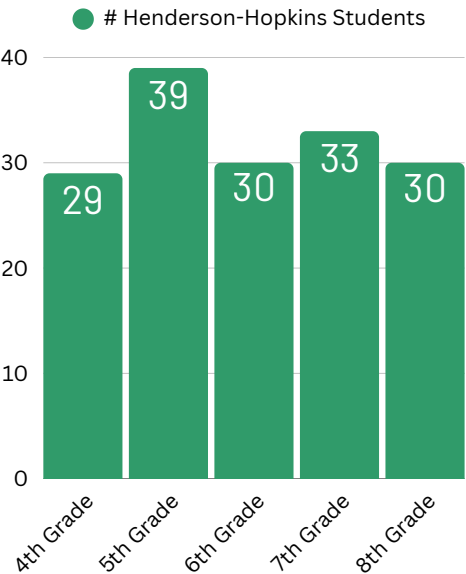
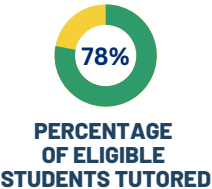
Math Acceleration Tutoring with Hopkins Program



Launched in Fall 2023, the Math Acceleration Tutoring with Hopkins Program (MATH), previously known as Henderson-Hopkins Math Tutorial Program, works to address pandemic learning loss for Baltimore City Public School students in mathematics. The program pairs paid Hopkins graduate and undergraduate student tutors with Henderson-Hopkins students to provide small group, personalized tutoring, during the school day to 4th - 8th graders performing below grade level. Students receive tutoring support twice a week for 16 weeks. Our program seeks to increase participating students' self-efficacy, abilities and attitudes in mathematics.

"Our students' math skills are improving, but there are other immeasurable benefits, too. Our students know that there are Johns Hopkins students who care about them. They've built relationships with them, so they start to envision themselves as college students too. That's really important."

- PETER KANNAM, HENDERSON-HOPKINS PRINCIPAL



Whiting Internships in Science and Engineering



The Whiting Internships in Science and Engineering (WISE) program is a paid research learning opportunity for Baltimore City public high school students who are mentored by Johns Hopkins University (JHU) researchers. This year, WISE was offered after school in the spring or daily over four consecutive weeks in the summer. Each student explores a subject in laboratory, computer, or field settings. At the close of each program, WISE students present their research and experiences to fellow WISE students, their research labs, their families, and Hopkins community members. WISE started with students from Garrison Forest School, a private school for girls in Baltimore County. The Center for Educational Outreach continues to support their program administratively.

	CITY SCHOOLS STUDENTS	FACULTY MENTORS	GRADUATE STUDENT MENTORS
Summer 2024	9	7	9
Fall 2024	-	-	-
Spring 2025	8	8	11



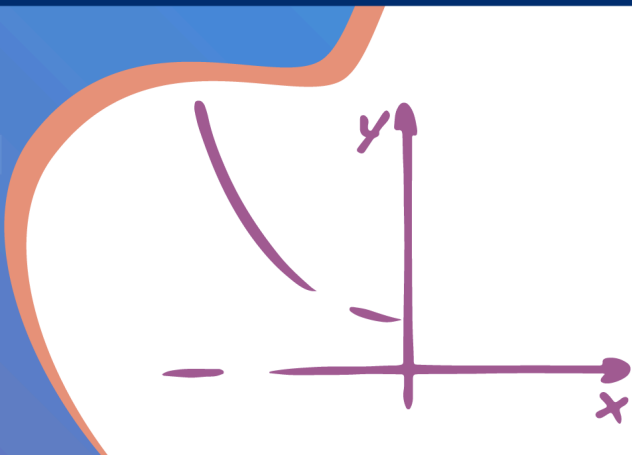
"[The] WISE experience confirmed that I can learn hard things."

- WISE Alumni

"I get to mentor, communicate, and learn from another inquiring mind. Sometimes, I feel that I am challenged to think broader and deeper."

- WISE Mentor

Baltimore Online Algebra for Students in Technology Program



YEAR 5 OF 6

The Baltimore Online Algebra for Students in Technology (BOAST) Program was launched in 2021 as an afterschool program and research study for 9th-11th grade students with a burgeoning interest in STEM fields who want to apply their algebra skills to solve real-world challenges.

In Fall 2024, BOAST (renamed "Project X: Algebra Engineering Lab") was piloted as a for-credit math elective class at Forest Park High School and Digital Harbor High School.

19
WEEKS OF
LEARNING

10
ROLE MODEL
VIDEOS

6
PROBLEM-
BASED
MISSIONS

3
NATIONAL
CONFERENCE
PRESENTATIONS

"JHU engineering instructors, serving twice a week in schools, were seen as the key resource in aiding student success. In addition to learning about engineering fields and improving algebra proficiency, students developed critical thinking, independent problem-solving, perseverance, and time-management skills."
-CENTER FOR RESEARCH AND REFORM IN EDUCATION

1
FIELD TRIP
TO JHU

41
CITY SCHOOLS
STUDENTS
ENROLLED

2
BALTIMORE CITY
SCHOOLS SERVED

Charm City STEM League



Charm City STEM League (CCSL) is a mentoring program that envisions a future where every student can excel in STEM careers and form beneficial relationships with mentors. This year, 65 JHU undergraduate mentors engaged 248 Baltimore City students in active learning and scientific inquiry through Science Olympiad, a national STEM competition.

Mentors created online curriculum resources and over 250 material kits which were distributed to 35 local schools with support from a generous grant from Northrup Grumman. Mentors also supported 4 coach clinics, supporting more than 35 coaches and served as tournament test writers and volunteers at local regional and state tournaments.

CCSL hosted multiple on-campus events, including a high school campus visit coinciding with JHU's Design Day. The annual "Build It, Study It" event in November engaged where middle school students from 3 partner schools in hands-on activities and workshops like building balsa towers, wind turbines and scrambler vehicles.

"The mentors played a crucial role in enriching my students' Science Olympiad experience. They provided consistent support for test and building events, and boosted their confidence and teamwork skills. Many students felt more motivated and better prepared because of the encouragement and expertise the mentors offered."

- PARTNER COACH




248
CITY SCHOOLS
STUDENTS


242
MENTORING
SESSIONS


65
UNDERGRADUATE
MENTORS


2,858+
VOLUNTEER
HOURS


21
SCHOOLS
MENTORED

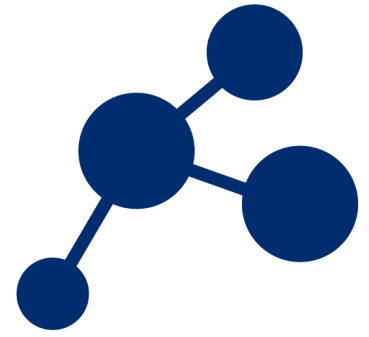

35
COACHES
SUPPORTED



22 TEAMS SUPPORTED:
4 DIV. A TEAMS (GR. 3-6)
13 DIV. B TEAMS (GR. 6-9)
5 DIV. C TEAMS (GR. 9-12)



STEM Achievement in Baltimore Elementary Schools



STEM Achievement in Baltimore Elementary Schools (SABES) began as a National Science Foundation (NSF)-funded collaboration between JHU and City Schools seeking to improve STEM curriculum and instructional delivery in grades 3 – 5. It focused on community engagement in nine schools within three specific neighborhoods: Greater Homewood, Greektown/Highlandtown and Park Heights. SABES continues to operate beyond initial grant-funding to date in an independent partnership with City Schools and local after school programs. With additional funding from the Maryland State Department of Education (MSDE), the writing team was able to expand the curriculum to include grades K-5.

SABES IN SCHOOL CURRICULUM

The SABES curriculum allows students to problem solve real-world challenges. Each unit is written around a phenomenon-driven question and story line. Students complete an Engineering and Design Challenge where they define the problem, develop possible solutions, and then optimize the best solution. The K-5 SABES curriculum is undergoing revisions and will be comprised of 30 units and 714 lessons.



All lessons are written, reviewed, and updated to align with Next Generation Science Standards (NGSS), Common Core Literacy Standards, and researched-based instructional practices. Each unit developed contains a 100+ page teacher guide, student resources, presentations, and student assessments. All elementary teachers in Baltimore City Public Schools have access to use the turnkey SABES curriculum for science instruction.

**SABES Curriculum
available to:**



34,028
K - 5 Students

SABES AFTER-SCHOOL

SABES curriculum consists of units from the Engineering Adventures (EA) curriculum in addition to independent STEM projects. Throughout the school year, students complete engaging, inquiry-based STEM projects. Partway through the year, classes break away from the structured curriculum to work on Student Driven Projects, during which students identify an area for improvement in their local community and use STEM in order to address it. In 2024-2025, we offered two program sites at Sandtown-Winchester Achievement Academy as well as James McHenry Elementary/Middle School.



26

**CITY SCHOOLS
STUDENTS**



13

**CITY SCHOOLS
STUDENTS**



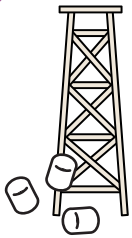
ONE-DAY EVENTS

In addition to running several long-term programs year round, our office also coordinates, hosts, and sponsors a variety of one-day or short-term events to promote STEM. These programs run anywhere from 2-12 hours in length and provide more pathways for us to engage the community in STEM enrichment. Check out a selection of this year's one-day events below:

BARCLAY SCIENCE AND ENGINEERING EXPO

Thursday, April 3, 2025 - Location: Barclay Elementary/Middle School

100 Barclay students and 50 family members engaged in 10 hands-on engineering activities and an Egg Drop challenge led by 12 JHU volunteers and 12 staff of the Center for Educational Outreach. Barclay Science Teachers also prepared and displayed 9 tri-fold posters featuring highlights of their respective students' STEM activities from the year. In total, JHU volunteers and CEO staff combined for 83 impact hours in this community event for Barclay School families.



TOWER OF POWER

Tuesday, February 18, 2025 - Location: Virtual/Homewood Campus

Thirteen Maryland middle schools participated in a virtual spaghetti and marshmallow building challenge. The Waldorf School of Baltimore took first place with a tower measuring 180 centimeters. The top 5 teams then advanced to compete in-person at the Homewood campus event and Waldorf School of Baltimore took first place there as well!



MARYLAND SCIENCE OLYMPIAD STATE TOURNAMENT

Saturday, March 29, 2025 - Homewood Campus

We hosted the annual State Tournament where 313 students from the top 24 middle school teams from across Maryland competed in over 23 different STEM topic events and engineering design challenges. Over 97 volunteers from JHU and the community served over 527 volunteer hours to run the event. Baltimore City had 12 teams qualify for the event, including 11 teams supported by JHU mentors from Charm City STEM League.



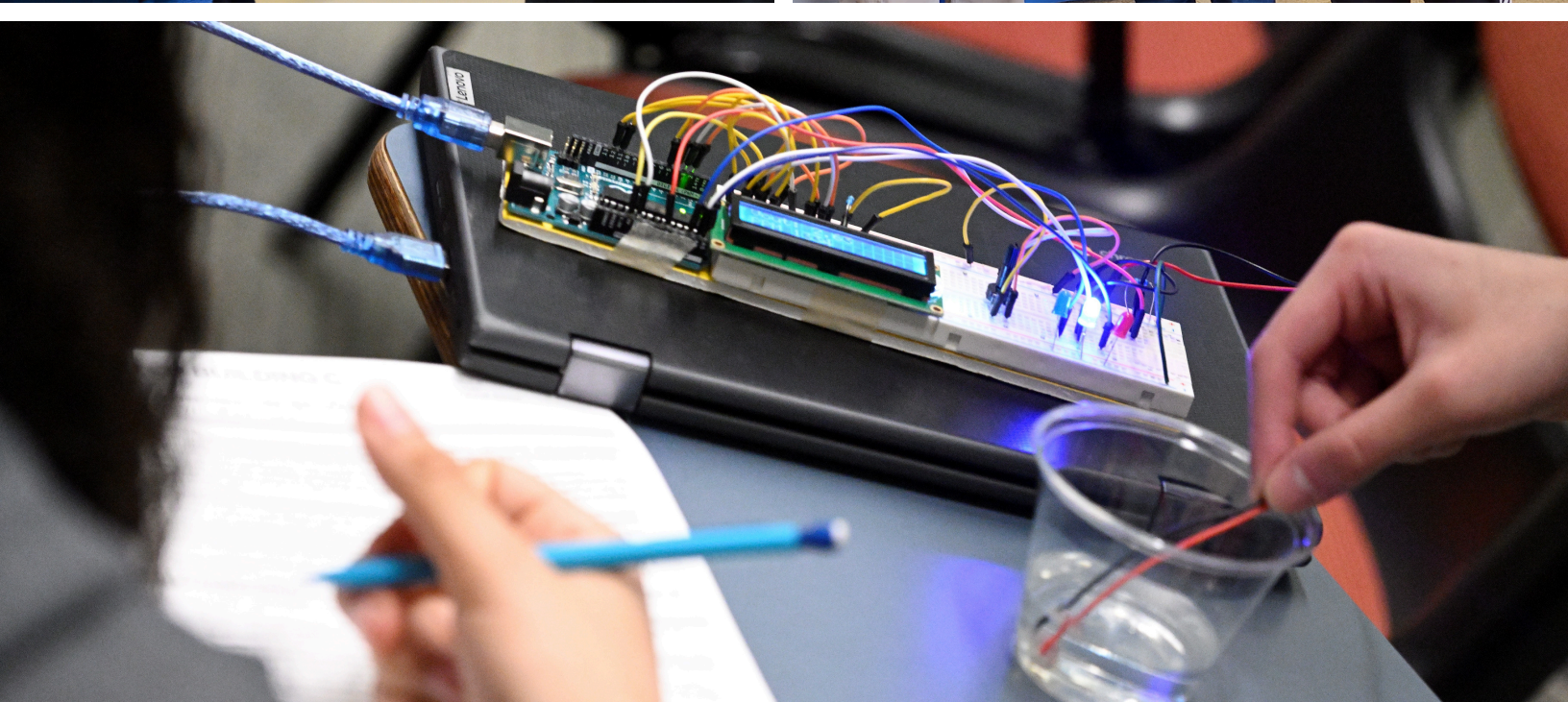
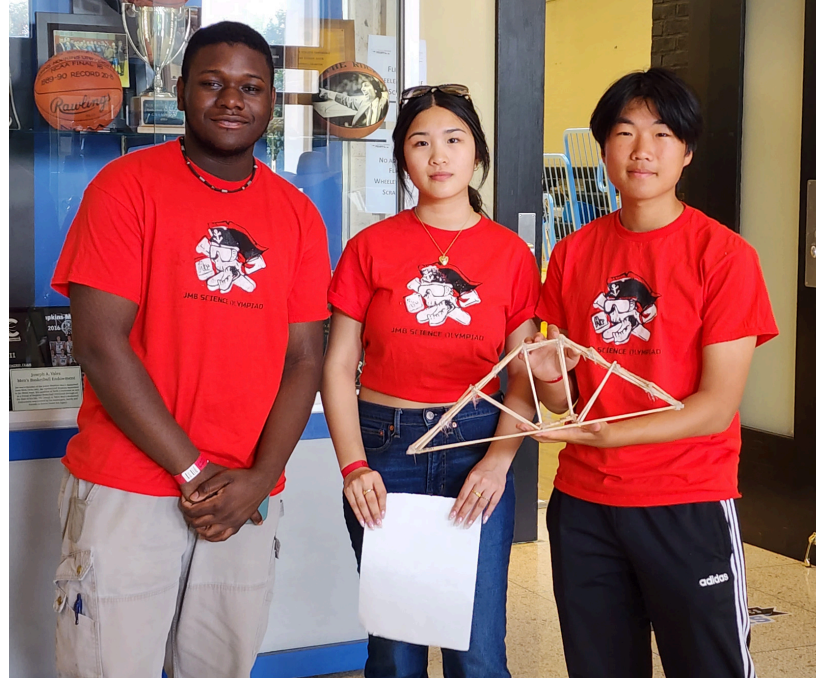
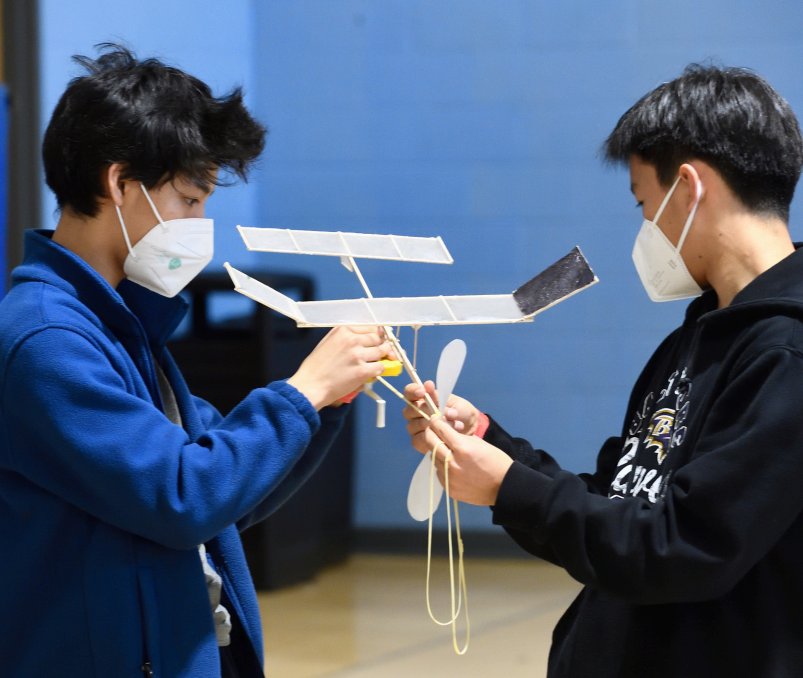
Awards and Honors

Recognizing Exemplary Outreach and Community Service

IRINI J. MAROULIS AWARD

This award was established by Maria Maroulis Cunningham (WSE '97, MME '01) to honor the memory of her mother, Irini J. Maroulis, and her dedication to community service and outreach. Each year, an outstanding female engineering student is recognized with the honor and this year's awardee was Chemical Engineering and Mathematics undergraduate student Lavanya Gupta.





Meet Our Team

Our team is comprised of former informal and formal K-12 educators, engineers, and champions for STEM education. We are passionate about using our unique skills and experiences to deepen our impact and serve as changemakers in the STEM education ecosystem in Baltimore City and beyond.

FULL TIME STAFF:



Alisha Sparks
Executive Director



Margaret Hart
STEM Outreach
Advisor



Adrienne Bantum
Budget Analyst



Katie James
MATH Program
Administrator



Kahea Chai
MATH Site
Coordinator



Alexis Daniels
Baltimore OST
Program
Administrator



Amanda Valledor
STEM Outreach
Program
Administrator



John Van Beckum
Barclay Program
Administrator



Artelia Davis
Compliance and
Operations Program
Administrator



Nicole Pulliam
Sr. Administrative
Coordinator

PART-TIME STAFF:



Dr. Jaracus Copes
SABES Instructional
Coach



Alli Reigel
BOAST Content
Developer and
Instructional Coach

Nantambu Kohlbatz - BOAST Hybrid
Instructor

Tyair Manning - BOAST Hybrid
Instructor

Emily Henkes Callahan - SABES
Instructional Coach

Partners and Sponsors

We could not do our work without the vital support of our current and former community partners and sponsors.

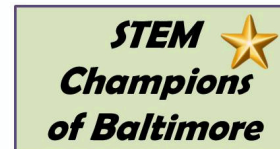
Thank you to all of our supporters and champions!

BALTIMORE CITY
PUBLIC SCHOOLS

HENDERSON
HOPKINS



Student Affairs
Center for Social Concern



NORTHROP
GRUMMAN



National
Science
Foundation

.....
A B E L L
.....
F O U N D A T I O N
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JOHNS HOPKINS
ALUMNI ASSOCIATION

Acknowledgements

Photo Credits: Will Kirk, Phil Laubner, Liz Bonilla, Greg Stansbury, Hartlove-Goodyear

Program Map Illustration: Amanda Valledor



We also thank our wonderful volunteers, faculty, staff, students, and JHU campus partners who make our programs and events possible!



JOHNS HOPKINS
WHITING SCHOOL
of ENGINEERING

Center for Educational Outreach

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STEMOutreach@jhu.edu

