Partnerships

Aberdeen Proving Ground (APG), one of the premier research facilities in the Department of Defense, is located two miles from the SMA. Personnel from APG have been part of the planning and design of the SMA since its inception. We continue to utilize the expertise of the local professional community through a Science and Mathematics Academy Advisory Board comprised of professionals from APG, science and technology companies, and regional universities. The advisory board meets quarterly to discuss the curriculum, co-curricular experiences, postsecondary preparation, and professional development opportunities for faculty and students. In addition, partnerships with local science and technology corporations such as Battelle, Northeastern Technology Council, and Army Research Lab have provided additional support for faculty and students.

Testimonials

Students:

"To be part of the SMA is a huge honor. The students here inspire me to try to be better. Being part of the SMA means taking on problems that do not always have solutions, pushing yourself harder than you have ever pushed yourself before, and being part of a family that is united not only by a drive to be better, but also by an openness to be different." ***M.W., Class of 2013***

"Everyone wants to be my lab partner because I am the only one who actually knows what they are doing. Everything is so easy for me. I'm really glad that I went to the SMA and that the teachers were as tough on us as they were, because that has made the college transition very easy."
R.H., Class of 2014

"I'd like to start off by saying thank you! It's mind blowing how well I'm doing in college, mostly because of the studying skills I've learned and challenging material I've faced in the SMA. I still find myself taking notes just as I did in APES, and I'm currently working on a robotics project to create a coil gun, and I'm documenting my progress just as I did in SRT."
D.C., Class of 2020

"The SMA's emphasis on problem solving and inventive solutions has done me wonders thus far." ***J.R. Class of 2011***

"I just finished up the first half of my junior year, currently on track to graduate with a degree in Computer Science in June of 2019. I took some really cool classes this semester like Introduction to Artificial Intelligence and Foundations of Software Construction. I'm definitely really glad I had the SMA backing (especially SRT) when going into MIT."
K.B. Class of 2015

Mentor:

"After teaching at West Point for a number of years I realized the impact that mentorship has on students. Mentorship allows scientists and engineers to teach students real science. We all have a stake in ensuring that we have a strong bench of scientists to work at Aberdeen Proving Ground."
Dr. Fountain, Mentor

Parent:

"[A capstone project] is really like an independent research project, almost like at a college level that [students] are doing their senior year of high school. Not many senior high school graduates can say that they've done something like that."
A.S., Parent of students in Class of 2008 and 2011

@SMA_STEM

SMA Science and Mathematics Academy

The Science and Mathematics Academy

at Aberdeen High School

2023-24 School Profile

The Science and Mathematics Academy at Aberdeen High School is a school-within-a-school magnet program that provides academically talented students with educational experiences that integrate science, technology, engineering, and mathematics beyond the traditional advanced program. Admission to this rigorous four-year program is by competitive application based on prior academic success, interest and motivation in science and mathematics, teacher recommendations and written communication skills. Each year hundreds of students apply for the seats in the freshman class. Entering students must be ready for Algebra II as an entry level mathematics class, having completed courses in Algebra I and geometry prior to high school.

NCSSS National Consortium of Secondary STEM Schools

The Science and Mathematics Academy (SMA) is a member of the National Consortium of Secondary STEM Schools (NCSSS). The NCSSS is comprised of over 100 specialized schools across 32 states whose vision is to serve as a primary catalyst for the transformation of science, technology, engineering, and mathematics teaching and learning to enable students to meet the challenges of the future. Our students and faculty receive the benefits of NCSSS professional development opportunities.

The Instructional Program

The SMA offers a college preparatory program in which students engage in challenging coursework that prepares them for Science, Technology, Engineering and Mathematics (STEM) opportunities in higher education. All courses emphasize problem solving and creative thinking through inquiry-based learning. Advanced placement courses in science and mathematics are offered to students, as well as a large selection of science and mathematics semester electives based on students' interest and faculty experience:

Exclusive to the SMA is a four-year sequenced series of courses called Science, Research, and Technology (SRT I-IV) in which students integrate STEM curriculum in relevant and authentic research. Regular contact with practicing scientists, engineers, and mathematicians occurs throughout the program. Beginning in the junior year of the SRT course sequence, each student completes projects in the following fields:

- Biotechnology & medical sciences
- Engineering & physical sciences
- Computational sciences & robotics
- Biomechanics & research

In the senior year, each student conducts a capstone research project under the mentorship of a professional scientist, mathematician, or engineer. The year-long capstone project concludes with a detailed, scientific poster and a presentation to peers, faculty, parents, and mentors.

SMA Science and Mathematics Academy

251 Paradise Road
Aberdeen, Maryland 21001
410-273-5500

Mr. Michael Quigg
Principal

Mrs. Sarah Ashley,
Program Specialist
Sarah.Ashley@hcps.org

www.scienceandmathacademy.com

HARFORD COUNTY PUBLIC SCHOOLS

Harford County Public Schools
102 S. Hickory Avenue
Bel Air, Maryland 21014

Dr. Sean Bulson
Superintendent

www.hcps.org

The Instructional Program (continued)

Organizations providing mentors to SMA seniors include:

- Arup
- Becton, Dickinson and Company
- Blue Cypress Consulting
- Cellares
- Chesapeake Systems Engineering
- Digital Fabrication Systems
- Energetics Technology Center
- Grand View Farm
- Johns Hopkins University APL
- Kinzinger Fram
- Lockheed Martin
- Lufburrow & Co.
- Naval Postgraduate School
- Raytheon
- Space Telescope Science Institute
- The Hydrofarm Inc.
- U.S. Army C5ISR
- U.S. Army CCDC Chemical and Biological Center
- U.S. Army DEVCOM
- U.S. Army MRICD
- U.S. Army Research Laboratory

SMA Advanced Placement (AP) Courses

Calculus AB/BC
Statistics
Computer Science
Biology
Physics C
Chemistry
Environmental Science
World History
US Government
Language & Composition
Literature & Composition
Foreign Languages

SMA Electives

Biotechnology
Pre-engineering
Microcontrollers
Algorithm Development
Organic Chemistry
Research Methods in STEM
Ecology
Robotics
Linear Algebra
Cryptology
Mathematical Logic
Astrophysics
Technical Writing
Design Engineering
Biochemistry
Kinesiology

Embedded Technology

Technology is an integral part of the SMA program. SMA students have the ability and confidence to learn new technologies that they may encounter in postsecondary education and their chosen professions.

- Laptops are available to all students.
- Students use software such as Minitab, Mathematica, ArcGIS, PicBasic Pro Compiler, Finch TV, Visual Basic, ImageJ, Photoshop, and AutoCAD Fusion 360 to facilitate data collection and analysis.
- Calculators are used by students to develop an understanding of fundamental and complex mathematical functions.
- Students use state-of-the-art laboratory equipment including 3D printers, Vernier technology, GPS units, Gel electrophoresis apparatus, thermocyclers, Boe Bots, oscilloscopes, a Laminar Flow Hood, function generators, an IR camera, an Instron, a CNC mill, HD video cameras, and Microcontrollers.
- In addition, as part of their senior capstone project experience, students conduct field research with their professional mentors and utilize the technologies available at mentor organizations' laboratories.

Student Profile

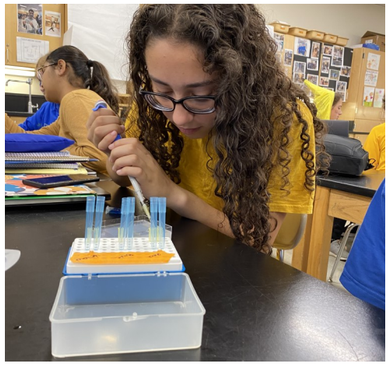
The SMA graduated its first class in the spring of 2008. Over 90 percent of the graduating classes have selected STEM majors in college and 95 percent are attending four-year institutions. Many of these students were accepted into their college's honors or scholars programs. The SMA is proud of its National Merit Scholars and AP course offerings.

The rigor of the SMA is recognized within the local scientific community and has allowed students opportunities to achieve beyond the classroom.

SMA students:

- Speak on a regular basis at meetings with the local professional scientific community.
- Co-author scientific papers with professional researchers.
- Work as summer interns at STEM organizations including Johns Hopkins Hospital and Aberdeen Proving Ground.

Students attending the SMA are multi-talented, active leaders within the high school and community. SMA students are student government officers, athletes, musicians, thespians, and artists.



Grade Point Average and Grading System

Cumulative GPA is a weighted calculation which includes all courses the student has taken.

Class of 2023
Grade Frequency Distribution

Weighted GPA Range	
5.00 – 4.50	61%
4.49 – 4.00	32%
3.99 – 3.50	7%

AP Scores 2022-23
Average Score

Calculus AB/BC	4.40
Computer Science A	4.60
Statistics	4.28
Biology	4.27
Chemistry	3.00
Environmental Science	3.94
Physics C: Mechanics	2.88
Physics C: E&M	4.00

College and University Admissions

The 44 members of the Class of 2023 had scholarship offerings of over $10.8 million.

The following are the outstanding institutions to which members of the SMA Class of 2023 were accepted:

Barnard College-Columbia University
Boston University
Clemson University
Drexel University
Duke University
Embry-Riddle Aeronautical University
Emory University
Florida Institute of Technology
Georgetown
Johns Hopkins University
Loyal University
Milwaukee School of Engineering
New Jersey Institute of Technology
North Carolina State University
Penn State
Pitt
Rochester Institute of Technology
Rutgers University
St. Mary's College of Maryland
Temple University
Texas A&M
Towson University
UCLA
University of Connecticut
University of Delaware
University of Florida
University of Maryland Baltimore County
University of Maryland College Park
University of Miami
University of North Carolina
Virginia Tech
West Virginia University
Worcester Polytechnic Institute
York College of Pennsylvania

When reviewing the records of SMA students, please consider the accelerated nature of this program and the rigor it demands of the young scholars who willingly accepted the challenge to leave the traditional high school setting. My colleagues and I believe you will be pleased with the results of our students' efforts and impressed by their ability to think independently, solve problems, and work through difficult tasks.

Mrs. Sarah Ashley,
Program Specialist

SMA
Advancing Education.
Enhancing Futures.