The Science and Mathematics Academy

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

“Even though I may have been reluctant to appreciate all those long hours spent doing homework, I am able to say that the SMA definitely prepared me for college. And for that, I would like to thank you and all the teachers for pushing us.”

V.P., Class of 2008

...the main thing I have noticed since the start of [college] classes is that I feel very well prepared for all of them, even advanced and “unique” classes. Plus, I really feel like the whole capstone process has left me very capable of interacting with the professors and other students in a meaningful, organized way.

C.A., Class of 2010

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

The Science and Mathematics Academy

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 55 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.

The Science and Mathematics Academy (SMA) is a member of the National Consortium for Specialized Secondary Schools of Mathematics, Science, and Technology (NCSSSMST). The NCSSSMST is comprised of over 100 specialized schools 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 NCSSSMST professional development opportunities.

The Instructional Program

The SMA offers a college preparatory program which provides students the opportunity to engage in challenging coursework that will prepare them for Science, Technology, Engineering and Mathematics (STEM) opportunities in higher education. All courses emphasize problem solving and creative thinking by using multiple resources and inquiry-based learning. Advanced placement courses in science and mathematics are offered to students, as well as a large selection of 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) which provides all students with an opportunity to integrate STEM curriculum in relevant and authentic research. Regular contact with practicing scientists, engineers, and mathematicians is provided throughout the program. Beginning in the junior year of the SRT course sequence, each student is introduced to a breadth of research and career options in:

- Biotechnology & medical sciences
- Pre-engineering & physical sciences
- Computational sciences & mathematics
- Geosciences & environmental sciences

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.
The Science and Mathematics Academy

The Instructional Program (continued)

Organizations providing mentors to SMA seniors include:
- Battelle
- Chesapeake Environmental Management, Inc.
- Community College of Baltimore County
- Ecotone, Inc.
- Fork Veterinary Hospital Inc.
- Harford Community College
- Harford County Public Schools
- Johns Hopkins University
- Kieran Timberlake
- Michael Baker Jr, Inc
- MITRE Corporation
- Oak Ridge Institute for Science and Education
- ORSA Corporation
- Raytheon
- SAIC
- Service Engineering
- The Maryland Zoo of Baltimore
- Towson University
- U.S. Army CE COM/CEMC
- U.S. Army Medical Research Institute of Chemical Defense
- U.S. Army Research Laboratory
- US Army RDECOM SCBC
- Veteran Compost/Garrity Renewables
- Vulcan Materials Company

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 SolidWorks to facilitate data collection and analysis.
- TI-84 and Nspire calculators are used by students to develop an understanding of fundamental and complex mathematical functions.
- Students use state-of-the-art laboratory equipment including 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 80 percent of the graduating classes have selected STEM majors in college and 90 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.

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, Army Research Lab, and Drexel University.

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

The Science and Mathematics Academy does not rank its students because of the selectivity of the admissions process. GPA is calculated each year. Cumulative GPA is a weighted calculation which includes all courses the student has taken. SMA students are eligible to take up to fourteen Advanced Placement courses.

Class of 2012

<table>
<thead>
<tr>
<th>GPA Range</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.00 – 5.00</td>
<td>33%</td>
</tr>
<tr>
<td>3.50 – 3.99</td>
<td>39%</td>
</tr>
<tr>
<td>3.00 – 3.49</td>
<td>28%</td>
</tr>
</tbody>
</table>

Grade Frequency Distribution

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.

Ms. Sarah Voskuhl, Program Specialist

College and University Admissions

The 43 members of the Class of 2012 had scholarship offerings of over $5.1 million.

The following are some of the outstanding institutions to which SMA students have been accepted:
- Albright College
- Boston University
- Brigham Young University
- California State University
- Campbell University
- Carnegie Mellon University
- Clemson University
- Colorado School of Mines
- Cooper Union
- Drexel
- Elizabethtown College
- Fairleigh Dickinson University
- Florida Institute of Technology
- George Mason University
- Georgia Tech
- Goucher College
- Hampton University
- High Point University
- Howard University
- Indiana University of Pennsylvania
- Johns Hopkins University
- Loyola
- Maclester College
- McDaniel College
- Messiah College
- Millersville University
- Mount St. Mary’s University
- North Carolina State
- Notre Dame of Maryland University
- Pace University
- Pennsylvania State University
- Princeton
- Randolph Macon
- Roanoke College
- Shenandoah University
- Siena College
- St. John’s University
- St. Mary’s College of Maryland
- Temple University
- Towson University
- UMBC
- United States Coast Guard Academy
- United States Merchant Marine Academy
- University of California-Berkeley
- University of Chicago
- University of Delaware
- University of Maryland
- University of Minnesota
- University of North Carolina, Chapel Hill
- University of Pittsburgh
- University of Wisconsin
- Virginia Polytechnic Institute and State University
- Washington College
- West Virginia University
- York College of Pennsylvania