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.” C.A., Class of 2010

“The SMA’s emphasis on problem solving and inventive solutions has done me wonders thus far.” J.R. Class of 2011

**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

at Aberdeen High School

2014-15 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 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 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
- 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.

Harford County Public Schools

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Mrs. Barbara P. Canavan
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The Science and Mathematics Academy

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Mr. Michael O’Brien, Principal
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The Instructional Program (continued)

Assignments providing mentors to
SMA seniors include:
Aberdeen Test and Evaluation Command
APTA of Maryland
Becton, Dickinson and Company
Bel Air Veterinary Hospital, LLC
CNC, Inc.
Department of Public Works - City of
Aberdeen
EcoBee, Inc.
Fidelity Engineering Corporation
Johns Hopkins Hospital
Kennedy Krieger Institute
Leidos
Michael Baker, Jr., Inc.
MITRE Corporation
National Institute on Drug Abuse
NORS Corporation
Raytheon
The Maryland Zoo of Baltimore
U.S. Army Corps of Engineers –
Aberdeen Proving Ground
U.S. Army Environmental Center
U.S. Army Medical Research Institute of
Chemical Defense
U.S. Army Public Health Command
U.S. Army Research Laboratory
U.S. Army Research, Development, and
Engineering Command
U.S. Army Test and Evaluation Command
U.S. Department of Veterans Affairs
Upper Chesapeake Health

Advanced Placement (AP) Courses
AP Biology
AP Calculus AB/BC
AP Chemistry
AP Computer Science
AP Environmental Science
AP Language and Composition
AP Literature and Composition
AP Physics B/C
AP Psychology
AP Spanish
AP Statistics

Electives
Biotechnology
Pre-engineering
Microcontrollers
Mathematics Science
Bacteriology
Organic Chemistry
Genetics
Ecology

Plant Physiology

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
Minotab, Mathematica, ArcGIS,
PicBasic Pro Compiler, Finch TV,
Visual Basic, ImageJ, Photoshop,
and SolidWorks 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
Vernier technology, GPS units, Gel
Electrophoresis apparatus,
thermocontrollers, Boe Bots,
obscilloscopes, 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 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, 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
officials, athletes, musicians,
theatrical artists.

Grade Point Average and Grading System

GPA is calculated each year.
Cumulative GPA is a weighted
calculati which includes all courses
the student has taken. SMA students
are eligible to take up to fourteen
Advanced Placement courses.

Class of 2014
Grade Frequency Distribution

<table>
<thead>
<tr>
<th>GPA Range</th>
<th>Class</th>
<th>Percent Passing</th>
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</thead>
<tbody>
<tr>
<td>4.00–5.00</td>
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<td>38%</td>
</tr>
<tr>
<td>3.50–3.99</td>
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<td>54%</td>
</tr>
<tr>
<td>3.00–3.49</td>
<td></td>
<td>4%</td>
</tr>
<tr>
<td>2.50–2.99</td>
<td></td>
<td>4%</td>
</tr>
</tbody>
</table>

AP Scores 2013-14

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<thead>
<tr>
<th>Course</th>
<th>Score</th>
<th>Percent Passing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calculus AB/BC</td>
<td>96%</td>
<td></td>
</tr>
<tr>
<td>Physics B/C</td>
<td>77%</td>
<td></td>
</tr>
<tr>
<td>Biology</td>
<td>97%</td>
<td></td>
</tr>
<tr>
<td>Chemistry</td>
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</tr>
<tr>
<td>Environmental Science</td>
<td>97%</td>
<td></td>
</tr>
<tr>
<td>Statistics</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

College and University Admissions

The 52 members of the Class of 2014
had scholarship offerings of over $8
million.
The following are some of the
outstanding institutions to which SMA
students have been accepted:

- American University
- Boston University
- Brigham Young University
- Bryn Mawr College
- Bucknell University
- California Institute of Technology
- Clemson University
- Columbia University
- Cornell University
- Drexel University
- Elizabethtown College
- Elon University
- Florida Institute of Technology
- Georgia Institute of Technology
- Howard University
- Indiana University of Pennsylvania
- Johns Hopkins University
- Lehigh University
- Loyola University Maryland
- Lycoming College
- MIT
- Mount Holyoke College
- Naval Academy
- North Carolina State University
- New York University
- Pennsylvania State University
- Princeton University
- Rensselaer Polytechnic University
- Richard Stockton College of New
  Jersey
- Roanoke College
- Salisbury University
- St. Mary’s College of Maryland
- The Cooper Union
- Towson University
- Tulane University
- UCLA
- UBC
- United States Coast Guard Academy
- University of Connecticut
- University of Delaware
- University of Maryland - College Park
- University of North Carolina
- University of Pennsylvania
- University of Pittsburgh
- University of South Carolina
- University of South Florida
- University of the Sciences in Philadelphia
- Virginia Polytechnic Institute and State
  University
- Virginia Wesleyan College
- Washington College
- West Point
- West Virginia University
- 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.

Ms. Sarah Voskuhl,
Program Specialist