



Arlington
Public
Schools

SCIENCE

BRIEFING REPORT

DECEMBER 2018





SCIENCE

The APS Science Program serves to inspire an enthusiasm for scientific literacy, foster an inquisitive spirit in learners through inquiry-based experiences in real-life contexts, and create a community of scientifically literate individuals who are able to make informed decisions.

MAJOR SERVICES PROVIDED

- Collaboratively develop, revise, and enhance curriculum; identify and create teacher resources that support a rigorous curriculum aligned with state standards
- Monitor instruction and program implementation; promote high quality teaching and learning experiences through observation and feedback cycles for teachers
- Facilitate and coordinate high quality professional learning for staff
- Sponsor, organize, and manage the Northern Virginia Regional Science and Engineering Fair
- Organize and support student participation in state and national science competitions, such as the Virginia Junior Academy of Science (VJAS), the Virginia State Science and Engineering Fair (VSSEF) and the International Science and Engineering Fair (ISEF)
- Develop and maintain chemical and safety management plan; coordinate the inventory, management, and disposal of chemicals at middle and high schools
- Administer and manage the Planetarium and the Outdoor Lab programs, including curriculum, purchasing, transportation, and delivery of services

BRIGHT SPOTS

IMPLEMENTATION OF NEW ENVIRONMENTAL SCIENCE COURSE

In the Fall of 2018, APS began offering a new Environmental Science course that allows students to earn an additional laboratory science credit. Upon completion of the course, students will have the option of choosing a Biology or Earth Science credit toward graduation. This course offering aligns with the APS Strategic Plan for providing *Multiple Pathways to Success for All Students*. By providing students with different course options to earn science credits, they will have greater flexibility to fulfill their graduation requirements.

EXPANSION AT THE OUTDOOR LAB

The Outdoor Lab continues to be a highlight for many APS students. Last year, over 7,000 students participated in educational programs at the Outdoor Lab. This includes the 5th grade overnight program which served almost 2,500 elementary students. To address the growing student enrollment, additional funding was allocated to the Outdoor Lab program for 2018-19. The funding covered staffing support for additional overnights, and reinstated the high school trips. The Outdoor Lab program has been a partnership between APS and the Arlington Outdoor Education Association for over 50 years. The Outdoor Lab program aligns with the APS Strategic Plan for developing *Strong and Mutually Supportive Partnerships*.

FOCUS ON ENVIRONMENTAL LITERACY

The Science Office has been coordinating a variety of programs to advance environmental literacy for Arlington Public Schools' students. This includes working closely with community partners and stakeholders to leverage resources and expertise.

B-WET (Bay Watershed Education and Training) Grant: APS is in the second year of a three-year grant focused on Sustainable Solutions for Urban Stormwater Management through Project-Based Learning. Funding from the National Oceanic and Atmospheric Administration (NOAA) provides professional learning and training for secondary science teachers to implement stormwater management projects in their classrooms. A key component of this project is to provide students with Meaningful Watershed Educational Experiences (MWEE). Students participate in water quality testing in their local watersheds and contribute data to national and international platforms that are used by scientists around the world.

Sustainability Liaisons: Eighteen schools, representing elementary, middle, and high, were selected to have Sustainability Liaisons this year. The liaisons will continue to lead, develop, and implement a variety of school-based projects focusing on environmental and sustainability education. In addition, all liaisons will spearhead projects on waste reduction this year, focusing on reducing consumption and increasing recycling at their schools.

Arlington Nature Centers: The Science Office has developed a partnership with the Arlington County Department of Parks and Recreation to provide hands-on, inquiry-based science programming for all first graders in the school division. Naturalists from Gulf and Long Branch Nature Centers will visit all first grade classes during the second and third quarters. Students will learn about the characteristics of animals (SOL 1.5) and have opportunities to interact with different critters from the Nature Centers.

The environmental programs coordinated by the Science Office are aligned with the APS Strategic Plan Core Value of *Stewardship through managing our resources to honor the community's investment in our schools; create safe, healthy, and environmentally sustainable learning environments; support civic and community engagement; and serve current and future generations.*

PLANETARIUM PROGRAMS

Each year, over 15,000 APS students visit the Planetarium. With the recent program additions, students now are also learning about life and physical sciences at the Planetarium. In addition, APS continues to partner with the Friends of the Planetarium to provide weekend shows and special events that include science experts.



SAFETY TRAINING AND CERTIFICATION

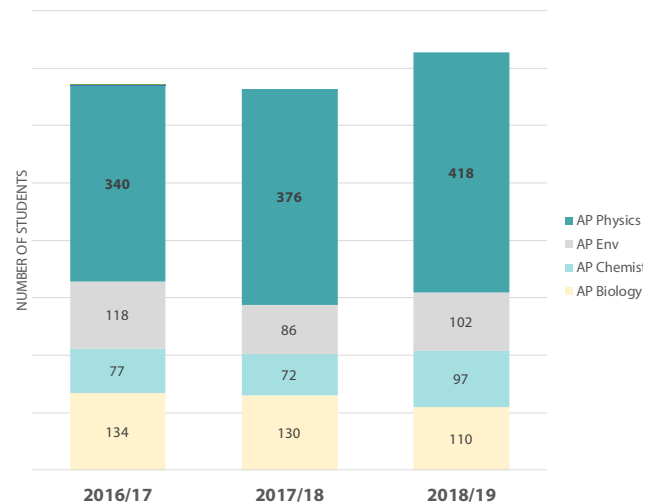
Safety continues to be a priority for the APS Science Program. In addition to updating our Chemical Hygiene Plan and Safety Guide each year, the Science Office collaborates with the Department of Facilities and Operations to conduct safety inspections for all secondary laboratory classrooms. All secondary science teachers have also completed a 7-hour online safety course and received safety certification.

DATA THAT PROVIDES INSIGHT

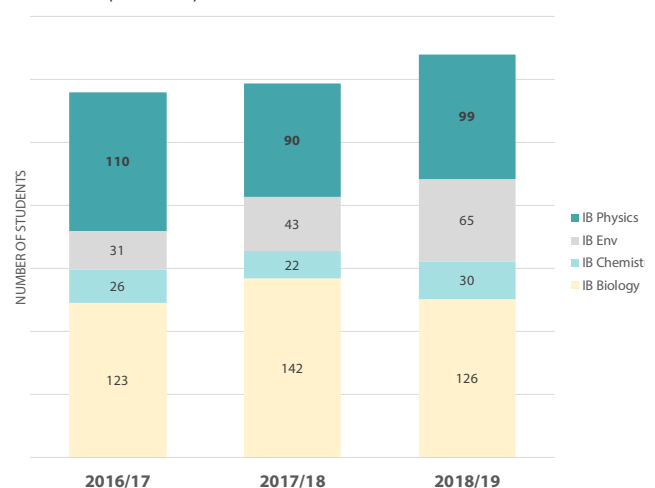
AP/IB COURSE ENROLLMENTS

Enrollment numbers in AP and IB science courses continue to rise. The enrollment in AP Science classes increased by almost 10%, as compared to last year. IB Enrollment also continues to rise from the previous year, increasing by nearly 8%.

AP Enrollment (3-Year Trend)



IB Enrollment (3-Year Trend)



MORE DATA

APS STUDENTS EXCEL IN SCIENCE COMPETITIONS

The Northern Virginia Regional Science and Engineering Expo was held on April 16 at Washington-Lee High School. Over 100 middle and high school students shared their scientific research with other students, parents, teachers, community members, and science experts. Several of these students also competed at the state and international level. Twelve APS student projects were nominated and competed in the Virginia State Science and Engineering Fair (VSSEF), which was held at Virginia Tech Carilion School of Medicine. At the middle school level, 15 seventh and eighth grade projects were nominated for the Broadcom Masters, a competition sponsored by Society for Science and the Public.



Additionally, in May 2018, over 200 APS students competed in the Virginia Junior Academy of Sciences (VJAS) at Longwood University. This represents about a third of the VJAS participants among all school divisions statewide. The VJAS competition provides students an opportunity to present their papers to university professors and science experts and engage in scientific discourse to further explore their topics. Students have also benefited from the experience of being on a university campus.



WHAT WE LEARNED

RESOURCE IMPLEMENTATION

The Science Office has been working collaboratively to implement the newly adopted resources for secondary science. The new resources afford students and teachers the opportunity for differentiation and personalized learning with access to current content. Secondary science teachers have had multiple opportunities for engagement in professional learning toward use and implementation of the resources. Additionally, resources are integrated with Canvas to streamline the log-in process for teachers and students. A comprehensive list of adopted resources can be found online at www.apsva.us/science.

PROBLEM-BASED LEARNING

The Science Office has been working closely with Gifted Services to provide all middle school science teachers professional learning on how to incorporate and implement problem-based learning into the science curriculum. Problem-based learning is an approach that allows for authentic problem-solving, hands-on, and self-directed learning. It encourages teachers to incorporate the core content into inquiry-based problems that lend themselves to differentiated instructional strategies. As a result, students develop a deep understanding of science through meaningful learning experiences.

MOVING FORWARD

1. Continue to expand dual (DE) enrollment offerings. Over the past three years, DE offerings have increased from one to six courses. Plans to include additional DE offerings will cover all science disciplines. Along with AP and IB courses, DE will allow students to earn college credits while in high school.
2. Align curriculum documents to the new science resources and the new science Standards of Learning that was adopted by the Virginia Board of Education in fall 2018.
3. Continue to develop, refine, and monitor Performance Assessments in grades 3-5 to ensure students successfully develop proficiencies with the 5 C's addressed in the Profile of a Virginia Graduate.
4. Continue to develop partnerships with organizations to leverage resources to support science instruction. This includes increasing the number of scientists in the classroom, who provide expertise to make learning science relevant, engaging, and exciting for elementary school students.

