The Academies of Loudoun (AOL)

Mission Statement:

The mission of the Academies of Loudoun is to provide a center for Science, Technology, Engineering, and Mathematics (STEM) education and career readiness that creates opportunities for the Loudoun community to innovate, explore, research, and collaborate.

The Academies of Loudoun Vision:

The Academies of Loudoun will be a center for student and community learning, research, and exploration. Using traditional and non-traditional classroom settings, the Academies of Loudoun will offer multiple pathways toward college and workplace readiness for all LCPS students. Housed within the facility will be the Academy of Science, the Academy of Engineering & Technology and the Monroe Advanced Technology Academy which together with expanded workplace, dual enrollment and AP coursework will serve up to 10% of the LCPS high school population.

This state-of-the-art facility will be utilized beyond regular school hours and throughout the year. The Academies of Loudoun will be a hub for online courses, offering expanded courses to the high school students within LCPS. It will serve as an incubator for future course development, teacher professional development and innovative instructional practices that could be implemented division-wide or nationally.

The Academies of Loudoun will be a project /research-based resource open for use by all LCPS students, staff, and the community. It will serve students through a variety of camps, unique courses, institutes, seminars, field trip experiences to the facility, and after school activities throughout the year. It will be a facility offering adult education courses: Adult Basic Education, Adult High School, Adult ELL (English Language Learner) classes and a variety of specialized interest courses year-round. It will be a Pearson-Vue test center offering community members an opportunity to take a variety of professional licensures and exams at this centralized site.
Goals:

1. Offer flexible schedules allowing access for non-academy program students to take special interest and unique courses
2. Implement A/B day scheduling for the 2-year and 4-year academy programs
3. Provide program enrollments of 1000 students at the Monroe Advanced Technology Academy (MATA), 1000 students at the Academy of Engineering and Technology (AET), and 500 students at the Academy of Science (AOS).
4. Deepen students’ knowledge, skills, and habits of mind that characterize STEM.
5. Provide multiple program pathways for advanced STEM and specialized course work geared toward accelerated learners.
7. Develop expanded STEM curriculum and serve as an incubator for innovation & research.
8. Implement a variety of usage models, flexible scheduling, and access for LCPS students
9. Provide LCPS students with the facility, resources, and state-of-the-art technologies to become the innovators and explorers of the 21st Century.
10. Foster business and industry partnerships for student mentorship/ internship opportunities.
11. Offer community outreach opportunities by offering workshops, seminars, or institutes on site.

What will be new?

- A unique combination of two-year and four-year academy pathways that will provide a strong academic foundation. An integrated curriculum for 9th and 10th grade students that provides a strong STEM focus within computer sciences/information technology, engineering, career, and academic pathways. Students will earn 4 credits within multiple STEM disciplines over a two-year period. This foundation will then allow students to continue on to one of the identified academy pathways during the 11th and 12th grade year or to take additional elective courses at their individual high schools.
- Expanded access to a highly-trained academic and technical staff to advise, assist, and mentor individual research and project-based learning activities.
- Students will have access to a variety of new STEM course offerings at the Academy of Engineering & Technology and the Monroe Advanced Technology Academy.
- Increased opportunities for dual enrollment, online, and distance learning coursework.
- An opportunity for students not enrolled in the academies to take special interest and unique courses
What are the Academy programs?

**Academy of Engineering and Technology (AET)**

The mission of the LCPS Academy of Engineering and Technology (AET) is to provide an academic environment where students can explore multiple program pathways for advanced STEM coursework while having the opportunity to pursue a rich, well-rounded high school experience. Students at the AET will deepen their knowledge, skills and habits of mind in the STEM fields. They will have the opportunity to participate in integrated, collaborative STEM focused programs across the AET and stay fully involved in their home high school academic and co-curricular activities.

AET pathways are built around integrated STEM course work that begins in a student’s 9th grade year and continues in 10th grade. AET pathways blend science, technology, engineering and mathematics content in integrated courses that allow students to focus on STEM fields and attain multiple credits in an accelerated timeframe.

AET students are selected through an application process. Rising 9th grade students with an interest in STEM will be eligible to apply. A selection committee will meet to determine which students will be offered a slot for the following academic year. Selection is based upon the following criteria: student interest in STEM fields, quality of application content, academic achievement, discipline, attendance, and teacher and counselor recommendations. Students entering the AET as 9th graders must commit to a two year AET course of study. Students who have not completed Algebra I before entering the AET will be required to participate in Algebra “Boot Camp” in the summer prior to entering the AET.

**Academy of Science (AOS)**

The mission of the LCPS Academy of Science (AOS) is to provide an academic environment where students are encouraged to develop creative scientific endeavors of their own design, while having the opportunity to pursue a rich, well-rounded high school experience. A student at the AOS will acquire skills to ask sophisticated scientific questions and conduct research and experimentation, to explore the interconnections between the sciences, math, and the humanities, to read, write, and communicate at a level that is required of university students, and to develop perspectives to assess the impact of scientific advancements on society.

The cornerstone of science preparation is a ninth/tenth grade integrated science program, which blends the physical sciences of physics, chemistry and earth science into a seamless, inquiry based lab course in preparation for independent research. The goal of the lab program is student designed investigations coupled to an in-depth writing/scoring rubric. In addition, sophomores begin instruction in basic research technique to be followed by two years of
research in a topic of their choosing. The Math program offers courses from Algebra and Trigonometry through Multivariable Mathematics. All courses have a heavy component of statistics and modeling and are taught in terms of practical application in order to coincide with the science program.

AOS students are selected through an application process. Rising ninth grade students are invited to attend after a competitive process that evaluates test scores, academic achievements, writing samples, teacher recommendations, and self-reported interests and activities. Student motivation and interest in science are the most valuable characteristics of AOS students. Highly motivated students who are consistent, dedicated learners have the greatest chance of success.

**Monroe Advanced Technology Academy (MATA)**

The mission of the Monroe Advanced Technology Academy is to provide a college and career ready curriculum that offers students multiple career pathways. These career pathways are built around an integrated STEM and entrepreneurial curriculum that begins in a student’s 9th grade year and continues in 10th grade. MATA pathways blend science, technology, and mathematics content in integrated courses that allow students to focus on STEM and/or specific career pathways to attain multiple credits in an accelerated timeframe. This strong foundation will ultimately prepare students to become college and career ready.

MATA students are selected through an application process. Rising 9th grade students with an interest in STEM and/or specific career clusters will be eligible to apply. A selection committee will meet to determine which students will be offered a slot for the following academic year. Selection is based upon the following criteria: student interest in STEM and/or specific career pathways, quality of application content, academic achievement, discipline, attendance, as well as teacher and counselor recommendations. Students entering the MATA as 9th graders must commit to a two year MATA course of study. Students who have not completed Algebra I before entering MATA will be required to participate in Algebra “Boot Camp” in the summer prior to entering MATA.

**Community Outreach**

The Academies of Loudoun will offer new opportunities for LCPS students, staff, and the community. These outreach programs will also provide a source of revenue from camp fees, course fees, professional licensure & test fees, and facility rental fees generated from community use. They include summer offerings (camps, after-school enrichment programs, and internships), professional development for teachers, access to shared resources and equipment for LCPS students, increased accelerated student course opportunities, and independent
research mentoring with the goal of building a culture of research in STEM. The facility could also be rented out by the community for a variety of activities, training, and meeting space.

Features of the proposed community outreach program include:

- The Academies of Loudoun will be a hub for student and teacher research, inquiry, and innovation
- An incubator for new courses, projects, and research
- Access to state-of-the-art lab and equipment for use by all LCPS students
- Opportunities for additional course offerings outside of the school day (i.e., zero period or after the regular school day) centered on student interest, inquiry and areas of focused research
- Innovative and creative learning spaces like Engineering and “Maker Space” labs, 3-D Printing labs where students can explore and innovate
- Training center for teachers to build a culture of research, exploration, and innovation in STEM pedagogy
- Summer courses, “boot camps,” seminars and institutes for the Loudoun community
- Expansion of business partnerships and internship opportunities for students
- Access to advanced dual enrollment, distance learning and online content
- A community resource facility for the citizens of Loudoun County
- Discovery and learning lab experiences for Pre K-12 students
- A nationally recognized academic program for STEM exploration, innovation, and incubation
The Academies of Loudoun
What Will Be New?

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- Expanded access to a highly-trained academic and technical staff to advise, assist, and mentor individual research and project-based learning activities.
- Students will have access to a variety of new STEM course offerings at the Academy of Engineering & Technology and the Monroe Advanced Technology Academy.
- Increased opportunities for dual enrollment, online, and distance learning coursework.
- An opportunity for students not enrolled in the academies to take special interest and unique courses
The Academies of Loudoun
Creating Increased Opportunities for Exploration, Innovation and Advancement

AET
Advanced Technology & Engineering
emphasizing Integration and Application
2 to 4 year programs

AOS
Advanced Science & Math
emphasizing Research
4 year program

MATA
Career & Technical Education (CTE) and Workplace Readiness
emphasizing Practical Skills and Certification
1 to 2 year programs

Flexible Course Enrollment & Advanced Coursework in Mathematics & Humanities
to facilitate enrollment, emphasizing Dual Enrollment and AP

1,000-1,600 facility capacity

- 3-D Design and Printing
- Advanced Computer
- Networking
- Advanced Geo-Coding
- Applied Mathematics
- Artificial Intelligence
- Auto Servicing Technology
- Biotechnology
- Building Construction
- Computational Physics
- Computer Graphics
- Cosmetology
- Culinary Arts
- Cyber and Information
- Security
- Digital Design and Animation
- DNA Science
- Electrical Engineering
- Electrodynamics
- Electronics
- Energy Systems
- Geosystems
- Graphic Communication
- Masonry
- Medical Laboratory
- Technology
- Nanoscience
- Nanotechnology
- Programming
- Optics
- Pharmacy Technology
- Plant Science
- Practical Nursing
- Quantum Mechanics
- Robotics and Automation
- Veterinary Science
- Web and Database
- Design
- Welding
The Academies of Loudoun Program Model

- Community Outreach (Adult Education, Training, Testing, and Facility Rental)
- Special Interest Courses for Accelerated Learners, Distance Learning, Online, and Dual Enrollment Courses
- 2-year Programs
- 4-year Programs
Academy of Engineering & Technology (AET)
4 Year Program

Integrated Engineering 9th and 10th Grade
2 year integrated Math, Technology, and Science
2 math, 1 science & 1 CTE credit

Computer Science 9th and 10th Grade
2 year integrated Math and Computer Science
3 math & 1 CTE credit

11th & 12th Grade Options

Academy Courses
• Bioengineering
• Robotics
• Engineering Labs
• Cybersecurity
• Dual Enrollment Courses
• Advanced STEM Courses

Certification Courses
• CISCO Networking
• Computer Integrated Engineering & Design
• Computer & Digital Animation
• Other MATA Pathways

High School Courses
• Advanced Placement Courses
• Dual Enrollment Courses
• Engineering Courses
Academy of Science
4 Year Program

9th Grade
- AOS Integrated Science I & Integrated Science II (Earth Science, Chemistry, Physics)
- AOS Analytic Geometry, Functions, and Trigonometry with Transformation (Students take SOL for Algebra II)

10th Grade
- AOS Integrated Science III (Students will take SOL for Earth Science & Chemistry)
- AOS Analysis AB or AOS Analysis BC
- AOS Sophomore Science Research

11th Grade
- AOS Biology
- AOS AB Calculus with Statistics or AOS BC Calculus with Statistics
- AOS Junior Science Research

12th Grade
- AP Sciences (Chemistry, Biology, Physics, Environmental)
- AOS BC Calculus AP with Statistics or
- AOS Multivariable Calculus
- AOS Senior Science Research
Monroe Advanced Technology Academy

1-2 year programs

Career Training
- Advanced Networking
- Auto Collision Repair Technology
- Building Construction
- Cosmetology
- Culinary Arts
- Graphic Communications
- Heating, Ventilation, Air Conditioning (HVAC)
- Masonry
- Nail Design
- Television Production & Digital Moviemaking
- Veterinary Science
- Welding

Governor’s STEM Academy
- Auto Servicing Technology (DE)
- Biotechnology (DE)
- Computer & Digital Animation (DE)
- Introduction to Engineering (DE)
- Environmental Plant Science (DE)
- Intro to Health & Medical Services (DE)
- Medical Laboratory Technology (DE)
- Radiology Technology (DE)
- Pharmacy Technology
- Practical Nursing-NVCC Partnership Pathway to RN

Dual Enrollment (DE) Programs
- Administration of Justice
- Computer System Technology
- Emergency Medical Technician (EMT)
- Firefighter
- Future Expanded Courses

Partnership Pathway to RN Governor's STEM Academy