

Alexandria City Public Schools

November 17, 2023

Prepared for

Cynthia Caglar

Senior Manager, Amazon in the Community, Education
Amazon, Inc.



Program Title: Student Experiences and Integration in STEAM Learning

Students Served: 1,292 students

Timeline: Spring 2024

Amount Requested: \$87,230

Overview

In 2022-23 Alexandria City Public Schools (ACPS) celebrated increases in division performance in annual Standards of Learning (SOL) student pass rates in the areas of Mathematics, Science, Writing and History/Social Sciences. Academic achievement gaps in Mathematics and Science, widened by the pandemic, began to narrow with most historically underserved student groups increasing proficiency at rates greater than all students.

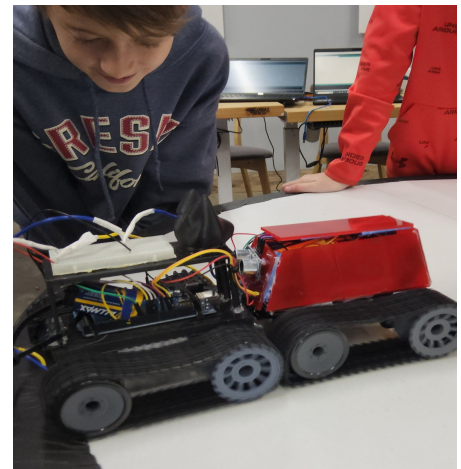
Continuing the positive trajectory for academic achievement and nurturing student growth, this proposal outlines our funding request for a spring 2024 initiative to really extend CTE experiences beyond the classroom for grades 6-12 science and CTE students. As we prepare for the new middle school career explorations course along with academies and pathways related to the high school project, providing students with experiences beyond the classroom will foster increased interest and passion in STEAM careers. Working collaboratively with local partner, Building Momentum, *Student Experiences and Integration in STEAM Learning* will provide students with hands-on, experiential learning through high-quality, interdisciplinary educational experiences in order to enhance their skills in collaboration, communication, and analytic innovation while making positive equity and/or sustainability impacts on their local and global community.

Program Details

- **Experiences:**
 - **Grades 6-8: ROBOT OBSTACLE COURSE**
 - Alignment: CTE: Technology Education; Science PH.1a-f, PS.1a-f. PS.8a-b; Computer Science SOL 8.1a-b, 8.2, 8.3, 8.4
 - **Grades 9-12: BUILD A TETHERED DRONE WITH A MICROCONTROLLER**
 - Alignment: CTE: Technology Education; Science PH.1a-f, PH.2a-d, PH.3a-b. PH.4, PS.1a-f. PS.8a-b; Computer Science SOL 7.1a-b, 7.2, 7.3, 7.4, 8.1a-b, 8.2, 8.3, 8.4
- **Estimated Student Enrollment:**
 - Francis C. Hammond Middle School: 515 students
 - George Washington Middle School: 436 students
 - Patrick Henry K-8 School: 67 students
 - Jefferson Houston K-8 School: 70 students
 - ACHS STEM Academy: 204
 - Total Number Of Students: 1,292 Students
- **Duration:** 4 hours
- **Estimated Cost:** \$5,500 per 100 students/Bus Transportation \$600 per bus
 - Total Cost: \$71,500 student total/ \$7,800 bus transportation total

CTE - Robot Obstacle Course

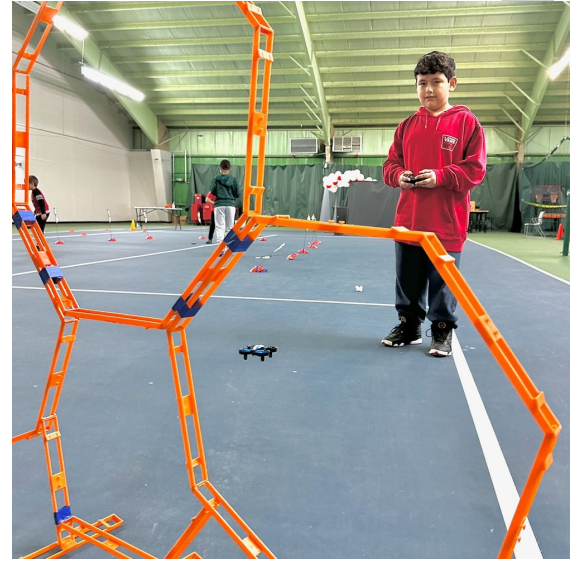
Students read wiring diagrams, assemble an Arduino-based robot, and code it to perform various tasks. This educational adventure is designed to introduce students to the fundamental principles of electronics, programming, and robotics while promoting teamwork, problem-solving, and creativity. Students will engage in challenges to program the robot to navigate mazes, follow lines, and complete obstacle courses.



Build A Tethered Drone With A Microcontroller

Students will delve into the intricacies of drones, starting with a detailed exploration of essential components such as propellers and motors. Through hands-on demonstrations and visual aids, they will gain a profound understanding of how these elements contribute to the principles of flight, enabling drones to achieve stability and maneuverability in the air.

Following this foundational knowledge, the students will transition to the realm of Arduino microcontrollers. They will be introduced to the microcontroller, exploring its various pins and understanding their roles in facilitating communication between different components of the drone. To bring theory into practice, the students will then be immersed in the programming environment associated with Arduino. This segment of the field trip aims to demystify the coding process by providing a step-by-step guide on how to write, compile, and upload code to the microcontroller.



With guidance, students will actively participate in crafting the necessary code to control the drone's flight, focusing on fundamental maneuvers such as hovering within their designated workspace. This hands-on experience not only reinforces theoretical concepts but also empowers students with practical coding skills, fostering a deeper appreciation for the symbiotic relationship between technology and flight dynamics.

Each field trip will begin with an overview of drone technology, including the propellers, and motors. The students will learn about the principles of flight and how these components work together to ensure stability and maneuverability. Next, the students will be introduced to the Arduino microcontroller, its pins, and the programming environment used to write and upload code. They will be guided step-by-step on how to write the necessary code to control the drone's flight to hover in their workspace.

Measurable Outcome

Students will be given a formal assessment based on the learning objectives when they conclude for the day. Classroom teachers will have results from the assessment immediately following the field trip to determine whether the students met the objective.

Contact

We truly value the incredible impact that collaborations between schools, community partners, and corporations can have on our students. Thank you for considering this proposal. If you have any additional questions, please feel free to reach out to:

Julia Neufer, STEM Coordinator & Elementary Math Instructional Specialist

Julia.Neufer@acps.k12.va.us