



SUBMISSION FORM

All submission forms must include the following information. Separate submission forms must be turned in for each eligible program. **Deadline: July 1, 2025.** Please include this submission form as the first page of your electronic entry. If you do not receive an email confirming receipt of your entry within 3 days of submission, please contact [Gage Harter](#).

PROGRAM INFORMATION

County: Henrico County, Virginia

Program Title: Hands-on Robotics: Inspiring Innovation, Equity and Collaboration in STEM Education

Program Category: Health and Human Services

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1. Summary

Henrico County Public Schools' FIRST LEGO League initiative is a transformative STEM education program designed to inspire students in grades 2-8 through hands-on robotics, coding and engineering challenges. The program supports the school division's Henrico Learner Profile's "durable skills" — critical thinking, collaboration, communication and problem-solving. It aligns with HCPS' mission to prepare life-ready learners. In the 2024-25 school year, 33 of HCPS' 46 elementary schools and nine of its 13 middle schools are participating in the program, engaging more than 400 students.

The program includes two levels: Explore (grades 2-4), focusing on foundational STEM skills, and the Challenge level (grades 4-8), featuring advanced problem-solving and engineering tasks. Both levels culminate in competitions that foster innovation, teamwork and resilience. Additionally, supported by a 2024 STEM+C Competition grant, HCPS is expanding the program by developing an implementation plan to launch a FIRST Tech Challenge team at Varina High School in 2025-26. This team will provide hands-on learning in robotics and real-world problem-solving, extend STEM+C opportunities to high school students and enhance academic performance.

By bridging classroom learning with real-world applications, the FIRST LEGO League and FIRST Tech Challenge programs address STEM access disparities, foster equity and inclusion and prepare Henrico learners to succeed in the global economy while nurturing a lifelong passion for STEM.

2. The Problem or Need for the Program

Henrico County Public Schools recognized the urgent need to address STEM access and engagement disparities among students in grades 2-8, particularly in underrepresented populations. With STEM careers shaping the global economy, helping students cultivate skills

like coding, design and problem-solving is essential. Traditional teaching methods often fail to develop the durable skills outlined in the division's Henrico Learner Profile, leaving students unprepared for STEM career paths.

To bridge this gap, HCPS launched the FIRST LEGO League program to provide equitable, hands-on STEM experiences that empower students with critical skills for an evolving workforce. A STEM+C Competition grant will expand the initiative to the high school level with plans to launch a FIRST Tech Challenge program team at Varina High School in 2025-26. This expansion addresses science achievement challenges, creating a pipeline from elementary to high school and ensures that students have meaningful opportunities in STEM+C education to prepare for high-demand careers.

3. Description of the Program

HCPS' FIRST LEGO League program aims to inspire and prepare students in grades 2-8 through innovative, hands-on STEM education experiences. The program's objectives focus on three key areas:

1. **Expand participation and engagement:** Increase student access to STEM education by implementing the FIRST LEGO League Explore level for grades 2-4 and the Challenge level for grades 4-8, engaging 33 elementary schools and nine middle schools by 2024-25.
2. **Develop critical skills:** Cultivate the Henrico Learner Profile's durable skills such as critical-thinking, collaboration, communication and problem-solving, along with technical skills in coding and design aligned with Virginia's computer science standards.
3. **Promote innovation and resilience:** Encourage students to create innovative solutions to real-world challenges through robotics competitions, preparing them for future STEM careers.

The program began in 2021-23 with two pilot schools at the Explore level. By 2023-24, it expanded to 13 schools, providing students with foundational STEM skills. The 2024-25 school year marked a significant milestone, with 30 Explore teams (grades 2-4) and 22 Challenge teams (grades 4-8), engaging more than 400 students.

Development involved significant planning, including teacher professional development, acquisition of LEGO education kits and technology and collaboration with organizations like FIRST and local robotics teams. Structured team meetings over 12 sessions culminate in dynamic competitions such as the Challenge event in March 2025 and the Explore Festival in April 2025. These events showcase student learning and innovation while fostering community engagement. Both levels emphasize the FIRST organization's core values, including inclusion, teamwork and gracious professionalism, ensuring that students gain technical skills along with essential life skills.

HCPS leadership and staff played a pivotal role in developing and implementing the program by:

- Designing the program to align with the Henrico Learner Profile and Virginia's computer science standards. The Henrico Learner Profile aligns with FIRST's core values, including inclusion, teamwork and gracious professionalism, ensuring that students gain technical and essential life skills.
- Providing professional learning opportunities for educators to enhance STEM instruction in classrooms and extracurricular settings.
- Securing funding, including grants, to purchase LEGO education kits and other necessary materials.
- Organizing and managing local competitions to celebrate student achievements and build community support.

Additionally, HCPS' Department of Innovation supported teacher collaboration and coaching, providing the program with sustainability.

- **FIRST:** The global nonprofit provided curriculum resources, professional development and competition guidelines to ensure program alignment with its mission of preparing young people for STEM futures.
- **Local robotics teams:** Groups like the Deep Run High School Blue Cheese Robotics Team mentored younger students, fostering peer learning and inspiration.
- **Volunteers and school administrators:** These stakeholders contributed to the program's logistical and operational success.

The 2024 STEM+C Competition Grant supports the next phase of HCPS' STEM initiative: launching an FTC team at Varina High School in 2025-26. The expansion offers high school students advanced robotics experiences, including competitions, mentorship from community STEM professionals and exposure to engineering and information security careers. The high school team will mentor FIRST LEGO League teams in feeder elementary and middle schools, strengthening the STEM pipeline and fostering a mentorship-driven model.

By fostering innovation, collaboration and inclusion, the school division's FIRST LEGO League and FIRST Tech Challenge programs prepare students to excel academically and thrive in an evolving global workforce, ensuring equitable STEM opportunities for all Henrico learners.

4. Advancing Diversity, Equity and Inclusion

The HCPS FIRST LEGO League and FIRST Tech Challenge initiatives are rooted in advancing diversity, equity and inclusion opportunities within STEM education. By targeting schools across the division, particularly those with historically underserved populations, the program provides equitable access to transformative STEM opportunities.

Many students lack access to resources such as robotics kits, coding tools and extracurricular STEM programs. HCPS eliminates financial and logistical barriers by supplying schools with LEGO education “SPIKE” kits, laptops and ongoing teacher support, making it possible for students from diverse socioeconomic backgrounds to participate. Title-I schools are actively recruited and outreach efforts focus on increasing participation among underrepresented groups, including girls and students of color.

Through partnerships with community mentors and local robotics teams, students are exposed to role models in STEM fields who reflect their own backgrounds. This mentorship inspires students to envision themselves as future STEM leaders and provides guidance for navigating STEM pathways. Additionally, the program aligns with FIRST’s core values, emphasizing inclusion, teamwork and respect for diverse perspectives. These values are reinforced during team activities and competitions, fostering collaboration across differences and creating a sense of belonging.

The planned FIRST Tech Challenge program at Varina High School builds on this foundation by targeting a school with a diverse student population and demonstrated need for STEM engagement. By expanding the mentorship model and providing high school students with opportunities to mentor younger teams, HCPS ensures a sustainable pipeline of STEM opportunities that benefits students across all grade levels.

By focusing on equitable access and inclusion, the FIRST LEGO League and FIRST Tech Challenge programs not only enrich the educational experiences of individual students but also strengthen the division’s broader community by preparing a diverse and innovative future workforce.

5. The Cost of the Program

The two programs provide a cost-effective, scalable approach to delivering transformative STEM education. Funding supports acquiring materials, event coordination, educator training and team registration, ensuring that all participants and educators have the tools and resources to succeed.

Breakdown of costs:

Initial funding and development (years 1-2): The program launched with a \$20,000 Virginia Department of Education STEM+C Competition Grant. This seed-funding covered foundational costs, including equipment purchases, registration fees and teacher professional development, creating a successful pilot and program expansion.

Operating costs (2024-25): The 2024-25 budget supports 30 Explore teams and 22 Challenge teams:

- **Explore teams:** Registration at \$75 per team for 30 teams (\$2,250), educational supplies (\$6,298) and competition event snacks (\$356).
- **Challenge teams:** Expansion kits for 45 teams at \$140 per kit (\$6,298), event materials and logistical costs.
- **Competitions:** Including food (\$1,000), certificates (\$53), decorations (\$100) and volunteer support (\$300).
- **Event Branding:** Banners and signs (\$3,953) and lanyards (\$180).
- **Custodial Support:** Two custodians for 10 hours each at \$25 per hour (\$500).

The total operating cost is approximately \$25,500 annually, excluding in-kind contributions.

FIRST Tech Challenge expansion: Supported by a \$5,000 allocation from the 2024 STEM+C Competition Grant, the FIRST Tech Challenge program will require investments in equipment,

training and competition fees. Annual operating costs are estimated at \$25,000 and will be offset by grants, sponsorships and community partnerships.

Cost to replicate: Replication in other divisions requires:

- **Initial investments:** Approximately \$20,000 for materials, training and initial registrations.
- **Annual operating costs:** Around \$25,000 for 30 Explore and 22 Challenge teams, with variations based on program scale and local support.
- **Community partnerships:** Sponsors and local mentors can significantly reduce costs and ensure long-term sustainability.

By combining grant funding, operational efficiencies and community support, HCPS has established a replicable and impactful model for advancing STEM education in diverse communities.

6. The Results/Success of the Program

The HCPS FIRST LEGO League program has achieved measurable success in advancing STEM education and cultivating critical life skills in students in grades 2-8. Since its inception, the program has addressed STEM access disparities and fostered the Henrico Learner Profile's durable skills of critical-thinking, collaboration, communication and problem-solving. The program's growth and impact demonstrate its ability to prepare students for academic and career success while empowering them to become innovative problem-solvers and collaborative contributors to their communities.

Launched in 2021-23 with two Title-I pilot schools at the Explore level, the program engaged a small group of students in hands-on robotics and engineering challenges. By 2023-24, the program expanded to 13 schools, featuring 13 Explore teams and in the 2024-25 school year, it has grown to include 30 Explore teams and 22 Challenge teams. This expansion now engages

more than 400 students and educators in 30 elementary and nine middle schools, reflecting the program's scalability and the rising interest in STEM education among HCPS students. These achievements underscore the program's capacity to close gaps in STEM access and inspire a diverse population of learners.

The program's success is further enhanced through mentorship opportunities with local robotics teams, such as the Deep Run High School Blue Cheese Robotics Team, which provide younger students with role models and pathways to advanced STEM experiences. Partnerships with community organizations and sponsorships have been instrumental in offsetting costs for materials, competitions and events, ensuring the program's sustainability. Additionally, the planned introduction of the FIRST Tech Challenge program at Varina High School will extend the STEM pipeline by offering advanced STEM+C skills and mentorship opportunities for feeder schools.

By addressing gaps in STEM access and fostering measurable growth in essential skills, HCPS' FIRST LEGO League program has established itself as a model for innovation in education. It prepares students for future academic and career success and empowers them to be creative problem-solvers and collaborative community contributors. This success underscores the program's ability to close gaps in STEM access while fostering durable skills aligned with the school division's mission to create life-ready learners.

7. Worthiness of Award

The HCPS FIRST LEGO League program is a shining example of innovation, equity and community impact, making it highly deserving of a VACo Achievement Award. This program addresses critical disparities in STEM access by providing hands-on learning experiences in coding, robotics and design that cultivate essential durable skills such as critical-thinking, collaboration and problem-solving, directly aligned with the division's Henrico Learner Profile.

What sets this program apart is its focus on equity and inclusion. By targeting underserved schools and removing barriers to participation, the program ensures that students of all backgrounds can engage and thrive. Since its inception, the program has rapidly expanded from two pilot schools to more than 40 participating schools, impacting more than 400 students and educators annually.

The integration of the 2024 STEM+C Competition Grant to establish a cohesive STEM pipeline from elementary to high school exemplifies sustainability and scalability, addressing a critical need while inspiring a generation of life-ready learners. Henrico's FIRST LEGO League program not only delivers effective outcomes but also serves as a replicable model for other counties nationwide. Its success underscores its worthiness of this prestigious recognition.

8. Supplemental Materials

- [Henrico County Public Schools FIRST LEGO League challenge video](#)