Grant Proposal

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LIBS 674: Management and Leadership in Library and Information Studies

Dr. Anderson

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Cover Sheet

Title of the Project: Girls and Gadgets STEM Club

Total amount of funding requested: \$1,244.93

Primary Application (SCPS Project leader/organizer) Information

Name: Jennifer Rose	Job Title: Library Media Specialist		
School/Dept.: Wilderness Elementary	Grade Level: Pre-K through 5th Grade		
Email: jrose@wes.com	Phone #: 555-555-5555		

Additional Project Leaders/Organizers/Participants Name

Name: Linda Smith	Job Title: Instructional Technology Resource Teacher			
School/Dept.: Wilderness Elementary	Grade Level: Pre-K through 5th Grade			
Email: lsmith@wes.com	Phone #: 555-555-5555			
Name: n/a	Job Title: n/a			
School/Dept.: n/a	Grade Level: n/a			
Email: n/a	Phone #: n/a			

If the project has more than 3 project leaders/organizers/participants, please list names

here: n/a

Please select all that apply:	
Education Level Early Childhood School ✓ Elementary School Middle School High School Other:	Grant Category Business (Marketing, Finance) Career & Tech Early Childhood (Pre-K, Head Start) Fine Arts (Music, Art, Drama) Foreign Language Health/Sports/P.E. Language Arts Special Needs Social Studies ✓ Stem (Science, Technology, Engineering, Math) Other:

Project Description

Provide a brief summary of the proposed project (average 100-150 words with a maximum character limit of 1,000). This description (or an edited version) will be used in SEF publications to include but not limited to the SEF website, social media, newsletters and emails.

The Wilderness Elementary Library is seeking funds to add LEGO robotic building materials to its collection in order to support STEM activities for the *Girls and Gadgets* club.

The purpose of this club is to introduce female club members to Makerspace and STEM activities. According to the authors of *Makerspace in STEM for girls: a physical space to develop twenty-first century skills* (2017), females "hold less than 25% of STEM jobs" even though they make up close to half of the working population (p.151). This club exposes girls to STEM education at an early age, which can help influence their future career decisions. Marva Hinton, author of *Makerspaces help kids tap potential, find confidence, success, and friendships*, describes the importance of Makerspaces in students' lives and states that they "help kids discover subjects, materials, and possibilities they didn't know existed. They develop previously hidden talents and, possibly, find themselves on a path to a future career" (2018).

The *Girls and Gadgets* club is sponsored by the school librarian. The club hosts female students in fourth and fifth grades. It meets every Thursday for an hour after school. During club meetings, students work collaboratively on different projects utilizing library materials (e.g. Ozobots, Botleys, Spheros and art supplies) that require them to use "21st-century skills and aptitudes such as creativity, innovation, transmedia, navigation, visual literacy, and (if based in technology) computational thinking" (Bowler, L., 2014, p. 59). This program aligns with the division's library statement by providing an opportunity for female patrons to "think, create, share, and grow" (<u>"Welcome to our SCPS libraries", n.d.</u>).

The club is in its third year and has seen growth over the last two years. There are currently 23 students who attend. The club would like to attend a First LEGO League competition in Richmond, Virginia. However, the school library currently does not have any robotic building materials. The addition of robotic materials will not only allow club members to prepare for the competition but will also help them learn vital STEM skills for the future.

Project Details Narratives

Please answer all questions in bold type. Questions in parentheses are meant to help clarify the bold questions. You may find it helpful to create your narrative in a word processor such as MS Word, and then cut and paste into this section. All responses have a character limit of a 1,000.

1. **How is the project an innovative approach to motivate students?** (Will the activity stimulate students on your grade level, is your idea a new approach to learning, have you developed your own material(s)? If this activity has been previously funded, what new ideas will be implemented or how will your project grow?)

The addition of robotic building materials to the school library will expose students to a new form of technology. Students' creativity will guide the building process and they will expand upon their current coding skills as they navigate the new materials.

2. How does the proposed project actively engage students? (is it truly student-centered?)

Student engagement will be a vital aspect of the project's success. Although there will be staff support, the majority of the project is student led.

Students will sketch ideas for their robot. They will then present their ideas to fellow club members and a design will be selected by student vote. Students will then work as a team to build the robot. Students will collaborate to brainstorm solutions to issues that arise while building the robot. Students will also host a mock competition for the school community and families to share their robot design.

3. How many students are projected to be served by your project during the 2021-22 school year? Please provide a whole number (not a range).

23	23		
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3.a. How will you measure the improvement in skills and/or attitudes as a result of the project? (Examples include pre and post assessments, changes in discipline or attendance, and student journals.)

There are several assessment measures that will be used to measure student growth. These include:

- Pre and post test assessments on key robotic terms (via Nearpod)
- Student surveys (via Google Forms)
- Club attendance records (via Google Sheets)

4. How will this project be an avenue for student creative expression and/or foster a love of learning?

The *Girls and Gadgets* club is a project-based learning program. Students use critical thinking and problem solving skills to navigate real life scenarios using hands-on materials. The addition of the robotic building materials will continue this learning model in a safe and nurturing environment. Students will be encouraged to embrace mistakes as learning opportunities.

5. List the specific Standards of Learning (number and text) and/or reference other school division goals the project will address. (SOL, AYP, School Division Strategic Plan, etc.)

4th Grade

- **Computer Science 4.4** The student will create a plan as part of the iterative design process, both independently and collaboratively using strategies such as pair programming (e.g., storyboard, flowchart, pseudocode, story map).
- English SOL: Communication and Multimodal Literacies 4.1 h) Demonstrate the ability to collaborate with diverse teams, while sharing responsibility for the work.
- English SOL: Reading 4.4 d) Use vocabulary from other content areas.
- Science: Scientific and Engineering Practice 4.1 a) Asking questions and defining problems
 - identify scientific and non-scientific questions
 - develop hypotheses as cause-and-effect relations
 - define a simple design problem that can be solved through the development of an object, tool, process, or system

5th Grade

- **Computer Science 5.4** The student will create a plan as part of the iterative design process, both independently and collaboratively using different strategies (e.g., pair programming, storyboard, flowchart, pseudocode, story map).
- English SOL: Communication and Multimodal Literacies 5.1 h) Work respectfully with others and show value for individual contributions.
- English SOL: Reading 5.4 f) Develop and use general and specialized content area vocabulary through speaking, listening, reading, and writing.
- Scientific and Engineering Practice 5.1 a) Asking questions and defining problems
 - ask testable questions based on observations and predict reasonable outcomes based on patterns
 - develop hypotheses as cause-and-effect relationship
 - define design problems that can be solved through the development of an object, tool, process, or system

6. What unique or underserved need is targeted by this project?

Wilderness Elementary School serves students in Pre-K through fifth grade ("Wilderness Elementary Quality Profile", n.d.). According to the VDOE's School Quality Profile Report, Wilderness Elementary School had a student population of 639 students during the 2020-2021 school year (n.d.). Of those, 288 students (45%) were female and 351 students (55%) were male ("Wilderness Elementary Quality Profile", n.d.).

This project is targeted at serving female students who attend Wilderness Elementary School.

Female students are currently scoring below their male peers on math and science assessments. According to the Virginia Department of Education's *School Quality Profile* report, for the 2020-2021 school year females scored four percentage points lower than males on the mathematics SOL assessment and three percentage points lower on the science SOL assessment (VDEO, n.d.). For the mathematics SOL assessment, this was an increased

discrepancy from the 2018-2019 test results (VDEO, n.d.).

7. Provide a brief timeline of activities.

September 2022

- Purchase robotic equipment
- Pretest on robotic vocabulary during one club session
- Fundraiser for entrance fees

October 2022

- Lesson/activities during club session centering around robotic vocabulary
- Unveil robotic equipment during club session
- Club members will explore and experiment with robotic equipment
- Register for competition
- Permission slips sent home
- Watch competition introduction video
- Discuss robotics competition
- Divide students into two teams
- Brainstorm ideas for competition

December 2022

• Club members will begin building robots for competition

January 2023

• Continue working on robots

February 2023

- Mock Competition-school community and family invited
- Attend Competition

March 2023

- Post test on robotic vocabulary
- Student Survey
- Reflection meeting on competition results

8. What aspects of the project can effectively and inexpensively be adapted for use by other educators?

Within the school

The robotic building materials will become a part of the school library collection. When not in use for competition building, the materials will be utilized in library lessons. The materials will also be available for staff checkout to be used in the classroom. The school librarian will provide training sessions during teacher workdays.

Within the division

The school librarian will share program information (lesson plans, competition information, etc.) during monthly library media specialist meetings.

9. Explain how the project will be a collaborative effort? (Across disciplines and/or between school administrations, teachers (other employees), students, parents and/or community, etc.)

Collaboration with Students

Students collaborate with one another as they design and build their robot.

Collaboration with School Staff

The school librarian is collaborating with the Instructional Technology Resource Teacher to develop lessons/activities that support student learning.

Collaboration with Parents

Parent volunteers are an essential part of the program's success. The librarian and parent volunteers will collaborate to organize fundraisers that will help provide additional funding for the competition.

10. Provide a written description of costs for the proposed project. (How do costs support proposed activities? If applicable, include information on matching funds or funds from other sources.)

LEGO RePlay Challenge Set (\$75)

This set includes a game field mat and mission models that will allow the club members to practice with their robots prior to the competition.

Mindstorm Robot Inventor sets (\$719.98)

This set includes materials for students to create and code a robot. The set has 949 pieces which includes: an information hub, 4 motors, 2 sensors and rechargeable battery

LEGO Education SPIKE Essential Set (\$274.95)

This set includes materials for students to create and code a robot. The set has 449 pieces which includes: an information hub, 2 motors, 1 sensor, a rechargeable battery, 4 diverse minifigures, and teacher resources

First LEGO League Table (\$100)

The table will require around \$100 of materials to build. The table is being built by parent volunteers. The volunteers will supply all tools and fasteners required.

10.a. Does the project require additional funding to implement in future years? If so, what funding avenues will you investigate?

The majority of the robotic building materials purchased with the grant money can be used again for future First LEGO League competitions. These include:

- Mindstorm Robot Inventor sets
- LEGO Education SPIKE Essential Set
- First LEGO League Table

These materials can also be utilized by all Wilderness Elementary School staff and students when not in use by club members.

The only additional funding the project will require in future years is the \$75 for the LEGO RePlay Challenge Set and the entrance fees. These funds can be raised via fundraisers or additional grant opportunities.

Proposed Budget

Please be as detailed as possible. Only include your request from this grant. Requests exceeding \$2,000 will not be considered. Columns in red will automatically calculate. (Do not attach purchase orders or order forms.)

Item Description	Reusable	Quantify	Itemized Cost	Total Cost
LEGO RePlay Challenge Set	NO	1	\$75	\$75
Mindstorm Robot Inventor	YES	2	\$359.99	\$719.98
LEGO Education SPIKE Essential Set	YES	1	\$274.95	\$274.95
First LEGO League Table (materials to build)	YES	1	\$100	\$100
Use this row for estimated shipping and handling charges, if applicable.				\$75
Total Request:				\$1,244.93

Requests exceeding \$2,000 will not be considered. Funds \$50 or over not spent by May 27, 2022 must be returned to SEF.

References

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- Bowler, L. (2014). Creativity through "maker" experiences and design thinking in the education of librarians. *Knowledge Quest*. 42(5),58-61. <u>https://web-s-ebscohost-com.proxy.lib.odu.edu</u>/ehost/pdfviewer/pdfviewer?vid=2&sid=730fb653-9cf7-4e43-bc39-286487e15742%40redis
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Appendix A

SEF 2021-2022 IDEA Grant Application