



APPLICATION FORM

All applications must include the following information. Separate applications must be submitted for each eligible program. **Deadline: June 1, 2018.** Please include this application form with 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: County of Henrico

Program Title: Elementary Explorers: STEM Education for Upper Elementary-Aged Students

Program Category: Customer Service

CONTACT INFORMATION

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SIGNATURE OF COUNTY ADMINISTRATOR OR DEPUTY/ASSISTANT COUNTY ADMINISTRATOR

Name: Douglas Middleton

Title: Deputy County Manager for Public Safety

Signature: 

1. Program Overview

Beginning in February 2016, the children's department at Tuckahoe Area Library in Henrico County began offering a recurring program for upper elementary schoolers called Elementary Explorers. This program teaches STEM topics (science, technology, engineering, and math) to third through fifth graders who have aged out of children's storytime and craft programming, but are too young for teen programs.

Elementary Explorers aims to engage older elementary students through an innovative approach, providing age-appropriate learning opportunities at the library with an emphasis on STEM concepts, hands-on learning, and discovery. The program complements school curriculum while also fostering curiosity and excitement for STEM topics. Elementary Explorers has consistently strong attendance and positive feedback from both children and their parents.

2. Problem/Challenge/Situation Faced by Locality

Many public libraries provide effective services to young children and families and then engagement decreases as children reach later elementary school. While Tuckahoe Library offered several programs for children, including 10 weekly storytimes for ages five and under and crafts for ages three to nine, the children's department received requests from parents to provide additional program opportunities to older elementary students. Elementary Explorers was developed to continue engaging those older elementary children with library programming, fulfilling the library's mission to foster life-long learning, supporting local school curriculum, and satisfying community demand for STEM learning opportunities.

3. How Program Fulfilled Awards Criteria

Elementary Explorers was developed in response to parental requests that additional programming be provided to children in upper elementary school grades. Prior to this program, upper elementary school children had no library programs specifically tailored to their needs, a

common issue for public libraries. Elementary Explorers has managed to build a following and make a connection with its intended audience through innovation, by using interactive lesson plans, being flexible in its approach to selecting topics or structuring classroom time, and by providing a variety of activities with broad appeal for upper elementary students involving STEM learning and discovery. The lessons complement school curriculum, and can be tied into system-wide library initiatives or high-profile library events.

Librarians across the state could replicate this program inexpensively and easily to serve the needs of their upper elementary school patrons and satisfy demand for STEM programming. Elementary Explorers requires minimal investment in supplies, but delivers a great return for Tuckahoe Library families, with dozens of young people attending each session, and more joining in each time.

4. How Program Was Carried Out

The hour-long Elementary Explorer programs begin with a staff member teaching vocabulary and interesting facts about a selected STEM topic for approximately forty minutes. The last twenty minutes are dedicated to interactive science experiments and/or crafts. The grade 3-5 age group is capable of sitting through some classroom-style instruction, as they do so in school every day. Still, hands-on activities, demonstrations, and videos are useful teaching tools for this age group, and active participation creates a more engaging learning environment. Library staff can be highly flexible in their lesson plans, combining hands-on activities, opportunities for discovery and self-directed learning throughout each lesson. Library staff also provide hands-on demonstrations and instructional videos.

Topics and activities are selected from a variety of sources including current events, reference books, tie-ins to system-wide library events, and supplies or kits that Henrico County Public Library (HCPL) already owns. Elementary Explorers take place on Wednesday afternoons, every-

other month during the school year, and monthly during the summer, in the Tuckahoe Library children's program room or larger meeting room.

Below are example lesson plan outlines from the most popular Elementary Explorers programs:

Solar Eclipse

In August 2017, everyone was excited for the natural phenomenon of a solar eclipse. Because Elementary Explorers is an open, recurring event, library staff can select topics for each session that are tied to current events and therefore high-interest.

The Solar Eclipse program began by defining solar eclipses. Library staff showed videos on how to properly view a solar eclipse, featuring Bill Nye the Science Guy. The staff demonstrated various models of handmade eclipse viewers that could be used to safely view the eclipse in the absence of eclipse glasses, which were in high demand and sold out all over town. An active demonstration with the use of three volunteers from the group showed how the sun, moon and Earth aligned for a solar eclipse. Vocabulary included rotation, revolution, and path of totality. At the end of the program, paper towel rolls were used to make eclipse viewers. Participants went outside, accompanied by library staff and adult caregivers, to test whether or not they could see the sun in the paper towel roll. The viewer during the eclipse would change from a small speck of light to various shapes when the moon crosses over the sun. During the day of the eclipse, Tuckahoe Library had a limited number of eclipse glasses to distribute, and demand quickly overwhelmed supply. The children's library staff recreated the paper towel viewer as a craft during the eclipse and 48 patrons who didn't get a pair of glasses were able to safely view it.

Ladies of NASA

When Henrico County Public Library started participating in the NASA @ My Library Project, library staff at the Tuckahoe Library created "Ladies of NASA" for Elementary Explorers, a program highlighting women who made major contributions to NASA science. Library staff research about NASA and jobs in STEM from the U.S. Department of Commerce showed that 34% of NASA's workforce are women and less than 25% of women in the U.S. workforce work in STEM jobs. In Elementary Explorers, staff talked with children about the lives of these Ladies of NASA, and why they thought the statistic of females working in NASA was so low. We covered skill sets that these women needed to succeed at NASA as well as what the children thought about NASA. One of the major goals of the NASA @ My Library Project is to increase opportunities in STEM education for people traditionally underrepresented in STEM fields, like women. Elementary Explorers' Ladies of NASA program demonstrates how this series is flexible enough to align with larger, system-wide library initiatives.

Ladies of NASA began by watching *Aspire to Inspire: Women in STEM from Women @ NASA*. Staff and children discussed the careers and achievements of several women, including Katherine Johnson, Sally Ride, and Mae Jemison. Library staff read a new nonfiction title, *Margaret and the Moon: How Margaret Hamilton Saved the First Lunar Landing* by Dean Robbins, aloud to the group. After further discussion of the achievements of these female scientists, librarians led children through a program provided in a kit from NASA @ My Library entitled "How Big? How Far? And How Hot?" The children then made inspirational posters using star stickers and die cut rockets to inspire themselves and other children to "reach for the stars." By incorporating reading, discussion, experiments, video, and crafts into each Elementary Explorers program, library staff ensure that the STEM topics presented will have broad appeal.

Sea Animals

The Sea Animals Elementary Explorers program was developed to connect with the library system's signature event, All Henrico Reads, in which county residents are encouraged to read a selected book. The All Henrico Reads selection for 2017 was *The Soul of an Octopus* by Sy Montgomery. The Sea Animals program began by discussing exactly how deep the ocean is and the names and depths of the different ocean layers. The depth of each layer was compared to a famous landmark, from the Washington Monument to Mount Everest. The library staff used hands-on demonstration to illustrate why sea animals, specifically whales, have blubber. Using Crisco, gloves, and ice water, children could feel first-hand how fat traps heat when their Crisco-covered hands were submerged in the cold water. The group watched a video featuring fascinating creatures found in the depths of the ocean. Staff read aloud Therese Shea's *The Bizarre Life Cycles of an Octopus* as photographs of octopuses displayed on a PowerPoint presentation. At the end of the program, each child worked on a craft making miniature Octopuses in water bottles they could take home.

Slime

The Slime program was developed by referring to the book *Maker Lab*, from DK Publishing's Smithsonian imprint, which provided the recipe to make slime as well as information about the science behind slime. The program defined the different states of matter, and viscosity. Staff demonstrated viscosity by setting up three containers with equal amounts of different liquids and dropping a ball into all three at the same time. The most viscous liquid would cause the ball to take longest in reaching the bottom of the container, which the children could observe. The children were then introduced to non-Newtonian fluids, which are fluids that do not follow Newton's Law of viscosity. At the end of the lesson, the children created their own slime to take home. The hands-on approach of Elementary Explorers can make an advanced topic like non-Newtonian fluids interesting and accessible for third to fifth graders.

Minecraft Escape Room

Henrico Library owns Breakout EDU kits that staff use for “Escape Room” programming, challenging participants to solve a series of puzzles in order to reach a final goal. There are many lesson plans available online through the Breakout EDU website, and the kits are designed to allow the user to develop their own lesson plan. The Breakout EDU kit contains locking boxes and a variety of special locks with resettable combinations. “Back to Reality” is a Minecraft-themed escape room created by Adam Bellow and Patti Harjo that contains science and math strategies. This program was an exception to the traditional Elementary Explorers layout, as all work was done in groups and there was no teaching portion of the program. However, the program still promoted hands-on learning through discovery.

The lesson was set up in the large meeting room at Tuckahoe Library. A large, locked box was placed in the center of the room which contained a prize. Other locks with associated clues were set up around the room. Children would need to use the clues to solve puzzles and open the locks before reaching the center prize. For example, one of the stations required the children to calculate area and perimeter to unlock one of the locks. A clue printout was placed nearby to explain how to make area and perimeter calculations. One station required the children to find four different elements, which are also resources in Minecraft, around the room and match them to the Periodic Table. Their combined elemental numbers unlocked another lock. The children had 45 minutes to unlock the box and broke out in 30 minutes. The children were rewarded with stickers and keychains for successfully breaking out.

5. Financing and Staffing

Each Elementary Explorers program is different, which means the cost of each session varies and is flexible. Library staff were able to minimize costs by using donations from library staff and

participants of things like cardboard paper towel rolls, repurposing existing programming supplies from the Tuckahoe Library children's supply budget, and buying additional materials at Dollar Tree. Planning the Elementary Explorers programs at least a month apart helps not only with staff planning time but also with minimizing the cost of supplies. Librarians seeking to replicate Elementary Explorers elsewhere will be able to repurpose existing library supplies, invest in reusable supplies, and tailor their lesson plans to their budgets.

A sample supply list for the Slime program is below.

Program Cost: Elementary Explorers, Slime

5 boxes of 40 ft. Aluminum Foil

2-32 fl. oz. bottles of White Distilled Vinegar

4-16 fl. oz. bottles of Canola Oil

2-14.5 fl. oz. bottles of Shea Butter

2-15 fl. oz. bottles of Conditioner

2-9 fl. oz. bottles of Dishwashing Liquid

3- 1 lb. boxes of Baking Soda

3 packs of Active Yeast

Measuring cups

Measuring spoons

1 pack of Plastic eyeballs

Total: \$26

6. Program Results

The success of the program has been measured by attendance numbers and patron feedback. The first Elementary Explorers in February of 2016 began with five participants. Attendance numbers grew into the teens and the twenties over the following months, and the latest program in December 2017 had 41 attendees. There have been a total of 14 Elementary Explorers programs at Tuckahoe Area Library presented by staff. The programs with the highest numbers included the solar eclipse, engineering challenge, and Minecraft escape room.

Feedback from attendees has been positive. Parents appreciate an opportunity to encourage their child's interest in STEM and learning. In addition, it was parental requests to increase programming available to the grade 3-5 age group that prompted the creation of this program. The steadily increasing attendance and positive parental feedback shows that the library is meeting a real need with Elementary Explorers. Each session now attracts a growing, core group of attendees along with new participants who are drawn to the particular topic of the day. Prior to Elementary Explorers, the library saw a drop-off in engagement in the older elementary school demographic, a trend which is now reversing. The program is helping to ensure the library maintains a strong connection to upper elementary school children.

7. Brief Summary

Beginning in February 2016, the children's department at Tuckahoe Area Library in Henrico County began offering a recurring program for upper elementary schoolers called Elementary Explorers. This program teaches STEM topics (science, technology, engineering, and math) to third through fifth graders who have aged out of children's storytime and craft programming, but are too young for teen programs – an age group often underserved in public libraries.

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Librarians across the state could replicate this program inexpensively and easily to serve the needs of their upper elementary school patrons and satisfy demand for STEM programming. Elementary Explorers requires minimal investment in supplies, but delivers a great return for Tuckahoe Library families, with dozens of young people attending each session, and more joining in each time.

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Elementary Explorers: STEM Education for Upper Elementary-Aged Students

From Elementary Explorers: Solar Eclipse



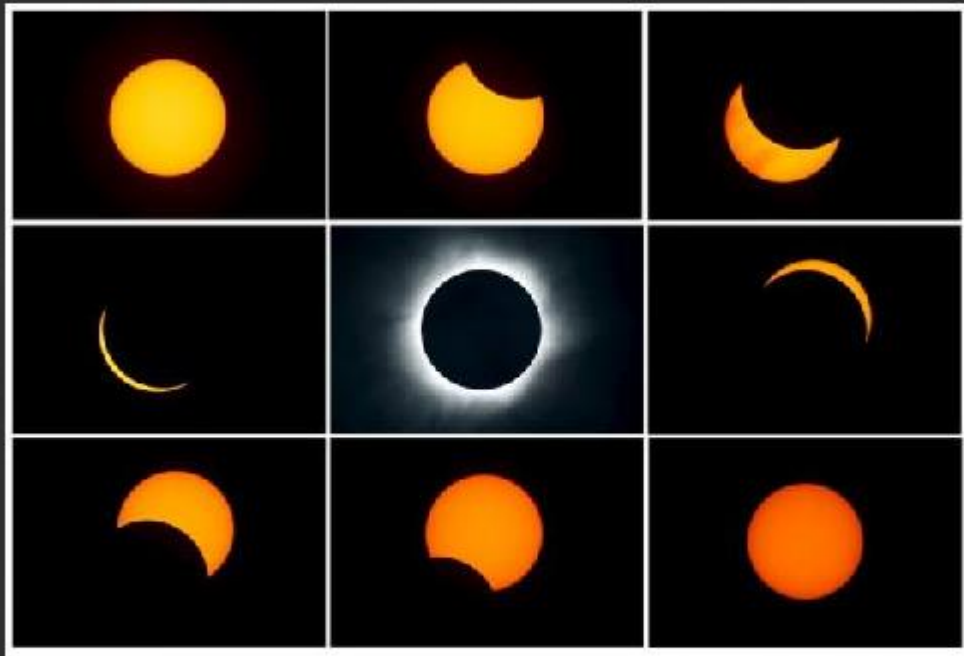


From Elementary Explorers: Solar Eclipse



From Elementary Explorers: Engineering

ELEMENTARY EXPLORERS



Solar Eclipse

August 16

3:30 p.m.

Rising 3-5th grades



www.henricolibrary.org/KIDS

ELEMENTARY EXPLORERS

ESCAPE ROOM

December 20, 3:30 PM

Meeting Room

3-5th Grades



Steve is counting on you to help him
escape the meeting room.
An hour is all you have to help him
escape without getting trapped
yourself!

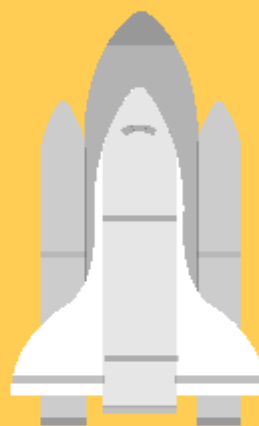


 **HENRICO COUNTY** PUBLIC LIBRARY

Tuckahoe Area Library

1901 Starling Dr.
Henrico, Virginia 23229-4564 | (804) 501-1910
www.henricolibrary.org/

Elementary Explorers



Ladies of NASA

October 25 3:30 pm

Grades 3-5

Learn about some of the many women who have contributed to NASA's space program.

www.henricolibrary.org/kids

Henrico
County
Public
Library



Elementary Explorers



Engineering Challenge

Calling all makers! We need your help
to create a functional hand out of office supplies

Grades 3-5
June 21, 3:30-4:30 p.m.