

Strengthening Communities Through Libraries

**Librarian Toolkit for Developing
STEAM Learning Opportunities
during Out-of-School Time**





HELLO, YOUTH SERVICES LIBRARIAN!

This toolkit is designed to help you create STEAM (science, technology, engineering, art, and mathematics) programs for children in your library. It contains information related to the importance of STEAM programs, as well as the need for opportunities for children during school breaks and after-school time. It also provides ideas on lesson plans and resources for creating your own programs.

In fall 2016, the Association for Library Service to Children (ALSC) used a grant from the Dollar General Literacy Foundation to award twelve Strengthening Communities through Libraries Minigrants. The recipients of the grants used the funding to create STEAM learning opportunities during out-of-school time. The results of their experiences as well as recent research and best practices serve as the guide for this toolkit.

As more and more schools cut creative opportunities such as music and the arts, libraries can offer programs to help build imagination and creative thinking. STEAM activities that involve group work and problem-solving can fill part of this gap and help build twenty-first-century skills. These skills include coding, problem-solving, teamwork, collaboration, and creativity (skills that really can be considered necessary for any century).

Some libraries may shy away from STEAM programs that require technology because they don't have funding available to purchase enough

for every child to have their own piece of equipment. Don't let this stand in your way. Teamwork is a great skill to work on. It is also a necessary skill when trying to use technology effectively. One grant recipient said the following about kids working in teams with 3Doodlers (3-D pens): "The creative and engineering processes can be hard to navigate in a group, but the amount of work required to build something durable really required it—as it often does in the adult world." There are also a multitude of STEAM projects that do not require technology. You can find ideas here in the Sample Lesson Plans and Ideas on a Shoestring Budget sections.

STEAM programmer beware! These activities may elicit the following reactions from patrons (taken from the final reports of the grant recipients):

- "Mom, please let me stay longer."
- "It's great hands-on enrichment."
- "It was awesomely awesome! Super cool!"
- "I had a lot of fun and I loovved it."
- "It was really hard, but I DID IT!"

This toolkit contains the following sections:

- This introduction, including brief information about the importance of out-of-school programs and STEAM and where to learn more
- Three sample lesson plans from grant recipients
- Resources for finding more program ideas
- A list of the technology used by the grant recipients
- Ideas for doing programs on a shoestring budget
- Outreach and partnership tips
- Promotion and advertising tips
- Information about the Strengthening Communities through Libraries Minigrants



WHY OUT-OF-SCHOOL TIME?

Programs outside of school hours engage students in exciting learning opportunities. Children are able to explore topics that interest them and, therefore, further expand their reading skills, critical-thinking skills, and general acquisition of knowledge. Best of all, because these programs are held outside of school hours, they are fun and stress-free. Kids can learn without fear of failure or poor grades. Kids can learn for the sake of learning (many times without even realizing they are learning).

Free, quality programs offered by a public library help to bridge the achievement gap between children from different socioeconomic levels. All kids can learn together; kids of different ages, kids with varying learning abilities, kids from different schools, and kids from different backgrounds.

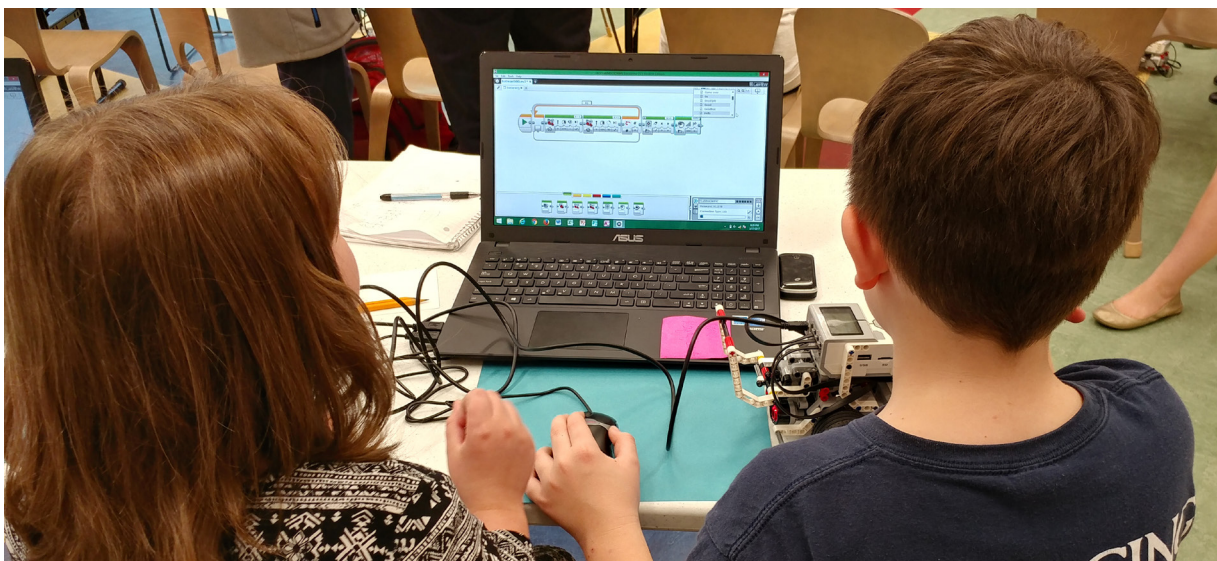
According to the United Way's Out-of-School Time Toolkit, participation in high-quality programs before school, after school, on weekends, and during the summer has the following benefits:

- Improved student work and study habits, homework-completion rates, and course grades
- Increased student engagement and school connectedness
- Increased self-esteem

- Improved relationships with peer and adults
- Declines in negative risk-taking behavior¹

The Noyce Foundation commissioned a paper on the impact of after-school STEM programs. In that report, they highlight findings of a 2009 study by the National Research Council titled *Learning Science in Informal Environments*. One of the conclusions is that “learners [that participate in out-of-school STEM programs] will begin to think about themselves as science learners and develop identities as young people for whom science matters.”² The paper also stresses that STEM or STEAM opportunities outside of the school day are “necessary partners” with the school system.

Remember that STEAM programs can, and should, happen throughout the year. Yes, an intensive STEAM camp might fit best during the summer months or spring break, however, after-school and weekend programs are important as well. Work with your community to find the best fit. That may mean programs in your library. It also may mean bringing programs to established after-school groups in your area. When STEAM programs are presented during the summer, consider scheduling them to coincide with free lunch or snack programs. Food brings everyone in the door. Once they are there, you can introduce fun and exciting programs.





WHY STEAM?

While it may seem that STEAM focuses on the specific subjects of science, technology, engineering, art, and mathematics, it really does pervade all aspects of the learning experience. It encourages innovation and strengthens critical-thinking skills; things that are important everywhere in life.

Click2Science provides online STEM professional development for out-of-school providers. Their website has an infographic highlighting the importance of STEM during out-of-school time. Perhaps the most compelling part is the following fact: seventy-five percent of Nobel Prize winners in the sciences report that their passion for science was sparked in a nonschool setting.³

STEAM programs are important to show kids that anyone can be a scientist. According to a 2014 study, many kids “reported liking science, having positive views of science and scientists, and doing well in school in those subjects—but imagined scientists to be mostly white, middle class, male, and “brainy,” and thus was not something they could imagine for their own lives.”⁴ STEAM programs can generate interest in, engagement with, and excitement about science. Libraries can be especially effective by inviting actual science professionals to present or assist with STEAM programs. Meeting a real scientist—especially a nonwhite, nonmale



scientist—can open eyes and doors. Be sure to refer to the Outreach and Partnerships part of this toolkit for tips and ideas from the first year of grant recipients.

It is important to introduce STEAM concepts at an early age. According to Dr. Judy Cheatham, vice president of literacy services at the organization Reading Is Fundamental, “Middle school is the wrong time—too late—to introduce complex science and math terms and vocabulary. . . . Research shows that young children’s brains are like sponges . . . eager to absorb information on a wide variety of topics.”⁵ Libraries should continue programs for teens but make sure they are also offering STEAM programs for school-age children and preschoolers.

You may even find that STEAM projects can help you do your job better. As reported in *School Library Journal*, one library in Virginia included third-graders in a library redesign project. The students generated ideas, selected solutions, and evaluated the end result. The students measured floor space and furniture and created floor plans, all with the understanding that the library did not have funding for anything new. The best part is that those students now have ownership of the current library design.

REFERENCES

- 1 United Way, Out-of-School Time Toolkit, accessed June 26, 2017, <http://outofschooltime.unitedway.org/>.
- 2 Anita Krishnamurthi, Melissa Ballard, and Gil G. Noam, Examining the Impact of Afterschool STEM Programs (Los Altos, CA: Noyce Foundation, 2014): 3. Accessed June 26, 2017, <http://afterschoolalliance.org/ExaminingtheImpactofAfterschoolSTEMPrograms.pdf>.
- 3 “STEM & Out-of-School Time,” Click2Science PD, accessed June 29, 2017, http://www.click2sciencepd.org/sites/default/files/STEM_infographic_final_0.pdf.
- 4 Krishnamurthi, Ballard, and Noam, Examining the Impact of Afterschool STEM Programs, 7.
- 5 Lisa J. Kropp, “STEAM at the Library Support Literacy, Common Core,” School Library Journal website, July 5, 2013. Accessed July 19, 2017, <http://www.slj.com/2013/07/industry-news/steam-at-the-library-supports-literacy-common-core-ala-2013/>.
- 6 Anita Mays, “Design Thinking, and a Library Update, with Third Graders,” School Library Journal website, May 22, 2017. Accessed July 19, 2017, <http://www.slj.com/2017/05/students/design-thinking-and-a-library-update-with-third-graders/>.

WHERE TO LEARN MORE

ALSC webinars (<http://www.ala.org/alsc/elearning/webinararchive>). Archived webinars are free for ALSC members (nonmembers pay \$25 per individual or \$195 for groups). ALSC has many STEAM-related webinars available:

- “Building STEAM with Día: The Whys and Hows to Getting Started” (<http://www.ala.org/alsc/building-steam-d%C3%AD-whys-and-hows-getting-start ed>)

- “Early Literacy and STEAM”
(<http://www.ala.org/alsc/early-childhood-programs-and-services-series-part-4-early-literacy-and-steam>)
- “Maker Programming for Kids: No Makerspace Required”
(<http://www.ala.org/alsc/maker-programming-kids-no-makerspace-required>)
- “‘Making’ Readers: How the Maker Movement Can Impact Literacy”
(<http://www.ala.org/alsc/making-readers-how-maker-movement-can-impact-literacy>)
- “Summer Science @ Your Library”
(<http://www.ala.org/alsc/summer-science-your-library>)

ALSC online courses (<http://www.ala.org/alsc/elearning/courses>). ALSC offers many asynchronous online classes throughout the year. There is often a course related to STEAM.

Summer Matters: Making All Learning Count by Elizabeth M. McChesney and Bryan W. Wunar. “Here a team of librarians and educators from the Chicago Public Library (CPL) and Chicago’s Museum of Science and Industry present a guide based on their award-winning, STEAM-inspired approach. They outline practical steps for libraries and cultural institutions to partner in creating a sustainable summer learning program that’s both fun and educational” (quote from publisher’s website: <http://www.alastore.ala.org/detail.aspx?ID=12013>).

Sample Programs from Dollar General Building STEAM with Strengthening Communities Through Libraries grant winners

The following programs were submitted by recipients of the Strengthening Communities Through Libraries grant. The sample programs and supplemental materials are described as presented by participating librarians. Substitutions of featured books and materials may be necessary depending on available resources.



Here are three lesson plans to help you start your own out-of-school time STEAM programs.

- The first program uses Makey Makeys, which are a popular STEAM technology option. You can use this idea as a stand-alone program.
- The second does not need anything electronic. People often think STEAM needs bells and whistles. This idea is an effective low-tech option.
- The third is a sample multiweek program idea. Some STEAM concepts are best learned over many weeks. Look at this idea and then build your own multiweek programs.

As with any library program, look for activities, books, and ideas that appeal to you. Your excitement about the topic will translate to enthusiasm in your program participants.

These are three samples from the multitudes of ideas that are available. Please refer to the Resources section of this toolkit for a quick list of places to look for lesson plans and ideas.

The creators of the following lesson plans have agreed to serve as resources if you have any questions. You should also feel free to adapt any of the ideas to fit your library and community.

MAKEY MAKEY LESSON PLAN

Melissa Harrison, Children's Librarian

Camden County Public Library,

P.O. Box 190, Camden, NC 27921

252-331-2543

camdenlibrarian@earlibrary.org

<http://www.camdencountync.gov/>

[departments/library](http://www.camdencountync.gov/departments/library)

Follow them on Facebook: [https://](https://www.facebook.com/CCNCPL/)

www.facebook.com/CCNCPL/

INTRODUCTION (2 MIN.)

"Good Afternoon! We are so excited that you have joined us for our first Make It Happen session. Before we begin, we would like everyone to fill out a quick survey that we will use for research purposes. All identifiers will be kept confidential. We also would like everyone to sign a photo/image/video release form. Please let us know if you have any questions about this form or would rather not be included in photos, as we will need to organize the room to still allow for some pictures to be taken."

SURVEY (5 MIN.)

Overview: "Today we will be exploring music and electricity with a Makey Makey kit. To get us in a musical mood, let's start with a wonderful book about instruments."

BOOK (5 MIN.)

88 Instruments by Chris Barton, illustrated by Louis Thomas

BOOK CONNECTION (5 MIN.)

"This book was perfect because we're going to start with making piano sounds with our Makey Makey. But before we do that, can you help me remember some of the instruments from the book? We might explore a bit more than just the piano."

Write list of instruments on the whiteboard.

DEMONSTRATION (5 MIN.)

“Awesome! Let’s see what you’ll be making today. I have my simple version here. What we are doing is creating a connection between what we draw and the computer by connecting these alligator clips. If you look at the circuit board, each area corresponds to a key on a keyboard: Up, Down, Left, Right, Space, and Enter. So with this you can create a bunch of different things by connecting it to a different app such as a game controller or, like we’re doing today, instruments. So we’re going to connect our Up arrow to the first key, then our Right, Down, Left, Space, and Enter. Make sure when you are connecting that the clip is touching a dark, solid area. If you do lines from your drawing, make a little area that you can connect to.”

Demonstrate first piano. It looks like a piano, it sounds like a piano. But the fun of Makey Makey is that you get to make what you want! Here is my instrument.

Demonstrate second instrument.

INITIAL TEST (20 MIN.)

“Now it’s your turn. My tips for making this work are to make sure your lines are thick and dark and not to cross them for your first instrument. When you are ready, come up and test it out!”

EXPERIMENTATION (REST OF TIME)

“Alright, it looks like most of you have tested your instruments a couple times. Now you really get to be creative. We have a bunch of different supplies for you to test out, and we can pull up some different instruments.” (Maybe include a simple explanation of why it will work for certain materials and not for others.)

CATAPULTS, PULLEYS, AND SIMPLE MACHINES—OH MY!

Gayle and Ian, Youth Librarians

Aldrich Public Library

yalibrarian@aldrichpubliclibrary.org

6 Washington St., Barre, VT 05641

www.aldrichpubliclibrary.org

802-476-7550

Follow them on Facebook: [https://](https://www.facebook.com/AldrichLibrary)

juniorroom@aldrichpubliclibrary.org

www.facebook.com/AldrichLibrary

No electronics needed for this lesson!

GOAL

Design and build a catapult that launches cotton balls the furthest or most accurately, and a pulley that can lift the heaviest load!

TIME

1½ hours

STEAM AREA

Engineering and science

CREATIVITY TARGETS

Imagination & originality

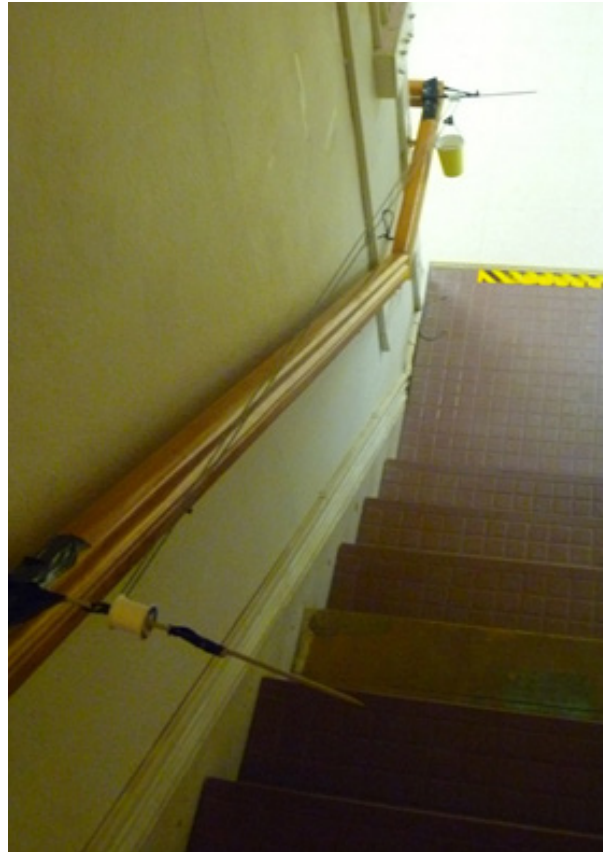
Flexibility

Decision-making

Communication & self-expression

Collaboration

Motivation



MATERIALS

- Craft sticks (\$10)—consumable
- Rubber bands (\$10)—consumable
- Cotton balls (\$10)—consumable
- Bottle caps (\$5)—consumable
- Empty thread spools (\$20)—consumable
- String or cord (polyester kite string suggested, \$2.50 per 500-yard spool on Amazon)—consumable
- Empty plastic cups (\$1.50)—consumable
- Knitting needles or bamboo skewers (\$4.40 for 100 on Amazon)—consumable
- Duct tape (for fixed pulleys)
- Weights for the pulleys (use coins)
- Book: Explore Simple Machines! With 25 Great Projects by Anita Yasuda (\$9.12 per book on Amazon.com)
- Cardboard and markers with which to create targets—kids take home

FOR THE PULLEY

- String or cord
- Empty thread spools
- Staircase or hallway
- Cups for lifting things
- Coins for weighted load.

Set up pulley system on unused staircase or hallway in children's room. Attach the knitting needles or bamboo skewers to a banister, shelf, or table to create a fixed pulley. String cord over one spool and then attach cup to cord, or add multiple spools to make a compound pulley, which will double the strength of the lifter's force.

QUESTIONS FOR THOUGHT

How many coins can you lift with your pulley?

Does adding spools make it easier or harder to lift the load?

RESOURCES FOR CATAPULTS:

<http://showmelibrarian.blogspot.com/2013/05/attack-on-fort-steam-program.html>

<http://doitandhow.com/2011/10/01/craft-stick-catapult/>

<http://lisaslibraryland.blogspot.com/2014/02/mad-scientists-catapults.html>

ROBOT DANCE ACADEMY

Maryann Brickey, Children's Librarian

Live Oak Public Libraries,

brickeym@liveoakpl.org

Garden City Library, 104 Sunshine Ave., www.liveoakpl.org

Garden City, GA 31405

Follow them on social media:

912-748-0471

@liveoakplga

The Garden City Library used LEGO Mindstorms EV3 robots to create an eight-week program. Teams of kids built a robot and then programmed it to dance to a song of their choice. The final week was a recital where all the robots performed.

Suggestion from the library: have families sign attendance agreements because of the multiweek format. This lets everyone know that you are taking attendance seriously (with understanding, of course, for illness or other unforeseen circumstances).

TIME	WEEK 1	WEEK 2
4:30–5 p.m.	Ice breaker/introductions	Team build/brag
5–6:20 p.m.	Explain goal for the day Form teams/establish roles and rules Learn and robot build	Goal for the day/competition Continue robot build/ programming with LEGO EV3
6:20–6:30 p.m.	Daily reflection and dismissal	Daily reflection and dismissal

TIME	WEEK 3	WEEK 4
4:30–5 p.m.	Team build/BRAG	Team build/brag
5–6:20 p.m.	Goal for the day/competition Programming with LEGO EV3	Goal for the day/competition Code for dance—20-second song choice
6:20–6:30 p.m.	Daily reflection and dismissal	Daily reflection and dismissal

TIME	WEEK 5	WEEK 6
4:30–5 p.m.	Team build/brag	Team build/brag
5–6:20 p.m.	Goal for the day/competition Code for dance	Goal for the day/competition Code for dance
6:20–6:30 p.m.	Daily reflection and dismissal	Daily reflection and dismissal





RESOURCES

Ready to start offering STEAM programs but don't know where to start? There are so many ready-to-go programs available. This list of places to find activity ideas, assessment tools, and booklists is just the tip of the STEAM-program-idea iceberg.

ACTIVITY IDEAS

- The ALSC blog—specifically, the STEAM/STEM category: <http://www.alsc.org/blog/category/stemsteam/>.
- Kids.gov (<https://kids.usa.gov/>)—use the tabs at the top of the website to find sections for kids grades K–5, teens grades 6–8, parents, and teachers. Then delve into the Art and Music, Math, and Science sections to find information, activities, games, and videos.
- NASA SpacePlace (<https://spaceplace.nasa.gov/>)—games, crafts, activities, media, and a special section for educators.
- All Things STEAM section from the Show Me Librarian blog (<http://showmelibrarian.blogspot.com/p/all-things-steam.html>)—librarian Amy Koester gives program ideas for preschool and school age, lists other electronic resources for library STEAM programs, and provides a helpful list of background information about STEAM.
- Steve Spangler Science (<https://www.stevespanglerscience.com/>)—experiments are broken down by topic such as chemistry, food

science, and rocks and minerals. The experiments list the materials needed, videos to watch, and information about the science behind the experiment.

- Pinterest—a simple search for “STEAM and out-of-school” provides a wealth of ideas from engineering challenges with balloons to architecture with paper cups and cardboard.

ACTIVITY IDEAS DIRECT FROM THE TECHNOLOGY SITES

- 3Doodler (<http://edu.the3doodler.com/curriculum/>)—activities, lesson plans, and units are available on the 3Doodler website. One grant recipient raved about the activity where students create a decorative case to protect an egg from breaking when it is dropped from a table.
- Cubelets (<http://www.modrobotics.com/education/#lesson-plans>)—lesson plans are broken down by age group: pre-K-K, grades 1-3, grades 4-6, and grades 7-12.
- Dash and Dot robots (<https://store.makewonder.com/#/education>)—coding curriculum can be found on the Teachers section of the website.
- LEGO Mindstorms (<https://www.lego.com/en-us/mindstorms/games>)—recommended games to play with your Mindstorm.
- littleBits (<http://littlebits.cc/education>)—activity ideas under the “Lessons” tab. Click on the “Resources” tab and register to access the “Librarian’s Guide to littleBits & STEAM.”
- Makey Makey (<http://makeymakey.com/education/>)—browse step-by-step lesson plans posted by the manufacturer as well as educators on the Makey Makey website.

BOOKS RECOMMENDED BY THE GRANT RECIPIENTS

- Rubber Band Engineer: Build Slingshot-Powered Rockets, Rubber Band Rifles, Unconventional Catapults, and More Guerrilla Gadgets from Household Hardware by Lance Akiyama—“Amazing, fun, engaging low-tech and low-cost STEAM education programs that anyone can do” (direct quote from a grant recipient).

- STEAM Kids: 50+ Science/Technology/Engineering/Art/Math Hands-On Projects for Kids by Anne Carey—this title has a paper circuit valentine project that was the favorite activity for one of the grant recipients.

ASSESSMENT TOOLS

- Public Library Association (PLA) Project Outcome (<https://www.projectoutcome.org/>)— A free toolkit to help libraries assess and measure outcomes in these key library service areas: civic/community engagement, digital learning, early childhood literacy, economic development, education/lifelong learning, job skills, and summer reading. There is also a free on-demand webinar titled “Outcome Measurement Made Easy with PLA’s Project Outcome” (<http://www.ala.org/pla/education/onlinelearning/webinars/archive/projectoutcomeeasy>).

BOOKLISTS

- “Building Steam with DÍA” (<http://dia.ala.org/content/free-program-downloads>)—age-defined booklists created by ALSC; scroll down the webpage to find booklists.
- “50 Books about Science and Scientists” (<https://ccbc.education.wisc.edu/books/detailListBooks.asp?idBookLists=76>)—created by the Cooperative Children’s Book Center in 2003 and updated in 2012.

TECHNOLOGY

This is a list of technologies that 2016-17 Strengthening Communities through Libraries grant recipients enjoyed using with patrons. Please keep in mind that technology is constantly changing and that newer options and technologies may quickly replace items on this list.

Technology can be expensive; however, it is not necessary to purchase individual items for each child or teen. In fact, the need for collaboration

and teamwork among kids working with the same pieces of technology helps build necessary skills for the workforce.

- 3Doodler (<http://the3doodler.com/>)—this 3-D pen literally lets you draw in the air. “The kids LOVED working with the 3-D pens and would consistently complain when we had to wrap up at the end of each session” (direct quote from grant recipient). The website includes an education section with lesson plans and challenges (<http://edu.the3doodler.com/curriculum/>).
- Bee-Bot (<https://www.bee-bot.us/>)—“This colorful, easy-to-operate, and friendly little robot is a perfect tool for teaching sequencing, estimation, problem-solving, and just having fun!” (quote from manufacturer’s website). Bundles are available for purchasing multiple Bee-Bots (<https://www.bee-bot.us/beebot-bundles.html>). This company also makes a Pro-Bot, “Bee-Bot’s big brother.” Depending on how many Bots you have, one grant recipient suggests keeping on top of use so that everyone gets a chance.
- Cubelets (<http://www.modrobotics.com/cubelets/>)—according to their website, these magnetic blocks are used to build robots and can be used by children as young as four. The Education page has lots of free lesson plans broken down by age group: pre-K-K, grades 1-3, grades 4-6, and grades 7-12 (<http://www.modrobotics.com/education/#lesson-plans>). Libraries like these because they are intuitive and provide instant gratification.
- Dash and Dot robots (<https://www.makewonder.com/>)—this 2015 Good Housekeeping Toy of the Year allows kids to learn about coding while playing with robots. “They were very intuitive and proved a great way to learn programming without the kids even noticing that they were learning programming” (direct quote from grant recipient). Free apps and curriculum are available on the website. Price information for package deals can be found at <https://store.makewonder.com/#/education>.

- LEGO Mindstorms (<https://www.lego.com/en-us/mindstorms>)—build a robot and then program it or direct it using the app on your tablet. One library used these to create a multiweek program that concluded with a robot dance recital. The website has everything you need from the technology to the software. Pricing information can be found at <https://education.lego.com/en-us/middle-school/shop/mindstorms-ev3>. Note that one library mentioned that some of their robots tried to update every time they were connected to the laptop. Make sure kids hit ignore, and update robots outside of program time.
- littleBits (<http://littlebits.cc/>)—these are color-coded, magnetic, reusable, electronic building blocks. The Education page has a librarian guide (<http://littlebits.cc/education>). One library suggested that these are best for small groups unless you are able to purchase a classroom pack. However, with many lesson plans on their website, there are tons of program ideas.
- Makey Makey (<http://www.makeymakey.com/>)—these are invention kits that allow you to turn everyday objects into touch pads that can be connected to a computer. They can be connected to anything that can conduct electricity. The Educators page has very easy lesson plans that you can follow (<http://makeymakey.com/education/>). Libraries like Makey Makeys because they are a flexible piece of technology that provides endless options for programming.
- Just need a few pieces? Check out SparkFun Electronics (<https://www.sparkfun.com/>)— an online retail store that sells bits and pieces to make electronics projects possible.

IDEAS ON A SHOESTRING BUDGET

Flashy and new technology is great, but it is not necessary to create fun and effective STEAM activities. The following ideas won't break the bank (you may even have the supplies already in your closet).

- Learn about the phases of the moon using Oreo cookies (<https://spaceplace.nasa.gov/oreo-moon/en/>). Supplies needed:

- Oreo cookies
 - Plastic knives to scrape off filling
 - Image of the phases of the moon
- Build a boat using tinfoil. Test the design by counting the number of pennies the boat can hold before it sinks. Kids learn about buoyancy and boat design. Check out the National Park Service Teacher Resources page for this activity and more (<https://www.nps.gov/miss/learn/education/teacherresources.htm>). Supplies needed:
 - Tinfoil
 - Pennies
 - Tub of water
 - Coding without computers. Kids can learn the process of coding, programming, and debugging as they write a program for a human “robot” to follow. The simple activity involves following directions to stack cups in a particular pattern. The lesson plan, in both English and Spanish, can be found at <https://csedweek.org/unplugged/thinkersmith>. Supplies needed:
 - Symbol key (printed on a sheet of paper)
 - Cup stack cards (patterns printed on a sheet of paper) Six plastic cups per team
 - Blank paper
 - Pens or pencils
 - Program a “Human Robot” (<https://static1.squarespace.com/static/54a1ab67e4b092556fa8c9e1/t/579f9a1120099e1d86a90459/1470077462645/human-robot.pdf>). Supplies needed:
 - Band-Aids
 - Washable red marker
 - LEGO Architecture. Show images of famous buildings (Taj Mahal, Sydney Opera House, Space Needle) while sharing a few quick facts about each building. Before providing LEGOs to each group, ask them

to draw/write a plan for recreating one of the buildings (or creating their own new building) with LEGOs. Then provide each group with LEGOs to implement their plan. Supplies needed:

- LEGOs
 - Paper
 - Pens or pencils
- Rubber Band Engineer: Build Slingshot-Powered Rockets, Rubber Band Rifles, Unconventional Catapults, and More Guerrilla Gadgets from Household Hardware by Lance Akiyama—“Amazing, fun, engaging low-tech and low-cost STEAM education programs that anyone can do” (direct quote from a grant recipient).

OUTREACH AND PARTNERSHIPS

Some people are scared to present programs about [STEAM?] science, technology, engineering, art, and math because they are afraid they do not know enough about the topic. Many libraries have found success approaching experts in their communities. These people are often honored and flattered to have been asked and are very willing to help. Here are a few suggestions for experts and organizations you may find in your community:

- Granite sculptors to help with 3-D modeling
- Makerspace groups
- University professors
- College clubs: chemistry club, entomology club, engineering club
- AmeriCorps groups to staff programs
- Society of Women Engineers
- Software engineers
- Television meteorologists
- Astronomical societies

- Farm Bureau agriculture education office
- Your county economic development office may have ideas on individuals and businesses to partner with

Libraries that received the 2016-17 grant have provided the following tips on building and maintaining partnerships:

- Get to know the people and organizations you are working with.
- Reciprocate support whenever you can.
- Help build connections between partners.
- Everyone is busy and friendly reminder phone calls can make a positive difference.
- Don't be afraid to flatter people about their expertise.
- Don't be afraid to hear "No."
- Make the collaboration as easy as possible for the partner.
- If the experts have fun, ask them to share their experience with their colleagues; you may just end up with more people volunteering to help.
- Depending on the reliability of volunteers, some libraries have had better luck using them as interns.
- Consider volunteers schedules when planning programs and training sessions.
- If an organization has an outreach department, talk to them first.
- Does your local school or other organization have a STEM or STEAM festival? Attend in order to build connections.
- Be persistent.

PROMOTION AND ADVERTISING

Are you always getting the same people at your programs? Are you offering programs for school-age kids but only getting a few attendees? Want to let non-library users know about your cool STEAM programming? Try the following ideas:

- Ask local schools to promote programs during morning announcements or by sending home flyers.
- Ask the homeschooling community to spread the word through their e-mail or online groups or newsletters.
- Fold library programming into after-school programs regularly provided by groups such as Boys & Girls Clubs of America.
- The excitement of kids already in the program inspires word-of-mouth promotion to their friends.
- Invite the local newspaper to write a story about one of the programs.
- If your program is funded by a grant, ask a local branch or division of the company or organization to help promote the program.
- Share calendars with moms/dads groups.
- Purchase media spots on a local radio station.
- Bring programs to outreach centers that serve homeless teens.
- Put program information in a church bulletin.
- Put flyers in places where families spend time, such as the laundromat or local pizza shop.
- Plan a STEAM and Snacks program. Food is a great way to attract people to programs. It can also be very important for kids that don't have access to nutritious food (or possibly any food) on days when school is not in session.
- Don't forget about the library's newsletter, press releases, and social media posts.

THE STRENGTHENING COMMUNITIES THROUGH LIBRARIES GRANT

In 2017, ALSC awarded Strengthening Communities through Libraries Minigrants in the amount of \$5,000 to twelve ALSC members in public libraries to support STEAM learning during out-of-school time. Grant recipients had to be personal members of ALSC. The recipient libraries had to be within twenty miles of a Dollar General location.

Please refer to the ALSC Grants and Corporate Partnerships page for more information about available grants (<http://www.ala.org/alsc/externalrelationships/grntpartnerships>).

ABOUT ALSC

ALSC is the world's largest organization dedicated to the support and enhancement of library service to children. ALSC's network includes more than 4,000 children's and youth librarians, children's literature experts, publishers, education and library school faculty members, and other adults dedicated to creating a better future for children through libraries. For more information about ALSC, visit www.ala.org/alsc.

ABOUT THE DOLLAR GENERAL LITERACY FOUNDATION

The Dollar General Literacy Foundation is proud to support initiatives that help others improve their lives through literacy and education. Since 1993, the foundation has awarded more than \$97 million in grants to nonprofit organizations, helping more than 5.8 million individuals take their first steps toward literacy, a general education diploma, or English proficiency. To learn more about the Dollar General Literacy Foundation, visit www.dgliteracy.org.



Association for Library Service to Children

www.ala.org/alsc

**Creating a Better Future for Children
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This paper was made possible through funding from the Everyone Reads @ your library Grant; awarded to ALSC by the Dollar General Literacy Foundation.