

A STEM Starter Guide for Librarians: Epic Science at Your Fingertips

Presented by LACONI YSS

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Introduction

A Youth Services librarian's job is never done. We are all expert multi-taskers and yet even we are capable of feelings of doubt at just how much we are able to accomplish. With emphasis on STEM (Science, Technology, Engineering, and Mathematics) education getting an increasing amount of national attention, the initial feeling might be that we have yet another responsibility to shoulder, but in fact, librarians find themselves in a very fortunate position at this critical juncture.

As we have known for some time, avid readers are not always born—as much as we would love them to be—but they can be made. A child who develops a true love of reading can be unstoppable, and sometimes it is really a matter of finding a way to ignite the spark to set them on their way. The scientific world is not so different. The drive behind invention and discovery is motivated by a similar unquenchable desire to learn more, to find answers, a desire to discover new worlds. Librarians have long served as tour guides for these types of journeys, so we are particularly qualified for this challenge now.

Although some of us may feel as if we are rookie voyagers ourselves, it is our hope through this guide that we can show that every one of us has the ability to tap into that curiosity even if we start with a few basic tools and a lot of questions. Some of the best discoveries and journeys have started out in exactly that way.

Science By the Book

Although this is not an exhaustive list by any means, we hope these titles will start you on your way, whether you are looking for inspiration yourself or doing readers' advisory. Between STEM awareness and Common Core, librarians have more options than ever before, particularly in the area of non-fiction, so we are providing a mix of the latest sure-bets as well as some really excellent older titles that are worth discovering. Remember too, that your fiction collections can also be powerful assets when it comes to sparking interest in some of these areas, creating tie-in displays, or generating good discussion with the kids at your library.

Adler, David. Mystery Math: A First Book of Algebra. New York, NY: Holiday House, 2011.

Alexander, Chris. Star Wars Origami: 36 Amazing Paper-Folding Projects from a Galaxy Far, Far, Away. New York, NY: Workman, 2012.

Angleberger, Tom. ART2-D2's Guide to Folding and Doodling. New York, NY: Amulet Books, 2013.

Beal, Susan. World of Geekcraft: Step-by-Step Instructions for 24 Super Cool Craft Projects. San Francisco, CA: Chronicle Books, 2011.

Bonnet, Robert L. 46 Science Fair Projects for the Evil Genius. New York, NY: McGraw Hill, 2009.

Boutell, Robin. Creepy Critters: A Pop-Up Book of Creatures That Jump, Crawl, and Fly. New York, NY: Abrams Books for Young Readers, 2011.

Ceceri, Kathy. Robotics: Discover the Science and Technology of the Future with 20 Great Projects. White River Junction, VT: Nomad Press, 2012.

Connolly, Sean. The Book of perfectly Perilous Math: 24 Death-Defying Challenges for Young Mathematicians. New York, NY: Workman Publishing, 2012.

DK. The LEGO Ideas Book: Unlock Your Imagination. London, England; New York, NY: DK, 2011.

Dyer, Alan. Mission to the Moon. New York, NY: Simon B. Schuster Books for Young Readers, 2009.

Frederick, Shane. Football, the Math of the Game. Mankato MN: Capstone Press, 2012. (this is just one of the titles from this high-interest series)

Gardner, Robert. Whose Bones are These? Crime-solving Science Projects. Berkeley Heights, NJ: Enslow Publishers, 2010.

Goldsmith, Mike. Train Your Brain to Be a Math Genius. London, England; New York, NY, DK Publishing, 2012.

Gray, Theodore W. The Elements: A Visual Exploration of Every Known Atom in the Universe. New York, NY: Black Dog B. Levanthal Publishers, 2009.

Gray, Theodore W. Theo Gray's Mad Science Experiments You Can Do at Home But Probably Shouldn't. New York NY: Black Dog B. Levanthal Publishers, 2009.

Hughes, Catherine D. National Geographic Little Kids First Big Book of Dinosaurs. Washington, D.C: National Geographic, 2011.

Lew, Kristi. This Book Requires Safety Goggles: a Collection of Bizarre Science Trivia. North Mankato, MN: Capstone Press, 2012.

Martineau, Susan. Cool Circuits. New York, NY: Windmill Books, 2012.

McKellar, Danica. Girls Get Curves: Geometry Takes Shape. New York, NY: Hudson Street Press, 2012.

Schwartz, Heather E. Cool Engineering Activities for Girls. Mankato, MN: Capstone Press, 2012.

Sidman, Joyce. Swirl by Swirl: Spirals in Nature. Boston, MA: Houghton Mifflin Harcourt, 2011.

Sparrow, Giles. The Night Sky. New York, NY: Scholastic, 2013.

Time for Kids. Big Book of How. New York, NY: Time for Kids, 2011.

Tymony, Cy. Super Sneaky Uses for Everyday Things. Kansas City, MO: Andrews McMeel, 2011.

Veasey, Nick. X-treme X-ray: See the World Inside Out! New York, NY: Scholastic, 2010.

Woodford, Chris. Cool Stuff Exploded: Get Inside Modern Technology. New York, NY: DK Publishing, 2008.

Woodward, John. This Book Made Me Do It. London, England; New York, NY: DK, 2010.

Yoder, Eric. 65 More Short Mysteries You Solve With Science! Washington, D.C: Science, Naturally! 2013.

What are your favorites? Shout them out on our LACONI YSS Facebook page <https://www.facebook.com/laconiyouth>

Helpful Websites and Blogs

Kid-friendly activity and game sites

- Brain Pop
<http://www.brainpop.com/>
- Cornell Lab of Ornithology Bird Cams
<http://cams.allaboutbirds.org/live-cams/>
- Encyclopedia of Life
<http://eol.org/>
- Fetch! activities and games at PBS Kids Go!
<http://pbskids.org/fetch/games/activities.html>
- Jameson's Lab
<http://allforkids.tv/cast/jamesons-lab/>
- Kids' Health <http://kidshealth.org/>
- NASA's Kids' Club
<http://www.nasa.gov/audience/forkids/kidsclub/flash/index.html>
- PBS Kids Site
<http://pbskids.org/games/>
- SciGirls
<http://pbskids.org/scigirls/>
- Science News for Kids
<http://www.sciencenewsforkids.org>

Grants/Partnership Opportunities

- Chicago STEM Pathways Cooperative
<http://stemchicago.wordpress.com/about/>
- DuPage Childrens Museum
<http://dupagechildrens.org/>
- James Dyson Foundation
<http://www.jamesdysonfoundation.com/education/default.asp>
- National Girls' Collaborative Project
<http://www.ngcproject.org/programs>
- National Science Foundation
<http://www.nsf.gov/>
- Project Syncere
<http://www.projectsincere.org/>
- Scientists for Tomorrow
<http://www.colum.edu/scientistsfortomorrow/>
- The Society of Women Engineers
<http://societyofwomenengineers.swe.org/index.php/partner-resources>

Parent and Teacher Resources

- American Museum of Natural History
<http://www.amnh.org/>
- The Coalition for Science After School
http://afterschoolscience.org/from_the_field/index.html

- Kindergarten Science Activities and Experiments
<http://www.education.com/activity/kindergarten/science/>
- Library as Incubator Project
<http://www.libraryasincubatorproject.org/>
- Library Makers
<http://librarymakers.blogspot.com/search/label/WonderWorks>
- National Summer Learning Association
<http://www.summerlearning.org/>
- The Royal Society of Chemistry
<http://www.rsc.org/>
- The Show Me Librarian
showmelibrarian.blogspot.com
- STEM Friday
<http://stemfriday.wordpress.com>
- STEM Outreach Site by Northern Illinois University
http://niu.edu/stem/community_programs/Bright_Futures.shtml
- STEM Teen Read
<http://teenread.niu.edu/index.php>
- Summer Advantage USA
<http://www.summeradvantage.org/>
- Supercharged Science Homeschool Science Curriculum
<http://www.superchargedscience.com/>
- Tinkercad
<https://tinkercad.com/>

Additional Professional Development and Online Resources

- American Science & Surplus science equipment
<http://sciplus.com/>
- "Getting to the Core of Non-Fiction: Common Core Strategies for Schools and Public Libraries" Prezi
<http://prezi.com/yaswog-4bgxp/getting-to-the-core-of-nonfiction/>
- High Touch High Tech
<http://sciencemadefun.net/locations.cfm>
- National Science Board
<http://www.nsf.gov/nsb/stem/>
- Pinterest <https://pinterest.com/>
- STEM Education Coalition
<http://www.stemedcoalition.org/>
- Technology for the Early Years Conference Resources
<http://www.colum.edu/Academics/Education/conference>

**Like on
Facebook:**

Common Core Illinois

Epic Lab Time

LACONI YSS

STEM Education Alliance

**Follow on
Twitter:**

@Badastronomer

@Cmdr_Hadfield

@Gizmodo

@GadgetLab

STEM: There's an App for That!

Even if your library does not currently circulate tablets, it can be useful to have a few good recommendations up your sleeve. Be forewarned: some of these may prove just as addictive for you!

- **Apparatus**
Available through both the Apple Store and the Play Store for phones and tablets, \$2.49.
- **Bobo Explores Light**
Available through the Apple Store for the iPad, \$4.99.
- **Color Uncovered** and **Sound Uncovered**
Available through the Apple Store for the iPad, free.
- **The Curse** (puzzle games)
Available through the Apple Store for the iPad and the Play Store for phones and tablets, \$2.99.
- **Cut the Rope** (and **Cut the Rope Experiments**)
Available through both the Apple and Play Stores for the iPad and Android devices, free.
- **Machinarium**
Available through the Play Store for tablets, \$5.00
- **Sky Map**
AAvailable through both the Apple and Play Stores for Apple tablets and phones, and Android devices, free.
- **Sushi Monster** (math)
Available through the Apple Store for Apple tablets and phones, free.
- **Toca Builders**
Available through the Apple Store for Apple tablets and phones, \$1.99.
- **Ultimate Dinopedia**
Available through the Apple Store for the iPad, \$4.99.
- **WWF Together (World Wildlife Fund)**
Available through the Apple store for Apple tablets and phones, free.

Program Prompts

Core STEM programming can start very simply with a really good program idea that captures your patrons' attention, and the beauty of it is that a good program does not have to be big to be successful. A lot of the ideas below can come to life without great expense or expensive supplies. Think of these as your inspiration kick starters. See our Websites and blogs section for places to go to see video demonstrations, photos, tutorials, and slideshows of some of these along with even more example of epic science in action.

- live action Angry Birds
- Flubber/Slime/Gak lab
- ant farm or butterfly observation project
- owl pellet dissection
- container gardens
- sugar crystal labs
- film canister rockets
- balloon rockets
- leaf identification
- craft stick catapults
- DIY lava lamps
- free LEGO build
- science fair
- discovery bottles
- Rube Goldberg machine challenges
- paper airplanes
- pentominoes
- sorting/matching challenges
- I Spy
- CSI programs
- collections/hobbies fair
- geo-caching
- snap circuits
- app design
- recycled materials craft project
- code-making (and breaking) workshop
- architecture with marshmallows, toothpicks, or straws
- pumpkin math
- marble rollercoasters
- take-home science kits
- computer animation or stop-motion animation
- Minecraft programs
- model-building
- vinegar/baking soda experiments

The Reinforcements

When librarians need to turn to the experts, there are a lot of options available. Here is a listing of some favorites recommended from our membership and fellow librarians in the field.

C & A Robot Factory

Although they have gained a name through their camps as well as their snap circuit and LEGO robotics programs, they are beginning to take their classes out to libraries. Since they bring materials to you, be prepared to set fairly firm minimum and maximum registration numbers when you schedule with them.

Home Base: Libertyville, IL

Website: <http://carobotfactory.com/>

E-mail: info@carobotfactory.com

Phone: (847) 996-0123 (Matt is the contact)

Discovery Center of Rockford

This highly recommended science center has a strong outreach focus with traveling exhibits such as a portable planetarium, although be prepared to pay some additional costs for travel.

Home Base: Rockford, IL

Website: <http://discoverycentermuseum.org/>

E-mail: outreach@discoverycentermuseum.org

Phone: (815) 972-2844 (Jacquelynn is the contact)

Fermilab Education

Although a lot of the terminology on the website may seem school-focused, never fear! Public libraries are also able to book their classroom presentations.

Home Base: Batavia, IL

Website: <http://ed.fnal.gov/home/educators.shtml>

E-mail: edreg@fnal.gov

Phone: (630) 840-8259 (Andrea Cox is the contact)

Frank Lloyd Wright Preservation Trust

Offers Froebel block and pentomino prompts as well as tie-in programs for Blue Balliett's *The Wright 3*.

Home Base: Oak Park, IL

Website: <http://gowright.org/education/teachers.html>

E-mail: educate@gowright.org

Phone: (708) 725-3828 (for the education department)

Forest Preserves of Cook County

Contact the center closest to your service area for more information about current offerings.

Website: <http://fpdcc.com>

Barrington: (847) 381-6592

Lemont: (630) 257-2045

Northbrook: (847) 824-8360

River Forest: (708) 366-6530

South Holland: (708) 868-0606

Willow Springs: (708) 839-6897

Garfield Park Conservatory

One recent "Buzzing with the Bees" program combined a high-content program on pollinators and food chains with a wide variety of interactive props and featured a honey tasting following the program.

Home Base: Chicago, IL

Website: http://www.garfield-conservatory.org/about_us.htm

E-mail: mharding@garfieldpark.org

Phone: (773) 638-1766 (x16) (Melanie is the contact)

LEGOLand Discovery Center

They provide the materials.

Home Base: Schaumburg, IL

Website: <http://www.legolanddiscoverycenter.com/chicago/>

E-mail: Preferred contact method is through the inquiry form on the website.

Phone: (847) 592-9704 (Kristina Pucci is the contact)

Mad Science of Chicago

Offer a wide range of workshops on a variety of science topics, often with a bonus take-home component.

Home Base: Chicago, IL

Website: <http://chicago.madscience.org/>

E-mail: Madscientist@mschicago.com

Phone: (773) 227-3345

Make-a-Messterpiece

Their Experimentation Station slime program adds new depth to their already fun repertoire of process-based sensory art experiences as children get to interact with polymers in the most hands-on way.

Home Base: Glenview, IL

Website: <http://www.makeamessterpiece.com>

E-mail: creative@makeamessterpiece.com

Phone: (847) 730-5275

The Science Alliance

Inquiry-based workshops and presentations for kids.

Home Base: Lake Geneva, WI

Website: <http://www.thesciencealliance.com>

E-mail: thesciencealliance@gmail.com

Phone: (262) 248-4399 (Jenny is the contact)

For more good leads, see our special Grants and Partnerships category in our Helpful Websites section.

STEM Superlatives and Acknowledgments

Many thanks to the intrepid LACONI librarians, RAILS librarians, and PUBYAC librarians who sent in suggestions and material for this guide. There are many librarians among us who are making contributions to the field with their innovation and creativity , and though it would be impossible to name them all we did want to give some kudos to the following libraries and librarians who caught our attention in the research process.

Gillian King-Cargile has been involved in some really wonderful work at Northern Illinois University and is a wealth of information. For more information on NIU's STEM achievements, be sure to check out the links in our Helpful Websites section.

Indian Trails Public Library has had a lot of success with their monthly Super Sleuths science experiment program and also offer a STEM "certification" program series for kids that sounds as fun as it is educational.

Laura Harper at **Joliet Public Library** created an Engineering Lab and a weekly Snap Circuits program that features a new building project every month.

Phyllis Davis of **Matteson Public Library** was featured in the blog for the ILA's Youth Services Forum for her efforts to spread awareness about STEM resources and programming, as well as the need for strong partnerships.

Glenview Public Library offers LEGO Mindstorms programs combining engineering and technology through stop-motion animation thanks to the efforts of savvy STEM librarian **Amanda Barnett Jacover**.

Brookfield Public Library has now joined the ranks of libraries using 3D printing technology in their programs. If you have not yet seen the video of their MakerBot in action, watch it here:
http://www.youtube.com/watch?v=29oITs_SB8Y&feature=player_embedded