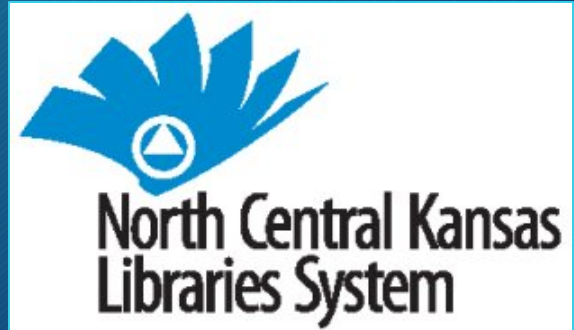


Makerboxes

Maker Programs in a Box

~ Melendra Sutliff Sanders

#makerboxes



Things to Consider

- What needs are there within the programming that's already being offered, and how will these mobile makerspaces fill them?
- What definition of mobile are you using? Mobile in that the materials will go to the teens in kits, or mobile in that the technology will move to them (like tablets)?
- What broad library goals are these makerspaces addressing?
- What specific goals are you/your department expecting these makerspaces to accomplish and how will they be measured?
- How big can your makerspaces be? Where will they be housed? Are they going to be shared between locations?
- Will your makerspaces be available for checkout to the general public? Will they be available for checkout to teachers or other educators?
- How are you going to move them? How are they going to be secured?
- What resources will be consumed within the makerspaces and how will they be replenished?
- How are you going to fund them initially? How are you going to keep up with funding?

From Teen Services Underground at www.teenservicesunderground.com/mobile-makerspaces/#more-5592

Why Makerboxes?

System Goals:

- Exposure and experimentation
- Master new skills
- Increase programming
- Partnerships

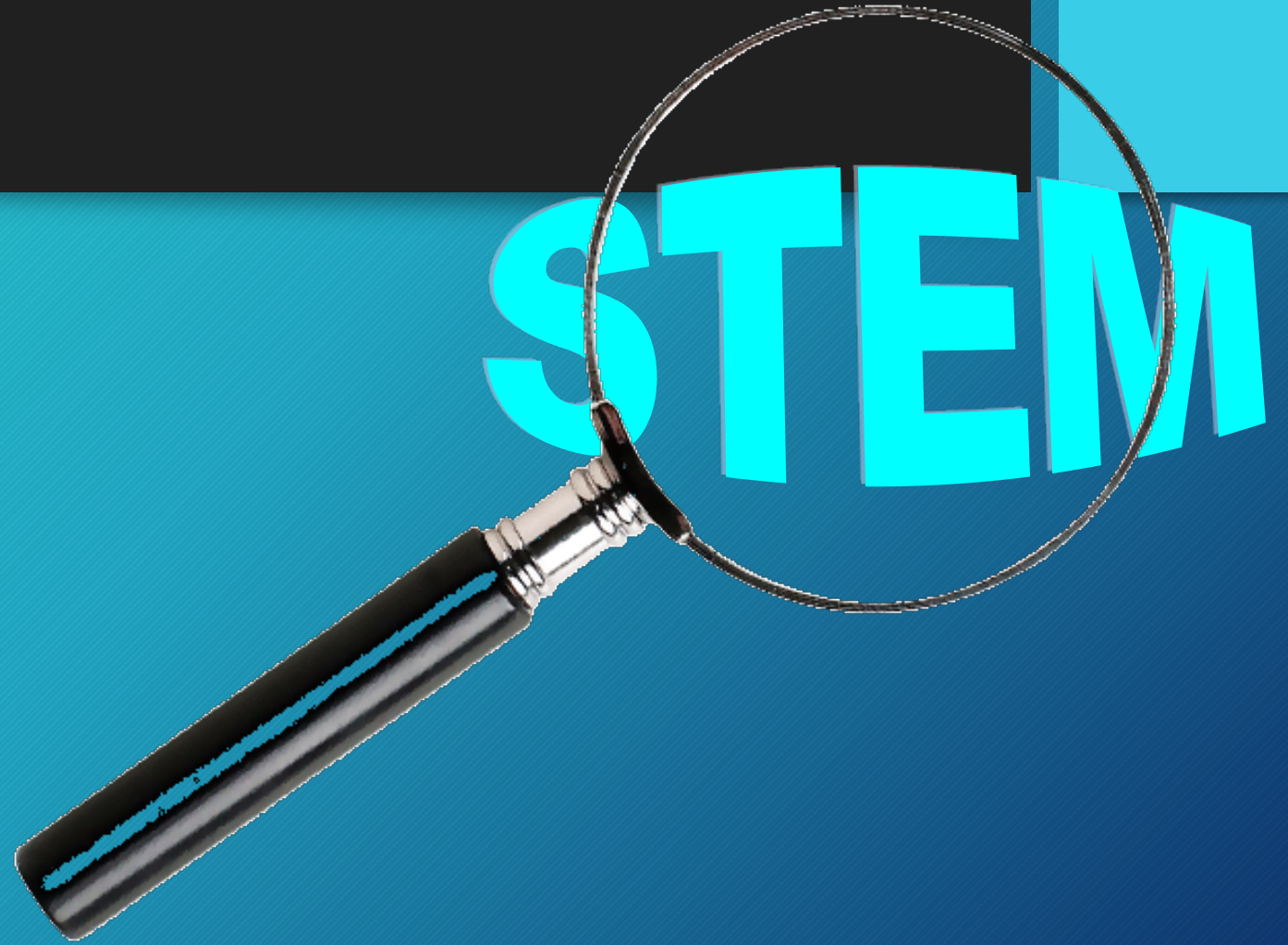
Limitations:

- Budget
- Durability
- Ease and flexibility of use



Finding Focus

- Defining Maker
 - Arts & Crafts?
- STEM
- Makerbox Themes

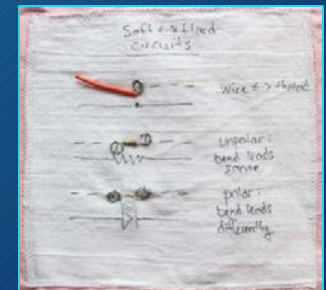
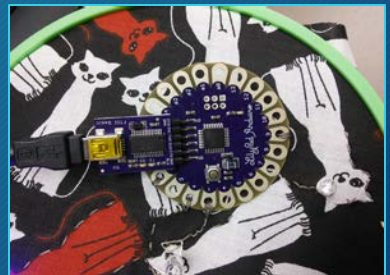


My Makerboxes

- Robots
 - Circuits
 - Solar
 - Mini Weapons
 - Builder
- Repurposing Books
 - 2 Photo Booth
 - Break It reMake It
 - 4 LEGO
- 
- A photograph showing a stack of clear plastic storage bins. The bins are labeled with white tape and black text. The labels visible are 'LEGO' on the top bin, 'Mini Weapons' on the second bin, 'Circuits' on the third bin, and 'Robots' on the fourth bin. The bins are stacked on a wooden surface.



- Books
- Projects to make
- Supplies to make projects
- Program Activities & Ideas for additional projects
- 40 Developmental Assets for Middle Childhood & 40 Developmental Assets for Adolescents
- Documentation



Program Activities & Ideas

Activities on the Computer

Simple Make a Robot websites

www.kanogames.com/build/robot

www.abcya.com/make_a_robot.htm

www.konstruktorz.com/create

Build a Robot and Test it on simple tasks

Wonderville Robot Factory: www.wonderville.ca/asset/robot-factory

Robot Related Computer Games

Robot vs. Alien game:

www.luckygamez.com/kids/play1391#.UssNwfRDu5J

Escape from Robotron game:

www.luckygamez.com/kids/play1496#.UssOEPRDu5I

Short Robot Videos

Robot Horse: www.youtube.com/watch?v=YezNJ9Ttsjs

Kangaroo: www.youtube.com/watch?v=_4luJ0ZSqy8

Flipping Pancakes: www.youtube.com/watch?v=W_gxLKSSsIE

Stacking: www.youtube.com/watch?v=v9oeOYMRvuQ

ArtBots: www.youtube.com/watch?v=VnL4222gtWc

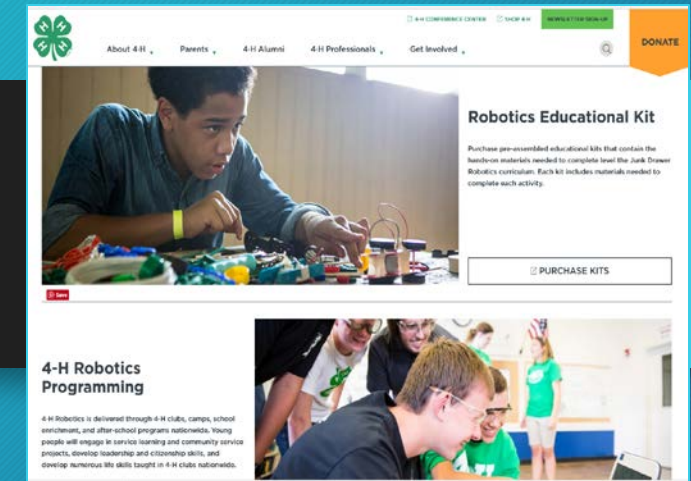
Other Ideas

Watch Wall-E

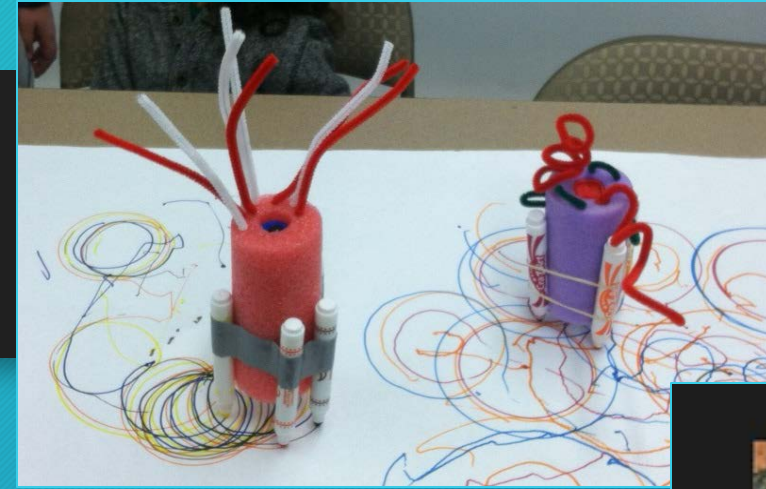
Cereal Box Robots

Make ArtBots

Make a Mini-Robot



Program Activities & Ideas



Building Non-Kit Robots

4H Robotics Curriculum: <http://4-h.org/parents/curriculum/robotics/>

Boy Scouts Robotics: http://www.scouting.org/filestore/Merit_Badge_ReqandRes/Robotics.pdf

diyready: <http://diyready.com/how-to-make-a-robot/>

Instructables: <http://www.instructables.com/howto/robots/>

Let's Make Robots: <http://letsmakerobots.com/>

Make: https://makezine.com/page/1/?s=robot&post_type%5B0%5D=projects#038;post_type%5B0%5D=projects

Popular Mechanics: <http://www.popularmechanics.com/technology/robots/a7388/build-your-first-robot/>

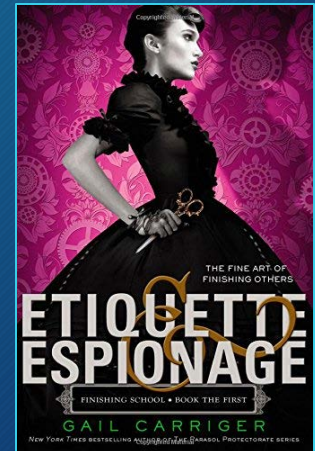
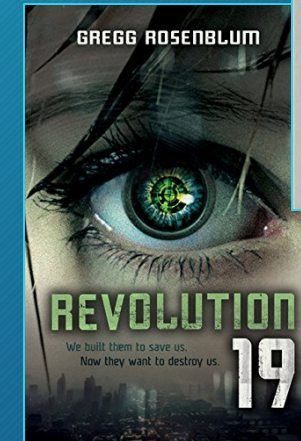
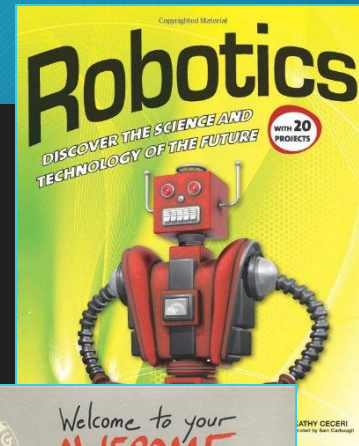
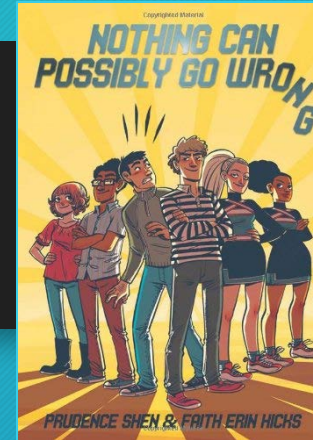
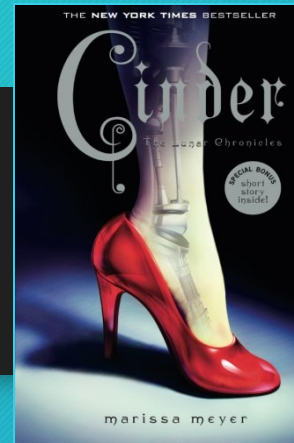
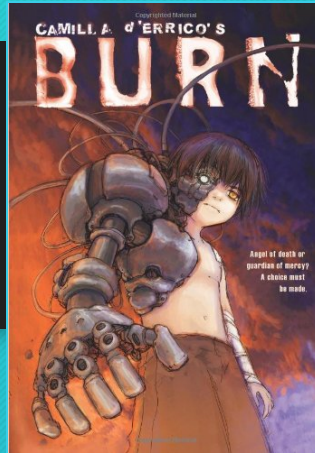
Science Buddies: <http://www.sciencebuddie.org/blog/2015/04/how-to-do-robotics-at-home-with-your-kids.php>



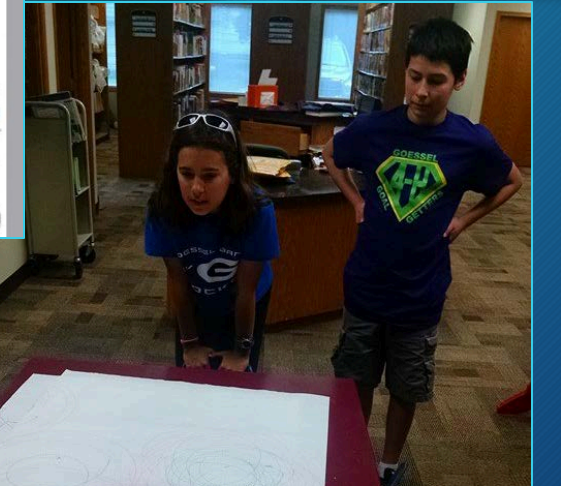
Robots

- Books:

- *Nothing Can Possibly Go Wrong* by Prudence Shen
- *Welcome to Your Awesome Robot* by Viviane Schwarz
- *Mila 2.0* by Debra Driza
- *Etiquette & Espionage* by Gail Carriger
- *Revolution 19* by Gregg Rosenblum
- *Cinder* by Marissa Meyer
- *Camilla D'errico's Burn* by Camilla D'errico
- *Robotics: Discover the Science & Technology of the Future with 20 Projects* by Kathy Ceceri



Robots = \$196.91



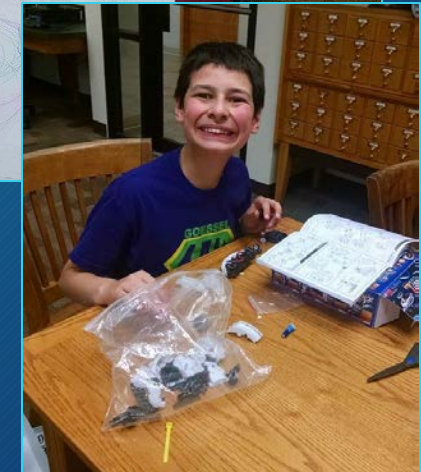
• Projects:

- Make: SpinBot
- Smithsonian: Robo-Spider
- OWI: 7 in 1 Space Fleet
- 4M: Techno Robot
- 4M: Box Robot



• Supplies:

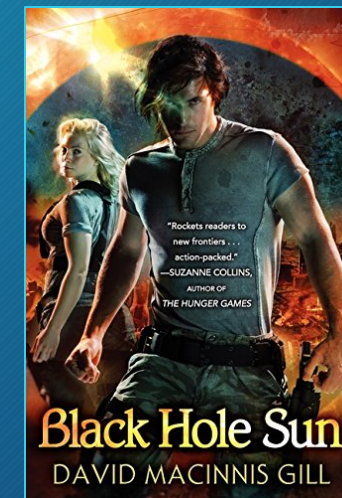
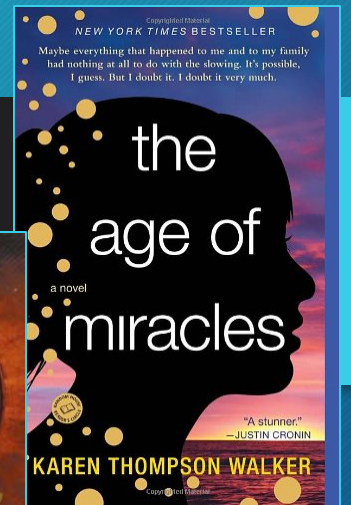
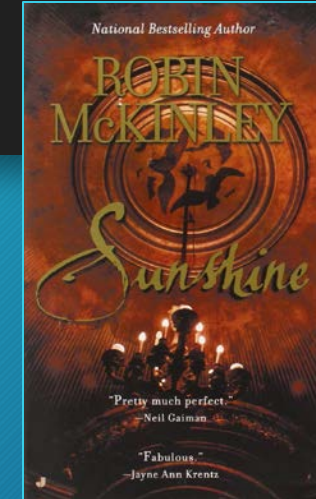
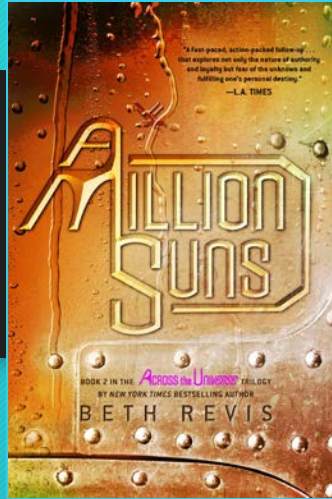
- Batteries
- Scissors
- Wire Cutter
- Screwdriver
- Double-Sided Tape
- Travel Bin



Solar

- Books:

- *A Million Suns* by Beth Revis
- *Every Soul a Star* by Wendy Mass
- *Sunshine* by Robin McKinley
- *The Battle of the Sun* by Jeanette Winterson
- *Black Hole Sun* by David Macinnis Gill
- *Sun and Moon, Ice and Snow* by Jessica Day George
- *The Age of Miracles* by Karen Thompson Walker



Solar = \$226.15

- Projects:

- Greenex Solar Eco-House
- Solar Deluxe Educational Kit
- Thames & Kosmos Solar Mechanics
- SNAP Circuits Green
- Solar Oven



- Supplies:

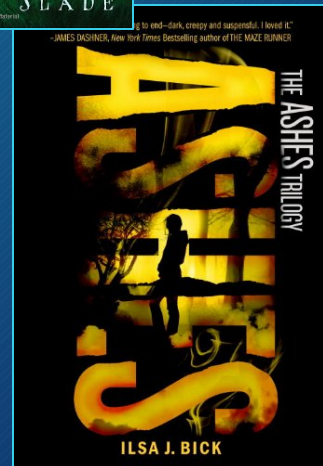
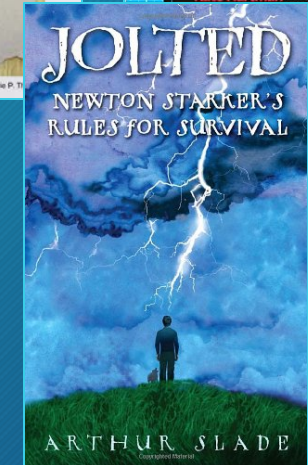
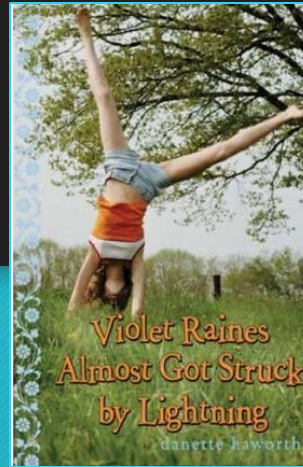
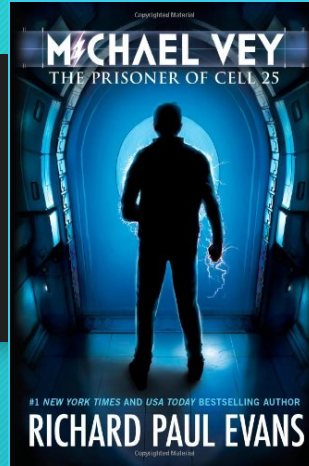
- Mylar
- Ruler
- Aluminum Foil
- Tape
- Craft Knife
- Screwdriver
- Travel Bin



Circuits

- Books:

- *Ashes* by Ilsa J. Bick
- *Squishy Circuits* by Kristin Fontichiaro
- *Michael Vey: The Prisoner of Cell 25* by Richard Paul Evans
- *Make: Wearable Electronics: Tools & Techniques for Prototyping Interactive Wearables* by Kate Hartman
- *Make: Electronics: Learn by Discovery* by Charles Platt
- *Violet Raines Almost Got Struck by Lightning* by Danette Haworth
- *Jolted: Newton Starker's Rules for Survival* by Arthur Slade

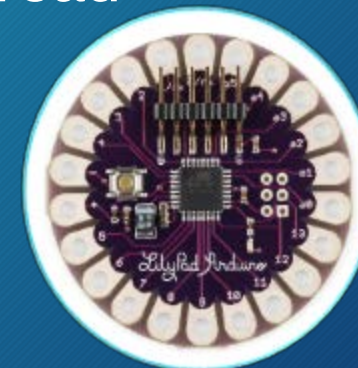


Circuits = \$358.01

- Projects:
 - LilyPad Arduino Fabric Circuits
 - MaKey MaKey
 - Squishy Circuits
 - Electronic SNAP Circuits
- Supplies:
 - Batteries



- Tape
- Fabric
- Scissors
- LEDs
- Needles
- Double-Sided Tape
- Conductive Thread
- Travel Bin



Aggieville
Mini Maker Faire®

Call for makers!

Join us at the second annual Aggieville Mini Maker Faire on Moro Street in Aggieville

looking for:
interactive art projects bicycles
space projects glassblowing
textile arts and crafts electronics
sustainability rockets and RC toys
robotics CNC mills and 3D printers



Sept 12 • 10am-4pm

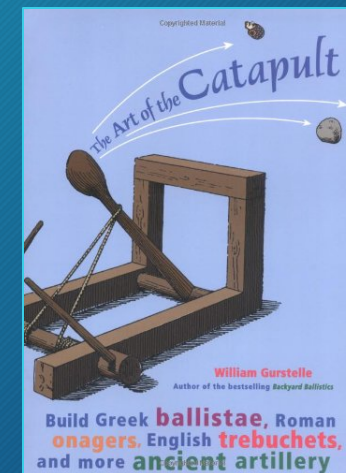
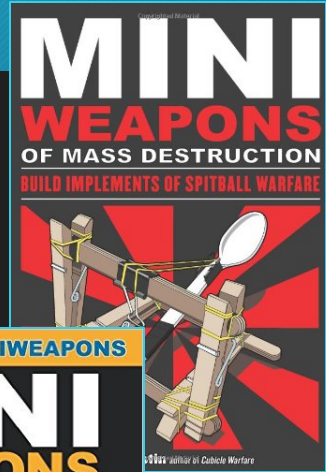
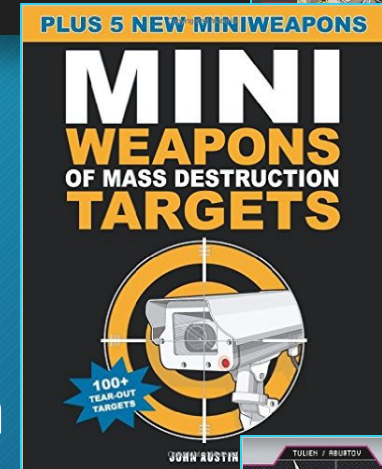
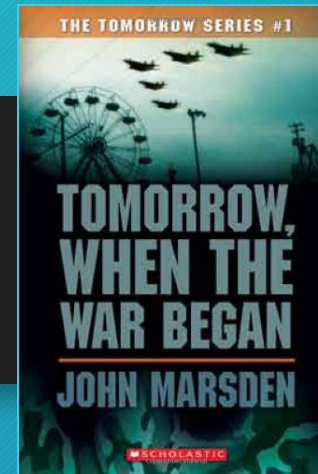
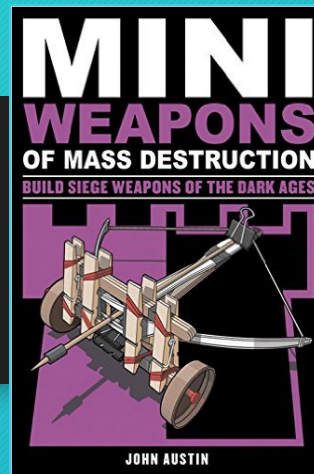
Maker Faire showcases the amazing work of all kinds and ages of makers - anyone who is embracing the do-it-yourself (or do-it-together) spirit and wants to share their accomplishments with an appreciative audience.

to get your own booth space, visit
aggievilleminimakerfaire.com

Mini Weapons

- Books:

- *Mini Weapons of Mass Destruction* by John Austin
- *Mini Weapons of Mass Destruction 3* by John Austin
- *Mini Weapons of Mass Destruction Targets* by John Austin
- *Paintball Punk* by Sean Tulien
- *Point-Blank Paintball* by Scott Ciencin
- *The Art of The Catapult* by William Gurstelle
- *Tomorrow, When the War Began* by John Marsden

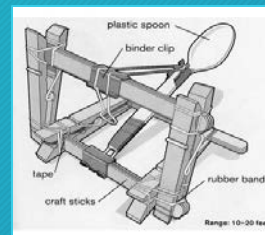
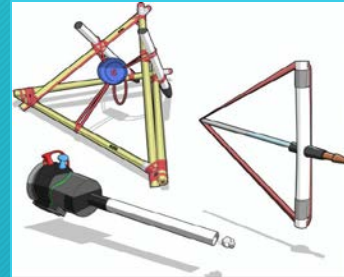


Mini Weapons = \$157.96



- Projects:
 - Based on the ideas in the books

- Supplies:
 - Scissors
 - Rulers
 - Glue Gun & Glue
 - Binder Clips in 3 Sizes
 - Clothes Pins
 - Craft Knives
 - Wire Cutter



- Pens
- Duct Tape
- Pencils
- Tacks
- Toothpicks
- Marshmallows
- Tongue Depressors
- Rubber bands
- Travel Bin

ZOMBIE SURVIVAL SHEET

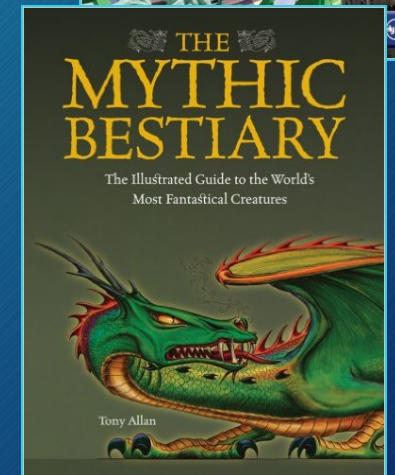
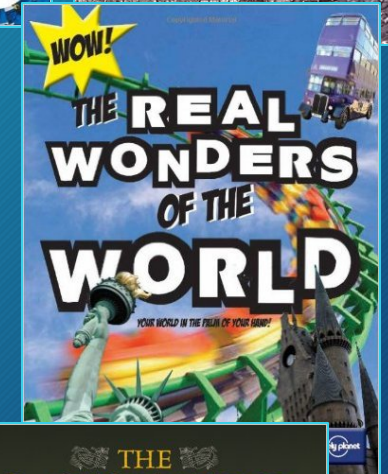
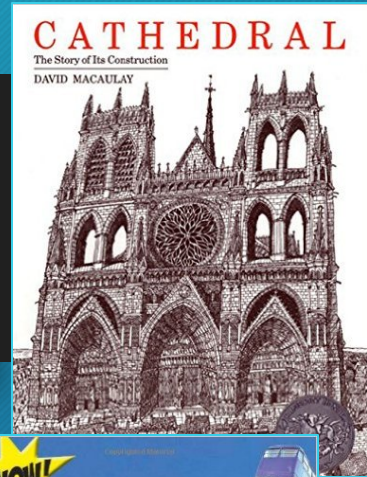
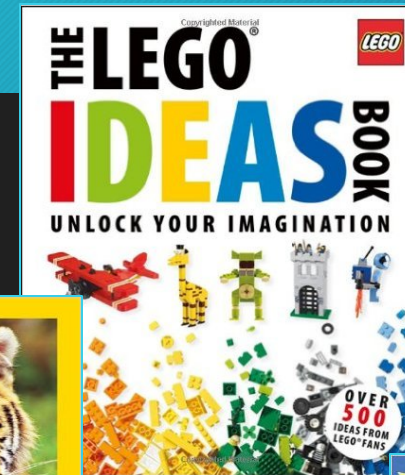
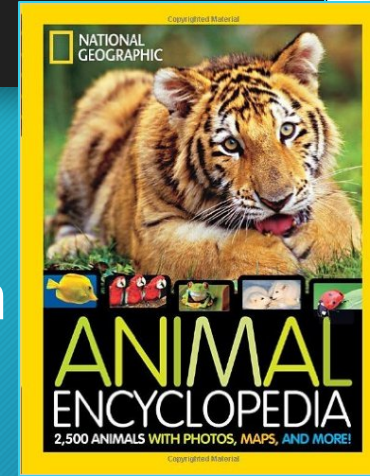
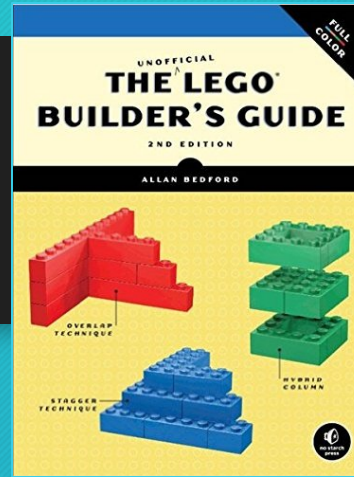
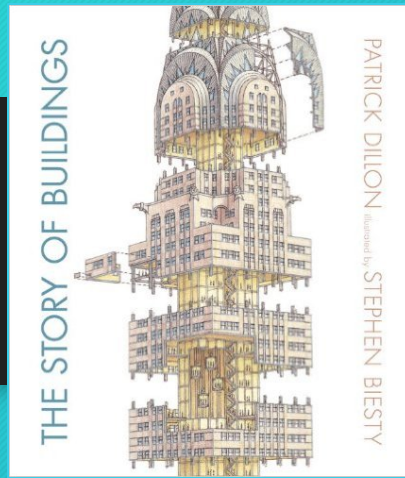
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CLOTHING (UPPER):	WEAPONS (UPPER):	WEAPONS (LOWER):
MAIN WEAPON:	CLOTHING (LOWER):	WEAPONS (UPPER):
INVENTORY:	SECONDARY WEAPONS:	TOOLS:
BATTLE ACTION:		



Builder

- Books:

- *The Story of Buildings* by Patrick Dillon
- *The Mythic Bestiary* by Tony Allan
- *Cathedral* by David MacAulay
- *The LEGO Ideas Book* by Daniel Lipkowitz
- *Lonely Planet Not-for-Parents: The Real Wonders of the World* by Moira Butterfield
- *The Unofficial LEGO Builder's Guide* by Allan Bedford
- *National Geographic Animal Encyclopedia* by Lucy Spelman



Builder = \$262.12

- Supplies:

- 607 LEGO Bricks
- Tumble Tree Timbers (Lincoln Logs)
- Fiddlestix (Tinkertoys)
- 521 K'Nex Pieces
- Krinkles (Bristle Blocks)
- 3D Printed Joiner Pieces
- Travel Bin



Photo Booth 1

- Books:

- *Rain Is Not My Indian Name* by Cynthia Leitich Smith
- *Sources of Light* by Margaret McMullan
- *Curveball: The Year I Lost My Grip* by Jordan Sonnenblick
- *Pictures of Hollis Woods* by Patricia Reilly Giff
- *Hollow City* by Ransom Riggs
- *Circa Now* by Amber McRee Turner
- *Picture Me Gone* by Meg Rosoff

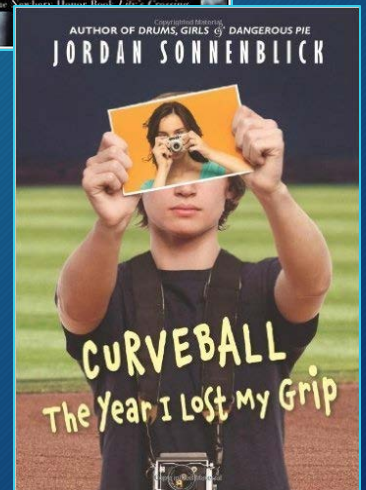
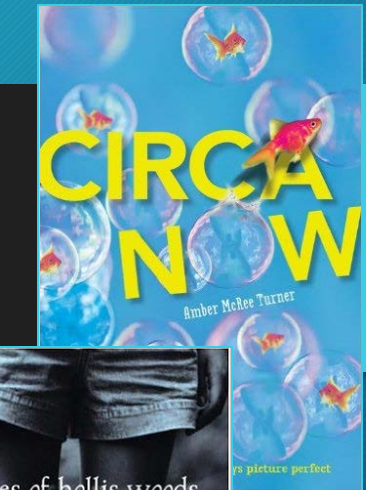
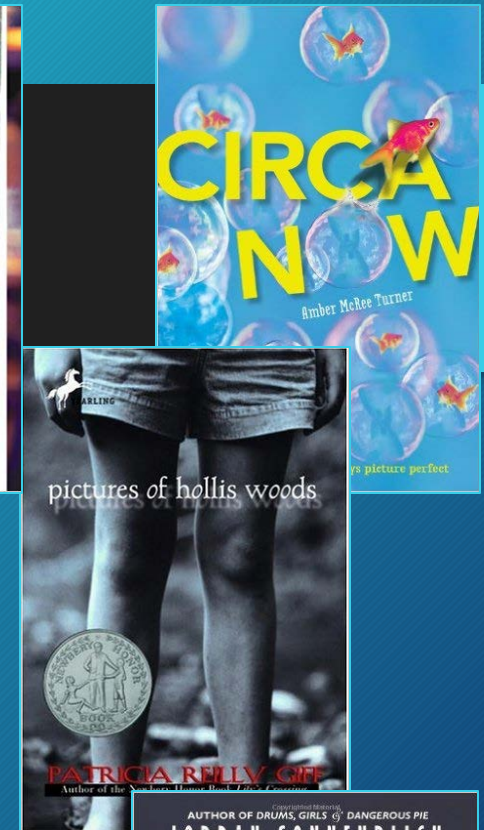
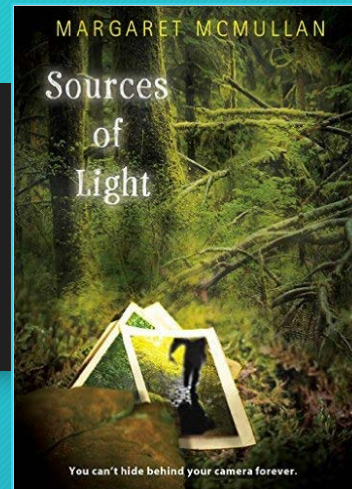


Photo Booth 2

- Books:

- *Sixty Tips for Creative iPhone Photography* by Martina Holmberg
- *iPad & iPhone Digital Photography Tips & Tricks* by Jason R. Rich
- *The iPhone Photographer* by Michael Fagans
- *The Paper Hat Book* by Alyn Carlson
- *Party Masks* by Judy Balchin
- *SnApp Shots* by Adam Bronkhorst

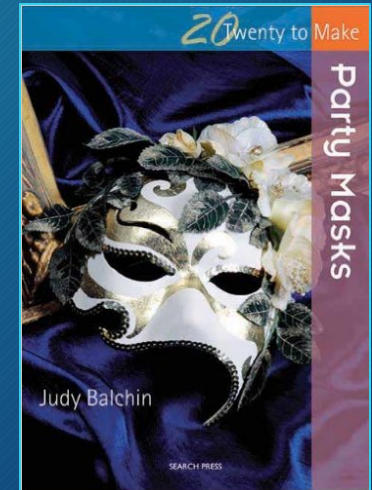
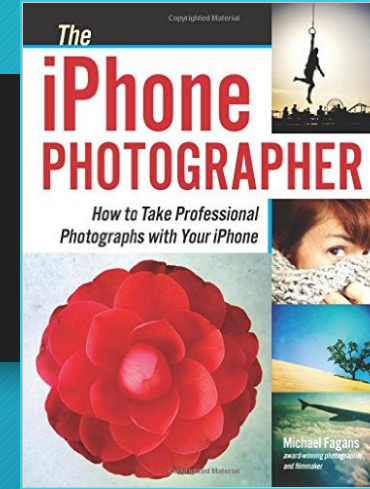
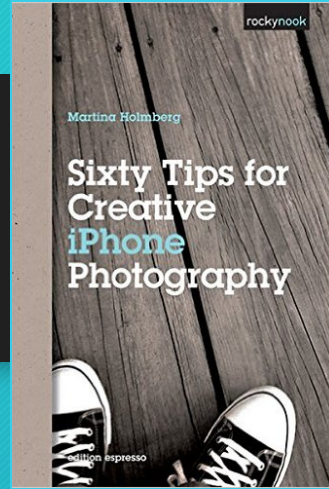


Photo Booths = \$235.26



• Resources:

- Canon SELPHY CP910 Wireless Color Printer
- Canon Printer Paper
- Travel Bin



• Supplies:

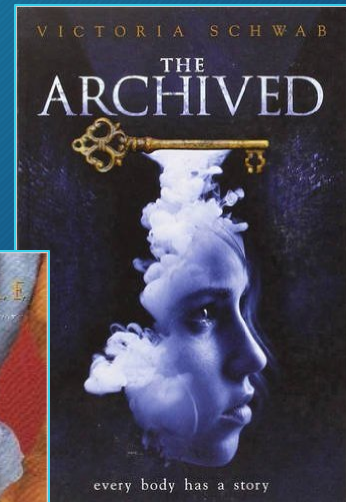
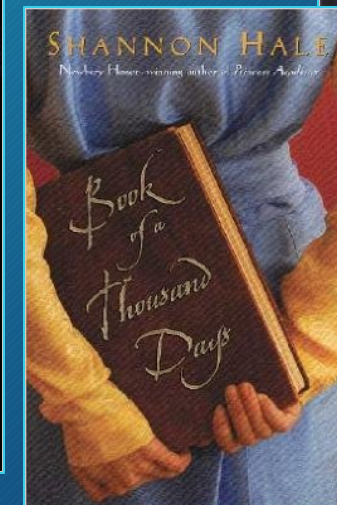
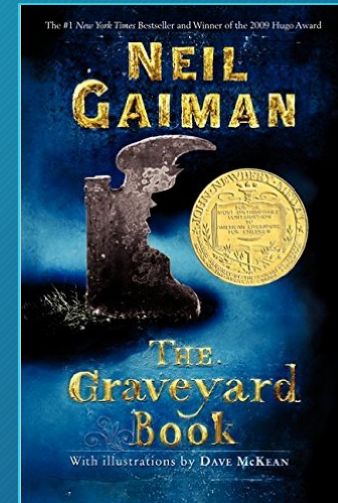
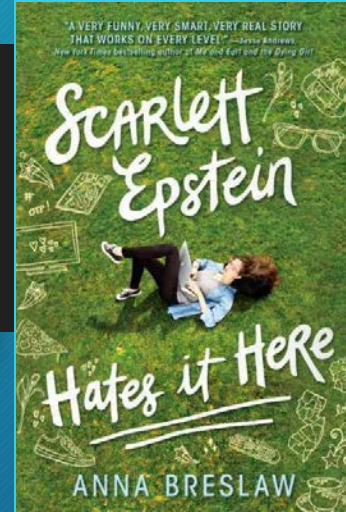
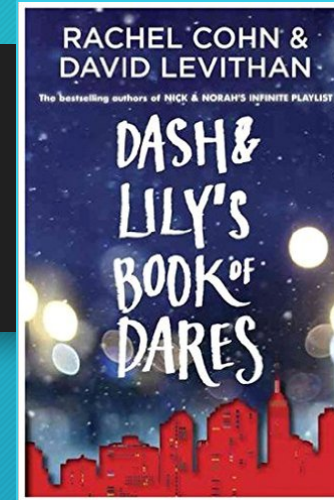
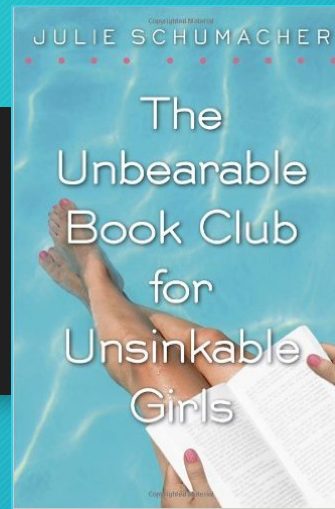
- Props
- Cardstock
- Travel Bin
- Speech Balloons & Markers
- Fabric Backdrops



Repurposing Books

- Books:

- *Dash & Lily's Book of Dares* by Rachel Cohn & David Levithan
- *Scarlett Epstein Hates It Here* by Anna Breslaw
- *The Unbearable Book Club for Unsinkable Girls* by Julie Schumacher
- *Book of a Thousand Days* by Shannon Hale
- *The Graveyard Book* by Neil Gaiman
- *The Grimm Legacy* by Polly Shulman
- *The Archived* by Victoria Schwab



Repurposing Books = \$135.75

- Supplies:

- Craft Knives
- Modge Podge
- Foam brushes
- Fishing Line
- Ribbon Spools
- Needle-nose Pliers
- Twine

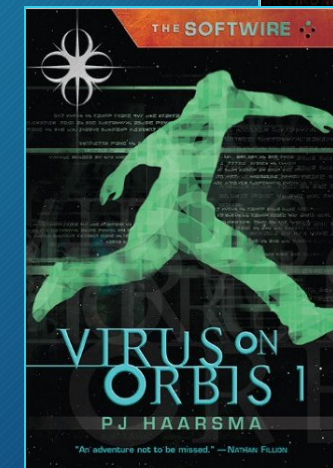
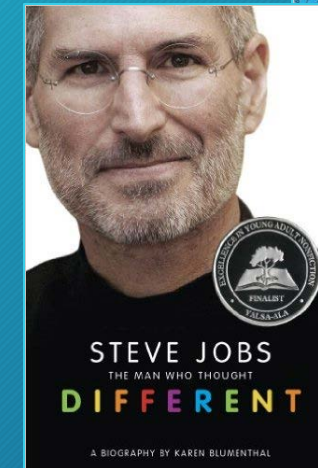
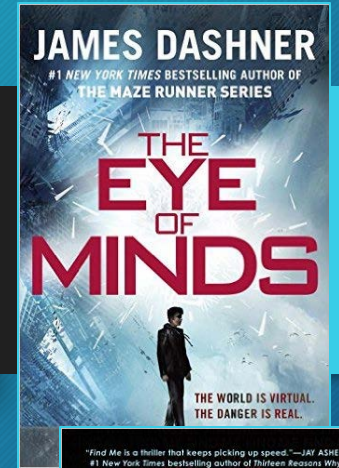
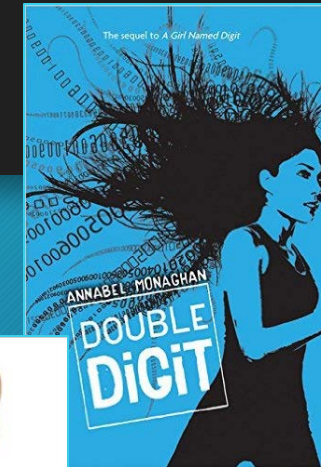
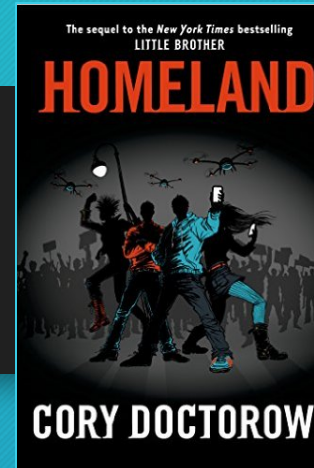
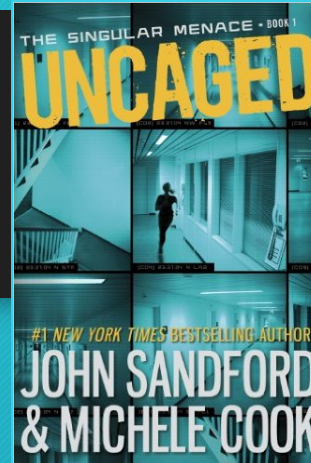


- Scissors
- Wire
- Glue
- Glue Gun
- Glue Gun Glue
- Double-sided Tape
- Glue Sticks
- Rulers
- Travel Bin

Break It reMake It

• Books:

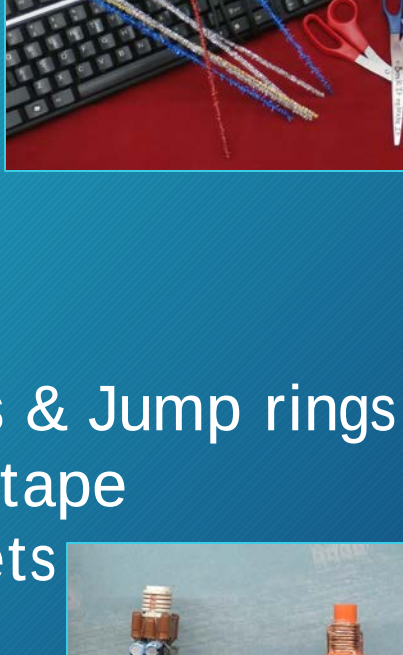
- *Double Digit* by Annabel Monaghan
- *The Eye of Minds* by James Dashner
- *Find Me* by Romily Bernard
- *Homeland* by Cory Doctorow
- *Virus on Orbis 1* by P.J. Haarsma
- *Uncaged* by John Sandford & Michele Cook
- *Steve Jobs: The Man Who Thought Different* by Karen Blumenthal



Break It reMAke It = \$181.11

- Resources:
 - Computers or laptops to dismantle
 - Belkin Computer Tool Kit
 - Supplies:
 - Scissors
 - Pipe cleaners
 - Wiggly eyes
- 



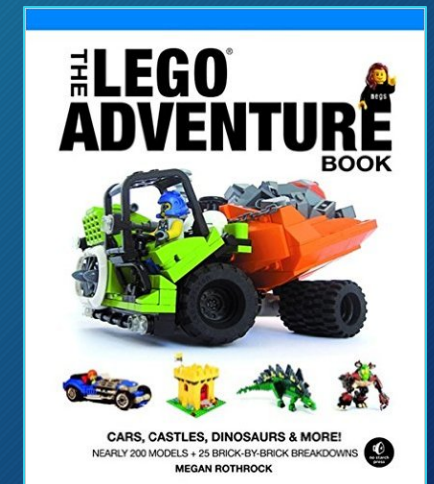
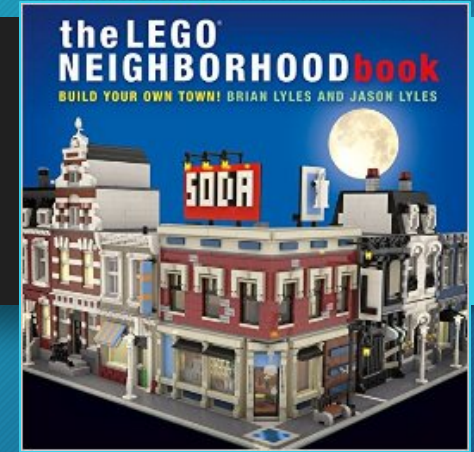
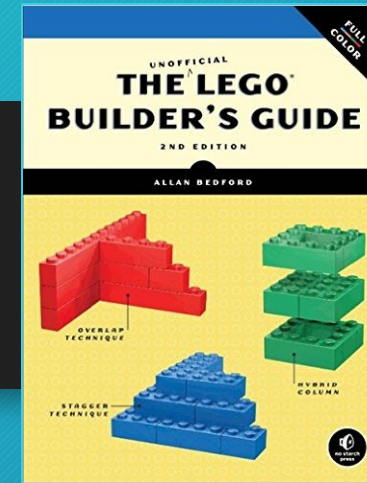
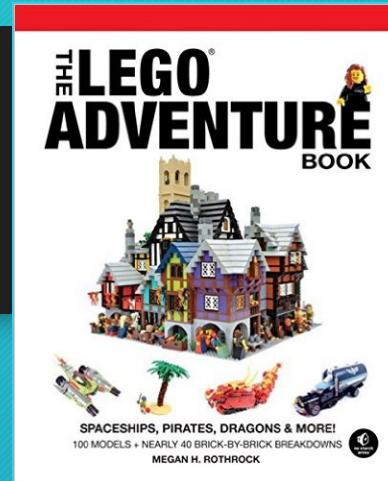
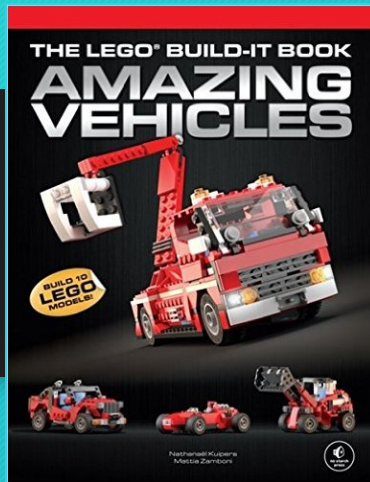
- Earring backs
 - Beads
 - Beading wire
 - Stretch cord
 - E6000 Glue
 - Lobster clasps & Jump rings
 - Double-Sided tape
 - Magnetic sheets
 - Travel Bin
- 



LEGO

- Books:

- *The LEGO Neighborhood Book: Build Your Town* by Brian and Jason Lyles
- *The LEGO Adventure Books: Cars, Castles, Dinosaurs & More* by Megan H. Rothrock
- *The LEGO Adventure Books: Spaceships, Pirates, Dragons & More* by Megan H. Rothrock
- *The LEGO Build-It Book: Amazing Vehicles* by Nathanael Kuipers
- *The Unofficial LEGO Builder's Guide* by Allan Bedford



LEGO = \$147.94 each



- Projects:

- LEGO Club suggestions
- LEGO Challenges
- Stop Motion Animation information

- Resources:

- 1 Lay-n-Go Bag/Play Mat each
- 5 LEGO Building Mats each
- 5,000 LEGO blocks each



Activity #1

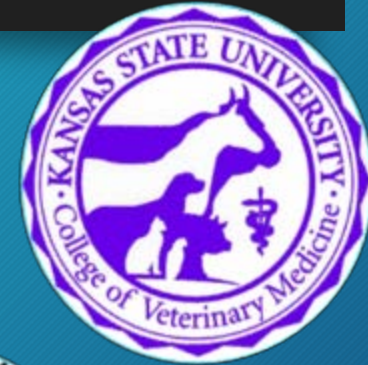
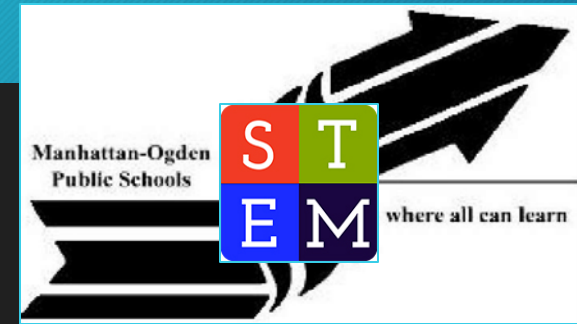
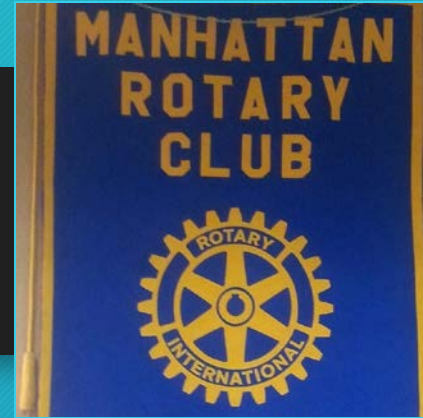
Makerbox Passive Program Ideas

1. Brainstorm ideas for passive programs that you could present at your library.
2. Pick a Science, Technology, Engineering, or Math focus.
 - a) How does that work with your makerbox?
 - b) What does that change about your program?
3. Share ideas to room

8 minutes

Partnership Opportunities

- Local Schools, Businesses, & Organizations:
 - Universities, Community Colleges, & Vocational Schools
 - Military Bases & Veterans' Groups
 - Telecommunications & Computer Companies
 - AmeriCorps & Job Corps
 - Rotary International
 - Lions Club International
 - The American Legion
 - Jaycee Club

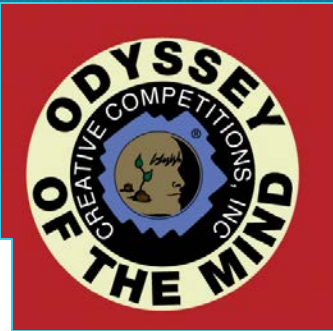


Partnership Opportunities

- Clubs:
 - Girl and Boy Scouts
 - 4H
 - Odyssey of the Mind
 - First LEGO League
 - Gardening
 - Woodworking
 - Astronomy



BOY SCOUTS
OF AMERICA®

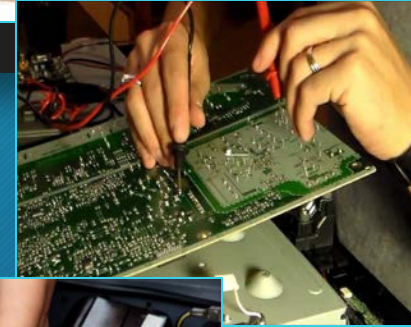


Gardening Club



Partnership Opportunities

- Individuals in Your Community:
 - Current & Retired Teachers
 - Plumbers and Water Treatment Managers
 - Electricians & Carpenters
 - Automotive & Bicycle Mechanics
 - Gardeners & Landscape Artists
 - Health Professionals
 - Bakers & Chefs
 - Radio & Sound Technicians
 - Video, Movie, & TV Technicians



Activity #2

Program with a Partnership Ideas

1. Brainstorm ideas for partnered programs that you could host.
2. Who, within your community, would you partner with?
 - a) How does that work with your makerbox?
 - b) What does that change about your program?
3. Share ideas to room

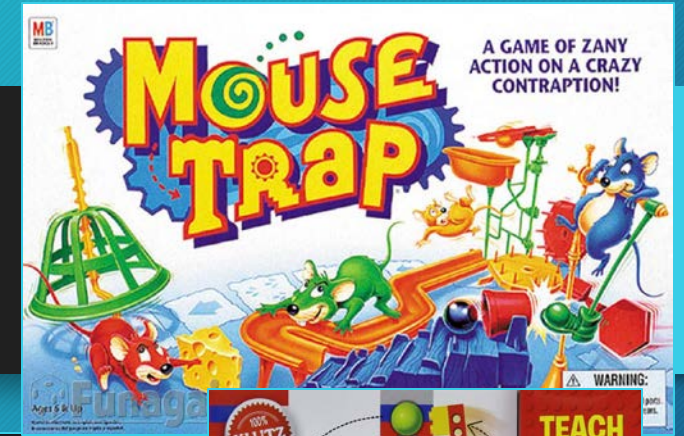
8 minutes

Evaluating Our Makerboxes

- In the last two years, our makerboxes have circulated 62 times to 21 of our libraries.
- I've had an increase in requests for Teen Services consulting.
- We've seen an increased interest in the Maker Movement.

The Future of the Makerboxes

- Rube Goldberg Machine
- Coding
- Stop Motion & Movie Making



What Are Other Library Systems & Consortiums Doing?

- Arrowhead Library System

Arrowhead Library System Mobile Makerspace accessed from
<http://als.lib.wi.us/Makerspace/index.html>

- Blue Valley School District

Educational Technology Blue Family Schools accessed from http://www5.bluevalleyk12.org/techsource/?page_id=5453

- Illinois State Library

Make it @ Your Library accessed from
<http://makeitatyourlibrary.org/makerkits>

- Knox County School District

Johnson, et al. (2016). "Mobile Maker Spaces," *School Library Journal*. Accessed from <http://www.slj.com/2016/05/technology/mobile-maker-spaces/>

Tinker Tubs: **Circuit Tub Inventory**

Building: _____ **Date:** _____

Initials: _____

Please utilize the checklist below to inventory the items.

Makey Makey – 2 Sets

☐ 1 - Box Contents: Red cord, Wires, Base

☐ 2 - Box Contents: Red cord, Wires, Base

Little Bits Basic Kit – 5 Sets

☐ 1 - Box Contents: 10 Bits, Battery & Cord, Manual

☐ 2 - Box Contents: 10 Bits, Battery & Cord, Manual

☐ 3 - Box Contents: 10 Bits, Battery & Cord, Manual

Little Bits Electronics Premium Kit – 2 Kits

☐ 1 - Box Contents: 14 Bits, Battery & Cord, Manual

☐ 2 - Box Contents: 14 Bits, Battery & Cord, Manual

BUILD MOBILE MAKER SPACES

What's on the carts?

*Starred items are on each library's maker space docking station, not part of the cart. For instance, every library has a supply of 3-D filament that's kept on site.

ITEM CART	PRODUCTIVITY CART	ART GUEST
Articulated starter kit	Digital microphone	Letterpress starter kit
Raspberry Pi 2 starter kit	2-Light Saffron Ink	Sewing machine
Raspberry Pi camera module	Linotype Lazerus Mk system	Stenciling machine
Pencil Palette	Wireless plate	Paper shapers
Shoelace punch	Mouse Mount kit	Lace punch
Shoelace punch/plating plastic	Recommender headphones	Tape and vinyl cutter
Hummingbird starter kit	Diagnosehead headphones	Etching machine
Grove starter kit	"Flow"	Assorted die cuts
"K'nex"		Assorted dies
LEGO Logic Link Kit		Penicils
LEGO Technic®		Thread
3-D puzzle*		Buttons
Maker Mayhem		Sewing kit
Breadbot pack		LEGO Technic set*
Sensory Circuits		Wire and solder
Shoelace punch		Cottonwood card stock
LEGO bricks & motors/motors*		Sewing project kit*
LEGO floor*		Craft sticks
		Pattern tape*
		1000 Paper Clones kit*
		Origami paper*
		Scissors*
		Assorted modeling clay
		Staples*
		Wire solder tape
		Cray paper*
		Anchor punch*
		Label maker*
		Friendly Loom*
		Colored dot tape
		Color 3D filaments*

ADDITIONAL ITEMS THAT DON'T ROTATE

Magnetic project board and stands

Wireless app keyboard

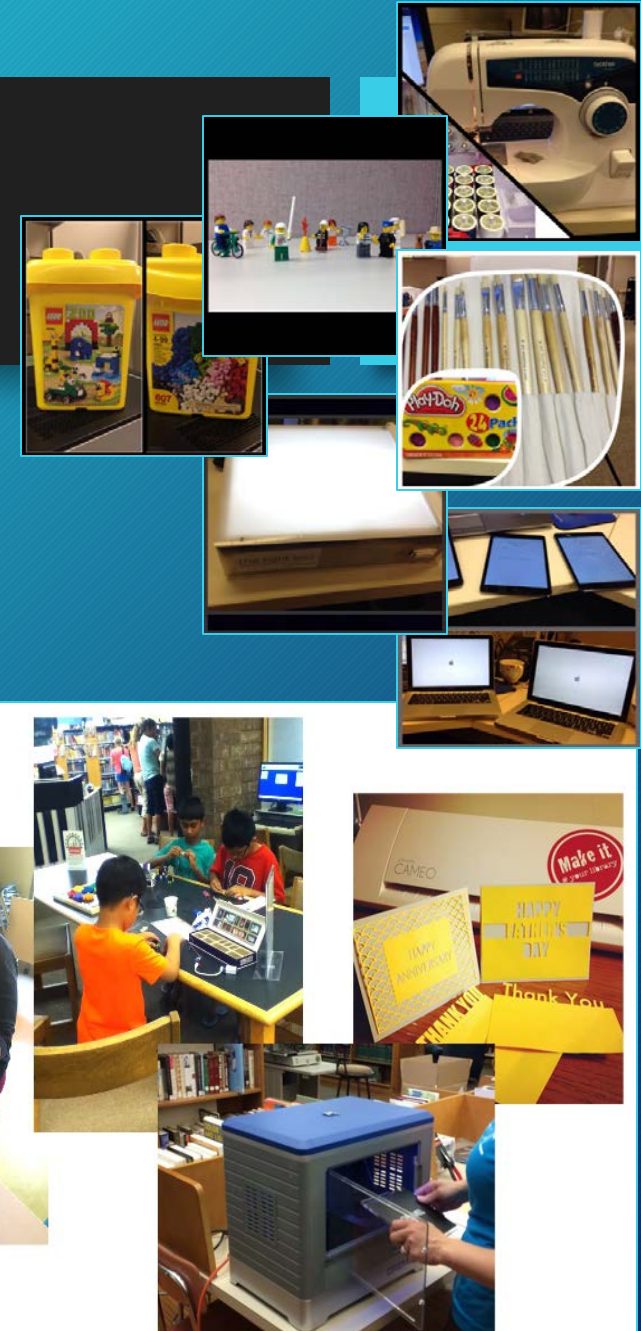
First Aid kit

Safety gloves

Safety goggles

Wireboard tables

Maker zone



Activity #3

Mystery Maker Bags

1. Pretend that you have an unlimited supply of each of the items in your bag.
2. Plan a maker program using these materials.
3. Share ideas to room.

10 minutes

Questions?



Thank you

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Youth Consultant

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Resources

Arrowhead Library System. (N/A). *Arrowhead Library System Mobile Makerspace*. Retrieved from <http://als.lib.wi.us/Makerspace/index.html>.

Blue Valley Educational Technology Services. (2013). *Tinker Tub*. Retrieved from http://www5.bluevalleyk12.org/techsource/?page_id=5453.

Gibrich, C. (2016, August 19). *Mobile Makerspaces*. Retrieved from www.teenservicesunderground.com/mobile-makerspaces/#more-5592.

Johnson, M., Witte, B., Randolph, J., Smith, R., & Cragwall, K. (2016, May 3). *Mobile Maker Spaces*. Retrieved from <http://www.slj.com/2016/05/technology/mobile-maker-spaces/>.

Make It @ Your Library (N/A). *Maker Kits*. Retrieved from <http://makeitatyourlibrary.org/makerkits>.

Rendina, D. (2015, April 2). *Defining Makerspaces: What the Research Says*. Retrieved from Renovated Learning <http://renovatedlearning.com/2015/04/02/defining-makerspaces-part-1/>.