

Brainstorm & Prototype

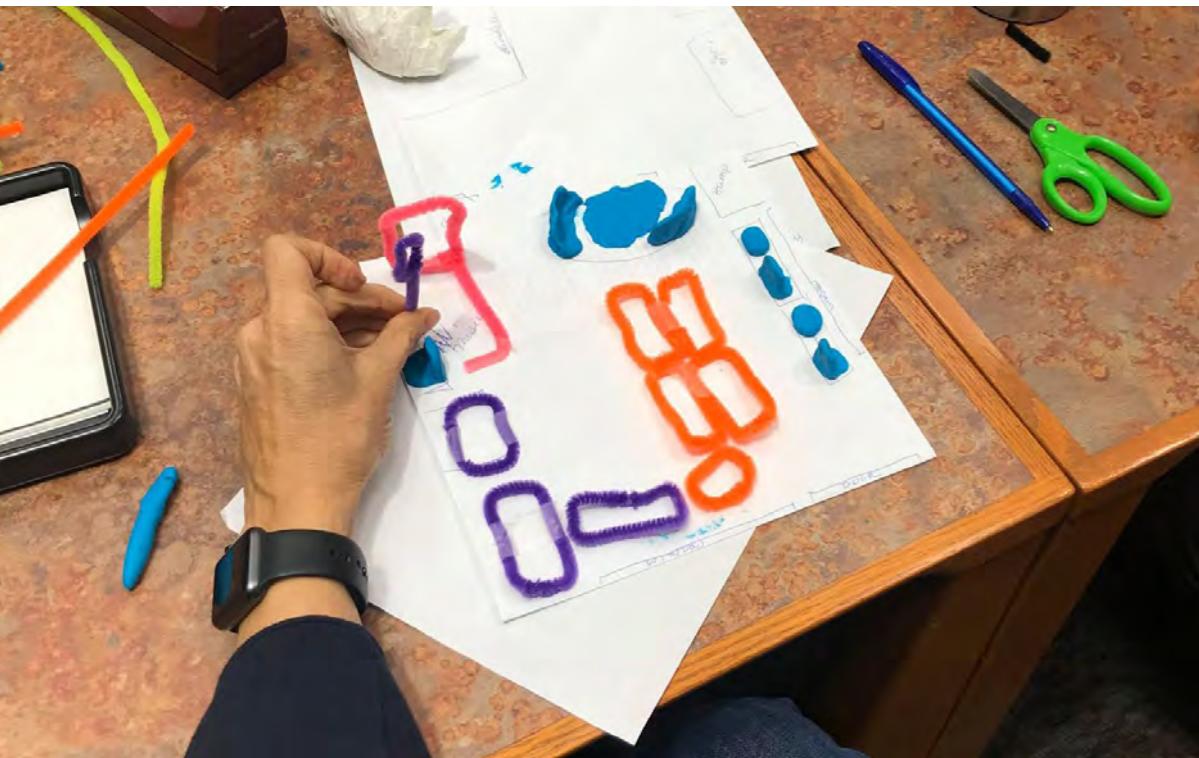
- **IMPLEMENTATION MODELS**
- **BRAINSTORM TO EXPAND YOUR THINKING**
- **PROTOTYPE TO TEST YOUR IDEA**

Brainstorm & Prototype

By this stage of the process, your team has listened to people, discovered the needs and interests of the community, and then defined a starting point for your work: the audience and purpose you serve. You've written a Framing Question, which includes the who and why for your maker program, but now it's time to start figuring out the how, what, and when. We begin by exploring the five makerspace implementation models referenced in this toolkit.



Our project isn't perfect, but we're constantly learning from it. We test and tweak things along the way until we find something that works for us. — LIBRARY STAFF



Prototypes are sometimes rough, quickly made models built from simple materials that help you think through a concept, like this makerspace layout prototype from the JFK Library.

IMPLEMENTATION MODELS

The 10 libraries from our pilot project created makerspaces that could each be classified in one of five main categories, which we refer to as *implementation models*. Each model offers unique benefits and challenges, as outlined in this section. We also share real-world examples and pictures of each model, along with notes on the day-to-day functioning of these programs.

Look at the benefits and challenges of the different implementation models and choose one way to move forward. Our process will give you a chance to test out your approach to get a better sense of what the unique situation will look like for your library.

Multi-Use Space

A room or area of the library is quickly converted to serve as a temporary space for maker programming at a specific time. This could be a program room or an indoor or outdoor area at the library that can be set up to accommodate maker activities and materials for a set period of time, after which everything can be put away without too much difficulty. Tools and materials are often stored in closets or on mobile carts that can be rolled into the space and then packed up and moved out of the room when the program is over.

Benefits

- Programs can be offered without a dedicated space, affording flexibility for libraries with limited space
- Schedule can revolve around staff or volunteer availability
- Doesn't need to be open all the time

Challenges

- Scheduling around other programming
- Time and effort to haul stuff in and out
- Appropriate and accessible storage for times when program isn't running
- Program less visible when not running



Creativity is in our mission statement. When you come to the library, it's not just about books now. It should be a place where you can learn and create new things.

— LIBRARY STAFF

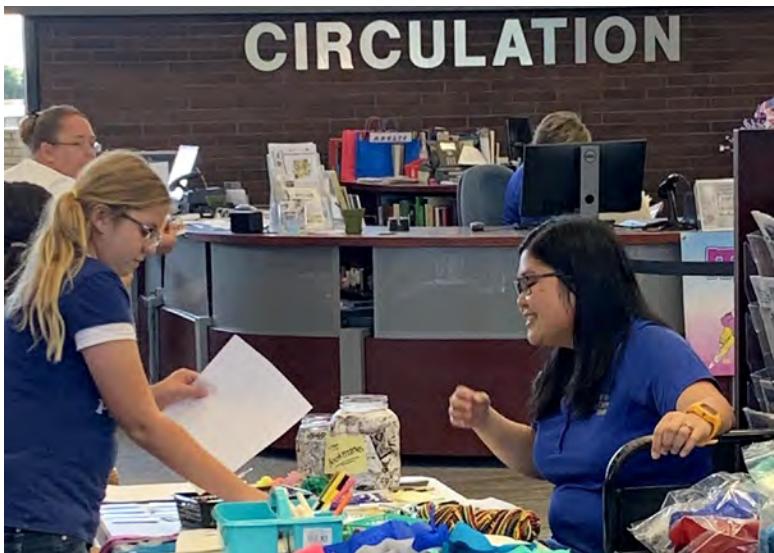
Exeter Library's multi-use program room is set up for makerspace activities a couple of times each week. The library has gradually been working to replace older furniture with new chairs and tables that are more flexible and easy to move. Staff have noticed how important it is to reserve empty floor space for children to build and test their creations on the floor, and to encourage easy movement for participants in the space. Although the room is used for many different programs throughout the week, there's a large bulletin board in the space dedicated to featuring information about past and upcoming makerspace activities.



Exeter Library's makerspace program happens in a multi-use space.

Sometimes the multi-use space is in the open public area of the library, as shown here at the **Kings County Library** (below, left) and the **Ponderosa Library** (below, right). One advantage of placing a maker program in a high traffic and high visibility location is how accessible and welcoming it is to patrons. Kings County Library experimented with the placement of furniture and activity centers. Now they have it perfected and can set up and break down very efficiently, with all materials loaded on carts in advance and volunteers helping to set the furniture in place during the hour before the program starts.

Ponderosa Library sets up programs, like this after-school coding activity (right), in the center of the small library's main space. Sometimes staff bring out laptops, sewing machines, or cardboard construction, depending on the monthly theme they've planned. The activities are offered to all ages and bring in a loyal following of local families. Materials are kept organized in labeled bins to help with easy set up and clean up, and computers are kept on a dedicated cart.



One of several activity centers for Maker Monday at Kings County Library is set up near the circulation desk.



A coding program is held in the open public space at Ponderosa Library.

Dedicated Space

A room or area in the library is either specifically designed for or converted (e.g., an underutilized computer room) into a permanent space for maker activities, tools, and materials. A dedicated space allows for programming to take place anytime the library is open and provides adequate room for participants to work and collaborate.

Benefits

- Designed to accommodate needs of making activities and storage of supplies (e.g., ventilation, electrical supply, sinks, secure equipment)
- Available for staff training
- Greater visibility in the library
- More opportunities to offer an open studio or drop-in program

Challenges

- Might require dedicated staff member
- Higher cost to build and maintain
- Could limit capacity for participants
- Open studio or drop-in programming is challenging for staff to multitask between space management, customer service, and instruction support



The Makery is a dedicated makerspace housed in a former computer lab at the **JFK Library**. The space includes tools for digital fabrication, audio and video recording, sewing, soldering, VR, and gaming. These photos show before (left) and after (right) the transformation.

Help us develop a place for imaginary play with nature and science!

Lakeport Library Children's Patio

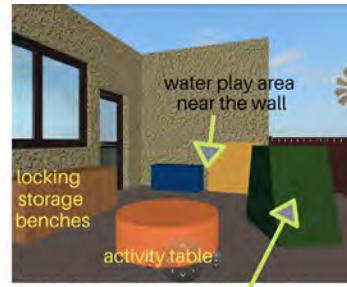
Examples of Possible Features for the Patio



planting workbench and worm compost bin



look at how plants grow



Imaginary play structure (like a play house or farm stand)



grid provides a place to hang interactive elements



Lakeport Library shared their vision for an outdoor makerspace and recruited volunteers with this poster.

Lakeport Library had an underutilized, fenced-in patio directly off the children's section. They were able to transform the space into a delightful area for kids to explore science and nature using their senses, with planters and worm boxes, a water table custom-built by a volunteer, and tools that help kids explore sun and wind power. Shown is a diagram that was posted and was very helpful in recruiting volunteers for the new kids patio.

Community Events

One way to reach a broader audience is to offer your maker activity outside the parameters of your library through hosting or participating in community events. The Maker Movement is known for its “show-and-tell” events called Maker Faires, which convene makers of all ages and types. You might bring tools and materials to host an activity or demonstration at a booth during a fair, or you might offer a maker experience at a school, farmer’s market, retirement home, or club. Whatever the setting, the community event is an opportunity to share making with new audiences, exchange ideas with other makers, and let more people know that the library is a place for making.

Benefits	Challenges
<ul style="list-style-type: none"> • Raises visibility of library in the community and maker ecosystem • Able to reach and interact with audiences not usually at the library • Opportunity to change public perception of “what libraries do” • Enhances existing partnerships and helps build new ones 	<ul style="list-style-type: none"> • May be time-consuming to organize • Logistical challenges (e.g., permits, space, electricity, wi-fi, weather) • Materials cost can be high for large-scale events • Time and effort to haul stuff in and out • Might require a special vehicle • Activity must be engaging but relatively quick • Staff are off-site for the event and not available to work inside the library

The **Gilroy Library** organized and held its first ever Mini Maker Faire in 2019 with great success. An estimated 3,000 attendees participated in hands-on experiences presented by schools, artists, museums, and independent makers (as seen in the images at right and on the following page). The 2020 event was slated to be bigger and better than the first but had to be canceled due to the COVID-19 pandemic. Organizers say that even the effort to recruit makers has forged new supportive partnerships with many sectors of the community.





There were many hands-on opportunities at the Gilroy Mini Maker Faire, hosted by the Gilroy Library.



Corona Public Library works in conjunction with the municipal Recreation Services Department to bring programs in a mobile vehicle around the city. Pictured at left is an example of the Maker Exchange's booth at a city festival. Participation in an event like this requires portable staging equipment, such as folding tables, a pop-up shade structure, bold signage, and a method for transporting the project supplies.

Corona Public Library takes their makerspace program out to community events.

Maker Box Program

Maker boxes are conveniently packaged activity kits that offer an effective way to share rich resources between library branches. Each box comes with all the tools to launch a program, with instructional guides included. Sometimes consumables are included in the box, but simple things like paper and scissors are often left to the branch to supply, with only the more specialized materials included in the box. Many branches collaborate on developing ideas for the kinds of activities to feature, and then someone takes the lead to maintain the collection, oversee a distribution system, and circulate the maker boxes between branches.

Benefits

- Resources are used more often
- Good for libraries with no or low budgets to offer a greater variety of programs
- Can test if patrons like specific tools and materials before buying for the branch
- Less intimidating for staff that aren't used to maker activities
- Builds collaboration and sharing of best practices between branches

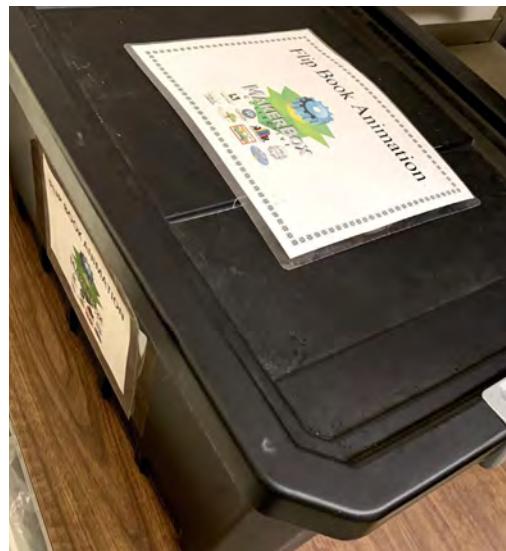
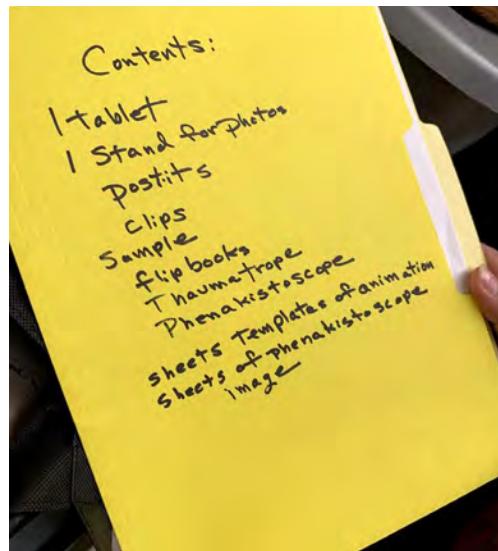
Challenges

- Logistics for maintenance, restocking, and cleaning between uses
- Reservations and delivery system needed
- Materials are limited to items that are transportable and fit in a box
- Patrons might have to wait to repeat popular programs

The **Tulare County Library** system is investing in maker program boxes to circulate to all the branches in their large rural system. Staff members brainstorm ideas for types of activities to include, as shown in the simple circuits activity box pictured here. Contents include LED lights, coin cell batteries, conductive tape, and instructions for leading a workshop on paper circuits. Jose Ruiz-Garcia, the librarian at **Pixley Library**, has taken the lead on building and maintaining the kits. Rather than build all the boxes at once, he's launching and testing a couple at a time, gathering ideas and input from all branch staff before building more kits.



Librarian Jose Ruiz-Garcia assembles the Simple Circuit Maker Box at the Pixley Library.



The Blanchard Community Library created this Flip Book Animation maker box.

The **Blanchard Community Library** is a small library with no other branches, but they benefit from a collaborative endeavor between their library and others in the region. Along with seven other libraries, they've formed a partnership called [MakerBox Collective](#). Every year, the libraries each agree to develop one maker box. They work together to cover a diverse assortment of activities and avoid overlap or repetition. The libraries rotate the boxes according to schedule once a month.

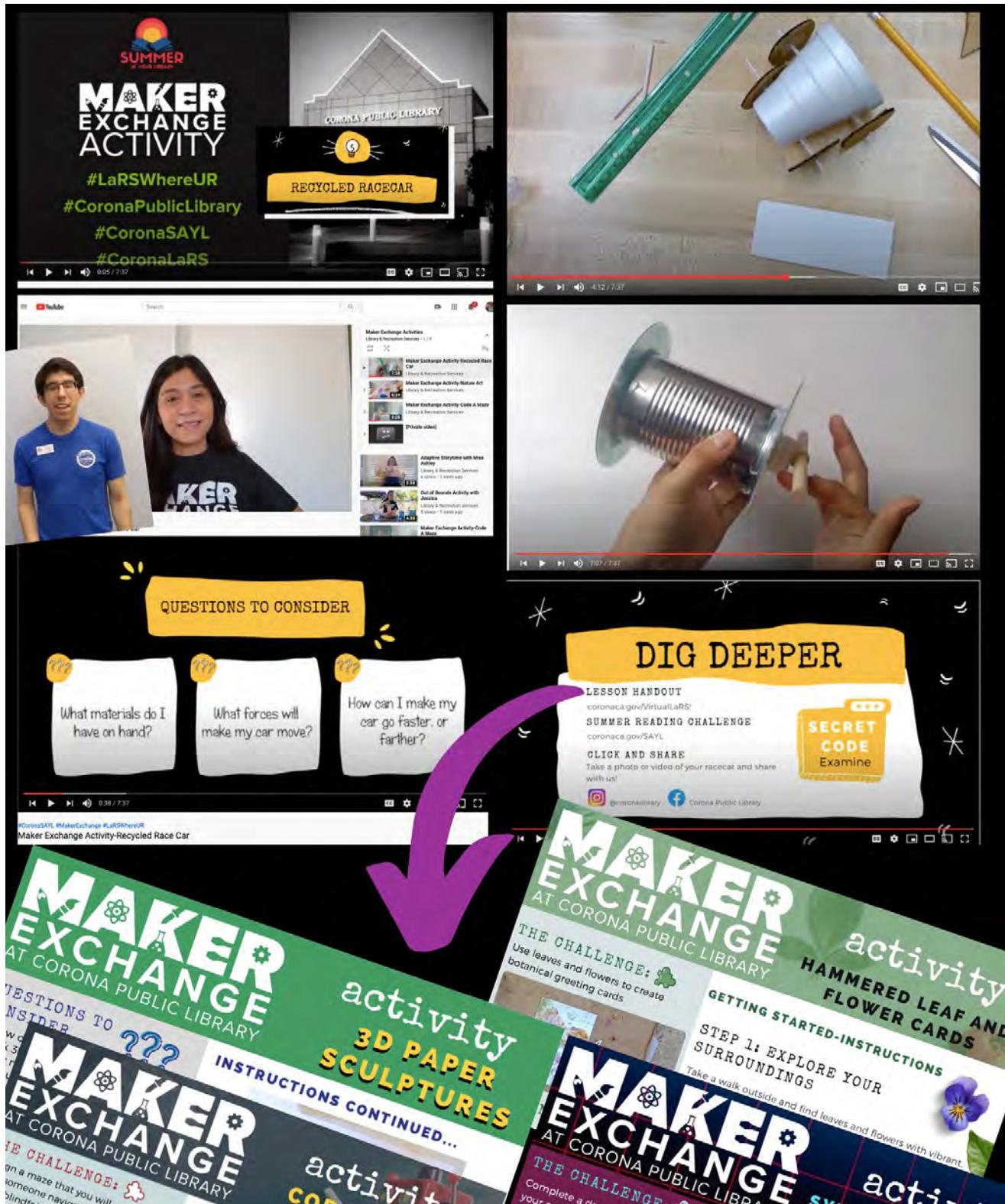
Virtual Maker Program

Virtual programs are delivered remotely, engaging with patrons online through demonstrations, tutorials, or live interactives, whether *asynchronous* (on-demand through archived videos and subscription services) or *synchronous* (live demonstration or activity through social media or video conferencing). The closure of libraries and stay-at-home orders due to the COVID-19 pandemic prompted many libraries to pivot to an online delivery model for their programs. Some produced how-to videos, while others launched live streaming events on Facebook, Instagram, or YouTube. Most libraries have decided to adopt virtual offerings as an ongoing component of their programming even after the pandemic because it has the capacity to reach people who generally might not be able to visit the library in person.

Benefits	Challenges
<ul style="list-style-type: none">• Potential to reach people who cannot attend a library program• Patrons can repeat program as often as they wish• Patrons can go at their own pace (e.g., pause video and repeat instructions)• Staff can share a collection of both original and curated digital program content• Unlimited number of participants• Low supply costs	<ul style="list-style-type: none">• Requires technical aptitude for staff and patrons• Digital divide makes programming inaccessible to some• Patrons might not have access to supplies and tools• Requires equipment for media production

At **Corona Public Library**'s Maker Exchange, once staff realized the COVID-19 pandemic would prevent in-person programs from taking place over the summer, they designed and produced a series of virtual activities. The activities include a video, a printable handout, and the availability of materials for curbside pickup (though most activities are designed to use simple household items). These videos and printable guides can be used over and over, and they now constitute part of a growing virtual resource for Corona makers, young and old.

At the rural **Lakeport Library**, lack of transportation makes it hard for many to access the library building, so the library invested in Creativebug, an online subscription-based collection of digital arts and crafts tutorials. The tutorials not only helped patrons learn techniques at home, but staff used some of the video tutorials in their Saturday morning Creative Club sessions, which also reduced staff time investments because they didn't have to develop a full arts program from scratch. Inspired by the videos, maker participants then expanded their creative pursuits beyond the online instruction.



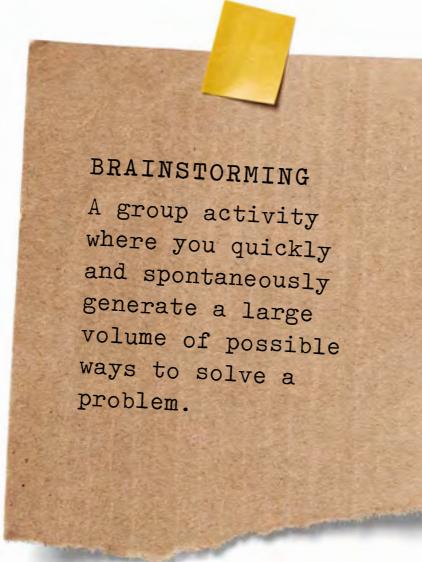
Corona Public Library's virtual maker programs from the Maker Exchange include videos, written materials, and supplies for pickup curbside.

BRAINSTORM TO EXPAND YOUR THINKING

Once you've landed on your Framing Question and thought about the variety of types of makerspace programs you could offer, gather with colleagues to brainstorm what possible solutions meet the needs of your audience(s). There are several ways you can facilitate a brainstorming session, and we've suggested one option below that could easily be part of a regular staff meeting. At the outset, be sure that everyone is clear on what problem you're attempting to solve. Keep your Framing Question front and center for this exercise.

This part of the process should stretch your imaginations and generate a wealth of ideas. As a leader of the session, be ready to not only listen and receive new perspectives, but even encourage ideas that might seem unconventional or impossible. It's important to allow the ideas to come freely without passing judgement on any suggestions—even concepts that seem outlandish, wild, or against the rules of the library.

Throwing the net wide and pushing the boundaries on possibilities spurs new thoughts and approaches that might never have been dreamed otherwise. The idea is to promote expansive thinking. One way to help break the ice is to ask people to start by brainstorming all of the ideas that *wouldn't* work. This method offers a fun and playful way to get started, and you may be surprised at what great ideas it sparks.



Brainstorming with your team can open doors to creative solutions. Here, pilot library staff are engaged in a session during training at the Bay Area Discovery Museum.

Conduct a Brainstorming Session

There are many ways to run a brainstorming session with your staff. Here's one simple process you could use to get started.

- Provide the group with colorful sticky notes and pens.
- On a whiteboard or the wall, post your one-sentence Framing Question.
- Give everyone 5 minutes to generate as many ideas as possible to address this question, writing one idea per sticky note.
- Have participants post their notes on the board.
- Call out the ideas verbally or write them down and then read, review, and come up with more as the group gets warmed up.
- Ask the group to organize and sort the sticky notes, looking for similarities and differences. As you arrange them, which ideas stand out?
- After the meeting, write all of the ideas down and send them out to the group so everyone can give it more thought before you gather again. Some ideas need time to marinate before you can move forward.

Visit Other Makerspaces

At this stage, it's helpful to pay a visit to one or more other makerspaces. It's remarkable how many insights and ideas you can gain from seeing how other spaces are arranged and run. Keep in mind the makerspace you visit doesn't necessarily need to be in a library, though that would be great. Seek out places on your Maker Ecosystem Map, perhaps at a local school or college, community space, or museum. Or try taking a "virtual tour" by searching for library makerspaces online and exploring pictures or videos of their programs.

If you're fortunate to visit at a time when people are busy making things, you can simply observe what's happening, noticing how people move around the space, how they know what to do, how they get the tools and materials they need, and whether they're guided by a facilitator. Take note of many physical details, including storage, signs, equipment access, ventilation, seating, and lighting. And pick up any pamphlets, flyers, or calendars of upcoming events.

Be sure to introduce yourself to the team who operates the makerspace and let them know you're in the planning stages for a library makerspace. You may be surprised by their willingness to share and offer advice. Even if you're conducting a virtual visit, reach out and ask a few questions via email, phone, or video meeting.

TOOL

FIELD TRIP

NOTES

This tool offers factors to consider during your visits and helps you keep track of the ideas you gather from these experiences.

PROTOTYPE TO TEST YOUR IDEA

We recommend you start small and try out a few ideas first to give you a sense of how they'll resonate with your audience before spending a lot of time and money committing to the full-blown program. Creating a test or prototype can provide you with a lot of information that may be useful to gain more support for your idea and even to get funding.

Bring the brainstorming group back together, review all of the ideas you came up with, and discuss the different approaches for your future programming. Together, pick one or two (or more) ideas that might be worthy of a quick, rough test for viability. Talk about how you might set up this prototype; then craft a model to mock up the idea, or run a low-cost, short-term viability test. Always keep in mind the original problem you were aiming to solve and decide what factors to monitor with your prototype, so you can have some measure of its success. Also, keeping good records provides data to guide the decisions you make about your program—and offers the chance to take a creative risk by trying a brand-new approach, with a minimal investment of time and money.

Sample Prototype Scenarios

INTERGENERATIONAL MAKING

You've come up with the idea of having tweens learn sewing from senior citizens. To prototype, you could invite one senior citizen and one or two tweens to come to the library and try sewing a simple project together. See how it works, gather their input, and learn what was great and what was hard about the intergenerational project.

Gather data on: target audience, delivery method, type of activity

MAKER ACTIVITIES OUTSIDE THE LIBRARY

You've decided that the farmer's market is a great venue to reach new audiences for creative programming. You could sign up for a table and set up a simple creative project there for people to experience. Then talk to them about the idea of the makerspace. You could potentially learn about whether outreach at the farmer's market is worthwhile, and if people seem to enjoy the hands-on project opportunity in this different setting.

Gather data on: delivery method, type of activity, venue, timing

PROTOTYPE
An early-stage model of a concept designed to test certain aspects of its functionality.

TOOL

PROTOTYPE FRAMEWORK

This tool helps you plan your prototype and keep track of the results.

MAKERSPACE ON A CART

You're wondering how to efficiently store and transport materials for family programs. You decide to try converting a book cart or a media cart into a mobile makerspace. Determine how much space you need, what type of storage you need, and how you might arrange items and label them so it's easy to use, both for you and the families. Do containers need to be covered? Harnessed to the cart to prevent them from disappearing? Easy to rearrange? Is the cart flexible for multiple projects, or do you have to rearrange and restock every time?

Gather data on: delivery method, type of activity, space design

WORKING WITH PARTNERS

Invite one of your existing library partner organizations to collaborate on planning and leading a creative activity in the library. Can they help run the activity? Provide any supplies or equipment? Help bring the audience to your site?

Gather data on: staffing models, delivery method, marketing

SHARING MAKER BOXES WITH ANOTHER BRANCH

Collaborate with another branch to test-run the format for a maker box. Take one maker activity that you have materials for on hand, try packing all the needed supplies and simple facilitation notes in a box, and send it to your colleague. Have your colleague first provide feedback to you about whether the materials arrived in good condition, and if they understand your notes for how to produce the activity. Next, they could test-run it with staff members or offer a trial run with a small group of patrons, and then provide feedback on the activity itself.

Gather data on: format, delivery method, type of activity

LIVESTREAM VS ASYNCHRONOUS VIRTUAL PROGRAM

Test two ways of offering virtual activity online, via livestream and a pre-recorded session. Try to limit the number of variables so you can better compare. Did the audience interact during the livestream? Check the number of views to see which method reached a larger audience. Was one more difficult to facilitate and produce than the other?

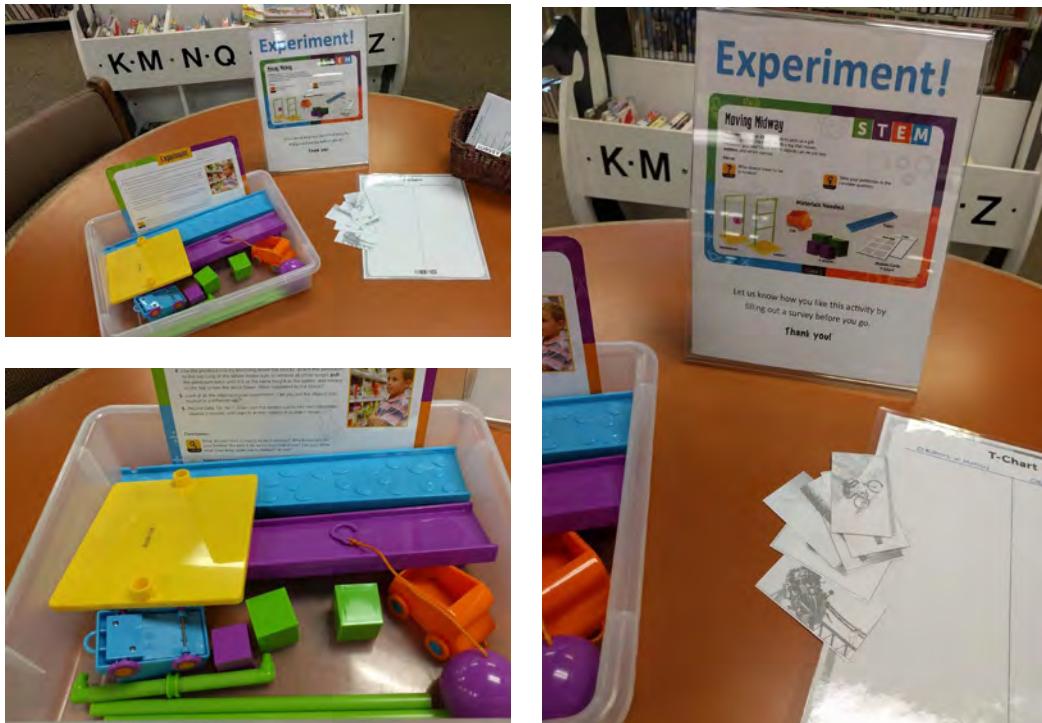
Gather data on: delivery method, type of activity

Prototype Examples from Pilot Libraries

Seeing how other libraries approach their prototypes can often be helpful with shaping yours. Here we share prototype examples from three of our pilot program libraries: Lakeport, Exeter, and Blanchard.

LAKEPORT LIBRARY

The team at Lakeport Library set out to design a maker program for young children that would foster creativity and provide opportunities for hands-on learning. They wanted to know if a passive program set up in the children's section with science manipulatives would attract young patrons. They also wanted to know if signage would be enough to guide them to engage with the activity and if the materials would supply multiple uses.



Lakeport Library's Force and Motion prototype tested a passive program in the children's area.

Using a science activity set called Force and Motion that they had on hand, staff set up an activity center in the children's area, with guided instructions. The location was chosen because it would be the first thing people see when they come into the children's area, providing maximum visibility for patrons, while also being clearly visible for front desk library staff to keep an eye on. Within one hour of setting up the program, all the materials (except the surveys) were gone and spread across the room, and the area had to be reset. This happened multiple times, where people would take materials to the

smaller tables nearby or to other tables around the room. In total, library staff reset the materials nine times.

Overall, this prototype revealed that children did interact with the materials. Despite it being a “passive” program, staff would need to be involved to keep materials in order. Also, it prompted them to consider moving the prototype to other areas in the room, as patrons may have been moving the materials because they felt uncomfortable sitting in the doorway, or the table may have been too tall for younger children.

EXETER LIBRARY

Exeter Library wanted to offer programs for children that would introduce STEAM (science, technology, engineering, arts, and math) concepts in a way that would encourage playfulness and creativity. They had also heard from community members that there was a strong interest in robotics. The prototype was designed to find out how successful potential robotics programs facilitated by an outside partner would be, if passive or facilitated programs work best, which days of the week and times were optimal, and what the ideal setup and arrangement of furniture would be.



Exeter Library's robotics prototypes revealed that ample floor space is needed for the activity.

For the first prototype, they invited the local ImagineU Museum to the library to set up and facilitate an activity while staff observed and talked to patrons. The ImagineU staff brought three different robotics activities, which worked out well, and children enthusiastically tried them all. This helped the library realize that they could combine various robotics offerings into one program. Staff were also surprised that the children didn't need as much guidance as they initially thought, and the unstructured environment worked well.

They also noticed that kids needed ample floor space to participate. So, for the second prototype, they moved furniture out of the room and offered a Dash and Dot robotics activity. Children naturally helped each other without an adult coaching them to work together. Families reported they were *very* happy to attend and participate in the program, and they wanted to see more of this at their library. Staff learned that robotics

are of extreme interest in the community, that ample floor space makes a big difference, and that very little direct facilitation is needed.

BLANCHARD COMMUNITY LIBRARY

At Blanchard Community Library, the staff was looking for ways to offer a variety of STEAM activities that might promote innovation and creativity for their patrons. They set up a prototype activity called Slime Time, designed to test three things: if low-tech projects are as engaging to patrons as high-tech ones, if potentially messy projects were containable, and how effective youth volunteers would be.

For the prototype, elementary and tween participants were provided materials and instruction on how to create slime with borax, glue, and food coloring. Six tween and teen volunteers assisted throughout the activity, which included time for children to play with their slime. The library staff learned that it's never going to be quite as bad as you fear it will (the interest level or the mess afterward) and to not be afraid to try something risky (e.g., glue-based slime in a building full of books). Also, the volunteers were awesome, knowledgeable, and brought their own passions to the projects. Their findings relieved library staff of needing to be experts on everything because they learned that others in the community love sharing their interests.



Blanchard Community Library set up a messy materials prototype with the Slime Time activity.

Document What Happened

One of the most important aspects of your prototype is to document the results.

Documenting is imperative and has many benefits:

- Others will learn from your experiments.
- You'll develop experience, techniques, and best practices for collecting data that will be useful to you as your project evolves.
- Logging what you did and how it went provides a recorded history of programming that new staff can easily access and use.

You'll need to find the methods that work best for you, but we recommend you consider the following:

- **Take photos!** Make sure to take photos of your room setup, space, materials, and supplies before the event and how the space looked *after* everyone left. If you don't have photo permission for the attendees, try to get shots of the back of heads or closeups of hands engaging in the activity.
- **Record numbers of participants.** How many were from your target audience? A clicker counter is cheap, readily available, and can easily be kept in the pocket of staff or volunteers during the event to keep track.
- **Reflect immediately afterward.** We're all tired and exhausted after an event, but you can't underestimate the importance of taking 10 minutes to reflect with staff and volunteers and to jot down notes. You can always go back and put the details you gathered in a more formal format later, but you'll definitely forget things if you don't record them immediately. Use the questions on the Prototype Framework tool to guide your reflection.
- **Gather feedback from participants.** You may want to create a survey on a half sheet of paper, or set one up using an electronic format like Google Forms or SurveyMonkey. Make sure to think about translations if your target audience has non-native English speakers.

Next Steps

After you've finished your prototype, where do you go from here? In many cases, you may need to run a series of prototypes before you have a clear vision of where you'd like to go and what implementation model will work best for your library. There are so many variables when you're presenting a program (e.g., content, mode of delivery, audience) that can influence your results, but by paying close attention and making subtle changes as you go, you'll learn more and more about what works best for your unique community needs. And, in the long run, starting small is a much more economical and practical way to build your space and conserve your library's valuable time and money.

TOOL

PARTICIPANT FEEDBACK FORM

Feel free to modify or add questions to this form based on the specific items you want to test. We've also included additional resources in the Evaluate portion of the Reflect & Refine section.

FURTHER READING

[**Reimagining Library Spaces: Transform Your Space on Any Budget**](#) was written by a school librarian with the school setting in mind, but it offers many ideas that translate to the public library setting, especially useful for programs designed for children and youth.

[**San Jose Public Library's Mobile Makerspace Guide**](#) shows how brainstorming and prototyping helped inform the development of their mobile makerspace, the Maker[Space]Ship.