

Implement

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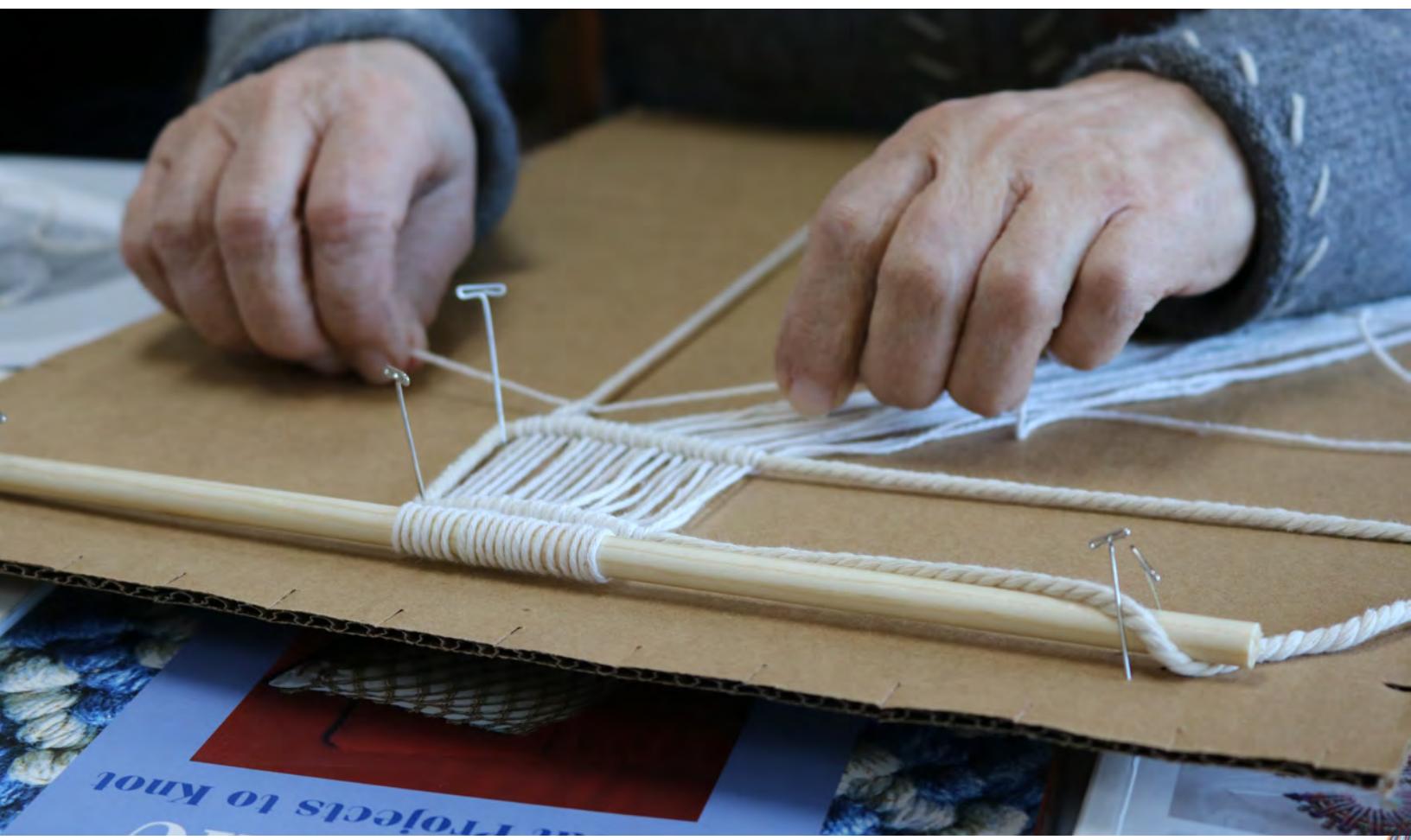
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Implement

The implementation part of the process is about taking what you've learned so far and putting it into action to get your makerspace program started. To help you think through all of the steps needed to make that happen, we've divided this section into Part 1 and 2: Prepare and Launch. Part 1 starts with setting concrete goals and making a plan to achieve them, while keeping in mind your budget, the activities you want to offer, and the environment you want to create. Then, in Part 2, we move into how to staff your space, along with the training and operational systems you need to have in place. As you embark on this phase of the process, use your Framing Question to guide you and decide what different implementation model(s) to embrace before diving into the finer details of launching your program.



Macrame is a popular low-tech activity at the Lakeport Library.



Part 1: Prepare

SET GOALS

Goals are about change. And articulating these goals is an important first step toward making your dreams a reality. When your goals are clear, you can use them to get key stakeholders on board with your idea, rally staff around your vision, and even inspire patrons and potential volunteers to join you.

When creating a makerspace in your library, think about your goals in terms of three main areas: partnerships, programming, and physical space. Although, in some cases, goals in these areas overlap, it's helpful to consider each area individually to ensure you're giving the appropriate attention to all aspects of your space. For example, it can be very easy to push off reaching out to the local high school to form a partnership with the robotics team when you're busy trying to plan your May programming. But those teens may become volunteers for future programs and help you spread the word in the community. Partnerships, in particular, take time, so constantly keeping those goals front and center will pay off in the long run.

Here are a few partnership, program, and physical space goals set by libraries in our pilot project.

Partnership Goals

- Identify and establish contacts with five new potential partner groups or individuals, including possible in-kind donors.
- Connect with the local school district to identify programming opportunities with their existing makerspace program.

Program Goals

- Identify and develop a team of maker facilitators from existing library staff across other branches to help lead programming.
- Have two staff members trained to operate, maintain, and run classes on 3D printing equipment.

Physical Space Goals

- Work with administration to formulate a plan for the redesign of the current computer center.
- Establish makerspace storage in the basement area.



These goals all follow a common goal-setting framework called SMART.

S is for specific: Goals should be well defined and easily understood. There's no point in making goals vague or too broad; they can seem overwhelming and unattainable. You can revisit goals over and over again if you need to make changes, but it's better to be specific now and flexible as you move forward.

M is for measurable: You must be able to measure the results and know when each goal has been accomplished. This measurement doesn't necessarily need to be through numbers or statistics, but you do need to have a clear way to "check the box" and move on.

A is for assignable: Oftentimes, after goals are set, they sit on shelves because there's no one specifically assigned to move them forward. Each goal should have a point person who "owns" that goal, tracks its progress, and calls it to everyone's attention when things need to shift.

R is for realistic: Goals should force you to stretch a bit but also fit within the realm of possibilities. For example, you may set a goal to turn an unused storage closet into an audio recording soundbooth in the next month. But if your board needs to approve any changes to the space in your library and they only meet every six months, then the goal as written is achievable but not realistic.

T is for timely: Goals must have an associated deadline, otherwise they'll be continually deferred, delayed, or denied—perhaps even all three! Deadlines motivate us, whether we like to admit it or not. They also give a specific reason to check in and reassess your progress.

Applying the SMART framework to your partnership, program, and physical space goals helps add focus, accountability, and timeliness to your process, ensuring you move ahead effectively.

CREATE AN ACTION PLAN

A very large and potentially complex project like developing a makerspace can seem overwhelming, but once specific goals are defined, it's helpful to break down the steps to achieve them into smaller, manageable tasks. The number of tasks needed to complete a goal will correlate to how complex the goal is.

Even if you're not the main decision maker in your organization, articulating an action plan helps you see what part you play in the bigger picture. Seeing your progress as you complete tasks on the plan will feel good and provide the impetus to keep going. Plus, you'll have a record of what you've achieved to share with stakeholders.

Key elements of an action plan are:

- Goals you set to achieve
- Description of the tasks needed to achieve each goal
- Who each task is assigned to
- Deadline for each task
- Who might need to approve a task before it's considered complete
- Status indicator if it's completed (or notes on what might prevent its completion)

As you work toward your goals, keep in mind that sometimes things develop in unexpected ways, or something you assumed would happen doesn't materialize. That's when you take a look and make adjustments to the plan so you can keep making progress, without falling apart or abandoning the project. The libraries in our pilot program all agree that perseverance and flexibility are central keys to success!

Our pilot sites shared the following tips on using goals and an action plan:

- **Just do it.** Let's face it, not many people like to take the time to write down goals, but it really does help to get the ball rolling.
- **Revisit every quarter.** Set a recurring meeting on the calendar every three months to revisit your goals and to tweak your action plan. You may be surprised by how much you've actually accomplished and will be reminded of things you still want to achieve.
- **Make it public.** Many of our pilot libraries decided to post their goals and action plan on a bulletin board or in the break room so that everyone could see them. That way, they're always top of mind and not stored in a file on a computer somewhere.
- **Be flexible.** Partnerships fall through, priorities change, and staff come and go. Don't be afraid of revisiting your plan and making changes. Your first action plan is one path to achieving your goals, but it's not the only path.

ACTION PLAN

A project management tool that helps to outline, assign, and track the steps you need to take to accomplish your goals.

TOOL

ACTION

PLAN

This tool includes a sample action plan from one of our pilot sites and a link to an online template to complete your own.



While starting a makerspace program can seem like a daunting amount of work, the rewards for the library and community are well worth the effort. Setting goals and developing an action plan from the beginning will help you stay focused, organized, and motivated. Remember to celebrate your successes along the way, no matter how small. Every task completed is one step closer to a goal met.



Planning and implementing one step at a time gave us the opportunity to effectively bring the makerspace together using the feedback of the community.

— LIBRARY STAFF





BUILD A BUDGET

When people start creating a makerspace, one of the most common questions is: How much will this cost? We began our process by guiding you to listen to your community, take inventory of what you already have, and look at other makerspaces, giving you a better sense of how to create a plan that is realistic and aligns with your library's capacity. Creating a budget that is aligned with your goals is the next important step toward garnering support, soliciting donations, and getting the funds and approvals you need to move forward.

Driving for bigger change? Thinking about remodeling a space? Create a special budget category for facilities improvements. Sit down with your administration and others who manage your building to find out if the improvements you have in mind might fit in with the site improvement plans of your library or local municipality, and if any other departments can foot the bill for the upgrades. Keep track of the one-time expenses for major physical improvements to your facility separately from the ongoing cost of program activities.

If you don't need a piece of equipment or tool for ongoing use, or you just want to try it out, consider borrowing it short-term from another branch or partner institution. Reaching out might also help to open up dialogue about your new program.

And if you're considering the purchase of any internet-connected devices or computers, be sure to work with your library IT department before selecting and purchasing, as they may have policies and guidelines you need to follow. You'll also want to coordinate a plan for troubleshooting when any issues occur. If purchasing laptops or tablets specifically, consider how you can set them up from the start to manage software installs and updates efficiently.

Remember that you don't need to purchase everything for your space. Ask your community for specific donations of supplies and materials, and be firm but kind in saying no to other items, or you may end up spending more time managing donations than running the program. The Build Support Through Fundraising portion of the Amplify & Grow section offers best practices when asking for in-kind donations and funds to support your various needs.

TOOL

BUDGET PLANNER

This **downloadable spreadsheet** helps you estimate the cost for items you'll need to purchase and the value of items you hope to obtain through donations.



FURTHER READING

The [Makerspace Playbook](#), although designed for schools, provides useful information for any makerspace, particularly around tools, materials, and safety considerations.

This set of [tool cards](#) from the SparkTruck gives a brief overview of some popular tools and what materials and activities pair well with each one.

[High School Makerspace Tools & Materials](#) outlines an à la carte approach to selecting equipment, tools, and materials for a new makerspace. It covers space requirements, workbenches, storage, and maintenance materials.

[STEAM Trunks](#) from Drew Charter School outlines how to create maker carts focused on specific strands of making—from construction to electronics, 3D printing, arts, and crafts.



SELECT AND PLAN ACTIVITIES

Now it's time to get specific about program content. What will people be doing and making in your makerspace? You've heard what kinds of things people enjoy, and you know what kinds of special skills your staff and volunteers possess. You have useful feedback from your prototype tests in regard to how, when, and where to offer your program. Is there a type of activity that you noticed was particularly well received, that participants might want to come back to and build on? What are people still curious to explore?

While this toolkit doesn't provide you with a collection of specific activities, we do know that searching for and selecting projects can be a daunting task, so in the Further Reading section below, we're sharing some of our go-to books and websites for ideas that might be helpful.

As you search for maker projects, keep in mind that you can (and should!) adapt any activity—whether from the internet or a book on your shelf—to inspire community and creativity by being more aligned with a maker mindset. Don't accept activities as they're written! Hack them to create the custom environment you want for your participants.

As you write out more activity plans, we suggest keeping them all in one place, either in a physical binder or a digital computer folder. That way, you and other staff members can effortlessly refer back to the details of an activity, making it easy to repeat and modify the activity at a later date.

And if you remember only one thing, let it be this: Our pilot sites told us, time and time again, that flexibility is key. Being flexible to new ideas before, during, and after your programs, letting go of any preconceived expectations, is the best way to go. Most of the principles highlighted here will happen naturally if you remain flexible and adaptable.

TOOL

MAKER ACTIVITY PLAN

Use this tool to plan and record the materials, instructions, adaptations, and other details for your maker activities. An example glass etching plan is included.



FURTHER READING

[Maker Ed's Resource Library](#) provides a curated set of resources related to maker education. Click on "Projects & Learning Resources" to search a collection of popular maker activities that can be adapted to your program.

The book series [Invent to Learn: Making, Tinkering, and Engineering in the Classroom](#), [The Invent to Learn Guide to Fun](#), and [The Invent to Learn Guide to More Fun](#) provides a wonderful range of activities for the makerspace, all designed to build knowledge, develop skills, and foster a maker mindset.

If you're planning to design maker boxes, Madison Public Library provides a [database of kits](#) available through their makerspace, The Bubbler.

The Bay Area Discovery Museum has a searchable [database of activities](#) to boost creativity for children ages 2–14 and up.

[Make It @ Your Library](#) from the Illinois State Library provides a curated list of activities to provide inspiration for maker programming.

[Making & Tinkering with STEM](#) provides an assortment of activities for children ages 3–8 using everyday materials to design and build solutions to problems faced by characters in their favorite books.



CREATE AN ENVIRONMENT FOR MAKING

The environment of a maker experience is an important aspect that you have control over, and it can make or break the success of your programming. The need to thoughtfully create and facilitate a maker activity isn't just for in-person workshops, but rather, it's relevant across the many different makerspace models. The way you influence materials, process, and space can make a difference, whether you're offering a workshop, a self-guided activity, a passive program, a virtual program, or a hands-on opportunity at a community event.

For our pilot project, we used a framework developed by the [Bay Area Discovery Museum](#) called CREATE, which is an acronym for *child-directed, risk-friendly, exploratory, active, time for imagination, and exchange of ideas*.

Let's take a closer look at each part of this acronym and how it applies to your maker programming.

The C is for child-directed but you could easily replace that verbiage with the words *participant-driven*. Your participants need to feel personally invested in the program to be engaged and have a meaningful connection to what they're making. Fully accomplishing this is tough for a lot of people because you have to let go of some control. But we urge you to give it try because the benefits far outweigh the risks. There are a number of ways you can accomplish this, but here are a few ideas to get you started:

- **Provide choice over materials, tools, and process.** Instead of following an activity in a step-by-step fashion, provide additional tools and materials so there is more than one way to accomplish the project at hand. Or try providing little to no instructions, supplemented with models or examples, to encourage participants to come up with their own creative process.
- **Refrain from immediately answering a question.** One tactic to creating "buy-in" and ownership over a space is to empower participants to discover things for themselves, even if you already know the answer. When a patron asks, "How does this work?" you can reply "What do you think we should try first to figure it out?" or "I'm not sure. Let's find out together."
- **Encourage participants to get guidance from others.** If you observe that one person has mastered a certain skill, encourage others to go to that individual for help and support instead of you. You'll empower that participant and help build community.

I had no idea of the possible impact of a makerspace. It changed how I do crafts. Instead of just handing out some paper, I think, 'What can you do with this paper and these supplies? If I give you minimal instructions, what can you do?'

—LIBRARY STAFF



- **Try using the phrase “I wonder.”** When you see someone struggling, instead of solving the problem for them, try using the phrase “I wonder” to give them a little hint. For example, “I wonder what would happen if you tried to use a different tool to attach that.” Some of the most impactful, memorable experiences are those where you face a challenge that you have to overcome on your own.
- **Offer opportunities to share.** Ask participants to share what they’ve made so they can learn and get new ideas from one another. This sharing might happen physically in your space or might take place digitally on a social media platform.
- **Get feedback from your participants and act on it.** Ask what they liked and what they would like to see next time. Then, try to act on their feedback, whenever possible. If participants see their suggestions put into action, they’ll be more invested to attend in the future.



Lakeport Library’s outdoor patio makerspace gives young children the space for exploration and wonder with water and dirt.



The R is about making your experience *risk-friendly*. The first step is to make sure that everyone feels safe, both physically and emotionally. How are you helping your patrons feel welcome and have a sense of belonging? Can they see examples of their work and the work of others on display? Are they greeted with a friendly hello when they walk in the door or come up to your table at an event? Are details (e.g., materials, wall decorations, or the music you might have playing) culturally relevant or reflective of the people you serve? Are patrons asked about their interests? Are there places for people to sit comfortably? Do the tools and materials used meet a range of accessibility needs (e.g., left-handed scissors, appropriate table height, space for assistive devices or personal assistants)? Are your signs and handouts wordy or do they rely on pictures? Are they available in another language?

When people feel like they belong in a space, they're more likely to take a risk and try something new, such as a tool they've never touched before or a technique they've been hesitant to learn. A big part of maker experiences is helping people to discover new passions and build confidence along the way.

This can be tricky when you have a drop-in audience with mixed ages—or if you set up a self-directed activity. Being prepared with ways to modify your activity to make it easier or more challenging as needed is helpful. Why? If an adult walks into your space and sees that you're coloring by number that day, they may think it's too easy and walk out. On the flipside, if that same person walks in and hears you tell everyone that they're going to reproduce Van Gogh's *Starry Night* with no other help or instruction, they may quickly get so frustrated that they give up and walk out.

How do you keep people in the room—and coming back for more? You make sure the activity helps them stretch their skills, or take just a big enough risk that they feel proud of what they made. Having modifications ready is so important because you may not know what background or skill set your audience has prior to your program.

For example, the Gilroy Library offered a paper circuits program for tweens and teens. Staff polled the group at the start to find out who had made circuits before and discovered that most had done it in school, but not all. Thankfully, program staff had prepared for this situation. They had templates available for the beginners, plain paper for those ready to make their own unique design, and a level-up challenge for those needing even more. Since they were prepared, all participants could engage at their own level and feel welcome.

We have a brother and sister, 10 and 9, who have high anxiety, to the point that they give up too soon on projects. Through makerspace programming, they've been working, and succeeding, at trying despite fear of failure. They've returned numerous times, each visit more confident. —LIBRARY STAFF





Teens show off their paper circuits at Lakeport Library.

The first E stands for *exploratory*. One of the most important ways you can make an activity more exploratory is by designing it to be open-ended, or allowing for many paths. Programming can be open-ended in a number of ways. First, some activities are just naturally open-ended. For instance, hosting a “take-apart” program—where participants bring in old appliances and electronics and take them apart to see how they work—is an open-ended activity. There’s no “correct” way to take apart a hair dryer, and even if you gave every single person the same hairdryer to tinker with, they would all probably discover something unique.

Another tactic to make an activity open-ended is by employing prompts and questions. These cues can be used to set the tone for the experience right from the start and can continue throughout. For example, if you had a paper craft workshop planned, you could start by saying, “Today we’re going to make pop-up cards.” Or instead, you could make the prompt inherently open-ended and say: “Today we’re going to explore different ways paper can be folded to make it come to life.” In the latter case, participants may not even make a card, and that’s okay.

Most activities you host in your space will be somewhere along the spectrum of closed-ended to open-ended. You tend to need close-ended experiences when you’re reviewing safety measures for a tool or teaching a new skill, like soldering or crochet. There’s a time and place for both.

OPEN-ENDED

There’s no “right way” to complete the project or solve the problem, and creations will all look different.



For example, the Corona Public Library hosted an evening program for adults on making sugar scrubs. The library staff member who was leading the workshop started her instructions with some basic chemistry to help everyone learn about the ingredients, why they were chosen, and how they interact. Then everyone made the same basic starter recipe (a closed-ended activity).

After this skill-building exercise, participants were offered a choice of ingredients to create their own custom recipes (making the activity open-ended). By having all participants start out with one simple introduction to ground their understanding of the materials and process, everyone felt comfortable enough to try their hand at doing something new and creative the second time. The library staff made sure there was plenty of time and materials to allow, encourage, and celebrate that exploration.

As you try to modify activities that you find through books, the internet, and elsewhere, ask yourself a few questions to help push your experiences to be more open-ended.

- How can you introduce the activity so participants don't think there's a predetermined final product?
- How can participants have more choice over which tools and materials to use?
- What will you do/say when someone gets stuck or comes up with a different idea that strays from your plan?

The A stands for active. Have you ever had to sit in a room where you were being talked at for hours on end? How long were you able to stay focused? To keep people engaged, they need to be actively participating in your program. This is especially important for younger participants. When planning your activities, expect and invite movement, taking into account and accommodating patrons with mobility limitations.

Physical movement can be encouraged by:

- Having people stand at tables to work, instead of sitting
- Providing alternative seating, like exercise balls or bean bag chairs, that allow room to wiggle
- Stopping and taking deliberate breaks for a chance to stretch or move around
- Setting up the activity with stations so participants need to get up and move from one to the next
- Playing music to encourage people to sway along



Adults at Corona Public Library make sugar scrubs.



Even minimal movement—such as seated yoga poses or just smiling from having fun—is effective. Physical activity (in whatever form possible) improves oxygen and blood flow to the brain and helps people not only stay engaged but enjoy their time more at your program.

The T stands for *time for imagination*. Imagination is at the heart of creativity and a vital component of any makerspace. Remember to provide space and time for imagination to flourish. Sometimes new ideas come at unexpected moments.

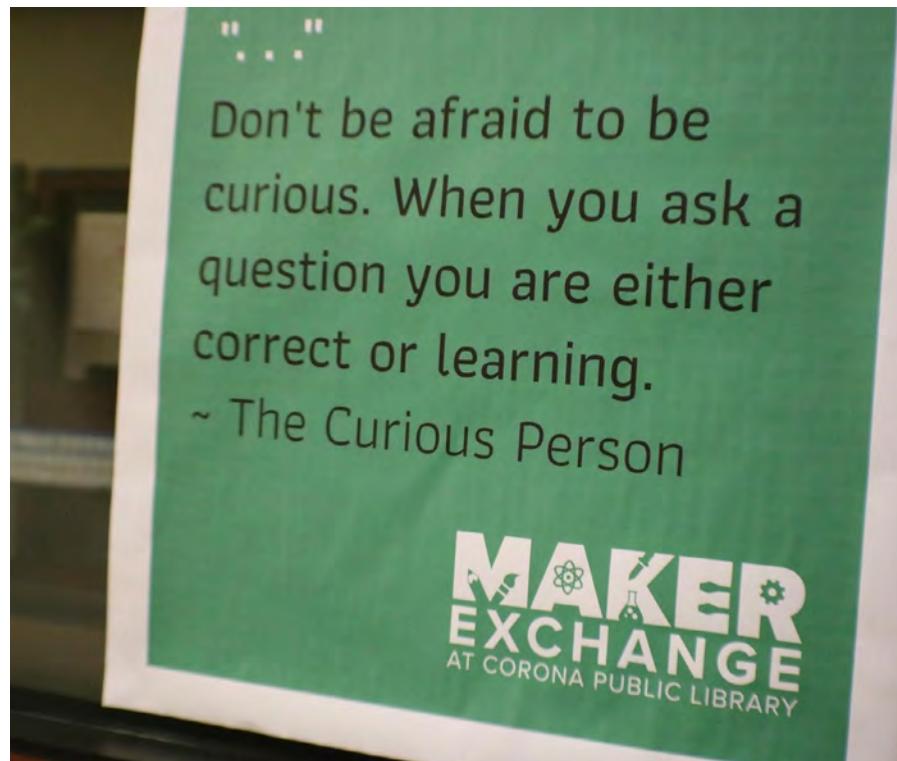
Try being explicit and literally tell participants that you would like them to use their imaginations and be creative. Many times, just the verbal permission to do so gets the juices flowing. Think about including encouraging posters as the backdrop of your videos or on your walls, leaving a note inside your program box, or placing a sign on your program tables with messages like “Stretch your imagination!” and “Wondering encouraged!”

Padding in ample time is also important, as is listening to participants. At community events, for instance, plan for some people to spend more time lingering while others finish more quickly. In a virtual program, suggest participants pause the video while they take time to tinker. In your library, consider having space on a bulletin board or even just paper slips near a jar to collect ideas for future activities/programs. All of these things will help establish a vibrant environment for creativity and imagination to thrive.

The final E stands for *exchange of ideas*. Creative collaboration and building off each other’s ideas are hallmarks of the Maker Movement. And it becomes especially important for activities with tweens and teens, who’ve often been taught to think that looking at someone else’s work is “cheating.”

If someone is struggling, try redirecting them to find inspiration from another patron (e.g., “I think Jose figured that out. Why don’t you talk to him?” or “Tamara tried a really unique design. You should go check it out. It might give you some new ideas.”)

Finding opportunities for patrons to talk with and get ideas from one another, whether in person or online, will not only build community and push new ideas, but it also takes the pressure off of you to always have the answers. You may even discover some new instructors for future programming!



Inspiring signs are posted around the Maker Exchange at Corona Public Library.



At one of our small pilot sites, Anaheim Public Library, during a self-directed fiber arts-themed program, a staff member was unsure how to thread the new sewing machine, and kids who had taken a sewing class before demonstrated how to do it. Several moms also ended up teaching kids how to embroider, a skill they had learned many years ago and had almost forgotten about until they visited the makerspace. All the library had to do was set the stage for these interactions and provide time and space for connection and collaboration.

You can also set the stage for collaboration by how you physically arrange the furniture in your space. Changing your space doesn't have to require massive amounts of money and can even be done in multi-use makerspaces. Did you know that a "shower board" from your local hardware store is a cheap substitute for a whiteboard that provides a great place to collaborate on ideas? What would happen if you installed castors on some of your furniture to add more mobility so you can rearrange the space more easily? Do you have a closet to store a few floor cushions to bring out for programming so teens can feel comfortable hanging out together, conversing, and sharing thoughts and ideas? Take a moment to think about the physical arrangement of your program and how it can encourage an exchange of ideas.



Children are welcome to play together and interact on the colorful floor mats during Maker Monday at Kings County Library.



Given the space and opportunity, maker program participants can teach one another, which is encouraged at Ponderosa Library.



FURTHER READING

The CREATE Framework: Learning Environments to Develop Creativity outlines how educators can build children's creative problem-solving skills through intentional experiences across a range of learning experiences, from designing exhibits to classroom setup and curriculum development.

Make Space: How to Set the Stage for Creative Collaboration is a practical guide that shows how space can be strategically set up to ignite creativity.

The Space: A Guide for Educators helps the reader explore creative ways to improve your space to support learning, even if you're on a tight budget.



It's not just about what we learn, but also how we learn it. It's important for us as facilitators to recognize that there are different ways and approaches to learning, so that we can be more adaptable and flexible when it comes to planning and facilitating our programs.

—LIBRARY STAFF



ENVISION THE PATRON EXPERIENCE

Creating a hypothetical patron experience is a great technique to help you fully envision your entire program experience and ensure that you thought through every aspect. Start by imagining your patron's experience from the moment they learn about the program to the moment they leave after the program or event is over. You may want to do this activity with your team and sketch things out on a whiteboard or on a large sheet of paper. Ask yourself:

- How do participants find out about the program? Do they need to preregister?
- Is the program visible and/or easy to find? How are they greeted when they arrive?
- How do participants get started? How are they invited to make?
- What does the space look like when they arrive? What is displayed on the walls?
- How is the furniture arranged? Can participants move about while doing the activity?
- How will the tools and materials be arranged or distributed for participants to find, access, and use? Are they adapted for varied skill levels, ages, or special needs?
- Will participants be encouraged to work collaboratively or individually?
- What happens if participants finish early or need more of a challenge?
- How many staff members are available to interact with?
- Are there ways to extend the learning afterwards (e.g., books in the collection or virtual resources)?
- Will participants be asked for their feedback at the end?

After you run your program, reflect on what parts of the experience went well and which did not. You may need to regroup the team and conduct this exercise again focusing on the aspects that need improvement.



At Kings County Library's Maker Mondays, the entire participant experience is considered, from the signage outside to the variety of activities offered.

Kings County Library hosts a Maker Monday event one evening a month, geared toward families. When families arrive at the library, they see a special sandwich-board sign outside on the sidewalk advertising that the event is taking place. Upon entering, a family might first encounter either the circulation desk, where they're greeted with a welcome and suggestion to visit the Maker Monday area, or they may go straight to the first Maker Monday activity table, where a staff member is stationed. That staff member explains what the featured activities are this month and encourages them to visit each table or try the VR experience. Strategically, there are some activities set down on a colorful mat for young children to enjoy, while older siblings can try out the hands-on science and art activities, including a tech demo. Before participants leave, there's at least one opportunity for them to give feedback on a paper survey. Everyone is encouraged to attend other maker-themed events that are coming soon on the calendar.



The glass walls at JFK Library's makerspace serve as an open invitation to passersby.

The Makery, a dedicated makerspace at the **JFK Library**, is located at a distance from the library main entrance, so there are flyers posted near the entrance with the latest activities offered, to guide patrons. The makerspace room is enclosed with two walls of glass, so it's easy to see inside, and the VR equipment and 3D printers are strategically placed up against those windows, to draw the attention and interest of passersby. When patrons arrive, they're greeted at the door with a friendly hello by The Makery staff, given a quick run-through of the space and the creative tools offered, and are informed that the space is open to the public, age 13 and up. If a younger person arrives, they explain that they can enter with an adult or return at a future time dedicated to young makers. Before getting started with any tools or activities, patrons sign a liability waiver, which is kept on file in the space. During open hours, the activities are largely self-directed, but staff is on hand to provide assistance. There are also times when patrons can come back for more structured workshops.



Part 2: Launch

STAFFING

As we mentioned at the beginning of this toolkit, people are the heart and soul of a makerspace. And staffing can be a difficult challenge in any makerspace, regardless of where it's located. Without adequate staffing, it's very difficult to offer the programs that you know your community needs and wants.

Naturally, we'd all like to know exactly how much people-power time is needed to run a maker program. The challenge is that every program and space is unique, so there's no "one size fits all" answer to the question. The actual job descriptions and number of hours dedicated to the maker program will vary depending on many factors, including but not limited to the implementation model you're launching, the frequency of your programs, and the complexity of the activities.

For example, if you're opening up a dedicated space, you'll need to schedule staff for all the hours that it's open and for any workshops you plan. But if you plan to run a weekly or bimonthly program in a multi-use space, you may need less dedicated staff time. Always keep in mind that outside of the time required to run a program, makerspace staff also need time to plan for activities, order supplies, maintain equipment, train, and arrange for program facilitation and support.

That being said, we asked the libraries involved in our pilot project what key qualities are most important for makerspace staff. They all unanimously said the three most important qualities are *open-mindedness, curiosity, and flexibility*.

Other key characteristics they mentioned are:

- Community builder, able to connect with your target audience
- Collaborator with people management skills
- Organized with project management skills
- Proactive, go-getter, independent thinker
- Comfortable with social media and online engagement
- Determined, doesn't give up or get discouraged easily
- Experienced in teaching and/or classroom management skills

Although it'll be nearly impossible (and not necessary) to find one person who possesses all of these qualities—in addition to any specific software or technology background that your space may require—this list provides an array of general traits to keep an eye out for and include in your interviews or recruitment language. Having a team of staff and volunteers that reflects these traits will contribute to a strong and sustainable outcome.



Look Within

The best place to start looking is within the walls of your own library. Do you already know who on your staff and volunteer list is a maker at heart? Have you determined which people in your library naturally have a maker mindset? You may not realize that your circulation desk staff member is an amateur ham radio enthusiast, your library page is an expert at macramé, and your retired volunteer was a former game designer. Start there and find out what hidden talents your staff and volunteers have because chances are they would be more than happy to share their passion with your community. Everyone can play at least a small part in shaping your maker program!

When **Blanchard Community Library** started planning their makerspace, the library staff wanted to find a community member with experience in digital media to help. It turns out that a volunteer at one of their partner organizations, the local art museum, was a retired Disney animator, highly skilled in 3D modeling. They reached out and not only did she want to help with the program, but she ended up getting a part-time job at the library and has been an integral part of the maker team ever since.

At **JFK Library**, they discovered that one of their part-time employees at the circulation desk had a degree in filmmaking. After uncovering that expertise, they decided to shift his duties to running the makerspace open hours and helping to set up their video-editing workshops. He loves his new job and has brought his skills and passion to the position.

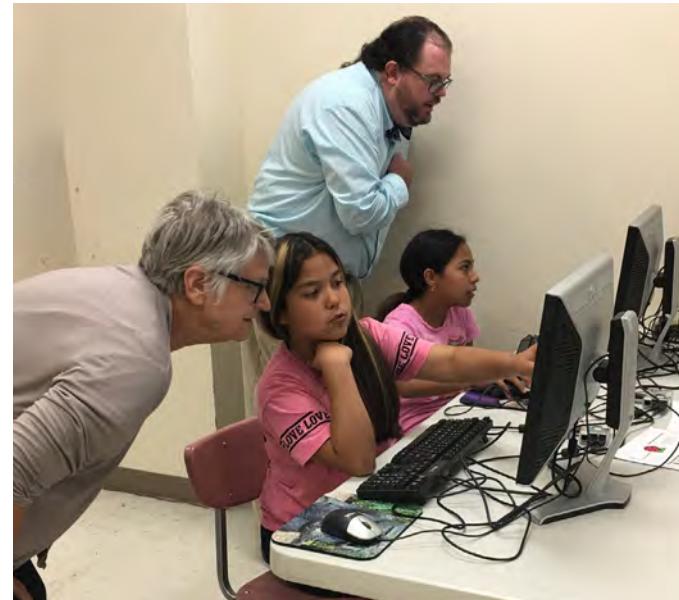
Ask for Help

Most makerspaces rely on volunteer help. This is true in both private community makerspaces as well as public library ones. Once people in your community start to learn about your space, make sure to constantly advertise your need for and openness to volunteers.

When recruiting for volunteers, be specific about what they can do to help. Do you need assistance on a regular ongoing basis, or is it a short-term project?

Based on the need to have staff facilitate the open hours, we've changed a staff member's shifts and job duty focus. He's shown an amazing change in his work attitude. He's excited to be here and share his knowledge. His supervisor has found his area of expertise and it's been a joy to watch him blossom.

—LIBRARY STAFF



The coding workshop for kids at Blanchard Community Library, led by a retired professional animator, is very well received.



What skills do you require most? Chances are that you need to recruit a bit differently for the makerspace than you do for your volunteers who help with tasks like shelving books. Think about looking to local industries and businesses that align with any special skill sets you might find helpful.

To encourage people to lend a hand, consider how you might incentivize your volunteer program. Is there any benefit a makerspace volunteer gains by helping out? Would they get access to any of the equipment during off hours in exchange for coaching others or leading workshops? Be creative as you build your maker volunteer program and develop ways to show gratitude and appreciation to all your volunteers.

And remember that young people can be some of the best volunteers. Since schools are incorporating more coding and STEM education into the classroom, there are more kids who have experience with the tech and tools that are in a makerspace. Some of these kids really geek out over it! Why not invite them to share their passion for tech with others in a youth volunteer program? They might serve to help peers, or work in an intergenerational program to teach tech to seniors. Don't underestimate your teens!

COMING 2019

THE MAKERY

WHERE SCIENCE, TECHNOLOGY, & ART MEET

WE NEED YOU!

Are you eager to share your time, talent, technical or artistic expertise with our community? The Makery is a collaborative space for local innovators to create, explore, discover and learn. If you're curious about how you can get involved please contact the JFK Library staff.

John F. Kennedy Library
 505 Santa Clara St. Vallejo, CA 94590
 1-866-57-ASKUS solanolibrary.com

SOLANO COUNTY LIBRARY

This flyer soliciting help for JFK Library's makerspace is simple yet effective.



Everyone on the staff is interested in different things and good at different things, which they're generous to invest their time and resources in. They've also been open about coming back again, sharing their craft, and showing willingness to help future maker events.

—LIBRARY STAFF



Youth Community Service

Many secondary schools require youth to volunteer in some form of community service. If that's true in your town, plan for simple straightforward tasks that young people can do to help out with the maker program—from prep to publicity. Have you noticed that a few of your teen program regulars have advanced skills with making? Invite them to share their talent in a youth-led maker activity. It's important to provide some coaching and encouragement, balanced with lots of room for youth to express themselves. Libraries—such as our pilot sites in Atascadero, Corona, and Gilroy—value the input of their teen advisory boards to help guide the direction of their programs.

Hopefully, through community service programs, your library will kindle new and fruitful relationships with creative and energetic young people in your area. You may notice youth who are interested in sticking around and getting more involved (though you may need to outwardly encourage this idea). Consider recruiting some of these youth as helpers for your virtual programming, busiest events, and summer programs.



Summer help from teens is essential at the Corona Public Library Maker Exchange.



Internship Programs

Interns from high school, community college, or university can bring advanced skills and dedicated staff support to your program. Hosting an intern is a commitment to mentoring an individual in exchange for some valuable help, so be sure you have the time and capacity to invest in anyone you recruit. Consider what kinds of skills they're hoping to develop, and how they align with the goals of your maker program. You might have someone looking to gain general work skills—like customer service, marketing, or project management—or someone wanting practical experience in applied technology. Others might be seeking teaching experience or professional experience in library science.

Many internships are paid, but often the library isn't responsible for funding them. Depending on the source, the intern might get paid through a workforce development program or through a school work-study program.

Feldheym Library approached the city and recruited an intern through a local economic development initiative, while our pilot library in Atascadero regularly hosts an intern from the community college's library information science program. Internship programs are a great way to get passionate, eager-to-learn individuals on board, put their talent to work, and provide a benefit to both parties involved.

Contract with Local Makers

If your budget allows, you may even want to pay someone (e.g., a local artist, repair specialist, scientist, or bike mechanic) to teach a class or a series of classes. In some cases, libraries hire these individuals as a "maker-in-residence" for an extended period of time, to infuse the programming with rich content and new people.

Many individuals in your community who "make" for a living have great skills to share. Showcasing their skills through hands-on learning is a prime opportunity to model careers and invest in the local maker ecosystem. As a bonus, this programming may attract new audiences to your space, who in turn may become volunteers in the future.



TRAIN FOR SUSTAINABILITY

Staff training can be a challenge, especially when you have to plan for staff turnover. One of the big lessons learned from established library makerspaces is the need to integrate training across staff from many departments and programs. Thinking you can hire just one individual to run “all things maker” is a staffing model that will get you into trouble fast. What happens when that person calls in sick or takes a new job and you have to wait months to hire someone new?

There are many ways to “spread the love” across your library. And not everyone, of course, will be knowledgeable in all aspects of your space, but the more you can cross-train staff, the better. You want your makerspace to be seen as one of the core services you offer at the library.

Invite all of your staff, administrators, interns, and volunteers to become at least generally familiar with the tools and materials available in the makerspace. Even if you don’t plan to schedule these folks to facilitate the program, they’ll be able to refer people to the resources available if they’re familiar with what the library has to offer. You might find that some will be excited, but others might be nervous or hesitant to participate.

Here are some common statements you might hear, along with suggestions for how to respond.

“This will take too much time to learn.”

Emphasize the need to simply play around and just try out the tools and materials. They might surprise themselves by something they find really fun or interesting.

“I’ll never be able to learn enough to answer the questions patrons would have.”

Let them know that they don’t need to be the expert and can respond with “I’ll find out” or “I don’t know, but we can try and find out together.”

“I’m just going to break that thing.”

Ease their worry and let them know it’s highly unlikely that they’ll break something. Even if they do push the wrong button or make a rookie mistake, things can be fixed (and often in the fixing, the learning gets even deeper).

“This is not why I became a librarian.”

Find common ground on why they entered the library field in the first place. If it’s a love of lifelong learning, makerspaces are exactly the place for both staff and the community to learn, grow, and try something for the first time.



Once you get through some of the initial hurdles, here are a few ways to invite individuals across departments to get involved:

- **Encourage free play.** Allow staff to take time on lunch breaks or after you close to experiment with the 3D printer pen or to try out the VR headset. People will gravitate toward things they're naturally interested in and curious about, and they may be inspired to dive deep and gain expertise that could really help you in the long term.
- **Lend tools to take home.** If it's okay with your administration, allow people to take something (e.g., robotics toys or the Silhouette cutting machine) home with them. This allows staff to become familiar with new tools without the pressure of being "watched" at work.
- **Host a maker "petting zoo."** Ask for time in an upcoming staff meeting or training day to set up a maker petting zoo. Have all of the equipment, tools, materials, and software out, and just allow everyone to explore while you tell them more about the programs you offer. Kings County Library held an event like this and introduced their new tools at a systemwide all-staff meeting.
- **Create a training video playlist.** Most makers are self-taught and became "experts" on a particular tool by watching hours of how-to videos on YouTube. Don't feel that you have to create a massive training plan to get everyone up to speed. Create a playlist of training videos to get people started, record any training you do, and encourage others to share great videos they've seen to add to your collection.
- **Offer skill builders.** For those who will be more directly involved in the makerspace, schedule some specific training for each type of tool or technology. We recommend starting with a two-hour training that provides the basics of how the tool works, plus some troubleshooting tips.



If you're not learning or being stimulated, it's so easy to become stagnant. To keep things interesting and keep staff motivated, you need to provide new learning opportunities, as well as space for staff to express themselves creatively. —LIBRARY STAFF

FURTHER READING

Check out rich conversation and reflections about training and staffing from several library representatives and get practical tips for success on this "[Understanding the Post-Emergent Phase of a Makerspace](#)" webcast, and browse case studies and reports posted on YouMedia's [Post-Emergent Library Makerspaces](#). These two resources come from interviews and articles with some of the libraries who first created library makerspaces here in the U.S.



OPERATIONS

Aside from the people needed to run your space, there are a lot of logistics to consider around the general operations of a makerspace to ensure it runs safely and efficiently. Like staffing, many factors are dependent on the unique characteristics of your space and the type of programming you're offering. We've pulled together a list of things to consider, gleaned from discussions with many library makerspace teams.

Design for Health and Safety

When you design the space and select tools, materials, and activities, there are important safety precautions you must follow to ensure that the facility and the people inside it are safe from harm. This encompasses everything from how equipment in the space is set up to signage and training, and there is absolutely nothing more important. Safety first, always. Here are a variety of considerations.

Safety Guidelines: Based on your programming, think about safety guidelines necessary for both staff and patrons. Do you need to have any safety rules posted (e.g., safety glasses must be worn)? Can patrons operate a tool themselves, or does a staff member need to assist? Is there a safety manual easily accessible for staff? Are the first aid kit and fire extinguisher accessible and clearly marked?

Training and Orientation: Employee and volunteer training are essential for creating a safe makerspace, providing guidance and procedures for both smooth operation as well as when things go wrong. A solid orientation, regular "refresher" courses, and plenty of clear signage throughout the space lay the foundation for a safe environment. Consider what specific training might be needed before any staff or volunteers use a tool or operate a machine.

Electrical Supply: Before you purchase electric-powered tools, check on your library's capacity to run these machines. Collaborate with facilities staff and electricians to see if you have ample infrastructure to handle the load. If you have to increase your capacity to add digital fabrication tools, for example, you may be encumbered by significant cost.

Ventilation: Many tools and materials can off-gas or smoke, negatively impacting the air quality in your space. Paints, solvents, certain types of 3D printer filament, soldering, and laser cutting all have the potential to emit harmful particles or vapors. Carefully read all warnings on the tools and materials you choose for your programs. Work with your facilities department to maximize fresh air flow and filtration of the air in the space. Purchase equipment options that help keep the air filtered and/or vented outside, such as air filter systems for laser engravers. Running programs outdoors or having a window that you can open is also helpful.



Accident Prevention: There are many factors to consider to prevent accidents before they happen. When setting up centers for activity, consider how people will move within the space. Prevent accidents by eliminating trip hazards, and avoid having groups of people near equipment that could harm them if they got accidentally bumped. Are electrical tools unplugged when not in use? Are sharp instruments kept tucked away safely until needed? Even sewing needles, scissors, and hot glue guns could cause harm, so be mindful of precautions to take with all of your activities, whether low tech or high tech.

Protective Gear: Keep an adequate supply of protective gear—such as safety goggles, gloves, first aid supplies, masks, and smocks—on hand, considering what you plan to do in your maker program.

Cleanliness: Provide protocols and supplies for cleaning and sanitizing materials and equipment between users. And make sure to budget for any specific cleaning agents that are needed to maintain your tools and equipment.

Liability Waivers

Are you offering any equipment that would require patrons to sign a liability waiver before using? One could argue that knitting needles, hot glue guns, and scissors pose a safety risk, let alone laser cutters and soldering irons. Most of the libraries in our pilot program didn't institute a waiver requirement, which was determined based on the tools and equipment that patrons would be using themselves, along with the risks involved. You'll need to consult with your own administration to determine the specific needs at your site. But if tools are only operated by staff members, that may mitigate the need for waivers.

- At JFK Library, patrons are provided a tour of The Makery and invited to fill out an information form and sign a release form. These forms are kept on file in the space, and the staff make sure participants are registered before using the space or participating in a program.
- If you host a large community event, like the Mini Maker Faire that the Gilroy Library hosted, sometimes the liability waiver is connected to your registration form. You might consider this to make the event day less complicated.

Age Restrictions

Does any of your equipment (e.g., VR headsets) have age restrictions from the manufacturer? Remember to check with your administration on whether you need to get a parent or guardian to sign a waiver for a minor to participate in your program or use a piece of equipment. At JFK Library, The Makery restricts the open studio participants to age 13 and up, with some exceptions if accompanied by an adult. And at Feldheim



Library, only patrons age 13 and up can use the VR system, and all participants sign a waiver in their gaming program, which is featured every Tuesday night.

You may also choose to implement an age restriction because you want to preserve certain programs or spaces for certain patrons (e.g., a teens-only space). Teens, in particular, tend to thrive when they can be together with other teens but often aren't interested in attending if the program includes younger children and tweens. Most of our pilot libraries keep their teen program restricted to teens only and support the program with a teen advisory committee. When Corona Public Library launched their maker program for teens, parents clamoured for additional STEAM programs for elementary and tweens. They experimented with a variety of program times, figured out the right times for teen-only programs, and then added something for younger children at a different time.



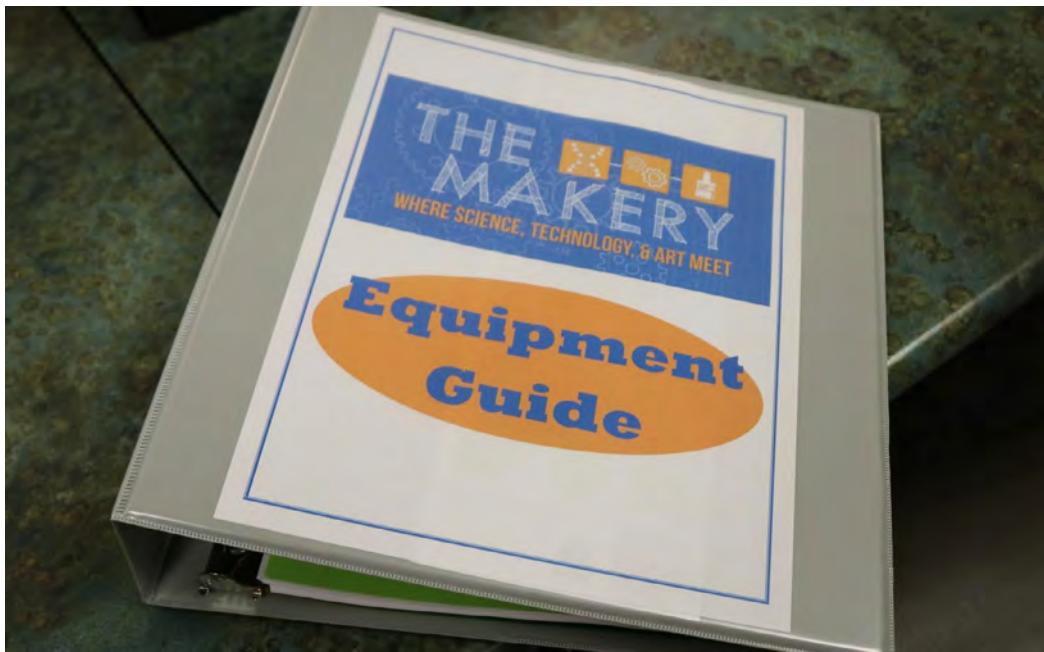
The Makery has age restrictions, along with ID and waiver requirements, posted at the entrance.



Maintenance

Creating a maintenance schedule is crucial for any tool or piece of equipment that you want to keep working optimally. It's also something that can easily slip through the cracks, so it's best to assign one person to be in charge of making sure it happens. Here are a few additional tips gleaned from our pilot libraries.

- When you purchase new equipment—such as a laser cutter, CNC mill, or 3D printer—find out about the optional maintenance plan. This could provide additional technical support, which might not be available otherwise in your town.
- Keep the warranty information, serial numbers, and equipment manuals in an easy-to-find place. When something goes wrong, be sure to check your warranty and be persistent! When the new laser cutter wasn't functioning at Gilroy Library, the manufacturer kept insisting it was user error. But after much persistence, they agreed that there was a problem with the machine and finally replaced it.
- Wondering how to maintain a particular piece of equipment? Ask your community for help! The Lakeport Library's solution was to hold a program on sewing machine maintenance. Not only did the patrons learn more, but the staff got good information too and built a stronger relationship with a local expert on sewing machine repair.



The Makery keeps their equipment instructions and maintenance manuals in a handy binder in the makerspace.



Digital Fabrication Policies and Procedures

If you're choosing to go the "high-tech" route for your makerspace, you'll need additional policies and procedures related to the production of your patrons' digital creations. Whether it's a digital design destined for the 3D printer, or a vector graphic file destined for the vinyl cutter, laser cutter, or CNC mill, you'll need to decide a few things.

- How many files can patrons send for production? How often?
- Are there restrictions on the size of the project or the time it'll take to use the equipment?
- Does the patron need to provide their own consumable material or pay a fee to the library for materials like filament, wood, vinyl, or fancy paper?
- How will the file transfer take place? Will patrons upload the file to an online queue system? Or give it to you on a flashdrive?
- Sometimes the design files can have format or quality problems that must be addressed before sending to be cut or printed. Who will handle that?
- Will you restrict the use of copyrighted imagery?
- Will you allow individuals to sell or make a profit on things they create in your space? Do they need to recognize the library?

Storage

Makerspaces, regardless of what form they take, always have lots of stuff—tools, materials, manuals, safety equipment, and more—and it just goes with the territory. Having a good system to store things and access them when and where you need them is important. Where will you put all of the tools and materials when not in use? Can some be left out for patrons to use whenever they need? Does any of it need to be locked? Will participants be able to leave behind a project-in-process? Consider cabinets or carts that have wheels in case you need to move them from one location to another. Also think about how you'll label bins and shelves to keep things in order.

The Atascadero Library maker program shares cabinet space with the children's librarian and uses a small staff kitchenette area for consumable materials. The Maker Box program in Tulare County is managed by the lone librarian of the tiny rural Pixley Library. Since they don't have storage space at this branch, kits are stored and restocked at the central library.

Rolling carts can be very useful for storage. Kings County Library outfitted a locking, rolling storage cart for each of its branches and filled them with a starter assortment of maker tools and materials. The library plans to share program tips and activity ideas so each of the branches can incorporate creative making into their programs. Here are a few more examples of maker carts.



Pictured here is an affordable rolling cart for consumable supplies at the Feldheim Library that also holds a paper sorting system and pen holder on top. Participants can easily access supplies organized in the many pull-out drawers.



Kings County Library, along with many of the libraries in our pilot, invested in a dedicated cart that is specifically designed for the 3D printer, allowing them to keep all the supplies in one place, move to different program rooms and demonstration locations, and store when not in use.



This rolling tool cart, used by Blanchard Community Library and Kings County Library, is handy because it has locking doors and drawers for any items that you need to keep secure, as well as a butcher block work surface on top. You can find carts like this in tool storage sections of hardware retailers.



If you don't have funds for a new cart, consider repurposing one of your book carts. This one uses simple, inexpensive bins and containers (even a cardboard box!) to organize supplies. Space and flexibility are maximized by hooking a two-compartment plastic tote over the handle.



This cart is like a cabinet and counter-height table on wheels, and it offers many useful features like electrical outlets, a trash can compartment, and a system for storing stools for seating.



Alternately, creative reorganization of existing closets or cabinets might be your best strategy for supply storage. Blanchard Community Library reorganized a closet to serve this purpose (before and after pictured here), and Atascadero Library put some underutilized kitchenette cabinets to use for their arts and crafts supplies.



Hours of Operation

How often will your program run and what hours will your space be open? This may be something that you limit at the beginning and grow over time.

- Blanchard Community Library started by integrating their maker program into their weekly teen program but then discovered the demand and interest of teens allowed them to expand it to twice per week.
- Libraries with dedicated spaces, such as JFK Library and Corona Public Library, both started out with “soft openings” and limited hours, giving staff a chance to get trained, as well as build interest and awareness of the program, before expanding to daily hours.
- The Feldheym Library discovered that the library’s 6 p.m. closing time made it very difficult to attract adults and families to the library for maker programs. They advocated to expand hours one night per week, and now Tuesdays are a very active program night not just for the makerspace, but for all areas of the library.

Registration System

Depending on the type of implementation model you’re using, you may need to have a registration system in place. Many libraries already have a digital event registration program, but if not, there are options available, from a simple clipboard sign-up sheet to an event management software system.

For any in-person or virtual program you’re implementing, it’s important to keep track of the ratio of how many signs-ups there were compared to how many attended. For example, If you regularly get only 60–70% attendance compared to reservations, you could plan to overbook the event and still be able to accommodate the group. Another helpful hint is to collect phone numbers when people sign up and give them a call the day before the program. Making these calls is a great task for a volunteer.

Registration systems can be helpful if you:

- Have limited space (e.g., maximum capacity for a physical room or an online event)
- Have limited materials, tools, and supplies (e.g., for an in-person program or a Maker Box program)
- Want a certain staff-to-participant ratio to ensure things run smoothly and safely
- Wish to send a reminder before and a thank you after attending

If you’re implementing a Maker Box program, you’ll need a way for branch libraries to register and receive their boxes. A simple method is to have a set rotation of these boxes that everyone has agreed to in advance, or a sign-up system where a library branch can



reserve a box for a certain time period on the calendar. You could use either your own library calendaring or catalog system or a shared spreadsheet. Be sure to note if a Maker Box happens to be out of circulation for maintenance or repair.

FURTHER READING

When developing policies, rules, and procedures, it helps to look at models from other libraries. Here are just a few examples and resources to get you started:

- American Library Association's resources for [developing a 3D printer policy](#) and [guidance regarding policy for digital media labs](#)
- Marin City Library's [3D printing policy and guidelines plan](#)
- Sacramento Public Library's [3D printing policy](#)
- [Makerspace Waiver of Liability](#) and [Code of Conduct Agreement form](#) from the Makerspace Media Studio at the South Novato Library
- [Participant release form for adults](#) and the [form for minors](#) from Woodland Public Library's Square One makerspace
- [Online permission form](#) for San Francisco Public Library's teen space, The Mix
- [Certification required](#) by the Fayetteville Free Library to use designated tools
- Maker Ed's [makerspace safety resources](#) to plan training, operations, and draft rules for the makerspace
- St. George Library in Washco, Utah, produced a [set of YouTube videos](#) to help with safety certification training
- Santa Clara University's Makerlab [tool safety videos](#)