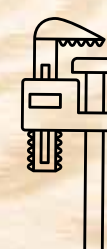


San Mateo
County
Libraries

EVERYONE IS A MAKER

MAKERSPACE MASTER PLAN



GYROSCOPE INC

June 19, 2017

ACKNOWLEDGEMENTS

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SECTION 1:

Executive Summary

Background & Context

GOALS AND VISION

San Mateo County Libraries (SMCL) engaged Gyroscope Inc. in partnership with S. R. Kent to develop a Master Plan for makerspaces for the library system. This plan aligns with the Libraries' strategic plan, which includes goals to create spaces that support discovery, enrich lives, and uplift the community. This plan also supports San Mateo County Libraries' vision to "ignite growth through transformative experiences". The purpose of the Master Plan is to provide a framework for future decision-making for all library facilities and programs around making.

PUBLIC LIBRARY TRENDS

The American Library Association's Center for the Future of Libraries tracks societal trends that have or will have a major impact on libraries. Their website¹ has a section devoted to the maker movement. On it they emphasize that access to new tools in libraries such as 3D printers and design software now permit library customers to "invent and create in ways that might have previously been limited to manufacturers and businesses." Making as learning matters in a library because makerspaces and maker programs can transform libraries from institutions that collect resources to ones that enable individuals and groups to create resources.

Goals and Vision:

BROAD STRATEGIC GOALS

- Build and update facilities to create inviting and flexible spaces
- Develop innovative programs and services that have measurable results
- Grow a culture of learning and participation

BROAD PERFORMANCE OUTCOMES

- Participants learn something new and feel more confident about what they learn at the makerspace
- Participants intend to apply what they learn through tools, resources, and programs
- Participants feel more involved in the community of makers

Executive Summary

WHY MAKERSPACES IN LIBRARIES?

A successful maker initiative in a library goes beyond makerspace classes to a network of opportunities and possibilities to transform both individuals and the community through making. Libraries have always been institutions that share resources and skills, while also building social capital within communities.

NEEDS AND OPPORTUNITIES

With twelve library locations and mobile outreach services, the Libraries are very active and heavily used. They have been doing maker programs for several years and have some maker equipment, such as 3D printers, in all locations.

AUDIENCES

- Inclusive, particularly to people unfamiliar with maker activities
- Available to a broad, ethnically and socio-economically diverse audience of families, children, teens, adults and seniors

COMMUNITY ENGAGEMENT

The consultants conducted broad community engagement to understand the needs and opportunities for makerspaces in the Libraries:

- Toured five libraries
- Facilitated a public workshop, three focus groups, and a staff workshop
- Conducted one-on-one phone interviews with key stakeholders



Approach & Key Strategies

The approach for this makerspace Master Plan is two-pronged: balancing system-wide library planning with opportunities to customize programming for local communities. This approach leverages the efficiency of managing and procuring system-wide resources with the differing needs, enthusiasm, and personality of local communities.

KEY STRATEGIES

- Invest in people
- Develop partnerships
- Make learning visible
- Be flexible and nimble



Community workshop facilitated by Gyroscope Inc. at the Belmont Library, CA.

SYSTEM PLANNING OBJECTIVES

- Align the Makerspace Master Plan with the strategic plan
- Prioritize and develop space planning and design for all locations
- Develop a staffing plan to support the Makerspace Master Plan
- Create strategic partnerships
- Research, develop, and plan programs
- Develop plans and service models for evolving library mobile services
- Integrate maker-centered learning approaches
- Manage tools, equipment and materials, acquisition and distribution
- Develop and manage operational systems and maintenance aspects
- Develop and integrate marketing and communications
- Plan for long-term growth and sustainability

CUSTOMIZE AT THE COMMUNITY LEVEL

- Identify local characteristics and culture
- Determine local community needs
- Develop programs that respond to community interests
- Implement and evaluate program impact on participants
- Share successful approaches between communities
- Create local partnerships

Programming Guidelines

EVERYONE IS A MAKER

San Mateo County Libraries are deeply committed to inclusiveness and diversity, and in that spirit the goal of the maker initiative is to bring opportunities for making to all. Everyone is a Maker.

TYOLOGIES AND LEARNING APPROACHES

Because people learn in different ways and have differing skills and experience, San Mateo County Libraries will offer a variety of types of programs (typologies), to appeal to different age levels, interests and learning styles.

The typologies include:

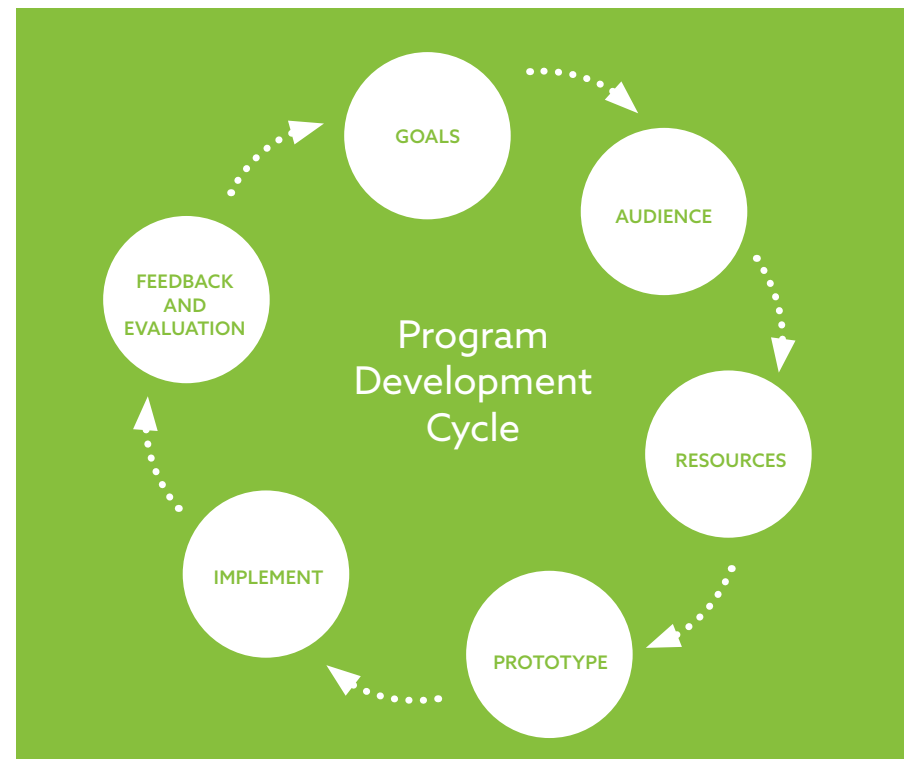
- **Start With A Book**
- **Maker In Residence**
- **Outdoors Experience**
- **On The Road**
- **DIY (Do-It-Yourself)**
- **Maker Moments**
- **DIT (Do-It-Together)**
- **Pop Up**
- **Maker Online**
- **Take It Home**

The learning approaches include:

- **Crafting**
- **Tinkering**
- **Project Based Learning**
- **Inquiry Based Learning**

PROGRAM PLANNING

The process San Mateo County Libraries will use to develop maker programs is iterative. The process starts by defining program goals, outcomes, and audiences, then determines what resources are available, selecting program typologies, and designing and testing program ideas. Next comes an implementation plan and an evaluation process that measures whether key goals are being met. The program can then be refined to maximize its impact.



Design & Equipment Guidelines

ARCHITECTURAL GUIDELINES

Facilities at the twelve San Mateo County Libraries differ in size, layout, and space availability. As a result, the Master Plan provides flexibility and freedom for individual makerspaces to change and evolve over time.

Options for makerspaces include:

- **Making throughout the library**
- **HOMAGO (Hang Out/Mess Around/Geek Out)**
- **Clean/wet/dusty spaces**
- **Pop-up maker activities in non-dedicated spaces**
- **Maker programs in flexible multi-purpose space**
- **Dedicated makerspaces**

The infrastructure needed for each type of space includes electrical, plumbing, lighting, acoustics, storage and security.

TOOLS, EQUIPMENT, AND MATERIALS

The Master Plan includes a list of general categories of tools, equipment and materials for differing programs, types of programs and types of spaces.

SAFETY

Safety manuals are an industry standard to assure that operations and safety measures that guided the original makerspace design are followed for the life of the equipment/facility.

- **Library will develop and maintain both internal and public safety and operations/rules manuals for all locations**
- **Library will maintain first aid, portable eye wash, and blood-borne pathogen clean up kit at each location**
- **Library will implement general safety messaging in the makerspace created from a template in the graphics standards**
- **Library will conduct regular staff safety training**



Staffing

STAFFING AND VOLUNTEER GUIDELINES

Staff development will be critical. All staff must be introduced to the maker initiative before it is rolled out, and staff should be kept up-to-date as the program develops in order to answer questions from the public. Those individuals directly involved in implementing the project will need more intensive training on the various maker programs, equipment and tools. Program staff must be kept current as new tools, equipment, and programs are developed.

A successful maker program should include volunteers from the community who can serve as trainers, presenters, and/or mentors. The Libraries should develop a volunteer program specific to making that targets skilled experts interested in teaching and mentoring.

Closer Look: San Mateo County Libraries

IMPLEMENTING STAFF PLAN

1. Centralized (Administration level)

- **ROLE:** determine roles required to execute the plan; makerspace management, procurement, and agreement development
- **SKILLS:** determine skills needed to execute assigned role
- **RESOURCES:** determine number of staff required to fulfill the role
- **DURATION:** determine duration of the need
- **IMPACT:** determine roles and impact

2. Local (dedicated makerspace, non-dedicated, and mobile)

- **RESOURCES:** local staff to support makerspaces; involve current staff and leverage skills and hobbies; recruit staff with specialized skills
- **TRAINING:** provide training to staff to support programs/activities
- **SKILLS:** determine skills needed at the local level to fulfill the role

3. Community Resources and Groups

- **VOLUNTEERS:** support makerspace through volunteers; use specialized skills to host events, workshops, or classes; assist staff in running the space
- **MAKER GROUPS:** invite maker groups

Implementation

Implementing the Master Plan will require a streamlined and efficient process. Key recommendations include:

Process and Action

- **Make sure staff have available time to participate in the maker initiative**
- **Develop a schedule that maps out short-term and long-term goals**
- **Align the schedule with other library initiatives to look for conflicts and complements**
- **Develop an efficient communications strategy and reporting structure**
- **Build in feedback loops that allow the process to be refined with an eye towards efficiency and effectiveness**
- **Use the “Four Threads of Implementation” (next page) to chart the four cornerstones of the plan and evaluate as the plan proceeds**

Implementing Program Development

- **Implement program development to reach desired demographic groups using various program typologies**
- **Prototype and test maker programs**
- **Create various models of makerspaces – dedicated and non-dedicated with appropriate equipment and tools**
- **Create mobile maker vehicle and take maker programs on the road to library and non-library venues**

Marketing and Communications

- **Aggressively market the “Everyone is a Maker” initiative through the library’s communications and social media platforms**
- **Connect with the audiences at various library facilities and potential partner organizations**

Operations and Budget Strategy

- **Work with the various cities to look at capital improvements needed in individual library facilities**



Summer Interns learning 3D printing

© San Mateo County Libraries (flickr)

Executive Summary

FOUR THREADS OF IMPLEMENTATION



SECTION 2:

Background & Context

Goals & Vision

The San Mateo County Libraries service plan strives to create spaces that support discovery, enrich lives, uplift the community and “ignite growth through transformative experiences”. In that spirit, the Libraries are now poised to create a system-wide maker network. The goal is to build a community of learners - providing everyone with access to the skills and opportunities that come from learning by doing. Makerspaces and maker-centered learning will enable the people of San Mateo County to develop 21st century skills, learn problem solving, and promote critical thinking. The Master Plan for San Mateo County Libraries is a road map for achieving that vision.



Maker Festival at Toronto Public Library

BROAD STRATEGIC GOALS

- Build and update facilities to create inviting and flexible spaces
- Develop creative programs and services that have measurable results
- Grow a culture of learning and participation

BROAD PERFORMANCE OUTCOMES

- Participants learn something new and feel more confident about what they learn at the makerspace
- Participants intend to apply what they learn through tools, resources, and programs
- Participants feel more involved in the community of makers

Public Library Trends

In developing a Makerspace Master Plan, it is essential to look forward to where libraries are going. Public libraries have always been places where people come to learn, to explore, and to engage with one another. As a vital community resource, free and open to all, the public library has a long-standing tradition of welcoming new ideas, utilizing new technologies and formats, providing a wide variety of public programming, encouraging children to love to read and learn, and responding to the specific needs of the communities in which they are located.

As public libraries face the future, they are enthusiastically embracing innovations in digital media and the fast and ever-changing world of new technologies. Bringing together traditional formats such as print with new digital formats and virtual reality has been a way that the public library meets and anticipates the needs of the people it serves.



San Jose Public Library Teen HQ Recording Studio, CA

Current trends in public library service—and, it should be noted, this list is ever evolving—include the ideas that the library of the future will:

- **Focus on the patron in the building and in the “cloud”**
- **Provide physical and digital collections that are responsive to patron demands and community needs**
- **Enhance the patron experience by providing latest technologies for public use and library operations**
- **Provide flexible and sustainable physical spaces for community interaction, collaboration, collections and patron-centered creation and makerspaces**
- **Create virtual resources that offer the ability for individuals to create and share content**
- **Encourage literacy and learning through services both traditional and innovative**
- **Have a building design that offers opportunities for limitless learning, bridging the education gap, supporting interest-driven learning and multiple literacies**
- **Add to the continued vitality in a welcoming environment where patrons feel empowered and enlightened by their own learning experiences**
- **Become an active node in residents’ daily lives, in which people connect with one another and work collaboratively, as well as individually**

Background & Context

These trends resonate with the findings of a (2016) study commissioned by the Aspen Institute, the International City/County Management Association (ICMA) and the Public Library Association. The nation-wide survey of chief administrative officers in local governments focused on the evolving role of public libraries in advancing community goals.

The top five priority areas where local government leaders see libraries playing an important role are:

Access to high-speed Internet service (73%)

Digital literacy (65%)

Early childhood education (65%)

Primary and secondary school attainment (59%)

Online learning/virtual learning (52%)



Early literacy computer workstations at Foster City Library, CA

MAKING AS LEARNING

Making elevates the idea of learning to a different level. One can read and learn, take a class and learn, watch a video or listen to a podcast and learn. In some cases learning has been done individually, and the public library has been called “the people’s university” for just that reason. In others, learning comes in a classroom or an online setting. While there has always been “hands-on” learning, and some of that has taken place through library programs for kids, like learning traditional native crafts or for adults in participating in library quilting circles or garden clubs, there have not been intentional opportunities for learning focused on individual creativity, or the spaces and resources necessary for this type of learning.

The American Library Association’s Center for the Future of Libraries tracks societal trends that have or will have a major impact on libraries. Their website has a section devoted to the maker movement. On it they emphasize that access to new tools in libraries, such as 3D printers and design software, now permit library customers to “invent and create in ways that might have previously been limited to manufacturers and businesses.” Making as learning matters in a library because makerspaces and maker programs can transform libraries from institutions that collect resources to ones that enable individuals and groups to create resources.

MAKERSPACES AS INSPIRATION AND ASPIRATION

There are many makerspaces in libraries, schools, colleges and universities, and in commercial enterprises in the United States and around the world. What appears to be common among those in public libraries is that they emerged and are growing in numbers because of several factors:

- The specific interest and determination of a library staff member
- The need to provide expanded technology and other resources to the community because of community interest and/or library future planning
- The availability of space to create something “new” and focused on making
- An interested donor who wanted to support a new type of learning
- An expansion of the tool lending library



Makerspace, Papalote Children's Museum, Mexico

© Exhibit design by Gyroscopic, Inc.

Why Makerspaces in Libraries?

MAKING CHANGE AND BUILDING SOCIAL CAPITAL

Libraries, one of the greatest civic and cultural institutions of our time, are ideal places for maker-centered learning. As public institutions, they offer a number of elements that support maker-centered learning: free access to all, public programs and services, and a common place where people can share values and ideas. Libraries house rich collections of learning resources, and they employ library staff as community liaisons.

A successful maker initiative in a library goes beyond single makerspace classes to a network of opportunities and possibilities to transform both individuals and the community through making. In maker-centered learning, one might start with a small project, be introduced to new tools and technical skills, but in fact gain much more than a simple “how to”. Going deeper than these technical approaches is the personal outcome – making change in the individual. Jean Piaget wrote about educating children in *To Understand Is to Invent*: “Lead the child to construct for himself the tools that will transform him from the inside – that is in a real sense and not just on the surface.” This transformation of the individual is at the heart of making. Maker learning helps people find personal agency, develop confidence, patience, perseverance, design thinking, and find networking connections in the community.

Making change is one of the important factors in the maker movement. As noted in a recent book, *Maker-Centered Learning*, progressive education researchers and thought leaders are seeing that maker-centered learning leads to maker empowerment – giving people the skills and ability to change the world around them. Maker-centered learning is a direct link to design and problem solving.

“The free exchange of ideas and information and the opportunity for people to connect with each other lie at the heart of a civil society. These values are reaffirmed every day through the collections, services, and programs provided at libraries across America,”

– Paul LeClerc, past President NYPL

Building on individual skills, one of the outcomes of the maker initiative is to build social capital in the community. Miklos Marschall, executive director of Transparency International, has defined social capital as the "values and social networks that enable coordination and cooperation within society...the relationship between people and organizations, which form the glue that strengthens civil society."² A maker initiative is about connecting people and resources in an informal learning environment, and creating opportunities and positive change in the community.

Libraries are well-suited to empower their visitors and communities to make change. Library programs can introduce learning simple skills to more advanced problem solving. A critical component of maker projects is to ask what are the implications of this project? How can I use this program to make meaningful change for the needs of my community?

Programs and tools enable people to learn skills, build self and agency, and creative positive change in the community. This helps build social capital.



Musical story time, at Pacifica's surf spot, CA.

© San Mateo County Libraries

Needs & Opportunities

San Mateo County and the Bay Area have a rich maker culture of organizations, programs, and people. With the first Maker Faire held at the San Mateo Fairgrounds in 2006, the maker movement has spread to schools, camps, clubs, museums, libraries, universities, publications, and online communities. Unfortunately, many of the existing maker programs and spaces are exclusive and costly, or consist of free online tutorials that are overwhelming and unappealing in quantity, quality and scope. San Mateo County Libraries have the opportunity to provide organized, free or low cost access to maker technology, skills, and programs to a broad audience – particularly to those who are not familiar with the maker movement.

San Mateo County Libraries may have many locations, but they are all part of one unified vision to strengthen their communities by providing meaningful library services. Each of the twelve libraries is part of a larger family offering worlds of discovery.

Approximately 283,000 people live within the boundaries of the service district, which covers 351 square miles. More than 165,000 community members, or 58% of the service population, have library cards, and more than two million people visit in person annually. Through innovative outreach and mobile services, enriching experiences are also delivered beyond library buildings.

SMCL hosts over 12,000 events each year, curating programming that

provides high-quality learning experiences reaching over 300,000 program attendees.

SMCL's strategic plan includes a re-branding with the tag line "Open for Exploration". The icon is a "burst of knowledge" visible at the entrance of all library locations. This new branding aligns well with the potential and spirit of the maker movement – access, discovery and exploration of tools, skills, and knowledge. The logo communicates how each local library is a part of a larger family with a single, unified vision. Likewise, the maker movement is about open source creative commons-sharing, collaboration, and strong communities.

There are many opportunities for SMCL to build alliances to sustain the maker initiative and at the same time benefit community and business partners. These partnerships range from strategic to programmatic, from national corporations to local businesses. In addition, partnering with schools and community organizations provides opportunities for program development, a volunteer base, and reaching new audiences.



Audiences

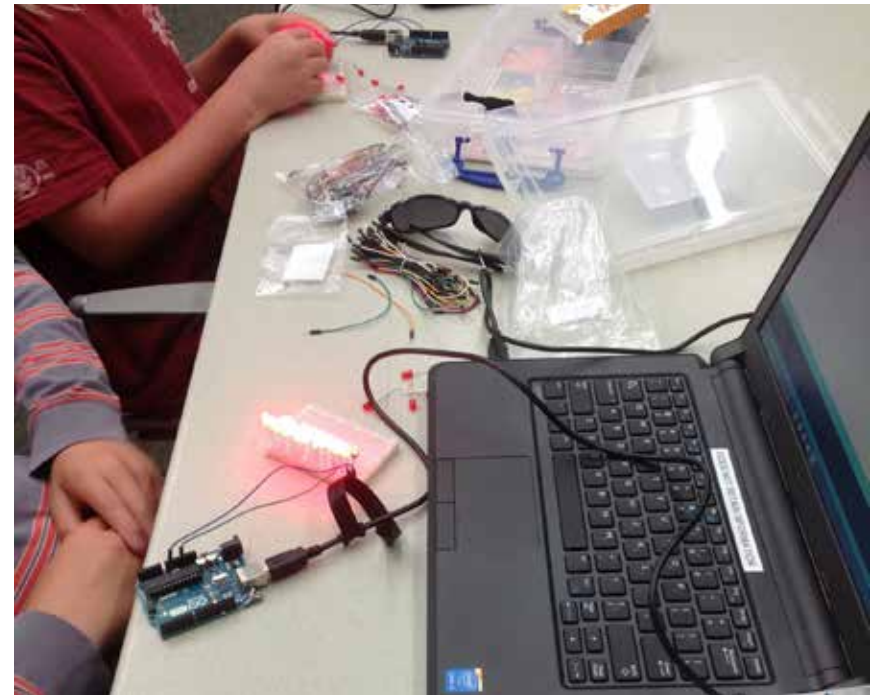
San Mateo County Libraries' maker programs will be accessible to all ages and inclusive, particularly to people who are not familiar with the maker movement and maker activities. The audience is broad, ethnically and socio-economically diverse, and includes families, children, teens, adults, and seniors. Each of these audiences has unique needs.

CHILDREN AND FAMILIES

The maker initiative can introduce children to STEAM (Science, Technology, Engineering, Art, Math) and help address challenges of literacy and early learning. Half of San Mateo County children are not reading proficiently by the third grade.³ Using hands-on project-based learning will support academic achievement for students for whom traditional educational models are failing.

The library can also help curate and direct their patrons to the free online resources in an organized and curated way, to continue their maker education outside of the library walls.

Agency by Design, a research group funded by the Bay Area-based Abundance Foundation, recently completed a three-year study to understand the benefits of maker-centered learning. Their key findings include "a new pedagogy that encourages community and collaboration, distributed teaching and learning, boundary crossing, and flexible teacher practices." These findings are well-aligned with the vision and goals of SMCL's maker initiative.



Children learning Arduino, San Mateo County Libraries

"Give the people something to do, not something to learn; and the doing is of such a nature as to demand thinking; learning naturally results."

– John Dewey (1859-1952)

Background & Context

TEENS

The maker initiative can encourage and support teen interest and excitement in STEAM with special emphasis towards girls and minorities who are not equally represented in STEM careers. Economic projections point to a need for approximately one million more STEM professionals than the U.S. will produce at the current rate over the next decade if the country is to retain its historical preeminence in science and technology. To meet this goal, the United States will need to increase the number of students who receive undergraduate STEM degrees by about 34% over current rates.⁴

ADULTS AND SENIORS

In a library makerspace, adults can gain career development opportunities, practical life skills such as learning how to fix things, a chance to explore new hobbies, enjoy connecting with others and keep current with technology.

EDUCATORS

SMCL can offer educators hands-on learning resources and be a partner in the classroom. Libraries are well positioned to offer after school and summer maker programs that integrate projects from the classroom.



A repair cafe where community members help each other to repair appliances



*Build and Design your own Skateboard Camp
Rockwood Library MakerLab, OR.*



LEGOengineering Educators Conference. Chattanooga Public Library, TN, 4th Floor public lab and education facility.

Community Engagement

THE PLANNING PROCESS

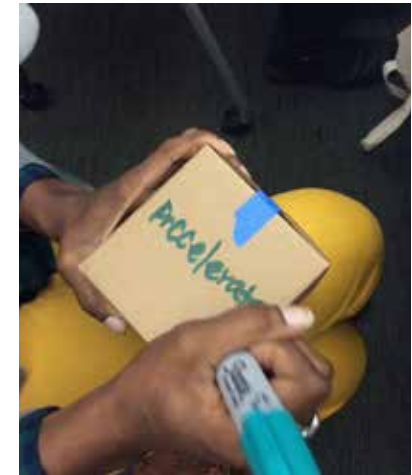
Gyroscope conducted a community engagement process to understand the needs and opportunities for makerspaces throughout the San Mateo County Libraries. This research process included meetings with the Core Team and Project Team, visiting five libraries, facilitating a public workshop, facilitating three focus groups at libraries, and conducting one-on-one phone interviews with key stakeholders. The engagement process included over 95 people between the community and library staff. In addition, the library conducted an online survey and had responses from 1,300 people and set up poster boards at each library to gather community ideas.



Public workshop, Belmont Library, CA.

Block Brainstorming:

The community engagement process included a brainstorming activity. People in the workshops assembled cardboard boxes and labeled each side with a maker issue: topic, skill, tool, partner, project, and favorite library service. They then wrote ideas for one issue and passed the block to a neighbor. After the six sides were filled with ideas, the blocks were stacked to create interesting and unexpected maker ideas and combinations.



© Gyroscope Inc.

Interests

Sewing

Electronics

Tools

Sewing Machine

Soldering Iron



Project

Robotic Stuffed Animal

Background & Context

COMMUNITY WORKSHOPS AND INTERVIEWS

Gyroscope has found strong consensus, enthusiasm and support for a system wide maker initiative. The concept got support both from people who are well versed in the maker movement and from those who are curious and want to learn more. Some people saw maker programs as a way to learn new skills, some want to work on specific projects, and some are keen to share maker knowledge with others. A group of teenagers who volunteer at the Belmont Library expressed interest in mentoring in a new makerspace. Community members were enthusiastic about the Libraries existing maker programs and the installation of 3D printers at all libraries. They were eager to participate in the future development of library maker programs and expressed interest both as users of the spaces and as potential volunteers.

Based on the community meetings and one-on-one interviews, we discovered that the community:

- **Highly engages in their library**
- **Understands the broad outcomes of maker-centered learning**
- **Has experience in a wide variety of maker skills and activities**
- **Will be a resource for new maker program ideas**
- **Wants to use making to build community connections**



Focus group facilitated by Gyroscope at the Half Moon Bay Library, CA.

© Gyroscope Inc.

Community members saw many benefits to makerspaces including learning specific skills and gaining knowledge in specific areas such as self-publishing and digital fabrication. Overall, the community members had good understanding of the space constraints and stated that the new makerspace could be small and functional, a place to prototype, then build elsewhere. Like the Libraries' logo, ideas can start at the library, then spread out. Participants also saw the benefits of linking the educational outcomes of hands-on learning to career skills and the economy.



Community workshop facilitated by Gyroscope Inc. at the Belmont Library, CA.

WHAT WE HEARD FROM THE COMMUNITY

"Kids need to be learning creativity and innovation. As hard as the schools try, they are under so many regulations that's not what they are teaching. Let's learn design thinking. We need that to drive the California economy."

-Friend's of the Library member at the Belmont workshop

"We need to address the challenge that kids don't have time or opportunity for electives in school...when kids slow down to make things, this ability and perseverance translates to technology fields."

-Kathleen, a retired science teacher and quilter, Half Moon Bay focus group

"Mentorship can happen both ways between older and younger generations to empower young people, build confidence and perseverance."

-Mary Anne, homeschooling parent, Half Moon Bay focus group

Background & Context

Parents expressed the desire for a safe space to support their kids in making and learning. They see the library as a welcoming and comfortable space for their families, including young children.

Many ideas came out of the community workshops. At the Half Moon Bay Library focus group, one woman was interested in carpentry and woodworking and would like classes on practical things like how to install shelving and basic household repairs. Another participant was interested in basic car repair. They both saw the library as a place to access knowledge. People agreed that everyone will find something that they will want to do in a makerspace and that maker classes will spark further interests. They see their library as a gathering place for people to learn new skills, create community collaborations, and have meaningful interactions. At the Half Moon Bay Library, the Piecemakers-By-The-Sea, a dedicated quilting guild, were very interested to share their skills and knowledge around quilting. Many people in the workshops and interviews expressed a great interest in how makerspaces and maker activities can be used to build community.



“The makerspace shouldn’t be too much of any ONE thing.”

-James, teen, Half Moon Bay focus group

“Let’s emphasize community service. The makerspace can be a social space and an opportunity for the community to work together. Change DIY to DIT, do it together.”

-Mike O’Neill, Brisbane Focus Group; Pacifica Council Member and JPA Governing Board Member

“Maker activities should teach cognitive skills that youth can transfer to academic and career paths.”

-Elizabeth Softky, ED of Jump Into Writing, East Palo Alto focus group

ONLINE SURVEY AND POSTER BOARD SURVEY: KEY FINDINGS

SMCL conducted an online survey and had responses from 1,300 people and set up poster boards at each library to gather community ideas. These include:

- Over 50 local maker groups identified (these groups could be potential sources of inspiration, partnerships, or resources)
- Over 500 suggestions for particular classes or equipment (this list can be used for understanding local needs and interest and might inspire program development)
- Over 100 volunteer responses

ONLINE SURVEY Q6: WHAT DO YOU BELIEVE IS THE SMCL ROLE AND FUNCTION IN THE MAKER MOVEMENT?

"Support schools"

"To inform and inspire people"

"The library should be facilitating...community members should be very involved in creating the content of classes/projects"

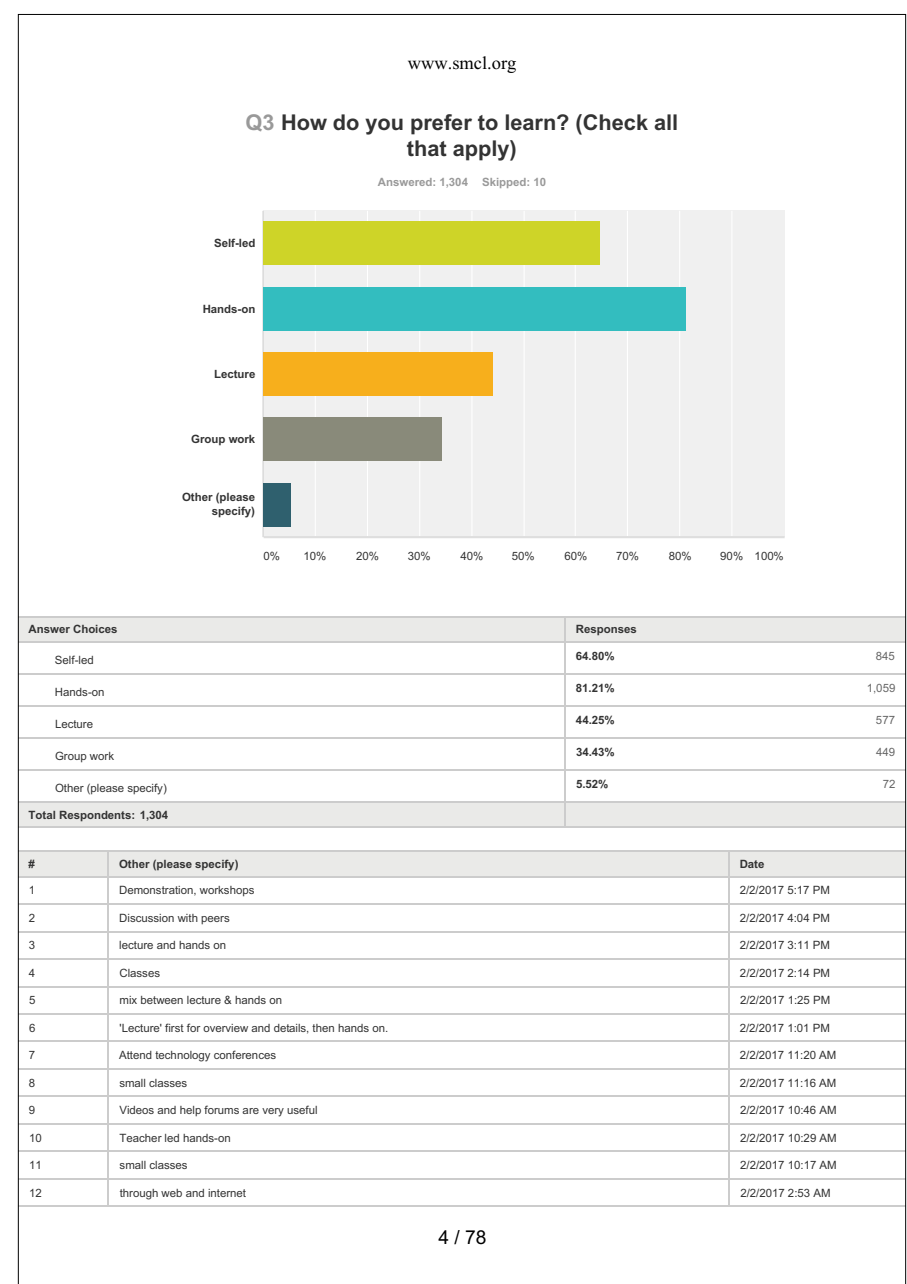
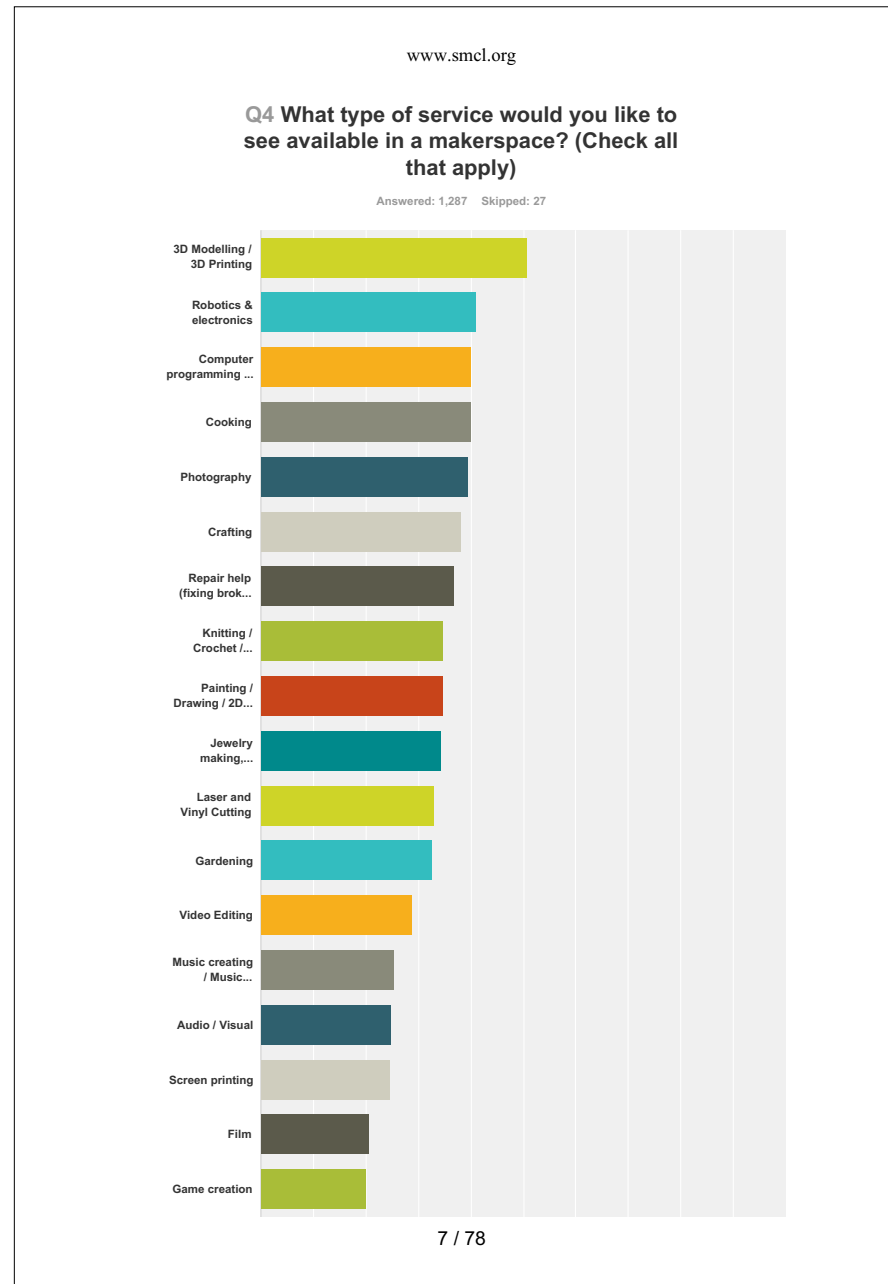
"Education, cultural enrichment, preservation of traditional arts/crafts"

"Get people involved, increase awareness and curiosity"

"It could be a hub for tools, exchange, and mentoring...a start-up incubator"

"I worry that this is another rush to a technology fad...please do not neglect the real purpose of the library. It has nothing to do with an easily broken 3D machine that will be obsolete in 18 months"

Background & Context



Sample pages from SMCL online survey.

SECTION 3:

Approach & Key Strategies

Approach

The approach for this Makerspace Master Plan is two-pronged: balancing system-wide library planning and systems with opportunities for customization at the community libraries. This approach leverages the efficiency of managing and procuring system-wide resources with the differing needs, enthusiasm and personality of local communities.

This development reflects the Libraries' strategic concept of a family of libraries. For example, programs can be developed around sharing ideas, projects and events that connect all the libraries in a maker-centered network.



Painting, at Pacifica Library, CA.

SYSTEM PLANNING OBJECTIVES:

- **Align the Makerspace Master Plan into the strategic plan**
- **Prioritize and develop space planning and design for all locations**
- **Develop a staffing plan to support the Makerspace Master Plan**
- **Create strategic partnerships**
- **Research, develop, and plan programs**
- **Develop plans and service models for evolving library mobile services**
- **Integrate maker-centered learning approaches**
- **Manage tools, equipment and materials, acquisition and distribution**
- **Develop and manage operational systems and maintenance aspects**
- **Develop and integrate marketing and communications**
- **Plan for long-term growth and sustainability**

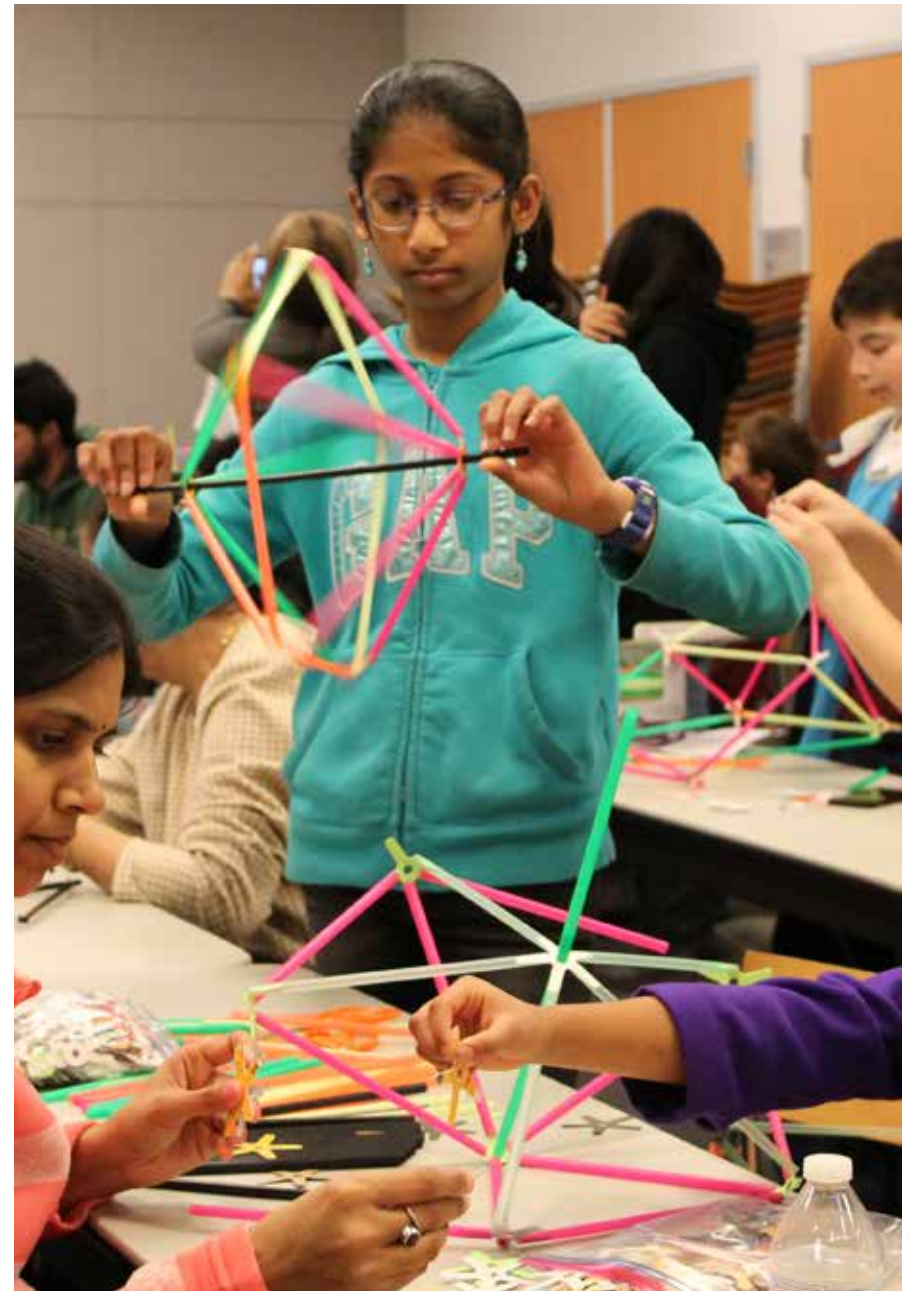
CUSTOMIZE AT THE COMMUNITY LEVEL:

- **Identify local characteristics and culture**
- **Determine local community needs**
- **Develop programs that respond to community interests**
- **Implement and evaluate program impact on participants**
- **Share successful approaches between communities**
- **Create local partnerships**

Key Strategies

Key strategies that apply to the library system are essential for a successful maker initiative. These strategies will guide planning and implementation for the maker initiatives.

-
1. INVEST IN PEOPLE
 2. DEVELOP PARTNERSHIPS
 3. MAKE LEARNING VISIBLE
 4. BE FLEXIBLE AND NIMBLE
-



Ideas in Motion kick off event, San Jose Public Library, CA.

Approach & Key Strategies

1. INVEST IN PEOPLE

People are critical to implementing a successful maker initiative. In addition to the spaces, tools, materials, and programs, qualified staff help to create a meaningful maker experience. In maker programs, people come together to solve problems, share ideas, exchange values, teach others new skills, be mentors, and generators of new ideas. These include library staff, volunteers, community members, students, parents, business owners, children, and teachers. Everyone can participate, and everyone can contribute.

Strategy in action:

- **Create professional development opportunities for staff around maker skills and programs**
- **Target specific audiences with each maker program and define the needs**
- **Create dedicated display areas to highlight local talent**

Fayetteville Free Library, NY

The Fab Lab is open 51 hours per week staffed in 2-3 hour/week shifts by 8 librarians, support staff (3-4 hours/month shift), and 8 trained volunteers (2-3 hour/week shifts).



Training workshop, at TechShop, CA.

© SPL (flickr)



SMCL staff training, at annual Staff Development Day

© San Mateo County Libraries

2. DEVELOP PARTNERSHIPS

The success of a maker initiative depends on the inclusion of partners, something SMCL already embraces with a long list of active partnerships. Partners can be strategic, working at the system-wide level, and also operational at the local level. These partners can provide programs, help to reach audiences, be a source for volunteers, give operational support, and help with funding. The partner relationships build and sustain the Libraries' maker network.

Strategy in action:

- **Build upon existing SMCL partnerships such as: the College of San Mateo Makerspace, The California Academy of Sciences, and The Exploratorium**
- **Find existing program providers who want to reach a wider audience and have them facilitate their programs in the library makerspaces**
- **For each new program, seek out new partnerships that have the potential for long-term benefits**



Activated Story Theater, Atherton Library, CA.



Lunar New Year Celebration, Millbrae Library, CA.

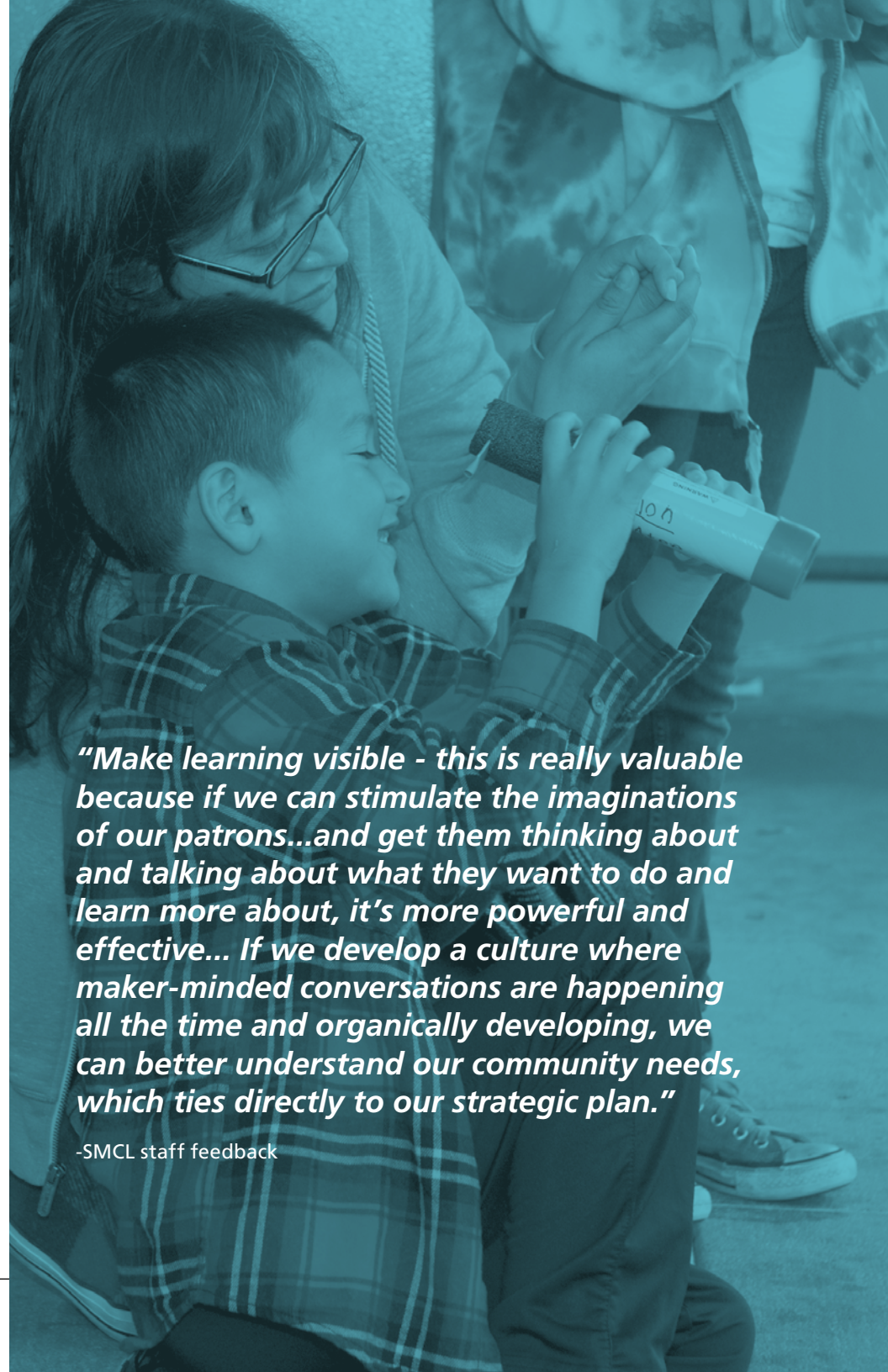
Approach & Key Strategies

3. MAKE LEARNING VISIBLE

This strategy puts making on display throughout the library, including the tools, materials, spaces, finished projects, project failures, and works in progress. This visibility creates an exciting and stimulating environment that draws people in and makes them curious about making in the library. The platform for making learning visible applies to the library spaces, mobile libraries and the eLibrary.

Strategy in action:

- Document the making process in pictures, words and video share these with the community and include thought provoking messaging; use these resources to show impact
- Hold events where makers share their project ideas and challenges
- Display maker works in progress and completed projects throughout the library spaces



“Make learning visible - this is really valuable because if we can stimulate the imaginations of our patrons...and get them thinking about and talking about what they want to do and learn more about, it’s more powerful and effective... If we develop a culture where maker-minded conversations are happening all the time and organically developing, we can better understand our community needs, which ties directly to our strategic plan.”

-SMCL staff feedback

4. BE FLEXIBLE AND NIMBLE

Makerspaces and maker-centered learning inherently undergo constant change. To support these changes, the maker initiative needs to develop systems, methods, and habits that are flexible, nimble, and adaptable to the varying needs of a wide range of audiences. Given that the Makerspace Master Plan will be implemented across many library spaces, with different staff and community members, flexibility is critical if the programs are to be successful.

Strategy in action:

- Have staff participate in professional development programs that teach flexibility and nimbleness
- Develop programs that can scale up or down to accommodate space constraints and different number of users from small groups to larger classes
- Develop system-wide programs with strong goals and foundations but allows room for customizing to specific needs



© Chattanooga Public Library (Flickr)

4th Floor, Chattanooga Public Library, TN

The 4th floor is a messy space that changes all the time and it's evolution is expected to continue organically. The staff are part of the community maker movement. Community groups use the space constantly for their own projects ranging from tech to textile/craft.

SECTION 4:

Programming Guidelines

Everyone Is A Maker

A Conceptual Framework for San Mateo County Libraries

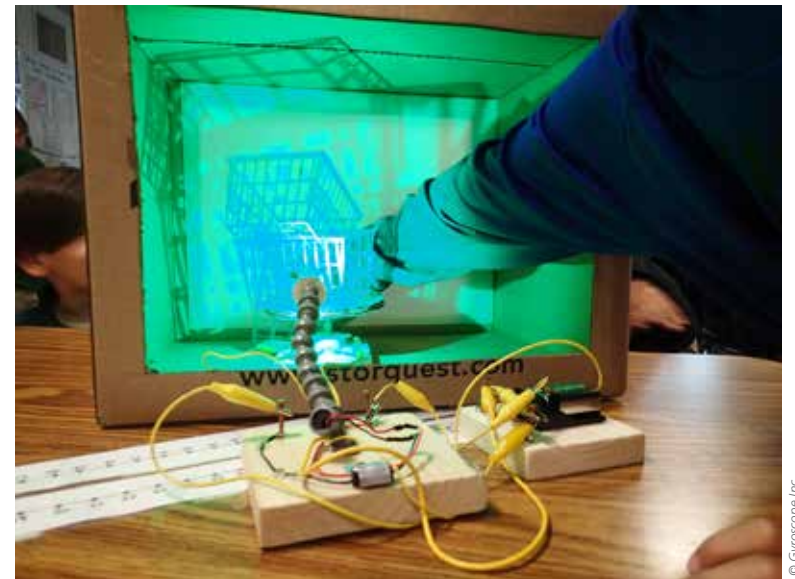
A Conceptual Framework expresses an organization's vision, mission and values in ways that manage and extend a rich variety of environments, experiences and programs, both indoors and out. A Conceptual Framework serves both creative and practical functions. It helps inspire and shape spaces and adjacencies, opens possibilities for look and feel, and guides material selection. At the same time, a Conceptual Framework provides cohesion, allowing spaces and experiences to connect with, build on, and strengthen one another.

The Conceptual Framework for the San Mateo County Libraries maker initiative is 'Everyone Is A Maker.' This framework aligns with the goal developing a program that is inclusive and open to all members of the community. Maker-centered learning can be woven throughout the entire library system. This is about a maker mindset, not just a makerspace. This framework takes the maker experience and integrates it with all the other library components including staff, services, books, spaces, and programs.



Chef hat making, Foster City Library, CA.

© San Mateo County Libraries (flickr)



Shadow box project, in 2nd grade classroom, Lighthouse Community Charter School, CA.

© Gyroscope Inc.

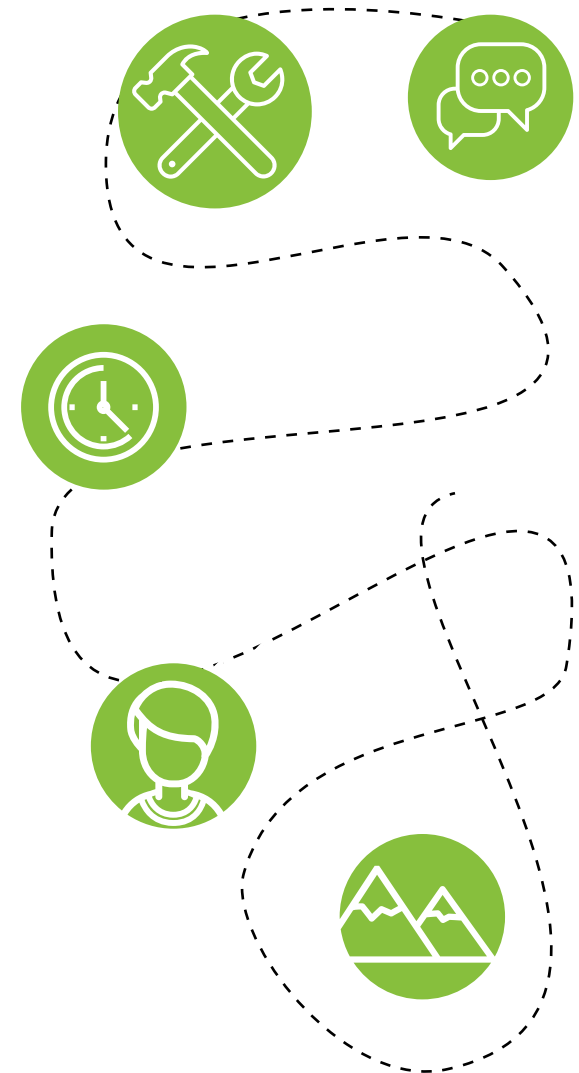
Typologies

The term typology describes the types of learning experiences. Successful cultural organizations are often a deliberate mix of typologies that are intended to appeal to a wide range of visitors with different interests, and entry points — they shape the visitor experience.

The following typologies, under the umbrella of the conceptual framework 'Everyone is a Maker,' provide a starting point for program planning, development, and marketing for maker-centered learning. Any one typology might encompass a range of programs that can be implemented at different scales, with different learning approaches, targeting a variety of audiences and subjects. Many maker typologies can be implemented concurrently throughout the library, enriching existing programming and spaces.

START WITH A BOOK
MAKER IN RESIDENCE
OUTDOOR EXPERIENCE
ON THE ROAD
DIY

MAKER MOMENTS
DIT
POP UP
MAKER ONLINE
TAKE IT HOME





START WITH A BOOK

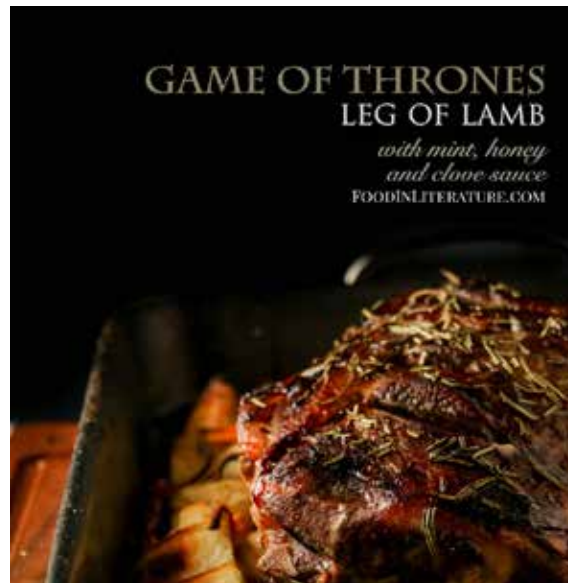
Start With A Book pairs reading with hands-on making to introduce patrons to library resources and to celebrate community. Programs will reach out to traditional library users who are new to making as well as experienced makers who want to learn about library resources. Example programs could be:

- **Make and Talk Book Club** - a book club where people gather to discuss literature while crafting, cooking, or making something thematic from the story
- **Baby and toddler story-time with STEAM activities**
- **Take home suggested STEAM activities with circulating books**
- **System-wide book event and maker activity**
- **Book-making and self-publishing workshops**



© Multnomah County Library (Flickr)

Photoshoots based on comic book characters.
Comic-Con For Kids, Multnomah County Library System, OR



Literature recipes, InLiterature.net



© Clearwater Public Library (Flickr)

Book planter, Clearwater Public Library, FL



MAKER IN RESIDENCE

Many museums, schools, and art organizations have artists in residence programs that enrich the institution's public offerings and support the careers of local artists. The Maker In Residence would be under contract with SMCL for a certain stipend and time duration, exchanging workspace and access to equipment for community service. The artist/maker might teach workshops, develop curriculum, or build an exhibit for the library's permanent collection. Here are some examples of maker/artist in residence programs around the country:

Madison Public Library, The Bubbler, Artist In Residence Program:

A jury selects Artists In Residence on a yearly basis for a 1-3 month long paid residency. The Artists In Residence are an important part of the Bubbler programming, providing opportunities to "learn, share, and create in their special field". Artists hold an open studio at least two days per week in the Bubbler Room and are expected to plan at least two workshops in each month of residency.

Recology SF Transfer Station: Artists In Residence have scavenging privileges and 24-hour access to a large well-equipped art studio. Artists speak to elementary school classes and adult tour groups about the experience of making art from scavenged recycled materials. At the end of the residency, there is a public exhibition, and artists contribute artwork to the program's permanent and traveling collection.

San Jose Quilt Museum: Artists In Residence have on-site Fiberspace open studios during their three month residency in the museum's Makerspace.

Appleton Public Library: Funded by the Friends of the Appleton Public Library, residencies last for three months. Artists exhibit their work, do demonstrations, and lead two hands-on public workshops.

Mesa County Libraries: The goal of the Artist In Residence program is to further Mesa County Libraries' mission to enrich lives and build community through opportunities to learn, discover, create, and connect. While in the 970 West Studio, artists work with library staff to provide three library workshops (one per month) during the

residency. Artists are encouraged to hold regular open studio hours for public interaction.

Pikes Peak Library District: PPLD's Makerspaces at Library 21c are great places for generating creativity, innovation, and learning. Each maker/artist in residence has a 6-week contract. During that time, he/she works on a studio/lab project, and teaches classes at several locations.



Stamping at Brisbane Library, CA.

© San Mateo County Libraries (flickr)



OUTDOOR EXPERIENCE

This typology is an opportunity for wet, messy or loud activities which cannot be easily accommodated inside the library. Outdoor programs can be themed with the seasons and might use natural materials available at a certain time of the year. The library could partner with outdoor providers such as local hiking groups, native plant enthusiasts, or bird watching groups. Outdoor experience programs might have a larger educational goal to promote environmental awareness. Some example outdoor maker experiences could be:

- **Portable wood shop**
- **Portable welding**
- **Blacksmithing**
- **Building rockets and rocket launchers**
- **Kite making**
- **Fort building**
- **Building raised garden beds**
- **Building bat or bird houses**
- **Making pinhole cameras**
- **Making sundials**



Kite Making, College of San Mateo Makerspace + Family Science & Astronomy Festival, CA.



Container carrot gardening, at the Pacifica Sanchez Library, CA.



Welding at The Crucible, CA.



ON THE ROAD

Maker programs can meet new audiences and find new opportunities outside of the library with a mobile approach predicated on the success of the San Mateo County Library Bookmobile, Lookmobile and other outreach activities. Possible ideas for On the Road typology are the following:

- **Maker Mobile**
- **Farmers market and community event maker stand**
- **Bringing programs to schools and senior centers**
- **Continue attending the Maker Faire**



SMCL booth at the San Mateo County Maker Faire, CA.



Maker [Space] Ship, San Jose Public Library, CA.



SMCL bicycle at the San Mateo County Maker Faire, CA.



DIY

The Do-It-Yourself typology is about individuals pursuing their own projects with the support of library resources. Some examples of DIY programming could include:

- **Open studio time**
- **Access to knowledgeable library staff and community members scheduled for drop in help**
- **Access to tools and equipment**
- **DIY patrons can fill out a “Maker Project Brainstorming Worksheet” (see appendices) to plan their project**



© Philippe Cabots (Flickr)

Sewing and textile projects.



© The Crucible (flickr)

Woodworking, The Crucible, CA.



© Multnomah County Library (flickr)

Soldering, Rockwood Library Makerspace, Portland, OR.



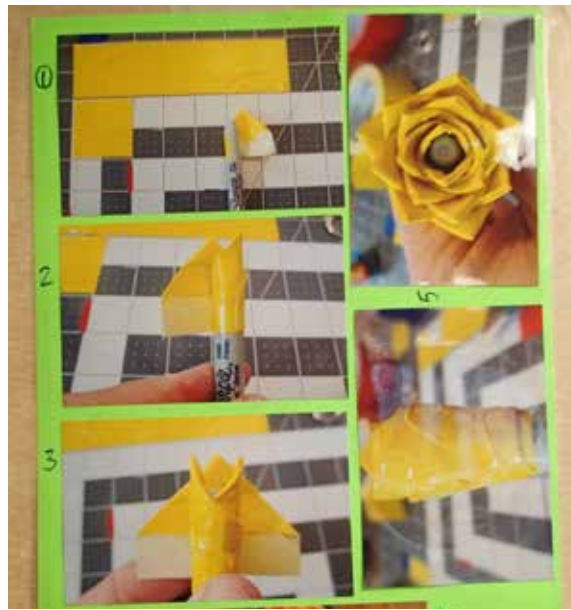
MAKER MOMENTS

This typology is about short-duration activities that might last 1-10 minutes, like an interactive hands-on exhibit. This is a great intro for timid wannabe makers who have not built up the confidence to sign up for a longer program yet. It could be presented in a range of scales. Possible examples could be the following:

- **Small scale diversion: discover a STEAM display in the stacks 12" x 12" x 12" space**
- **Medium scale: Pause and contribute to a hands-on collaboration at the end of a bookshelf**
- **Large: Contribute to a large community-made art installation**



Craft time at the Half Moon Bay Library, CA.



Creativity Lab poster, Lighthouse Community Charter School, CA.



Circuit project, Pacifica Libraries, CA.



DIT

Do-It-Together typology is about bringing back a traditional communal way of thinking in our increasingly individualized society. The barn raising and quilting bees of old represent a communal tradition where the sum is greater than the parts. Today people converge for hackathons and Repair Cafes. These activities are great opportunities for social gatherings around making.

- **Summer long maker programs - similar to summer reading programs with goals and merit prizes**
- **Traveling artifacts that get added to/modified by each library such as a 3D printed city scape model**
- **Community Service days and Repair Cafe - getting help from your community on specific challenges**



"Toss it? No way!" at Palo Alto Repair Cafe, CA.



Video production using a green screen, Rockwood Library Makerspace, Portland, OR.

Programming Guidelines



POP UP

The Pop Up typology is a temporary program designed for and installed in a space that is not conventionally used for that activity. Possible examples could include the following:

- **Host events that will attract new patrons and professional makers**
- **All night hackathon**
- **Cooking demonstrations**
- **Performances and workshops**
- **Bike repair stations**



Bicycle repair stall at the Reading Repair Cafe, Reading, UK.

©Karen Blakeman (Flickr)



Beer making demonstration, 21+ Night at the Thinkery, TX.

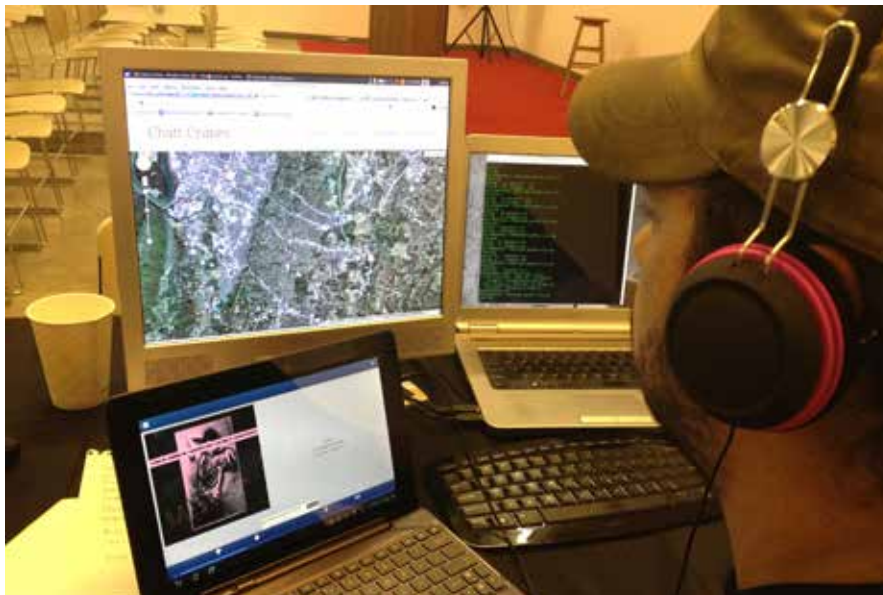
©The Thinkery



MAKER ONLINE

The eLibrary is San Mateo County Libraries 5th busiest “location” with the largest single collection. Possible online programs could include:

- **Online tool tutorials and quizzes for self-certification that are required for patrons to use certain tools at the library**
- **Online references to maker projects and expertise**
- **Online gallery of media projects made in the library**
- **Online community blog/forum documenting and sharing maker stories**
- **Online collaborative digital arts project where makers can create together in the cloud - a mural, an eBook, a music album**



© Chattanooga Public Library (flickr)

National Day of Civic Hacking, Chattanooga Public Library, TN



Chattanooga Public Library

Powered by the 1 GIG network in Chattanooga the library has hosted National Day of Civic Hacking and Online community education projects.⁵



TAKE HOME

This typology encourages making to continue after the library visit as an activity that can be brought home. Possible examples could include the following:

- **Curated project kits:** Simple directions and a few materials for small maker projects that use common household items.
- **Home improvement and construction tool lending library:** Precedents in the Bay Area include Berkeley's Tool Lending Library at South Branch (est. 1979), Oakland Tool Lending Library at Temescal Branch (est. 2000), College of San Mateo Tool Library (est. 2015). SMCL currently offers some home improvement tools such as Energy and Water Saving Toolkits.
- **"Library of Things":** SMCL currently offers devices, kits, and various 3D objects for check out, but many patrons are not aware of the offerings. Sacramento Public Library and College of San Mateo Tool Library have strongly publicized their lending programs by associating them with their makerspaces. See the Tool Library case study in the appendices for more information.



Clearwater Public Library, FL



Harris County Public Library, Clear Lake City-County Freeman Branch, FM Jocelyn H. Lee Innovation Lab

Each month staff curate an "Adult Crafts-To-Go Kit" available for pick up at the reference desk that might be prepped in the Innovation Lab, for example using a material cut on the laser cutter. This is a good way to reach new audiences and let people know about the maker programs.

San Jose Public Library STEAMhome

San Jose Public Library hosts a blog series called STEAMhome curating a list of STEAM project ideas that families can make at home with children.

Learning Approaches

Library programs should cover a range of projects for different ages, types of learners and skill levels. Providing access to making for a wide-range of people requires a broad set of learning approaches and entry points. People learn in different ways. Having a range of programs that adopt to different learning styles makes the program more successful and impactful. There are numerous learning pedagogies and education theories that apply to maker-centered learning and there is no single right solution. The approach is to offer multiple strategies that meet the needs of the Libraries' varying audiences.

In the spectrum of learning approaches, the scale ranges from easy and familiar entry points and simple goals, to more sophisticated and complex projects that require a longer time commitment and have several goals. For example, a one hour non-facilitated tapigami program where people explore the possibilities of building using only a roll of masking tape is an easy entry point, accessible to everyone, requires minimal technical skill and has simple learning goals. A more complex project may be to design and build an underwater robot. This project-based program would have more sophisticated learning goals, be accessible to a more limited audience, includes many types of skills and technologies and have broader uses.

Here are some examples of styles of learning that can be used as a

framework to guide maker programs at the Libraries. These descriptions are just touching on the ideas behind the subjects, and we have included references for some of the descriptions for deeper reading:

- **Crafting**
- **Tinkering**
- **Design thinking**
- **Project based learning**
- **Inquiry-led learning**

CRAFTING

Crafting is a familiar and straightforward approach to developing maker programs. SMCL has developed and implemented several craft programs including: Knitting with Arnie, Make Emoji Pillow Faces, and Wicked Watercolors. The crafting programs offer unique opportunities including:

- **Easy entry-point for people not familiar with the maker movement**
- **Timeless practice that adapts to a wide-range of materials, tools, skills, and people**
- **Emphasis is on the individual's skill and creations**
- **Creates good opportunities for sharing and community organizations**



Knitting Class, East Palo Alto Library, CA.

© San Mateo County Libraries



Wooden Jewelry, Olabi Makerspace, Brazil.

© Douglas Lopes (flickr)

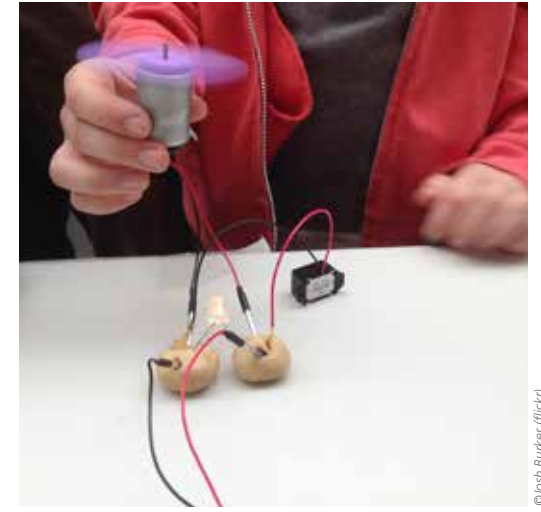
TINKERING

Tinkering is a playful discovery that includes open exploration, inquiry, creativity, and iterations. In tinkering, there is an emphasis on the unknown and the process. There are no distinct outcomes. Tinkering can be done as an individual or in groups, in small spaces or large spaces. This learning approach adapts to many areas in a library space. Key aspects of tinkering include:

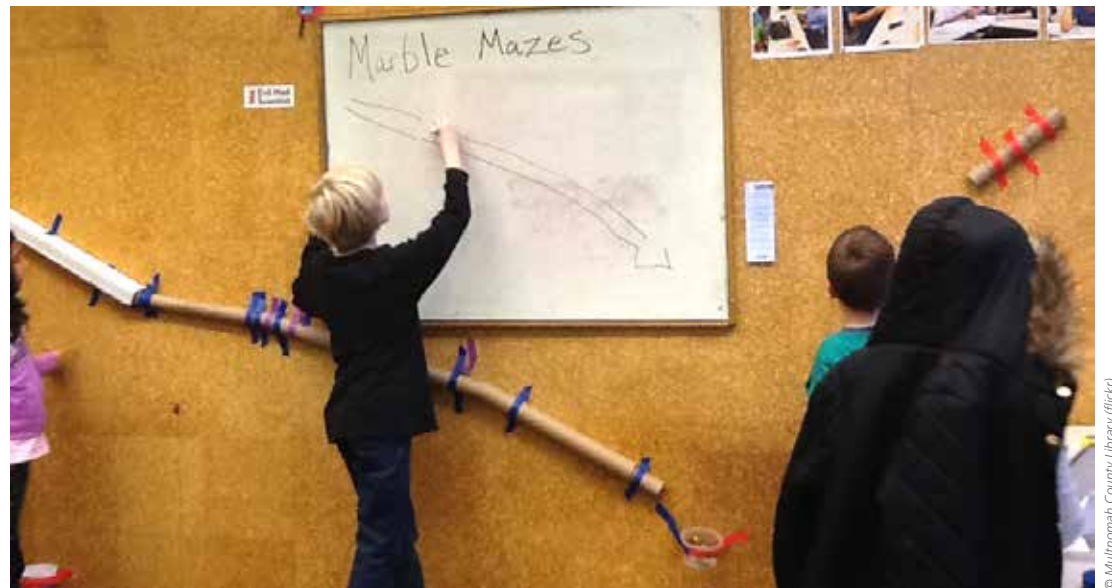
- **Open-ended and playful explorations and discoveries**
- **Emphasis on ideas and process - experimenting, building**
- **Not goal-driven - emphasis is on the unknown**
- **Adaptable to a wide-range of materials, tools, and participants**
- **Excellent opportunities for group engagement and sharing**



Tinkering with a steam cleaned car engine.



Tinkering with Squishy Circuits, Westport Public Library, CT



Tinkering with cardboard tubes, tape and cups, Rockwood Library Makerspace, OR

DESIGN THINKING

Design thinking is a structured approach to generating and developing ideas. The approach has a human-centered focus that looks at the needs of the end user of the product being developed.

Key aspects of design thinking include:

- **Approach and methodology with emphasis on human-centered design - needs and feedback**
- **Key stages in process include: empathize, define, ideate, prototype, and test**
- **Integrates product development with process**
- **Values skills in expressing ideas through sketching, drawing, rapid prototyping, digital storytelling**



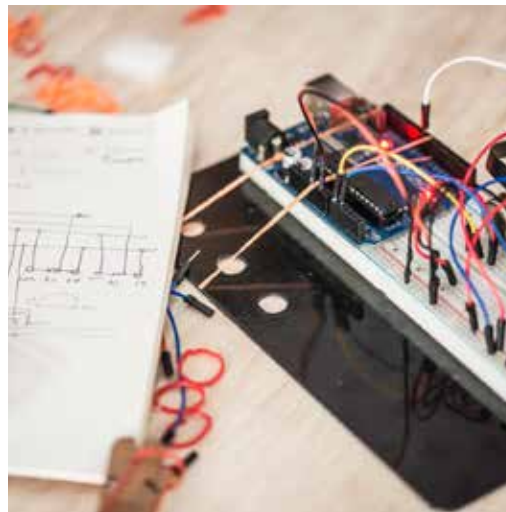
© Conrado Bassini/ Meduza (flickr)

Dancing Robot Workshop facilitated by Fernando Daguanno, Olabi Makerspace, Brazil.



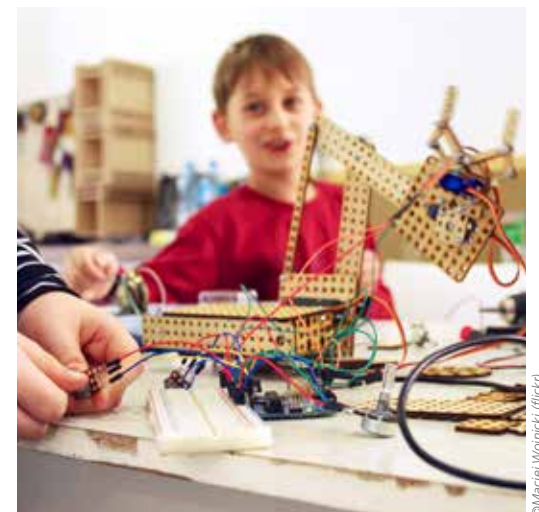
© College of San Mateo Library (flickr)

Lego shake table



© Conrado Bassini/ Meduza (flickr)

Dancing Robot Workshop facilitated by Fernando Daguanno, Olabi Makerspace, Brazil.



© Maciej Wojnicki (flickr)

Laser cut robot

PROJECT BASED LEARNING

This approach uses a specific project to learn skills and develop solutions. Key elements of project-based learning include:

- **Uses specific projects for learning - usually focused on technical skills**
- **Connects to real world problems or challenges**
- **Emphasizes collaborations if project is team-based**
- **Enables participants to develop their own pathway for discovery and problem solving**
- **Project cycle includes key milestones for reflection and presentation**



Felt creations at Rockwood Library, OR

© Multnomah County Library (flickr)



Making at Westport Public Library, CT

© Josh Burkner (flickr)



CNC furniture workshop, Fab Lab Tricity, Poland

© Macej Wojnicki (flickr)



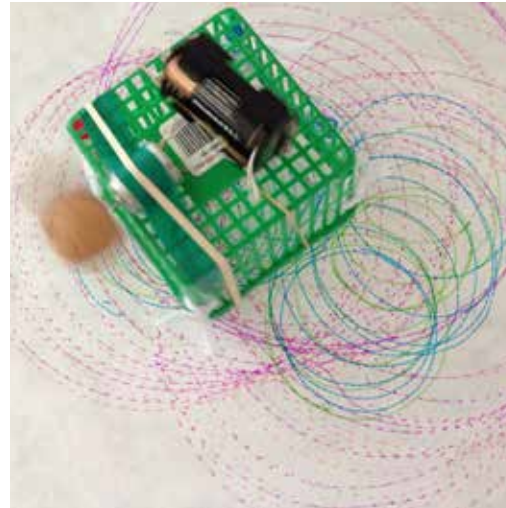
Making at Westport Public Library, CT

© Josh Burkner (flickr)

INQUIRY BASED LEARNING

This learning approach starts with asking questions. Program participants are asked to come up with their own questions and to design the type of projects, experiments, and activities they need to find solutions. This investigative approach has similar methodologies as the scientific inquiry process. Key aspects of inquiry-based learning include:

- **Applies to a wide-range of subjects**
- **STEAM areas use the scientific method: observation, hypothesis, prediction, experimentation**
- **Adapts to a variety of levels: questions can be framed around specific concepts: how can a vibrating motor be used for drawing, to more open-ended questions: what is possible to build from this pile of materials?**



Scribbling machine



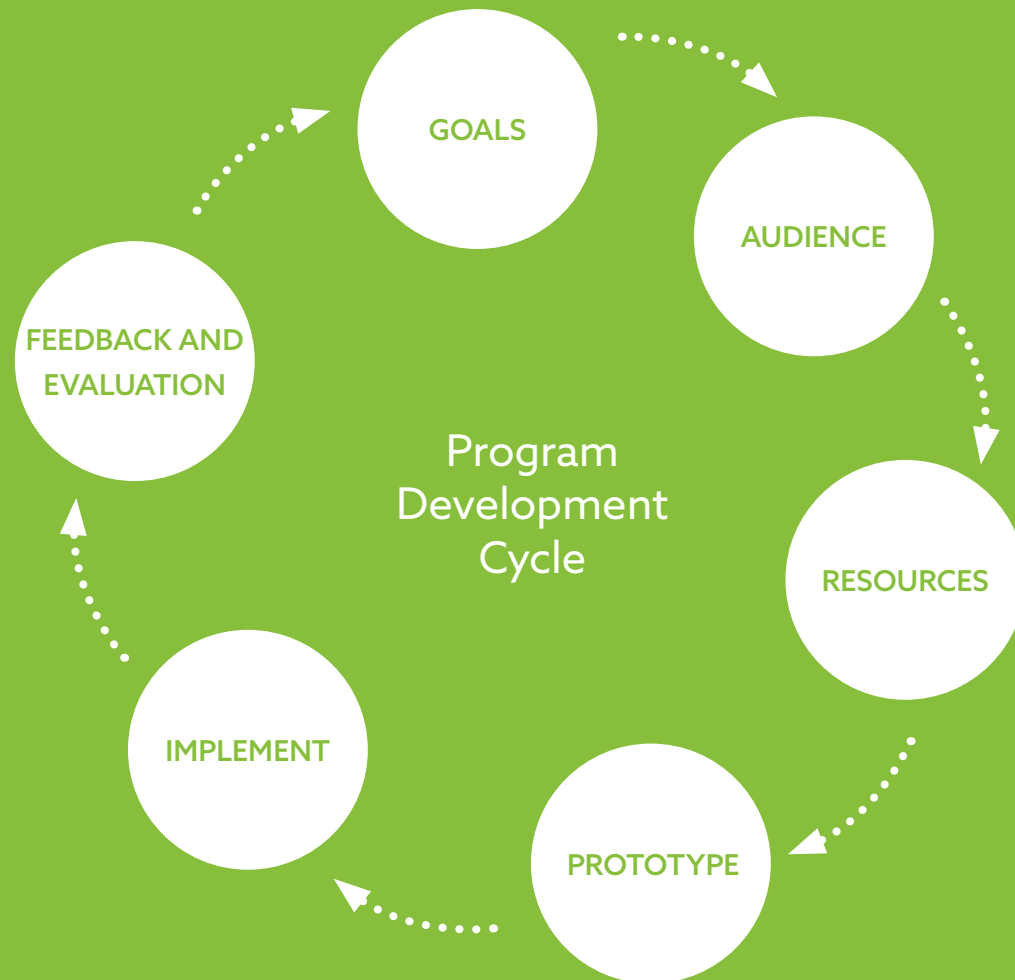
Inspecting circuits



"Challenge Accepted" engineering experiment or design challenge, BOOMbox space, Skokie Public Library, IL

Program Planning

The process of developing new maker programs is iterative, beginning with defining goals, outcomes, and audience. The team then determines what resources are available, selects program typologies, and designs and tests program ideas. Next comes an implementation plan that includes resources, schedules, and budgets, and an evaluation process that determines if key goals are being met. The program can then be refined and tuned to maximize its impact.



DETERMINE PROGRAM GOALS AND OUTCOMES

Maker programs should first establish goals that apply across all libraries. For example: integrate STEAM learning from common core curriculum, or address key issues like literacy and job training. The program goals should also include a description of the outcomes. Outcomes could have both system-wide and local community implications.



Lookmobile interactive mobile exhibit at the East Palo Alto Library, CA.

© San Mateo County Libraries

BROAD STRATEGIC GOALS

- Build and update facilities to create inviting and flexible spaces
- Develop creative programs and services that have measurable results
- Grow a culture of learning and participation

BROAD PERFORMANCE OUTCOMES

- Participants learn something new and feel more confident about what they learn at the makerspace
- Participants intend to apply what they learn through tools, resources, and programs
- Participants feel more involved in the community of makers

DEFINE TARGET AUDIENCE

Questions to ask: Who is this program for? Are you trying to reach new makers? Tap into existing makers and have them be mentors? Create new partnerships? The idea is to look for opportunities to bring together multiple inter-generational audiences.

Once the audience is defined, we will design the structure and activities of the program. One example of how to be responsive to one's audience is the Exploratorium's EDGE Guidelines. They conducted a National Science Foundation funded study called Exhibit Design For Girls' Engagement and identified the nine most important design attributes for engaging girls at STEAM exhibits. These attributes also can be applied to STEAM maker projects and will improve the experience for both girls and boys.



The EDGE Design Attributes

EXHIBIT LABELS



Use drawing



Image of a person

EXHIBIT LOOK-AND-FEEL



Familiar object



Homey, personal,
homemade, or delicate



Playful, whimsical,
or humorous

EXHIBIT INTERACTIONS



Multiple stations
or sides



Space to accommodate
three or more people



Visitors can watch
others to preview



Open-ended

Exploratorium: Exhibit Designs for Girls' Engagement

*Dancstep (née Dancu), T. & Sindorf, L. (2016).
Exhibit Designs for Girls' Engagement: A Guide to the EDGE Design Attributes.
San Francisco: Exploratorium.*

DEVELOP IDEAS AND IDENTIFY RESOURCES

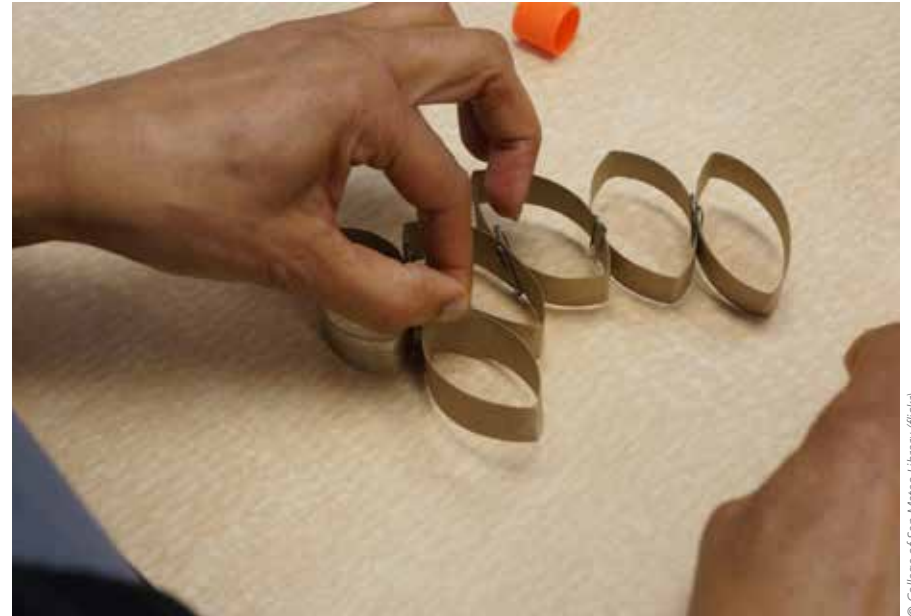
Once the audience is defined and the goals are set, ideas are generated to accomplish the goal. Ideas will be brainstormed with library staff and the local communities with focus groups or questionnaires. Ideas will be tested to determine if they are scalable for various group sizes, and inventory of existing material resources (tools, kits, supplies, etc.) will be taken.

PROTOTYPE IDEAS USING DIFFERENT TYPOLOGIES

The typologies offer a wide range of styles to “making” throughout the whole library system. In the prototype phase, selected typologies and specific program ideas are tested. For example, a program around early childhood literacy may work best with the “Start With A Book” or “Outdoor Experience” typology rather than with “Pop Up” or “DIY”. The prototypes can be tried out at a small scale to enable quick iterations and refinements.

IMPLEMENT

When prototypes are complete, SMCL will develop an implementation plan that includes resources, schedules, budgets, and evaluations. SMCL provides the systems, staffing, tools, materials, and distribution across the library locations.



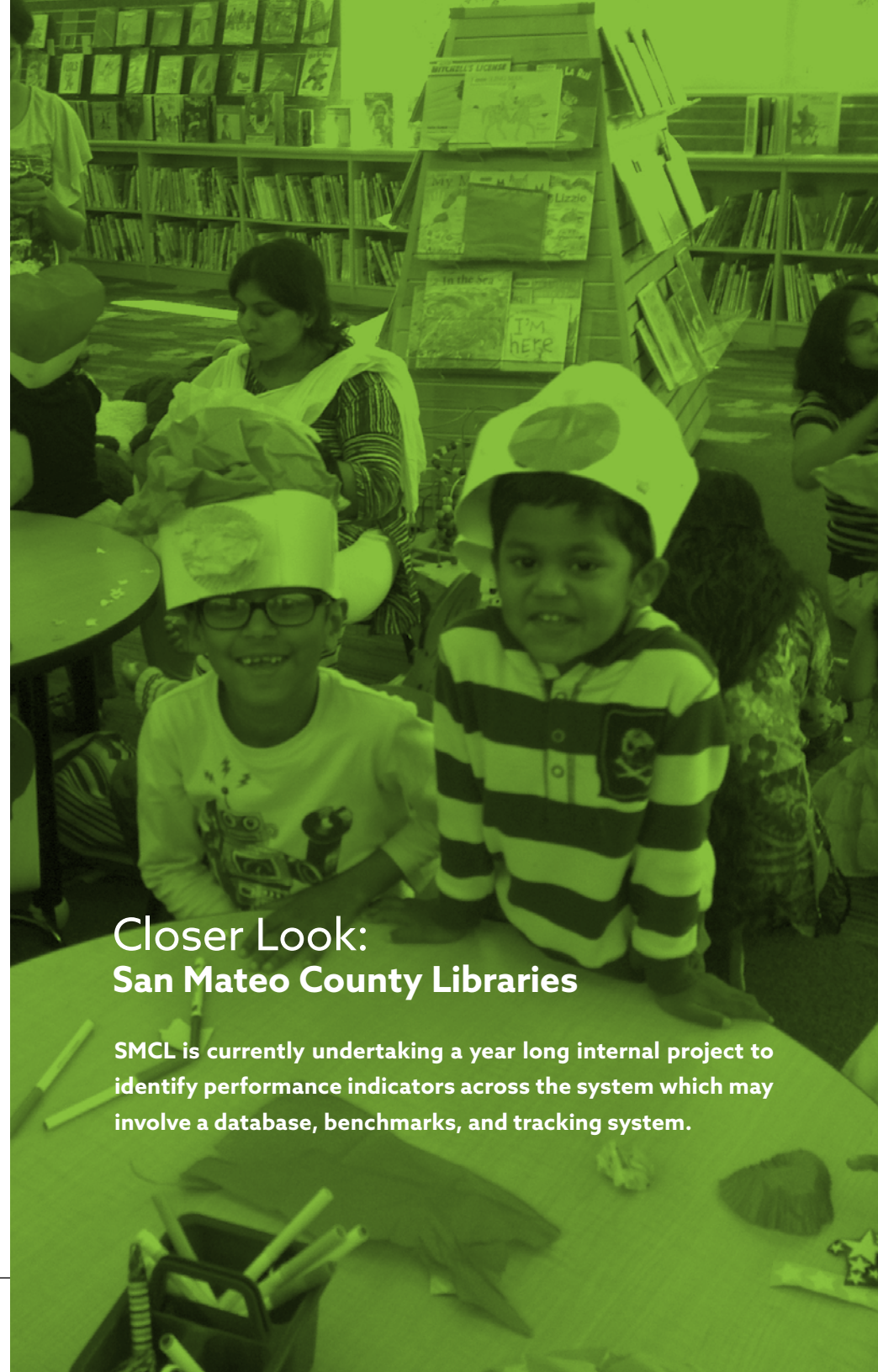
© College of San Mateo Library (flickr)



FEEDBACK AND EVALUATION

Maker programs are fluid, and they require an evaluation period to look for modifications and improvements. A librarian from Mountain View Public Library says "We've found that our makerspace programs are conducive to small-group learning, so we've shifted away from high attendance as our primary program goal and are now more focused on less tangible but no less important outcomes, such as receiving positive feedback, reaching new users, developing meaningful connections, and patron and staff learning."⁵

SMCL will develop an evaluation process that identifies key goals and how and if they were reached. Evaluations can be as simple as on-site observations, a post-program survey, anecdotal evidence - "I can't believe I am making music with a banana!" - or a more formal evaluation throughout the program (see Anythink Brighton survey⁶). It is important to capture the feedback in words, pictures, and video. Feedback and evaluation will be shared with the community. This demonstrates the impact of the maker activity and will be used to support and bolster future funding and to share with key stakeholders.



Closer Look: San Mateo County Libraries

SMCL is currently undertaking a year long internal project to identify performance indicators across the system which may involve a database, benchmarks, and tracking system.

SECTION 5:

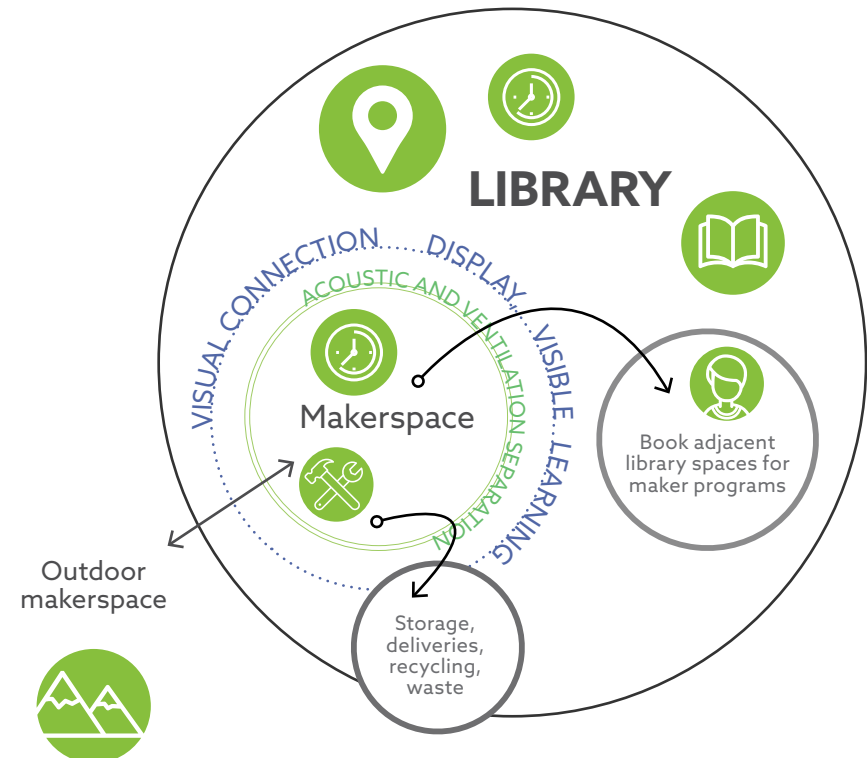
Design & Equipment Guidelines

Architectural Guidelines

This section touches on general space planning concepts and considers a range of design solutions from non-dedicated to fully dedicated makerspaces, applicable to various library sizes and facility constraints, and includes best practices for infrastructure and furnishings.

Well designed learning environments promote and support learning behaviors. Studies show that students perform better in classrooms with natural light, good ventilation, good acoustics, and opportunities for team work. This is especially true for STEAM education and maker-centered learning. Makerspace should be designed to support creative collaboration and experimentation across multiple disciplines and media. Planning the ideal makerspace is an open ended challenge. It is important to not over design in order to allow flexibility and freedom for the use of the space to evolve.

It is important to consider adjacencies for new makerspaces and programs. Makerspace activities should be visually connected to other parts of the library while also considering acoustic and ventilation separation, and infrastructure adjacencies. When patrons see making activities happening, curiosity and interest will be sparked, and audiences will grow. Where possible, it is desirable to provide a separate entrance to a new makerspace for offering extended hours and easy access for deliveries and waste. Maker programs often require a lot of material storage, collection, and moving around. Providing direct access to the outdoors allows loud, wet or messy activities to easily move outside.



Making Throughout The Library

Making can happen throughout the library at different scales and with different audiences and with a variety of media.

Design & Equipment Guidelines

SPACE PLANNING CONCEPTS: HOMAGO

Makerspaces go beyond classroom learning, provide access to specialized equipment and serve as a place for socializing and building community. One space planning concept is based on the learning theory of HOMAGO⁷ (hang out, mess around, geek out), a term coined by researchers studying how youth learn through social and recreational use of media. Furniture and equipment can be arranged in zones to support a spectrum of engagement from passive and casual to rigorous and focused.

HO HANG OUT

Lounge
Think tank
Brainstorm
Soft seating
White boards
Screens



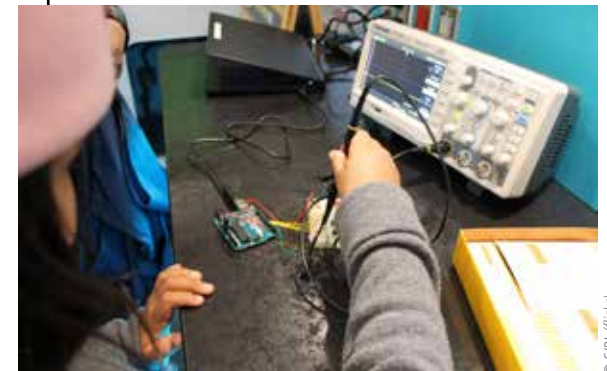
MA MESS AROUND

Access to general tools and materials
Project layout space: work surfaces



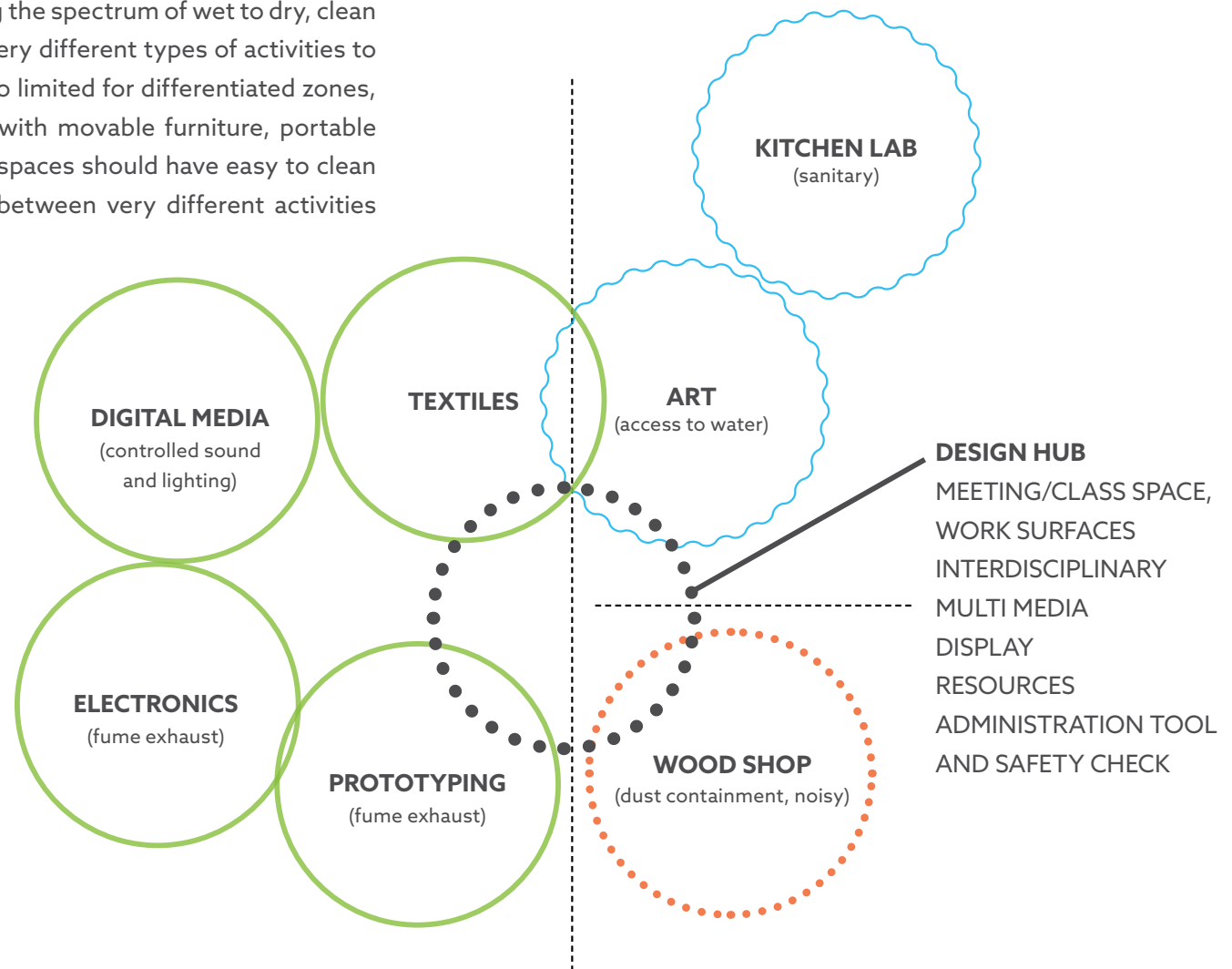
GO GEEK OUT

Workshop
Access to more complex tools,
Noisy tools, safety supervision



SPACE PLANING CONCEPTS: CLEAN, WET, DUSTY

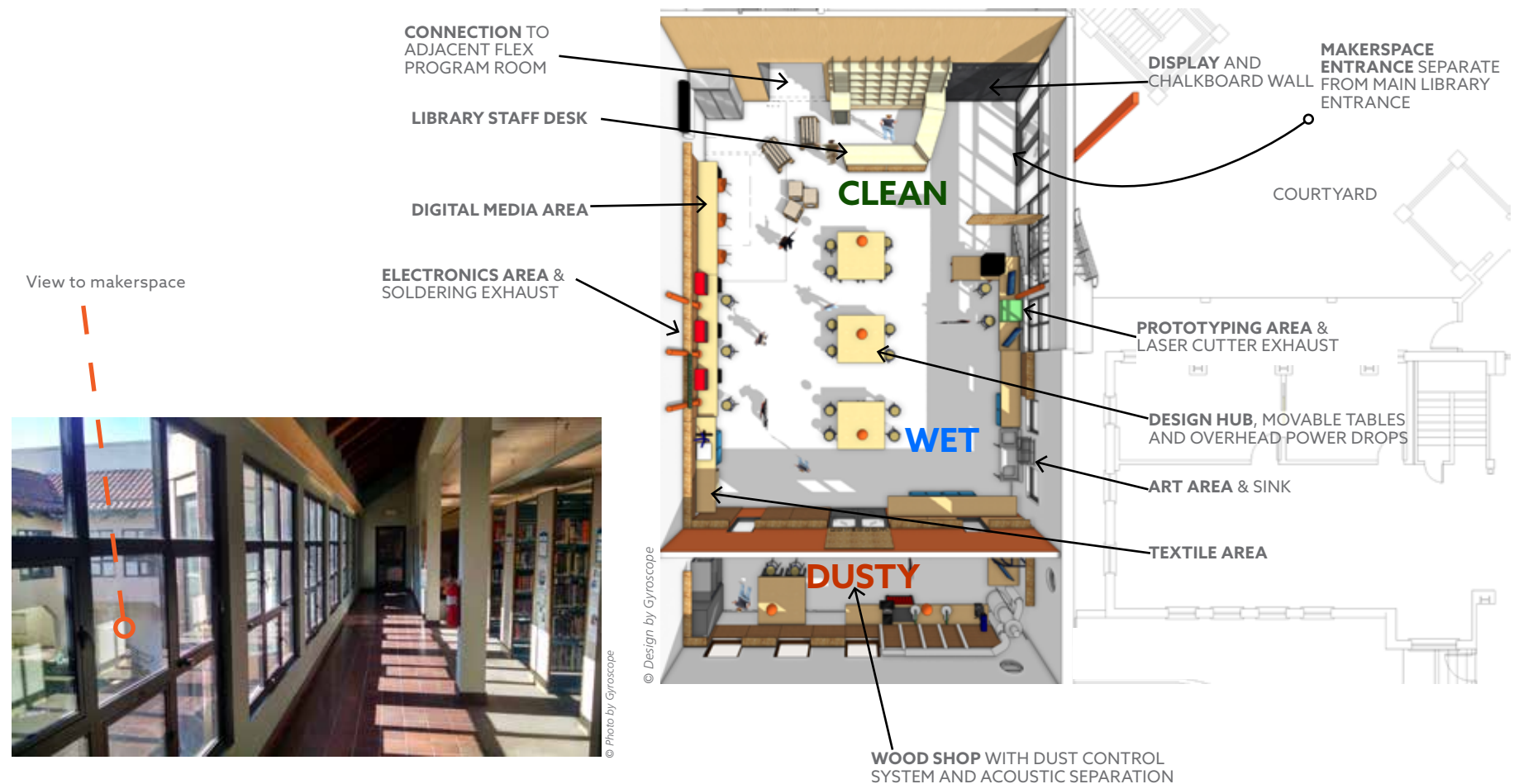
Large makerspaces of 2,000 sq. ft. or more are often arranged by disciplines, usually characterized along the spectrum of wet to dry, clean to dirty, and quiet to noisy, allowing very different types of activities to occur concurrently. Where space is too limited for differentiated zones, a floor plan can remain very flexible with movable furniture, portable equipment, and room dividers. Makerspaces should have easy to clean finishes and flooring for quick reset between very different activities that share the space.

Zones and Activities:

Design & Equipment Guidelines

CASE STUDY

745.5 SQUARE ONE MAKER SPACE + LEARNING LAB at Woodland Public Library, in California, is both visually connected and has acoustic and HVAC separation to the rest of the library. The 2,000 sq. ft. makerspace is located a level below the main library, opens to a courtyard that is highly visible from all of the library wings and has a separate entrance.



CASE STUDY

LIGHTHOUSE COMMUNITY CHARTER SCHOOL, CREATIVITY LAB, OAKLAND, CALIFORNIA

At this makerspace wood shop, tools are portable and can be rolled outside for minimizing interior noise and dust.



© Photo by Gyroscopic



© Photo by Gyroscopic



© Photo by Gyroscopic



© Photo by Gyroscopic

Design & Equipment Guidelines

POP-UP, NON DEDICATED, AND DEDICATED MAKERSPACES

Each library facility is unique in regards to site, size, and condition. Some libraries have the opportunity to build new makerspaces, but many others do not have the space and storage for a full-time dedicated makerspace and use their community rooms for flexible programming. Below are three facility approaches to bringing maker activities into the library and are detailed in the subsequent pages.

A POP-UP MAKER ACTIVITIES NON-DEDICATED SPACES

New activities are accommodated in traditional spaces
Less cost investment
Mobile tools and various sites
Part time staffing
Limited hours



Deconstruct Reconstruct, using tools to disassemble household electronics, Clearwater Public Library, FL.

B MAKER PROGRAMS IN FLEXIBLE MULTI-PURPOSE SPACES

Changing environment
Medium cost investment
Mobile tools and specialized on site resources
Part time staffing
Part time access and hours



3D printing day, College of San Mateo with San Mateo County Libraries, CA.

C DEDICATED MAKERSPACES

Structured environment
More investment
Permanent tools on location
Fully staffed
Full access and hours

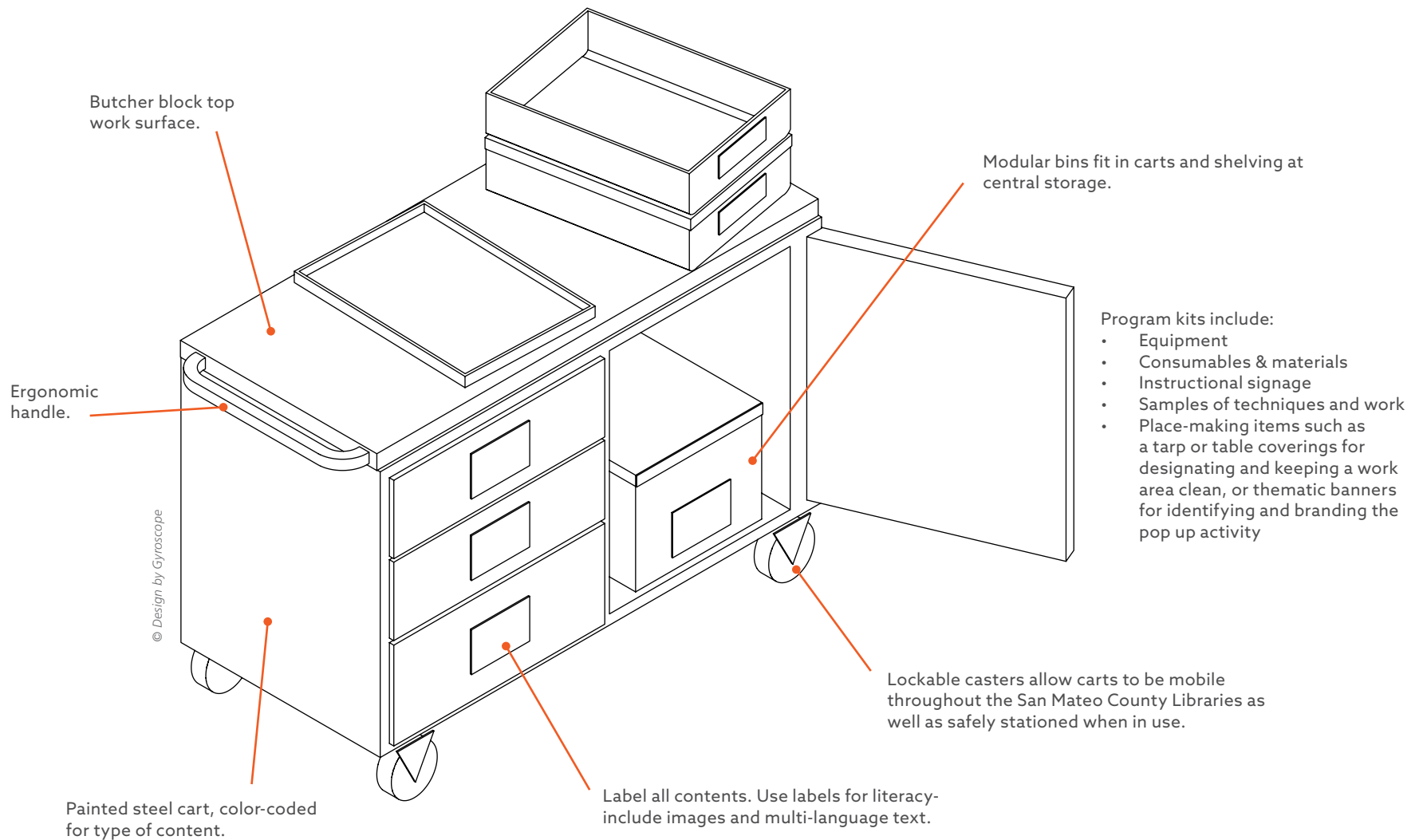


Rockwood makerspace, Multnomah County Public Library, OR.

Architectural Guidelines:

A. POP UP MAKER ACTIVITIES NON-DEDICATED SPACES

Industrial steel carts, approximately 36"-48" long x 21"-24" wide x 32"-36" tall are available ready made, in many colors, with options for drawers and shelving.



Design & Equipment Guidelines

Architectural Guidelines:

B. MAKER PROGRAMS IN FLEXIBLE MULTI-PURPOSE SPACES

Wall finishes for display and work surface.

- Pegboard
- Whitewall
- Galvanized sheet metal (magnetic)
- Magnetic pegboard
- Greenwall
- Cork board
- Homasote pin-up wall
- Recycled rubber pin-up wall
- Pog display wall
- Plywood wall

1 1/2" thick butcher block counter.

Sewing cart with expanding work-surface.

Carts dock below counters.

L-style countertop brackets, coordinated spacing with wall framing/blocking, approximately 48" on center. Brackets provide full clearance below counters for carts and for accessibility.

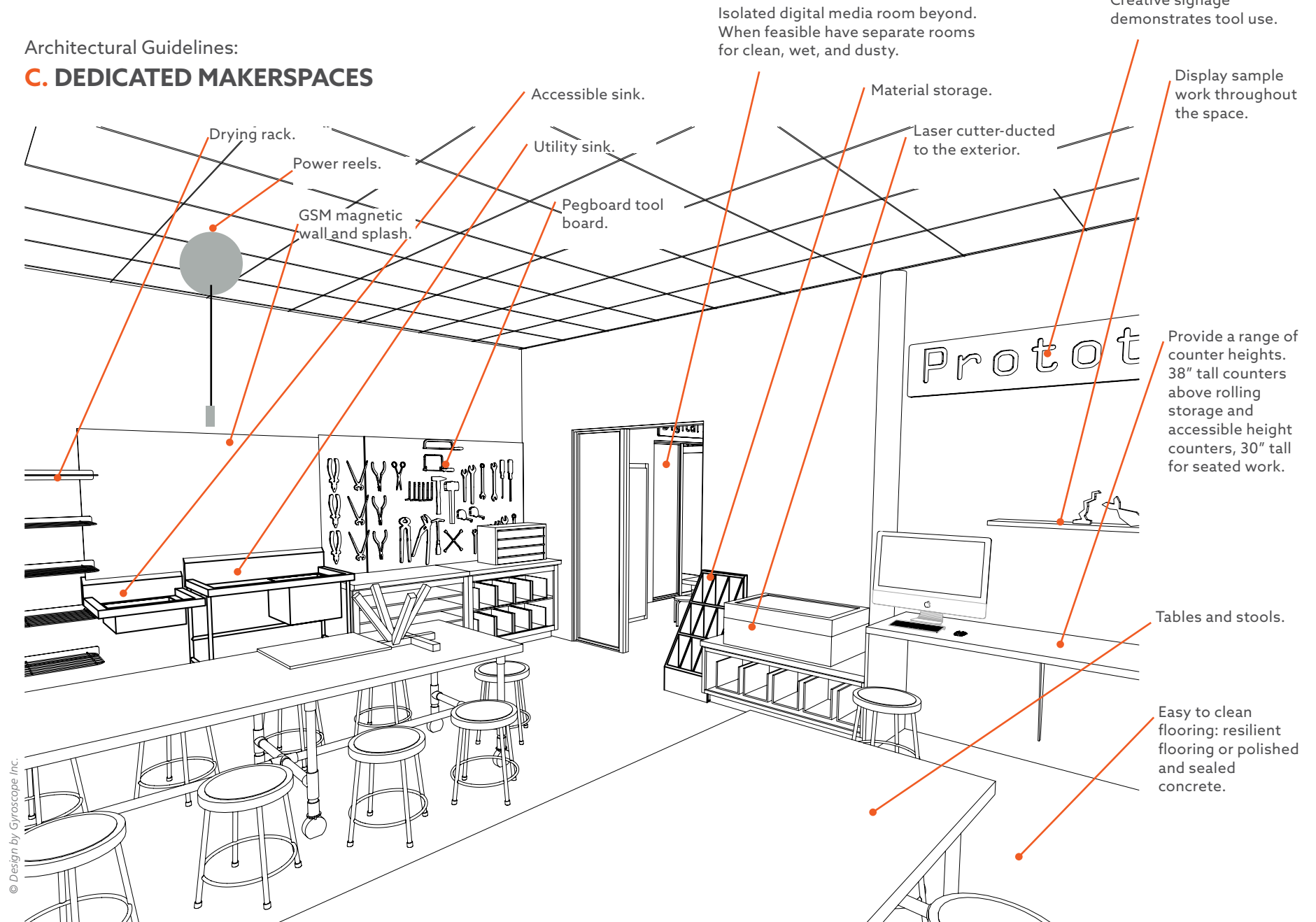
Quad electrical receptacles minimum 6'-0" on center.

People are more engaged working standing up. 38" tall counters with stools provide working flexibility, and opportunity for rolling storage. Adjacent tables, 30", tall provide accessible and seated workspace.

Design & Equipment Guidelines

Architectural Guidelines:

C. DEDICATED MAKERSPACES

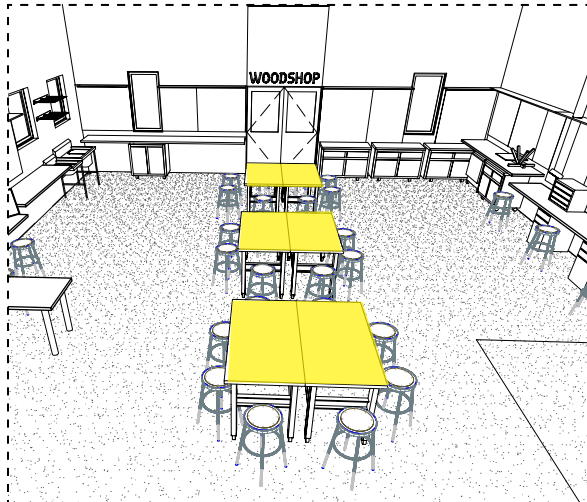


Design & Equipment Guidelines

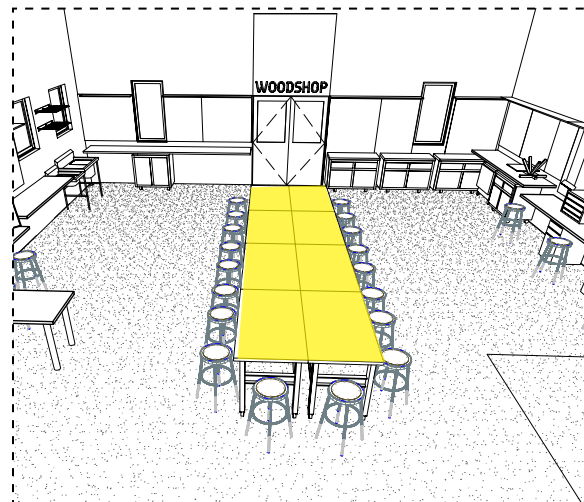
FURNITURE: WORK TABLES

It is recommended that tables have lockable casters so they can be moved into different configurations for various projects, and group sizes. In general, a 2'-6" X 5'-0" table can accommodate four people. This is a convenient table size, and is narrow enough to roll through a standard door frame. In general, rectangular tables are easier to work on than curved tables since many sheet materials and fabric rolls are rectangular.

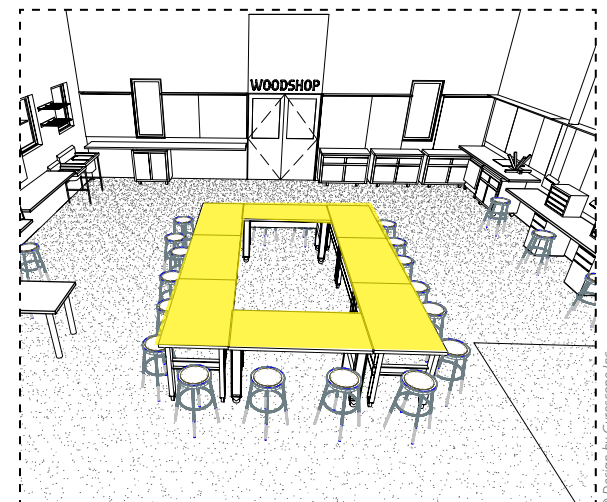
CONFIGURATION #1



CONFIGURATION #2



CONFIGURATION #3



© Design by Gyroscopic Inc.

WORKING WITH DIFFERENT TABLE SURFACES



Gyroscopic Inc.

Butcher block table top



Clearview Public Library

Butcher paper table covering



MOSI, Tampa FL

Shower board covering,
white board top



© Multnomah County Library (flickr)

Cutting mat



© Clearview Public Library (flickr)

Robotics course

FINISHES

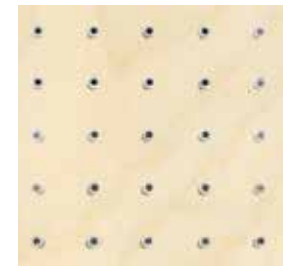
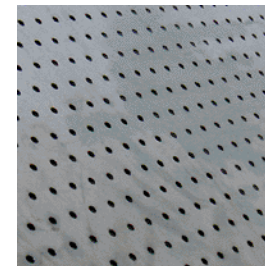
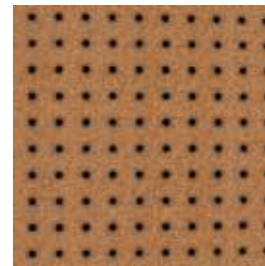
MATERIALS: The look and feel of the space should support the brand of the maker program. A palette of materials that stands out as different from the rest of the library, but is consistent across the makerspaces in the library system, will reinforce the brand identity.

The environment of the makerspace should also communicate the idea that everything we are surrounded with can act as inspiration and guidance on how to build things. This can be done by making the construction of the space as evident as possible.

One strategy is to use raw materials to show how things are constructed. For example, butcher block, plywood, and OSB are easily available, affordable, and durable. They look like what they are made from, and you can easily see how they are constructed. Celebrate their materiality, don't paint them with color, add laminate, or edge banding.

For connections between different materials, use simple joints and exposed fasteners. An example of this is pegboard; the connections are simple, flexible, ingenious, and understandable.

Be open to creative mess. Don't specify materials that are too precious to work on.

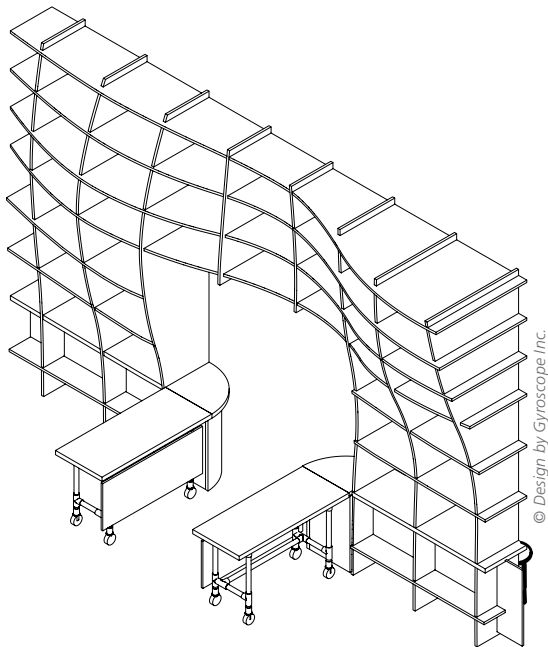


Design & Equipment Guidelines

DISPLAY: FINISH PROJECTS

Display of all kinds is crucial to enrich the space, inspire participants and make learning visible. Provide a range of display opportunities throughout the library. There are a range of types of things to display, and a range of ways to display them.

Display vitrines to highlight and show off visitor or staff made projects. These should have internal lighting, be out of visitor reach and glorify all the hard work gone into a project. They could be at the entrance to the library, in the stacks, or on a wall above head height. The display of these projects inspires visitors, shows them the possibilities of the space, and gives creative confidence to the person who made them.



© Design by Gyroscope Inc.

*"I really like the idea of dedicated display areas...it encourages libraries with a blank canvas to do something unique and hyper-local to foster relationship-building with their community. **A really cool display could travel between our libraries and show off special talents throughout the system and expose that special skill to a new community.***

-SMCL staff feedback

DISPLAY: PROCESS PIECES

Display the less precious, but still valuable, objects from the process of making, such as test pieces, projects gone wrong, first prototypes, sketches, etc. These are great learning opportunities for visitors, and great conversation starters between visitors and staff. As far as possible, these should be located near where they are made, next to a staff station, so questions can be asked about them, and inviting for the public to pick up and touch them.

DISPLAY: REFERENCES AND RESOURCES

Show references and resources from the library collection that inspire, inform, and support deeper exploration of a particular subject.

DISPLAY: TOOLS AND MATERIALS

The more a visitor knows what tools and materials are available to them, where they are located and how to access them, the more creative confidence they will have. If visitors are shy, it may take a few visits quietly looking at the tools and learning about them before they have the confidence to start a conversation and start making something. Make sure the tools are as visible as possible, even when locked away.



Papalote Children's Museum Makerspace, Mexico City



Program Flier, College of San Mateo, CA.



Laney College Fab Lab, CA.

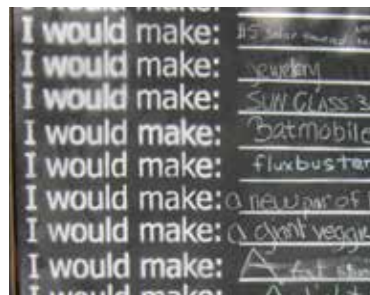
Design & Equipment Guidelines

DISPLAY: GROUP PROJECTS

Display of large group projects (Do-It-Together) is inevitable because of their size. Other library users will be interested in what is happening and potentially spark up conversations, or even join in. Careful thought should be given to other library users by providing a clear physical boundary for both team members and other patrons. Consider a title or short description of the project for when no team members or staff are around to explain it. If you want other patrons to join in, be sure to have a big sign-up inviting them! A mobile chalk board, or sandwich board would be one way to do this.

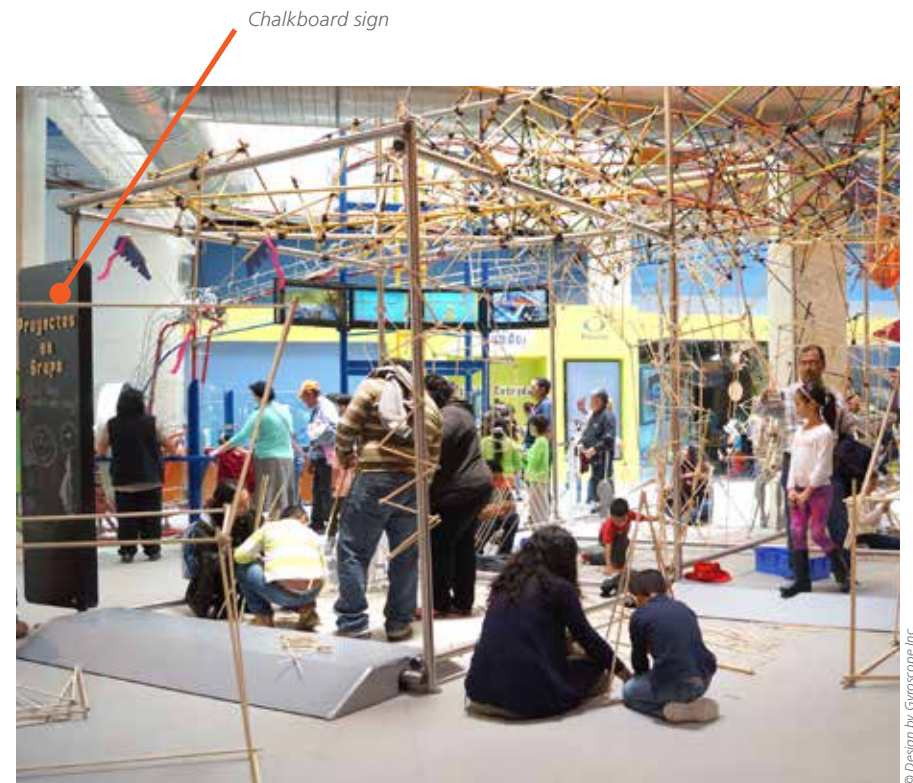
DISPLAY: FEEDBACK

Flexible wall surfaces, such as white-board or chalkboard, offer great opportunities for quick feedback on projects, inspiring maker ideas, or provocative questions. They also provide an area for lessons, working diagrams, figuring out problems and consumable shopping lists. Having these surfaces large and highly visible keeps the space constantly changing and inspiring. Having easily available dry erase pens or chalk alongside a prompt, such as "I want to make...", shows the visitors you value their opinion.



DISPLAY: PEOPLE WORKING

This is also known as shoulder surfing, and is a great way to demonstrate to other patrons the capabilities of the space and the type of projects happening. More than anything, this can inspire visitors to come back to do the next program, or to suggest a program of their own. As much as possible, ensure there is good visibility into program rooms, such as internal windows, glass doors, or knee walls.



Papalote Children's Museum Makerspace, Mexico City

© Design by Gyroscope Inc.

INFRASTRUCTURE

Manufacturer's equipment instructions and data should be researched before a tool is purchased to understand safety, best practices, and required infrastructure and space planning.

MECHANICAL: Tools that produce fumes, like laser cutters and soldering stations require mechanical air extraction or air filtration. While portable air filtering units are often a less expensive up front cost than installing a ducted exhaust fan, the portable air units have expensive filters that need to be changed frequently. For a full shop space with major power tools, building officials may require a separate HVAC system from the rest of the library.



Exhaust from laser cutter equipment



Work counter with Exhaust Hood

IMPLEMENT WOOD DUST CONTROL: Wood dust, generated from sanding and power tools, is both a fire and health hazard. Very fine wood dust, the dust you actually don't see, is carcinogenic and poses a health risk with extended exposure. In wood-shops, where several people are simultaneously using power tools, a central dust collection system with centrifugal extraction is best practice. Wood shops should also use HEPA (High Efficiency Particulate Air) shop vacuums and stand alone air filter units. In makerspaces, if only one tool is being used at a time, dust can be controlled with a HEPA shop vacuum fit to a power tool exhaust port. Shop vacuums and cyclone dust collectors and the tools they are serving are noisy, typically 80-90 decibels, and users should wear hearing protection. Because of the noise nuisance, power tool use may need to be limited to special hours, or used in acoustically separated spaces.



Most bench-top power tools such as a band-saw, miter saw, scroll saw, panel saw, and sander can be exhausted through a port to either a central dust collection system or to a HEPA shop vacuum to reduce airborne dust.

Design & Equipment Guidelines

ELECTRICAL: In a new makerspace, provide a generous number of power receptacles for power tools, and equipment to allow many groups of people to work at the same time. Provide power reels dropped from ceilings over central work tables to avoid the tripping hazard of electric cords. Provide wall outlets approximately 4'-0" on center at work counters to serve individual workstations. Three phase power is desired for certain equipment to run more efficiently, such as CNC (computer numerical control), laser cutter, and industrial dust extractor.

PLUMBING: Specify sinks at a variety of heights and configurations to accommodate different uses: accessible height, child height and standard height with a deep utility sink. A solids interceptor trap is recommended for maintenance where ceramics, paper mache, or paint might be cleaned in the sinks. In the case of renovation, if extending plumbing supply and sanitary sewer lines to the makerspace is not feasible, then consider purchasing a portable sink.

LIGHTING: Makerspaces should have general ambient lighting, task lighting and some decorative lighting. LED lighting is recommended for energy savings and is now available at competitive prices. For an industrial look and feel, consider wire cage impact guards on strip lighting. For decorative lights, specify simple stem lights that the library can customize with lamp shades made in the makerspace.



Power reel retrofit, Creativity Lab, Lighthouse Community Charter School, CA.



Maker lamp shades, Techshop SF, CA.



Workstation power receptacles. Red outlet tied to photo voltaic system, gray outlet tied to generator. San Jose Public Library Maker[Space]Ship, CA.



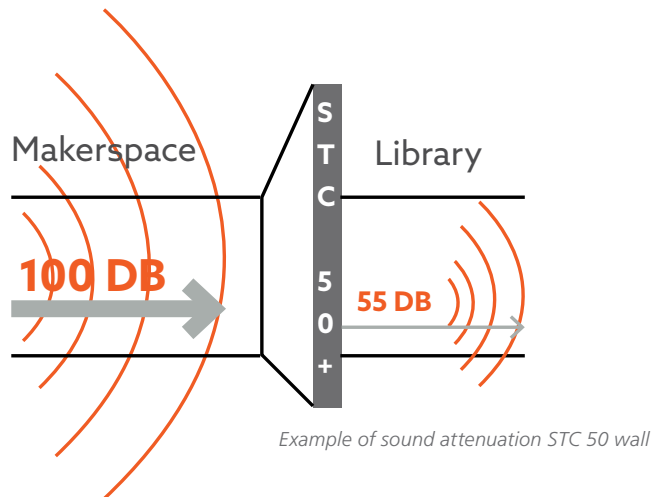
High and low sinks, Thinkery Innovators' Workshop, TX

ACOUSTICS: Maker programs range in noise level depending on tools and number of participants. Ideally, a makerspace should be acoustically isolated from adjacent quiet library zones to allow for the use of 100 db power tools.⁸

Acoustic engineers and architects design acoustic separation with full height rated walls, insulation, acoustic gypsum board, resilient channels, acoustical clips, double frame studs, acoustic sealant, insulated glazing and door seals, and sound absorbent finishes. Locate the loudest equipment on exterior walls. When acoustic separation is not achievable, plan the maker activities accordingly or consider other solutions, like programming off hours or using portable power tools outdoors.



ADA accessible pre-fab sound booths as stand alone recording studios. SJ Teen HQ, San Jose Public Library, CA.



SECURITY: While some tools may be freely accessed by users, tools that are costly or potentially dangerous should be dispensed by staff for safety checks and loss prevention.

STORAGE TIPS:

- Using tool outlines reminds staff and patrons how to organize and clean up.
- In classroom makerspaces, a general guideline is a one-to-one ratio of storage space to program space. This ratio will drop with the shared storage at the Libraries' central administration building.
- Storage needs to be lockable and well labeled.
- Storage labels are an opportunity for literacy and learning. Use graphics and multi-language labels.
- Kits can be conveniently stored in clear plastic bins. Size bins to fit in carts and shelving.
- Use color coding to differentiate staff only or patron use.



Design & Equipment Guidelines

SIGNAGE AND BRANDING

Support the branding of the makerspace with signage and graphics developed from the brand standards. Consider the aesthetic of all signage, including safety and instructional signage. Whenever possible, communicate with the use of reclaimed/interesting materials.



© Photo by Gyroscopic Inc.

Communicate with the use of materials.
Creativity Lab, Lighthouse Community Charter School, CA.



© Photo by Douglas Lopes (flickr)

Customize with stencils. Olabi Makerspace, Brazil



© Design by Gyroscopic Inc.

Tools, Equipment, and Materials

Tools, equipment, and materials can be procured through purchase or donations. In general it is recommended to purchase these supplies for specific programs so that they don't take up storage and grow obsolete. People are familiar with donating to Friends of the Library, and the same type of fundraising campaign can be started for tax deductible donations to the makerspace.

Most all maker tools and equipment can travel but some pack more easily than others, and there are product choices that are more or less robust. For example, the San Jose Public Library's mobile makerspace, the Maker[Space]Ship, has installed a Lulzbot TAZ 3D printer because the manufacturer, based in Colorado, had tested the equipment on the road. Alongside the 3D printer, The Maker[Space]Ship also has a laser cutter and CNC securely tethered to a workbench. For programs on board the Maker[Space]Ship, staff decided it was important to buy multiples of the smaller equipment, such as vinyl cutters, so that each small group of two to four workshop participants has access to the tool.

On the following pages, tools are listed in general categories such as power tools, and digital arts, but any given project or program may be inter-disciplinary and require tools from several lists. The Libraries should curate kits and carts for specific programs but also be flexible

to deploy a combination of kits and carts for new projects that require multi-media such as a sewing cart and an electronics kit for sewing circuit teddy bears or wearable electronics.

“Branding and/or customizing tools and equipment..for identification/loss prevention, marketing, and cool factor. For example, anyone can use safety goggles, but it would be more fun and cool and create a uniqueness factor to wear “library” goggles. Or maybe even “nerd-looking” goggles?”

– SMCL Staff

Design & Equipment Guidelines

Tools, Equipment, and Materials: **GENERAL WORKSPACE AND SAFETY**

Dust pan, broom, garbage cans on wheels

Power strips

Extension cords

First aid kit

Eye wash station

Safety glasses

Gloves: disposable/work

Aprons

HEPA Shop vacuum (vacuum bags)

Fire extinguisher

Special projects: ear protection

Special projects: respirators/dust masks

Tools, Equipment, and Materials: **CONSUMABLES**

String, wire

Paper, card stock, cardboard

Paintbrushes, pens, pencils, markers, chalk

Popsicle/craft sticks, toothpicks

Zip ties, rubber bands

Binder clips, paper clips, clothespins

Paper mixing cups

Tape: packing tape, electrical tape, duct tape, masking tape, scotch tape, paper craft tape

Adhesives: wood glue, glue sticks, Elmer's glue, glue guns

Special projects: special adhesives supervised: epoxy, super glue, spray adhesive, PVC cement

Special projects: acid brushes

Special projects: mineral oil lubricant



The East Bay Depot For Creative Re-use

This non profit storefront in Oakland relies on community donations to stock its shelves with second hand art supplies and materials such as egg crates and toilet paper tubes in bulk, old film canisters, buttons, beads, paint, wood and fabric scraps. It is a fantastic resource for school teachers, artists and tinkerers to find funky and surprising materials for re-purposing. Creativity is inspired from inventory of supplies and materials in makerspaces. The libraries should take advantage of community donations to fuel maker programs.

Tools, Equipment, and Materials

HAND TOOLS

Utility knife (razor blades), **x-acto cutter** (x-acto blades), **cutting mat**

Cardboard safety cutters (blades)

Scissors

Hacksaw (blades)

Wood saw

Hand-crank, craft drill (bits)

Wood and metal files

Sanding block, sandpaper (80/200/400/600)

Awl

Tubing and PVC pipe cutter

Deburring tool

Center punch set

Ruler, yardstick

Caliper

Angle square, adjustable square

Compass

Tape measure

Level



Laney College Fab Lab, CA.

Vises

Clamps

Needle nose/joint/locking pliers

Adjustable and combination wrenches

Staple gun

Staples

Hot glue gun (glue sticks)

Glue sticks

Screwdriver sets

Allen wrench

Claw hammer, mallet

Miter box

Ratchet and socket set

Chain breaker

ADVANCED:

Sheet metal brake

Tin snips

Arbor press

Pop riveter (box rivets)

Foam cutter

Wire splice set

Tap and die

Design & Equipment Guidelines

Tools, Equipment, and Materials: **POWER TOOLS: BENCH TOOLS**

Drill press

Belt sander

Scroll saw (blades)

Desktop band saw (blades)

ADVANCED:

Chop/miter saw

Radial arm saw

Panel saw

Table saw

Plastic bender

Vacuum former

Tools, Equipment, and Materials: **POWER TOOLS: HAND TOOLS**

Orbital sander (sand paper)

Cordless drill (drill bits, hole saw bits, countersink drill bits)

Dremel (dremel bits)

ADVANCED:

Jigsaw (blades)

Circular saw (blades)

Router (bits)



© Brightworks School (flickr)

Teen using a band saw at Brightworks Charter School, CA.

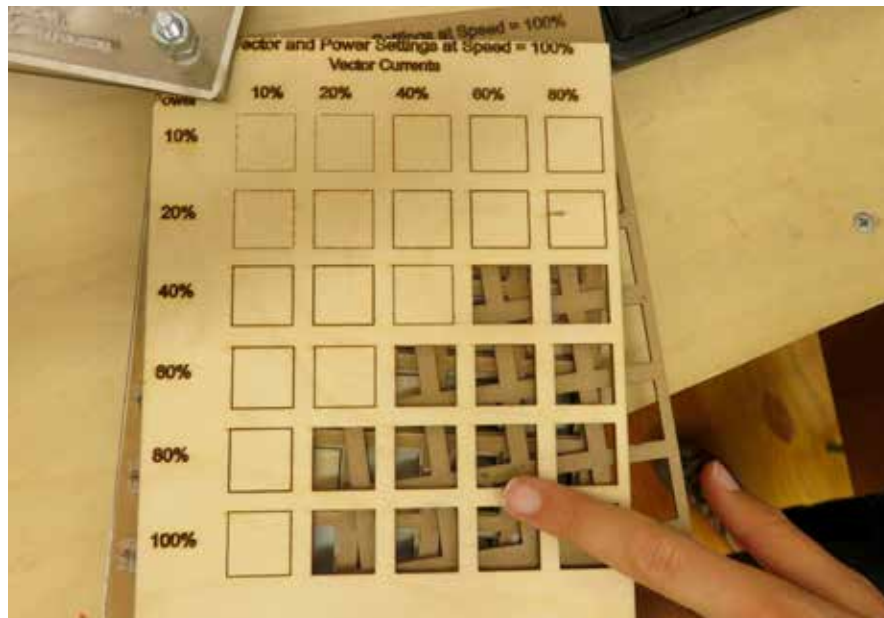


© Photo A. Brooks, kcpkbranch (flickr)

Teen using a jigsaw. FM Jocelyn H. Lee Innovation Lab, Clear Lake City-County Freeman Branch Library, Harris County Public Library, TX.

Tools, Equipment, and Materials: **FAB EQUIPMENT**

3D printer (filament)
Laser cutter
CNC machine (bits)
Vinyl cutter (blades)
DI-wire
CNC embroiderer
3D scanner



Laser Cutter Chart, Tam High Woodshop, CA.

Tools, Equipment, and Materials **COOKING**

Induction cook-top
Kitchen appliances
Bicycle blender
The Charlie Cart Project - a mobile kitchen classroom



Cheese making workshop. Note inductive cook-top and exhaust vent at each workstation. San Jose Public Library Maker(Space)Ship, CA.

Design & Equipment Guidelines

TOOLS
KITS

Tools, Equipment, and Materials: **ELECTRONICS**

Soldering Iron (stand, tips, tip tinner, solder sucker, solder)
Wire cutter, crimper tool, diagonal cutter
Digital multimeter
Third hand
Tweezers
Heat gun
Mobile equip. - Oscilloscope rigol ds1102e
Power supply - Dr. Meter
Arduino kits
Raspberry Pi kits - CanaKit
Digital multimeters - Mastech
Elenco snap circuits
Makey Makey kit
Squishy circuits
Inventor's kit for Arduino
LittleBits modular electronics kit
Extraordinaires design studio

CONSUMABLES

LEDs

Batteries: coin cell 3v, AA, AAA 9v, NiMH , rechargeable, battery clips, and holders

Breadboards

Resistors

Buzzers

Motors

Photo-resistors

Jumper wires bundle

Wire

Solder

Shrink tubing

Conductive thread

Alligator clips

Capacitors



Foto- Conrado Bassini/Meduzza, Olabr

Tools, Equipment, and Materials: **TEXTILES**

Sewing machine (sewing machine needles, bobbins, thread)

Serger

Iron, ironing board

Silk screen printing press heat press (screens, ink)

Anajet garment printer

Hand Looms, manual knitting machines

Fabric scissors, pinking shears

Cloth tape measure

Knitting and crochet needles

Snap setter (snaps)

Grommet kit (grommets)

Rotary cutter (blades)

Hand sewing, embroidery (needles all sizes, needle threaders, thread)

Straight pins, safety pins

Sew in snaps, buttons, velcro



Clearview Public Library, FL.

© Clearview Public Library (flickr)



Olabi Makerspace, Brazil.

© Olabi Makerspace (flickr)

EQUIPMENT

TOOLS

Design & Equipment Guidelines

Tools, Equipment, and Materials: **DIGITAL ARTS**

Drone camera - Lily Pro Camera
DSLR camera
Video camera - Canon Vixia Camcorder
Action camera - GoPro camera
Portable green screen
Portable lighting set
Tripod
Projector, laptop
Virtual reality - Oculus
TV - Apple TV
iPad - Apple iPad 16gb
Microphones, stands
TV - 75" Smart TV
Scanner - Epson perfection v600
Video Converter - Elgato video converter

Corel Paintshop Pro X8 Ultimate
Solidworks
V Carve Pro
V Carve Desktop
Autodesk AutoCad / Revit / Fusion 360
Adobe Creative Suite
Windows Movie Maker
Apple iMovie



Multnomah Public Library, Rockwood Makerspace, OR.

© Multnomah County Library (flickr)

Tools, Equipment, and Materials: **BIO-HACKING LAB**

- Mini fridge
- Mini freezer
- Pressure cooker or autoclave
- Incubator or heat pad in a cooler
- Centrifuge
- Bio-safety cabinet
- Pipettes
- Digital thermometers
- Digital scales
- Variety of glass ware and plastic ware



Science Garage

South San Francisco Unified School District

Genentech Foundation is partnering with SSFUSD to create Science Garage, a 6,900 sq. ft. lab for high school students to pursue biotech curriculum.



Science with Ernie at the Millbrae Library, CA.



©San Mateo County Libraries



Olabi Makerspace, Brazil.

Safety

SAFETY AND OPERATIONS MANUALS AND TRAINING (INTERNAL)

It is recommended that the Library develop an internal policy, procedures, and safety manual specific to each facility, with a copy available for reference at each location. Internal operations manuals are an industry standard best practice, and as an example, TechShop has these manuals at all locations. It is important to document and record design and operations decisions to assure that operations and safety measures that guided the original design are followed for the life of the equipment/facility. A draft of this manual may be helpful during the building permit process.



SAFETY AND RULES MANUALS AND TRAINING (FOR PUBLIC)

It is recommended that the Library develop public user safety guidelines and safety training videos and/or classes for each specialized piece of equipment. As an example, San Jose Library Teen HQ and Fayetteville Free Library Fab Lab have safety guidelines online and require participants attend training, or watch training videos online to be certified on tools before they can use them in the library.

Material Safety Data Sheets (MSDS) indicate hazards and best practices for manufactured materials. Both equipment and materials should be researched before purchase to understand the opportunities and limitations of each. It is recommended that the library keep a binder compiling MSDS data for reference. At TechShop, members need to bring in MSDS sheets for new materials that they would like to work with, to get staff approval.

- **Library will develop and maintain both internal and public safety and operations/rules manuals for all locations**
- **Library will maintain first aid, portable eye wash, and blood-borne pathogen clean up kit at each location**
- **Library will implement general safety messaging in the makerspace created from a template in the graphics standards**
- **Library will conduct regular staff safety training**

SECTION 6:

Staffing

Staffing & Volunteer Guidelines

Support from both community and library staff will help with the success of the maker initiative. The staff development component needs to be robust and ongoing as new technologies and new equipment appear at various libraries.

VOLUNTEERS, INTERNS AND MENTOR GROUPS

The San Mateo Libraries has had excellent support from and interest in the community around its proposed system-wide maker initiative. As plans proceed, the Libraries should consider establishing a volunteer maker/mentor program that would engage local makers in the project and tap them for their assistance on maker projects. A roster of volunteers and mentors with each person's area and level of expertise, willingness to work on programs with what target audience group and ability/interest to do programs at what locations should be established. Depending on the target audience, the libraries will have to vet the mentors/volunteers who are willing to work with children according to State and local regulations. SMCL should also inform and educate its Friends of the Library groups. The Friends are a great source of advocacy and support and need to be kept up-to-date with the maker initiative, its resources and its need for support.



Millbrae Library, CA.

© San Mateo County Libraries

TECH FOCUSED LIBRARY STAFF AND THE COMMUNITY TECHNOLOGY SPECIALIST

To grow the ranks of the technology focused staff, the Libraries have taken an important step forward by creating the position of Community Technology Specialist (CTS). According to the position description, the CTS leads efforts to provide the best possible technology and STEAM-related services, addressing the digital divide while transforming expectations about what libraries can do for their communities. They will work in a variety of settings both inside and outside of the Libraries, providing adults, teens and children with exceptional customer service and access to technology resources, workshops and support.

It is important to note, that a mobile maker program, where maker kits and projects can move from one library to another, may require that tech focused staff move from one library to another to share their expertise. By having such a committed group of maker staff members, the Libraries are poised to take the first comprehensive staffing steps as they implement their maker initiative.

Because of the breadth of proposed initiative, the necessity to implement it both system-wide and locally, the complex nature of the equipment and resources necessary for the initiative, the extensive nature of the staff training needed, and community outreach and coordination, Gyroscope recommends that the Libraries dedicate resources to oversee the initiative and coordinate its multiple parts.



Sonoma State Maker Educator Certificate

The first specialized maker education program of its kind, participants earn certification after 50 hours of coursework and designing a maker project. They become part of a Maker network and receive mentorship from other educators.

www.sonoma.edu/exed/maker-certificate



Laney College Fab Lab

Fab Lab staff and students use the online technical chat platform "Slack" for internal communications about tools, equipment and programs. This creates an in depth, searchable archive about the makerspace operations.

Staffing

STAFF DEVELOPMENT

There are two levels of staff development. The first, and the most general, is an introduction to the maker initiative for all library staff. All-staff meetings or smaller convocations can be held to inform the staff about the initiative and its components, the schedule for roll-out and marketing efforts. This general informational staff development effort will inform library staff and prepare them to answer the public questions about the initiative and its programs. It will be necessary to continually update this information as new activities take place using the internal library communications channels.

The second level of staff development is for the SMCL staff directly involved with implementing the maker initiative. This staff-development effort will cover the entire program and its components and include training in program implementation, new technologies and the various types of maker programs being implemented across the Libraries' system. This level of staff development will also have to be continually updated as new maker ideas and programs using new types of equipment are planned and implemented.

The technology and CTS staff should be engaged in both levels of staff development as trainers and participants, and a lead position should be responsible for planning and implementing the staff development modules.



© San Mateo County Libraries

To prototype new ideas, the "Pitch-It Program" awards grants to staff for experimental programs such as the library bike fleet, maker backpacks and 3D printers. San Mateo County Libraries, CA.



Maker Ed

Many professional maker groups exist to help promote best practices and developments in the field. The Oakland based Maker Ed organization provides training, resources and a community of support for organizations.

makered.org

Closer Look: San Mateo County Libraries

IMPLEMENTING STAFF PLAN

1. Centralized (Administration level)

- **ROLE:** determine roles required to execute the plan; makerspace management, procurement, and agreement development
- **SKILLS:** determine skills needed to execute assigned role
- **RESOURCES:** determine number of staff required to fulfill the role
- **DURATION:** determine duration of the need
- **IMPACT:** determine roles and impact

2. Local (dedicated makerspace, non-dedicated, and mobile)

- **RESOURCES:** local staff resources need to support makerspaces; involve current staff and leverage skills and hobbies; recruit staff with specialized skills
- **TRAINING:** provide training to staff to support programs/activities
- **SKILLS:** determine skills needed at the local level to fulfill the role

3. Community Resources & Groups

- **VOLUNTEERS:** support makerspace through volunteers; use specialized skills to host events, workshops, or classes; assist staff in running the space
- **MAKER GROUPS:** invite maker groups

GOALS OF STAFFING PLAN:

1. Provide effective human resources to the makerspaces in San Mateo County Libraries. Staff who are best-performing, highly adaptable, and innovative.
2. Provide learning opportunities to support the makerspaces through formal training, self-paced training, and industry certifications.
3. Continuous measurement and improvement of staff goals and functions.
4. Provide staff best practices to support making in the library.

SECTION 7:

Implementation

Process & Action

The implementation phase sets the master plan into action at both the library system level and at the local community level. The Master Plan establishes visions, goals, strategies, and guidelines for program development, space planning, maker components, tools, equipment, staffing, and operations. Implementation is about defining priorities for these, and scheduling prototyping, designing, building, and operations. These parts are all connected and must be thought of holistically during the implementation phase.

The Libraries will need a streamlined and efficient process to implement the master plan. Key recommendations for this process include:

- **Assigning an individual as the lead**
- **Making sure staff have available time to participate in the maker initiative**
- **Developing a schedule that maps out the plan for short-term and long-term goals**
- **Align the schedule with other library initiatives to look for conflicts and complements**
- **Developing an efficient communications route and reporting structure**
- **Building in feedback loops that allow the process to be refined with an eye towards efficiency and effectiveness**



SMCL staff assisting with the College of San Mateo 3D printing meet-up.

Implementation

FOUR THREADS OF IMPLEMENTATION



Implementing Program Development

San Mateo County Libraries are not new to maker activities. It has successfully rolled out a variety of maker programs over the years. Now, with a Master Plan in place, the library should develop an initial set of new maker programs with targeted goals and outcomes for the next several years, always being prepared to adjust and adapt these as interests change and new technologies arise. At the heart of implementing the maker initiative is program development, including programs of interest to all the various demographic groups served.

Programs can be developed for each demographic group, or the initial maker programs can be focused on one or two groups. For example, because increasing the proficiency of early readers in San Mateo is critically important, a new set of programs that would focus on K-3 graders might be developed, pairing literacy activities with STEAM maker activities using a tool like Makey Makey and Scratch Jr.

For the longer term and where possible, some of these activities should be outcome-based and measurable, and the Libraries should develop them to evaluate their impacts on the participants. In terms of evaluation, it is important to remember that a public library is not a controlled environment, and that testing and quantitative evaluation is difficult if not impossible, in most circumstances, particularly, with children and teens. But qualitative evaluations from participants and from parents of children can be very valuable.

Closer Look: Existing San Mateo County Libraries Maker Programs

- **MAKE YOUR OWN STOP MOTION MOVIE:** Teens learn how to create their own short animated movie utilizing stop motion techniques, iPads and various everyday objects. This four-day intensive program includes writing a script, crafting a set, filming, and post-production.
- **MAKE YOUR OWN MINICOMIC:** Kids learn how to create and develop their own original characters and feature them in their own mini-comic story, using just one sheet of paper!
- **CREATIVE PHOTOGRAPHY STUDIO KIT:** The studio kit has different photographic equipment compatible with DSLR cameras to create their own studio photos
- **LEGO MINDSTORM:** Teens can use the Lego robotics kit to build a robot and learn engineering and programming in the process.
- **3D PRINTING DESIGN:** With the implementation of 3D printers at each library, patrons can learn how to design and print out their own 3D models. Patrons can learn the basics of 3D modeling using Tinker-cad.
- **MUSIC RECORDING:** Using the digital audio workstation Pro Tools, patrons can play their instruments or sing their favorite song and leave the branch with a recording of their performance.
- **FILM MAKING:** Teens have created and edited their films, then showcased them at their county library.
- **ARDUINO WORKSHOPS:** San Mateo County patrons have opportunities to attend Arduino workshops and learn how to create LED circuits.
- **SCIENCE ACTION CLUB:** The library partnered with the California Academy of Sciences to offer a free, hands-on, after school series of learning sessions for middle schoolers.
- **Other programs include:** Painting, Community Murals, Bike Powered Cooking, Cooking (Adults, Teens & Kids), Button Making, Zine, Kids Craft Club, Poetry Night, Coffee & Coloring, Imagination Playground, Knitting Group, Dancing, Paper circuit cards, STEAM Saturday, Tinkering Tuesday, Rigamajig STEM play, Tech Labs

APPLYING PROGRAM TYPOLOGIES

The program typologies are intended to inspire program design. When prototyping a program, test out a couple of typologies to determine what formats are best adapted to specific goals and audiences. For example, if a program goal is to reach new and novice maker audiences, Maker Online might not be the best entry point compared to Start With A Book or facilitating a Pop-Up. During these prototypes, it is essential that the outcomes and evaluations are displayed and shared with a broad group of library patrons. The evaluations could be simple and spontaneous – quotes from a workshop, photos of before and after, simple displays of the steps in the process. Engaging library patrons in the process will help educate them on the maker initiative and get valuable input for the development.



Set both long-term goals and short term goals that require greater or fewer resources and time. Keep things fresh with a short-term goal to inspire the maker spirit in all staff. This could be achieved by setting up an all-staff Pinterest board for sharing everyone's maker projects or perhaps with the challenge to "make a little something, by lunch" – matchbox dioramas inspired by a sentence in a book, or bookmarks made from recycled packaging. These practices would encourage staff to be nimble, and to think and make on their feet. Staff might be excited to continue to develop new maker programs by focusing the Pitch-It program with a maker challenge. The programs the Library develops can be as interesting and varied as the staff, participants and volunteers who are engaged in the maker initiative. Above all, flexibility, creativity, and adaptability are key.



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Marketing & Communications

Choose a name for the makerspaces that reflect the initiative's unique goals. The conceptual framework - Everyone is a Maker - should be reinforced through all the library's communications outlets. Because there are already maker programs at the library, telling the new story of Everyone is a Maker should be done across all media platforms, answering the question about why this is different and new.

Everyone is a Maker can feature one or several local makers every week – in print or online describing projects and participation, including photos and videos. Many of the public relations materials can also be maker “made” and designed - bookmarks, t-shirts, etc. An Everyone is a Maker kickoff, such as a mini-maker faire, should be planned to initiate the program and inform the media of what is happening. The public kickoff should not occur until programs are in place and ready to go through the library system, not necessarily in each library but with a good geographical distribution. While most communications are directed at the local community, other information on the program should be developed to target a national audience as well. National recognition can be reached through professional conference presentations, and through actively contributing to online maker resources.



The Bubbler

The Bubbler is a program of the Madison Public Library in Wisconsin. It offers tools, workshops, demonstrations and an Artist in Residence program and curates an exhibition space. The Bubbler uses the tag line “Learn Share Create” to communicate its programs. It has a graphic standards and a website distinctive from the Madison Public Library reinforcing its distinct brand. madisonbubbler.org

MARKETING AND COMMUNICATIONS IN ACTION

- **Graphic standards that reinforce the Library brand guide the layout for all print material, including program flyers, tool labels, safety signage, and instructional signage.**
- **Launch a makerspace website through the portal of the SMCL web page with a distinctive look and feel but compatible with the existing branding system. Incorporate a personal style in the graphics, showcasing local community work and community stories.**
- **Design bookmarks announcing new maker programs and services, cache them in new print books. Draw a connection between making and library collection with notable quotes.**
- **Host workshops for the public to learn media technology and create community radio, podcast, or video advertisements for the maker program. Select a winning project to go live.**



SF Public Library Type Truck, letterpress printing, CA.



Book Arts and Special Collections, San Francisco Public Library

Implementation

CONNECT WITH YOUR AUDIENCE

The following are examples of how to connect with women, girls, immigrants, low income families or non-English speaking populations across all age groups. Many of these examples are already rolled out in the Libraries' programs.

- **Specialize the program.** Develop and sustain some programs with a particular audience in mind. As an example, Girls Who Code is a nonprofit dedicated to closing the gender gap in the tech industry and serves over 40,000 girls in locations nationwide including Millbrae, Foster City and San Carlos Libraries.
- **Continue to make the programs warm and welcoming.**
- **Consider offering a stipend to participants.** See San Francisco Public Library The Mix as an example (Reel Stories: Audio Production Work\$hop, Control freqs: audio production work\$hop.)
- **Hire diverse staff to reflect the ethnic and cultural diversity of library patrons.**
- **Offer bilingual programs and promote these with bilingual public relations materials.**
- **For programs that target parents, guardians, or caregivers, offer concurrent programing for adults and the children under their care.**
- **Connect/partner with local cultural/ethnic organizations to reach new audiences.**
- **Advertise through local cultural/ethnic media like radio stations and newspapers.**



Community Mural Paint-In. Village Market at Sunnydale & Hahn Streets, Judith Sandoval Visitacion Valley gift of stories collection, San Francisco Public Library, CA.

"...the way you best serve your community is to look like them. For some, that means 3D printers. For others, it means fishing rods."

Professor David R. Lankes, director of South Carolina School of Library and Information Science.¹⁰

Operations & Budget Strategy

Individual cities are responsible for their city owned buildings and spaces. The Library will support staffing, equipment and services in these spaces. The operations strategy and budget strategy for the Master Plan are intertwined. Operations will require resources, and resources, for the most part, have a budgetary impact. How much of financial impact is directly related to the roll-out of the plan for the first and, then, subsequent, years? A multi-pronged roll-out with many different activities for all age groups in each library will require more resources than a slower and more focused roll-out in selected libraries. However, if the Library's commitment to maker activities is as deep as it appears, and the interests of community members are as broad as they appear, a wider and more extensive first year program is advisable.

Once the Master Plan is accepted by the JPA Board, a plan for the first year of activities with the related budgetary impact should be put in place. The Four Threads of Implementation chart the four areas that are the cornerstones of this plan. Each thread has operations and budget implications and all of them have an effect on one another.



Johnson County Library Makerspace, Kansas

The Black and Veatch Makerspace at the Central Resource Library was funded by that company and a private foundation. They have a four-month long rotating maker in residence program, sponsored by Black and Veatch that features local makers of note who teach in their own area of expertise.

Closer Look: San Mateo County Libraries

New Libraries

Construction is underway on a new 22,000 sq. ft. Half Moon Bay Library. The new facility will include a 740 sq. ft. makerspace located on the second floor. The new library is estimated to open in the summer of 2018.

A new 9,000 sq. ft. Atherton Library is being designed as part of the new Atherton Civic Center. Library construction is estimated to begin in 2018 and includes a 400 sq. ft. dedicated makerspace and a 400 sq. ft. digital lab. Both spaces can be combined to accommodate larger maker activities. In addition, a maker yard will be situated adjacent to the makerspace which will allow for outdoor maker activities.

A new 7,000 sq. ft. Brisbane Library is being designed to replace the current Brisbane Library. The new library facility will include a 440 sq. ft. makerspace that will be located next to the 685 sq. ft. community room. These two spaces will be separated by movable walls to adapt and accommodate larger maker activities. The makerspace will also be positioned close to the outdoor garden for outdoor maker activities. Construction is estimated to begin in 2018.

Improved Libraries

Work to design and create makerspaces in the Belmont, Foster City and Millbrae Libraries will begin in the summer of 2017. Teen and Homework spaces in each of these libraries will be renovated to accommodate maker activities.

Our other libraries will continue to be evaluated for maker related facility improvements. Facilities without a dedicated makerspace will offer maker activities, utilize the maker carts, and have access to the mobile maker vehicle.

Mobile Libraries

Work to design and procure a mobile makerspace and a hands-on play space will begin in the summer of 2017. These outreach vehicles will support maker programs at our libraries without physical makerspaces, as well as throughout the county to support activities out in the community.

Implementation

NEXT STEPS

Program goals should be prioritized and a series of prototype programs developed to be used throughout the library system. As the programs are created, a budget should be developed for each that includes component design, cost of materials, related costs of presenters, marketing, replication, etc.

Component design, such as carts, kits, and display, should be undertaken for each of the prioritized programs with budget developed for the prototype and each additional replicable program “package” that will be created. The Libraries should work with their cities to prioritize capital needs for makerspace infrastructure and design, and engage architects based on the priorities set by the system. Many Libraries currently facilitate maker programs in existing flex spaces and can continue to do so where a designated makerspace is not feasible.

Coordinating the Master Plan and its implementation will involve leadership on the part of the Library staff. Because of the variety of components involved and the complexity of developing the programs, resources and spaces, it is recommended that staff resources be budgeted to support the program.

Staff training and development will need to start once the Master Plan is adopted. Hands-on workshops, training in new equipment and training in outreach to potential community partners and volunteers are the beginning. Resources may be necessary to pay trainers and/or to send staff to visit other successful makerspaces and maker conferences. For example, the Library Entrepreneurship & Maker Services Public Group, a member of the American Library Association, is on Facebook and frequently has information about workshops, shared ideas and services that staff members can consult. Additional resources are in the appendices.



Painting, at Pacifica Library, CA.

© San Mateo County Libraries

Conclusion

Because maker-centered learning is all about change, innovation and adaptation, any operation and budget strategy has to be open to change, refreshment, and reallocation. Community interests and demand will change; new ideas for new technology, new equipment, and new programs will be constantly forthcoming. Flexibility will be key to programs, priorities, components, spaces and, therefore, financial resources. Strategizing the introduction of this initiative, developing maker materials, developing internal communications, planning a public relations campaign and kickoff events should be done as soon as, if not prior to, the Master Plan has been approved.

It is easy to say start small and grow, but the Library and the community are looking forward to a more ambitious effort. The Library has an opportunity to make an impact in the County by engaging community members in exciting making and learning activities. Prototyping new maker activities for all ages, involving community partners, providing equipment and resources, and generating “buzz” about the role of the Library in the community are all important as the Master Plan is introduced and implementation begins.



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Appendices

ENDNOTES

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2. lj.libraryjournal.com/2001/11/library-services/libraries-create-social-capital
3. <http://www.thebiglift.org>
4. Engage to Excel: Producing One Million Additional College Graduates with Degrees in Science, Technology, Engineering, and Mathematics, The President's Council of Advisors on Science and Technology
5. chattlibrary.org/content/cpl-help-pilot-three-gig-powered-mozilla-community-education-projects
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7. See book with same title "Hanging Out, Messing Around, and Geeking Out: Kids Living and Learning with New Media", published MIT Press, 2013.
8. CDC Noise and Hearing Loss Prevention Power Tools Database <https://www.cdc.gov/niosh-sound-vibration>
9. www.sjpl.org/sites/default/files/documents/SJPL_TeenHQ_SafetyGuide.pdf
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Makerspace Playbook, School Edition. N.p.: MakerEd, 2013. Web. <<http://makered.org/wp-content/uploads/2014/09/Makerspace-Playbook-Feb-2013.pdf>>.

Youth Makerspace Playbook. N.p.: MakerEd, 2015. Web. <http://makered.org/wp-content/uploads/2015/09/Youth-Makerspace-Playbook_FINAL.pdf>.

ARTICLES

<http://www.ala.org/advocacy/intfreedom/statementspols/contentcreationQA>

This Q&A can be used as a guide by libraries as they create policies for makerspaces or other content creation forums within their facilities.

<http://www.ala.org/transforminglibraries/future/trends/makers>

Do-it-yourselfers, tinkerers, hackers, entrepreneurs, and interested learners are finding opportunities to make what they want and determine their own creative paths. Makers take advantage of the availability of new technology and traditional craft tools, improved communication between community members, and new pathways to the marketplace (sharing economies, e-commerce, crowd-sourcing).

<http://www.techsoupforlibraries.org/blog/fix-it-at-the-library-with-diy-repair-programs>

Fix It at the Library with DIY Repair Programs

https://placesjournal.org/article/Makerspace-towards-a-new-civic-infrastructure/?gclid=CNUA5_OLudICFYmffgod848BrA

"Makerspaces are at once an emerging architectural and institutional typology and a manifestation of the so-called sharing economy. But will they last?"

<http://www.washington.edu/doi/making-makerspace-guidelines-accessibility-and-universal-design>

Making a Makerspace? Guidelines for Accessibility and Universal Design

https://www.nytimes.com/2015/09/15/us/these-public-libraries-are-for-snowshoes-and-ukuleles.html?_r=0

These Public Libraries Are for Snowshoes and Ukuleles, By Patricia Leigh Brown, New York Times, Sept. 14, 2015

https://kf-site-production.s3.amazonaws.com/publications/pdfs/000/000/233/original/Knight_UL_Innovation_Report_final.pdf

Developing Clarity: Innovating In Library Systems, March 2017

John S. and James L. Knight Foundation

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ONLINE EDUCATOR RESOURCES/ FORUMS

Maker Ed - national community:

<https://plus.google.com/u/0/communities/108516741770696736815>

Bay Area Maker Educators Meet Up:

<https://plus.google.com/u/0/communities/112974120022463718222>

K-12 Fab Labs and Makerspaces Google Group:

<https://sites.google.com/site/k12makers>

"Welcome! Digital fabrication labs, makerspaces, innovation labs are popping up in K-12 schools all over the country (and the world!) but are still rare enough that many of us aren't living in close vicinity to many other similar labs. Let's build a virtual community of lab directors/administrators/coordinators/enthusiasts so we can share our best practices, tips, tricks, challenges of managing and running such labs. Consider this a forum for all things about digital fabrication in K-12 education - equipment reviews, conference/workshop announcements, rumors about new gadgets, troubleshooting problems, advice about vendors, cool resources for projects, etc."

<http://www.agencybydesign.org/>

"Investigating the promises, practices, and pedagogies of maker-centered learning."

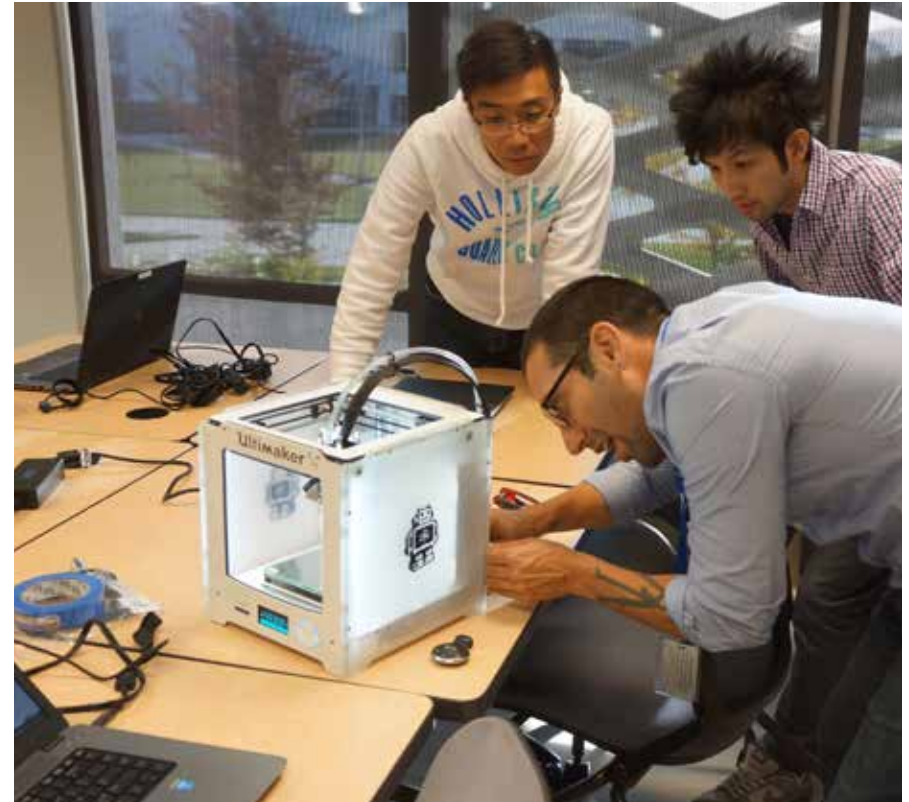
<http://makered.org/resources/spaces-places>

Makerspace guides, tools, resources.

<http://www.sonoma.edu/exed/maker-certificate>

<https://makingandlearning.squarespace.com>

"Here, we present a framework to guide and grow the capacity of museum and library professionals as they create the conditions for learning to unfold within and through making experiences."



3D printing, College of San Mateo, CA

Appendices

References

ONLINE PROJECT REFERENCES

<https://diy.org>

DIY is a safe online community for kids to discover new passions, level up their skills, and meet fearless geeks just like them.

<http://www.diyncrafts.com/home>

<http://www.instructables.com>

<http://www.makereducation.com>

<http://makezine.com/projects>

http://www.sciencebuddies.org/science-fair-projects/project_ideas.shtml#browseallprojects

<http://www.arvindguptatoys.com/toys.html>

Making toys from simple materials. "Toys from trash. The best thing a child can do with a toy is break it !"

<http://www.thingiverse.com>

Browse the world's largest 3D design community for discovering, printing, and sharing 3D models. Join over 1,449,860 community members in downloading, sharing, and remixing 3D designs.

ADDITIONAL CASE STUDIES

<http://www.repaircafe-paloalto.org>

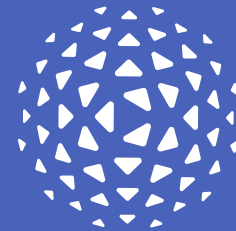
"We hold Repair Café events periodically. Bring your broken things and work with our repair volunteers to assess what it would take to repair them. You can work with our volunteers to do the repairs yourself (with their guidance) or have them tackle the job directly. With luck, you'll walk away with a once-again useful item and some knowledge of how to repair other things in your universe."

<https://sunnyvalemakeher.wordpress.com>

"The Make-HER program at the Sunnyvale Library is all about women. It is designed to give girls ages 8 – 12 and their moms the opportunity to work side by side, applying their creativity both to the use of existing tools and the invention of new ones. Led by a superstar team of #LadyMakers, girls and their mothers (or other adult female mentors) carry out project-based, hands-on STEM learning in a series of two-hour workshops."



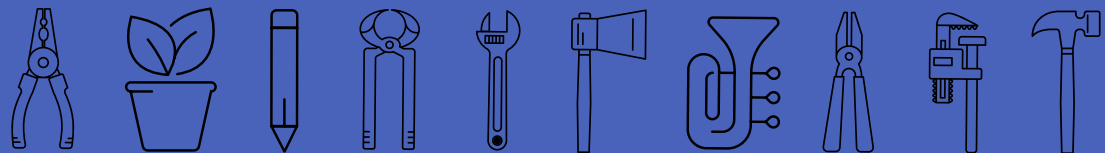
San Mateo
County
Libraries



San Mateo
County
Libraries

Makerspace Master Plan

ADDITIONAL MATERIAL



Case Studies

Workshop Data

Project Worksheet

GYROSCOPE INC

Case Study

CHATTANOOGA PUBLIC LIBRARY 4th Floor

Opened in 2012, Open 6 days a week, 3 PT staff, plans for 1 FT staff. Staff available for one on one assistance. Low structured environment, can be messy, that changes all of the time. 12,000 sq. ft.

Sources:

<http://chattlibrary.org/4th-floor>

Additional information gathered from Corinne Hill, Library Director

Chattanooga, Tennessee

“Our Vision: The 4th floor is a public laboratory and educational facility with a focus on information, design, technology, and the applied arts. The more than 12,000 sq. ft. space hosts equipment, expertise, programs, events, and meetings that work within this scope. While traditional library spaces support the consumption of knowledge by offering access to media, the 4th floor is unique because it supports the production, connection, and sharing of knowledge by offering access to tools and instruction.”

<http://chattlibrary.org/4th-floor>

Example Programs:

- Hosted a Lego Engineering educators conference, 43 attendees from Hamilton Co.
- Etsy Craft Entrepreneurship program to help craft makers establish an online business.
- Access to free online courses on a variety of topics, many focused on design, technology and the arts.
- Tech Goes Home CHA strives to provide technology access and support to all County residents.
- Provide co-working and community space, heavily used.
- Online community education projects powered by Chattanooga’s 1 GIG network. <http://chattlibrary.org/content/cpl-help-pilot-three-gig-powered-mozilla-community-education-projects>
- Mozilla, NSF, US Ignite Gigabit Community Fund launched at the library. Event described as “call-for-RFP meets hack-a-thon”.
- National Day of Civic Hacking: One who collaborates with others to create open source solutions using publicly-released data, code and technology to solve local social, economic, and environmental challenges.

INSPIRATION TO SAN MATEO COUNTY LIBRARIES:

- **Be flexible and open to change. Have a relatively non structured environment that can be messy, and will evolve over time.**
- **Have programs that support entrepreneurs and adult education.**
- **Partner with tech companies.**

Case Study

LABORATORY DE IDEAS Papalote Children's Museum

Mexico City, Mexico

Gyroscope Inc. designed 15,000 sq. ft. of exhibits in the "Laboratorio de Ideas", a highly interactive and social makerspace encouraging creative problem solving with peers and parents. The "Laboratorio de Ideas" includes a traditional workshop, an art space, a paper making zone, a digital fabrication area, a robotics and new technology area, an edible experiments kitchen, a design challenge area, a group build space and a broadcast media area. Each area considers the history and culture of Mexico while celebrating and looking forward to current and future technologies. Infused throughout the gallery are display options for artists in residence, visitors and staff to inspire and encourage the next visitors, as well as create an enticing environment with a high rate of change.

INSPIRATION FOR SAN MATEO COUNTY LIBRARIES:

- **Emphasize the maker initiative branding with unique design aesthetics.**
- **Curate art and project displays at each local library.**
- **Implement an Artist In Residence program.**



Papalote Children's Museum Makerspace

© Exhibit Design by Gyroscope

Case Study

CHARM BRACELET PROJECT

Children's Museum of Pittsburgh,
Carnegie Library of Pittsburgh Allegheny
+ 20 other cultural, recreational and educational organizations.

"The Charm Bracelet Project is a network of cultural, educational, and recreational organizations transforming traditional understandings of how institutions make community impact. We work collectively to foster a vibrant, attractive and accessible North side that is unified by visible, lasting connections between organizations and amenities. The major focus areas of the Charm Bracelet Project are public projects and programs; education and youth programming; environmental sustainability and green practices; and mobility...The group has grown to include over 20 cultural, recreational and educational organizations that implement projects, share information about individual initiatives and explore possible collaborations."

Pittsburgh, Pennsylvania

INSPIRATION FOR SAN MATEO COUNTY LIBRARIES:

- Partner with cultural organizations that have shared values to expand on the vision that each of the libraries is part of a larger family.
- Reach a wider and inclusive community demographic through these partnerships, and a broader range of making as learning experiences.



Case Study

THE BUBBLER Madison County Public Library

www.madisonbubbler.org
Madison, Wisconsin

The Bubbler is a program of the Madison County Public Library in Wisconsin. It offers tools, workshops, demonstrations and an Artist in Residence program and exhibition space. The Bubbler uses the tag line "Learn Share Create" to communicate its programs where one can "learn, share and make anything" from beer brewing to creative writing to 3D printing. The Bubbler partners with local institutions on programming such as the "Madison Story Project," which is a collaboration with the Teen Bubbler and Madison Children's Museum. The program "School Time Teaching Partnerships" takes the Teen Bubbler into school classrooms. A recipient of a National Leadership Grant from the Institute of Museum and Library Services, the Bubbler has space in the Central Library and presents "make-and-take" workshops in all nine library branches and in other locations throughout Madison. Programming is filtered by five audience categories- Adult, Families or All Ages, Preschool, Bubbler Jr (K-5); Teen Bubbler (grades 6-12). making the programming both inclusive and specialized. The Bubbler has a volunteer program and encourages members of the community to be presenters.

INSPIRATION FOR SAN MATEO COUNTY LIBRARIES:

- Brand the maker initiative with a distinctive name, logo, and website.
- Host an Artist/Maker In Residence to connect with the community, and keep the programming fresh and current. Curate art shows in the library, as part of both temporary and permanent art collections .
- Produce events and programs in partnership with local institutions, businesses and non profits.
- Invite community volunteers to be presenters.



<http://madisonbubbler.org/>

Case Study

CREATIVITY JAM PROTOTYPE Minnesota Children's Museum

St. Paul, Minnesota

Gyroscope Inc. worked with MCM to develop the Creativity Jam Prototype platform for staff to evaluate their future expansion through cost-efficient, exciting and flexible experiences for visitors to enjoy over a three month time period. Fort-building prototype lab was a one day workshop where staff and visitors collaborated in developing new exhibits. Everyday materials were transformed to create extraordinary spaces. Lessons learned: simple was effective, don't forget to use the floor as a design element, staff learned to watch, observe, and make changes. Fort building was a success!

INSPIRATION TO SAN MATEO COUNTY LIBRARIES:

- **Prototype ideas with the public before scaling them up and out to multiple locations.**
- **Staff watch, observe and adapt program ideas as needed based on user experiences and feedback.**
- **Simple is effective. Making with everyday materials can be extraordinary.**



Prototyping with the public, Fort Building and Creativity Jam Gallery

© Photo and exhibit design by Gyroscope

Case Study

FAYETTEVILLE FREE LIBRARY

www.fflib.org/make
Fayetteville, New York

Fayetteville Free Library in New York started one of the first makerspaces in a public library, the Fab Lab, in 2010. Using local funding, in-kind support, and a crowd-sourcing campaign, they have digital media and fabrication equipment for adults and kids. The 2,500 sq. ft. Fab Lab has hand tools, sewing machines, 3D printers, laser cutter, vinyl cutter, and soon will have a CNC. There is also a 250 sq. ft. digital media space called the Creation Lab and a 250 SF Little Maker's Area for free STEAM centered play. The Fab Lab is open 51 hours per week staffed in 2-3 hour/week shifts by 8 librarians, and support staff (3-4 hours/month shift), and 8 trained volunteers (2-3 hour/week shifts).

INSPIRATION FOR SAN MATEO COUNTY LIBRARIES:

- **Have all library staff receive maker program training so that the maker mindset is integrated throughout the library. The makerspaces are intended to be inclusive to all ages and abilities (including staff).**
- **Capture stories from the maker programs via blog, video making, or poster making as a teaching tool, community project, and publicity opportunity.**
- **Have a feedback loop in place to continue growing and improving services. See Fayetteville's survey.**
- **Use a program assessment tool to help plan and design new or existing programs. See Fayetteville's tool.**
- **Require certification training on high risk tools. See Fayetteville's certification system with online video tutorials and quizzes, or in person training classes.**
- **Have all participants sign maker agreement/waiver for using technical tools and participating in technical programs. See Fayetteville's maker agreement.**

Case Study

LIGHTHOUSE COMMUNITY CHARTER SCHOOL Creativity Lab

www.creativitylab.org

Oakland, California

Lighthouse Community Charter School is a K-12 free public school serving low-income youth and integrates design-making into the entire school program. From their website: "We believe that all students are designers and makers and we want to give our students the choice to pursue their own passion by providing them with the opportunity to make at all ages." The mission of Lighthouse is "to prepare a diverse, K-12th grade student population for college and the career of their choice by equipping each child and youth with the skills, knowledge, and tools to become a self-motivated, competent, lifelong learner." Creativity lab staff are active with Bay Area Maker Educator Meet-up groups and host professional development classes with Castelleja school. At Lighthouse, student projects are displayed in hallways and classrooms. Learning is visible.

INSPIRATION TO SAN MATEO COUNTY LIBRARIES:

- Partner with schools to compliment curriculum with design-making.
- Post online project recipes as a resource to educators and to spark interest with library patrons.
- Sustain the maker initiative with professional development.
- Display projects throughout the library. Make learning visible.

The Creativity Lab posts online project guides for tried and tested maker projects in their K-12 classrooms.



Paper Circuits
1st-12th Grade
1 Hour

MATERIALS


- Copper Tape
- Aluminum Foil
- Paper
- 3V Coin Cell Batteries (CR-2302)
- Scotch Tape
- LEDs (3mm or 5mm)
- Binder Clips


Paper Circuits use simple materials to safely engage students in basic circuitry, and help them visualize the flow of electric current. (For a more in-depth look at paper circuits, see our complete paper circuit project guide.)

E-mail us at creativitylab@lighthousecharter.org

To Build A Paper Circuit...

1. Make a trail of copper tape on the paper. Remove its backing to make it stick. Be creative in your shape.
2. Make a second trail using aluminum foil. Secure it to the paper with scotch tape, but leave the last inch or so of each end free. The two paths should nearly meet at one end, and overlap at the other.
3. Use an LED to bridge the gap between the two trails. Bend the LED's leads, and tape them firmly in place.
4. Sandwich the battery between the two trails at the other end. If the light does not shine, flip the battery over. (The positive lead of the LED must connect to the positive terminal of the battery, and the negative lead to the negative terminal.) Optionally, use a binder clip to secure the battery in place.







<http://www.lighthousecreativitylab.org>

Case Study

ROCKWOOD MAKERSPACE Multnomah County Library

Rockwood Library Makerspace is a “collaborative learning environment” for teens to learn real-life technology and engineering skills. They offer instruction, workshops, mentors and access to hi tech tools like a laser cutter and 3D printers.

<https://multcolib.org/library-location/rockwood-Makerspace>
Portland, Oregon

INSPIRATION FOR SAN MATEO COUNTY LIBRARIES:

- Design the space for maximum flexibility to accommodate a range of experiences.
- Incorporate display throughout the makerspace.



© Multnomah County Library (flickr)

Case Study

SAN JOSE PUBLIC LIBRARY STEAMstacks Teen HQ Maker [Space] Ship

Sources:

<https://sjpl.org/steamstacks>
<https://www.sjpl.org/teenhq>
<https://www.sjpl.org/Makerspaceship>

Additional information gathered from
 Erin Berman, Innovations Manager
 Erik Berman, Youth Services Librarian

San Jose, California

San Jose Public Library STEAMstacks initiative facilitates pop up STEAM programs throughout the system, but without dedicated makerspaces. STEAMstacks recently launched the Maker [Space] Ship, a mobile makerspace in January 2017. It is a fully customized RV with photo-voltaic panels on the roof, pop out sides, a wheelchair lift and does not require a special drivers license to operate. Currently, one full-time staff person takes the Maker [Space] Ship on the road 15 hours per week and develops programs and books sites. The Maker [Space] Ship travels to non-library locations throughout the community and facilitates programs for up to 20 participants on board. The Maker [Space] Ship has 5 workstations that accommodate 3-4 people. Each workstation has a flat screen, laptops, exhaust fan, and power receptacles. One workstation is wheelchair accessible. The Maker [Space] Ship also has a laser cutter (vented to outside), CNC, and 3D printer tethered to a work bench.

Gyroscope Inc. facilitated teen design workshops for the new Teen HQ at the Dr. Martin Luther King Library which includes a makerspace in addition to a gamer lounge, a recording studio, and a hang out area.

San Jose Public Library hosts a blog series called STEAMhome curating a list of STEAM project ideas that families can make at home with children.

INSPIRATION FOR SAN MATEO COUNTY LIBRARIES:

- **Develop a mobile maker vehicle to travel to non library locations to reach new audiences.**
- **Engage youth in designing spaces and programs.**
- **Develop safety and instructional manuals. See example on TeenHQ website.**



Makerspace in TeenHQ

© photo by Gyroscope Inc.

Case Study

SKOKIE PUBLIC LIBRARY The BOOMbox

The BOOMbox is an experimental space, in the Youth Services area of the library, designed to facilitate STEAM learning for all ages. Every few months the theme of the room changes. They host drop in times, classes and workshops. One recurring event is called "Challenge Accepted" where teams of teens are invited to compete on engineering experiments or design challenge.

<https://skokilibrary.info/resources/boombox>
Skokie, Illinois

INSPIRATION TO SAN MATEO COUNTY LIBRARIES:

- **Be flexible and open to change.**
- **Encourage prototyping and experiments both for staff and patrons.**
- **Have an adaptable space.**



Challenge Accepted engineering and design workshop



Big & Small program, looking at a sample of snow with a digital microscope.

Case Study

JOHNSON COUNTY LIBRARY, Black & Veatch Makerspace at the Central Resource Library

Sources:

<https://www.jocolibrary.org/makerspace>

Information gathered from Sean Casserley,
Director of the Johnson County Library

Johnson County, Kansas

The Black & Veatch Makerspace at the Central Resource Library was made possible by generous donations by Ewing Marion Kauffman Foundation and Black & Veatch. The Library Foundation approached Black & Veatch and offered naming rights to the makerspace for three years. Black & Veatch provided \$30,000 of funding for each of the three years. The donation went to buy equipment for the space. The Johnson County Library worked with Black & Veatch's marketing firm to develop the logo and colors for the space and related public relations materials. Black & Veatch is a company with a strong engineering presence in the area, and it was concerned that they were having difficulty finding employees with the backgrounds they needed. The Library initiative in STEM programs and through the makerspace would help to provide interest in engineering and science and encourage young people to go into these fields. The makerspace has a one "maker-in-residence" per trimester, paid for by a grant from Black & Veatch.

There are four staff people assigned to the space that is open six days per week. Three of these staff members have maker backgrounds, one has a strong IT background. All staff members are paid by the Library's operating budget. The Johnson County Library believes that makerspace staff needs to get out into the community and connect to organizations serving people of all ages. They have built a network of staff from other makerspaces and meet to share programs and ideas with them on a monthly basis.

There is a mobile makerspace, a cargo van, that brings maker activities out to the community. The Johnson County Library deliberately did not put makerspaces everywhere. There is only one at the Central Resource Library so that they could centralize resources and staffing, and concentrate on providing the best services to the community. They believe that people will travel to the great resource they have, and that has proven to be the case. Currently they are building a new large branch that will have a digital media lab focusing on technology. When they looked at doing a makerspace they addressed two issues: what problem were they solving and what value was being added to the community.

INSPIRATION TO SAN MATEO COUNTY LIBRARIES:

- **Seek out funding partners and provide donors with naming opportunities for spaces, equipment, or sponsored programs.**
- **Implement a Maker In Residence program.**
- **Designate enough staff hours to the maker initiative, including time for staff to do community outreach.**

Case Study

SAN FRANCISCO PUBLIC LIBRARY The Mix

Sources:

<https://themixatsfpl.org>

Information gathered from SFPL
website and Cathy Cormier,
Program Manager

San Francisco, California

- Teen learning space, for ages 13-18.
- 4,770 sq. ft., youth designed space including an audio studio, video studio and makerspace.
- Mix on the Move brings projects throughout the SFPL's 27 branches.
- The Mix received a planning grant from the Institute of Museum and Library Services and the MacArthur Foundation, with additional financial support provided by Friends of the San Francisco Public Library
- The Mix is a collaboration with the Bay Area Video Coalition (BAVC), California Academy of Sciences, and KQED.
- The Board of Advising Youth (BAY) is The Mix's leadership group that rose out of the original teen design board. They currently have about 30 BAY, 15 of which actively assist with Mix programs on a weekly basis. Some BAY only attend the monthly meeting and participate 2-3 hours a month, but the more active BAY participate about 5-6 hours a week. Like nearly all of the peer teen leadership programs in the area, SFPL pays stipends to teens to show that they value them and their time.
- Since Spring 2016, SFPL has paid a \$50 stipend to teens that complete a series of four workshops in either the audio studio, video studio or makerspace. So far, at least 50 teens have completed a workshop series. By paying a stipend to teens who complete a series of four workshops, SFPL shows them that they value their commitment. SFPL is working to include mastery of basic competencies as a criteria for receiving future stipends.
- Beginning FY15 SFPL launched the 9912 Public Service Aide/College Intern position, which provides three positions for high school graduates to assist as youth mentors at The Mix. These positions are 15 hours a week, a step up from BAY, and require a deeper level of responsibility.
- The new YELL program gives a \$500 scholarship to teens who complete a summer workforce development internship program.

INSPIRATION TO SAN MATEO COUNTY LIBRARIES:

- **Implement stipends for youth leadership programs such as a youth advisory board, a 9912 Public Service Aide/College Intern position, and/or a summer workforce development internship program as part of the makerspace initiative.**
- **Continue to partner with California Academy of Sciences and other institutions as part of the makerspace initiative.**

Case Study

HARRIS COUNTY PUBLIC LIBRARY

Clear Lake City-County Freeman Branch Library
FM Jocelyn H. Lee Innovation Lab

<http://www.hcpl.net/content/jocelyn-h-lee-innovation-lab-0>
<https://www.flickr.com/photos/hcplebranch/sets/72157641870068855/with/32526011255/>

Houston, Texas

"The Innovation Lab is a place for people of all ages to learn, share resources, work on projects and network with other creative minds."

The Freeman Library received a generous donation from a community member FM Jocelyn H. Lee in 2013. The FM Jocelyn H. Lee Innovation Lab was opened two years later. During the planning phase a partnership was formed with local maker group CreatorSpace to bring maker programming to the library. The partnership continues and the library provides CreatorSpace with meeting space and has helped expand their membership to a more diverse audience. Each month staff curate an "Adult Crafts-To-Go Kit" available for pick up at the reference desk and prepped in the Innovation Lab, for example with material cut on the laser cutter. Staff have written project recipes for their library maker classes and posted them on the Innovation Lab web page.

INSPIRATION TO SAN MATEO COUNTY LIBRARIES:

- Curate "Take Home" project kits, available at the main library desk, to advertise the makerspace and reach new audiences.
- Share project recipes and post them online. This is a great resource for educators and sparks interest for patrons to participate.
- Establish partnerships with local maker organizations.
- Seek out funding partners and provide donors with naming opportunities for spaces, equipment, or sponsored programs.

Case Study

TOOL LENDING LIBRARIES

College of San Mateo Tool Lending Library part of the Makerspace Project

The College of San Mateo Tool Lending Library was started in 2015 as part of the makerspace project with grants from the Pacific Library Partnership and the College of San Mateo Office of the President. CSM students and CSM employees can check out a wide variety of tools categorized under the following groupings:

- TLL-C Arts & Crafts
- TLL-E Electrical & Computer
- TLL-EDU: Educational Toys
- TLL-H: Hardware & Power Tools
- TLL-SCI: Science Projects

<http://libguides.collegeofsanmateo.edu/tools>

Library of Things Sacramento Public Library

"The Library of Things is a new service from the Sacramento Public Library that offers things for checkout—such as sewing machines, musical instruments and video games. The items in the Library of Things were chosen in a voting process by Sacramento Public Library patrons and funded by a Library Services and Technology Act grant administered through the California State Library."

<http://www.saclibrary.org/Services/Library-of-Things>

Berkeley Public Library Tool Lending Library at South Branch

Berkeley's Tool Lending Library (TLL) was started in 1979 with funding from a federal Community Development Block Grant (CDBG). With the motto "measure twice, cut once," BPL offers thousands of tools for check out, knowledgeable staff, a collection of helpful DIY how-to books and media on construction projects, gardening, plumbing, and electrical work. www.berkeleypubliclibrary.org/tools

Oakland Public Library Tool Lending Library at Temescal Branch

The tool library, with 5,000 tools, is one of the Oakland Public Library's most popular and unique services. It grew from a small Home Resources Collection that was started after the Oakland Hills Firestorm of 1991 to help residents rebuild and repair following this disaster. In 2000 the library was established with seed money from a Community Development Block Grant, and continues grow with City funding. <http://www.oaklandlibrary.org/locations/tool-lending-library>

INSPIRATION TO SAN MATEO COUNTY LIBRARIES:

- **Include "Library of Things" within the makerspace communication and branding. SMCL currently offers devices, kits, and various 3D objects for check out but many patrons are not aware of the offerings.**

Community Workshop Data:

Participants brainstormed to come up with ideas that could be combined in endless combinations to create maker projects and programs.

| INTEREST/ TOPIC | | SKILLS | TOOLS | |
|------------------------|---------------------|--------------------------|------------------------|-------------------------|
| 3D printing | Machines | 360 video | 3D printer | Music/singing station |
| Airplanes | Musical instruments | 3d printing | Amazon Alexa | audio interfaces, |
| Animation | Mentoring | Adobe software | Animation station | microphone, musical |
| Anthropology | Model railroad | (Photoshop, Premier, | Arduino | instruments |
| Astronomy | Murals | etc.) | Camera | PCB |
| Automation | Music | Animation | Ceramics tools - | Rainbow Loom |
| Board games | Painting | Architecture | wheel, kiln, etc. | Reference books- how to |
| Botany | Photography | Brazing | Chainsaw | Saw |
| Cephalopods | Podcasting | Building | Cheap tools | Sensors |
| Chess | Poetry | Cabinet making | Circuit components | Sewing machines |
| Clowning | Robotics | CAD - 3D design and | CNC machine | Silkscreen |
| Coding | Scratch | modeling | Community tool library | Sink |
| Comics | Sewing | Car repair | Computers and tablets | Smartboards |
| Community sharing | Singing | Character design | Electronic gages | Software/apps |
| Cooking | Skate boarding | CNC- milling machine | Expensive tools | Soldering iron |
| Costuming | Technology | Coding and programming | Film developing | Stained glass tools |
| Crafts | Textile design | Computers | equipment | Testing devices |
| Curriculum development | Toy design | Cooking | Film making station | Thermoform oven |
| Dance | UX (user experience | Creativity | FX (special effects) | TIG welder |
| Design | design) | Critical thinking | Google home | Tool set |
| Digital art and media | Video games | Crochet | Hammer | Typewriter |
| Drawing | Virtual reality | Deep learning | Hot glue gun | Vacuum former |
| Drones | Visual arts | Design | Injection molds | Video cameras |
| E-Sports | Writing | Digital arts | Jigsaw | Whiteboards |
| Electronics | | Dioramas | Keyboard | Woodworking tools |
| Fabrication | | Drawing | Kitchen | |
| Fiber Arts | | Electronics and circuits | Laser cutter | |
| Film | | Embroidery | Makey Makey | |
| Folk art | | Excel | Materials library | |
| Gardening | | Film making | Micro controllers | |
| Gymnastics | | Fine motor skills | Mini mill | |
| Hair care | | Gardening | Mini wood/metal lathes | |
| Home repair | | Guitar | Miter saw | |
| Literature | | Helping | Mobile app building | |
| | | Home repair | | |

Community Workshop Data (continued):

POTENTIAL PARTNERS

4H
 Adobe
 AKQA (Digital Agency)
 Apple
 Authors -
 Society of Children's
 Books Writers and
 Illustrators
 Autodesk
 Bakery
 Biotech companies
 Bloggers
 Churches
 Collective roots
 Community gardens
 Digital Monkey School
 Disney
 Dreamworks
 Excel expert
 Facebook
 FiLoLi
 Foundations
 Genentech
 Google
 Government funding
 Hardware stores
 Hiller Aviation
 Local artists
 Local businesses
 Local carpenters
 Local farming
 Local fishing
 Local musicians
 Local tech
 Lockheed Martin
 Mentors
 Metal shop
 Microsoft
 Monterey Bay Aquarium
 Museum
 NASA
 News outlets
 Non-profits
 Notre Dame
 Odyssey
 ORACLE
 Park & Rec
 Pixar
 Police and fire
 Department
 Quest
 Quilt Guild
 Quilters
 Roblox video games
 Robotics club
 Schools and colleges
 Scouts
 Senior centers
 SF Botanical Garden
 Small business owners
 Stanford
 STEM-oriented groups
 Suppliers
 Teachers
 TechShop
 Tool companies
 Universities
 Voices
 Woodshop
 Young working
 professionals
 Youth Spark

PROJECT

3D printing
 Accelerator
 Adhesives
 Animation
 Architecture
 Arduino satellite
 Art Faire
 Birdhouse building
 Book publishing
 Bottle rockets
 Build from knick-knacks
 Building model
 Ceramics
 Chess set making
 Children's museum
 Cloud-based animated
 story books
 Coding
 Community service
 Cooking
 Create "smart home"
 add-ons
 Design and build
 Digital story
 Doll making
 Drone making
 Exhibition/ event
 Fantasy world building
 Film making
 documentary, stop
 motion
 Fixing community
 Gardening- make a
 vegetable bed
 Greenhouse building
 Helicopter model
 Historic recreation
 Home appliance making
 or repair
 Home improvement
 Projects
 Jewelry making
 Little library
 Magazine making
 Marble runs
 Music instrument- learn
 to play
 Music recording - make
 an album
 Music video making
 Musical instrument
 making
 Phone app
 Photo album
 Photography
 Quilt making
 Redesign library spaces
 Robot making
 Scrapbooking
 Scrum master
 Sculpture
 Segway robot
 Sewing clothes, bags
 Silk screening
 T-shirts and tote bags
 Useful items for library-
 making
 Videography
 Weaving
 Website making
 Welding
 Writing
 Zoom

FAVORITE LIBRARY SERVICES

3D printing
 Activities
 Book and audio book
 access
 Bringing the community
 together
 Café
 CD borrowing
 Community
 Computers
 Crafts
 Film festivals
 Fireplace
 Food
 Free internet
 Free parking
 Free resources
 Friends
 Hang out after school
 with friends
 Holiday celebrations
 Homework time
 Inclusiveness
 International music and
 movies
 It's free
 Kids activities
 Knowledgeable staff
 Learning
 Librarians
 Looking out windows
 Making mechanical
 objects
 Making things with kids
 Media
 Movies
 Printers
 Private rooms
 Providing education
 Quiet spaces
 Reading
 Safe place
 Sharing my knowledge
 Trivia night
 Video games
 Wandering and browsing
 Writing (creative)

Maker Project Worksheet

WHAT IS THIS?

This worksheet is a tool to show ways to apply the typologies, as well as brainstorming interesting and varied subjects to combine. Here is an example of how one might be filled out.

SEE NEXT PAGE for a blank copy of this worksheet.

SEE COMMUNITY WORKSHOP DATA for inspiration for topics, tools, and skills!

MAKER PROJECT/PROGRAM BRAINSTORMING WORKSHEET

What It Is: (Start to build your project/program by picking 3 subjects, tools, materials, partners, or skills, you are combining)

Super heroes + costume making + film making

Typologies: (Circle 1-3 of the typologies. See SMCL Maker Space Master Plan for full typology descriptions)



Project Title & Description: BE A SUPER HERO!

FIRST PART:

Participants can create super hero costumes. (possible workshop)

-help from Maker In Residence costume maker?

Create theater sets or obstacle courses (indoor? outdoor?)

Get filmed in front of a green screen for an action scene/explosion.

SECOND PART:

The footage is taken and special effects, backgrounds, etc are added in by the film making team (possible separate workshop)

Strategic Goals:

Participants will create costumes.

A series of short films will be produced (with special effects and backgrounds).

Strengthen community engagement & intergenerational activities.

Performance Outcomes:

To get participants engaged in a dynamic, way with multiple points of entry (comic book fans, movie fans, sewing clubs, people interested in film and special effects).

Creating an overlap between digital and physical mediums.

Tools & Equipment:

sewing machines

wood working tools

(saws, hammers, etc)

computers & software

green screens

Materials:

fabric, costume material

paint (for painting sets)

green screen paint

Super hero props

various set pieces

Potential Partner(s):

cosplay groups.
costume makers.
theater/set design.
local movie theaters.
film studios.

Audience:

- ☐ Babies ☒ Young Adults
☐ Children ☒ Adults
☐ Tweens ☐ 55+
☒ Teens ☒ All Ages

Duration:

- ☐ <30min. ☐ One-time
☒ 1-2 hrs. ☐ On-going
☒ Day workshops ☐ _____
☒ Multi-day workshops

if costumes are pre-made & simple, the workshop can be short.

Budget:

\$ \$200-\$1000+

Staffing:

1-3 Number of Staff

1-3 Volunteers

Brie B.
YOUR NAME

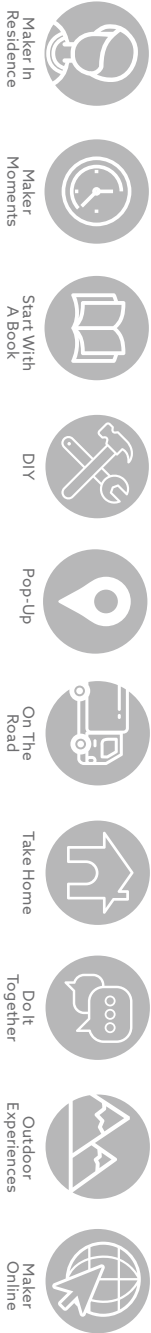
MAKER PROJECT/PROGRAM BRAINSTORMING WORKSHEET

What It Is: (Start to build your project/program by picking 3 subjects, tools, materials, partners, or skills, you are combining)

+

+

Typologies: (Circle 1-3 of the typologies. See SMCL Maker Space Master Plan for full typology descriptions)



Project Title & Description:

Potential Partner(s):

Audience:

- ☐ Babies
- ☐ Young Adults
- ☐ Children
- ☐ Adults
- ☐ Tweens
- ☐ 55+
- ☐ Teens
- ☐ All Ages

Duration:

- ☐ <30min.
- ☐ One-time
- ☐ 1-2 hrs.
- ☐ On-going
- ☐ Day workshops
- ☐ _____
- ☐ Multi-day workshops

Performance Outcomes:

Tools & Equipment:

Materials:

Budget:

\$ _____

Staffing:

_____ Number of Staff

_____ Volunteers

YOUR NAME & CONTACT INFO



San Mateo
County
Libraries