

Community Science Workshops: Building a Bridge to Science for Urban Youth

A Descriptive Look at CSWs



CSW's mission is to "Expand knowledge, thinking and imagination with tools of discovery and things to discover."

What is a Community Science Workshop (CSW)?

Community Science Workshops are community-based non-profit programs that offer underserved youth living in low-income, high-minority neighborhoods a fun and safe way to explore their world through science. Developed over the past 14 years, CSWs now operate in 12 cities throughout the nation – six main CSWs in California with numerous satellite sites, and sites in six cities across the country.

Neither school nor science museum, the CSWs are an unusual kind of institution. They are part science center, part wood shop, part nature center – all in the heart of urban neighborhoods. Located in community centers and schools, they attract youth from local neighborhoods who drop in after school and on weekends. At

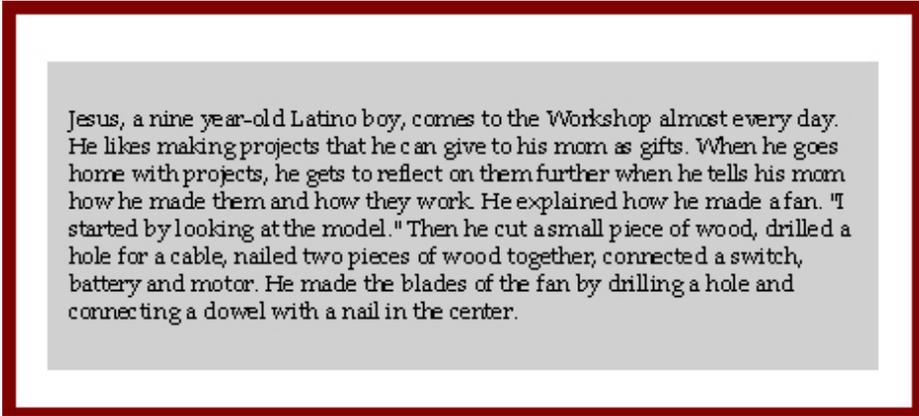
these places, children, mostly eight to twelve year olds, play with homemade exhibits. They also build their own birdhouses, stereo speakers, hydraulic cars, robots, and rockets. They care for fish and snakes and examine pond water under microscopes – all the while working with other youth and caring adults.

CSWs are community centers devoted to providing local youth with opportunities to engage in their own projects and to pursue their own firsthand learning. Filled with science, technology and art, these workshops offer young people alternatives to gangs, drugs, violence and boredom in neighborhoods where there are few other positive alternatives. CSWs provide a space for exploration with tools, workbenches and a variety of self-directed projects, as well as group programs for students to tinker with things and ideas and learn about science in an informal atmosphere. These high quality inquiry-based science education opportunities provide youth with the materials, resources, and coaching that develops many different skills, reinforces their natural curiosity, and instills an excitement about learning, science and technology. As Dan Sudran, founder of the Mission Science Workshop upon which the Community Science Workshops were based, said:

Good science teaching is good materials science—it is about getting the “stuff” this world is made of into kids’ hands so they can learn about it by playing and working with it through observation, experimentation, and project building.



Typically, youth who come to the workshop engage in projects or experiments, working by themselves or with partners. The site director generally helps get the youth started on a project, then he or she roams the room working with groups of youth to guide them through their projects. They might work on constructing a music box as a gift for their moms; they might tinker with an old computer, tearing it apart to figure out what all the parts are and how they go together; they might take water quality samples from a nearby creek and study the samples; they might construct robots, rockets or sculptures. The following vignette illustrates one youth's experience at a CSW:



Jesus, a nine year-old Latino boy, comes to the Workshop almost every day. He likes making projects that he can give to his mom as gifts. When he goes home with projects, he gets to reflect on them further when he tells his mom how he made them and how they work. He explained how he made a fan. "I started by looking at the model." Then he cut a small piece of wood, drilled a hole for a cable, nailed two pieces of wood together, connected a switch, battery and motor. He made the blades of the fan by drilling a hole and connecting a dowel with a nail in the center.

While many of the sites consist of one workshop and one director, several of the CSWs operate "satellite sites" – additional workshops in other spaces in the same city. In some cases, these satellite sites have their own directors who run the programming. In one case, Fresno, California, there is also a mobile science workshop which operates out of an RV and offers programming throughout the city.

Current CSW sites include:

- San Francisco, California: Mission Science Workshop (1 site)
- Oakland, California: Brookdale Discovery Centers (2 sites)
- San Jose, California: Joseph George Science Workshop and Computer Studio, (1 site)
- Watsonville, California: Watsonville Environmental Science Workshop (1 site)
- Fresno, California: Fresno Community Science Workshop (2 sites plus mobile science workshop)

- Los Angeles, California: University of Southern California Mesa-Mission Science Workshop (10 satellite sites)
- Washington, DC: Columbia Heights Community Science Workshop (1 site)
- Houston, Texas: The Children's Museum of Houston's Science Workshop at Edison Middle School (6 sites)
- Miami, Florida: Citizens for a Better South Florida's Community Science Workshop at Citrus Grove Elementary, City of Miami Virrick Park and Holmes Elementary (3 sites)
- New Orleans, Louisiana: New Orleans Community Science Workshop (1 site). (In August 2005, the New Orleans site was severely damaged by Hurricane Katrina but is now being rebuilt. Until they have a physical site again, the CSW director is doing CSW activities in the schools.)
- Newark, New Jersey: New Jersey Community Science Workshop at Montgomery Academy (1 site)
- Boston, Massachusetts: Boston Community Science Workshop at the John D. O'Bryant Math and Science School (1 site)

In short, CSWs:

- Serve large numbers of children,
- Provide long-term support for youth, many of whom are at-risk and who reap real benefits from their association with CSWs,
- Create multi-faceted science-focused programming that serves youth, parents, and teachers in creative and appropriate ways,
- Generate local partnerships, as well as financial and in-kind support to aid in their on-going efforts to be self-sustaining.

How did the CSWs come about? What is the history of the Community Science Workshops?

Community Science Workshops began in the early 1990's with the Mission Science Workshop in San Francisco, grew in the late 1990's with the development of the other California CSWs, then went national in 2000.

The Origins: Mission Science Workshop



The Mission Science Workshop (MSW) began in Dan Sudran's garage in the Mission district of San Francisco, a predominantly Hispanic community. Sudran is a self-taught scientist who lives in the Mission. With a long history of community activism and organizing, Sudran was interested in serving the children of the Mission district. He was also a teacher and graduate of the Exploratorium's Teacher Institute. Sudran had confirmed for himself the value of learning through investigation, experimenting and building things. As Sudran said:

I subscribe to the theory that the brain and hand evolved together and human beings learn best when our brains and hands are inseparable partners in the process of investigation and problem solving.



During the late afternoons, he was often in his open garage tinkering with simple machines and tools. Neighborhood kids started dropping by and tinkering alongside Sudran. He began an informal drop-in program in his garage, and looked for sponsors to help him fund and house a more permanent neighborhood science center. In a spring 2001 article in *California Wild* magazine¹, Sudran said:

These kids are living in a neighborhood prone to youth violence. Some are deterred from coming here because of gang turf issues. They've never heard of the Exploratorium, and even if they have, they've been herded through with their classes. So I started getting this idea about a neighborhood Exploratorium. I liked the idea of making it happen in a neighborhood, but I didn't want to turn my house over to it. I learned from working with Cesar Chavez to organize one person at a time, so I started teaching, one kid at a time.

¹ Wagenvoord, H. Spring 2001. The Circle in the Mission (Science Track). *California Wild*, Vol. 54, No.2, p. 44-45.

In 1992, as a result of the backing from key Exploratorium staff and Sudran's ability to articulate and share his vision of a community science workshop, City College of San Francisco donated a space on the second floor of their Mission Campus building to house the program. The facility held 50 exhibits, microscopes, live animals, marine plants in aquaria, and workshop tables. It was also filled with different types of programs that allowed children, teachers and parents to be creative, pursue their own interests, and "do" science. In addition to the after-school drop-in program, MSW has historically offered field trips, Saturday programs, and family nights. In 2006, the workshop moved to nearby Mission High School.

It is the enthusiasm of the kids that has kept Dan Sudran involved all these years. In the *California Wild* article, he said:

When I hear kids come in and say, 'Ooh, this is really cool, look at this' it's obviously opening their eyes to something. They wouldn't say that unless it was something new and interesting to them.

And Sudran has devoted a lot of time to this cause. In the same article, he said:

I learned from working on social causes that you don't do things halfway if you're working to change people's lives. You go whole hog or don't bother. I've made myself into a science nerd, not just to satisfy my curiosity, but to help the community.

The First CSW Grant: Replicating the Mission Science Workshop Model

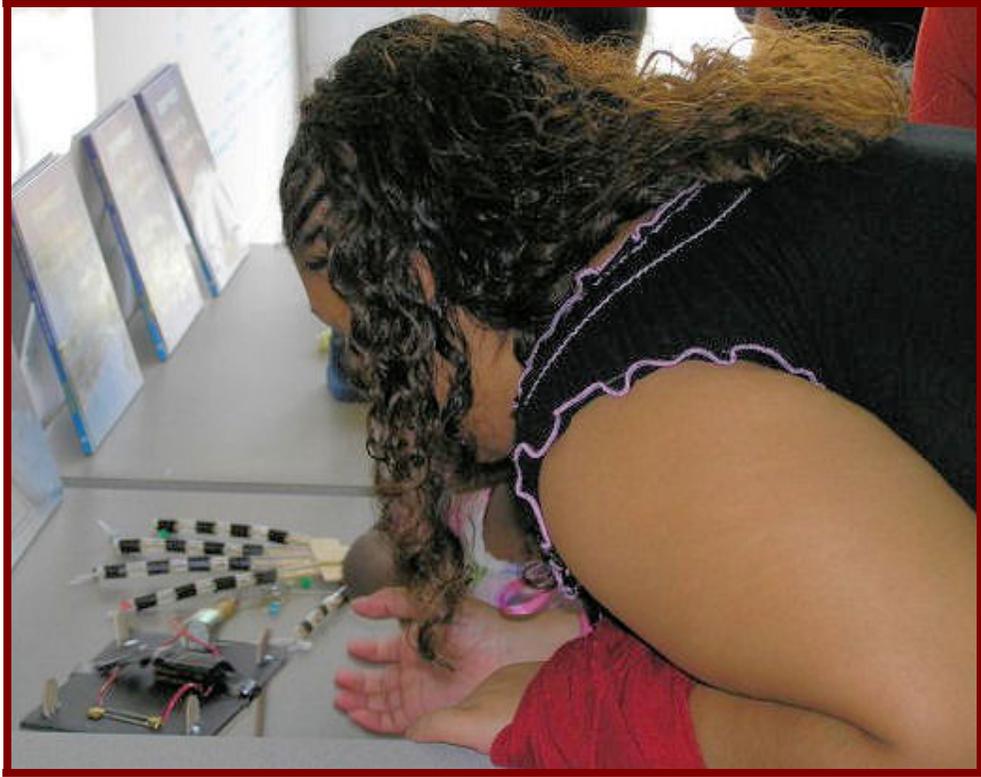


In 1994, the National Science Foundation gave three million dollars in funding to create the Community Science Workshops throughout California in order to replicate the model of the Mission Science Workshop in under-served neighborhoods throughout the state. Over the course of a four year period, eight main sites were established in Oakland, Los Angeles, Fresno, San Bruno, San Jose, Stockton, Bayview-Hunter's Point in the Bay Area, and Watsonville. Of these, five cities still have active sites, and several of these have opened "satellite" workshop sites serving additional youth in other areas of their cities. These workshops are housed in community and youth centers, schools, and colleges. These sites have been highly successful at serving many underserved youth through their programming efforts. In addition, these sites were all successful at securing additional funds so that they could continue to thrive after NSF funding ended.

Inverness Research Associates served as the external evaluator for the first round of National Science Foundation funding to the California sites. To learn more about our evaluation findings, see the Inverness Research evaluation report from January 2000².

² Inverness Research Associates. *The Community Science Workshops: A Report on Their Progress*. January 2000. Electronic version available at: http://www.inverness-research.org/reports/ab2001-01_Rpt_CSW_ProgressRpt.htm.

The Second CSW Grant: Taking the Model Across the Nation



In 2000, the National Science Foundation provided an additional three million in grant funds to create Community Science Workshops throughout the nation. To date, science workshops have opened in six cities throughout the United States (outside California). Like their California predecessors, these sites are housed in a variety of places, from community centers to schools, and partner with a variety of community agencies, such as non-profit community-based organizations, children's museums, science centers, city parks, and schools.

The National Science Foundation provided supplemental grant money for the project to include California sites in its national networking and dissemination activities. NSF funds were also used to support the entire Community Science Workshop network banding together to provide programming and assistance to the areas affected by Hurricane Katrina.

Much of the effort in recent years has focused on establishing and sustaining the network of CSW sites across the country. To that end, the CSWs have a website, and have annual meetings where directors come together to share ideas and learn from each other.

Dan Sudran summarizes the power of the original idea and the resulting growth of the CSW network:

When I began the Mission Science Workshop in my garage... I had no idea it would grow as it has grown. That experience showed me the power of the idea of using a workshop setting to bring science to life on a neighborhood level for children, teachers and parents, and using materials, tools and instruments of discovery.

What does a CSW look like?

CSWs are all quite different, yet share much in common, especially the fact that they are very much “of” their particular community. Having local flavor is important. Sites have different strengths and emphases (e.g., GPS mapping, fixing bikes, sewing, natural history, environmental stewardship, music recording). CSW is not like a fast-food franchise, where one size fits all. CSWs reflect their community and their leaderships’ interests and strengths. They reflect these different things, but they share common structures and core values.

Community Science Workshops generally are stocked with benches and stools or chairs; in addition most have long tables around the edges of the workshops to house tools, as well as spaces for glue guns and soldering equipment. Most have pegboards and pegs to hold tools, and a stockpile of plywood and other materials for building projects. Many have live animals of some sort: snakes, lizards or gerbils. Many have microscopes for examining things, as well as smaller exhibits that demonstrate specific phenomena.

One of the key elements of the workshops is the abundance of tools available for youth to use in developing their projects. The tools at most CSWs include the following:

- hand saws
- hammers
- rulers and squares
- pliers
- vises
- clamps
- screwdrivers
- scissors
- files
- hot glue guns
- soldering irons
- hand drills
- drill press
- scroll saw
- table saw

Most sites also have paints, crayons, markers, glue, sand paper and glue sticks available.



Who runs the Workshops?

Site Directors

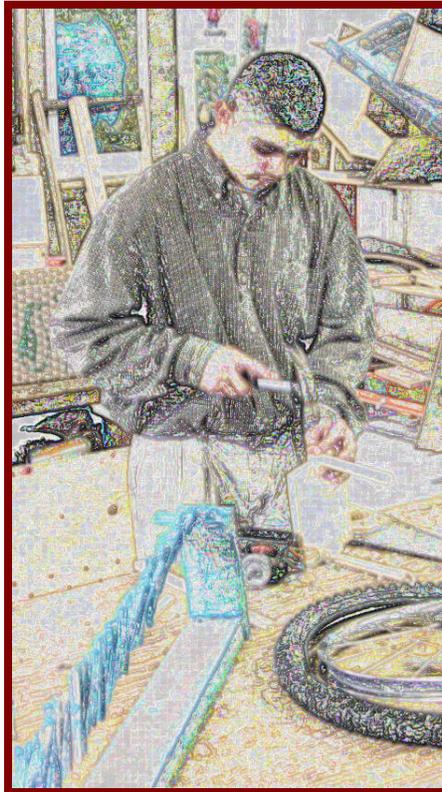
Each CSW is directed by a very important individual – an adult site director who works with the children, organizes the materials and space, and works with the community. These site directors manage not only the day-to-day operations of the site, but also are the main adult that youth interact with when they come to the CSW for programming. They are highly knowledgeable about and passionate advocates for the communities in which they live and the youth in those communities. They are inquirers and tinkerers and are highly skilled at facilitating the development of youth’s inquiry skills. They are caring adults who listen to the youth in their programs and help them grow and develop. The site directors are each unique individuals with a range of backgrounds; some are scientists, some are environmental activists, one is a former gang member, some are parents, and some have education backgrounds. They share the ability to facilitate youth in developing the skills and confidence they need to carry out their own inquiries and projects.

LeAnn Adam, CSW National Project Coordinator, describes the role of the site director in the following way:

The CSW director’s two main objectives are to run and coordinate the daily activities of the program and to establish and implement plans for the growth and

sustainability of the workshop. Creating, running, and expanding a CSW requires dedication and long hours. Therefore, the most important qualification of a successful CSW director is a love of learning through exploration. The director must “live and breathe” tinkering with objects/materials in pursuit of scientific understanding. He/she must be passionate about sharing this enthusiasm with children, parents, and teachers in the community. The director must be able to comfortably communicate with the children being served and the community members involved with the CSW.

There is no “cookie-cutter” description of the perfect CSW Director. This is a particularly beautiful aspect of the job. The director is free to explore many areas of science and art in order to bring his/her personality to the workshop. A healthy CSW reflects its director’s scientific and artistic interests through the creative projects, experiments, and activities done by the children in the community. It is the goal of each CSW to serve as many children, parents, and teachers as possible through this process of exploration.



The Management Team

The Community Science Workshop project has been shepherded through its iterations by several key individuals that comprise the management team. Dr. Paul Fonteyn, Provost at the University of Massachusetts in Boston and previously of San Francisco State University, is the Principal Investigator on the National Science Foundation grants to CSW. Dan Sudran, founder of CSW, serves as Co-PI on the NSF grants. The national grant has been managed by LeAnn Adam, the CSW National Project Coordinator.

Who comes to the CSWs?

The youth who participate in Community Science Workshops come from the local neighborhoods in which the CSWs are housed, and from nearby schools; thus, they reflect the demographics of the neighborhoods in which the workshops are located – African American, Hmong, Chinese and of Latin-American origin. More importantly, these tend to be underserved youth who do not have other opportunities for after-school and extra-curricular activities available to them in their neighborhoods. Additionally, often the youth who benefit the most from workshop programs are those individuals who have not had success in traditional schools and are often seen as being “at-risk.” For more information on the experience of youth participating in CSWs, see [**“What Do Community Science Workshops Do For Kids? The Benefits to Urban Youth”**](#) which is part of the CSW Evaluation Portfolio.

What are the types of programs that are offered?

CSWs as a whole are exploring a range of programming approaches from after school drop-in to school-related methods of serving youth. The types of programs offered at each CSW differ from place to place, but in general, most CSWs offer one or more of the following:

- **Drop-in programs:** These are scheduled times – usually after school, in the evenings, or on weekends – when the workshop is open for youth to come on their own accord and work on their own projects. These programs are offered both during the school year and sometimes in the summer, depending on the site.
- **Special focus programs:** These have a set theme or one project that all participants work on at the same time (like building a wooden box for gardening).
- **Field trip programs:** These are times, usually during school hours, when school groups and their teachers visit the workshops, usually for a special focus activity.

- Outreach programs: These involve CSW staff going into the community (to schools, parks, festivals, etc.) and facilitating hands-on science and art activities.

The programs offered at each of the CSWs cover a range of topics, including physics, environmental sciences, natural history, geology, anthropology, photography, art, and practical things like how to build a bird house or music box, or how to fix a bike. For more information on the types of programs offered at CSWs, see "[CSWs by the Numbers: A Statistical Portrait of Community Science Workshops](#)" which is part of the [CSW Evaluation Portfolio](#).

The "curriculum" for a CSW comes from a variety of sources. One is the original Mission Science Workshop, where Dan Sudran and his colleagues developed many projects, such as the pin-hole camera and the paper-cup motor. Also, individual directors, staff and volunteers at the workshops have developed many of their own projects over the years, and those activities are shared throughout the network of CSW sites. Sometimes site directors simply draw on their own interests and passions, sometimes the organizational resources or materials they have available drive their curriculum, and sometimes they are attentive to teachers' requests to cover certain topics in order to complement what the students are getting in school. Perhaps most importantly, students generate their own ideas for projects, creating and building things that are of importance to them.

What are the core values of a CSW?

Community Science Workshops place certain values such as tinkering and discovery at the heart of their work with young people. The CSW directors and management team have thought about and [articulated a set of core values](#) that guide their work and make it unique compared to most other after-school and youth science programs. In addition to tinkering and discovery, these core values include things like using an inquiry approach to learning, having tools and materials accessible to youth, providing time for self-guided investigation and reflection, and having skilled, caring adults available to facilitate and guide the learning. These shared underpinnings of their work are maintained and supported through the national network, and help describe to the outside world who they are and what they do.

What types of organizations do CSWs partner with?

Community Science Workshops work in partnership with many different types of organizations. These organizations – such as Parks and Recreation Departments, science and children’s museums, school districts, universities and colleges, and community-based organizations – provide a range of supports for the CSWs, including space for programming, materials, staff and/or volunteers, public relations, and additional funding. In return, these organizations receive hands-on science programming provided by the CSWs for the youth they serve. The CSWs “fit the bill” for a lot of agencies looking either to serve youth directly or fund opportunities for underserved youth.

For example, the Washington, DC CSW partners with the Latin American Youth Center and Smithsonian’s National Zoological park for program management, recruitment of participants, and volunteers. The Miami site partners with Citizens for a Better South Florida, a multi-lingual environmental education non-profit organization. They also partner with Home Depot for donations of scrap wood, the Biscayne Nature Center for busing and field trips, Dade County Emergency Resource Management for funding and educational materials, and Florida International University and Miami Dade College for interns and volunteers.

For more information on the types of community organizations CSWs work with, see “[CSWs by the Numbers: A Statistical Portrait of Community Science Workshops](#)” which is part of the [CSW Evaluation Portfolio](#).

Where do the CSWs fit in the larger educational landscape?

CSWs reside in a realm we call semi-formal education. It is not formal, like school, and it is not completely informal. It is not the Boys and Girls Clubs or YMCA. It is a different kind of idea, a different kind of approach and infrastructure for supporting youth. It is a unique idea and a relatively new creation. It is not a science museum, not a school, but a workshop.

Community Science Workshops are institutions that hold a special place in the education landscape. Like libraries and museums, they are outside of the formal arena of education, but connected to it. They provide additional services and specialized programming to youth who need it the most. They provide a venue to offer more in-depth and inquiry-based experiences to youth than most schools can.

CSWs are neighborhood-based and materials-rich. CSWs develop partnerships with community organizations. Shared characteristics include the fact that they

are all located in the middle of urban areas, they are inquiry-based, science-based, materials-based, and have the goal of empowering children in terms of their interests and their knowledge, attitudes and skills.

To learn more about this unique effort in the context of the nation's educational landscape, see Inverness Research Associate's evaluation brief of the CSWs, "[Community Science Workshops: A Powerful and Feasible Model For Serving Underserved Youth](#)" which is part of the [CSW Evaluation Portfolio](#).