

# ***STEM JUSTICE*** **RESEARCH PROJECT:** **YOUTH DEVELOPMENT INSIGHTS**

A Practice Brief  
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## **THE *STEM JUSTICE* RESEARCH PROJECT**

This brief shares youth development insights from a museum-based, informal science learning program that uses STEM as a tool for social justice. Key to the success of this program were young people and adults feeling at home in a welcoming, diverse, and inclusive space; activities that focused on connecting and relationships; a holistically supportive space that attended to family and personal needs; shared norms for conversation and expectations; and science content grounded in young people's lives, experiences, and communities as well as work with community members.

These needs were identified as part of the work of *STEM Justice: Building Youth Science Capital*. This research project was a collaborative, participatory research study of this long-term, out-of-school programming for high-school aged youth under-represented in STEM (including girls, youth of color, and youth from low-income households) at the Kitty Andersen Youth Science Center (KAYSC) of the Science Museum of Minnesota (SMM). Its goal was to better understand, refine, and communicate the KAYSC's youth development model for its high-school participants (who were also paid staff members).

Interviews, meetings, conversations, and project work from the first two years (school years 2016/2017 and 2017/2018) of the research project led to large programmatic changes in the third year of implementation. This report captures adult and youth descriptions of programming before these changes in the hopes of contextualizing other reports from this research. During the first two years, the research team conducted 44 interviews with KAYSC adult and youth staff and 49 observations of youth crew meetings. Three focus groups were also conducted with youth in the third year, and their thoughts and responses are included in this report to represent youth voice and support prior findings. Identifying information was removed from quotes to preserve participants' anonymity, and the pronoun "they" is used to refer to all individuals. For readability, we did not provide ellipses where words were removed. However, if a word was changed or added for readability, it is placed between hard brackets.

## **Overview of KAYSC program structure in 2017 and 2018**

During the first two years of this research project, the KAYSC's calendar mirrored that of the public schools, with youth crew programming launching in late September and continuing through December with a brief break and then continuing through May. Summer opportunities for youth programming varied in both years, with some crews continuing to meet and others having specific outreach events planned for the summer. Youth were also recruited to support a St. Paul Freedom School over both summers. Most often, youth were recruited to enter programming in the fall of their freshman or sophomore years in high school, though older candidates were also considered and hired. Once hired into the high school program, KAYSC leadership's goal was to continue to offer them employment and program access throughout their high school tenure.

High schoolers were paid employees of the Science Museum of Minnesota and received vouchers for free public transit to and from the museum. Upon hire, youth were recruited into crews focused on a topic or project that used STEM to address social and racial inequities in their community. During this period, there tended to be seven youth crews, each composed of 6-12 high schoolers, one adult crew leader, and one young adult (18-24 years old) co-leader. Crews generally met two times a week during the school year, for a total of about six hours, and featured different intersections of STEM and social justice, including how systemic racism and power imbalances in our communities could be addressed through actions around health, the environment, technology, computational thinking, or social science. The KAYSC also had a leadership crew composed of representative youth from other crews to think about and act on KAYSC-specific issues.

# YOUTH DEVELOPMENT INSIGHTS FROM KAYSC

## Adults and young people felt at home in the KAYSC

During observations, meetings, conversations, interviews, and focus groups, both youth and adults shared that they felt “at home” in the KAYSC. One youth said, “the [KAYSC] builds great bonds” and another shared, “I look forward to coming here.” Youth shared some of their favorite moments from the KAYSC, and many of these had to do with how they felt just being in the space and knowing the people involved. One shared how much they appreciated the support of their peers and crew leaders, saying, “there are people here just rooting for you and for your excellence.” Another youth summed up how they felt at the KAYSC by sharing, “they’re good at giving us a sense of community.”

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## Diversity and inclusion helped create a welcoming space for adults and young people

Adult and youth staff also called out how the diversity of the KAYSC helped them feel more comfortable and excited to work in the space. “On our crew, we have a lot of diversity in people, which is really welcoming,” a youth shared. One crew leader said, “I really loved seeing the diversity in the KAYSC. [I’ve historically been] a person of color in a predominantly white department, so there was a little envy of [this space].” Another youth talked about inclusivity, describing it as “letting everyone’s voices be heard.” They went on to describe the distinction between diversity and inclusivity: “with diversity, it’s like with the people; different minds coming together. And with inclusivity, it’s not letting one person have the big voice — [you get to] have everyone share their own thoughts.”

## **Activities that focused on connecting helped develop bonds**

Many other programming features contributed to creating a welcoming space as well, like the planned activities of icebreakers and check-ins. Ice-breakers were common practice across crew meetings, and usually featured youth actively moving their bodies and playing a game with each other. One youth shared, “Having engaging activities like ice-breakers and energizers” was one of their favorite experiences from the KAYSC. Check-ins were also important for creating cohesive crews. During check-ins, each person was asked to share a “high” moment, a “low” moment, and respond to a creative prompt written by a crew member. Overall, youth shared that this kind of programming really supported them in getting to know each other: “I guess the KAYSC does a really good job of having you work with your coworkers and getting to know them.”

## **The KAYSC attended to families and personal needs of young people to create a more holistically supportive space**

Crews adapted flexibly to meet needs of the young people’s families, health, and school experiences. Siblings sometimes attended crew meetings alongside youth staff, and many family members attended KAYSC meetings, as well as outreach events at neighborhood gatherings. Crew leaders flexed around formal schooling needs and scheduling, encouraging youth when they checked in about academic struggles and providing positive, non-judgmental support. Snacks and sometimes meals were an important part of the crew experience, encouraging bonding and healthful food habits.

Several group norms were also widely established in the KAYSC around developing professionalism, using the Four Agreements of Courageous Conversations (see the following page), and participating in attention re-focusers. Norms around professionalism included having autonomy on different projects, as well as coming to crew on time and avoiding swearing, and were gently and not rigidly encouraged. For many youth, the expectations that they would choose what aspects of a project to work on and be responsible for making progress on during meeting time was a key way in which the KAYSC felt different from other spaces and supported their growth. One youth shared that the KAYSC felt “really youth-focused” and that “not many organizations will trust you to do things that we do and I think that’s a big thing.” A crew leader also described the importance of youth collaboration, saying “the KAYSC is a very strong supporter of youth voice and youth choice, so the youth come up with projects themselves. I’m kind of there just to guide them and keep them in the parameters of what the grant asks us to do.”

## Consistently, but gently, using norms for conversation and re-focusing supported young people and adults

Using the Four Agreements of Courageous Conversations\* was widespread in KAYSC programming; both young people and adults referenced them during crew meetings, and the language of the agreements was posted in multiple places around the KAYSC, including a wall and as stickers on people's laptops. One crew leader shared, "We use [norms from Courageous Conversations] and it's kind of like a home. That piece I really understand. And I can have a commonality with somebody else. To me, it's a very good feeling. I think that's what norms do to each group. And I like that. That whole KAYSC norm is in the center of that STEM Justice cycle." Another adult added, "We were able to use that core for speaker truths, you know, be ready for discomfort and open-ended and all that. [The Four Agreements] helped us build our norm. So it's nice that we have that as a touchstone."

Attention re-focusers were also common throughout the KAYSC, such as saying, "I have. . ." and waiting for the others in the room to say, "respect," before a speaker continued. All of these norms seemed to be held gently; they were not used rigidly, but as a way to encourage young people to join in with the group and participate. In our observations, crew leaders tended to re-direct or ask youth questions when they didn't follow these norms, and were often able to get youth back on track and engaged with the group.

"I have . . ."

"Respect!"

\* The Four Agreements include: 1) stay engaged, 2) expect to experience discomfort, 3) speak your truth, and 4) expect and accept a lack of closure. (Adapted from Glenn E. Singleton & Curtis Linton, *Courageous Conversations about Race: A Field Guide for Achieving Equity in Schools*. 2006, pp. 58-65. Corwin.)

## **The KAYSC used STEM Justice and personal connections to ground science content**

One member described the KAYSC as “a program where youth learn how to solve community issues by using science as a tool.” Two key ways that adult staff did this were by grounding content in lived experiences and exploring how science (especially the content area of focus in their crew) had been used to positively and negatively impact communities of different racial, cultural, and socioeconomic backgrounds, especially in the neighborhoods around the KAYSC. They described this as the STEM Justice framework, with one crew leader saying, “I think this framework [of STEM Justice] asks, ‘how can young people relate themselves to the community outside of their learning environment?’” Crew leaders reflected that they “loved putting social justice with STEM content” and described STEM Justice as using “STEM content to build community.”

One crew leader described how this process looked with youth: “I started off looking at the general [community issue], and then diving into [how] we experienced this ourselves . . . What do we see in our community and among our families? When we started investigating it more, they got more passionate about it, because they learned about the disparity among people of color and white folks and [this STEM area]. After we started investigating more, they got a little bit more passionate about it, but I think it started with personal — like they’ve seen it in their lives.” Crew experiences certainly did seem to make some youth more aware of how science and technology were a part of their lives already. One youth said, “both my parents do jobs like this — they both work with computers — but I never really realized it before.” Exploring science and technology from the lenses of social justice and personal connections helped young people recognize how these important threads were already woven into their lives.

## **Examples of young people’s experiences with science content**

The belief behind this programming was that once young people had a compelling “why” for engaging with STEM, through the lenses of social justice and personal connections, they were better prepared to use specific STEM practices to make changes in their communities. When asked about the kind of STEM content they had been involved with during their crews, youth tended to share examples from math, engineering, biology, and technology.

One young person said, “We’ve been doing a lot of learning how to build things. Like learning about basic shapes and soldering.” Another shared, “we’ve been working with another organization outside the museum on helping to design a higher yielding microgreen system.” Several youth also talked about designing and building portable screen printers, measuring and building shelves for plants, and rewiring lights. One youth shared how they felt their skills had improved, working with technology in the KAYSC: “I think that my favorite memory here is probably just filmmaking with my group. [In] the beginning, when [my friend and] I used to record on the camera, our camera skills were trash. And if you see the things that we do now, the camera quality is way better.”

### **Working with community members was important to young people and adults**

Finally, both youth and adults shared the importance of connecting young people with adult activists, artists, engineers, and scientists in the community. This was an integral part of programming. Youth enjoyed meeting people from the community and learning from them in talks or workshops. One youth shared, “I like going to the workshops and talking to career experts.” Other youth described these as networking experiences — one-time meetings that may grow into more meaningful connections over time, or might help a person get started on a career path. One youth commented that “there’s a lot of really good networking opportunities and chances to meet organizations in St. Paul, and other people. Maybe a person that is in a career path you’re interested in.”

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