

# Co-Created Public Engagement with Science

PHASE III REPORT

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Research & Evaluation

**Evaluation & Report Credits:**

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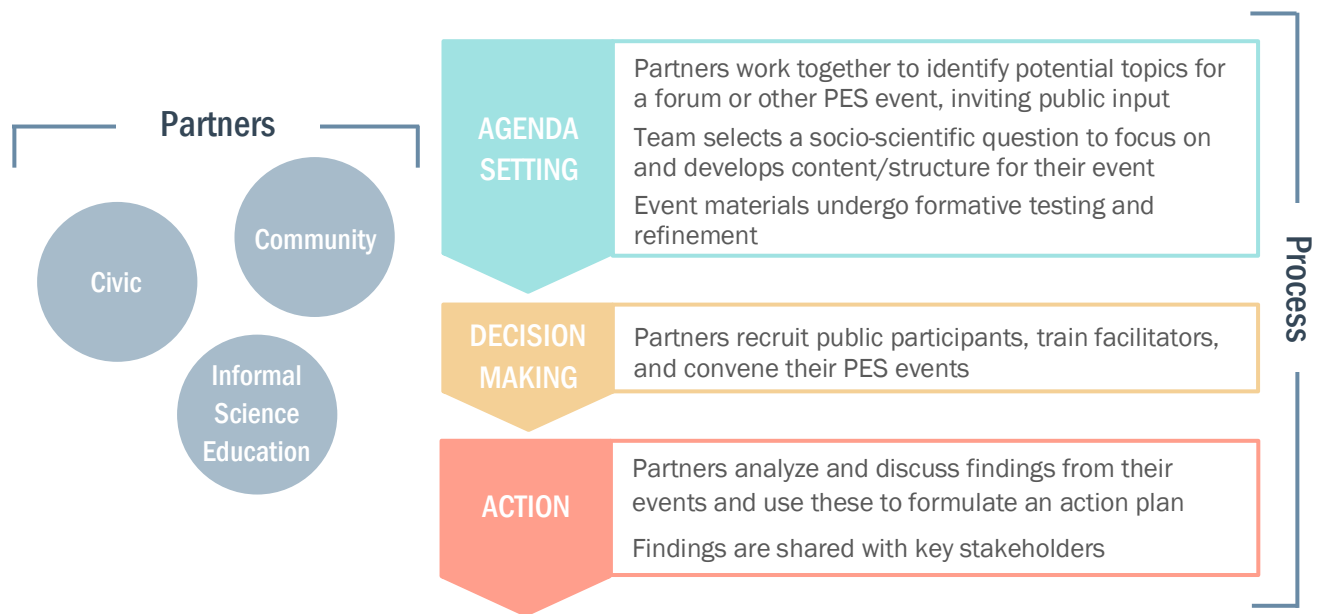
# INTRODUCTION

The Co-Created Public Engagement with Science Project (CC-PES) is an initiative led by the Museum of Science, Boston and funded by an NSF Advancing Informal STEM Learning award. This project seeks to build capacity among museums and other informal science education (ISE) institutions to develop and implement co-created public engagement with science activities.

**Public Engagement with Science** - public forum programs that include dialogue and deliberation in partnership with local community, civic, and scientist partners.

**Co-Created** – participation of public and civic participants along with scientists and informal educators in all stages of the CC-PES process, including topic selection, decision-making, and policy formation.

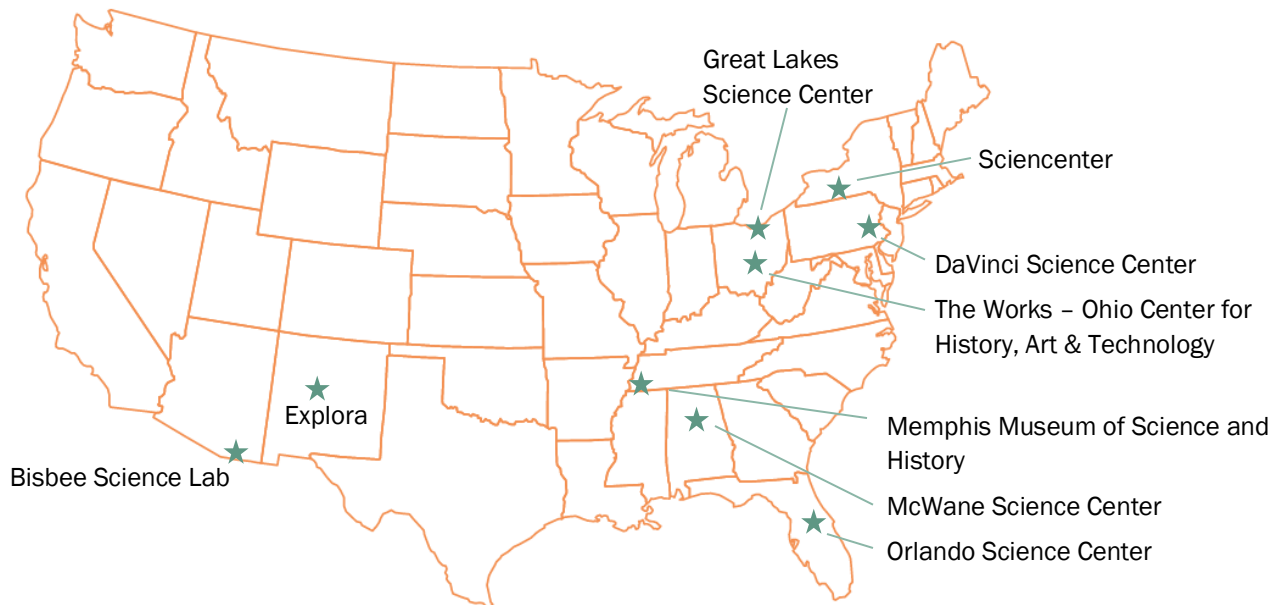
The Museum of Science, Boston (MOS) has been a leader in the museum field in developing deliberative forums where members of the public convene to consider complex scientific questions with real social ramifications – such as, “Should we genetically engineer mosquitos to eradicate malaria?” and “What are the risks and rewards of self-driving cars versus human drivers?” These forums use a PES approach, inviting scientists and members of the general public to share information and perspectives with each other with the goal of mutual learning that can lead to better decision-making around complex scientific topics. In the CC-PES project, MOS has aimed to take this approach a step further by inviting civic and community partners to help develop PES activities, from identifying the topic that will be addressed to designing the event or activity that brings people together to discuss it, and finally to deciding what next steps might be taken based on the ideas exchanged. The CC-PES model that is being tested and refined through this project is shown below.



During the first two phases of the CC-PES project, three separate teams tested out this co-creation model, following its steps to identify a socio-scientific topic, develop and lead a forum, and later implement an action activity. These teams took anywhere from 18 months to four years to carry out the process. There were multiple reasons for the long timelines of these projects, including the global interruption of the COVID-19 pandemic and staff turnover. The CC-PES teams also found that the relationship-building necessary for their projects took time as they worked to build trust, align their ideas, and make sure their projects were serving their intended audiences.

Phase III of the project, which is documented here, has focused on implementing the CC-PES model on a much shorter timeline. Nine individual museums received mini-grants to carry out their own co-creation projects between January and June 2023 – again working through the steps of convening civic and community partners, identifying a socio-scientific topic to address, and designing and hosting a PES event. These teams – referred to here as Cohort III – were also asked to lay plans for an action step in accordance with the CC-PES model, but they were not required to carry out these plans within the six-month timeline set for their projects.

Figure 1. Map of Phase III Stipend Recipients



Phase III of the CC-PES project asks, “Is it possible to carry out the co-creation process on this accelerated timeline, and if so, what does that look like?” This phase of the project has also provided an opportunity to see the model implemented in nine new contexts – each bringing new partners, interests, constraints, assets, and challenges into the equation. This report presents key findings from these efforts that expand our understanding of co-created public engagement with science – what it means to partners, what it looks like in practice, and the benefits and challenges that go along with this work. The work of each individual team is also presented in mini-case studies, to illustrate the variety of possibilities for co-creation and help other organizations envision how they might undertake similar initiatives.

## EVALUATION QUESTIONS AND METHODS

Rockman et al (REA), an independent education research and evaluation firm, has served as the research partner for the CC-PES project. The following research questions for Phase III of the project include:

- How do the different teams interpret co-creation and implement this approach into their work with their civic and community partners?
- How are responsibilities divided in the project? How do teams incorporate the expertise of the different partners?
- Are teams able to build successful relationships with their partners on the short timeline allowed? What challenges and successes do they experience?
- Is the CC-PES roadmap a useful guide to the cohort? What works well about the guidelines provided by MOS, and what would teams change?
- What impact does the experience have on the informal science educators involved? To what extent do they build professional skills or experience other outcomes as a result of their work on the project?

REA staff conducted pre and post interviews with a key representative from each Cohort III museum. For this phase of the project, REA and MOS decided not to interview community or civic partners. While their perspectives on co-creation are valuable, the team decided it was more important to give these groups space to develop their relationships rather than hampering them with research requests, especially as these projects were operating on a short timeline.

## PROJECT IMPACTS – OUTCOMES FOR TEAM MEMBERS AND INSTITUTIONS

### *Strengthening Relationships with Partners*

The number one benefit that Cohort III members talked about in relation to their CC-PES projects was having the opportunity to expand or strengthen their relationships with community partners. The Museum of Science and History in Memphis used the project as an opportunity to build new connections in a rural community, as part of a larger institutional goal of expanding their reach beyond urban areas. The rest of Cohort III chose to work primarily with partners that already had some level of connection to their museum. Building brand new relationships between organizations in a six month timeframe was too ambitious for most. Even so, the Cohort felt that their projects were an important opportunity to solidify existing relationships. Furthermore, one Cohort member pointed out that while a prior relationship might have existed at the organizational level, the individuals involved were often new to working together and experienced the benefit. Phase III also resulted in new relationships between organizations outside the museums. For example, Orlando Science Center ended up turning their CC-PES event into an important networking opportunity between organizations with related missions. These groups formed a new web of connections, of which the museum is a single node. The project lead described the experience, saying, “Stepping into this world has opened my eyes to chaos...organizations don’t always talk to one another.” Thanks to their forum, that has changed, and the groups involved will hopefully benefit from their new connections in the years to come.

“It was really great to see how many community partners stepped up. Everyone I reached out said, ‘How can I help?’” - Explora

### *Finding New Ways to Be Relevant to Audiences*

The co-creation focus of this project has also pushed the teams to think about new ways to be relevant to their museum’s audiences and new strategies for incorporating community voices. At McWane Science Center, the project forum reached a more diverse audience than their typical program participants. Focusing on adult audiences was also new territory for this museum. The CC-PES project allowed the museum to say, “We also have things that are of relevance to adults and that touch on important issues in their life, and not just sciences entertainment.” Another cohort member made similar remarks. Because their project had provided space for an important community dialogue, they feel that participants are now thinking about their organization and the services they provide in a new way – as an organization with relevance to the lives of the community members.

“We can dive into things for issues that matter to us.” –  
McWane Science Center

“My biggest hope was it was genuine, helpful, and purposeful to the residents. That was a relief because my fear was that residents didn't have a need for this. We showed up and they cared.” – Great Lakes Science Center

At Sciencenter in Ithaca, the project lead talked about how the CC-PES model helped them think about civic representatives and policy makers as potential partners. Another Cohort III member said the project model helped them to slow down, reflect, and think critically before diving into designing a program. Instead of focusing on the end deliverable, they said the model helped them prioritize the process. Da Vinci Science Center found the project helped them expand the topics they are willing to address in order to serve their

audiences. The museum team member had initially hoped to tackle an easier issue than gun violence, but ultimately they followed the lead of their community partner and dove into a difficult topic that they knew was important. The result was a project that felt deeply rewarding for both parties. Staff from Bisbee Science Lab also talked about the reward of challenging topics: “I had to navigate difficult conversations with vulnerability and share my experiences which led to some growth experiences.”

### ***Strengthened Commitment to Community Work***

The feeling that the CC-PES project has been a growth experienced was shared by all members of Cohort III. Working with outside partners is not always easy, and tackling difficult issues and new audiences can be

intimidating. Nevertheless, the Cohort described their experiences as worth the challenge. One staff member at Da Vinci Science Center stated, “This project made me want to do more of this work. It is new for the science center, but the work is worth it and continues to be one of the most important things we do.” This sentiment was shared by many others, who talked about a renewed commitment to building community relations or to tackling issues of social relevance. The team lead from the Museum of Science and History stated, “In the museum field, no longer is it, ‘We build it and you will come.’ We need to understand what you want, and then we need to build it to fit the needs of our community. That's where I see the museum field going.”

“This has proved to me that this is a valuable experience.” – Orlando Science Center

### ***Professional Skills***

Finally, members of Cohort III talked about building a range of professional skills through the project. Each member of Cohort III came into this project with backgrounds and levels of experience related to co-creation, designing forums, and engaging with community partners. Da Vinci Science Center had never hosted a discussion based forum before their participation in the CC-PES project, nor had their community partner. McWane Science Center had prior experience hosting forums designed by external partners, but had never created their own. Staff at Orlando Science Center talked about the learning curve of arranging forum logistics during their museum's busy season. In addition to building experience in designing and hosting forums, some Cohort III members talked about building general project management skills. At Explora, the team lead talked about new budget tracking and time management strategies they adopted as they figured out how to coordinate efforts between their many student participants, STEM professionals, and departments within the museum.



## LESSONS LEARNED ABOUT CO-CREATION AND THE CC-PES MODEL

The Cohort III teams used the same CC-PES roadmap to guide their project, yet their experiences along the way were remarkably different from one another. Project topics varied from gun violence to sustainable food systems to raising awareness about colorectal cancer. The groups arrived at their topics by considering their own knowledge of the community, advice from partners, existing community data, and their own capacity. Most teams thought deeply about how to implement the CC-PES model or merge it with their existing programs. In a few cases, however, the structure and momentum of existing programs weighed more heavily than efforts to incorporate the CC-PES model. Nevertheless, Cohort III members had thoughtful reflections to offer on how to approach co-creation and what it means to do this work.

### *The Meaning of Co-Creation and the Roles of ISEs*

One of the key themes from the cohort's reflections on co-creation was recognizing that the input of different partners in a co-creation project will not be equal, nor does it need to be. This was also an important lesson learned in the earlier phases of the CC-PES project. One Cohort III member commented, "From what I've learned, co-creation is an important balance between sharing power, but also not putting undue burden on a community partner." Another individual echoed this statement, describing co-creation less as a balance of tasks on a project, and more as a balance of power:

*Even in current co-creation, you're going to have an organization or people that are the drivers, and then the others that are participating, but to a lesser extent. I feel like that's going to be true of any effort. I think what's important is just the honest intent to involve everybody's voices. And to make sure that the direction is true to the original goals.*

One cohort member pointed out that most ISEs have experience designing forums or other similar programs represented in the CC-PES model, so it makes sense that they might do the heavy lifting on organizing and hosting these, while community partners and civic partners could have a larger role in identifying the topics of interest and providing other forms of expertise. This idea of acknowledging and leaning on each partner's area of expertise is another theme from the earlier phases of the CC-PES project. The team lead from Orlando Science Center was especially energized by this idea when talking about the different organizations their project had brought together: "We could help them [community partners] develop their activities. Like they can utilize our knowledge of how to engage guests about STEM. If we can use their knowledge about the specific topic at

"I had one person question, 'Why the Science Center?' Which was a great question. And I said, you know, because we're trying to be a connector. This grant is trying to help enable science centers to be connectors in their communities."  
- Great Lakes Science Center

hand.” This team lead said they learned that co-creation is about gathering groups, understanding what each is capable of, leaning on their strengths, and not expecting them to do things outside their wheelhouse. Much like the Durham team – this individual recognized that partners can bring the content expertise around specific socio-scientific issues, while museums bring expertise in program and activity design.

Another cohort member described the role of museums as being a “conduit” or a “convener” for important conversations at “the crossover between education and public interest.” When there is an existing need or interest in a community, museums can provide the avenue for important discussions to happen:

*For us as an organization, it means us providing opportunities for organizations to well, just to use the word to create events, programs, opportunities that they wouldn't be able to do without our assistance.*

This sentiment was echoed by other cohort members, who talked about the importance of their events in bringing people together and giving people access to resources and individuals with like interests.

### **Building Successful Partnerships**

Some of the elements of co-creation discussed about – valuing and leveraging different areas of expertise, and power-sharing – are also important characteristics of the partnerships that are critical to co-creation. The CC-PES project has repeatedly shown that solid partnerships are key to the process. The Cohort III members talked about the importance of their relationships with their civic and community partners, and the time and thought that goes into creating strong relationships.

Taking time to talk through the priorities and motivations of different organizations was an important step for several of the Cohort III teams. One project lead described the initial meetings they had with the community partners: “We had to build the relationship and also talk about our goals for the forum and the project in general. So it was pretty intensive.” Each organization brings its own mission and values to the projects they take on, and the CC-PES project has shown that being forthright about these can help teams start off on the right foot. Project leads also had to be cognizant of differing motivations when presenting the project for the first time to potential partners. They found they had to adjust their communication strategy based on who they were talking to. “It's meaningful to different groups for different reasons,” they noted.

“Without those relationships, none of this would be possible.”  
– Explora, speaking about teacher/school partners

Another Cohort member talked about how their project was better thanks to the involvement of groups with perspectives different from their own or from that of the museum:

*It's great to have people with different experiences and different ages, because what I thought the forum would have been is different than what we came up with together. And what we came up with together was better than what I had*

*imagined. So I think it's just great to get outside of the museum and meet other people who are very passionate about other projects and get their input.*

One individual described the partnership as valuable, “but messy.” The divergent viewpoints community partners bring can create a more powerful project, but they also come with communication barriers and other hurdles. For example, the team lead at The Works described that it was sometimes difficult to describe the project to outside partners. “Even when you think you’ve covered it, sometimes they come back with the same questions repeatedly. It can be tough to wrap their minds around,” they noted.

Community and civic partners in this latest phase of the project – much like in earlier phases – don’t have the same capacity level as the museum partners. In one case, a team even lost one of their community partners due to capacity issues shortly before their CC-PES event, which left them scrambling to find a new host for the event. One individual noted that weekly check-in meetings are helpful, whenever possible, to keep projects like these from slipping to everyone’s backburner.

Finding partner organizations with the right level of buy-in is critical. “Partners who are easier to work with are partners who already were passionate about the topic,” reflected one team lead. “There needs to be a level of investment. Conversely, when you don’t have a commitment, the partnership doesn’t go well.” Unfortunately, it can be hard to accurately judge a partner’s level of commitment from the beginning, and staff changes or other events can change the situation quickly.

The team lead at Great Lakes Science Center also talked about the importance of recognizing when a particular community or audience is “over tapped.” In their case, this was a particular under-resourced neighborhood in Cleveland that leaders at GLSC were eager to work with, because they had already established a relationship. This neighborhood is often the target for similar project requests, and community organizations were therefore guarded when approached for the CC-PES project. These organizations worried that neighborhood residents would end up sharing their time and information again, without reaping any real benefit. While the GLSC team lead felt their final event did benefit the community, they cautioned that museums should be careful about leaning too much on the same partners or the most obvious partners. “The key to any partnership,” they stated, “is it needs to be a mutual benefit.”

Almost all of the Cohort III teams also had difficulty securing a civic partner for their projects, or else they avoided this step of the process. For many, working with civic partners is an entirely new venture, as opposed to working with a community organization. The Works in Ohio did work with a civic partner because the farmer’s market they engaged with was governed by a civic body. They found the relationship to be difficult, in part because the civic partner had some trepidation about the project and whether or not the data it generated would reflect well on the city. They also encountered civic red tape, which slowed processes down. Reflecting on the process, the team lead recommended getting the decision makers in the room whenever possible, to avoid having to wait for ideas to be “run up the ladder.”

### Time, Resources, and Support

Grant-based projects run on structured timelines, but each phase of the CC-PES project has shown that these timelines need to have flexibility. In particular it can be difficult to establish trusting relationships between partners while also sticking to a strict project schedule. Cohort III was asked to follow the CC-PES model as far as the “Decision Making” step in just six months. Most of the teams were able to achieve this goal, but they noted that it wasn’t an easy task. Most teams opted to work with established partners in order to make the goal easier. Like the Durham team in Phase II, several Cohort III participants also emphasized the fact that the relationships these projects lean on need to extend beyond the boundaries of a specific project timeline. Finally, several team leaders mentioned that their CC-PES event fell at a particularly busy time for their institution, making it more difficult to find the time and resources to make it a success.

“I would say that it’s a marathon, not a sprint, and taking time to make sure you have a solid foundation with your community partner and participants is very important. It’s great to have a big goal in mind, but it’s important to celebrate smaller goals...”  
- Da Vinci Science Center

Funds can be another difficult area for co-creation. In earlier phases, participants found that being part of a co-creation project might fall within the scope of responsibilities for individuals at some organizations, while being more of a stretch for others. When there isn’t much funding to support project work, it can be difficult for organizations to justify their involvement. One Cohort III team lead mentioned that they had to explain to their partner why the stipends weren’t larger, since these projects were subawards of a larger grant.

With so many challenges to contend with in co-creation projects, Cohort III members emphasized the importance of having colleagues to lean on for ideas and support. Those who met with a CC-PES mentor said it was very valuable for thinking through their projects. One team lead stated, “When you go to create a project like this, you just absolutely need an example. You need a concrete example.” Furthermore, they emphasized the importance of hearing about a wide range of projects, including those that struggled, instead of just hearing about the wild successes. Some members of the Cohort felt they didn’t have enough opportunity to learn from mentors or to exchange ideas with one another. In future projects, teams may benefit from having a more structured community of practice.

### Following the CC-PES Model

In reflecting on the utility of the project model, most of the Cohort III teams felt that it worked well. With the limited time they had to complete their projects, team leaders appreciated having a structure to follow. At the same time, one team lead said the model helped them slow down and focus on the process, rather than jumping into designing the final deliverable:

*I’m the type of person who just kind of dives right in and figures out the details later. This I liked because it purposely slowed you down. So you have all your ducks in a row. You know, so I, I liked the flow in the process.*

This particular team really invested effort in building new relationships and figuring out how to design a project that was right for these partners.

While having a model has been helpful for most, some partners' reflections also point to the importance of being adaptable. One individual talked about experimenting with "different forms of co-creation, to figure out what works best for you." Another said that while they appreciated the guidelines of the model, adopting this structure made their project feel less authentically co-created. They weren't sure how far they could stray from the project activities described in the model (e.g., the welcome event, topic selection workshop, and forum) to find a solution that worked for their particular situation. In the long run, having different examples of how institutions have adapted the CC-PES model may help organizations envision how to make it work best for them. The following case studies are a starting step in this direction.

## CASE STUDIES

### BISBEE SCIENCE LAB ADDRESSES ENVIRONMENTAL SUSTAINABILITY

<b>Location:</b>	Bisbee, AZ
<b>Partners:</b>	Bisbee Unified School District Local educators and students Environmental science researchers
<b>Project:</b>	Creating field sties to support and educate the local public about housing and environmental sustainability

#### *Context and Partnerships*

Bisbee Science Lab is a young organization with just two full-time employees located in southeastern Arizona near the US-Mexico border. It was founded with the goal of bringing improved science education opportunities to rural communities that lack access and serve high proportions of students in need. For this project, the Bisbee team wanted to focus on finding a community-driven purpose for several acres of city-owned land that is adjacent to the lab. The land is a worn-down playground of a decommissioned middle school. The Bisbee team knew they wanted to create field stations across the site that would support science learning, but didn't know what exact angle to take on the project.

To make sure their work was aligned with community priorities and incorporated scientific input as well, the Bisbee team invited local educators, students, environmental science researchers, and science center staff to have a voice from the very beginning of this project. They administered surveys, provided presentations in schools, and created a youth advisory council to help them identify local environmental issues that students wanted to see in the field stations. The council consisted of five high school students who were selected through an application process. These students decided to focus on water as the environmental topic of interest to be addressed in the field stations.

#### *CC-PES Event*

For their CC-PES event, Bisbee Science Lab hosted a "design charette" – a brainstorming workshop in which students, teachers, researchers, and museum members talked with the design team about community needs and the development of the field stations. The goal of this workshop was to provide design consultants hired by Bisbee with the feedback they needed to create a development plan for the land and the field stations. Leading up to event, the Bisbee team made sure to provide enough framing and information that all parties knew what to expect from the conversations. One important goal was to make sure student voices were given as much consideration as the voices of adult professionals. During the event, the group addressed questions like, "What makes a learning space engaging?", "How can the site incorporate both personal spaces and private spaces?", and "How can we protect the field stations as a community asset to make sure they are a resource for everyone?" The group talked

about what scientists would need to do actual research at the stations, what field trip groups might need from the space, as well as what single individuals or families might want from it as an outdoor recreation area.

### Successes

The design charette was successful in generating many ideas for the field stations and in helping community members think through some of the difficult logistics involved in creating a space that would fulfill many different needs. The Bisbee team felt the conversation flowed well and that most people appeared comfortable sharing their ideas and opinions. They feel that the students who were involved now have a sense of ownership of the space and feel empowered to shape their community and engage with researchers. The project is also gaining attention from outside parties and enhancing the reputation of Bisbee Science Lab's work. For example, the CEO of Arizona Science Center in Phoenix attended the design charette and said he had never been to a community event that so impactful.

### Challenges

While the work has been rewarding, the Bisbee team also acknowledges the challenges that go along with bringing together diverse groups to achieve a common goal. The conversation at the design charette was sometimes difficult to navigate – for example, when a teacher dismissed students' interest in keeping the baseball field which is part of the old school grounds. While the teacher reasoned that another baseball field could be built elsewhere in a few years, local students – who have felt the lack of resources in their community – were not at all encouraged by the idea. The Bisbee team talked about providing more context to participants in the future, while might help in these kinds of situations. Despite some challenging moments, Bisbee's project lead felt the workshop was productive overall.

“We need mess. If it's not messy we're not doing it right. Prior to this project, it was how much little mess we can make and now let's sit in the mess.”

### Future of this Project

The very clear end goal of this co-creation project is the installation of the field stations and final development of the acreage. At the time of this writing, the design work is ongoing, with pauses to gather community input and feedback. The design charette is the first of several opportunities that students, teachers, and other community members will have to weigh in on what the space should look like. When the field stations are complete, the Bisbee team hopes that they will provide useful, actionable information to community members on the environmental challenges that face the area. While the team doesn't know yet how they might address the action step of the CC-PES model, they are keeping their eyes open to possibilities for local advocacy work as well as ways to share resources and information. The team is also looking for additional ways to collaborate with the community – for example, in the development of low-income housing on land adjacent to the school yard. Bisbee staff are talking with the city about ways the housing development could incorporate solar panels, rainwater harvesting, and other sustainability-focused elements. The co-creation approaches they've tested through their CC-PES stipend may be a helpful basis for this and other future projects.

## MCWANE SCIENCE CENTER BOOSTS AWARENESS OF COLORECTAL CANCER

**Location:** Birmingham, AL

**Partners:** GI physicians at UAB Hospital  
University of Alabama Minority Health  
Equity Research Center  
University of Alabama Sociology  
Department

**Project:** A public forum to address and boost  
awareness for colorectal cancer

### *Context and Partnerships*

The team lead from McWane Science Center described tackling a co-creation project as venturing into “unknown territory.” The museum’s project lead had prior experience hosting a forum for adult audiences through the NISENet project, but this experience presented the new challenge of co-creating with civic and community partners, as well as developing the forum content from scratch. Furthermore, designing successful programming for adult audiences has been a difficult challenge for the McWane Science Center. Like many other science museums, McWane is seen as predominantly serving families and young children.

Conscientious of the short project timeline, the McWane project lead sought to identify a worthwhile and achievable forum topic with existing partners at the University of Alabama (UAB) and the UAB Hospital. After ruling out a number of potential health issues as being potentially problematic or dead-ends in terms of seeking policy change, the McWane team settled on colorectal cancer as a health issue that affects all kinds of people and which is underrepresented in public health discussions. A board member of the museum with connections to a radio station that targets underserved populations also worked with the project to help promote the forum.

“Once people wanted to discuss the topic, people did not stop talking and we went right back to discussions. We had a feel for it now, and doing a second round would be easier.”

### *CC-PES Event*

The McWane team followed the example of the NISENet forums in designing their event, starting with presentations from their medical and community partners. A GI doctor provided basic information on colorectal cancer, its effects, and the importance of early testing. If colorectal cancer is detected early enough, it is very treatable. The head of the University of Alabama’s Sociology Department and representatives from the UAB Minority Health Equity Research Center also spoke about social determinants of cancer and the disproportionate affects tied to individual’s race, gender, and economic status. After this, participants engaged in small table discussions, responding to question prompts the team had crafted about the barriers to being tested and what can be done to raise awareness around this issue. Facilitators were placed at each table to assist.



## Successes

Colorectal cancer is not an easy topic for people to discuss. Nevertheless, the McWane lead felt the forum was very successful at generating engaging dialog around the issue – to the point that people did not want to wrap up their conversations when time ran out. MSC staff said a lot of their final activity participants wanted to spread the word about colorectal cancer, screening, and preventative health care after the workshop, and physicians who were presented were happy to hear members of the public talking about a healthcare issue which is often ignored.

Staff also felt like the forum succeeded in bringing together audiences who really needed to hear each other's viewpoints. Not only did the public participants gain information about disparities and barriers in health care from the presenters, but doctors and medical students present were able to hear directly from participants about their attitudes related to colorectal screening and potential barriers to seeking care.

Despite never having created a forum before, staff at McWane felt this project ended up providing them with a "viable prototype" on which future events can be based. This is a promising step toward their goal of creating effective programming for adult audiences. They were also pleased that the forum attracted an audience that was more diverse than their typical visitors.

## Challenges

Like several other teams, the McWane team found the six month timeline to be a challenge. McWane staff noted that they would have liked gather input directly from the community on what people wanted to learn or what they would find relevant in a forum discussion; however, they didn't feel they had time to conduct public surveys or focus groups. Instead, they relied on their partners to identify topics that would be useful to address.

Crafting the forum itself was also a challenge. While the team leaned on the NISENet mosquito forum as an example at first, they felt less certain about how to proceed when they couldn't identify a specific policy-oriented question with contrasting positions and supporting evidence to present.

Finally, the McWane project lead noted they would have benefitted from having more time for exchanging ideas with the other cohort members and support structure for doing so – whether a message board, a Slack channel, or any other means for communicating on a regular basis.

## Action Step

In the original design of the CC-PES model, information gathered through these public events is intended to be leveraged toward some form of policy change or action that benefits a community. Early on, however, the McWane lead was told by a seasoned veteran in public health that the information gathered from such a forum would be nothing that hadn't already been well-researched and documented before. Furthermore, some key policy changes that could have a tremendous impact on rural Alabamans with poor access to treatment feel impossibly out of reach – like expanding Medicaid and Medicare under the Affordable Care

Act. When left to think about the contribution this forum (and subsequent ones) could make, the McWane staff decided to focus on the value of bringing together early career doctors and medical students to hear directly from their potential future patients, so that they can think beyond the science of healthcare to the social aspects that affect it. Reflecting on the action step, the McWane project lead noted that while they might not be able to influence large policy changes, they might be able to influence how individual doctors approach their practice. The McWane lead also noted that when they spoke with their partners and the public, people had good ideas and productive conversations about how to address the topic, even if larger policy changes felt out of reach.

### ***Future of this Project***

Participants at the forum suggested hosting future iterations at UAB's med school or at local churches, and the McWane project lead is enthusiastic about both these possibilities as ways to continue the work and reach broader audiences. They felt that the relationships involved in this project have been strengthened by the experience and future collaborations may be forthcoming. Finally, McWane's project lead feels that this project has ushered the museum into a new area of adult programming and addressing issues with more direct social relevance.

## ORLANDO SCIENCE CENTER BRINGS FOOD SYSTEMS PARTNERS TOGETHER

<b>Location:</b>	Orlando, FL	
<b>Partners:</b>	IDEAS for Us	Urban Smart Farms
	Worm Nerd	Local commissioners
	Local bakeries	State representative
	Fleet Farming	University representative
<b>Project:</b>	Forum to discuss food systems	

### **Context and Partnerships**

For Orlando Science Center (OSC), the CC-PES project came at an opportune moment. The museum had recently set its sights on developing programming that incorporated community discussions through the museum's Science Matters initiative. OSC had also hired a community engagement coordinator who had been busily establishing relationships with local organizations for the past year and a half. Many of these organizations also had missions related to food and food systems – a socio-scientific topic that aligns well with CC-PES project goals. At the start of the project, the OSC representative therefore felt well-positioned to tackle a co-created initiative with one or more of these organizations. A non-profit organization called IDEAS for Us, which focuses on environmental action and communities, ended up being a key partner for OSC and helped connect the museum with additional community organizations.

### **CC-PES Event**

For their CC-PES event, OSC and their partners decided to host a forum discussion at the museum during regular visiting hours. The event was open to museum visitors as well as the diverse community organizations OSC had been communicating with. In addition to the forum, these community partners brought food-related science activities to museum visitors – for example, a demonstration on the chemistry of bread-making. Due to severe weather, visitor attendance at the forum was fairly low. The OSC lead organizer noted that they had hoped the event would be an opportunity for those with less access to supportive food systems to interact with those with more access and knowledge to share, so that ideas for progress could emerge. With low general public attendance, the event instead turned into an opportunity for representatives from the community organizations to talk about their work together and imagine possibilities for their collaborations. The lead OSC staff member described the energy and productivity of the discussions as the organizations discussed, “What does our community need? And how can we work together to serve that in the best way?” Both the museum staff and the community partners felt the day was important for strengthening their network, and their conversations continued outside the museum walls into the parking garage that day.

## Action Step

OSC and its community partners identified a common need through their discussions together. Each partner had expertise related to food systems, but they felt they were missing opportunities to be involved in community events and festivals where their presence might be valuable. As one example, Orlando was celebrating the opening of a new park with an educational farm on the day following the forum discussion – a perfect opportunity for these community organizations to do outreach – yet none of them knew about the park or had been contacted by the civic organizations that OSC had been trying to reach. OSC and the community partners decided:

*Let's make a network of educational STEM-focused professionals who are really focused on food, food security, and food systems. And let's figure out a way to make sure that it's known where we can be of assistance in our community, like develop almost a bat signal kind of thing.*

The group came up with two action items leading out of their forum discussions. First, they scheduled a follow-up meeting for two months later, to keep the discussion and energy moving forward. Second, they planned to send a message to the local commissioners about the network that they were establishing, so that they could be top-of-mind in the future when the opportunities arise for community engagement around food issues.

## Successes

While the event did not turn out as planned, OSC staff said it was immensely valuable for envisioning future collaborations between the partners that could benefit underserved communities. OSC staff noted that past work with community partners had mostly been limited to offering them a table space at museum events where organizations could provide resources or activities. In contrast, OSC staff felt that this project led to deeper discussions about how partners could support each other and lean on each other's strengths for deeper community impact.

"I've never seen that much energy from partners before."

## Challenges

A key challenge for the forum was attracting the interest of OSC's typical adult audiences, who are higher income and may not have lived experiences that make food systems an obvious issue of importance. In the future, the community partners may have opportunities to bring their audiences to the museum, which could expand the impact of these kinds of events.

"It has helped me understand what work goes into the logistics of planning a large event like this. Overall, it must happen regularly, and it has to continue."

Another important challenge was engaging civic representatives in the process. OSC staff anticipated this would be an issue and found it to be true. Divisive politics and the busy schedules of elected officials made it difficult to forge partnerships during the span of this project. OSC staff found civic partners to be unresponsive and ended up forging ahead without them.

### *Future of this Project*

OSC staff feel confident that work undertaken between the community partners for this project is going to continue. The partners made plan for another meeting in three months and are looking forward to exploring future ways to support each other's work. The partners now see OSC as a great venue for PES and food systems, and OSC is aware of the important work being done by a wide range of community organizations, large and small. The content knowledge these organizations bring will strengthen OSC's work. As for civic connections, this project is now on their radar, and the museum hopes civic leaders and university leaders will attend future meetings. Finally, the museum's Vice President of Experiences and staff at OSC have approved and committed to three forum-style events per year.

## DA VINCI SCIENCE CENTER DISCUSSES GUN VIOLENCE WITH YOUTH

**Location:** Allentown, PA

**Partners:** Promise Neighborhoods of Lehigh Valley  
Allentown Police Department

**Project:** Forum to discuss community gun violence

### **Context and Partnerships**

The CC-PES mini grant came at an opportune moment for Da Vinci Scierter (DSC), at the same time that the organization was launching a new “community science center” in downtown Allentown. This new center makes DSC more accessible to diverse new audiences and is much larger than the pre-existing facility located on the outskirts of Allentown. The project lead at DSC saw the project as an exciting opportunity to use science to address community problems while making the community a better place to live. For this project, DSC worked with Promise Neighborhoods of the Lehigh Valley (PNLV) – an organization that provides a wide range of community support services. The two organizations had worked together previously, and staff knew that for this project they wanted to address the topic of gun violence. PNLV had worked on this issue before, and specific recent events in the community, a survey with local youth, and nationwide statistics on gun violence all demonstrated that this was a particularly relevant issue. DSC and PNLV decided to focus on middle and high school age youth as the focus for the project, exploring what they have experienced related to gun violence and what would make youth feel safer in their community. They identified the Allentown Police Department as a potential civic partner who could provide education around gun safety, if that ended up being a logical next step depending on youth feedback.

### **CC-PES Event**

PNLV and DSC designed a forum for youth, which attracted 15 local students. Similar to other PES forums, they began by presenting information on gun violence as a contagious epidemic. They also talked about lifting the stigma from families and communities affected by gun violence, pointing out the social and environmental factors that can be powerful forces leading to violence. After providing more information and resources to the participants, they led a discussion guided by questions such as: Have you been exposed to guns? What would make you feel safer? What would you like to see in your schools and communities? The youth shared very personal stories, including shooting incidents that affected family members and guns seen at school.

### **Action Step**

This forum was the first of several that the team plans to hold around this particular issue. DSC and PNLV staff hope to gather feedback from a large number of youth, to help them think about how they might take action for their community around this issue. Da Vinci Science

Center is also exploring a new violence prevention policy in partnership with the Allentown Police Department.

### Successes

Reflecting on the successes of the project, the DSC project lead said that the forum they came up with through collaboration with PNLV was better than what they had envisioned on their own. Furthermore, they were able to create a safe, respectful space for youth to share personal stories about gun violence - something Allentown youth didn't have before. They also emphasized advocacy with the participants - empowering them to advocate for themselves but also making a point that Da Vinci Science Center and Promise Neighborhoods are there to advocate for them as well. The forum also helped the team gather useful information on how youth perceive these issues and possible areas to improve conditions. For example, they learned that while almost all the youth felt they had a trusted adult in their lives whom they could talk to about gun violence, only a third felt that the adults would know what to do.

“Giving the students a chance to feel like they were truly the expert, and that we really cared about what they had to say was great and successful.”

### Challenges

The main challenge that DSC identified for their project was the brief timeline and its implications for building relationships. The DSC lead noted that while others at their museum had worked with PNLV before, she personally had not so she needed to carve out time to build those relationships for the success of the project. The DSC lead noted that it was crucial for the individuals from both organizations to spend time getting to know each other and coming to understand their respective goals. Thankfully, all members of the team were enthusiastic about the project and ended up having a positive experience working together.

Finally, DSC did not have a mentor organization to lean on for support. Part of the initial plan for supporting Cohort III was pairing them with staff from other ISEs who had undertaken co-creation projects in the past, so that these individuals could answer questions and be a sounding board for ideas. This mentorship didn't materialize for DSC, and they regretted its absence.

### Future of this Project

DSC and PNLV will continue to work together to hold additional forums and thinking about potential action steps that can be taken based on the information they collect. They are also talking about future funding opportunities to support the work, which comes with its own difficulties. The DSC representative noted that for these co-creation projects, “You don't always know what success is going to look like. You're going into this because you don't know what is best for your community, and that's what you're hoping to find out.” This is an important point for funders to consider as they seek to support community-oriented projects.

## SCIENCENTER TEACHES ABOUT WATERSHEDS

**Location:** Ithaca, NY

**Partners:** Future Science Leaders (middle school age youth attending a Sciencenter summer camp)  
Cornell Research Scientists in STEM fields  
NY SEA Grant through NOAA

**Project:** Summer science camp for youth focused on watershed health

### *Context and Partnerships*

Staff at Sciencenter in Ithaca, New York had extensive prior experience with running community programs and dialog events around socio-scientific issues when they applied for their CC-PES mini-grant. Besides participating in NISENet, the project's lead had also worked on community-focused science projects with Cornell University, the Greater Ithaca Activities Center (GIAC), and other local organizations. For the CC-PES project, Sciencenter decided to build on the momentum of previous work they had done with youth around the issue of flooding and lake level rise – a critical issue in the Great Lakes region. Their Future Science Leaders – a group of middle school aged youth who attend Sciencenter summer camps – became their target audience for the project. Prior relationships with Cornell researchers and New York Sea Grant (NYSG) scientists were leveraged as partners for the work.

### *CC-PES Event*

Sciencenter already had a strong summer camp curriculum in place to teach youth about watershed environmental health and flooding. The Future Science Leaders who attended these camps took part in a week's worth of project-based learning, where they studied water quality, temperature, turbidity, and macro-invertebrates in local streams and lakes. Sciencenter's goal was to give these youth a chance to absorb important science concepts before engaging in a culminating event where they shared their ideas, concerns, and hopes around water issues with Cornell and NYSG scientists. During this time, NYSG scientists also worked with the Future Science Leaders to test a prototype game that teaches about watersheds, using this as an opportunity to get feedback from youth in age range to which the game is targeted.

### *Successes*

Staff at Sciencenter felt this project was successful in that it put middle school youth – a group who seldom are given a voice in community matters – direct access to scientists who are working on important environmental issues in the area. By educating the participants in water ecology topics throughout the week, youth were also better informed to talk about the issues. Finally, as experts on their own learning and enjoyment, the Future Science Leaders could



provide critical feedback on the watershed game so that NYSG could improve it before using it to engage additional audiences.

### Challenges

Sciencenter's main challenge in taking on their CC-PES project was a changeover in staff shortly after the project kicked off. Thankfully, the center was able to lean on existing partners and programs to make the work more manageable. The museum was not able to pursue civic partnerships within the length of the grant period, however. They were also limited to a topic which had been previously identified as important to the region, rather than working with new community partners or audiences to identify a relevant socio-scientific topic through a co-creation process.

### Action Step and Future of the Project

The feedback from the Future Science Leaders is being incorporated into the final form of the watershed game, which NYSG researchers will then utilize with other middle school audiences as an entertaining educational tool. Sciencenter staff will also undoubtedly continue their partnerships with Cornell and NYSG, as well as their yearly summer camps for youth.



Figure 2. Students collecting data in a local stream



Figure 3. Students testing and giving feedback on the watershed game

## THE WORKS HELPS YOUTH ADDRESS AIR QUALITY AND FOOD DESERTS

**Location:** Newark, OH

**Partners:** Granville Schools Sustainability Project  
Canal Market District Farmer's Market

**Project:** Installing raised beds and collecting air  
quality data at a local farmers market

### **Context and Partnerships**

The Works: Ohio Center for History, Art, & Technology is a museum that has been working to expand its community partnerships and reach audiences beyond the museum walls – especially since the COVID-19 pandemic. It first hosted a public forum around a socio-scientific issue in 2022, when it partnered with local organizations to screen the film *The Color of Care*, followed by an audience discussion about equity and healthcare in their local community. In taking on the CC-PES project, The Works project lead was excited to try a similar form of public engagement, but this time with a new topic and new partners.

Teens involved in programs at The Works had expressed the desire for more opportunities to engage in environmental science and to talk about environmental issues with their local community. At the same time, staff at The Works were in conversations with a local school district, who had a special environmental initiative with a community service requirement to fulfill (the Granville Schools Sustainability Project). Museum staff had also recently engaged in talks with a local farmer's market, who expressed an interest in raising public awareness about food deserts and air quality issues. The CC-PES project presented the opportunity to bring the interests of these different organizations together into an action-oriented project for the community.

### **CC-PES Activities**

Together, the Canal Market District Farmer's Market, The Works, and the Granville Sustainability Project devised the idea of installing raised beds throughout the market during the summer of 2023. These raised beds would have two purposes: 1) provide impetus for a dedication ceremony and an activity booth where students in the Granville Sustainability Project could talk with community members about food deserts and air quality, and 2) provide a means for students to collect air quality data by measuring plant growth. The students would also collect air quality data with handheld monitors, and then share their air quality data with the public and with the public health department.

## Successes

At the time of this writing, information on The Works' summer activities was not yet available. In earlier interviews, however, team members at The Works spoke positively about the direction of their project thus far. The project was designed more collaboratively than previous work the museum has done with its partners, and team members were excited that the project would meet educational goals and advocate for air quality and food access in their local community. One team member said, "Where we are located, we have a lack of green spaces and noticeably a produce desert. This project highlights an issue that is tangible and relatable for the community. People don't think about the air they breathe." The team was hopeful that the data the students would collect could help the city think about new and creative ways to engage with the local community through the market.



Figure 4. A student waters a raised bed installed by the project

## Challenges

Like some of the other Phase III teams, The Works found that collaborating with a civic partner brought certain hurdles. Getting approval from the city for the installation of the raised beds took time, and city officials also raised concerns that the project would reflect negatively on the city if the data collected pointed to poor air quality. Weather conditions also led to project delays.

## Future of this Project

In the fall, the team plans for students to present their findings to the museum and share the information with the city commissioners and the farmer's market. The Works would also like to find additional ways to incorporate the air quality monitors into future programming and to continue educating the public on these topics. Finally, the team hopes to sustain their relationships with the market and the Granville Schools Sustainability Project, devising future projects around green space in urban environments, food desserts, and city planning and development.

## GREAT LAKES SCIENCE CENTER DISCUSSES UNEMPLOYMENT WITH NEIGHBORS

**Location:** Cleveland, OH

**Partners:** Midtown Cleveland, Inc.  
Manufacturing Advocacy and Growth  
Network (MAGNET)  
City Council Community Board Member

**Project:** Forum to discuss unemployment struggles

### *Context and Partnerships*

Prior to joining the Phase III Cohort of the CC-PES project, Great Lakes Science Center (GLSC) had begun exploring ways to work more closely with its local community organizations. They had partnered with Midtown Cleveland, a neighborhood development organization, on a project related to food access. They had also worked with MAGNET (Manufacturing Advocacy & Growth), an organization that supports small industries in communities, on a playground project. For a large science center with a small staff and no dedicated community outreach person, however, this project still felt like fairly new territory.

Unlike the other Cohort III members, GLSC experienced some immediate pushback from Midtown and MAGNET when it first pitched the project idea. Because the CC-PES model doesn't define a specific deliverable at the beginning of the process, the partners were wary about getting their constituents involved, especially since the community members they work with tended to be underserved, under resourced, and "over-tapped" by requests to participate in various initiatives. In particular, these organization were concerned that the project activities were going to amount to listening sessions without offering any kind of solution or action. While the last step in the CC-PES model is "action" the GLSC project lead couldn't define this for the partners during initial discussions, since they didn't know yet what direction the project might take. In the end, GLSC and the partners were able to move forward by agreeing that their final deliverable would be an informational resource (written, online, or in additional formats) about the selected topic that provided answers to questions and paths that users could follow in navigating the issue. Furthermore, rather than gathering community members for a topic selection event, the team decided to lean on data from previous surveys where people had already identified issues in the community. This idea was presented by the team's civic partner, a city council community board member. Based on this data and the strengths and preferences of the partners, they chose "obstacles to finding and keeping a job" as their topic.

### *CC-PES Event*

For their CC-PES event, the project team held a forum that was attended by 23 adult community residents representing a spectrum of ages, races/ethnicities, and genders. The GLSC project lead facilitated the event, alternating between small round-table discussions and sharing as a large group. They used question prompts to draw out participants' experiences and struggles in

finding and keeping work. They also told participants to think about others in their community: "While you're thinking about this, this is not just your personal story, but think about other stories that you have heard from family members, friends, neighbors, about their struggles, as well. Be their voice." They strove to make it a friendly and personal experience, using post-it notes to gather ideas and making sure to talk through each of them so that every person's voice was heard.

### Successes

The GLSC project lead was really pleased with the forum for multiple reasons. First, it gathered a diverse group who have experienced a range of struggles in their job searches. One table was a group of ex-felons, one of whom had convinced the others to attend to talk about their experiences and challenges. One of these individuals stood up during the forum to thank their friend for having them come. Elderly participants who attended talked about how they had faced age discrimination in their job searches or had difficulty finding volunteer work. Caregivers (of both the young and elderly) talked about the difficulty of finding flexible work. All the participants seemed grateful for the opportunity to talk about their experiences and to be heard. They applauded each other's comments and showed gratitude to the facilitator. One individual even approached the project lead at the end and asked if they could give her a hug. The project lead said their goal in taking on this work was "to be genuine," and they felt the forum succeeded in this regard. They noted, "This is why we do the work we do. Despite all the struggles we have in the museum everyone was grateful. I wasn't expecting such a strong response from just listening." They were also pleased to see that even though the community partners had initially expressed doubts about the project, the participants seemed to find great value in being part of a listening session on an issue that closely affected them.

### Challenges

As noted above, getting partner buy-in to the project process without having a well-defined deliverable was a significant hurdle for GLSC in launching their co-creation efforts. The GLSC project lead also noted that there is a challenge in reaching out to an under resourced neighborhood that gets frequent requests but not necessarily the ongoing support that it needs. In these situations, community members and organizations can be wary of opportunities which take their energy without offering positive results. These factors made partners wary of the project, and GLSC staff had to tread carefully in order to maintain the positive relationships they had built. Finding a way to define an outcome or goal from the beginning was one important step for the team. Leaning on the existing survey data, rather than re-asking the community, was another way the team showed respect for the community's time and energy.

In an ideal world, the GLSC project lead said they could have used additional time and resources to support this relationship-focused work. Longer-term projects with more funding would likely be of greater interest to community partners than a short term, single project event. GLSC also noted that their partners had difficulty grasping how tight the budget was because they did not understand the way the funding stream operated through a larger grant.

Finally, the team saw one community partner drop out last moment, which left them scrambling for a location for their forum. Thankfully, while MAGNET was unable to continue the project,

Midtown Cleveland was a deeply invested partner. They helped identify a new space, and recruited participants for the forum.

### **Action Step**

For their action step, GLSC is planning to put together a resource on job seeking that incorporates feedback shared by participants at the forum. Their final forum question asked participants about the form this resource should take, and participants shared that having a physical document, as well as an online one, would be helpful. GLSC has approached their action step in a very similar way to the Durham team from Phase II of the CC-PES project. Like the Durham team's pamphlet on homelessness and housing, the GLSC's resource will be an enduring asset for the community they are seeking to serve.

### **Future Work**

While the GLSC project lead found this co-creation experience to be valuable, they are uncertain about their institution's capacity to do similar work in the future. Without a dedicated community outreach department or even staff member, it is difficult for the museum to sustain these kinds of projects. "I wish it would open a door, but a lot needs to happen," the project lead stated. They look forward to a time when the museum can provide ongoing support for this kind of work.

## MUSEUM OF SCIENCE & HISTORY GATHERS COMMUNITY ASSETS TO ENHANCE STEM EDUCATION

**Location:** Memphis, TN

**Partners:** University of Tennessee at Martin  
McNairy County School District  
McNairy County Tourism Board

**Project:** Forum to identify local assets to improve education

### *Context and Partnerships*

The Museum of Science and History (MoSH) in Memphis, Tennessee knew they wanted to build relationships with rural communities for their CC-PES project, so they began by reaching out to one of their existing partners - a professor at the University of Tennessee at Martin (UTM). UTM is located in rural McNairy County, about two hours from Memphis. UTM was excited to work with the museum again, and soon helped MoSH staff establish communications with the county tourism board and local schools to begin exploring directions for the project. These new partners were happy to jump into the project as well, and helped the museum gather additional civic, community, and public participants to take part in project discussions and events.

### *CC-PES Event*

After some exploratory discussions with school and county officials, the museum hosted a topic selection event to identify a focus for the forum they wanted to host. MoSH came prepared with five broad potential topics to explore, but the discussion stayed firmly centered on education issues after a kick off presentation by the local school district's superintendent. Since MSH had recently established a new and promising connection with a representative from the McNairy County Tourism Board, they didn't want to fully abandon tourism as a focus for the forum. Their solution was to weave tourism and education together into their final forum topic: How can assets in McNairy County help with the deficits in STEM learning in K-8 schools? They invited educators from county's six elementary schools to attend to talk about the needs in the school system, and they invited "community assets" to attend and hear about those needs and brainstorm ideas and solutions. These assets were identified by the tourism board and included representatives from state parks, local businesses, arts organizations, other science institutions. The community asset representatives also served as note takers during the event. MSH developed a series of questions to guide the discussion at the event and followed a format similar to the NISENet forums, with which they had previous experience.

## Successes

Staff at MoSH felt this project was “100% successful.” The forum generated rich discussion between participants, and within a short time MSH staff started hearing about follow up activities between McNairy community members – such as the county inviting the planetarium to give a local presentation. The project also felt like a great success in terms of relationship-building for MoSH. They renewed their relationship with UTM while also establishing new relationships with McNairy County organizations. “I feel like I could just pick up the phone and call them,” the project lead said.

## Challenges

The MoSH project lead identified a few different challenges in undertaking this work, although none felt insurmountable. One was the physical distance between Memphis and Martin, which created an extra hurdle for planning the forum and meeting in-person with community members. The MoSH lead felt, however, that it was worth going the distance to establish these relationships. They also talked about the difficulty of identifying a project direction when bringing together partners with diverse interests. “Partners always have their own agenda,” they noted, “but together we did a good job.” Finally, moving the project forward quickly enough on the tight timeline was difficult, especially because the partners had competing priorities.

## Action Step

MoSH looks forward to compiling the information gathered during the forum and sharing it back to the community, so that McNairy County educators and assets can continue to think about ways to support STEM education in the area. In many ways; however, the forum participants are already moving forward with new collaboration (as noted above). MoSH is looking forward to holding additional meetings, citing the importance of meeting in-person to talk about these issues.

## Future of this Project

Going forward, the MoSH project lead said that relationship building is part of the museum's strategic plan, as well as their personal mission. “It's not a one-and-done thing,” they stated. “The last thing you want to do is burn those bridges.” This project was a step toward listening to the voices of community partners to address partners' needs. MoSH will continue to work with its McNairy County partners to disseminate information find new ways to collaborate. MoSH staff are also looking forward to continuing the work through a current grant from the Institute of Museum and Library Services. This parallel funding opportunity will allow the partnerships to continue from different angles



## EXPLORA CONNECTS STUDENTS AND STEM PROFESSIONALS

<b>Location:</b>	Albuquerque, NM
<b>Partners:</b>	East Mountain High School STEM professionals at Three Sisters Kitchen, Agro Nature Center, Sandia National Labs, and other local organizations
<b>Project:</b>	STEM mentoring program for students with a creative media component

### **Context and Partnerships**

Explora Science Center and Children's Museum of Albuquerque (Explora) used their CC-PES opportunity as a way to support and improve an ongoing program for local high school students. Through this program, students are paired with a local STEM professional, or "STEMist." The students interview their STEMist partner to learn more about their work and the life path that led them to this career. The students then produce some form of media or art to represent what they have learned, and Explora posts these to their social media and displays them in the museum. The STEMist program at Explora emerged from a close relationship between the museum and a local high school teacher, which has allowed them to integrate the STEMist project into an elective class curriculum for several years now.

### **CC-PES Activities**

Explora's interpretation of the co-creation directive focused more on the individual students than identifying a larger community audience or topic to address. Speaking about the project, Explora's team lead stated, "[Co-creation] means just really letting the teens be the driving force on these projects. So they are the ones who really draft their interview questions. They're the ones who tell us what sort of STEM they're interested in... We just really letting them do that investigating." The team lead talked about the importance of letting the students' interests be the driver for their project, and of Explora facilitating the experience by helping students find mentors through the museum's various networks. The topics covered by this latest cohort of students were agriculture, zoology, culinary arts, robotics, radiation, geochemistry, and carbon dating. Explora also sees the STEMist project as an opportunity to highlight the work of local professionals and what it means to be scientist. For example, in a prior year, one of their STEMists was a jewelry maker who uses STEM knowledge and practices in working with and manipulating their materials.

### **Action Step**

Explora did not plan a specific action step for their project, since it did not adhere as closely to the CC-PES model. The students' work did, however, have a culminating activity. In prior years, students involved in the STEMist project would produce an artwork or media piece to represent their STEMist and their work, and this served as their final product. With the funding from this grant, Explora was able to purchase a new 3D printer and supplies for the school, which provided a new form of media for the students to work with and created an additional learning

opportunity for the students and teachers. Each student created an individualized 3D-printed object that represented their mentor's profession as a thank you gift. The students also documented their projects by creating a post for social media, and writing a biography of their STEMist mentor. Finally, the students were also invited to visit Explora's new teen center where they discussed their process of using 3D materials with one another and the public.

### Successes

Overall, staff at Explora were very pleased with the level of engagement from both the students and the STEM professionals they engaged. The project lead stated, "It was great to see how many community partners stepped up. Everyone I reached out to said, 'How can I help?'" They noted that the students were excited to create the 3D printed gifts for their mentors, and the STEMists were excited to receive them. The relationships between these students and professionals are one important outcome that they hope will be sustained into the future, and many of the STEMists already have plans to participate in future events at Explora.

The Explora team lead also felt the project was successful in empowering the teens involved. Students connected with people they were interested in and owned the interview process, and Explora was able to share these stories on social media. Students now know there are high expectations, but their work is valued. Explora staff said, "Students know what they are doing is cool and important, and they can make an impact all over the state."



Figure 5. 3d printed sculptures and a t-shirt created by students in honor of their STEM mentors

### Challenges

Explora didn't experience any significant challenges in their project, and noted that it really helped to already have an established relationship with East Mountain High School. Having an established program was also helpful, especially when some of the larger project meetings failed to materialize. They were able to proceed with their work, even when they didn't get outside affirmation or support. They noted, however, that the CC-PES mentor they were partnered with was very helpful. They only wished they could have connected with their mentor earlier in the process.

### Future of this Project

The STEMist program between Explora and East Mountain High School is sure to continue. The Explora team is excited to utilize its new teen center and 3D printing resources to continue engaging students. They also hope to do screen printing next year, making t-shirts for the

mentors. The relationships between the STEMists and Explora will also continue, and there are already planned events involving the robotics and agriculture professionals who worked on the STEMist project. While there are no ongoing plans to connect this year's cohort of students with their mentors now that the project has concluded, Explora's team lead hopes the students will maintain those relationships, especially since the students were the driving force to bring in these specific STEM professionals to the museum.

## CONCLUSION

These nine case studies demonstrate a variety of approaches to CC-PES and hopefully can serve as a source of inspiration and ideas to future institutions looking to pursue this kind of work. The Cohort III members each achieved important goals in a short amount of time, and have helped expand on our understanding of the CC-PES model and what it can look like in practice. CC-PES is a model, but also a guiding philosophy that seeks to replace traditional top-down approaches that dictate the relationships between the public and science. Helping organizations embrace a more nuanced understanding of co-creation may help future teams identify the kind of co-creation that works for them and feel a sense of achievement from their collaborative work.