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**Imagination Station**

Toledo Tinkers

Final Evaluation Report

September 2020 – June 2024

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## INTRODUCTION

This final cumulative report presents findings and recommendations from the evaluation of Imagination Station’s Toledo Tinkers grant from the Institute of Museum and Library Services (IMLS) from (2020 – 2024. The grant supported two types of programming – Maker Clubs and Tinkering Takeovers. Formative Evaluation Research Associates (FERA) is serving as the independent, external evaluator for the Toledo Tinkers grant (September 2020 – June 30, 2024). This report has the following sections: 1) background, 2) programming, 3) evaluation overview, 4) findings and suggestions for Tinkering Takeovers and Maker Clubs, and 5) summary.

## BACKGROUND

In 2020, Imagination Station received a three-year grant from the Institute of Museum and Library Services (IMLS) for Toledo Tinkers. This project addresses barriers to informal, hands-on Science, Technology, Engineering, and Mathematics (STEM) experiences for youth ages 11 – 13 and their families in Toledo, Ohio. It is important to note that the ages served has expanded from the original proposal to meet the needs of the communities and culture within each of the partner organizations. The Museum aims to expand community access to science by addressing structural and cultural barriers to reach diverse communities in “STEM deserts,” areas with limited access to quality STEM education. Engaging with culturally diverse communities is a core part of the project.

Imagination Station selected tinkering as a strategy to engage diverse communities in informal STEM learning. Research shows that making and tinkering are key vehicles to increase youth excitement about and interest in STEM. Making/tinkering activities allow for inquiry-based learning in a playful atmosphere. A sample of activities range from building circuits, to using tools to take apart electronics, to coding to control a micro bit. Imagination Station aimed to incorporate culturally relevant making/tinkering activities in Maker Clubs as they deepened their understanding of the communities served.

**Partnerships.** The Museum has partnered with a range of community-based organizations to bring programming to diverse communities in Toledo. Imagination Station has partnered with several Boys and Girls Clubs (BGC) in Toledo including: the Homer Hanham Boys and Girls Club, the East Toledo BGC, Schoenrock BGC, and the North Toledo BGC at Sherman Elementary. They have also partnered with Escuela SMART Academy, Water for Ishmael, McTigue Elementary, Rogers High School, and the Toledo Lucas County Public Library (TLCPL).

Imagination Station staff offered programming at their community partner sites which were located in predominantly economically disadvantaged communities across Toledo. Both the Homer Hanham Boys and Girls Club (BGC) and the East Toledo BGC are located within a predominantly economically disadvantaged, African-American communities in Toledo. Escuela SMART primarily serves Latino families in Toledo and is situated in a lower-income area. Water for Ishmael is a community-based organization serving diverse immigrant families, many of whom are new to the area.

Through the IMLS grant, Imagination Station developed a mobile tinkering makerspace, a van that allows staff to bring activities and materials to the community. They also partnered with Northwest State Community College to help link activities to higher education. Dr. Kari Peralta (University of Toledo) has been helping incorporate critical ethnography into the project.

## PROGRAMMING

Toledo Tinkers consists of two types of programming: 1) Maker Clubs, and 2) Tinkering Takeovers. The overall timeline shifted due to the COVID-19 pandemic, delayed, and required modifying the programming. In the new schedule, programming was from September 1, 2020 – June 30, 2024.

**Maker Clubs.** Imagination Station staff have carefully considered the culture of each community partner, and the youth served, and have shaped the Maker Clubs to fit accordingly. This flexibility and willingness to modify the program to meet the different needs of each community continues to be greatly appreciated by community partners.

*“At the beginning of a new partnership we spend time at the partner organization, visit and talk to the partner before starting. See what’s around the school and what the students see everyday. Learn what’s going on in the community, what they see in their community culturally and [become] aware of the community we’re going into.” (IS Staff)*

**Tinkering Takeovers**. These occurred at library branches, Toledo City Parks, and other community organizations in areas with little to no access to STEM programming. Imagination Station staff brought activities to youth and families to engage with in different community settings. These are one-time drop-in sessions with 3 – 5 activities. Initially the Tinkering Takeovers were designed for youth and families. Many families who participated had young children, usually about age 8 and younger. Through collaborations with local libraries, Imagination Station learned that many Toledo branches offer after‑school programming for middle school aged youth and were excited to incorporate Tinkering Takeovers during after-school sessions.

Overall, Imagination Station had a total attendance of XXX individuals at the Tinkering Takeovers. They offered programming in multiple locations including seven libraries (Birmingham, Kent, LaGrange, Locke, Mott, South Branch, Toledo Heights), Toledo City Parks (Navarre and Walbridge Park), the East Toledo Family Center, and the Riverside YMCA and Wayman Palmer YMCA.

## EVALUATION OVERVIEW

The key purposes of the evaluation are to 1) obtain feedback on the implementation of Toledo Tinkers, 2) assess participant outcomes, and 3) develop recommendations to strengthen programming. Because the two interventions that comprise Toledo Tinkers are different, data and suggestions are presented separately for each. The first section focuses on Tinkering Takeovers and the second on Maker Clubs.The evaluation provides a deeper dive into Maker Clubs given the more intensive approach of working with youth over multiple sessions. FERA shared data with Imagination Station annually and they have made modifications to the programming based on evaluation findings.

### Guiding evaluation questions addressed in this report are:

1. How well is the Toledo Tinkers programming working?
2. How can the programming be improved?
3. What are the outcomes for participants in Toledo Tinkers?

## TINKERING TAKEOVERS

Methods:

* **Interviews with:** Imagination Station staff (N = 3); Partner staff (N=8)
* **Informal observations of** Maker Club sessions at Homer Hanham BGC, Schoenrock Family BGC, Escuela SMART and Water for Ishmael. Observations at two Tinkering Takeovers.
* **Surveys with** youth in 7 Maker Clubs (N = 109) (see APPENDIX A)
* **Surveys with** youth (N=58) and adults (N=28) in Tinkering Takeover locations (see APPENDIX B and APPENDIX C)

## Overview

This section provides highlights from surveys with youth and adults participating in some of the Tinkering Takeovers over the full grant period. Imagination Station staff offered programming in multiple locations including libraries, Toledo City Parks, and community centers. Staff distributed surveys and received completed surveys at 10 locations.

A total of 58 youth and 28 adults completed surveys at Tinkering Takeovers between April 2022 and May 2024. The data presented are cumulative for Tinkering Takeovers over the full grant period. Youth respondents represented a wide age range, from 4 to 17 years old. Most were 8 – 12 years old (71%), followed by ages 13 – 17 (16%), and 4 – 7 (10%). Youth described themselves as Black or African American (77%), White (31%), or selected multiple categories (8%).

## Feedback

Overall Tinkering Takeovers worked well. Within the libraries, every site operated differently. Some offered regular after-school programming and have many of the same students daily. The key areas that worked well include: coordinating and scheduling with Imagination Station and the sites; partnering with libraries and Imagination Station; IS staff knowledge and accessibility; and IS exposing youth and families to STEM and technology; One partner commented, “*[Imagination Station is a really easy partner to work with and conscientious. It’s just delightful to work with [IS staff]…they’re developmentally appropriate with the kids – hitting the mark.”*

## Program Impact

Overall youth and adults agreed that the experiences in the Tinkering Takeovers had a number of positive impacts. These one-time events brought hands-on science into communities often not reached by STEM programming. Youth surveyed reflected on their own experiences and adults were asked to think about their youth’s experiences. Where relevant, data from youth is presented first followed by adults. Youth achieved the following outcomes:

**Tinkering Takeovers**

**Program Outcomes Related to Access to STEM Learning**

* Increased access to making/tinkering opportunities in diverse communities
* Increased exposure to high quality STEM education
* Increased interest in STEM-related activities
* Increased sense of inclusion in STEM practice
* Increased awareness of Imagination Station as a STEM resource

### Increased Access and Exposure to STEM

**Outcome: Youth had increased access to making and tinkering opportunities.** By holding these events in neighborhood community hubs, participants could more easily participate without having to find transportation to Imagination Station. Offering these as free opportunities also removed the barrier of cost.

**Outcome: Youth were exposed to new hands-on STEM experiences.** Youth and adults surveyed agreed that participating in Tinkering Takeovers provided new opportunities to explore STEM. They reflected that youth: tried something new today (95%, 100% adults), used a new tool (91%), did making/tinkering for the first time (59% youth, 54% adults); and have better access to making/tinkering in our community (85% adults).

### Increased Interest in STEM

**Outcome: Most youth were more interested in and excited about STEM based on their experiences at the Tinkering Takeover**. Youth would like to do more tinkering activities (95%) and do projects like this at home or in their neighborhood (93%).

84-93% of youth surveyed (N=56) agreed that because of the activities “I”:

* Am excited by something I did (93%)
* Am more excited about doing science (89%)
* Want to learn more about doing science (87%)
* Know more about doing science (86%)
* Am more interested in STEM (84%)

Adults surveyed felt their youth would like to come to another Tinkering Takeover (100%), would like to do projects like this at home or in their neighborhood (96%), would like to do more tinkering activities (96%), were more excited about STEM (92%), were more interested in STEM (85%), and more aware of STEM (70%).

### Increased Agency & Inclusion

**Outcome**: **Youth made decisions and learned perseverance.** They decided what to make (92%) and were proud of what they made (94%). Through hands-on science they also learned that if something did not work, to not give up (86%). One partner explained that “*some kids walk in from a rough day at school, sit down and they are validated as a scientist…they leave feeling I am capable. You can see it in their eyes. There are kids who are not validated during the school day or at home but when IS staff sits down with them and makes every kid feel capable.”*

**Outcome: Participants felt included in STEM**. Importantly, the majority of youth and adults agreed they feel they can take part in STEM activities (88% youth, 88% adults).

### Increased Awareness of Imagination Station as a STEM Resource

**Outcome: Youth learned about Imagination Station through Tinkering Takeovers.** Having Imagination Station (IS) staff in community hubs expanded awareness of IS and fostered the idea that STEM can happen anywhere.

Most youth surveyed:

* Would like to go to Imagination Station (100%)
* Would like Imagination Station to come to this location again (98%)
* Know more about Imagination Station (82%)

## Suggestions

The suggestions below for Tinkering Takeovers are based on FERA’s independent review of the data and build on recommendations across all program years. FERA has shared data with Imagination Station annually and they have made modifications to the programming based on evaluation findings.

**Continue to offer hands-on science opportunities in local libraries, parks and community centers throughout the city.** Being located within communities, these organizations are more accessible to youth and families who live nearby. This allows youth to engage in programming more easily. Some libraries provide regular after-school programming for youth and librarians know the young people well.

**Expand offerings by providing programming multiple visits at the same locations.** Most youth offered no suggestions to improve programming except “*Come again here*” or “*Open it to more people.*” This would require additional funding and staff to increase capacity.

**Bring different activities to the locations.** If Imagination Station continues offering programming to some of the same libraries, city parks and community centers, it would be beneficial to continue to introduce youth to different hands-on science opportunities.

**Have more staff available to support on-site programming.** The number of youth attending can fluctuate at each session. In order to support youth and, where relevant families, it’s helpful to have multiple staff members at each session. Typically there are 3-4 stations so it’s helpful to have enough staff for most if not all activities. Two adults recommended having additional direction at stations. One suggested, *“More than one staff per activity for more hands-on help with STEM activities.”*

## MAKER CLUBS

## Overview

This section begins with a description of some of the Maker Clubs implemented as part of the IMLS grant, then provides feedback, presents outcomes and offers suggestions. Imagination Station staff offered a Maker Club at the **Homer Hanham Boys and Girls Club** in 2021 during the COVID-19 pandemic. They began by learning about the culture and flow of the BGC and adapted the model while adhering to changing COVID safety measures. The Homer Hanham BGC embraces the philosophy of autonomous learning and student choice. Students decide what programming to attend and for how long. Imagination Station brought materials and activities on regularly scheduled days, but youth ages 11–13 had the flexibility of choosing which session to attend for an open amount of time. The number of students varied greatly due to the fluid nature and importance of student choice of Maker Club activities.When possible, they included younger students. Staff turnover and COVID also impacted the Maker Club. Several times the BGC closed due to COVID cases.

The **East Toledo Boys and Girls Club** **(BGC)** followed the drop-in model used in the Year 1 sites. Similar to other BGCs, East Toledo BGC embraces the philosophy of autonomous learning and student choice. Students decide what programming to attend and for how long. Imagination Station brought materials and activities on regularly scheduled days, but youth ages 11–13 had the flexibility of choosing which session to attend for an open amount of time. Similar to the Homer Hanham BGC, the number of students varied greatly due to the fluid nature and importance of student choice for Maker Club activities.

**Escuela SMART Academy**, a pre-K – 6th grade school, began in 2014 as a small bilingual charter school serving the Latino community of Toledo. Increasing over time, the school outgrew its original location and needed to expand. In 2018, Escuela SMART joined the Toledo Public School district. Escuela SMART has approximately 300 students. The Latino community served by Escuela SMART is family oriented. Because many families have multiple children at the school, younger students attended Maker Clubs due to transportation and childcare needs. The Maker Clubs met once a week after school in the cafeteria with the same cohort of students participating. The club has been so popular they held a second session and continue to have a waiting list of interested students.

**Water for Ishmael** is a community organization helping immigrants find a place and become successful members of the community. Part of their work is missionary-oriented. They work with individuals and families building relationships, learning about needs, and linking people with local resources. They offer a number of programs. For example, the American School for Kids is a program that provides academic support and tutoring to youth up to Grade 6. They have three pillars to their work: advocacy, education, and partnerships. Toledo Tinkers provided after school programming at Water for Ishmael to youth and families.

**Rogers High School** is a Toledo Public School serving an economically disadvantaged community. In the 2023/2024 academic year, the YMCA offered after school programming at the high school. YMCA staff were just building relationships with high school staff and students when recruitment for the Maker Club started. This was the first offering of the Maker Club to high school aged students. Approximately XXX students attended different Maker Club sessions. Both IS and high school staff struggled to recruit and sustain a core group of students in the Maker Club. Another key challenges is the nature of high school after school activities in which students often have to choose from competing opportunities such as sports and tutoring. For example, students active in high school sports were unable to attend the Maker Club given expectations to participate in all trainings and games.

### Feedback

This section provides feedback on the Maker Clubs from youth participants, Imagination Station staff, and partner staff. The feedback focuses on 1) how well the Maker Club is working, and 2) the partnerships. FERA developed and co-implemented a youth survey in Maker Clubs at seven locations – Escuela SMART, Homer Hanham BGC, McTigue Elementary, YMCA at Rogers High School, Schoenrock BGC, Sherman BGC, and Water for Ishmael (N=109). The data presented here is cumulative across these seven sites for all program years. FERA interviewed key staff at four organizations.

### Demographics – Survey Respondents

More than half of Maker Club survey respondents described themselves as girls (58%). The rest identified as boys (39%), non-binary (2%), or preferred to self-describe (1%). Most youth participants were ages 8 – 12 (64%), followed by 13 – 17 years old (22%) though some younger students participated as well (8%) ages 4-7, and 1% ages 0-3[[1]](#footnote-2).

Students were asked to self-identify their race/ethnicity. Their responses are presented in the following table.

| **Which of the following best describes you? (Select all that apply)** | (N=97) |
| --- | --- |
| Black or African American | 51% |
| White | 21% |
| Hispanic or Latino | 20% |
| Prefer not to say | 9% |
| American Indian or Alaskan Native | 6% |
| Multiple selected | 5% |
| Other | 3% |
| Asian | 2% |

The Maker Clubs intentionally operated differently at each site with IS tailoring the program to meet the diverse needs of the communities served and operate in alignment with each organization’s culture. For the programming held at the Boys and Girls Clubs, they were offered regularly but it was more of a drop-in set-up. In contrast, at Escuela SMART and Water for Ishmael most of the same youth participated weekly. This allowed Imagination Station staff to build relationships and scaffold learning with the same students.

### How Well Is Maker Club Programming Working?

Overall, the Maker Clubs worked well. Key areas that worked well included: bringing in a range of tools and technology for the youth to use; implementing the programming in community spaces; Imagination Station staff’s ability to build trust and camaraderie with the students; and the flexibility of all partner organizations. In multiple sites, youth of varying ages participated. Though challenging, Imagination Station staff modified some activities so that younger students could also participate.

“This is the best club I ever went to. It helps me. If I make a mistake I can fix it.” (Student)

“They bring in many pieces of equipment [which] is an integral part of the program. Everything is amazing – laptops, 3-D printer. It’s amazing to see. I’m impressed.” (Partner staff)

“We’re very grateful the kids probably wouldn’t have had the opportunity to be involved in anything like this. Exposure now will help them be more successful. We’re grateful for the opportunity.” (Partner staff)

“Staff and kids love it. I’m seeing good things happening, trying different activities the kids tell me about and they’re excited to talk about what they did. It’s very good I was excited to have them here. They do a good job the kids love them. They have rapport with the kids. The kids feel safe and comfortable with Imagination Station. The staff does a great job and it translates with to the vision of Boys and Girls Club (BGC) – trying to expose them to anything possible.” (BGC staff)

**Key finding: Exposing youth to a variety of tools, software, and materials was a positive experience.** Students surveyed liked the activities a lot (70%) or some (30%); no students responded “Not At All.” Youth enjoyed different parts of the hands-on activities, including: building things with others, designing for the 3-D printer, jitter critters, making robots, building circuits, coding, taking apart things, and using new tools (e.g., pliers). Partner staff noted the program provided *“a nice range of [STEM experiences] from mechanical, digital and physical.”* One BGC staff member noted, *“It gives kids access to new materials in a safe place. They get to explore different materials and activities with Imagination Station staff – it’s really beneficial.”*

**Key finding: Offering the Maker Clubs in community spaces made STEM accessible**. Youth were familiar with the community settings and felt comfortable and safe. For example, participants in Escuela SMART, McTigue Elementary and Rogers High School stayed after school and, thus, did not have to find transportation to the club. At Water for Ishmael, whole families took part in activities.

**Key finding: The Imagination Station lead staff member has strong facilitation skills and the ability to work well with youth**. All partners organizations interviewed underscored the combination of STEM content knowledge and ability to connect with youth as important to the program’s success. Though there was some staff turnover both at IS and partner organizations, one team IS member was the main facilitator throughout and an important part of the success of the program.

“[IS Staff] is an amazing facilitator. She has the ability to speak to the kids and is so knowledgeable about the subjects. The way she explains [science] it is easy to follow. She also has classroom management skills and is **an amazing asset** for the program. They are learning a lot…She makes connections with the kids and gets to know them.” (Partner)

“She came in beautifully organized and took great care with the children and the facility. She related really well with the students. She found the sweet spot of being a teacher and being relatable. She’s so experienced…side by side learning.” (Partner)

**Key finding: Imagination Station staff modified activities to meet a wider than anticipated age range (e.g., Water for Ishmael, BGC)**. At some locations participants brought their younger siblings to the Maker Club. For example, staff challenged older youth to make three types of circuits while younger participants created simpler circuits using three different items.

**Key finding: Where possible, staff intentionally connected tinkering to STEM jobs in the community**. They expanded on this over time. For example, staff discussed the need for electricians to understand circuits in order to do their work.

**Key finding: Operating a Maker Club in high schools needs a different approach**. At the first high school-aged Maker Club it was been difficult to recruit students and get a consistent group. Future groups may need activities tailored more to this age group and a wider range of recruiting strategies. It might also work better offering sessions once a week instead of twice.

## Partnerships

Overall, Imagination Station’s partnerships worked well. FERA interviewed representatives at four different locations.

**Key finding: 100% of staff closely engaged in Toledo Tinkers felt it worked very well.** The key aspects that worked well included: communication, adaptability, openness, and enjoyable to work with. Though most partners did not identify challenges with the sessions, they did explain that in the future there could be language barriers and the need for translators at both sites. Rogers High School staff noted the challenge of engaging high school students in the program, in part, due to the competing demands of other afterschool activities (e.g., sports).

**Key finding: Imagination Station staff took time to visit with and understand each partner organization’s culture and environment before beginning programming.** Each partner has its own unique culture and it was helpful that Imagination Station staff took time to learn about each center and adjust the Maker Clubs to meet the needs of the community and center, creating an inclusive environment. All partners invested time up front to build relationships.

**Key finding: Partner organizations were flexible, which was helpful.** According to one partner organization, *“[IS staff] flexibility was also a big piece of the success.”*

**Key finding: Partner organizations enjoyed working together and had clear and open communication.** One partner explained: *“[IS staff] is beyond professional. She is amazing…She is right there at the top. A big piece is how well organized she is.”*

## Program Impact

Overall, youth and staff agreed the Maker Clubs positively impacted youth in a number of ways. By working together, staff from both organizations helped create a safe and enjoyable space for youth to explore STEM. These Maker Club cohorts achieved outcomes outlined in the grant proposal across program years and locations. Youth self-reported growth in all areas with fewer growing in the area of awareness of STEM career opportunities.

**Program Outcomes Related to Access to STEM Learning
(from Logic Model)**

* Increased access to making/tinkering opportunities in diverse communities
* Increased exposure to high quality STEM education
* Increased interest in STEM-related activities
* Increased sense of inclusion in STEM practice
* Ability to identify the practice of making as an opportunity for creativity, self‑expression, and community transformation
* Increased awareness of Imagination Station as a STEM resource
* Greater awareness of STEM career opportunities

### Increased Access & Exposure to Tinkering/STEM

**Program Goal:** Develop and deliver a mobile tinkering lab and curricula to expand community access to transformative and innovative STEM learning opportunities.

**Outcome: Youth had increased access to making and tinkering opportunities by having the Maker Clubs at central community hubs across Toledo.** Transportation and cost are often barriers that make it difficult for youth to travel *to* Imagination Station and visit the tinkering space. Fully 91% of students enjoy working on projects with Imagination Station. IS staff focus on building a safe and comfortable environment for the Maker Clubs.

“[Maker Club] is fun, interesting…they teach you stuff.” (Youth)

“It gives kids access to things they normally can’t access. They’re always super excited to get their stuff back. It’s important to give them access early.” (Staff)

“It’s good to be **in** the community…[youth learn that] science can happen where I live.” (IS Staff)

**Outcome: Youth were exposed to new tools and hands-on experiences making STEM accessible.** 84% used a new tool and 85% learned or discovered something new.

*[My favorite part of the activities was] “Getting to work with my hands and try something new.” (Youth)*

*“We definitely saw kids excited to make stuff – creating was positive. Kids got really comfortable with the tools – wire cutter, CAD design software, pliers – these were unfamiliar tools before.” (IS Staff)*

### Increased Interest in STEM

For all sites youth reported an increased interest in STEM because of Imagination Station activities. During program Year 3, Imagination Station worked more closely with a consistent group of students at two sites. Youth in these locations reported a higher percentage of growth in 4 areas detailed below; these were in two locations with more consistent attendance of the same youth over time. These differences are noted in the ranges and the footnotes. The first percent presented is overall the second is for participants in Year 3. With these exceptions, most responses across the grant years were similar. As such, we have presented the combined data averaged across the three years.

73-96% of youth surveyed agreed[[2]](#footnote-3):

* Imagination Station makes me want to learn more about doing science (77% - 96%)
* I know more about doing science because of Imagination Station (75% - 89%)
* I now know more about Imagination Station as a place to learn about science (73% - 88%)
* I am more interested in STEM (73%-81%)
* The activities I’ve done here have made me think differently about STEM (80%)

“*[My favorite party of the activity was]...making rock, paper, scissors on the computer. I used to think science was boring. I’ll tell my mom about micro and coding.” (Youth)*

**Outcome: Overall, participants were more interested, excited, aware of, and engaged in making and tinkering**. Twenty-two percent of students had never been to Imagination Station and 94% would like to go to Imagination Station in the future.

### Increased Agency & Inclusion

**Outcome: Youth gained perseverance, agency, and ownership through the Maker Clubs**. Tinkering encouraged kids to decide on their project and materials (83%) and keep trying when things did not work (80%). This also expanded their idea of STEM. Importantly, most were proud of what they made (91%).

[I liked] “Figuring out what I was going to make and putting it all together.” (Youth)

“Laser cutting – I needed to do it again and again. I got something wrong so I needed to do it again.” (Youth)

“[Through STEM] I try to empower them, it helps them to retain things better, feel encouraged, supported and empowered.” (IS Staff)

81-90% of youth surveyed agreed:

* I feel included in Imagination Station activities (91%)
* Imagination Station makes sure everyone is taking part and has a say (86%)
* Imagination Station listens to young people (81%)

**Outcome: Youth felt included in STEM activities and welcomed by staff.** This supports one of the key aims of the grant: to make STEM inclusive to youth from all communities.

### Identify Making & Creativity for Self-Expression

**Outcome: Youth identified the practice of making as an opportunity for creativity, self-expression, and community transformation.** 91% of students surveyed agreed that science gives them an opportunity to be creative and a way to express themselves (81%). Most agreed that making things can help solve problems in their community (74%). Just over half of students agreed that some things they make in Maker Club could help their family, neighborhood, or community (58%).

*“Everything worked well, plus we got to be creative. Also I can help people by showing them what to use and many other things. Plus I think I do really good with my art and blocks. Also I think I'm learning new things about science, it's fun. When you actually try you'll get a hang of it. I love the Imagination Station.” (Youth)*

“Students seem a lot more into science. I try to relate everything [we do] to something in their neighborhood…I “I try to bridge the gap by helping make connections and help them see other options. For example, [while learning about circuits] I explain you could be an electrician.” (IS Staff)

### Awareness of Careers

**Outcome: Two areas with *less* of an impact include collaboration in tinkering (59%) and seeing themselves having a career as scientist in the future (46%)**. This finding has been consistent across all Maker Clubs all years; students tend to work more individually than in a group. IS staff have been working with students to explore working together to problem solve and learn about collaborating. Though the Maker Clubs demonstrate a range of hands-on science, starting in Year 3 staff have been more intentional about connecting tinkering to being a scientist or other STEM career explorations.

## Suggestions

The suggestions below are based on FERA’s independent review of the data and build on recommendations from all program years. Suggestions are organized into three broad categories: 1) engagement, 2) programming, and 3) sustainability.

## What did we learn? Now what?

### Engagement

**Continue to spend time *up front* learning about the community, building cultural competence, and understanding the environment.** Find ways to build staff involvement in the community *outside* of the partner organization (e.g., attend community-wide events). *Imagination Station staff have consistently been committed to connecting with their partners to tailor programming to each site and community.*

**For school-based programming, engage the 3rd – 6th grade science and math teachers.** Gather their input on recruiting students who might be interested in participating in the Maker Clubs.

**Find ways to engage families and parents in programming, and incorporate culturally relevant making/tinkering activities**. Ask for parent/family volunteers to help out with after‑school sessions. Continue to explore how to engage multigenerational families in activities at sites where the whole family attends.

**Plan ways to keep including younger kids in Maker Club activities.** Continue offering the same activity for different age groups with parallel components that are age appropriate. One youth suggested *“split kids – teenagers in 1 room we go to a room with kids my age.”*

**Seek different strategies for engaging high school students in the Maker Club.** Recruit through teachers and other adults at school. Seek input from high schoolers about activities they are more interested in and tailor those activities to their age group.

### Programming

**Continue to offer a wide range of tools and hands-on activities**. Youth enjoyed the diverse opportunities to explore various STEM activities and tinker with different tools and materials.

**Encourage students to work together to collaboratively solve problems or tinker.** Develop projects that require teamwork to complete and model working together to solve problems.

**Encourage returning and/or older participants to take on leadership roles in the Maker Club.** Because many clubs have a wide age range of participants, it is often necessary to have additional support to work with the younger kids. Older youth have the opportunity to hone their STEM skills, while strengthening confidence and leadership by working with and teaching their peers.

**Continue to seek opportunities to incorporate exposure to careers related to STEM and tinkering.** Consider inviting guests from the community who work in related fields to work alongside the students, while also teaching about what they do and the skills they need. It’s important to show students a range of careers, especially from members of their own community.

### Sustainability

**Continue to sustain the programming.** Since the inception of the Maker Clubs, Imagination Station has created a number of “leave behind” activities and materials that community partner staff can implement (e.g., mini Sphero robots, cardboard making tools, etc.). One challenge is having staff at the partner agencies with the knowledge, skills, and time to implement the program.

**Consider training sessions for Maker Club staff.** A video training could be developed to aid in training new staff.

**Seek funding to continue the programming.** Toledo Tinkers has expanded the reach of the museum into communities across the city. In the process they have worked toward broadening participation of diverse communities in STEM programming.

SUMMARY

This final report presented highlights from FERA’s evaluation of the Toledo Tinkers grant funded by IMLS (2020-2024). Overall, both the programming and partnerships worked well. They increased access to STEM opportunities for youth from a diversity of backgrounds representing groups typically underrepresented in STEM fields. Imagination Station took STEM tinkering opportunities out of the museum setting and offered them in multiple disinvested low-income neighborhoods throughout Toledo.

Tinkering Takeovers offered free hands-on STEM at libraries, Toledo City Parks, and community-based organizations across Toledo serving neighborhoods not often reached with informal science learning. By bringing science to communities, Imagination Station is helping increase access, exposure and inclusion in STEM. This report highlighted impacts of this programming on youth. Suggestions were offered to strengthen future Tinkering Takeovers.

The Imagination Station offered Maker Clubs at different sites across Toledo. Staff intentionally modified the club to fit within the culture of the partner organizations. For example, at Boys and Girls Clubs the Maker Club was more of a drop-in model, whereas at Escuela SMART students signed up specifically for the afterschool program held at school.

This programming positively impacted youth and achieved a number of outcomes outlined in the grant proposal. Toledo Tinkers increased access and exposure to STEM opportunities for young people in communities across Toledo that typically don’t have access to these activities. The programming increased:

* Exposure to high quality STEM education
* Interest in STEM-related activities
* Sense of inclusion in STEM practice
* Ability to identify the practice of making as an opportunity for creativity, self‑expression, and community transformation
* Awareness of Imagination Station as a STEM resource

# APPENDIX A

Imagination Station – Maker Club Participant Survey
(December 2021 through May 2024)
Data Summary and Verbatims (N=109)

NOTE: There are 3 versions of the survey (Dec 2021, Feb 2022, and beyond Feb 2022). Question differences are noted where applicable throughout the data summary.

1. Dates & Location **(N=109)**

**Dates**:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 5% (5) | 12/7/2021 |  | 9% (10) | 12/6/2022 |
| 6% (7) | 2/1/2022 |  | 6% (6) | 2/27/2023 |
| 6% (6) | 2/8/2022 |  | 9% (10) | 4/25/2023 |
| 1% (1) | 2/10/2022 |  | 9% (10) | 11/9/2023 |
| 19% (21) | 4/26/2022 |  | 4% (4) | 11/16/2023 |
| 7% (8) | 8/1/2022 |  | 6% (7) | 11/29/2023 |
| 6% (6) | 8/2/2022 |  | 6% (6) | 5/17/2024 |
| 2% (2) | 8/3/2022 |  |  |  |

Percentages do not add to 100%, due to rounding

**Locations**:

|  |  |
| --- | --- |
| 17% (19) | Boys & Girls Club - Homer Hanham |
| 18% (20) | Escuela SMART |
| 19% (21) | McTigue Elementary |
| 6% (6) | Rogers High School |
| 15% (16) | Schoenrock |
| 19% (21) | Sherman BGC |
| 6% (6) | Water for Ishmael |

**Dec 2021 Q1 (not asked later):** How many days did you come to Imagination Station activities at the Boys & Girls Club? **(N=5)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 20% (1) | 1 - 2 days |  |  | 20% (1) | 5 - 6 days |
| 60% (3) | 3 - 4 days |  |  | 0 | 7 - 8 days |

1. Imagination Station offered different activities as part of the Maker Club. What activity(s) did you like? *If you didn’t do an activity, check “Didn’t Do.”* **Dec 2021 Q2 asked: What activity(s) do you like best and why? Feb 2022 Q2 asked: Imagination Station has come to the Boys & Girls Club and offered different activities. What activity(s) did you like?
Choices offered differed across surveys.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Activity | N | Didn’tLike | Liked | Didn’t Do(n) |
| Built circuits with motors, lights and switches | 52 | 6% (3) | 94% (49) | 38 |
| Made something with circuits | 2 | 0 | 100% (2) | 3 |
| Used a circuit to create a light-up accessory | 11 | 0 | 100% (11) | 2 |
| Experimented with circuit blocks | 1 | 0 | 100% (1) | 12 |
| Built a drawing robot with a motor and battery | 51 | 12% (6) | 88% (45) | 38 |
| Built a crank puppet with wood and wire | 42 | 17% (7) | 83% (35) | 20 |
| Used coding to control a micro bit | 63 | 6% (4) | 94% (59) | 24 |
| Used tools to take apart electronics | 28 | 0 | 100% (28) | 50 |
| Took something apart (like a toy) | 4 | 0 | 100% (4) | 1 |
| Took something apart (like a toy) and used the parts to solve a problem | 4 | 0 | 100% (4) | 9 |
| Made a Halloween mask with laser cutter | 6 | 0 | 100% (6) | 12 |
| Made a coin with laser cutter | 6 | 0 | 100% (6) | 12 |
| Made an accessory on the laser cutter | 44 | 18% (8) | 82% (36) | 45 |
| Made something else on the laser cutter | 35 | 0 | 100% (35) | 68 |
| Designed something else on the laser cutter | 19 | 5% (1) | 95% (18) | 24 |
| Coding a robot | 27 | 0 | 100% (27) | 15 |
| Linkages | 16 | 0 | 100% (16) | 11 |
| Rigamajig | 15 | 7% (1) | 93% (14) | 11 |
| Used the 3D printer | 4 | 0 | 100% (4) | 1 |
| Designed something to be printed on the 3D printer | 4 | 25% (1) | 75% (3) | 9 |
| Made something new to solve a problem | 6 | 0 | 100% (6) | 12 |
| Created a prototype sculpture for Toledo | 6 | 0 | 100% (6) | 8 |
| Other (please specify; **n=14**) | 15 | 0 | 100% (15) | 22 |

\*Calculations of percentages do not include “Didn’t Do” responses.

Specification of Other: **(n=14); not asked in Dec 2021 or Feb 2022**

* designing the duck
* Liked Is an understate meant I loved the fan paintings
* I Loved everything
* 3D print
* Doesn't remember coding micro bit
* Doesn't remember drawing robot or coding micro bit
* Doesn't remember building a crank puppet with wood and wire
* Doesn't remember using tools to take apart electronics or coding a robot
* Marble run
* Sphero - liked. Tinker Cad - didn't like.
* Sphero
* Jitter Critter
* Made a heart
* 3D printer

Please comment on what you did or did not like: **(n=4); asked Dec 2021 & Feb 2022**

* liked the coin because it was used as decoration, the 3-D printer because of the clay.
* Liked getting to destroy stuff. Not something I usually do.
* only came once
* The 3-D printer
1. How much do you disagree or agree with each of the following? **In the Maker Club with Imagination Station**…
**Feb 2022 Q3 asked: “Today with Imagination Station…” (choices were identical)**

|  | N | StronglyDisagree[1] | Disagree[2] | Neither Agree Nor Disagree[3] | Agree[4] | StronglyAgree[5] | Mean |
| --- | --- | --- | --- | --- | --- | --- | --- |
| I was proud of what I made | 104 | 3% (3) | 1% (1) | 5% (5) | 43% (45) | 48% (50) | **4.3** |
| I was excited by something I did | 103 | 2% (2) | 5% (5) | 12% (12) | 45% (46) | 37% (38) | **4.1** |
| I decided what I wanted to make | 104 | 2% (2) | 8% (8) | 8% (8) | 49% (51) | 34% (35) | **4.0** |
| If something did not work, I didn’t give up | 104 | 5% (5) | 5% (5) | 11% (11) | 43% (45) | 37% (38) | **4.0** |
| I kept trying new ideas | 102 | 5% (5) | 3% (3) | 12% (12) | 44% (45) | 36% (37) | **4.0** |
| I got ideas from other people and/or projects | 103 | 7% (7) | 23% (24) | 8% (8) | 40% (41) | 19% (20) | **3.3** |
| I helped someone else with their project | 104 | 5% (5) | 21% (22) | 18% (19) | 35% (36) | 21% (22) | **3.5** |
| I learned or discovered something new | 104 | 2% (2) | 4% (4) | 9% (9) | 39% (41) | 46% (48) | **4.2** |
| I used a new tool | 104 | 2% (2) | 9% (9) | 5% (5) | 41% (43) | 43% (45) | **4.2** |

Percentages across a given row may not add to 100%, due to rounding.

1. Think about the Imagination Station activities you have gone to as part of the Maker Club. How much do you disagree or agree with each of the following? **(N=26)
Feb 2022 Q4 asked “…activities you have gone to at the Boys & Girls Club. How much do you…”**

|  | N | StronglyDisagree[1] | Disagree[2] | Neither Agree Nor Disagree[3] | Agree[4] | StronglyAgree[5] | Mean |
| --- | --- | --- | --- | --- | --- | --- | --- |
| I know more about doing science because of Imagination Station. | 102 | 3% (3) | 7% (7) | 15% (15) | 49% (50) | 26% (27) | **3.9** |
| I am more excited about doing science. | 102 | 4% (4) | 7% (7) | 14% (14) | 41% (42) | 34% (35) | **4.0** |
| Imagination Station makes me want to learn more about doing science. | 100 | 4% (4) | 5% (5) | 14% (14) | 40% (40) | 37% (37) | **4.0** |
| I like working on projects with Imagination Station. | 102 | 2% (2) | 2% (2) | 5% (5) | 47% (48) | 44% (45) | **4.3** |
| I would like to do an activity like this again. | 100 | 1% (1) | 3% (3) | 6% (6) | 44% (44) | 46% (46) | **4.3** |
| Imagination Station makes it fun to learn about being a scientist. | 102 | 2% (2) | 6% (6) | 11% (11) | 39% (40) | 42% (43) | **4.1** |
| The activities I’ve done here have made me think differently about STEM (science, technology, engineering or math). | 102 | 1% (1) | 5% (5) | 14% (14) | 47% (48) | 33% (34) | **4.1** |
| I am more interested in STEM (science, technology, engineering or math) because of Imagination Station. | 102 | 1% (1) | 8% (8) | 18% (18) | 44% (45) | 29% (30) | **3.9** |
| I feel like I can be a scientist when I grow up. | 101 | 12% (12) | 20% (20) | 23% (23) | 29% (29) | 17% (17) | **3.2** |
| I now know more about Imagination Station as a place to learn about science. | 102 | 3% (3) | 8% (8) | 16% (16) | 36% (37) | 37% (38) | **4.0** |

Percentages across a given row may not add to 100%, due to rounding.

**Rather than 3 & 4 above, Dec 2021 Q3 was Y/N and phrased as: Think about the Imagination Station sessions you have gone to at the Boys & Girls Club…**

|  |  |  |  |
| --- | --- | --- | --- |
|  | N | Yes | No |
| Imagination Station makes it fun to learn about being a scientist. | 4 | 100% (4) | 0 |
| I am more interested in science because of Imagination Station. | 5 | 80% (4) | 20% (1) |
| I know more about making and tinkering because of Imagination Station. | 5 | 100% (5) | 0 |
| I am more excited about making and tinkering. | 5 | 100% (5) | 0 |
| I like working on projects with Imagination Station. | 5 | 100% (5) | 0 |
| I get frustrated sometimes but I don’t give up. | 5 | 100% (5) | 0 |
| I learn new things from Imagination Station. | 5 | 80% (4) | 20% (1) |
| I used a new tool. | 5 | 100% (5) | 0 |
| Imagination Station makes me want to learn more about making and tinkering. | 5 | 100% (5) | 0 |
| I want to do more activities with Imagination Station. | 5 | 100% (5) | 0 |
| I feel like I can be a scientist when I grow up. | 5 | 80% (4) | 20% (1) |
| I can see how making things can solve problems for people in my community. | 5 | 100% (5) | 0 |

1. How much do you disagree or agree with each of the following? **(N=102); not asked in Dec 2021**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | StronglyDisagree[1] | Disagree[2] | Neither Agree Nor Disagree[3] | Agree[4] | StronglyAgree[5] | Mean |
| Imagination Station welcomes me sharing my experiences, knowledge and skills. | 3% (3) | 0 | 9% (9) | 50% (51) | 38% (39) | **4.2** |
| Imagination Station listens to young people’s views. | 1% (1) | 4% (4) | 14% (14) | 41% (42) | 40% (41) | **4.2** |
| Imagination Station makes sure everyone is taking part and has a say. | 1% (1) | 0 | 13% (13) | 37% (38) | 49% (50) | **4.3** |
| I feel included in Imagination Station activities. | 1% (1) | 2% (2) | 6% (6) | 36% (37) | 55% (56) | **4.4** |

1. How much do you disagree or agree with each of the following? **(Not asked in Dec 2021)**

|  | N | StronglyDisagree[1] | Disagree[2] | Neither Agree Nor Disagree[3] | Agree[4] | StronglyAgree[5] | Mean |
| --- | --- | --- | --- | --- | --- | --- | --- |
| I like to tell other people (like family and friends) about what I make here. | 99 | 4% (4) | 4% (4) | 7% (7) | 46% (46) | 38% (38) | **4.1** |
| Some things I make here could help my family, neighborhood, or community. | 99 | 4% (4) | 18% (18) | 19% (19) | 31% (31) | 27% (27) | **3.6** |
| I can see how making things can solve problems for people in my community. | 99 | 1% (1) | 6% (6) | 18% (18) | 40% (40) | 34% (34) | **4.0** |
| Doing science gives me an opportunity to be creative. | 99 | 1% (1) | 3% (3) | 4% (4) | 49% (49) | 42% (42) | **4.3** |
| Doing science gives me an opportunity to express myself. | 98 | 2% (2) | 8% (8) | 9% (9) | 39% (38) | 42% (41) | **4.1** |

Percentages across a given row may not add to 100%, due to rounding.

1. Is there anything you didn’t like or that didn’t work well in activities with Imagination Station? **(n=77); not asked in Dec 2021**
* No
* Not really the coding I didn't like much cause I'm not use to it
* Not really, I usually had fun during the activities they provided.
* No
* Nothing I didn't like. I Liked everything
* the puppet thing called automata
* That I couldn’t figure out how to train or make a kind of robot. And I disliked the coding
* The automata is the thing I dislike the most
* No I liked all of them
* No there is nothing. It is very fun here and I have a lot of fun. I get excited when it’s makers club. The best thing about it is I get to express my feelings!
* No not really, the people are nice, the projects are fun, and the projects help me towards my goal of being an engineer.
* When we didn't have enough of certain rigamajigs, it was hard because I couldn't make my creation how I imagined.
* no
* Nope
* I didn't like the sphero bots because it was difficult to control the bot.
* Everything worked well, plus we got to be creative. Also I can help people by showing them what to use and many other things. Plus I think I do really good with my art and blocks. Also I think I'm learning new things about science, it's fun. When you actually try you'll get a hang of it. I love the Imagination Station.
* nope
* Robots was boring
* I did not like the microbits
* I don't know
* I liked all of it
* No
* The crank puppet didn't turn out how I wanted it to
* The crank puppet
* The marker robot
* No
* No
* Laser cutting - I needed to do it again and again. I got something wrong so I needed to do it again.
* No
* No
* When I first got here I didn't know what to do
* I liked it all
* The nature project (on the computer) because I didn't really know what to do.
* - Tinker Cad - I thought I could make as many as I wanted.
- Circuits - I didn't like it because there was a lot of wires and I didn't understand.
* Laser cutter - it was hard to design and frustrating
* Everything worked.
* Pliers didn't work
* No, I like all of them
* No
* No
* No
* I put too much stuff on my circuit accessories
* No
* confusing
* I liked all of them
* more things to take apart
* none
* No
* liked all of it
* The first motor during Jitter Critters didn't work
* No
* I liked all of them
* no
* Laser cutter (tried to cut something twice, but it didn't work)
* The laser cutter didn't work 1st time.
* Scared to come in the room; bumped into a girl; it was ok after I came in
* I did not like the coding
* The marker robot I made didn't work.
* no
* No
* The bear with shadows. I got frustrated.
* The bear with the shadows and got frustrated
* no!
* no
* I liked everything
* The microbit
* No
* No
* Stuck on hands (the paper mache stuck to his hands as he was making his sculpture)
* No
* Everything worked
* I don't like how the light is flashing on and off
* No
* No
* loved it; didn't know about the wires
* I didn't like every time I made it the battery didn't work
* - Design - liked designing but it didn't work
- You gotta make stuff to solve a problem
1. How much did you enjoy the activities with Imagination Station? **(N=99); not asked in Dec 2021**

| A Lot[3] | Some[2] | Not At All[1] | Mean |
| --- | --- | --- | --- |
| 70% (69) | 30% (30) | 0 | **2.7** |

1. What was your favorite part of the activities? **(n=95); not asked in Dec 2021**
* Building or making things with others
* when I gave my duck a top hat
* The art fan
* Getting to work with my hands and try something new.
* Being able to solve out the challenges of the activities to find out interesting results and information.
* Taking apart of laptop and other things
* Teamwork and creative work
* Everything
* the automata
* Making robots do obstacle courses and the sphero
* The sphero thing
* The one where we got to pick up wood and build our own stuff.
* Getting to express my feelings and ideas!
* I don’t remember
* Making red crayons.
* The "doing" part, like the building, I love to build and create things.
* When we get to work with partners, and when I do things I haven't done before.
* designing or decorating
* ball machine thing
* When we all work together to find the right idea to use and also having fun talking to friends.
* Creating things and helping out with new people
* I loved coding robots.
* I liked the 3D printing
* the drawing
* When we made the glass
* Making robots
* Linkages, Jitter Critter, Circuit Accessories
* Linkages, Jitter Critter, Circuit Accessories
* Everything and making glasses
* Fun, interesting...they teach you stuff
* Designing for 3D printer
* Building stuff
* 3D print
* The one I'm doing right now (3-D printer)
* Marble run - the timing - see who gets the lowest
* The sphero bots - coding them
* Coding the bot - that you can move it around
* Today (3-D printer), laser cutter
* Trying new things - sphero bot
* When we got to do our own thing + look at the other things
* I don't know.
I really like the idea of making robots. It will help me with robotics.
* Sometimes I could bring them home.
[From Q3-New Tools:]
 - Scissors you twist
 - robot
 - I never made circuits
* Building circuits
* In the middle - when everything was working with the robots where you could control them.
[From Q3-New Tools:] Pliers - I was so excited because I never used them and made an airplane.
[From Q3-New Tools:] Lights
* The board - coloring on it.
From Q3: I was excited I finally made something on the computer - to make a design.
From Q3: New tools: Sodder.
* Making your own headband.
This is the best club I ever went to. It helps me with [illegible]. If I make a mistake I can fix it. It [illegible - started?] me with my video [illegible].
* IDK
* Circuit accessories
* Jitter Critters
* Robots - how they moved and how we got to make a custom one. I made one, Bubba, I made a hat and put motes
* making rock, paper, scissors (on the computer). I used to think science was boring. I'll tell my mom about micro and coding.
* it was science
* microbit
* laser cutting
* making music
* I liked that I made music. We get to make things on computer. It was fun to make our plan on the computer.
* making music
* microbit
* Microbit - it was on the computer. Have not done this before
* Jitter critters
* take apart activity
* taking apart things
* - I liked the circuits best b/c you put something together for electricity.
- Microbits - I liked making music and songs.
* microbits - could make stuff and put it on the board
* Make your own face on the microbit
* the take apart
* working [?] the laser cutter
* making it
* The coding and taking apart stuff.
* The laser cutter
* The robot
* Taking stuff apart
* all
* Coding
* Bottle Rocket
* bottle rocket
* making your own lipstick
* making stuff
* building
* I like to make things
* When the science part. [sic]
* the cutter
* the laser
* Liked using tools
* The coloring robot
* Super glue gun
* building it
* Stirring the paper mache
* Shaping the wires
* Figuring out what I was going to make and putting it all together
* - hot blower
- [Overall comment:] I never did this here - I find it inspiring & fun.
* The part where you put it all together
* Hot gun
* Using tool to bend the wire
* The hot gun - getting to use it
1. How could Imagination Station make their activities even better? **(n=90)
(Dec 2021 Q4 asked: How could Imagination Station make their Making sessions even better?)**
* I think it has activities that are already good to begin with.
* Not sure just keep up what you did
* Being a little more organized, and seeing what the kids want to do.
* It’s already good as it is!
* more fun activities
* By letting kids have a say about what they want
* Nothing. It Was Awesome
* make more fun things even better
* They can’t make it better its good
* Make it even more fun
* I don't know.
* They can't, it’s already amazing and I can't think of anything to make it even more exciting!
* if we actually went to the imagination station
* Make linkages sides/corners rounded so it is easier to make red crayons :)
* They can't, only because their projects are so amazing and fun, they're just the perfect projects to work on, especially if you have a goal in the STEM field, like me.
* They could have competitions where you get to work with a group and see who could make the best creation between all of the groups.
* Nothing, they all our awesome and very fun
* doing something related with basketball
* They could give more examples to help use brainstorm.
* By adding colors and creating things then see if we can create something like it.
* I love it and there is not a lot I want to change.
* tuggf [sic]
* Doing something more creative or interesting
* by play a game
* No
* I don't know
* Make potions
* No ideas
* Teach more
* Making more 3D stuff
* None
* No, I do not
* Have different shows at Imagination Station
* I don't know
* No
* I don't know
* I don't know
* I don't know
* Build robots with engines that you have to control and move.
* Add a rainbow house that you can go into at Imagination Station - I don't know
* No
* Have things that have controls for cars and robots to make them move and help kids get more interested in it.
[Misc Comment:] My first time in Maker Club I felt nervous. I had friends who told me I could do it. They told me I could do it. Maker Club is good but without [named staff] it is not as good. She shows us [illegible] to be good, and not be bad. She gives energy and [illegible].
* Maker Club is already good.
* A little bit longer - more times, because sometimes we have really great ideas and not enough time to do them.
* IDK
* Coding Sphero
* don't know
* don't know
* When they did robots they should have miniature hats
* no
* Split kids - teenagers in 1 room, we go to room with kids my age
* more details, ex. more options to be creative
* Learning
* I don't know
* Should use computers to design necklaces
* let you build more things
* nothing
* Add more stuff and bring back circuits
* No
* nothing
* they don't
* don't know
* They could let people vote on stuff.
* I don't know
* I do not know
* Mix different chemicals
* Stop using groups
* get free candy
* make your own slime
* nothing
* ?
* yes, maybe they can learn new things
* I don't know
* No. It's fine
* They can do more challenging stuff
* to come more often to the club.
* - food
- things that everyone could participate in (younger students)
- try to make rockets
* letting 9 year olds come because most of the younger siblings can't come.
* Have a bike session
* Go on field trips
* They are fine as they are
* add motors (Note: he really likes cars and his sculpture was a motor)
* don't know
* IDK
* - No
- [Overall comment:] I had fun and I want to do it again
* What I can do better: Try to shape it right and better way to put it together
* I don't know
* - they already are better
- I would like to work there
* If we were able to have multiple LEDs
* - Don't have to change anything
- I think I'm too old for it (to go to Imagination Station)
1. Have you been to Imagination Station before? **(N=104)**

| Yes | No |
| --- | --- |
| 78% (81) | 22% (23) |

1. Would you like to go to Imagination Station in the future? **(N=101)
(Dec 2021 Q6 asked: Would you like to visit the Imagination Station museum in the future)**

| Yes | No |
| --- | --- |
| 94% (95) | 6% (6) |

1. How old are you? **(N=98); asked differently Dec 2022 (see below)**

|  |  |
| --- | --- |
| 1% (1) | 0 – 3 years old |
| 8% (8) | 4 – 7 |
| 64% (63) | 8 – 12 |
| 22% (22) | 13 – 17 |
| 1% (1) | Don’t Know |
| 3% (3) | Prefer Not To Answer |

Percentages do not add to 100%, due to rounding.

**Dec 2021 Q7:** How old are you? **(N=5)**

|  |  |
| --- | --- |
| 100% (5) | 10 – 13 |
| 0 | 14 – 18 |

1. Are you a: **(N=104) (NOTE: Dec 2021 Q8 - only given boy/girl/other, but no “other” was chosen and all answered so data were combined)**

|  |  |
| --- | --- |
| 58% (60) | Girl |
| 39% (41) | Boy |
| 2% (2) | Non-binary |
| 0 | Prefer not to say |
| 1% (1) | Prefer to self-describe **(n=3)** |

* idk
* I talk a lot
* I’m gay
1. Which of the following best describes you (check all that apply): **(N=97)
Dec 2021 – not asked**

|  |  |
| --- | --- |
| 6% (6) | American Indian or Alaskan Native |
| 2% (2) | Asian |
| 51% (49) | Black or African American |
| 20% (19) | Hispanic or Latino |
| 21% (20) | White |
| 5% (5) | Multiple selected |
| 9% (9) | Prefer not to say |
| 3% (3) | Other (please describe; **n=2**) |

* I don’t know
* My name is [stricken] also I love basketball/football I love to have fun and go places and I’m black.

# APPENDIX B

IMAGINATION STATION Tinkering Takeover
YOUTH Survey
Data Summary and Verbatims (Nov 2022 through Jun 2024) (N=58)

1. About how long were you in the Tinkering Takeover Space with Imagination Station today? **(N=57)**

| 0 – 15 min | 16 – 30 min | 31 – 60 min | More than 1 hour |
| --- | --- | --- | --- |
| 5% (3) | 16% (9) | 61% (35) | 18% (10) |

1. Who came with you today? (Check all that apply) **(N=55)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 44% (24) | My brother/sister |  | 29% (16) | Friend |
| 13% (7) | My parent(s) |  | 0 | Neighbor |
| 5% (3) | Cousin |  | 31% (17) | Other (please describe) |

Other description: **(n=17)**

* Came from school
* Walked from school
* myself
* I'm by myself
* Community organization
* Nephew
* YMCA
* Grandma
* Noone
* Myself
* Just me
* Grandma
* Grandma
* no one
* Self
* by myself
* Self
1. How old are you? **(N=58)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 10% (6) | 4 – 7 years old |  | 0 | 18 years or older |
| 71% (41) | 8 – 12 years old |  | 3% (2) | Prefer Not to Answer |
| 16% (9) | 13 – 17 years old |  |  |  |

1. Which of the following are true for you today? **BEFORE TODAY** **I**…

|  | N | Yes | No |
| --- | --- | --- | --- |
| 1. Heard of Imagination Station
 | 58 | 91% (53) | 9% (5) |
| 1. Wanted to go to Imagination Station
 | 57 | 98% (56) | 2% (1) |
| 1. Have been to Imagination Station
 | 58 | 78% (45) | 22% (13) |
| 1. Tinkered/made things at home or in my neighborhood
 | 57 | 74% (42) | 26% (15) |

1. Which of the following are true for you today? **NOW** **I**… **(N=56)**

|  | Yes | No |
| --- | --- | --- |
| 1. Know more about Imagination Station
 | 82% (46) | 18% (10) |
| 1. Would like to go to Imagination Station
 | 100% (56) | 0 |

1. What activities did you try **for the** **first time** today? (Select all that apply) **(N=56)**

| Coding | Circuits | Cardboard Building | Laser Cutter | 3-D Printer |
| --- | --- | --- | --- | --- |
| 52% (29) | 55% (31) | 46% (26) | 30% (17) | 48% (27) |

1. Please think about your experience today. I…

|  | N | Yes | No | Don’t Know |
| --- | --- | --- | --- | --- |
| Tried something new today | 58 | 95% (55) | 5% (3) | 0 |
| Did making/tinkering for the first time | 58 | 59% (34) | 36% (21) | 5% (3) |
| Would like to do more tinkering activities | 58 | 95% (55) | 0 | 5% (3) |
| Would like to do projects like this at home or in my neighborhood | 57 | 93% (53) | 4% (2) | 4% (2) |
| Would like Imagination Station to come to this library again | 57 | 98% (56) | 0 | 2% (1) |

Percentages for a given row may not add to 100%, due to rounding.

1. How much do you disagree or agree with each of the following? **Today with Imagination Station**…

|  | N | StronglyDisagree[1] | Disagree[2] | Neither Agree Nor Disagree[3] | Agree[4] | StronglyAgree[5] | Mean |
| --- | --- | --- | --- | --- | --- | --- | --- |
| I am proud of what I made | 55 | 2% (1) | 0 | 4% (2) | 69% (38) | 25% (14) | **4.2** |
| I am excited by something I did | 56 | 2% (1) | 4% (2) | 2% (1) | 66% (37) | 27% (15) | **4.1** |
| I decided what I wanted to make | 55 | 2% (1) | 2% (1) | 4% (2) | 67% (37) | 25% (14) | **4.1** |
| If something did not work, I didn’t give up | 56 | 4% (2) | 7% (4) | 4% (2) | 66% (37) | 20% (11) | **3.9** |
| I kept trying new ideas | 56 | 2% (1) | 5% (3) | 2% (1) | 63% (35) | 29% (16) | **4.1** |
| I got ideas from other people and/or projects | 56 | 5% (3) | 29% (16) | 7% (4) | 43% (24) | 16% (9) | **3.4** |
| I helped someone else with their project | 56 | 4% (2) | 27% (15) | 11% (6) | 43% (24) | 16% (9) | **3.4** |
| I learned or discovered something new | 56 | 2% (1) | 5% (3) | 2% (1) | 64% (36) | 27% (15) | **4.1** |
| I used a new tool | 56 | 2% (1) | 4% (2) | 4% (2) | 59% (33) | 32% (18) | **4.2** |

Percentages for a given row may not add to 100%, due to rounding.

1. How much do you disagree or agree with each of the following? **Because of the activities with Imagination Station today, I**… **(N=56)**

|  | StronglyDisagree[1] | Disagree[2] | Neither Agree Nor Disagree[3] | Agree[4] | StronglyAgree[5] | Mean |
| --- | --- | --- | --- | --- | --- | --- |
| Know more about doing science | 0 | 4% (2) | 11% (6) | 57% (32) | 29% (16) | **4.1** |
| Want to learn more about doing science | 2% (1) | 2% (1) | 9% (5) | 57% (32) | 30% (17) | **4.1** |
| Am more excited about doing science | 2% (1) | 2% (1) | 7% (4) | 64% (36) | 25% (14) | **4.1** |
| Am more interested in STEM (science, technology, engineering, and math) | 2% (1) | 7% (4) | 7% (4) | 66% (37) | 18% (10) | **3.9** |
| Feel like I can take part in science activities | 2% (1) | 2% (1) | 9% (5) | 63% (35) | 25% (14) | **4.1** |
| Understand that making/tinkering is a way to be creative | 2% (1) | 2% (1) | 9% (5) | 57% (32) | 30% (17) | **4.1** |

Percentages for a given row may not add to 100%, due to rounding.

1. What did you like best? **(n=53)**
* 3D pens
* 3d pens, linkages
* 3d pens
* Making stuff
* 3D pen
* 3D pens
* 3D pens
* 3D pens
* 3D pens
* Coding
* Linkages
* 3D pen
* 3D pen
* Coding robots
* 3D pen
* Linkages
* 3D printing
* Circuit blocks
* Linkages
* Coding robots
* Making chomppers out of linkages .
* Being able to plug in circuits
* Circuits
* Circuits
* coding the robots and the 3d printing
* Everything
* KIBO coding
* KIBO coding
* Circuit blocks
* Circuit
* Circuits
* 3D Printer
* Rigamajig
* I liked the coding car the best.
* The 3D Pringer
* 3D Printer
* All of it!
* KIBO
* Circuit blocks
* 3D
* KIBO
* Linkages
* KIBO
* Circuits
* Tinkering
* Circuits
* Circuit blocks
* I didn't do everything so IDK
* laser cutter
* building with cardboard and making circuits
* Coding
* I enjoyed everything I saw.
* Everything
1. How could Imagination Station make their activities even better? **(n=48)**
* Nothing
* No, it's already better
* Nothing you could have done better
* Everything good do far
* No
* More time for 3D printing
* No
* No
* No
* No
* No, besides come again
* No
* No
* I don’t know
* No
* No
* Bring more things in.
* No, you did everything pretty good
* Nothing
* Prizes
* Nothing
* Get my robot to work.
* Bring a different robot.
* No, you did great today.
* I want to make stuff on the 3D printer and print it out.
* Bring other robots
* Nothing
* Making experiments
* More activities
* Put cushion under the bike
* By adding more stuff
* Yes, come here again
* Imagination Station is just fine.
* I don't know, they're great
* Not possible
* Not sure. I like this experience!
* No
* N/A
* I would like to make 3D things
* No
* Bring slime
* Design our creations on 3D printer and more coding
* It can't be improved.
* It can't get any better
* I don't know
* More variety
* I really don't know
* open it to more people
1. Are you a… **(N=26**; not asked prior to October 2023**)**

|  |  |
| --- | --- |
| 65% (17) | Girl |
| 35% (9) | Boy |
| 0 | Non-binary |
| 0 | Prefer not to say |
| 0 | Prefer to self-describe (please specify; **n=0)** |

1. Which of the following best describes you? (Select all that apply) **(N=26**; **not asked prior to October 2023)**

|  |  |
| --- | --- |
| 0 | American Indian or Alaskan Native |
| 0 | Asian |
| 77% (20) | Black or African American |
| 0 | Hispanic or Latino |
| 31% (8) | White |
| 8% (2) | Multiple selected |
| 0 | Prefer not to say |
| 0 | Other (please describe; **n=0)** |

1. Optional: What is the zip code where you live? **(n=32)**

|  |  |
| --- | --- |
| 3% (1) | 40609 |
| 3% (1) | 43011 |
| 31% (10) | 43605 |
| 28% (9) | 43608 |
| 16% (5) | 43609 |
| 9% (3) | 43610 |
| 3% (1) | 43612 |
| 3% (1) | 43614 |
| 3% (1) | 43620 |

Today’s Date: (N=58)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 9% (5) | 04/12/2022 |  | 3% (2) | 07/17/2023 |
| 5% (3) | 06/29/2022 |  | 3% (2) | 07/28/2023 |
| 10% (6) | 11/11/2022 |  | 7% (4) | 12/13/2023 |
| 10% (6) | 02/09/2023 |  | 12% (7) | 04/04/2024 |
| 2% (1) | 02/23/2023 |  | 7% (4) | 05/15/2024 |
| 7% (4) | 06/29/2023 |  | 9% (5) | 05/16/2024 |
| 5% (3) | 07/10/2023 |  | 10% (6) | 05/21/2024 |

Location (library name): (N=58)

|  |  |
| --- | --- |
| 17% (10) | Birmingham Library |
| 7% (4) | East Toledo Family Center |
| 12% (7) | Kent Library |
| 19% (11) | Lagrange Library |
| 10% (6) | Locke Library |
| 7% (4) | Mott Library |
| 5% (3) | Riverside YMCA |
| 12% (7) | South Library |
| 9% (5) | Toledo Heights Library |
| 2% (1) | Wayman D. Palmer YMCA |

# APPENDIX C

IMAGINATION STATION Tinkering Takeover
ADULT Survey
Data Summary and Verbatims (Oct 2021 through May 2024) (N=28)

1. Today’s Date: **(N=28)\***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 11% (3) | 10/23/2021 |  | 7% (2) | 02/23/2023 |
| 29% (8) | 03/01/2022 |  | 18% (5) | 06/29/2023 |
| 14% (4) | 11/11/2022 |  | 4% (1) | 07/17/2023 |
| 7% (2) | 02/02/2023 |  | 4% (1) | 05/15/2024 |
| 7% (2) | 02/09/2023 |  |  |  |

\*Percentages in the above table do not add to 100%, due to rounding.

1. Location (library name): **(N=27)\***

|  |  |
| --- | --- |
| 4% (1) | Birmingham Library |
| 19% (5) | East Toledo Family Center |
| 48% (13) | Lagrange Library |
| 7% (2) | Locke Library |
| 11% (3) | Mott Library |
| 4% (1) | Toledo Heights Library |
| 7% (2) | Wayman D. Palmer YMCA |

\*Percentages in the above table do not add to 100%, due to rounding.

1. About how long did you stay in the Tinkering Takeover space today? **(N=27)**

| 0 – 15 min | 16 – 30 min | 31 – 60 min | More than 1 hour |
| --- | --- | --- | --- |
| 15% (4) | 11% (3) | 37% (10) | 37% (10) |

1. How did you hear about this Tinkering Takeover (Check all that apply) **(N=28)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 29% (8) | Library website |  | 4% (1) | A friend |
| 4% (1) | My child’s school |  | 11% (3) | A family member |
| 0 | Newspaper |  | 64% (18) | Other (please describe) |

Other description: **(n=15)**

* Librarian
* Library flyer
* Facebook
* ETFC
* Facebook
* STEM Class at ETFC
* News
* Website
* While here at library
* just at the library
* Walked in
* Cousins/siblings
* Library (not website)
* Library (not website)
* phone call to me
1. Who came with you today? (Check all that apply) **(N=27)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 59% (16) | My child(ren) |  | 7% (2) | Friend |
| 15% (4) | My partner/spouse |  | 0 | Neighbor |
| 19% (5) | Niece/nephew |  | 37% (10) | Other (please describe) |

Other description: **(n=10)**

* Grandchild
* Grandchildren
* Sister
* sister & brother in-law
* Cousins
* Cousins
* Cousins
* family
* family
* 2 grandsons
1. How old are the youth that came with you? (Select all that apply) **(N=28)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 43% (12) | 1 – 5 years old |  | 4% (1) | 16 – 20 |
| 68% (19) | 6 – 10 years old |  | 7% (2) | 21 or older |
| 29% (8) | 11 – 15 years old |  |  |  |

1. Which of the following are true for the youth that came with you today? **BEFORE TODAY** **my youth had**… (please check all that apply) **(N=28)**

|  |  |
| --- | --- |
| 46% (13) | Heard of Imagination Station |
| 46% (13) | Wanted to go to Imagination Station |
| 68% (19) | Been to Imagination Station |
| 39% (11) | Tinkered/made things at home or in our neighborhood |

1. Which of the following are true for the youth that came with you today? **NOW** **my youth**… (please check all that apply) **(N=27)**

|  |  |
| --- | --- |
| 78% (21) | Knows more about Imagination Station |
| 70% (19) | Would like to go to Imagination Station |

1. Please think about your youth’s experience today. My youth…

|  | N | Yes | No | Don’t Know |
| --- | --- | --- | --- | --- |
| Tried something new today | 27 | 100% (27) | 0 | 0 |
| Did making/tinkering for the first time | 26 | 54% (14) | 38% (10) | 8% (2) |
| Would like to do more tinkering activities | 27 | 96% (26) | 4% (1) | 0 |
| Would like to do projects like this at home or in my neighborhood | 27 | 96% (26) | 0 | 4% (1) |
| Would like to come to another Tinkering Takeover | 27 | 100% (27) | 0 | 0 |

1. The making/tinkering activities today are all part of ***STEM*** (***Science, Technology, Engineering, and Math***) activities. Did the Tinkering Takeover activities make your youth…

|  | N | Yes | No | Don’t Know |
| --- | --- | --- | --- | --- |
| More aware of STEM | 27 | 70% (19) | 4% (1) | 26% (7) |
| Want to learn more about STEM | 27 | 85% (23) | 0 | 15% (4) |
| More excited about STEM | 26 | 92% (24) | 0 | 8% (2) |
| More interested in STEM activities | 27 | 85% (23) | 4% (1) | 11% (3) |
| Have better access to making/tinkering activities in our community | 26 | 85% (22) | 0 | 15% (4) |
| Feel like we can take part in STEM activities | 25 | 88% (22) | 4% (1) | 8% (2) |
| Understand that making/tinkering is a way to be creative | 25 | 88% (22) | 0 | 12% (3) |

1. What did your youth like best? **(n=24)**
* 3D Printer
* Building with the cardboard pieces
* Ligamajig
* Enlaces
* Link locks and building with the wood
* Ho my kids are so amazed and want to interact in learning more stuff.
* 3D Printer
* Circuits
* He enjoyed the linkages.
* The 3D printer!
* Marker Robot
* The circuits electronics
* The robot cars
* the new "toys"
* Making stuff
* the eleritions [sic]
* Making the head move (circuit blocks)
* - Playing with the bobble head
- Connecting the light and switch to turn them on and off (circuit blocks)
* everything
* The tinkering
* the games
* the games
* The sphero bots & 3D printing machines
* Sphero robots
1. Do you have any suggestions to make the Tinkering Takeover better? **(n=23)**
* No
* No, I think it's great the way it is. Deice is the greatest. She is very friendly and is awesome with everyone.
* No
* N/A
* No, doing just perfect!
* More direction in the Engineering station. Have examples of what the kids could build.
* N/A
* The program was great with lots of variety at the stations! Thanks so much for tickets!
* No, he says he enjoyed all the activities.
* More activities!
* More than one staff per activity for more hands-on help with STEM activities.
* Broader ways to tinker with
* No
* advertising
* No
* I don't know
* more time to keep playing
* Yes - y'all can make stuff for us to take home
* nope
* no
* no
* Better advertised so that we don't miss any of them
* Make robots to take home...per grandson
1. Optional: What is the zip code where you live? **(n=23)**

|  |  |
| --- | --- |
| 4% (1) | 43528 |
| 30% (7) | 43605 |
| 4% (1) | 43606 |
| 9% (2) | 43607 |
| 22% (5) | 43608 |
| 9% (2) | 43609 |
| 4% (1) | 43611 |
| 9% (2) | 43612 |
| 9% (2) | 74608 |

1. Please note for the survey in December 2022 the age categories were different based on the *expected* ages of participants. Fully 100% of youth (n=5) selected ages 10 – 13. [↑](#footnote-ref-2)
2. During program Year 3 a greater percentage of students agreed that “Imagination Station makes me want to learn more about doing science” (96%), “I know more about doing science because of Imagination Station” (89%), “I now know more about Imagination Station as a place to learn science” (88%), and “I am more interested in STEM” (81%). [↑](#footnote-ref-3)