



**NISE Network Diversity, Equity, Accessibility, and Inclusion Booklet:**  
Tools for Engaging Communities and Incorporating  
DEAI Practices into Informal STEM Projects



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## About This Booklet

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### Why diversity, equity, accessibility, and inclusion?

Many of our organizations' missions and visions aim to be for *everyone*, but until we recognize and actively work to address and remove systemic barriers that prevent full participation based on socioeconomic status, race, gender, power, ethnicity, location, or religion, we cannot claim to be truly essential and relevant. Focusing efforts and resources and building and developing better practices around diversity, equity, accessibility, and inclusion (DEAI) can be part of the solution. DEAI work promotes critical and sustainable values for informal learning institutions to pursue. These principles are not only pillars of ethical and morally courageous work; they also signal how our institutions can remain relevant and inclusive to an ever-diversifying US population and our local communities.

### Purpose and intended audience

DEAI work is an ongoing and iterative process that requires time and commitment. The purpose of this booklet is to provide you with practical tools to support your journey to a more relevant, inclusive, and equitable organization. These materials are developed for informal educator staff and volunteers at museums, science centers, children's museums, natural history museums, and planetariums. It may also be useful for staff and volunteers working with similar informal education institutions such as zoos, aquariums, botanical gardens, nature centers, parks, and libraries. The tools in this booklet are designed to work both as a complete set and as stand-alone tools. Depending on where you, your coworkers, and your partners are, some of these tools will be more relevant than others. You may revisit

some of the tools over and over, use specific elements piecemeal, or just share resources or reflection questions as you engage in this work and deepen your relationships.

Within each of the tools, you'll find brief descriptions and discussions, activities and planning exercises, and other resources you can use to incorporate DEAI practices into your project and at your organization. The tools are designed with flexibility in mind to accommodate a broad range of projects, institutions, professionals, and public audiences. They are not a comprehensive resource for DEAI concepts and practices, for which many excellent web resources and print publications exist.

### Raising awareness of DEAI practices at your museum

Together we can examine current practices and use innovative approaches to determine a collective path forward. Achieving sustainable equity in our institutions requires embracing systems knowledge and complexity, and a long-term commitment to meaningful, actionable, measurable change. We want to put you, your organizations, and your communities at the center of this conversation. More than solutions, we want to offer a space for active listening, reflection, interrogation, creation, evolution, innovation, and sustainability.

## Level of Operations for DEAI Related Goals and Outcomes

*From the NISE Network DEAI Landscape Study, 2021, developed in partnership with the Education Development Center.*

### System

- Change is across institutions
- Change is dynamic, cumulative among institutions, durable, and vital to genuine long-term, genuine progress
- Equip the field with resources and capacity to respond at the local level

### Organization

- Must address foundational elements, such as vision and values, leadership, governance and resources, as well as functional elements such as HR and operations
- Leadership is essential to organizational change
- Imperative that DEAI is not siloed, but core to mission and success
- Can be considered affirmative, with aims of increased access and participation in existing structure, or transformative, with changes to internal culture and process

### Program

- Focus is on integration and inclusion of community voice and perspective, shared ownership, and culturally responsive pedagogies
- Align with the STEM education ecosystem and community needs and priorities

### Individual

- Personal work to identify and address unconscious/implicit biases
- Professional development to build capacity to work with diverse communities

### Cross-Level

- Data collection and evaluation to inform DEAI efforts and progress
- Uncover and address community perceptions of museums and other cultural institutions

As the NISE Network continues to move forward in our efforts to inspire and support a lifetime of STEM engagement, we seek to ensure that our work embodies the principles of diversity, equity, accessibility, and inclusion (DEAI). For our organizations to evolve, we need to position DEAI as core to all of our organizations' missions and successes—not siloed within a specific initiative, individual, or program. DEAI work requires a layered and sustained approach.

The tools and resources in the booklet provide a chance for us all to learn with and from each other. The **reflection questions** can assist you and your teams in thinking through key concepts and planning next steps, and have been translated into Spanish to recognize and support that this professional work happens in multiple languages. Genuine listening, inquiry, and reflection promote trusting relationships and a safe, respectful, and supportive work environment, particularly in times of complex change. Asking deliberate questions can help teams overcome barriers, uncomfortable silences, and awkward exchanges regarding power and privilege in order to move the work forward. The additional resources listed in each tool offer more in-depth content to explore concepts and develop your professional practice.

Many individuals and organizations have shared ideas, resources, lessons, and daily work to help define this path. More than specific direction, this resource is intended to assist you in your local work and programming efforts by sharing what works and where there are challenges to help you make informed changes. These tools are meant to be used and adapted by you and your communities, and will evolve over time as we continue to learn more and integrate new research and knowledge into our practices.

### **What is the NISE Network?**

The National Informal STEM Education Network (NISE Network) is a community of informal educators and scientists dedicated

to supporting learning about science, technology, engineering, and math (STEM) across the United States. Our mission is to bring people together to engage in STEM, understand our world, and build a better future for everyone. The NISE Network fosters collaboration and draws on the collective strengths of our partners.

We achieve our reach and impact through the participation of over 700 partner organizations in Network activities—including museums, universities, and other organizations that provide informal learning opportunities for public audiences. Network projects create educational materials and support professional learning, while Network partners implement project activities locally, engaging 15 million people each year in high-quality STEM learning. As a

professional community, we are committed to learning alongside each other and our partners, and to evolving the way we work as a result.

### **Space and Earth Informal STEM Education (SEISE) project overview**

The NISE Network's Space and Earth Informal STEM Education (SEISE) project raises the capacity of museums and informal science educators to engage the public in Heliophysics, Earth Science, Planetary Science, and Astrophysics and their social dimensions. Through the SEISE project, the NISE Network has created four hands-on activity toolkits and a small-footprint exhibition, and has offered a variety of professional development

### **List of tools**

- Defining Diversity, Equity, Accessibility & Inclusion in Your Project
- Social Identity & Perspective
- Building Inclusive Teams
- Equity & Inclusion in Community Engagement
- Partnership Approaches & Strategies
- Culturally Responsive Programs
- Collaborative Program Development
- Multilingual Engagement
- Working with Indigenous Communities
- Inclusive Design

resources. Learn more about the project and find links to educational products and professional development resources at <https://www.nisenet.org/space>.

The SEISE project is part of the Science Activation (SciAct) program of the NASA Science Mission Directorate. SciAct projects are working together to implement a new strategic approach to engaging learners of all ages in NASA science education programs and activities. SciAct projects connect NASA science experts, real content, and experiences with community leaders to provide opportunities to do science in ways that inspire participants by promoting a deeper understanding of our world and beyond.

### **Earth & Space Project-Based Professional Learning Community**

As part of the SEISE project, the NISE Network brought together 100 partner organizations to participate in a project-based professional learning community focused on making Earth and space science relevant and inclusive for their local community. This learning community provided a chance to learn with and from each other and to support partner efforts for a more equitable STEM future for all of our local communities. Each participating partner organization developed a project that aligned with their organization's mission to increase relevancy and inclusion for Earth and space science. Many of the case studies featured in this guide come from these partner projects.



## Comprehensive resources for engaging in DEAI work

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- Get started with the Inclusive SciComm Starter Kit, which summarizes responses from focus groups conducted during the 2019 Inclusive SciComm Symposium: [https://inclusivesciemm.org/files/ISC-Starter-Kit\\_FINAL.pdf](https://inclusivesciemm.org/files/ISC-Starter-Kit_FINAL.pdf)
- Read the [Art of Access, A practical Guide for Museum Accessibility](#) by Heather Pressman and Danielle Schultz. 2021, Rowman & Littlefield Publishers.
- Explore resources curated by the Empathetic Museum to think about how museums are positioned in our culture and society: <http://empatheticmuseum.weebly.com/>
- Delve into the CAISE Broadening Participation Toolkit developed to support science engagement professionals in efforts to promote STEM: <https://www.informalscience.org/broadening-perspectives>
- Explore resources from the Museum as Site for Social (MASS) Action Toolkit, a comprehensive guide that provides tools for creating greater equity within the museum field: [https://static1.squarespace.com/static/58fa685dff7c50f78be5f2b2/t/59dcdd27e5dd5b5a1b51d9d8/1507646780650/TOOLKIT\\_10\\_2017.pdf](https://static1.squarespace.com/static/58fa685dff7c50f78be5f2b2/t/59dcdd27e5dd5b5a1b51d9d8/1507646780650/TOOLKIT_10_2017.pdf)
- Participate in or learn more about the work of Of/By/For All Change Network aimed at supporting institutions to become more inclusive and equitable: <https://www.ofbyforall.org/>
- Explore the YESTEM Equity Compass tool for supporting socially just practice developed by the YESTEM Project UK Team (2020): <https://yestem.org/wp-content/uploads/2020/10/EQUITY-COMPASS-YESTEM-INSIGHT.pdf>
- Assess yourself and your organization in terms of placing equity and inclusion as core to your work through the DiverSci website: <https://www.diversci.eu/strategy/>
- Engage with a free online professional development curriculum from Project READY: Reimagining Equity & Access for Diverse Youth: <https://ready.web.unc.edu/>
- Get grounded by reading the National Landscape Study: DEAI Practices in Museums conducted by the Garibay Group on behalf of CCLI (Cultural Competence Learning Institute): <https://community.astc.org/ccli/about-us/landscape-study>

## Defining Diversity, Equity, Accessibility & Inclusion in Your Project

Co-crafting a shared understanding of key language with local partners and your team

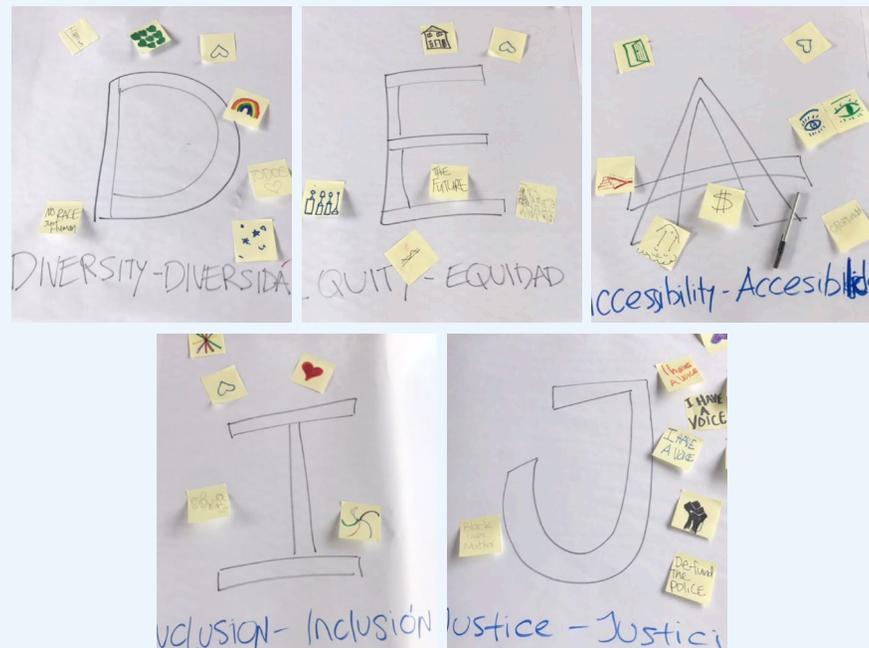
Taking the time to initiate a conversation about language and achieve shared understanding within your team is an essential first step to engaging in equity-focused work. People often get tripped up on definitions for *diversity*, *equity*, *access*, *inclusion* (DEAI), and other key words and concepts such as anti-racism and integration. We all sometimes struggle with how to use these terms comfortably to set goals and action plans for ourselves, our work, and our organizations. Universally agreed-upon language on issues relating to racism and exclusion is virtually nonexistent, so it's critical to work together as a team (preferably including partners and participants from your community) to develop the language you'll use collectively in an inclusive and relevant way.

This tool is designed to help you and your team take ownership of defining the language you will use together to develop a shared understanding of DEAI.

## Creating a Shared Understanding

Maritza Arango, Oregon Museum of Science and Industry (OMSI), Portland, OR

A team of OMSI museum staff and members of the Latino Network, an organization that works with members of the Latin American diaspora, created a shared understanding of DEAI+J as key terms. After a day of activities and community engagement, they came together to build and discuss how each person understood diversity, equity, access, inclusion, and justice. On large sheets of paper, the group defined these terms together. They then investigated these definitions to think about how they could co-create equity and inclusion practices for this particular community.



### Let's try this

One way to start developing a shared understanding is to invite team members (perhaps internally first, and then with any community partners or collaborators) to share their own definitions of diversity, equity, access, and inclusion. This may reveal that some individuals lack a clear way to distinguish between these terms or that significant differences in definition exist between individuals. That's OK! Understanding these differences is essential to establishing mutual respect among everyone in your community and to creating an inclusive environment for your staff and collaborators. Your group may also want to include other meaningful words in this exercise. Consider adding **belonging** or **justice** or other keywords and terms you prefer or use in your work. If you are unsure where to start, explore the resources at the end of this section to see how other organizations have approached this topic.



## Defining Diversity, Equity, Accessibility, and Inclusion

### Individually

Write down the keywords your team has decided to discuss on a piece of paper. Now define them yourself. Write buzzwords, bulleted definitions, or whatever comes to mind.

#### *What do you notice?*

Are there clear differences between the terms? Is there overlap?

Do you feel able to explain how they all relate?

Working through your own understanding of the differences between diversity, equity, accessibility, and inclusion can help bring further clarity to your conversations.

### As a team

Next, share your definitions with the team and actively listen to what your coworkers have to say! This is especially important within the context of our project work and partnerships.

#### *Discuss as a team:*

What are the interconnections and relationships between the terms?

How does equity support access, diversity, and inclusion? What concepts are missing?

For whom are you creating a more inclusive and equitable environment?

What systemic barriers exist that may limit or block any diversity efforts you're taking?

## REFLECTION QUESTIONS

1. “DEAI,” used as a lump term, can be shorthand for all the efforts institutions take toward serving and engaging marginalized groups within their communities. How do each of these concepts work together to contribute to a more equitable system? When might it be beneficial to consider these concepts separately and together?
2. How could you work with your partners or local communities to co-create your own shared definitions of DEAI and other important terms? What strategies do you have in mind to facilitate the conversation?
3. What other terms or frameworks do you want to consider? Does your team want to consider and define additional words such as *justice*, *racist*, *anti-racist*, *belonging*, or *welcoming*? How can you continue this conversation about words and language?

## PREGUNTAS DE REFLEXIÓN

1. “DEAI” (por sus siglas en inglés: Diversidad, Equidad, Accesibilidad e Inclusión), es un término que resume los esfuerzos institucionales necesarios para servir y crear participación de los grupos marginalizados de las comunidades que la institución atiende. ¿Cómo se coordinan estos conceptos para contribuir a un sistema más equitativo? ¿En qué situaciones podría ser beneficioso considerar o utilizar cada uno de estos conceptos por separado y cuándo en conjunto?
2. ¿De qué manera se podría trabajar con las comunidades y aliados locales para co-crear nuestras propias definiciones de DEAI y otros términos igualmente relevantes? ¿Qué estrategias tienes en mente para facilitar esta conversación?
3. ¿Qué otros términos o estructuras le gustaría tener en consideración? ¿En su equipo se consideran o definen con las ideas de justicia, antirracismo, pertenencia y/o acogimiento? ¿Cómo podría continuar esta conversación sobre el lenguaje y la asignación de palabras?

## Related resources for defining and developing DEAI language

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### Looking for a place to start with definitions and language?

- The *Facing Change: Insights from AAM's DEAI Working Group* report, available for download from the American Alliance of Museums, includes a set of definitions for D, E, A, I: <https://www.aam-us.org/programs/diversity-equity-accessibility-and-inclusion/>
- The *Awake to Work to Woke* publication, available for download from Equity in the Center, has a useful glossary of terms on page 24: <https://equityinthecenter.org/aww/>
- Racial literacy key terms and definitions from The Conscious Kid: <https://www.theconsciouskid.org/racial-literacy-key-terms>
- Read a short article by contributor Talia Milgrom-Elcott about the importance of Belonging in STEM education: <https://www.forbes.com/sites/taliamilgromelcott/2022/01/14/the-surprise-ingredient-to-stem-success-belonging/>

**Explore some of the many resources** created by the Smithsonian's National Museum of African American Culture and History. We suggest starting with:

- "Talking About Race," a collection of resources for educators and others to establish conversations about race: <https://nmaahc.si.edu/learn/talking-about-race>
- "Being Antiracist" overview page: <https://nmaahc.si.edu/learn/talking-about-race/topics/being-antiracist>
- "What Does It Mean To Be Antiracist?" handout from *Racial Healing Handbook: Practical Activities to Help You Challenge Privilege, Confront Systemic Racism, and Engage in Collective Healing* by Anneliese A. Singh, PhD, LPC: [https://nmaahc.si.edu/sites/default/files/downloads/resources/racialhealinghandbook\\_p87to94.pdf](https://nmaahc.si.edu/sites/default/files/downloads/resources/racialhealinghandbook_p87to94.pdf)
- A short video on the concept of intersectionality: <https://youtu.be/X5H80Nhm20>

**Watch a two-minute video**, "How to be an Antiracist" with Ibram X. Kendi: [https://youtu.be/\\_OXMgA0Fwsk](https://youtu.be/_OXMgA0Fwsk)

**Read the book** *Stamped from the Beginning: The Definitive History of Racist Ideas in America*, by Ibram X. Kendi: <https://www.ibramxkendi.com/books>

## Social Identity & Perspective

Exploring social identity, privilege, bias, and their potential impacts on educational programs

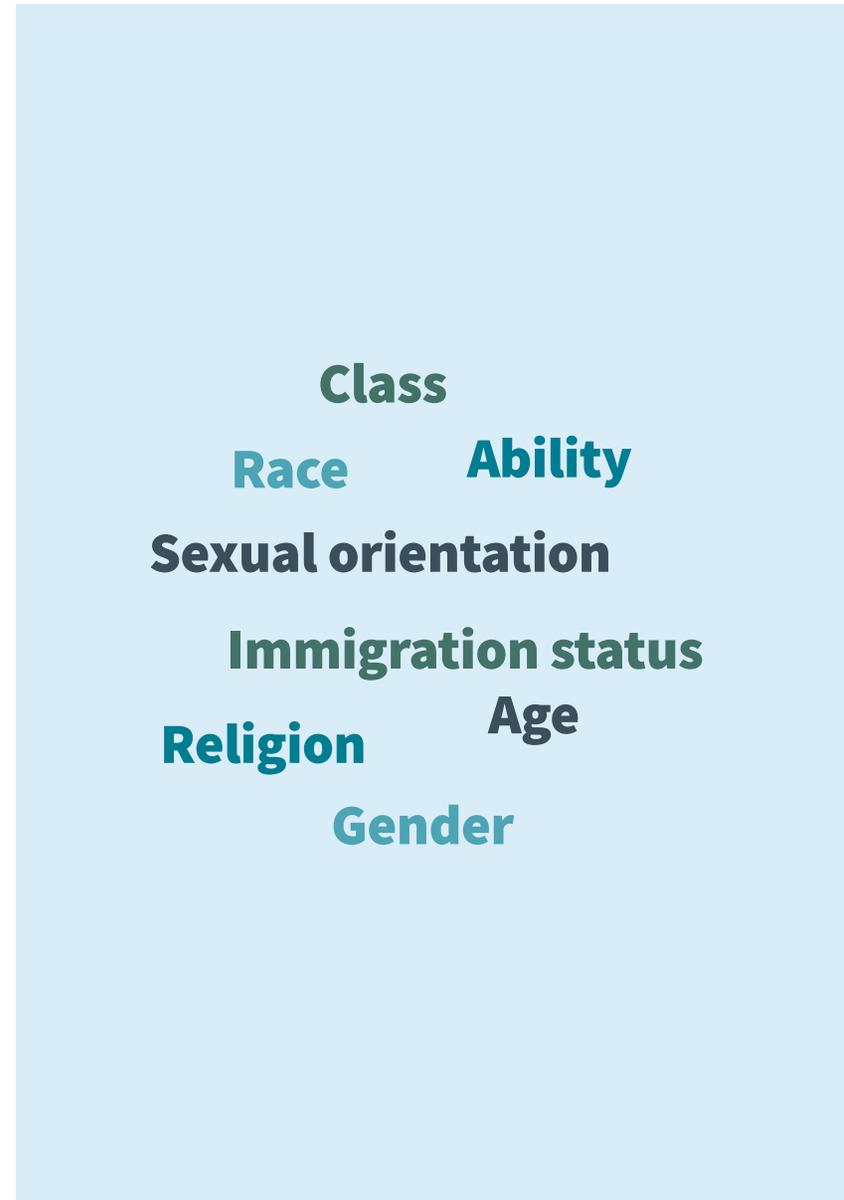
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Our own self-awareness is crucial to developing and facilitating inclusive educational programs. Successful educators take into account their own social identities and that of their audiences and teams to encourage engagement and meet the needs of everyone involved. Understanding how social identities impact us, as well as our audiences and teams, helps to ensure everyone involved with the program feels welcomed, respected, supported, and valued, which in turn can lead to better learning and engagement.

### Social identity

Social identities are a type of identity that are the “result of shared constructions and social relations based on human-created societal norms (Johnson, 2006 as cited by YW Boston). People identify in a variety of ways drawing from their identities to interact with the world. In creating educational programs, understanding your own social identity informs how to be inclusive. It helps us constantly question ourselves: how can this be universally understood or experienced? Some of the most common forms of social identity are shown here.

It is important to consider whether your project team includes anyone who belongs to the intended audience. Community partners or participants should be part of the development process and considered as possible leaders in the journey. That doesn't mean that people from other backgrounds shouldn't be included. However, there needs to be fair representation of the voices belonging to the intended audience or group to help validate and verify the content created.



### Let's try this

Print out this worksheet by YW Boston: <https://www.ywboston.org/wp-content/uploads/2020/10/Social-Identity-Activity.pdf>

This activity was created to help you gain insight into your own personal social identities and the level of social privilege attached to each. Keep in mind that the categories are not clear-cut, they intersect with each other, and that privilege manifests in different ways and to varying degrees. While the activity will not hold answers to making your program more inclusive, it helps to capture and visualize your identities and how they may align with unjust social systems. This activity is designed for personal growth, awareness, and reflection—it is not designed as a group activity.

### Unconscious bias

Understanding your social identity may also help to reveal biases you may have. Bias is not inherently bad; it reflects the human brain's evolutionary wiring to recognize patterns and assess threats based on what's going on around us. However, bias toward or against identities often leads to inequities and exclusionary practices in educational programs.

Bias toward or against social identities is one of the big stumbling blocks of DEAI work because it is often unconscious or implicit—in other words, not apparent. The level to which we are aware of our bias impacts our program audiences, so exploring your social identity can also help uncover biases you may have and how much you may need to overcome to practice cultural responsiveness.

## Social Identity Activity

eliminating racism  
empowering women

**yw**  
boston

### SOCIAL IDENTITY ACTIVITY

1. Color in the sections that coincide with your identity.
2. Star the outside of the circle at the location of identities that are invisible.
3. Put an exclamation point next to the identities that your perceived identity doesn't match how you feel.

If you are interested in taking a test that measures the strength of your biases on various topics, try taking an Implicit Association Test (IAT) by Project Implicit: <https://implicit.harvard.edu/implicit/takeatest.html>

## REFLECTION QUESTIONS

1. Think about how your personal identity/identities may influence the program you're developing or delivering. How do your identities show up in your program? How do you relate to your colleagues and audiences based on that?
2. Think about a time when unconscious bias may have affected a program you developed or delivered. What were the outcomes and lessons learned? How might you approach the program differently? What would you change, and how?
3. What are some harmful biases or stereotypes that may impact your community partners and participants? How might you engage your partners to ensure your programs don't perpetuate those biases or stereotypes?
4. How do social identities influence how visitors and participants engage in programs? How do you create a program that centers community identities, perspectives, and experiences? What steps do you need to take?

## PREGUNTAS DE REFLEXIÓN

1. Reflexiona acerca de cómo tu identidad/es personal/es pueden influir los programas que desarrollas o facilitas. ¿Cómo se reflejan estas identidades en tus programas? Con base en esto, ¿de qué manera te relacionas con tus colegas y audiencias?
2. Piensa en alguna ocasión en la cual tus preconcepciones hayan afectado un programa que diseñaste o facilitaste. ¿Cuáles fueron los resultados y los aprendizajes? ¿Cómo abordarías el programa de manera diferente? ¿Qué cambiarías, y cómo?
3. ¿Cuáles son los preconceptos o estereotipos negativos que pueden impactar a sus socios comunitarios y sus audiencias? ¿De qué manera podrías involucrar a tus socios para asegurar que tus programas no están perpetuando esos preconceptos o estereotipos?
4. ¿De qué manera influyen las identidades sociales en la forma como los visitantes y participantes se involucran en los programas? ¿Cómo creas un programa que se centre en las identidades, perspectivas y experiencias de la comunidad? ¿Cuáles son los pasos que se deben tomar? ¿Cómo creas un programa que se centre en las identidades, perspectivas y experiencias de la comunidad? ¿Cuáles son los pasos que se deben tomar?

## Related resources on identity, intersectionality, and bias

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- Check out “Your full self: Social identities and the workplace” by YW Boston for a deeper dive into personal social identity and social location. This resource was the basis for the above section on social identity:  
<https://www.ywboston.org/2020/10/your-full-self-social-identities-and-the-workplace/>
- Use other examples of identity wheel activities from the University of Michigan’s STEM Courses Inclusive Teaching Resources to encourage reflection on the relationships and dissonances between personal and social identities. Personal identity wheel: <https://sites.lsa.umich.edu/inclusive-teaching/personal-identity-wheel/>  
Social identity wheel: <https://sites.lsa.umich.edu/inclusive-teaching/social-identity-wheel/>
- Explore the *Diversity Toolkit* from the University of Southern California, which guides users in discussing identity, power, and privilege with working groups, teams, and organizations:  
<https://msw.usc.edu/mswusc-blog/diversity-workshop-guide-to-discussing-identity-power-and-privilege/>
- Listen to Mumu Fresh on NPR’s Tiny Desk Concert, specifically her last song at 14:00, “Say Her Name”:  
<https://youtu.be/ivR988qCPik>
- Review the Smithsonian National Museum of African American History and Culture page on “Social Identities and Systems of Oppression”: <https://nmaahc.si.edu/learn/talking-about-race/topics/social-identities-and-systems-oppression>
- Review Smithsonian National Museum of African American History and Culture’s “Talking About Race” page on bias. Suggested videos include the Jerry Kang’s TEDx Talk “Immaculate Perception” and Verna Myers’ TED Talk “How to Overcome our Biases”: <https://nmaahc.si.edu/learn/talking-about-race/topics/bias>
- Your choice of words affects how others perceive you, your program, and your institution. Refer to *A Progressive’s Style Guide* as a useful reference for communicating to and about diverse identities and other social topics.  
[https://s3.amazonaws.com/s3.sumofus.org/images/SUMOFUS\\_PROGRESSIVE-STYLEGUIDE.pdf](https://s3.amazonaws.com/s3.sumofus.org/images/SUMOFUS_PROGRESSIVE-STYLEGUIDE.pdf)

## Building Inclusive Teams

Integrating inclusion from within and from the start

It's important to build a team that reflects the communities you are trying to engage. Who we are defines our work and how others perceive us. Having a diverse and inclusive vision for your program builds trust in the communities you serve, especially when you reflect the voices of the audiences you serve from within your team and center nondominant cultural perspectives.

*“We feel safe and happy to bring our community to OMSI because we know that the families will feel comfortable having Latinas that speak in Spanish to them. It is a way to make us feel at home.”*

**—A member of the Latino Network about visits with the Oregon Museum of Science and Industry (OMSI)**

While an individual should never be expected to singularly represent a whole community, people (ideally multiple) from the intended target audience should always have a voice in the development or implementation of the project or activity. For example, if the project is being developed for target Latino/Latina/Latinx communities, people who identify as Latino/Latina/Latinx should be included, preferably leading the content development and delivery. This doesn't mean that professionals from other backgrounds can't participate; it means that priority is given to individuals that can represent the voices, interests, and questions of the intended audiences. This approach will provide the project with depth and culturally relevant experiences for both the public and professional participants.

## Institutional impact

Highlighting the importance of diversity and inclusion within the organization encourages a culture that validates each team member's authentic identity, welcomes them, and makes them feel that they belong in the project. Team members should feel empowered, included, and able to thrive professionally. This will in turn have a great impact on your communities, making audiences feel a better sense of representation and belonging. One of the best ways to build a diverse team is to start with a diverse and inclusive team of employees, but teams can also include the addition of volunteers, youth employees, community advisory members, or partners who are called on for specific roles based on influence, expertise, and experience.

Establishing inclusive and diverse teams also builds institutional capacity for DEAI, which is critical at all levels. It's worth noting that too often in our field, institutions make diverse hires for positions created with “community engagement” or “partnership” in the title—siloeing these positions and people and potentially limiting building inclusive teams across the entire organization. Compartmentalized DEAI hiring practices hinder the institution's overall efforts. As Jennings and Jones-Rizzi (2017) write, “the ultimate goal of diverse hiring is not to bring in people of color in order for the organization to continue as usual but to bring in diverse colleagues so that the organization achieves systemic change organically and internally.”



# How does having a diverse team impact the project's viability and relevance?

Motivates meaningful and diverse **conversations**

Creates more opportunities to reach out to diverse **communities**

Makes the team feel that **inclusion** is not just for participants

Collaboration within a multicultural team brings **different lived visions** to the museum and its projects

Ensures a **longer-lasting relationship** with the communities and their desire to collaborate with and support the museum's efforts



## REFLECTION QUESTIONS

1. Who are you developing this experience for? How will community members see themselves represented in the staff of educational programs and experiences that have been created?
2. “Target audience” is a common phrase used to define the community a program may intend to serve or belong to. How does the language we use show how we think about things or “other” people? How can we be more inclusive?
3. How are the voices of staff, volunteers, and collaborators representing diverse communities included in the planning of your project?
4. If you don’t have staff or volunteers that can represent your community audiences, what are some ways to address this issue? For example, could you recruit new volunteers, or could your community partner help by co-staffing your program?

## PREGUNTAS DE REFLEXIÓN

1. ¿Para quien estas desarrollando esta experiencia? ¿Cómo se verán representados los miembros de la comunidad en el personal de los programas y experiencias educativas que se han creado para ellos?
2. ¿De qué manera los empleados, voluntarios y colaboradores, representan la voz de diversas comunidades, incluso durante la planeación de los proyectos?
3. Si no tienes personal o voluntarios que pueden representar las comunidades de tu audiencia, ¿de qué manera puedes abordar esta situación? Por ejemplo, ¿podrías reclutar nuevos voluntarios, o será posible que los aliados comunitarios te ayuden a co-facilitar tu programa?

## Related resources on building inclusive teams

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- Read “Museums, White Privilege, and Diversity: A Systemic Perspective” by Gretchen Jennings and Joanne Jones-Rizzi, published in Dimensions, which reflects broadly on inclusion and diversity in the museum field: <https://www.astc.org/astc-dimensions/dimensions-special-edition-growing-toward-future-feel-welcome-heard/>
- Watch a recorded webinar from MuseumExpert, “Diversity is the Bare Minimum”:  
<https://www.youtube.com/watch?v=GLGPwTZHxnl>
- Explore the Free Management Library’s section on valuing diversity. It includes self-assessments, team-building exercises, and resources on teaching tolerance, building trust, and managing conflict.  
<https://managementhelp.org/interpersonal/multicultural-diversity.htm>
- Use the DiverSci website to assess yourself and your organization on indicators for a diverse staff:  
<https://www.diversci.eu/staff/>

## Equity & Inclusion in Community Engagement

Building trust, deepening relationships, and creating sustainable change

*“There are so many kids in this country who look at places like museums and concert halls and other cultural centers and they think to themselves, well, that’s not a place for me, for someone who looks like me, for someone who comes from my neighborhood.”*

– Michelle Obama

Being intentional and committed to inclusion, equity, diversity, and accessibility is critical to supporting relevant and inclusive programming in our local communities. Questioning current practices, reinventing, and innovating the ways we all commit to equity-focused programs is a vital step in redefining how our organizations function within our communities and how we create thriving and generous learning spaces for all individuals. Whole communities deserve to feel included and represented in the work we do, but historically this hasn’t been the case. Many Black, Indigenous, and People of Color (BIPOC) as well as immigrant and refugee communities are marginalized from mainstream science practices, including museums. This is not to say that BIPOC communities have not been engaged in science, but their practices, ideas, and discoveries have not been equally represented or acknowledged in our society, platforms, and public spaces. There are many scientific principles that come from these communities, and there is a lot of scientific knowledge to learn from our ancestors, and other communities’ ancestors.



### Community engagement exists along a spectrum.

A useful way to frame that range is along a flow of shared leadership. As learning institutions, we likely engage with our audiences and community participants across the continuum. Collaborating with partners can be thought of this way as well.

# Increasing level of community-driven involvement in learning experiences

TRANSACTIONAL ENGAGEMENT	TRANSITIONAL ENGAGEMENT		TRANSFORMATIONAL ENGAGEMENT	
<p><b>Outreach</b></p> <p>Some community organization involvement</p> <p>Communication flows from one to the other, to inform</p> <p>Provides community with information and experiences</p> <p>Entities co-exist</p> <p>Outcomes: establish communication channels and venues for outreach</p>	<p><b>Consulting</b></p> <p>More community involvement</p> <p>Communication more back and forth, answer seeking</p> <p>Feedback from the community</p> <p>Entities share information</p> <p>Outcomes: develops connections</p>	<p><b>Involving</b></p> <p>Better community involvement</p> <p>Communication flow both ways, participatory</p> <p>Community involved on issues, topics, format and content</p> <p>Entities cooperate</p> <p>Outcomes: Visibility of partnership, established modes of cooperation</p>	<p><b>Collaborating</b></p> <p>Community involvement</p> <p>Bi-directional communication flow</p> <p>Community is integrated in each aspect of the project from development to implementation</p> <p>Outcomes: partnership and relationship building, trust building</p>	<p><b>Sharing Leadership</b></p> <p>Strong multidirectional relationships</p> <p>Final decision-making is community level</p> <p>Strong partnership structures</p> <p>Outcome: Deeper community sense of belonging and ownership over the experiences and learning</p>



*Adapted from the [International Association for Public Participation](#)*

### Let's try this

As a team, think about where you most often fall in terms of outreach, consulting, involving, collaborating, and sharing leadership with your community. Together, generate some specific examples of programming at your organization for each of these categories in conversation or on a separate piece of paper.

## Examples of Community Engagement Work

<b>Outreach</b>	<b>Consulting</b>	<b>Involving</b>	<b>Collaborating</b>	<b>Sharing Leadership</b>
<i>Example:</i> School family Science Nights	<i>Example:</i> Expert advisors	<i>Example:</i> Prototyping w/visitors and community participants	<i>Example:</i> Advancement team developing shared goals for grant partnership with partner organizations	<i>Example:</i> Museum & Head Start Partnership: teacher training and family engagement events

How does shared leadership support or hinder your project goals?

Do you and your partners all have the same desire for shared leadership?

How does it support or hinder your DEAI goals and practice?

How can you take appropriate steps toward sharing more leadership and decision-making in your work as appropriate?

## Life Finds a Way

Peregrine Bratschi, Museum of Life and Science, Durham, NC

Our Earth & Space project, Life Finds a Way, centers on the questions about the past and future of life on Earth, and the relationship between humans and our universe. Co-developers from our community partners created, evaluated, and facilitated programs about a topic of their choosing.

We first assembled a Youth Advisory Council (YAC), a review board of youth with whom we built rapport and constructed shared values, which we used to build a program evaluation tool.

We worked with our community partners at Brogden Middle School, a Title 1 school about a mile from the museum, and their Encore! afterschool program. Our community partners at Durham Children's Initiative (DCI), a workforce development organization for low-wealth families in Durham, connected us with a pool of high schoolers who applied for our two available paid internships.



Rather than selecting these interns for their facilitation experience or science expertise, we asked applicants for a personal statement about their interest in sharing science with others. Over a six-week period, we worked with our interns to train on facilitation and program building, research activities in the NISE Net library, and to expand upon an existing program to make it more relevant and accessible to broader audiences.

The interns facilitated their program with the YAC, and the YAC in turn completed an evaluation to assess the program's relevancy and accessibility. After the evaluation, the interns finalized their program and facilitated it in English and Spanish with museum visitors as a part of the museum's NCSciFest celebration. As per the interns' design, visitors created milk nebulae, paint nebulae, and made constellation cards and constellation-viewers.

Fair compensation is an essential part of sustaining the co-creative process and building trust and long-term partnerships. Co-creating a program also necessitates honoring the lived expertise of partners, not only the professional experience of museum educators. It is paramount to examine and challenge assumptions and systematic barriers that too often exclude these perspectives. We hope to engage a YAC and new interns in the coming school year in a continued effort to make programs not for, but *with* our communities.

## REFLECTION QUESTIONS

1. Are you already authentically involving community participants in planning, implementing, or sustaining the program? What does this look like and who leads various aspects of the project?
2. What does your end product look like, and what strategies do you have in mind to make visible the voices of the community and program participants?
3. How would you make sure that the exchange between individuals and organizations feels and is fair and just?
4. How are you building trust with your partners and community members?

## PREGUNTAS DE REFLEXIÓN

1. ¿Ya estás involucrando a los miembros de la comunidad de manera auténtica en la planeación, implementación o manteniendo el programa? ¿A qué se parece y quiénes estarían a cargo de los diferentes aspectos del proyecto?
2. ¿A qué se asemejaría el producto final, y qué estrategias tienes en mente para hacer visibles las voces de la comunidad y los participantes del programa?
3. ¿De qué manera asegurarías que el intercambio entre individuos y organizaciones es y se siente justo y equitativo?
4. ¿Cómo te estás ganando la confianza de tus socios y los miembros de la comunidad?

## Related resources for community engagement

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- Explore the STEM Racial Justice resources, created by Science Museum of Minnesota, for partnering with community groups and communities through an anti-racist lens: <https://sites.google.com/smm.org/stem-rj/home>
- Situate and assess your work in the broader context by using tools from the Equity Compass designed to support socially just practice developed by the YESTEM Project UK Team (2020): <https://yestem.org/>
- Review the Equity and Inclusion Framework that outlines specific strategies and tactics aligned with Broadening Participation, Youth-Centric, and Skill Development programming from the National Girls Collaborative Project and the STEM Next Opportunity Fund:  
<https://stemnext.org/wp-content/uploads/2020/11/Equity-and-Inclusion-Framework-11-24-20.pdf>
- Read *Environmental Education in Latino Communities: Sharing Experiences*, an ebook (in English and Spanish) that includes findings and recommendations from Celebrating Urban Birds, a community-based project to engage diverse urban populations in science and science investigation:  
<https://celebrateurbanbirds.org/resources/collective-ebook-comes-light/>
- Explore the *Project READY: Reimagining Equity & Access for Diverse Youth* free online professional development curriculum. The primary focus of the curriculum is on improving relationships with, services to, and resources for youth of color and Native youth: <https://ready.web.unc.edu/>
- Appreciate and promote examples of scientific achievements of BIPOC communities through some of the stories shared by *STEAM the Streets* through music and videos: <https://youtu.be/3FCFXht1P0o>; <https://youtu.be/LcfsMwsw5R0>

## Partnership Approaches & Strategies

We can do more together than we can achieve on our own

Every partnership between your team or organization and another differs in breadth, depth, and length. No one kind of partnership is necessarily better than another. It's useful, though, to view partnerships as a continuum of possibilities, with scopes ranging in intensity from informal networking to a more complex collaboration. The intensity of a partnership and the interdependent relationship between two organizations can vary over time and across projects.



Working closely with partners invites depth and a better understanding of our audiences. Community-based organizations often have access to spaces and knowledge that museums and other institutions do not. Teaming up with them provides the opportunity to do things that we couldn't do on our own. Community organizations generally establish trust with their audience through years of engagement and have a deep understanding of their community from within, including language, culture, preferences, and customs.

By partnering with communities, schools, and local organizations, particularly those aimed at serving Black, Indigenous, and People of Color (BIPOC), low-socioeconomic-status immigrant and refugee groups, and people who identify as LGBTQ or have physical and neurological disabilities, museums and informal science centers can increase their impact by combining resources and knowledge.

### There are many reasons to partner, but they can be summed up in just a few:

- To listen and learn from your community to develop more relevant practices and experiences
- To build upon existing strengths and deepen personal relationships and connections
- To connect with and serve new audiences
- To make informal science education more equitable and accessible
- To bring visibility to science practices that have been or are marginalized

Establishing new relationships and partnering with other organizations takes time, intention, resources, and planning, but it is the best investment a project and institution can make! The project, the field, and individual people will all benefit from integrating a diversity of voices and perspectives. The level of intensity for each partnership varies according to what's appropriate for each unique relationship and project, and at each stage of program development.

## Tips for building partnerships with communities, organizations, and individuals

Partnerships are built on trust and must be nurtured to evolve and grow. Start building community relationships now—or better yet, before you need them. Begin with conversations that explore the partner’s strategic and operational goals and objectives, and discuss where there might be synergies.

### Purpose

- Approach the partnership with humility—you may have a lot to learn.
- Be ready and willing to listen, ask questions, apologize, clarify, and make space for conversations.
- As you work together, keep your long-term relationship in mind; by continuing to leverage your combined resources and strengths, you can each do much more for your community.

### Commitment

- Make time to get to know your partner organizations and communities to establish a solid foundation for building your relationship.
- Familiarize yourself with your partner’s organization by visiting their website, reading their newsletters, and learning about their events.
- Lock down meeting times that work for everyone’s schedules and be dependable; be prepared to adapt to your partner’s rhythm rather than asking that they adapt to yours.

### Structure

- Allow your partner to determine and define the best way to intersect based on their organization’s priorities.
- Involve more than one contact person at each organization at different levels to ensure the relationship can adapt to changing circumstances and turnover.
- If you are working on a short project that doesn’t allow the time to build a new relationship, consider partnering with organizations or communities that you have an established positive history with.

### Communication

- Establish a timeline, resources, and activities for facilitating communication. Keep track of the conversations and updates, and make sure everyone receives shared documents.
- Learn what means of communication best suit your partner’s organization (e.g., email, text messaging, videoconferencing, etc.) and check in regularly to make sure they are being accommodated.

### Process

- Be clear about your goals and expectations. Consider what’s really in it for each partner and decide on common goals to establish a mutually beneficial relationship. Check in regularly with your partner to be sure there is continued alignment.
- Occasionally review the original goals of the partnership and project and consider if it’s necessary to improve, change course, or evolve the relationship.
- Be open to making changes to scope and budget based on your partner’s feedback and needs.
- Consider ways to thank your partners for their contribution and expertise through grant funding, stipends, gift cards, memberships, or special events.

# Museum-Community Partnership for Early STEM Learning

Annie Gordon, Sciencenter, Ithaca, NY

For the Making Earth & Space Relevant and Inclusive Project-Based Professional Learning Community, the Sciencenter built on our existing relationship with our local Head Start agency, teachers, and families to create Earth science themed programs and teacher professional development. For nearly a decade, the Sciencenter has been able to support our overall mission by empowering parents, caregivers, and early childhood educators to integrate science, technology, engineering, and math (STEM) into everyday activities for preschool children.



Fitting into our existing partnership structure, the Sciencenter worked alongside the Tompkins Community Action (TC Action) Head Start/Early Head Start to discuss current research in early childhood cognition and

introduce hands-on science activities that educators can utilize in their own classrooms. Educators may replicate or adjust activities to meet the needs of their classroom while putting research-based principles to work. Additionally, we were able to support this work through Family Engagement Workshops at the museum co-facilitated by the museum and TC Action staff. At these evening events, caregivers and their children work together on hands-on activities that make visible and encourage development of science process skills in young children.

By strengthening existing partnerships with local daycare centers and preschools and expanding our reach with the Sciencenter's current

audience, this partnership builds the Sciencenter's capacity to meet the needs of our youngest guests by creating science literate, engaged adults who can inspire STEM learning at home, in school, and at the museum.

Over time, we have recognized several areas for improvement and modification to better meet the needs of our community partners and the audience we serve together. This has not only resulted in a positive, team-based atmosphere, but has also allowed the Sciencenter staff to build stronger, ongoing relationships with the educators. For example, the museum events were originally billed as parent training; they are now offered as "family" workshops open to parents and children to work and learn side by side. Parents are able to try activities and apply lessons immediately with their children and determine what works and what does not, and receive prompt response and support from Sciencenter educators and the TC Action teachers. Some teachers have been attending professional development workshops for a number of years. As the teachers have grown more comfortable with recognizing and teaching early childhood STEM, we have shifted the focus of the workshops to adapting STEM activities and encouraging teachers to share tips and practices.

Recent advances in early childhood science point to the immediacy of early learning experiences. These findings are a testament to the incredible learning potential of young children. As a well-used learning resource for families with young children, the Sciencenter is thrilled to enhance science education in our community by providing parents, caregivers, and educators with new opportunities to connect their children with science in the formative years.

## REFLECTION QUESTIONS

1. What are all the various partners' and stakeholders' needs, resources, and goals? What does each stakeholder bring to the table in planning and implementing the program?
2. Thinking about equity and inclusion from the start makes the project more sustainable. How fully supported is your project by the community you're working with? How could you really listen to what the community has to say and include their voices in developing the project?

## PREGUNTAS DE REFLEXIÓN

1. ¿Cuáles son las necesidades, recursos y metas de todos los variados socios y partes interesadas? ¿Qué es lo que las partes interesadas contribuyen en la planeación e implementación del programa?
2. Considerar la equidad y la inclusión desde el principio hace que el proyecto sea sostenible. ¿Qué tanto apoya a tu proyecto la comunidad con la que estás trabajando? ¿Cómo puedes realmente escuchar lo que la comunidad tiene que decir e incluir sus voces en el desarrollo del proyecto?

## Related resources for building partnerships

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- Read the NISE Network *Museum & Community Partnerships Collaboration Guide* to learn more about additional information, tools, and resources on how to establish and build trusted STEM collaborations:  
<https://www.nisenet.org/collaboration-guide>
- Explore the partnership and community science tools, workbooks, and resources created through the NOISE Project, a research project funded by the National Science Foundation led by communities that have been historically excluded from the sciences: <https://noiseproject.org>
- Review the Indian Arts Research Center’s website, *Guidelines for Collaboration*, intended as a resource for community members working in collaboration with museums. The guidelines were developed over a three-year period of collaboration between Native and non-Native museum professionals, cultural leaders, and artists:  
<https://guidelinesforcollaboration.info>
- Explore the Partner Power Framework from OF/BY/FOR ALL to build your capacity to develop authentic community partnerships: <https://www.ofbyforall.org/updates-feed/2018/12/10/partner-power-a-technique-for-building-more-authentic-community-partnerships-right-from-the-start>
- Review the status of your own institutional and community partnerships on the DiverSci website:  
<https://www.diversci.eu/partnership>

## Culturally Responsive Programs

Fostering an environment that centers the experiences and identities of learners

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To make educational programs inclusive, it's important to recognize and support learners' knowledge, experiences, cultural and other social identities, and worldviews. Asset-based approaches to learning focus on learners' cultural and personal resources as strengths rather than the misconception that learners lack knowledge or skill due to their different cultural and experiential backgrounds. For learning experiences to feel relevant to audiences and be truly engaging, there must be an opportunity to connect curriculum to lived experiences and cultural backgrounds.

### Culturally responsive pedagogical approaches

Researchers like Gloria Ladson-Billings, Geneva Gay, and Django Paris have generated frameworks for culturally relevant, culturally responsive, and culturally sustaining education. This body of literature is focused mostly on formal education, but can be applied to informal education. Shown here is a brief description of these three pedagogical frameworks, which are adaptable to the needs of your institution. The approaches are arranged by increasing depth of engagement with learners' cultures outside of white-dominant culture.

## Culturally Responsive Pedagogical Approaches

### Culturally Relevant Education

Culturally relevant teaching is a way to “empower students intellectually, socially, emotionally, and politically by using cultural referents to impart knowledge, skills, and attitudes.”  
(Ladson-Billings, 1994, p. 18 as cited in Moore, 2021)

### Culturally Responsive Education

Culturally responsive pedagogy sees BIPOC students' heritage and community cultural practices as resources to honor and explore, using the cultural knowledge, prior experiences, frames of reference, and performance styles of ethnically diverse students to make learning encounters more relevant to and effective for them.  
(Gay, p.36, as cited in Moore, 2021)

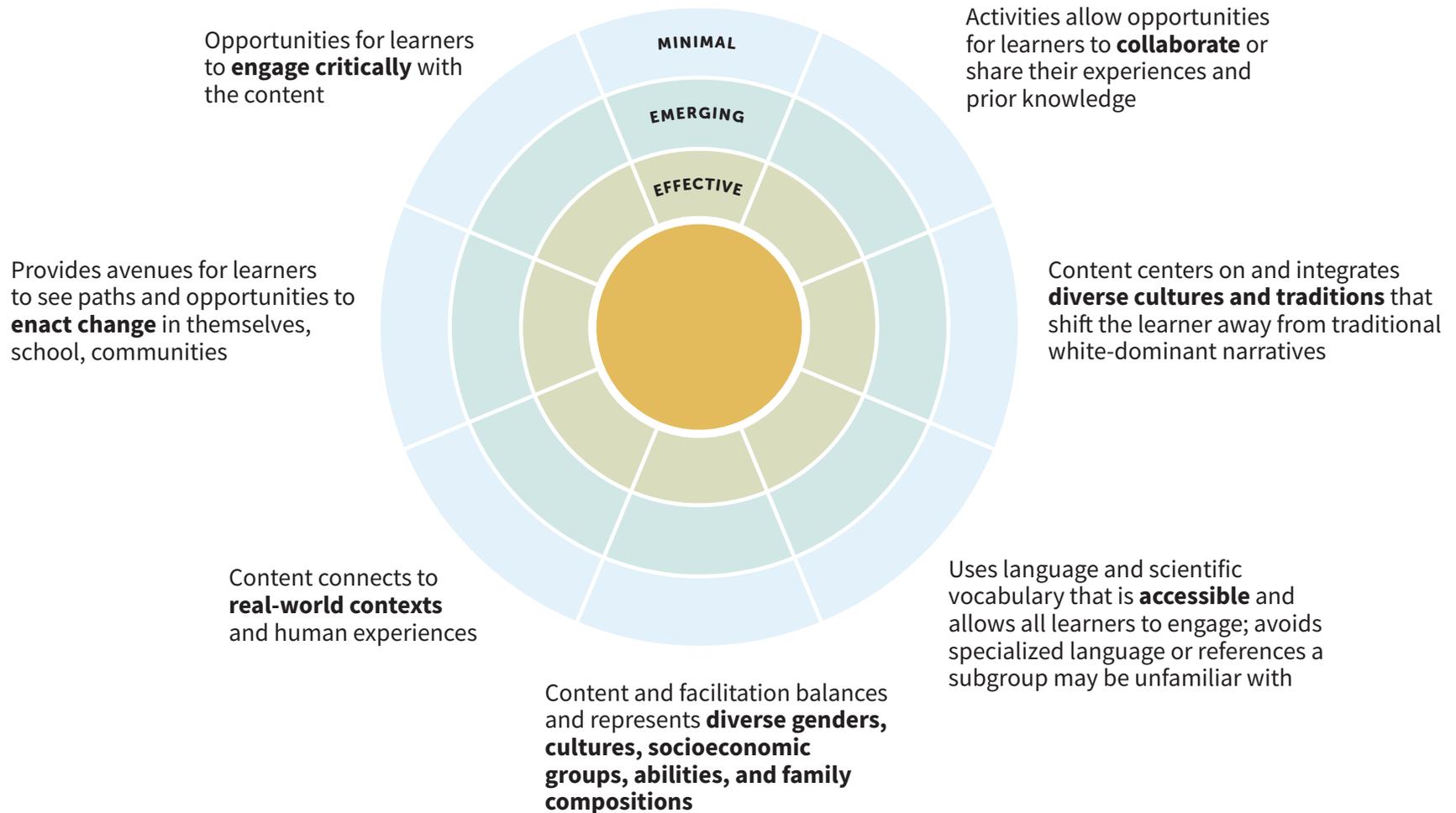
### Culturally Sustaining Education

Culturally sustaining pedagogy (CSP) further deepens upon culturally responsive education by honoring cultural knowledge, heritage, and practices as resources to honor, explore, and extend. “In addition to ensuring BIPOC students maintain their own heritage and community practices while gaining access to dominant practices, culturally sustaining pedagogy engages with students' youth culture practices and recognizes that youth are producers of culture as well as consumers . . . CSP seeks not only for students to maintain their own practices, but also to grow more critically engaged with them, seeing them as worthy of study themselves, rather than only seeing them as a bridge.”  
(Project READY, 2019)

## Let's try this

Think about how you develop and deliver your program. Consider the practices shown in the target below and mark them accordingly. How many practices are toward the center or toward the outer ring of the target? How might you move your program and practices closer to the center?

## Content Creation Target



Adapted from Oregon Museum of Science and Industry's Culturally Relevant Experiences Toolkit

## REFLECTION QUESTIONS

1. When you are planning, how do you make sure your program is relevant to your intended audience? How could you center the valued practices, languages, literacies, and cultural ways of your audiences?
2. What are some manifestations or examples that reflect your audiences that you can work into the program? Examples: props, materials, images, real-world experiences, significant dates.
3. How can you approach your program from asset-based perspectives and acknowledge community audiences and partners?
4. How can you incorporate opportunities for asset-based collaboration and critical engagement in the experiences you create?

## PREGUNTAS DE REFLEXIÓN

1. Cuando estás en la planeación, ¿cómo aseguras que tu programa sea relevante para la audiencia destinataria? ¿Cómo puedes centrar las prácticas valiosas, lenguajes, conocimientos, y las expresiones culturales de tus audiencias?
2. ¿Cuáles son algunas muestras y ejemplos que están reflejando a tus audiencias que puedes incluir en el programa? Por ejemplo: accesorios, materiales, imágenes, experiencias de la vida real, efemérides.
3. ¿Cómo puedes abordar tu programa desde una perspectiva basada en las capacidades y reconociendo a los socios y las audiencias de la comunidad?
4. ¿Cómo puedes incorporar oportunidades para la colaboración basada en las capacidades y en el compromiso crítico en las experiencias que creas?

## Related resources on culturally responsive education and programs

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- Read “What Does Asset-based STEM Learning Look Like?” by Raychelle Burks and Sunshine Menezes. Learn more about how to employ an asset-based approach to inclusive teaching practices:  
<https://www.informalscience.org/sites/default/files/BP-3-Asset-Based-STEM.pdf>
- Explore Asset-Based Community Development (ABCD) as an approach to sustainable community-driven development. ABCD’s premise is that communities can drive the development process themselves by identifying and mobilizing existing, often unrecognized assets:  
<https://www.nurturedevelopment.org/asset-based-community-development/>
- Dive deeper into the theory and research supporting culturally responsive education in the paper “Whose culture has capital? A critical race theory discussion of community cultural wealth” by Dr. Tara J. Yosso published in *Race Ethnicity Education*: [https://thrive.arizona.edu/sites/default/files/Whose%20culture%20has%20capital\\_A%20critical%20race%20theory%20discussion%20of%20community%20cultural%20wealth\\_1.pdf](https://thrive.arizona.edu/sites/default/files/Whose%20culture%20has%20capital_A%20critical%20race%20theory%20discussion%20of%20community%20cultural%20wealth_1.pdf)
- Participate in *Culturally Sustaining Pedagogy* by Project READY. This training module is part of a complete online professional development curriculum available free of charge:  
<https://ready.web.unc.edu/section-2-transforming-practice/module-17/>
- Read “But That’s Just Good Teaching! The Case for Culturally Relevant Pedagogy” by Gloria Ladson-Billings, published in *Theory Into Practice*: <http://www.jstor.org/stable/1476635>
- Read the NSTA article “Culturally Relevant and Culturally Responsive: Two Theories of Practice for Science Teaching” by Felecia Moore Mensah, *Science and Children*:  
<https://www.nsta.org/science-and-children/science-and-children-marchapril-2021/culturally-relevant-and-culturally>
- Learn about family-inclusive language through this helpful chart from Margaret Middleton, which provides an easy to use resource to help better incorporate family-inclusive language, as printed in the January/February 2016 *Museum* magazine: <http://ww2.aam-us.org/docs/default-source/resource-library/family-inclusive-language.pdf>

## Collaborative Content Development

Including and elevating stakeholder voices to make relevant and inclusive content

A collaborative development process produces a mutually valued outcome using a participatory approach that assumes some shared power and decision-making. Collaborative development aims to create rich and authentic experiences by informing the process from within and highlighting relevant stories and content. Collaborating with your partners and audience will ensure inclusion, meaningful engagement for learners, and personal relevance from voices having directly shaped the program or resulting product.

Different terms are used to define the collaborative, co-creative nature of a project. But what ultimately matters most is the relationship between you, your partners, and your audiences. The priority should be to have a process where people feel heard, partners feel valued, and the voices of the intended target audiences are truly represented in conversations and decisions. The goal is to create content that's genuine—when people read it or interact with it, the content feels like it was intended specifically for them.



## Considerations to establish a collaborative development process

- Make the effort to develop relationships and partnerships—nurture and sustain an authentic relationship before approaching a potential partner with an ask or need.
- Identify potential partners early on to allow enough time to review the project terms.
- Give potential partners an opportunity to define goals and provide input for creating the bigger picture. Partners are experts who bring their knowledge and experience to the table and should be accepted as equals/peers/colleagues in the process.
- Establish timeline, goals, expectations, and needs before the project begins and monitor them regularly during the development process to be sure they are being maintained.
- Compensate partners for their time and contributions. Invite your partners to openly share their feelings about the fairness of the collaboration and whether their needs and expectations are being met.
- When possible, invite staff or volunteers whose background or culture represents that of your partners to become involved in the project, either as part of the collaboration or through an internal capacity that allows for cultural awareness.
- Communication strategies and dynamics should be agreed upon to represent the preferences and customs of partners and implemented throughout the process. For example, if a partner organization serves a predominantly Spanish-speaking community, consider opportunities to conduct meetings or brainstorming sessions in Spanish.



## Let's try this

There are many processes used when developing programs or projects. How can you integrate collaborative practices through each step of your development process? Use the considerations above to guide your thinking as you complete the following worksheet.

## Product Development Model

### 1. You are part of the community

Listen to your partner, other community-based organizations, neighbors, and individual participants to build, nurture, and sustain relationships. Once we start actively listening, we can identify where and how we can collaborate.

### 2. Identify potential partners and community stakeholders

Who should be at the table and why are they there? How can you build trust and develop relationships? How is the work you're doing going to be mutually beneficial?

### 3. Define project goals and outcomes

Again, start by listening. How can goals and desired outcomes from partners be integrated into the project goals? What team exercise can you do to facilitate the process?

### 4. Research, analyze, and define

How can the content research process integrate culturally relevant practices from your target community? How can you integrate questions and ideas from partners?

## **5. Content development**

The voices and ideas of partners and community members should be palpable as people interact with the experience that's being developed. What parts of the content, including images, music, and colors, will reflect the community? How are partners involved throughout the development?

## **6. Evaluation and reflection**

What strategies will you use to evaluate your product? What questions will you ask to represent the voices of the partners? How would you remediate if the data shows that improvement is needed to represent the community?

## **7. Implementation**

How are partners participating in the implementation of the project? What roles are they playing and how are the roles defined?

# Layers of the Atmosphere Exhibition and Event

Kimberly Novak, Museum of Arts and Sciences, Macon, GA

The Museum of Arts and Sciences (MAS) co-created a new tactile exhibit on the Layers of the Atmosphere, including a claymation interpretive video alongside science and art students at the Georgia Academy for the Blind (GAB). With guidance from the NISE Network’s Earth & Space Project-Based Professional Learning Community, MAS co-developed engagement experiences alongside students and teachers from GAB to achieve a shared goal of increasing opportunities for greater awareness, understanding, and access for the visually impaired.

This project created many avenues for collaboration for the museum. As the work progressed, new partners joined us, specifically to support a culminating special event and exhibition opening. Partners from Mercer University designed and printed 3-D constellations for a special joint planetarium show to support understanding by the visually impaired and the visually acute. Colleagues from the College of Charleston and University of Edinboro sent additional copies of NASA’s tactile

books about the solar system. While typically not intended to be touched, several MAS art pieces were selected by the Curator of Art to share with GAB students. A special live animal show, developed with the MAS Animal Curator, was filled with touchable resources, including snake skins, fur pelts, turtle shells, teeth, and more. For the event and continued display, GAB used their braille machines to translate and create labels for various science and art objects throughout the museum.

For many of the high school students who visited the museum from GAB, this was their first experience at the museum—and they got to see and share materials they were involved with creating! Elements of this partnership will continue to be pointed out daily to visually acute school groups and other visitors to increase awareness and open a dialogue. The hope is that not only will the visually impaired feel welcomed at the museum, but that all visitors will leave with a better understanding of Earth & Space science and the value we gain from being open to diversity and more inclusive to all!



## REFLECTION QUESTIONS

1. How are you including relevant and representative community and key stakeholder voices in your project?  
Whose voices are missing?
2. What experiences do you have with co-creation processes, and what lessons could you apply from those experiences to your current project?
3. What would you add in terms of considerations and process?

## PREGUNTAS DE REFLEXIÓN

1. ¿Cómo estás incluyendo a tu proyecto las voces de los representantes comunitarios y de los principales interesados?  
¿Qué otras voces se han de incluir?
2. ¿Qué experiencias tienes en relación a los procesos de co-creación, y qué aprendizajes de esas experiencias podrías poner en práctica en tu proyecto actual?
3. ¿Qué añadirías en cuestión de consideraciones y procesos?

## Related resources on culturally responsive education and programs

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- Review the NISE Network Collaborations Guide: <https://www.nisenet.org/collaboration-guide>
- Watch a video presentation tour of the exhibition *Creatividad salvaje/Wild Creativity* from OMSI: <https://drive.google.com/file/d/1EBFUjfGuYKltK8eKB4vTuzeBXVNXpCBU/view>
  - See an example of a bilingual invitation to the communities to participate in project evaluation: <https://linktr.ee/omsi.eval>
- More about the NISE Network's product development process: [https://www.nisenet.org/development\\_process-more](https://www.nisenet.org/development_process-more)
- Reference the Designing and Running Co-creation Workshops Guide from The Partnering Initiative: <https://thepartneringinitiative.org/wp-content/uploads/2018/12/Co-creation-workshops.pdf>
- Review and assess your own content on the DiverSci website: <https://www.diversci.eu/content>

## Multilingual Engagement

Language is important to an inclusive approach to engagement

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Language is one of the most responsive ways to create a sense of belonging in museums and educational spaces. Bilingual individuals might speak English, but offering materials and interactions in other preferred and official languages provides incredible advantages to their learning experiences. The BERI report (Bilingual Exhibit Research Initiative funded by the National Science Foundation) found the following benefits:

- **Code switching**—a practice where individuals and groups go back and forth between two or more languages, allowing them to expand their communication and interactions.
- **Facilitation**—when there’s more than one language, adults in the group whose second language is English are more likely to facilitate and feel empowered in their caregiver role.
- **Emotional reaction**—having a native language present in a person’s educational experience enhances the value, comfort, and connection they have to the content as well as the space they are visiting. (Yalowitz, Garibay, Renner, and Plaza, 2013)

Also, in the publication *Museums & Society 2034* (2010), the Center for the Future of Museums of the American Association of Museums suggests that providing bilingual access to information makes visitors feel welcome and fosters a sense of belonging in institutions.

### Planning for multilingual engagement

Providing multilingual materials and experiences requires considerations around budget, capacity, and timeline. It is an intentional

investment that should be included early in the planning to ensure that the team has time to create quality materials and experiences. Presenting materials that have high standards both in English and other languages is a sign of respect, consideration, and dedication to our communities. Electronic translations are not recommended when presenting multilingual materials—native speakers can often tell when content has been developed by an application or someone who doesn’t speak or write their language fluently.

There are different approaches that organizations can take when developing multilingual materials, depending on budget, capacity, and timeline. The ultimate goal is to have content that is well represented, has equal quality standards, and that’s engaging for the intended audience.

The NISE Network has engaged with two different processes throughout the years: the translation approach and the co-development approach. The NISE Network developed a **Translation Process Guide** and **Bilingual Design Guide** to help organizations navigate these two approaches to creating quality multilingual educational products. Each project and organization should examine what process to use, depending on staff, budget, time, and goals.

#### Translation Process Guide

[https://www.nisenet.org/sites/default/files/catalog/uploads/8232/translation\\_guide\\_08\\_29\\_hr.pdf](https://www.nisenet.org/sites/default/files/catalog/uploads/8232/translation_guide_08_29_hr.pdf)

#### Bilingual Design Guide

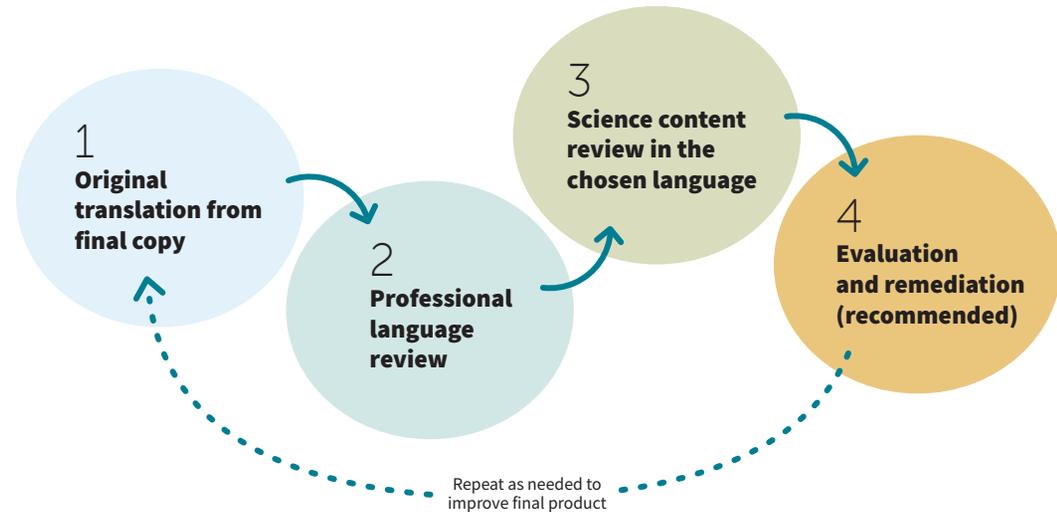
[https://www.nisenet.org/sites/default/files/catalog/uploads/10841/graphic\\_guide\\_08\\_29\\_hr.pdf](https://www.nisenet.org/sites/default/files/catalog/uploads/10841/graphic_guide_08_29_hr.pdf)

## Translation approach

Shown here is the NISE Network's process model to help teams ensure that translated materials maintain an appropriate interpretive tone and a high level of scientific accuracy.

**1. Original translation from final copy** The first step in the translation process is to create an original translation of the final copy into the second, third, etc. language. Whether your translation is done by a staff member or an external translation company, it should be the goal of your translator to preserve concepts, wording, and tone of the writing—not necessarily a literal translation, but one that aims at meaning and relevance. You will want to ensure that the translation is done carefully to avoid terms that could be offensive or misinterpreted due to regional differences or different dialects, and with cultural aspects and examples appropriate for your target audience. The craft of translating always entails preserving the original message, with the translation created to be as accurate as the original, and composed in a way that speaks to the reader. Done well, the original source language may be undetectable.

**2. Professional language review** The role of the professional language review (copyediting and proofreading) is to assess grammar, spelling, punctuation, style, and appropriate wording, and also to make sure the language is broadly accessible to a diverse audience. Unless your institution has internal professional-level editing capabilities, you should use a professional translation company for this part of the process.



**3. Science content review in the chosen language** In order to ensure accuracy and clarity of translated scientific concepts, we recommend having all translations reviewed by science content advisors who are native speakers of the chosen language. Ideally, you might have two or three reviewers who practice in different regions or countries where the language is spoken to review the content. Translations of scientific terminology, especially for emerging disciplines, are not always clear or available in dictionaries, so feedback from scientists is especially important.

**4. Evaluation and remediation (recommended)** In some circumstances, your team may choose to evaluate the bilingual/multilingual materials to improve a product's relevancy for target audiences or to assess overall effectiveness of an approach with target audiences. If you're considering an evaluation of the products, be aware that it will require evaluation instruments and data collectors that are fluent in the chosen language. Consider partnering with community groups to ensure you have testers from the target audience

you are hoping to reach with the materials. As with all educational products, keep in mind that you will need to budget adequate time and money to remediate multilingual materials as necessary. On the other hand, it would likely be even more expensive to make changes and improvements once the product is already finalized.

Finally, for layered, complex, and ongoing projects, consider creating a **Glossary** of frequently used terms, names of species, specific phrases, explanations, and phenomena to ensure internal consistency and accuracy.

### **Co-development approach**

Through co-development, multilingual educational content is conceived in all languages from the beginning. Ideally, developers who are fluent and have a cultural background of each language work together to write simultaneously. This process allows cultural references to be included from the beginning, and encourages a more rich, in-depth representation of the language, cultures, examples, stories, and activities. Co-development for multiple languages requires investment and possibly more time, but is a more culturally responsive approach to creating content.

The co-development process should be fluid and consider all aspects of the development process, from planning to the final product.

Some examples of co-development activities:

- **Data collection:** If data is being collected throughout the process, make sure that families and members who speak the languages of the content are invited to provide feedback.
  - **Marketing materials:** When marketing materials are co-developed, there's a better chance of creating content that is not only accurate but is also appealing to the audiences.
  - **Expert content review:** If you have content experts reviewing the copy, make sure to find individuals and/or organizations that have the background and expertise to not only look at the scientific accuracy, but can also provide feedback around cultural context.
  - **Final content:** Native speakers and proofreaders write text or proof simultaneously in multiple languages, choose images together, and hold equal weight in final approvals.
- **Research in multiple languages:** When co-developing content, the research should be done in the languages that are being represented. This will allow the developers to get familiar with phrases, words, nuances, and vocabulary.

## REFLECTION QUESTIONS

1. What materials from the experience you are developing are visible to your participants? How would you prioritize the content that requires translation? What are the most relevant concepts you want people to learn?
2. Do you have the elements and resources to ensure the end result will have a standard that equals the standard of English materials? If you need to reduce your scope, what would you translate?

## PREGUNTAS DE REFLEXIÓN

1. ¿Qué materiales de la experiencia que estás desarrollando son visibles para los participantes? ¿Cómo le darías prioridad al contenido que requiere ser traducido? ¿Cuáles son los conceptos más relevantes que quieres que la gente aprenda?
2. ¿Cuentas con los elementos y recursos para asegurar que el resultado final tendrá el mismo estándar que los materiales en inglés? Si tienes que reducir tu alcance, ¿qué traducirías?

## Creatividad salvaje/Wild Creativity

Kimberly Deras, Oregon Museum of Science and Industry, Portland, OR

Our museum, in partnership with Adelante Mujeres, Biomimicry Institute, and the Fleet Science Center, created a multilingual exhibition, funded by NSF, called *Creatividad salvaje/Wild Creativity*. This exhibition has a focus audience of young Latinas, ages 9–14, and is about engineering practices inspired by nature. Here are some steps OMSI took to involve girls from the community in the development process and going beyond standard translation:

1. Reached out to local organizations that work with the intended audience
2. Had conversations with the girls and the organizations to find out their opinions on how they can be inspired by nature
3. Started the development process in English and Spanish, applying the feedback from the conversations with the girls
4. Showed designs and educational activities to the girls and asked for feedback during bilingual formative evaluation
5. Applied the feedback to the designs and finalized the exhibition text in English and Spanish
6. Conducted remedial evaluation of the final designs with the girls and community to assess the implementation of feedback given throughout the development process
7. Brought the final exhibit and other education products out to the community, acknowledging and giving credit for co-development to the girls and organizations that participated in the process



## Related resources on multilingual engagement

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- Read the NISE Network Translation Process and Bilingual Design Guides:  
<https://www.nisenet.org/catalog/translation-process-guide>  
<https://www.nisenet.org/catalog/bilingual-design-guide>
- Read the Latino Network of the American Alliance of Museums' *Strategies for Engaging and Representing Latinos in Museums*: <https://www.aam-us.org/wp-content/uploads/2021/06/AAMLN-Strategies-for-Engaging-and-Representing-Latinos-in-Museums.pdf>
- Read the *Bilingual Exhibit Research Initiative: Institutional and Intergenerational Experiences with Bilingual Exhibitions* report funded by the NSF (2013):  
[http://www.informalscience.org/sites/default/files/2013-10-01\\_BERI\\_Research\\_report\\_Final\\_Sep\\_2013.pdf](http://www.informalscience.org/sites/default/files/2013-10-01_BERI_Research_report_Final_Sep_2013.pdf)
- Engage with the piece “Beyond Translation, Towards Better Bilingual Exhibitions” by Erica Kelly and Amparo Leyman Pino published in Exhibition: [https://static1.squarespace.com/static/58fa260a725e25c4f30020f3/t/594d173315d5dbae6d693055/1498224464433/13\\_Exhibition\\_BeyondTranslation.pdf](https://static1.squarespace.com/static/58fa260a725e25c4f30020f3/t/594d173315d5dbae6d693055/1498224464433/13_Exhibition_BeyondTranslation.pdf)
- Read the paper “Blended Language Programming: An Emerging Model to Promote Inclusion and learning” by Amparo Leyman Pino, Beth Redmond-Jones, and Vicki Wawerchak published in the *Informal Learning Review*:  
<https://yellowcow.net/wp-content/uploads/2020/06/Blended-Language.pdf>
- Get tips from the NISE Network in “Strategies for Engaging Bilingual Audiences”: [https://www.nisenet.org/sites/default/files/catalog/uploads/11785/strategies\\_for\\_engaging\\_bilingual\\_audiences\\_27oct2013.pdf](https://www.nisenet.org/sites/default/files/catalog/uploads/11785/strategies_for_engaging_bilingual_audiences_27oct2013.pdf)

## Working with Indigenous Communities

Developing and using land acknowledgements

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Initiating relationships and connecting with local community leaders is often the first step to honoring the past, present, and future contributions of Indigenous people. For white settler-colonialists, specifically in the US, land acknowledgements are a way to foster conversation about the long-standing history that brought us to reside and work on this land, to examine our place in that history, and to build awareness of the ongoing process of colonialism and our present participation. Too often these acknowledgements lack a substantive call to action and can end up centering on whiteness and being a performative example of empty activism. However, when it incorporates deeper reflection and a sincere call to action, it can be a great start in demonstrating solidarity with Indigenous Peoples and a commitment to social justice and racial equity. This approach can be adapted to any other land where its original settlers were displaced or eliminated by the conquerors who are now possessing the land.

### Example virtual land acknowledgement

Shared during the Making Earth & Space Relevant and Inclusive Professional Learning Community Online Kick-off Meeting in 2021

*While the space we are meeting in today is virtual, all the spaces in which we live and work are within the territories of Indigenous Peoples—lands that were forcibly stolen from them and upon which the economies and opportunities we are benefitting from right now were built. As we begin this gathering, we acknowledge and honor the original peoples of this land. Many of the social and environmental problems we are facing today are rooted in a history of colonialism, land theft, and genocide that have directly and negatively impacted Indigenous Peoples.*

*Our acknowledgement is a small yet critical step toward healing the cultural and personal trauma that has defined this nation, and, of course, our work does not end here. We must all take personal responsibility for discovering the truth in history and working toward intentional relationships with Indigenous Peoples.*

*A place to begin is to dedicate ourselves to creating authentic, long-term relationships and partnerships with Indigenous Peoples. Learn about the land that you currently occupy and the communities to whom they belong. Reach out with an offer of friendship and desire to be in service.*

*Let's take a quiet moment to honor the lands, waters, and skies that we are collectively gathered upon, give thanks for the resilience and strength that Indigenous Peoples continue to show worldwide. Let's honor them by learning how to have better relationships with and be in solidarity and service to Indigenous communities.*

*Thank you.*

\*Adapted from materials developed by Mass Audubon and shared through the New England Climate Change Education Collaborative

When making a land acknowledgement during a virtual meeting, you can recognize that participants may be joining from different places. Hold a space for participants to look up the history of the land they live and/or work on. Start by searching by location on the Native Land website: <https://native-land.ca>. If participants are already aware of the land's history, encourage them to spend a few moments reflecting on the relationship they have or the need to further develop with local Indigenous communities to bring our programs and resources into authentic partnership and service to Indigenous communities.

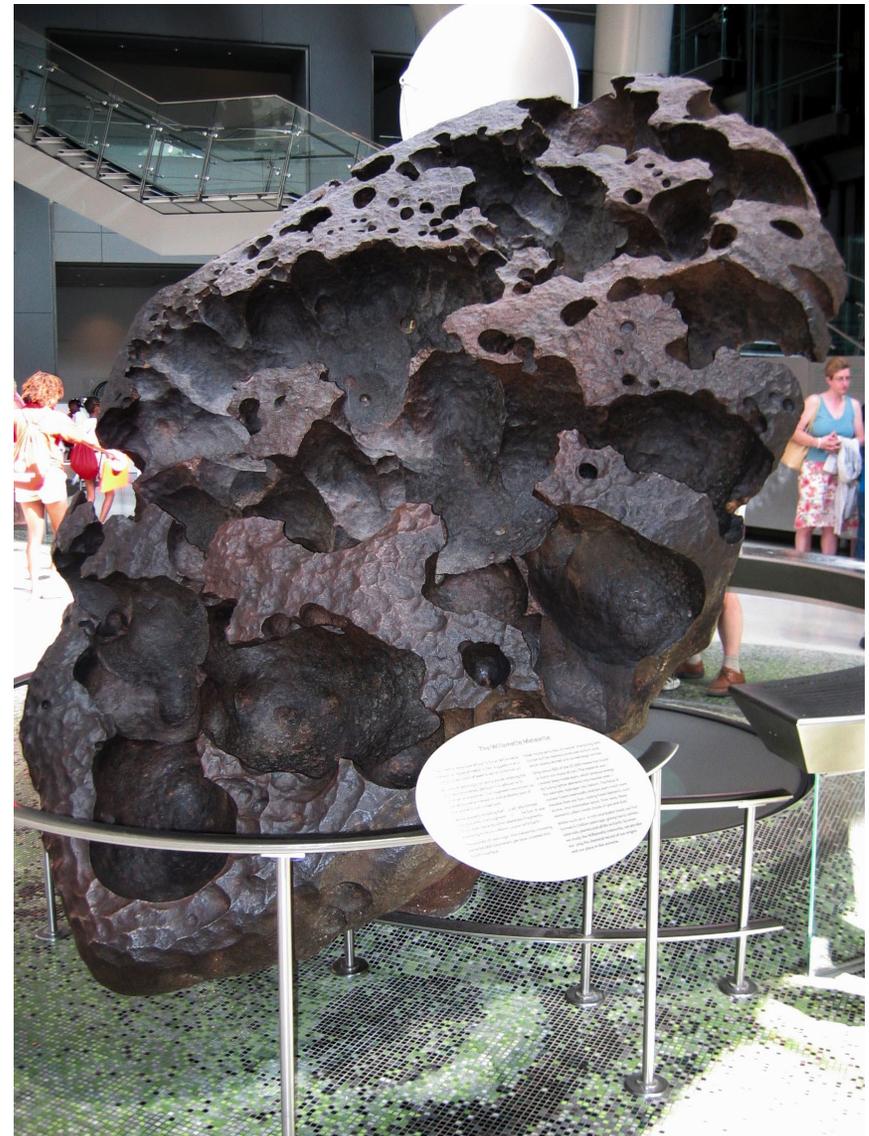
Developing a local land acknowledgement should be a deliberate and collaborative process for your team. Start with some self-reflection about why this step is important. Do your own research and discuss what you learn. Plenty of information about the past, present, and future culture of local Indigenous communities is available. Carefully consider the language you decide to use. Get buy-in and feedback. And don't end here. Land acknowledgement is merely a starting point. How do you plan to take action to build relationship and trust, and come into authentic service to Indigenous communities?

### Let's try this

Read about the Willamette Meteorite Agreement between the Confederated Tribes of Grand Ronde and the American Museum of Natural History. Reflect on the nature of the compromise the tribe made. Discuss if the museum could or should have simply repatriated the Meteorite.

*“The Willamette Meteorite Agreement recognizes the Museum’s tradition of displaying and studying the Meteorite for almost a century, while also enabling the Grand Ronde to re-establish its relationship with the Meteorite with an annual ceremonial visit to the Meteorite.”*

<https://www.amnh.org/exhibitions/permanent/the-universe/planets/planetary-impacts/willamette-meteorite/agreement>



The Willamette Meteorite on display at the American Museum of Natural History in New York City.

# STEM Cards Highlighting Traditional Ecological Knowledge

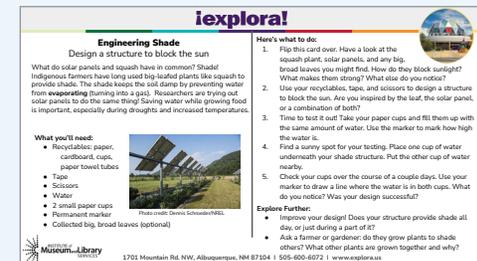
Lauren Butcher, Explora Science Center and Children’s Museum, Albuquerque, NM

For millennia, Indigenous peoples have made their homes in New Mexico’s arid lands, experiencing climate events such as extreme drought and devastating heat. Explora, together with local Indigenous experts from Zuni Pueblo and the Navajo Nation, showcase how Native people in the Southwest hold knowledge and practices relevant to today’s discussion on climate change. Together, we created at-home STEM activity cards that highlighted Traditional Ecological Knowledge (TEK) around drought, water conservation, and high temperatures. The six cards range from experimenting with water-conserving waffle gardens to analyzing the puddles in a field’s topography.

During our collaboration, Explora learned two important lessons. The first centers around the framing of climate change with Native communities. Kirk Bemis, a Zuni hydrologist who works for the Zuni Water Resources Department, shared that Zunis believe clouds are their ancestors and that rain is a sacred gift which can be influenced by prayer. Discussing drought suggests that prayers have failed. Instead, Mr. Bemis framed the question as, “How have you and your family in generations past dealt with times of less water? How have we as a people learned to live in this arid land?” This directly led to the foundation for the climate change STEM cards, entitled Traditional Ecological Knowledge from the Past and For the Future.

Our second lesson lay in showing the complementary nature of Western science and TEK. As Curtis Quam, museum technician and cultural educator at the A:shiwi A:wana (Zuni) Museum and Heritage Center, said, “STEM goes alongside the ancestral side. We understand it in our way.” He wants his young students to understand that “You already do this, you already know this.” As a result, the cards reference complementary modern STEM research and highlight the science and engineering practices already inherent in the Indigenous ways. They also encourage children and their families to expand their conversations to include local knowledge holders such as traditional gardeners, farmers, and elders.

Explora Science Center and Children’s Museum will continue to work with Indigenous experts across New Mexico to develop STEM Activity Cards to highlight climate mitigation strategies so that the next generation may continue to adapt and thrive.



## REFLECTION QUESTIONS

1. What is your motivation for wanting to acknowledge the land?
2. Whose lands are you occupying and what Indigenous organizations or sovereign governments can you contact to engage more deeply?
3. What programs do you currently run that prioritize Western knowledge systems and pedagogies?
4. How can you build relationships and trust toward co-creating programs that center and prioritize Indigenous knowledge systems to better engage Indigenous communities?

## PREGUNTAS DE REFLEXIÓN

1. ¿Qué te motiva a querer reconocer el territorio que pisas?
2. ¿A quién pertenecen/ieron los territorios que estás ocupando y qué organizaciones indígenas o gobiernos soberanos puedes contactar para que participen completamente?
3. ¿Qué programas están actualmente activos los cuales dar prioridad al los sistemas de conocimiento y pedagogías occidentales?
4. ¿Cómo puedes entablar relaciones y ganarte la confianza para la co-creación de programas que centren y prioricen los sistemas del conocimiento de las comunidades indígenas para promover su participación?

## Related resources on working with Native communities and developing land acknowledgments

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- Check with the Bureau of Indian Affairs for a list of federally recognized tribes (and acknowledge that this list has limitations and systemic bias): <https://www.bia.gov/regional-offices>
- Review this guide to Indigenous Land Acknowledgment from the Native Governance Center, including tips on creating an acknowledgment and additional factors to consider in working with Indigenous people and communities: <https://nativegov.org/a-guide-to-indigenous-land-acknowledgment/>
- Read this guide to Indigenous Land and Territorial Acknowledgements for Cultural Institutions: <http://landacknowledgements.org/>
- Read the Honor Native Land: A Guide and Call to Acknowledgment, from the US Department of Arts and Culture: <http://usdac.us/nativeland>
- Watch *We Are All on Native Land: A Conversation about Land Acknowledgments*: <https://www.youtube.com/watch?v=eZQldd3L0qw>
- Learn more about the Settler Logics of (Outer) Space: <https://www.societyandspace.org/articles/the-settler-logics-of-outer-space>
- Think about the 7 R's of Indigenous Research that promote ethical, equitable, and just values for collaborative and community-engaged scholarship: <https://thesolutionsjournal.com/2021/03/01/testing-justice-new-ways-to-address-environmental-inequalities>
- Read *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge and the Teachings of Plants*, the book by Robin Wall Kimmerer: <https://www.robinwalkkimmerer.com/books>

## Inclusive Design

Creating more inclusive experiences for everyone to learn

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### Why is it important to plan accessibility in programs and exhibits?

Museums are connectors for everyone and should be accessible to everyone. This helps disabled people feel a sense of belonging—not only to the institution, but to society as a whole. One in four people in the US have a disability and there are no “normal” or “typical” users. Everyone falls on a spectrum. Accessibility must not be an add-on, but integrated into all learning experiences. Often, museums comply with ADA (Americans with Disabilities Act) requirements and make limited accommodations to meet accessibility needs. But if we create accessible and inclusive designs and experiences from the beginning, there would be no need for accommodations and everyone benefits.

### What is universal design?

According to the website for the Center for Universal Design at North Carolina State University, “Universal design is the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design.”  
[https://projects.ncsu.edu/ncsu/design/cud/about\\_ud/about\\_ud.htm](https://projects.ncsu.edu/ncsu/design/cud/about_ud/about_ud.htm)

Universal design should not be confused with a one-size-fits-all approach. Instead, it encourages the creation of designs that promote flexibility and choice, enabling different users to interact with the same design in different ways. Universal design differs from accommodation; it’s proactive rather than reactive. It doesn’t rule out the need for

accommodations, but aims to create a product that ensures that the most people can use it regardless of ability, identity, etc., rather than supporting the needs of one person.

It’s appropriate to use principles of both universal design and universal design for learning. The main focus of universal design, as outlined by the Center for Universal Design, is physical accessibility for products and environments. As a complement, universal design for learning is a framework with a focus on the “why,” “what,” and “how” of learning. These two frameworks combined inform what we call “inclusive design” here. We can use inclusive design to create learning environments where people of all abilities can access and participate in learning experiences by:

- successfully moving around a physical space and interacting with design elements in a comfortable and inviting way;
- understanding the main ideas and concepts presented in an exhibition or program; and
- participating in learning as a part of a social group, working alongside friends and family members who may or may not have a disability.

Inclusive design does not always mean more. Often less is more. For example, having simple instructions that are easy to understand can actually be more inviting, accessible, and inclusive of more people. Also, exhibits and programs that have instructional photos and



illustrations may ultimately be more accessible than having wordy descriptions or instructions in many languages.

### “Nothing about us, without us.”

The saying “Nothing about us, without us” is strongly associated with the disability rights and disability justice movements. In practice, this principle means including people with disabilities and neurodiversity in the co-creation and co-implementation process. To achieve better inclusivity, people from the disability community must have a voice in the design and thinking process. This demands that professionals be mindful, humble, and open to listening.

To plan for physical, learning, and sensory accessibility in your project, it is an important practice to include people with disabilities, who can bring their knowledge and lived experiences to the co-creation process. Disability and non-disability vary from person to person and culture to culture, so the importance of closely knowing your audiences bears on the success of an inclusive design. A wealth of resources exist for designers and developers to refer to for practices (see resources section). For example, to make videos more accessible, there are guidelines from Described and Captioned Media Program (DCMP) for captioning. However, if designing a new planetarium program designed for deaf and hard-of-hearing audiences, be sure to seek input of deaf and hard-of-hearing individuals, educators, and experts.



As with all DEAI work, this is an iterative process with room to build resilience, to make mistakes, and to understand that the process and the journey are more important than the tangible outcome.

Every person is unique and it isn't realistic that you will be able to customize educational activities and exhibits for each person. Not every activity or exhibit will meet everyone's needs. A good place to start is by seeking out and using existing guidelines where appropriate. Examples include: designing physical accessibility for exhibits; signage color and font choices to ensure high contrast and legibility; wording choices and chunking text to aid comprehension; captioning videos; and accessible website design. Educating yourself about best practices and applying them where possible is a way to increase access for more people.

### Let's try this

The form on the following pages provides an example for how to assess the inclusiveness of a presentation-style, in-person program. For other kinds of learning experiences you may need to develop your own tools or audits. You can find examples and checklists in the NISE Network's *Universal Design Programs Guide* and *The Art of Access: A Practical Guide for Museum Accessibility* by Pressman and Schulz.

After you've filled out the form, try asking colleagues to complete it and have a discussion afterwards. To truly determine if your project is inclusive of people with disabilities, we recommend that you invite people with disabilities to view the program and provide feedback through an evaluation study.

# Universal Design Program Critique Form

This form is designed to help museum educators compare their programs to the universal design guidelines. You can use it as a starting point for assessing the inclusiveness of your program by asking colleagues to complete the form while viewing the program and discussing it afterwards. To truly determine if your program is inclusive of people with disabilities, however, we recommend that you invite people with disabilities to view the program and provide feedback through an evaluation study. We also recommend that you utilize the full guidelines document when developing your program.

<b>Repeat and reinforce main ideas and concepts</b>
<input type="checkbox"/> Explicitly state overarching main idea and supporting concepts visually and aurally.
<input type="checkbox"/> Present a content map (outline) visually and aurally.
<input type="checkbox"/> Actively engage visitors with the content visually, aurally, and tactilely.
<input type="checkbox"/> Deliver one core concept at a time.
<input type="checkbox"/> Repeat core concepts frequently during the program.
<input type="checkbox"/> Punctuate the delivery of key ideas by presenting them visually, aurally, and tactilely.
<input type="checkbox"/> Check in with the audience along the way.
<input type="checkbox"/> Provide handouts that summarize main ideas and concepts with text and images.
<b>COMMENTS:</b>

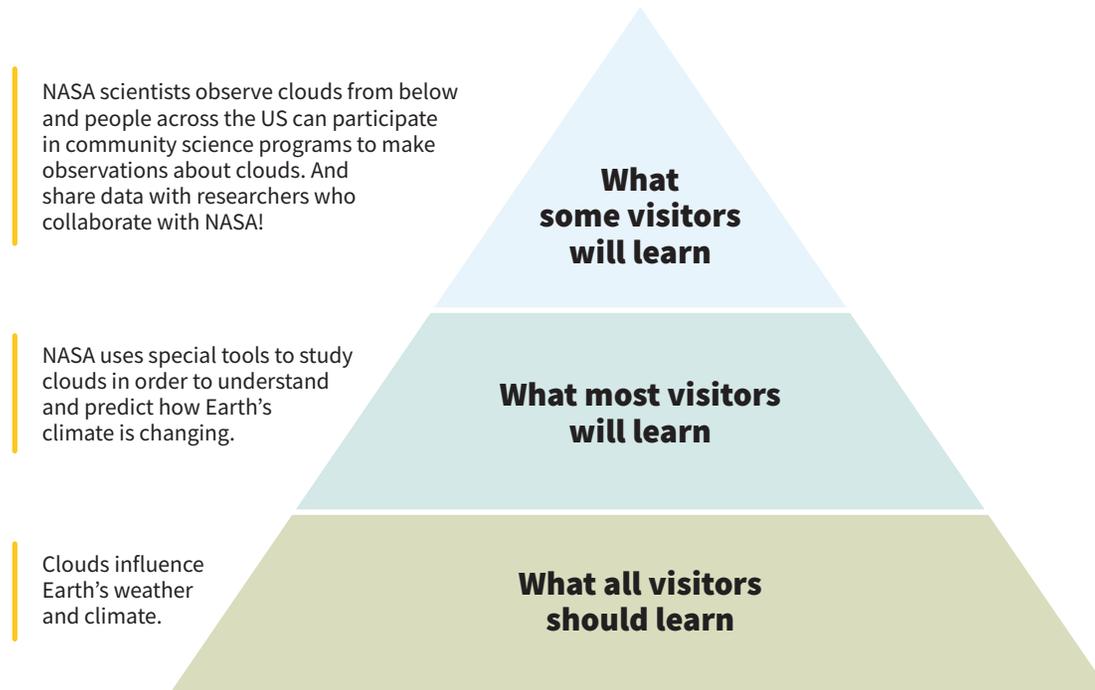
<b>Provide multiple entry points and multiple ways of engagement</b>
<input type="checkbox"/> Enable learners to enter at different places and take away different messages.
<input type="checkbox"/> Actively engage audience members in the program.
<input type="checkbox"/> Ask questions that encourage visitors to relate the content to their everyday life.
<input type="checkbox"/> Connect the content to a range of prior experiences and everyday life examples.
<input type="checkbox"/> Use multiple analogies to represent the same idea.
<input type="checkbox"/> Provide examples and non-examples
<input type="checkbox"/> Engage more than one sense when delivering jokes and special effects.
<b>COMMENTS:</b>

<b>Provide physical and sensory access to all aspects of the program</b>
<input type="checkbox"/> Provide good visibility of the presenter's face.
<input type="checkbox"/> Position the presenter so that he/she does not block the presentation.
<input type="checkbox"/> Speak slowly and provide extra time for people to process important ideas.
<input type="checkbox"/> Provide auditory descriptions of models and images.
<input type="checkbox"/> Make announcements that inform visitors of available accessibility options.
<input type="checkbox"/> Position materials so they can be viewed by visitors of a range of heights.
<input type="checkbox"/> Place all elements of the program (presenter, props, and presentation) in a well-lit area.
<input type="checkbox"/> Use high-contrast demonstration materials and models that can be seen at a distance.
<input type="checkbox"/> Provide tactile models that are easy to handle and manipulate.
<input type="checkbox"/> Use color and/or tactile designs to impart meaning on models and images.
<input type="checkbox"/> Use large, high-contrast, easy-to-read text and images for all graphics.
<input type="checkbox"/> Caption video presentations.
<b>COMMENTS:</b>

## Try this out too

Create a planning pyramid to lay out the educational goals of your projects with an inclusive design lens.

## Planning Pyramid for Educational Goals



A planning pyramid outlines the main idea you think everyone should know by the end of the program, and then lists related concepts that only smaller portions of the audience may come away with following their participation. This will help to ensure that younger visitors, visitors with developmental disabilities, and content novices will learn as well as visitors who are already familiar with the content.

# Astronomy Field Trip for All Learners

Ellen Reinecke, Education & Technology Manager, Robinson Nature Center, Columbia, MD

For the NISE Network’s Project-Based Professional Learning Community, the Robinson Nature Center redesigned an astronomy field trip for students that are deaf or hard of hearing (DHOH). We were inspired to work with this community by a coworker whose son is hard of hearing. She helped open our eyes to the lack of accommodations we were currently providing. The first and most crucial step we took in this process was hiring a consultant who works at a local high school as the DHOH liaison. We knew it was so important to have a member of the community help us in each step of the process. We held monthly virtual meetings with them to review our lesson plans, brainstorm accommodations, and review resources together. Our advisor also came to do a site visit to help us find the best way to light an ASL interpreter in our dark planetarium.

We adapted our lesson plan to increase the visuals, increase hands-on time, and allow more time for processing and reflection by the participants. The three field trip components we decided on were a hands-on classroom activity, a live night sky planetarium show, and a closed-captioned film. To gather additional feedback, we held two pilot field trips—one with elementary school students from Maryland School of the Deaf and one for the Alternate Learning Outcomes group at Rockville High School. We provided

two ASL interpreters per group of students. Having two was great for question and answer and small group work in the classrooms. In the planetarium, one interpreter was lit at the front of the room by flashlights clipped onto microphone stands while the other interpreter focused on answering questions from the students. It was imperative to have two interpreters in the planetarium since the light from the flashlight made it difficult for the primary interpreter to see the audience.

After each field trip, we asked students to fill out a quick survey by rating each activity 1–5 stars and sharing additional thoughts. The survey results indicated that most students liked the planetarium portion the best. One student suggested a video clip of a prerecorded ASL interpreter on the planetarium dome during the presentation. We also administered an online survey to teachers after the field trip. The chance to really develop this program with the intended audience was a great learning experience! We look forward to providing these accommodations again and to incorporating this process into future work.



## REFLECTION QUESTIONS

1. What resources are available to support developing and improving the accessibility and inclusion of your project? How can you identify and approach appropriate disability communities to co-create your project to meet their accessibility needs and make the content relevant to them?
2. Who is responsible for developing or improving your project for accessibility and inclusion? What resources or training do they need to be successful?
3. What features and characteristics of universal design does your project have? How does your project meet the needs of people with disabilities in a way that is also inclusive of BIPOC (Black, Indigenous, and people of color) and culturally specific communities, genders, faiths, education levels, socioeconomic status?

## PREGUNTAS DE REFLEXIÓN

1. ¿Qué recursos están disponibles que te ayuden a desarrollar y mejorar la accesibilidad y la inclusión de tu proyecto? ¿Cómo puedes identificar y acercarte a comunidades de discapacitados de manera apropiada para co-crear tu proyecto y satisfacer sus necesidades y hacer que el contenido sea relevante para ellos?
2. ¿Quién/es es/son responsable/s de desarrollar o mejorar tu proyecto en cuestión de su accesibilidad e inclusión? ¿Qué recursos o entrenamiento necesitan para que sean exitosos?
3. ¿Qué funciones y características del diseño universal tiene tu proyecto? ¿Cómo es que tu proyecto cumple con las necesidades de las personas con discapacidad de forma que también incluya personas que tienen todas las tonalidades de piel, que son indígenas, provenientes de varias diásporas, géneros, espiritualidad, niveles de educación, estado socioeconómico?

## Related resources for inclusive design and accessibility

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### GENERAL RESOURCES AND CORE CONCEPTS

- Get to know the principles of universal design from the Center for Inclusive Design and Environmental Access at the University at Buffalo: <https://idea.ap.buffalo.edu/about/universal-design>
- Get to know the principles of universal design for learning and find free online UDL learning tools at the CAST website: <https://www.cast.org/impact/universal-design-for-learning-udl>
- Read “Access Isn’t Enough,” a short article that critiques dominant STEM culture and typical narratives of how to serve audiences underrepresented in STEM: <https://www.astc.org/astc-dimensions/access-isnt-enough>
- Watch Sinéad Burke’s keynote address to Ecsite’s 2022 conference (the talk begins at 12:30 minutes): <https://youtu.be/iPhO6D0U0Y8>
- Read the report about accessibility in informal science learning experiences by the Center for the Advancement of Informal Science Education, Inclusion, Disabilities, and Informal Science Learning: <https://www.informalscience.org/sites/default/files/InclusionDisabilitiesandInformalScienceEducation.pdf>
- Find disability justice resources at the Disability & Philanthropy Forum: <https://disabilityphilanthropy.org/>
- Download a guidebook for making space science education accessible by NASA, Space Science Is for Everyone: Creating and Using Accessible Resources in Educational Settings: [https://www.nasa.gov/pdf/259240main\\_Space\\_Science\\_Is\\_for\\_Everyone.pdf](https://www.nasa.gov/pdf/259240main_Space_Science_Is_for_Everyone.pdf)

### INCLUSIVE DESIGN FOR MUSEUM EXHIBITS AND PROGRAMS

- Find comprehensive recommendations for museums in the book *The Art of Access: A Practical Guide for Museum Accessibility* by Heather Pressman And Danielle Schulz: <https://rowman.com/ISBN/9781538130506/The-Art-of-Access-A-Practical-Guide-for-Museum-Accessibility>
- Read the Universal Design Plan for exhibit design and development by the Museum of Science, Boston: [https://www.mos.org/sites/dev-elvis.mos.org/files/docs/misc/MOS\\_UD\\_Plan.pdf](https://www.mos.org/sites/dev-elvis.mos.org/files/docs/misc/MOS_UD_Plan.pdf)
- Design accessible exhibits using the Smithsonian Guidelines for Accessible Exhibition Design: <https://access.si.edu/museum-professionals>
- Read the Universal Design Guidelines for Public Programs in Science Museums by the NISE Network: <https://www.nisenet.org/catalog/universal-design-guidelines-programs>

- Bookmark or download “Accessible Communications Guidelines,” practical recommendations on creating communications in print and digital formats by the American Alliance of Museums: <https://www.aam-us.org/2021/07/01/accessible-communications-guidelines>
- Take a quick look at the NISE Network’s Tips for Accessibility, Inclusion, and Engagement in Museums and Planetariums: [https://www.nisenet.org/sites/default/files/catalog/uploads/exsci\\_space\\_tipsforaccessibilityinclusionengagement2022.pdf](https://www.nisenet.org/sites/default/files/catalog/uploads/exsci_space_tipsforaccessibilityinclusionengagement2022.pdf)
- Read Noreen Grice’s Everyone’s Universe, available from her website: <https://www.youcandoastronomy.com>

### **MEDIA ACCESSIBILITY**

- Follow guidelines and use helpful tools for creating accessible digital learning media by GBH National Center for Accessible Media (NCAM): <https://www.wgbh.org/foundation/ncam/guidelines>
- Read “A Framework for Diversity and Equity in K-12 Science Educational Media” by WGBH: [https://science.nasa.gov/science-red/s3fs-public/atoms/files/GBH\\_BUAC\\_Diversity\\_&\\_Equity\\_in\\_K-12\\_Science\\_Media\\_Final\\_Report\\_TAGGED.pdf](https://science.nasa.gov/science-red/s3fs-public/atoms/files/GBH_BUAC_Diversity_&_Equity_in_K-12_Science_Media_Final_Report_TAGGED.pdf)
- Follow guidelines for audio description by the Audio Description Project: <http://www.acb.org/adp>
- Follow guidelines for captioning educational video using the Captioning Key from Described and Captioned Media Program: *Web-based version:* <https://dcmp.org/learn/tags/captioning-key>
- Printed version: <https://dcmp.org/captioningkey/print>

### **BLIND AND LOW-VISION AUDIENCES**

- Read the free Handbook for Museum Educators by Art Beyond Sight: <http://www.artbeyondsight.org/handbook/index.shtml>
- Learn three quick and simple solutions to help increase accessibility for visitors who are visually impaired from the American Association for State and Local History: <https://aaslh.org/increasing-accessibility-for-visitors-who-are-visually-impaired-simple-solutions-for-small-museums>

### **DEAF AND HARD OF HEARING AUDIENCES**

- Follow the guide “Effective Communication for People who are Deaf or Hard of Hearing” by Janice Lintz: <https://janiceslintz.files.wordpress.com/2015/01/16-0208-effectiveaccess.pdf>
- Find deafness-related resources and links at The National Technical Institute for the Deaf: <https://www.rit.edu/ntid/resources>

### **AUDIENCES WITH LEARNING DIFFERENCES AND NEURODIVERSITY**

- Read the article “Full Spectrum: Addressing the Needs of Kids with Autism” by Lisa Jo Rudy:  
<https://www.aam-us.org/2011/03/01/full-spectrum-addressing-the-needs-of-kids-with-autism>
- Get examples of resources for visitors by the Intrepid Sea, Air & Space Museum, including social narratives, sensory guides, and visual vocabularies: <https://www.intrepidmuseum.org/education/accessibility-resources>
- Become more aware of differences in learning from the National Center for Learning Disabilities:  
<https://www.nclد.org>
- Find tips and tools to work with children and youth with thinking and learning differences by Understood:  
<https://www.understood.org>
- Find neurodiversity resources by NASA’s Neurodiversity Network at Sonoma State University:  
<https://n3.sonoma.edu/resources>