



Creating Accessible Exhibits



Tools for Exhibit Developers

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CHILDREN'S
MUSEUM
INDIANAPOLIS®

Introduction

At every turn within *Dinosphere: Now You're in Their World*® at The Children's Museum of Indianapolis, children and families come face-to-face with magnificent dinosaurs and marine reptiles that once dominated the world. After nearly 20 years as the cornerstone exhibition at The Children's Museum, *Dinosphere*® was renovated to include sauropod and marine reptile specimens, reopening in March 2022 with more interactivity than ever before.

As part of reimagining this popular exhibition, the exhibition development team was challenged to develop, test, and refine new processes for accessible exhibition design and development. With the input of experts in museum accessibility and local advisors with extensive experience with a range of communities and disabilities,¹ museum staff deepened their understanding of universal design. By engaging with families with one or more member who had a disability, museum staff gathered ideas and tested prototypes with user experts.

The result is an improved *Dinosphere*® experience for all families and an exhibition development process that addresses accessibility early and often.

Starting with a Lilly Endowment planning grant in 2017, museum staff began to strategically address campus and exhibition accessibility. This was followed by creation of the accessibility coordinator position in 2018 and the development of an accessibility master plan in 2019. Supported by a three-year Museums for America grant awarded in 2020 by the Institute of Museum and Library Services, The Children's Museum of Indianapolis was positioned to take on a big project—really, a HUGE project: the redesign of *Dinosphere*® to create a more accessible and inclusive experience for all families but especially those with a child or someone in their group with a disability.

This tool kit shares the collective work of the *Dinosphere*® exhibition development team, plus refinements made as staff developed a range of other exhibitions in the past three years. In a review of the literature and existing tool kits to support the creation of accessible or universally designed exhibitions, we found many resources focused on the work of exhibit designers. But what about exhibit developers?

At The Children's Museum of Indianapolis, exhibit developers are responsible for establishing the guiding educational messaging and storyline for exhibitions and ensuring all exhibition components align to that messaging. As key team members in the exhibition development process, exhibit developers create and refine tools used by the entire team. These tools highlight accessibility needs in the early planning stages, making sure accessibility is “baked in” to the conceptual planning that happens before detail design and subsequent steps.

We hope that sharing our processes and tools with other museum professionals will result in more accessible exhibitions for children and families at museums everywhere.

At The Children's Museum of Indianapolis, we think of things this way:

Access/Accessible/Accessibility: ADA compliance and beyond; ensuring that everyone is able to engage with the extraordinary museum experiences we provide; focusing on the physical space and elements as well as programming.

Accessible Exhibition Design and Development: A process that is conscious of the need to create exhibitions that everyone can engage with. Accessibility considerations are worked into the process from the beginning; diverse audiences are represented in schematic designs, prototyping, and exhibition remedial considerations. Consultation with expert and community/family advisors (including TCM Accessibility Advisor Families) happens throughout the design/development process.

Inclusion: Goes hand in hand with access; creates a sense of welcome. The museum experience is inclusive when visitors of all abilities see themselves reflected and have a sense that they belong. Inclusion is “the practice or policy of providing equal access to opportunities and resources for people who might otherwise be excluded or marginalized, such as those who have physical or mental disabilities and members of other minority groups.” (Oxford Languages)

Disability: ADA definition: “A physical or mental impairment that substantially limits one or more major life activities.”

Universal Design: “The design and composition of an environment so that it can be accessed, understood, and used to the greatest extent possible by all people regardless of their age, size, ability, or disability.” (Centre for Excellence in Universal Design) Everyone benefits from something that is universally designed.



Tip

No one likes getting to the end of a project and then trying to “add on” accessibility. This tool kit offers ways to “bake in” accessibility at stages throughout exhibition development so that accessibility is part of the process from the beginning.

¹ For this project, staff took a broad view of disability and accessibility, partnering with organizations that included the Indiana School for the Blind and Visually Impaired, Bosma Enterprises, Easterseals Crossroads, Damar Services, Hear Indiana, the Center for Deaf and Hard of Hearing Education, and the School of Health and Human Services at Indiana University–Purdue University Indianapolis.

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Who do we serve?

Constituents with a wide range of ages and abilities, from infants through grandparents. We do our best to consider the needs of visitors with physical disabilities as well as intellectual, developmental, cognitive disabilities, and sensory processing disorders/sensory sensitivities.

What does “inclusion” look like?

- Representation in schematic designs, prototyping, and exhibit remedial considerations
- ADA considerations throughout an exhibition’s lifespan
- Museum-wide efforts to maintain physical and social accommodations to support any and all visitors through consultation with expert and community advisors and Accessibility Advisor Families; improving training opportunities for staff, volunteers, and interns; and promoting diversity within the museum staff

Who are our community partners?

- **Easterseals Crossroads:** Offers a variety of adult, children, and family services to help people with disabilities address life’s challenges and achieve personal goals.
- **Hear Indiana:** Listening and spoken-language services for children who are deaf or hard of hearing.
- **Center for Deaf and Hard of Hearing Education:** Operates through the Indiana Department of Health. Serves all Indiana children who are deaf and hard of hearing ages birth until they leave school. Provides assessment, services information, resources, and recommendations related to communication, language development, and education of children who are deaf and hard of hearing.
- **Visually Impaired Preschool Services:** Network of teachers, interventionists, and orientation and mobility specialists who provide vision-specific early-intervention services to children ages birth through 3 years throughout the state.
- **Indiana Family to Family:** Parent to Parent organization and a state affiliate for Family Voices. Provides information, training, and one-on-one support to Indiana families of children and youth with additional health and education needs and the professionals who serve them.
- **Indiana University/Riley Children’s Health:** Staff from the occupational therapy department with expertise in child development and sensory needs.
- **Indiana School for the Blind and Visually Impaired:** Provides educational resources that include a

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residential program and day school, outreach services, and consultative services.

- **Indiana School for the Deaf:** Tuition-free state public school to eligible early childhood education and K–12 students who are deaf or hard of hearing.
- **Damar Services:** One of America’s leading providers of services to people with developmental, behavioral, and intellectual disabilities and the people who love them.
- **Bosma Enterprises:** One of the Midwest’s largest nonprofit organizations providing employment and training for people who are blind or have low vision.

Building a Project Team to Create Accessible Exhibitions

Many museums use a team-based model to collaboratively develop, design, and produce new exhibitions. Exhibition development is informed by a variety of perspectives and expertise, from graphic design to AV to carpentry. Whether these roles are filled by museum staff or contractors, when building for accessibility, have all of these perspectives involved from the beginning of a project. That way, everyone can operate with the same information and can proactively identify and solve any issues that arise. The development and design of an accessible exhibition is driven by the information gathering and sharing that happens within the team. Two critical roles when designing for accessibility in exhibitions are the accessibility representative and the exhibit developer.

The **accessibility representative** collaborates with the team to provide general and specific guidance regarding accessible practices. This individual might be a staff member wearing multiple hats in the project, a professional in the community advising the museum, or a consultant hired by the museum. This accessibility representative can help the team with decision-making, balancing multiple factors that might impact accessibility, and recognizing downstream impacts of decisions. However, this team member cannot be the sole keeper of accessibility concerns. All team members should recognize how their position on the team can impact and support universal design and accessible design standards and ensure that those standards are realized in an exhibition. All core team members are responsible for actively participating in not only shaping content but also strategizing about and implementing exhibition components that will function for a variety of audiences.

The **exhibit developer** facilitates idea generation for new experiences, ensuring that all elements—written content, interactives, objects, and environments—work in tandem to tell a cohesive story that is intuitive and naturally accessible to its audience. Being responsible for the visitor experience within each new exhibition, the exhibit developer is a key visitor advocate within the team. As an advocate for the visitor's experience, the developer is in the position to consider and include accessibility at every stage of an exhibition's creation. Their work includes coplanning visitor research and evaluation, establishing



exhibition learning goals, content research, the generation of foundational exhibition messaging, authoring visitor-facing content, and facilitating team conversations that lead to content idea generation and audience engagement strategies via exhibition elements, including interactives, environments, and displays.

The accessibility representative is a crucial voice when the exhibit developer leads the team in exhibition component brainstorming, calling out strengths and challenges to the experience's accessibility at the outset. The developer then works with the team to think through the functionality of each piece from the visitor's perspective, ensuring that conversations about accessibility occur as each component is workshopped. The developer also works closely with the accessibility representative to determine prototyping needs leading into exhibition production. Are there questions about potential elements that the team would like to ask specific audiences? After the exhibition opens, the developer and team observe visitors interacting in the space and develop a plan to address any accessibility roadblocks that surface.

Exhibit Developers: Supporting Accessibility

The exhibit developer—also called the content developer, curator, writer, interpretive planner, educational lead, or exhibit strategist—is well placed to support and influence the overall accessibility of the exhibition. They sit at the center of the process and carry the responsibility for the visitor's experience.

- **What does the exhibit developer do?** Conceptualizes the educational messages, flow, and content of the exhibition and is responsible for developing the big idea, content research, and label writing. At The Children's Museum of Indianapolis, this staff person also outlines the goal and user experience of each interactive, or hands-on component, so it aligns with the educational goals of the exhibition, telling a unified story in conjunction with the experience's environments and object displays.
- **Why did we focus on the exhibit developer's role for this tool kit?** Looking at resources on creating accessible exhibitions or universal design in museums, we noticed many resources focused on design details, such as height and turning radius, or creating accessible interactives. These details fall into "exhibit design" and are the realm of the 3D designer. But underlying the design is the educational approach of the exhibition—this is the responsibility of the exhibit developer. By focusing on the developer and tools to support them, this tool kit fills a gap in the literature. We wanted to share the tools our exhibit developers use to articulate and highlight accessibility throughout the development process. This ensures accessibility is "baked in" to support the educational approach and goals of an exhibition before we even get to design.
- **How do you budget your time as an exhibit developer?** As with so many aspects of creating an exhibition, how long something takes depends on the scale of the project in terms of square footage, budget, and timeline. Building in accessibility from the beginning is no different in that respect—the larger the project, the more time the team will devote to accessibility in terms of internal conversations, consultations with advisors, and prototyping. For Children's Museum developers, the most time-intensive accessibility-focused stages are within the schematic and detail design phases and the prototyping phase.

What is a Core Team?

The Children's Museum of Indianapolis uses a collaborative exhibition development process with a "core team" model. We have the internal capacity to develop, design, and construct an exhibition from start to finish due to our staff size and organizational budget. Our core teams may consist of 10 to 15 representatives from departments across the museum, depending on the project. Museum departments represented on core teams include gallery interpretation, collections, exhibit development, 3D design, graphic design, school resources, experience production, interactive media, AV and IT, research and evaluation, and accessibility.

The group is led by a project manager in the exhibits department. Depending on the size of your museum, all of these roles may not be represented internally. You may be contracting for design and production of your exhibition. Staff are likely wearing multiple hats—the exhibit developer might also be the project manager. These variations in team structure are to be expected due to the diversity of organizational sizes in our industry. Regardless of team size or titles, a team will have a combination of expertise, roles, and responsibilities. Identify who is doing what, especially the point person for accessibility. It might very well be you!



Tips

- **Identify an accessibility representative.** Some organizations have an accessibility coordinator or manager as a staff role. If your museum does not, consider who could be the accessibility advocate, like an advisor, board member, or education staff member. Someone who asks insightful questions and has a desire to promote accessible solutions would be a great fit.
- **Consider whose buy-in you need to create an accessible exhibition.** The people whose buy-in will be needed are the people you will want around the table for accessibility conversations. These roles could be internal staff or external consultants, and include designers, multimedia or AV, carpenters, and educators.

Tools and Processes to Support the Development of Accessible Exhibitions

Over the past five years, staff have refined the exhibition development process at The Children's Museum of Indianapolis, adding new tools along the way. The IMLS grant focused on accessibility planning gave staff the opportunity to review these tools with an eye toward 1) ensuring accessibility factors were included in the current tools and 2) creating new tools to fill gaps. Exhibit developers use these tools to plan for their own work, as communication points with other members of the exhibition team, and to share their work with museum leadership.

Four tools are described below with examples provided in the next section. The descriptions below use details of The Children's Museum of Indianapolis' processes and the titles of our team members. You might have different titles in your organization or work with contractors in some of these roles. Each tool serves a separate purpose and is tied to a different design stage. Each tool can be used independently or in combination. See the [Effort](#) and [Impact](#) graphic for each tool to help you decide on how to prioritize which tool(s) to use. Alternatively, implement the tool that fills a gap in your current exhibition development process.

The tools are:

- 1. Exhibition Development Matrix:** Captures accessibility information related to each exhibition element in writing. Spreadsheet format allows for easy sorting of accessibility information.
- 2. Accessibility-focused Floor Plans:** Visualizes all exhibition components on the floor plan. Format allows for review-at-a-glance of presence and distribution of components for accessibility.
- 3. Interactive Journey:** Highlights options for designing an interactive exhibit component with accessibility in mind. Allows team members to understand the interactive's flow and make suggestions to improve usability and accessibility.
- 4. Prototyping Plan:** Outlines evaluation questions and audiences related to accessibility needs during the element prototyping stage.

Hiring a Designer or Production Firm

Most museums will hire an external designer or production firm at some point. How do you integrate them into your museum's accessible exhibition development journey? The best route is to be hypertransparent throughout the process and be very vigilant about asking for what you want. The clearer you are, the more likely you are to receive a deliverable that aligns with your expectations. Consider meeting with prospective partners to learn about their typical processes and how your expectations might require them to adapt or change those processes.

- **Topics to add to your RFP:** Any considerations that are important to you and your community! Even if you think they are the norm in the industry, call them out in your RFP so potential contractors know your expectations from the very beginning. This includes open captions, American Sign Language interpretations, standard heights and widths, text and graphics standards, accessible handles/grips, etc. Include whether you expect the contractor to lead prototyping and how many rounds or iterations are desired.



- **Questions to ask the contractor/items for the RFP:** What other accessible exhibition projects have you done? What resources do you rely on to guide your designs and ensure accessibility? How will you prototype your designs? What groups do you invite for prototyping?
- **Things to look for: Is the contractor only focusing on one type of accessibility in their proposal or design?** For example, it is fairly typical to get proposals that address wheelchair access but neglect all other types of access. This could be an indication that the contractor is adhering to ADA requirements but not universal design guidelines. They might have a knowledge gap around universal design—you may need to supplement their knowledge yourself or with advisor feedback.

Challenge

Keeping accessibility top of mind for the team.

With so many details involved in creating an exhibition, keeping everyone informed can be a challenge. Here are a few suggestions:

1. Add an accessibility update to regularly scheduled exhibition planning meetings.
2. Review each deliverable with an accessibility lens.
3. If you don't have an accessibility coordinator, designate one team member to ask accessibility-related questions in meetings.



Accessibility Planning Tool 1

Exhibition Development Matrix

What The exhibition development matrix organizes and unpacks the exhibition's messages and educational content. Drawing on early concept conversations, when the exhibition team determines the major themes or topics of the exhibition, the exhibit developer organizes the matrix by these themes or topic areas. For each element within an area, the exhibit developer articulates the messages being presented and how those messages will be delivered.

Delivery of content includes objects, labels, interactive components, media, and immersive design. As the developer considers a cohesive plan for conveying content using a variety of methods, they are also articulating accessibility concerns, considerations, or needs for each of the content delivery elements. This accessibility assessment includes looking at the visual, auditory, tactile, and movement opportunities available across exhibit elements.

When Created in early schematic design and continuously updated until exhibition opening

Who creates Exhibit developer

Who uses and why The exhibit developer uses the matrix to track how messaging is manifesting across the space and to ensure each exhibition message is being presented in a variety of modalities (e.g., audio, visual, tactile). The matrix also helps the developer track all of the individual parts and pieces that make up each exhibition element. Other members of the team refer to the matrix to create subsequent tools or to keep track of a large number of interactive elements and objects in a complex exhibition.

Why this is important to accessibility This tool organizes much of the later work, serving as an outline of the exhibition that gets fleshed out as design progresses. By including accessibility in the exhibition development matrix, accessibility considerations and concerns are articulated very early in the process—they are “baked in,” as opposed to being an afterthought during the build process.

Impact and Effort

Look for the speedometer next to each tool detailing:

- **Impact:** how the tool affects and supports the process of crafting an accessible exhibition for the team as a whole
- **Effort:** developer's time spent on creating/ updating, sharing, and gathering feedback on the tool

Matrix Breakdown



High

- **Impact:** High for the developer because they are referring to it throughout the rest of their work; medium-low for the team



Medium

- **Effort:** Medium



Accessibility Planning Tool 1 Exhibition Development Matrix

Example: WinterFaire Exhibition Development Matrix

The example exhibition development matrix provided on pages 9 and 10 is from The Children's Museum of Indianapolis' *WinterFaire* project. In this annual seasonal exhibition, families spend time together and build new traditions in a magical forest setting with a carnival-like atmosphere. The matrix was created by the exhibit developer during the schematic design phase but was updated multiple times during both the detail design phase and the production phase to keep track of updates or changes to exhibition components.

The matrix contains information about each exhibition element, including family learning goals, a narrative description of the surrounding environment and the planned interactive elements, objects, and labels that accompany each element. Label numbering allows for comparison and tracking across documents—such as the graphics label list—managed by other team members.

Each element also includes accessibility review columns. Checkboxes allow the exhibit developer to easily track auditory, visual, tactile, and movement opportunities across the exhibition. The spreadsheet format also allows the elements to be sorted by modality. This allows the exhibit developer to look across the exhibition as a whole and note where there may be gaps in the way content is presented. For example, if a developer sorted the spreadsheet and noticed there was only one tactile opportunity in the entire exhibition, they could elevate this to the core team and come up with a plan for greater incorporation of tactile opportunities throughout the space. An accessibility notes column also allows the exhibit developer to capture notes from planning meetings, focus groups, or prototyping in a singular location. This notes column can include questions, comments, and concerns that have arisen in relation to accessibility.

Additional columns that track target audience and method of interaction (physical, digital, or a combination of both) also provide a tool identifying where there may be gaps in how content is being presented.



Tips

- **Decide who is the primary audience of the matrix.** Who is the content for? Will the matrix be shared with people outside of the core team? Is it primarily for the exhibition development team to keep the content in order? The audience will help you determine how much detail to use.
- **Make friends with a designer!** An exhibit designer or a graphic designer can help you visualize the exhibition matrix in the floor plan stages. If you don't have a designer close at hand, try using the Shapes illustration options in Microsoft Word or an online whiteboard tool, such as Miro.
- **Try creating an exhibit matrix in Microsoft Excel or Google Sheets.** These programs let you filter within columns and hide rows and columns, making for easier sorting when you are working with the document. Also try color coding your sections.
- **When discussing accessibility, point team members toward the "accessibility review" columns.** Help them understand and reflect on the distribution of modalities, such as tactile, auditory, and movement opportunities.



Challenge

Not everyone on your team will look at the matrix. Build in other communication opportunities, like in-person meetings with the team or external design groups so that others understand how accessibility is addressed across the entire exhibition and within individual components.



Accessibility Planning Tool 1

Exhibition Development Matrix

WinterFaire Exhibition Development Matrix

(Example is a portion of the WinterFaire Matrix)

Including this information here helps make the matrix more comprehensive for the team. It includes not just what and how, but also the why of the interactives.

Exhibition Area and Element	Family Goals	Environment	Interactives or Objects
Central Icon > Forest Square	Children and families will gather in the forest square to take in the beautiful sights and sounds of the frozen fountain and a magical show performance led by interpretation staff members.	Visitors will be immersed in a magical forest setting surrounded by four large trees, benches decorated with foliage, banners, pennants, and string lights.	N/A
Central Icon > Frozen Fountain	Children and families will work together to change the colors of the “frozen water” in the fountain in a moment of joyous and magical play and discovery.	Visitors will see a large fountain with “water” that looks as though it has been frozen in mid-spray. Indigo the chameleon will be perched on one of the fountain basins.	Visitors will work together to trigger magical symbols around the fountain's base, changing the color of the “frozen water” and playing harmonious sounds. Activating all six magical symbols at the same time will produce a special short sequence of lights and sounds.
Games > Slippery Slope Race	Children and families will engage in family-friendly competition as they race each other down a snowy hill by tilting a board back and forth to control their on-screen racer.	Visitors will see the façade with two side-by-side vertical screens. In front of each screen will be a board. One will be a snowboard and the other will be a saucer-shaped board.	Visitors will race another member of their family down a snowy hill by tilting a physical balance board left and right to control their racer on a screen in front of them. Visitors will have to avoid obstacles and pick up power-ups on screen.
Ice Cave > Arch Build	Children and families will rebuild an entrance to the ice cave that has caved in by working together to place large soft blocks into a catenary arch. Some families will feel nostalgic if they remember this activity from use in a former TCM exhibit.	Visitors will see a pile of large soft blocks that look like chunks of snow and ice. When put together, they make an arch. A nearby banner will provide storyline context and instructions for the activity.	Visitors will discover an entrance to the ice cave that has caved in and work together to rebuild a catenary arch that allows the ice phoenix to get back inside his cave.
Ice Cave > Tabletop Arch Build	Children and families will rebuild a smaller entrance to the ice cave that has caved in by working together to place small blocks into a catenary arch on a tabletop.	Visitors will see a table set against an icy wall backdrop. Small wooden arch blocks with tactile markings will sit on the table, providing a smaller-scale arch-building activity.	Visitors will discover an entrance to the ice cave that has caved in and work together to rebuild a catenary arch that allows the ice phoenix to get back inside his cave.
Artisan's Corner > Stone, Ceramic, and Glass Display	Children and families will see a display of objects representing the mediums of stone, ceramic, and glass. Families will make observations about which objects have been given an award and talk about which objects they would have given awards to.	Visitors will see a display case that is themed to look like a display you might see at a 4-H craft fair. Objects will be arranged by material composition, and visitors will see and touch tactile elements on the outside of the case that mimic the feel of the objects on display.	Stone: chess board and pieces, penguin figure, monkey figures, people figures Ceramic: seal figure, fox figure, bear figure, skier, turtle figure, teapot Glass: unicorn figure, stacked animals, pied piper, vase, child holding balloon

Accessibility Planning Tool 1

Winterfaire Exhibition Development Matrix

These categories are key universal design considerations. Having a mix of these attributes will help meet the needs of a wide variety of audiences.

Note the wide range of ideas recorded here, including design reminders, connections to gallery programs, and prototyping needs.

These columns allow the reader to look across the whole exhibition, seeing the mix of interactives selected and audiences served.

Labels	Auditory	Movement	Visual	Tactile	General Accessibility Notes	Target Age	Interaction Method
Bench Info Labels (B1.1, B1.2, B1.3, B1.4)	X		X		The interpretation show experience may offer additional movement or tactile opportunities. Music produced by fountain can be heard in this area.	All	N/A
Activity Prompt (B2.1, B2.2)	X		X	X	By making the symbols that visitors need to trigger tactile and adding sound connected to each symbol, the exhibit team hopes to make this highly visual element more accessible for visitors who are blind or have low vision.	3–8	Physical
- Space Identifier (C4.1) - Activity Prompt (C4.2)	X (Needs: timer v/o; game sound effects)	X (leg movement/ balance)	X		Prototyping will be conducted to determine if there is a board shape that would work for wheelchair users that are able/ willing to transfer to the board. Reviewed during accessibility advisor focus groups.	5–12	Combination of physical and digital
Activity Prompt (D2.1)		X (gross motor movement based on size of blocks)	X	X	Markings on the floor and numbers on each block will be raised/tactile to aid in building for visitors who are blind or have low vision.	3–8	Physical
Activity Prompt (D2.1)		X (fine motor movements)	X	X	Feedback from accessibility advisor focus group led to this interactive being added to complement the large-size arch build. Dots on blocks that indicate building order are tactile.	3–8	Physical
- Info Label: Superlatives (E2.1) - Activity/ Conversation Prompt (E2.2)			X	X		All	N/A

Accessibility Planning Tool 2

Accessibility-Focused Floor Plan Maps

What In addition to the typical floor plan that places environmental elements, objects, videos, labels, and interactives within the exhibition space, core team staff implement complementary floor plan maps that track tools of content delivery as well as sensory elements used within an exhibit that complement the matrix. The **storytelling tools map** highlights the use of environments, objects, labels, videos, and interactives, shown as E, O, L, V, and I on the example on page 13. The **exhibition element sensory map** shows visual, auditory, tactile, and movement opportunities, shown as V, A, T, and M on the example on page 14. This map also highlights special considerations, labeled with a * on page 14 used within the space, such as the inclusion of American Sign Language on videos or audio descriptions.

When Created in early- to mid-schematic design and referred to during detail design

Who creates The exhibit designer creates with input from exhibit developer (or by looking at the matrix).

Who uses and why In combination, core team staff examine the set of floor plan maps to ensure flow of content, distribution of exhibit messaging, and distribution of sensory elements. Spacing between each interactive with audio and options for gallery seating can also be examined. When others outside the core team are reviewing the schematic design package, which can be quite long and text-heavy, the maps included in the package can provide a quick, big-picture view. They provide a visual interpretation of the exhibition development matrix, which we have found is helpful in communicating with museum leadership and others not deeply involved in creating the exhibition.

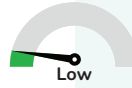
Why this is important to accessibility

The floor plan maps make the team's decisions visible to those in leadership positions, allowing leadership to more easily see how accessibility has been incorporated into the overall design.

Maps Breakdown



- **Impact:** High, especially if you can get the buy-in at this stage from the designer or vendor leading the production. Ideally, they would be involved in the cocreation of the maps.



- **Effort:** Low if there is a matrix to draw on; medium if you do not have a matrix. Then, when creating the maps, you are thinking through these considerations for the first time.



Bonus

Core team members who are visual learners have a new tool that can make digesting information easier!



Accessibility Planning Tool 2

Accessibility-Focused Floor Plan Maps

Example: Sacred Places Storytelling Tools Map and Element Sensory Map

The Sacred Places storytelling tools map and element sensory map shown on pages 13 and 14 were created by the exhibit designer in collaboration with the exhibit developer during the schematic design phase of The Children's Museum of Indianapolis' Sacred Places exhibition.

In this exhibition, families explore the sacred places and objects of community partners from around the world. The maps use labeled, color-coded dots to represent tools of content delivery (environments, objects, interactives, videos, and labels) as well as sensory components (auditory, movement, visual, tactile, and special considerations such as transitions for triggered audio).

These examples coordinate with the interactive journeys and the matrix created by the exhibit developer and provide a visual way to see the balance of these components as well as identify gaps in planning for consideration. Communicating key features of the interactive journeys in a visual format was highly effective in getting quick feedback from our core team, other museum staff (e.g., executive leadership and marketing staff), academic advisors, and project funders who are unlikely to delve into the highly detailed interactive journeys or exhibition development matrix. In later design stages for these individual components, the team referred back to these maps as a guiding source or made updates as needed.



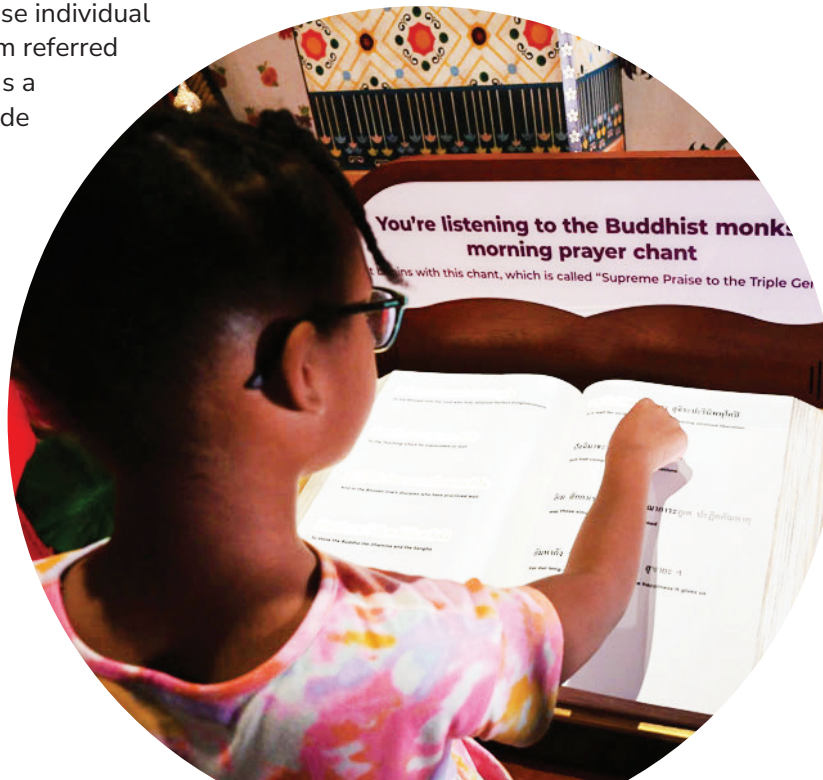
Tips

- **Know your audience!** Is the map for yourself as the exhibit developer or for communication with other members of the team? If it is for others, make sure to include information they need to know.
- **Think of the maps as a heat map.** When reviewing, remember to look for balance across the entire exhibition and within areas.
- **Color code and use letters to account for those reviewers who may be colorblind.**
- **You will need to have an initial floor plan/layout of the exhibition to create this tool.**



Lesson Learned

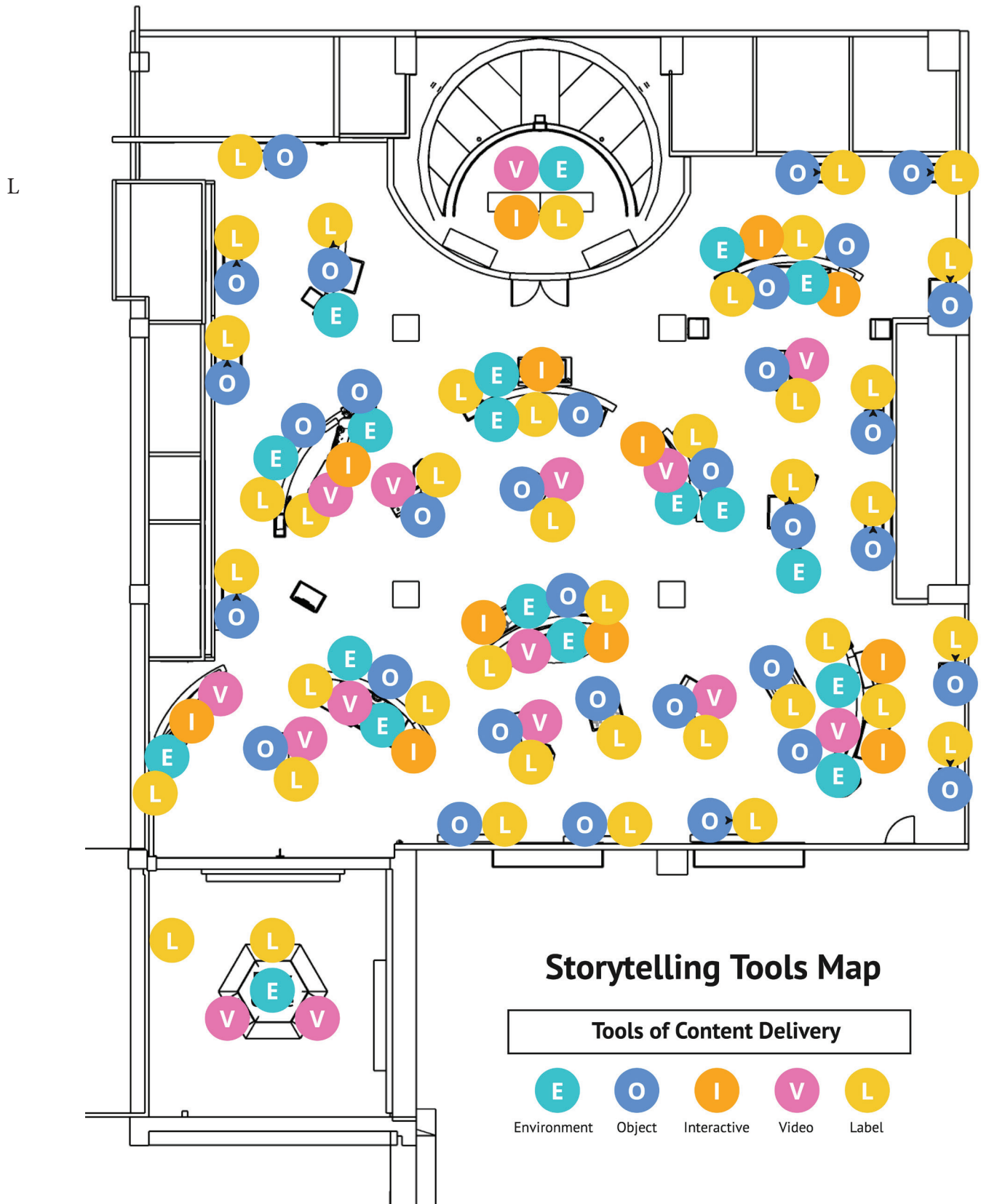
When the team reviewed the map on page 14, they observed that the exhibition was **reliant on visual content**, as represented by the V. This was directly related to it being an exhibition that included many collections objects. They were able to reflect on how the exhibition's focus on objects and visuals was key to the team's overall goals. They also saw the need to provide balance and access to the visuals with audio descriptions of the primary displays accessible through QR codes.



Accessibility Planning Tool 2

Accessibility-Focused Floor Plan Maps

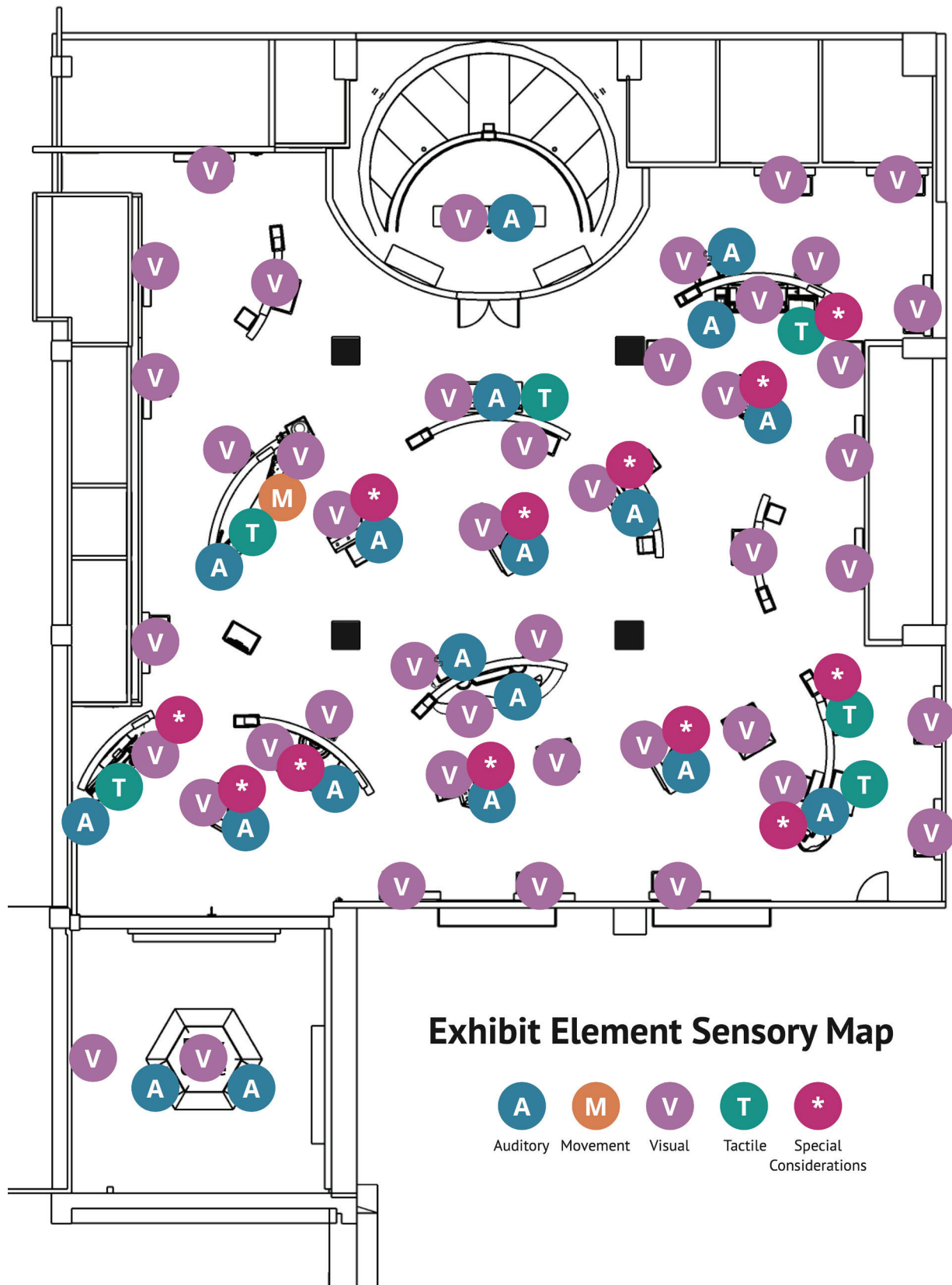
Sacred Places Storytelling Tools Map



Accessibility Planning Tool 2

Accessibility-Focused Floor Plan Maps

Sacred Places Element Sensory Map



Accessibility Planning Tool 3

Interactive Journey

What The interactive journey is a written narrative walk-through of an individual exhibition component, typically an interactive. It includes a description of the surrounding exhibition environment, the message(s) the interactive will convey to visitors, a step-by-step walk-through from a user's point of view that notes each action a user would take to complete the interactive, and the predicted learning outcomes for the interactive.² Accessibility needs and concerns are noted by team members in the step-by-step walk-through with any additional actions the team plans to take to investigate further (like prototyping or advisor feedback) or alternative options to consider. Interactive journeys may also include images for inspiration or to provide references for the core team as they transition into detail design. This helps inform the design considerations, such as the elements that could be purchased off the shelf and those that are completely custom builds.

When Created in mid-schematic design and referred to during detail design and production; can inform remedial or summative evaluation after opening

Who creates The exhibit developer

Who uses and why The exhibit developer creates to capture and articulate how an interactive element connects to and conveys the overall message/topic of the exhibition. The interactive journeys capture the details from core team conversations or brainstorming about how the element will work. Design and production team members reference the interactive journey when they begin designing the details, during preliminary engineering discussions, and when considering specifications of each element. The interactive journey helps team members responsible for production and implementation remember what each interactive needs to be able to do. Production team members may refer to the images in the interactive journey as a starting point for their build. If an element requires an in-depth evaluation study after opening, the evaluator refers to the interactive journey as the criteria for understanding whether the element is meeting its goals or not.

Journey Breakdown



- **Impact:** High, especially if team members/contractors engage with these and give feedback at this stage in the process



- **Effort:** Medium-high



Lesson Learned

If you can only do one thing: Discuss early plans for interactives with accessibility advisors, families, or community members. An interactive journey is a great resource to support this type of walk-through. Listen to their feedback and problem-solve ways to increase accessibility.

Why this is important to accessibility

Including the accessibility factors in the conceptualization of an interactive component aids in team conversations as the concept is refined. It also keeps accessibility top of mind during the production stage. By referring to the interactive journey, staff creating the interactive can get a clear picture of how they need to design and build for accessibility.



² At The Children's Museum of Indianapolis, those are based on our Family Learning framework and the ALFIE inventory. See Foutz, S. & Emmons, C. T. (2017).

Susan Foutz & C. T. Emmons, "Application and Adaptation of an Institutional Learning Framework," *Journal of Museum Education* 42, no. 2 (2017): 179–189.

Accessibility Planning Tool 3

Interactive Journey

Example: WinterFaire Interactive Journey for Snowboard Race

The WinterFaire interactive journey shown on pages 17 and 18 was created by the exhibit developer during the schematic design phase of The Children's Museum of Indianapolis' WinterFaire exhibition. In this annual seasonal exhibition, families spend time together and build new traditions in a magical forest setting with a carnival-like atmosphere. The example describes an interactive activity for children ages 5 to 12 that takes inspiration from the real-life activity of downhill snowboarding and arcade games that simulate snowboarding.

The interactive journey documents the environment, learning goals, and step-by-step interactive flow that was discussed and agreed upon by exhibit core team members during working group meetings. These working group meetings typically include the exhibit developer, two- and three-dimensional design, interactive media, production, the accessibility representative, the evaluator, and the project manager.

Throughout this example, you can find places where accessibility factors were documented, including:

- Options for multiple styles of playing surfaces that act as the game's controller. This element included a typical snowboard shape and a saucer. The saucer was selected as an accessible option for those who wished to sit down to play. It also allowed an adult to sit or stand on the controller with a child.
- The inclusion of both visual and auditory instructions, e.g., "see and hear" to guide the successful completion of the interactive.

The example also indicates where the exhibit core team discussed further prototyping needs with targeted user groups (in this example, it was users with mobility devices).



Tips

- **Create a realistic journey.** Write these from the users' point of view using a third-person narration, like an author describing what a character will do, step by step. Remember, it's not what the interactive will do, but what the user will do. Think about what the experience would be like for individuals who have disabilities as you write and review the journey.
- **Include visuals to help reviewers and team members understand the concept.** These could be a simple sketch, a mood board, or inspiration images, such as example toys or games that are similar.



Challenges

- **Updating your interactive journeys.** Interactive journeys can support the team's work at multiple stages, but only if they are reviewed by the team and updated. Your timelines might make this a challenge but try to update the document as the design changes. And you may want to go back and reference the journey at some point after the project.
- **Communicating with busy coworkers.** Have an elevator pitch ready so you can communicate the component clearly for team members who haven't read the interactive journey.



Accessibility Planning Tool 3
Interactive Journey

WinterFaire Interactive Journey for Snowboard Race

Narrative:

As families reach the back of the games area, they will encounter a booth where they can participate in a snowboard race. The exterior façade and area surrounding the Snowboard Race will match the look and feel of the winter carnival, including elements showcasing handcrafted charm and detail. Family members will step onto physical balance boards and then tilt the boards left and right to control a racer on a screen in front of them. Each racer will tilt their board to avoid obstacles in their path and pick up items to give them more speed as they race down a snowy hill toward the finish line. Two side-by-side stations will allow family members to compete head-to-head, while a more open façade design will allow family members not currently racing to cheer on the visitors that are racing. Since users will tilt the board using their legs and lower body strength, this game will provide opportunities for gross motor movements. This provides a nice complement to the other interactives available in the games area, which all require arm movements to complete.

Educational Flow:

- 1. Users will approach a games booth that holds two side-by-side balance boards. Each board will be situated in front of a screen that shows a penguin sliding down a snowy hill in a looping animation attract screen.
- 2. Users will step onto one of the boards. On-screen text will prompt users to tilt the board left or right to start. (Note: The design of the boards will need to be prototyped with potential users in various age groups, including users of different abilities. Prototyping with wheelchair users who are able to transfer or users who use a mobility assistive device will need to be prioritized. Initial ideas for board design include a traditional snowboard shape or a larger circular shape like a saucer-style sled.)
- 3. Users will be prompted to tilt their board to select one or two players. If the user selects two-player mode, then player two will need to tilt the board they are standing on to confirm they want to participate in the race.
- 4. Users will see and hear a 3, 2, 1 countdown timer that will signal the start of the race.
- 5. Users will start the race. In one-player mode, users will race against a computer-generated penguin character. In two-player mode, users will race against each other and the computer-generated penguin. The penguin will race by sliding down the snowy hill on his belly.
- 6. Users will tilt their board left and right to remain in the “ideal” track represented by carved snow. The better a user is able to keep their board in the “ideal” path, the faster they will go.
- 7. Throughout the race, users will need to tilt their boards to avoid obstacles that could slow them down (such as a tree) and collect or run over objects that could give them a speed boost.
- 8. Users will complete the 1–2 minute race and see which place they finished in.
- 9. On-screen instructions will encourage users to clear the area so the next racer can play.

Predicted Family Learning Behaviors:

Participate

B	Family members will participate in their experience when they step onto a balance board and tilt it left and right to complete the snowboard race.
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Accessibility Planning Tool 3
Interactive Journey

WinterFaire Interactive Journey for Snowboard Race

Collaborate

M	Family members will collaborate in their experience when they race each other at the same time to see who can finish first.
J	Family members will collaborate in their experience when they provide directions to one another on how to steer the board (i.e., Tilt right so you don't run into the tree!)

Enhance

R	Family members will enhance their experience when they reward each other's performance at the end of the game (i.e., Awesome job—you got first place!)
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Inspiration Images:

Inspiration for
snowboard-style
balance board



Final Interactive:



Final Children's Museum design



Similar style digital/physical
interactive from The Strong
Museum (Super Flight Interactive)

Accessibility Planning Tool 3

Interactive Journey

Example: Sacred Places Interactive Journey for Nepal Puja Merchant

This interactive journey details an element set within a realistic environment in the Sacred Places exhibition.

For this interactive, the educational goal was to teach visitors more about the items used in puja offerings at Hindu temples in Patan Durbar Square, Nepal. To deliver this content, the team set up a facsimile of a merchant stall, displaying touchable puja items. Touching the items triggered a digital representation of a vendor to provide more information about the items. To enhance accessibility, the team made sure that the items that visitors could touch were dimensional so that the items could be felt as well as seen. Additionally, descriptions of the items were offered audibly as well as through captioning. Finally, the counter that housed the items could be rolled under, providing ease of access for wheelchair users.

These aspects of the interactive journey are visualized on the Sacred Places storytelling tools map (on page 13) and element sensory maps. Here, the considerations that are discussed in the narrative are identified within the context of the full exhibition for ease of review and reference.

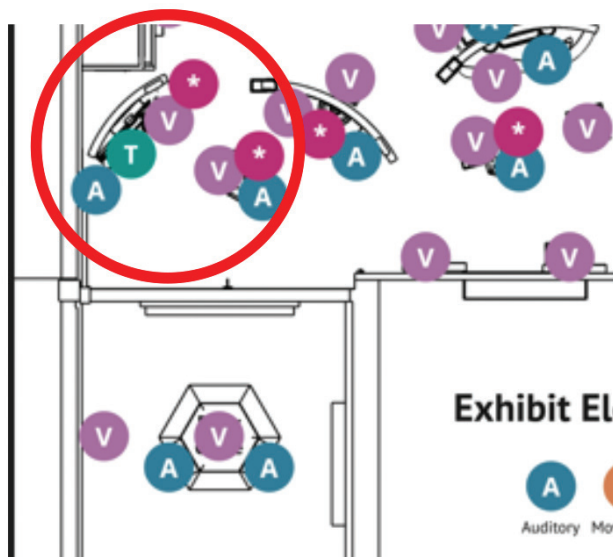


Figure: Puja Merchant Interactive
(along the curved wall and circled)



Tip

Share the journey with members of the team for feedback. This is an early point in the design process for team members to engage with the concept and share the final design.



Challenge

Even a well-thought-out design will not identify all issues in advance. This interactive was revisited after opening to refine the timing of the audio and visuals to align with how visitors were using the component. A combination of gallery staff feedback and direct observation of visitors during the remedial evaluation period helped identify the issue. The team then problem-solved to streamline the interactive.



Accessibility Planning Tool 3

Interactive Journey

Sacred Places Interactive Journey for Nepal Puja Merchant

Narrative:

Visitors who participate in this interactive will learn more about Hindu *pujas*, which are offering rituals. Specifically, they will learn more about the items found on a *puja* offering plate. During the interactive, families will visit a merchant space that sells *puja* offering items. The space will be staged to look as if it is placed outside of the King's Palace complex in Patan Durbar Square in Nepal. Families will have the opportunity to learn more about the significance of each item in the merchant space by touching the item and hearing and reading more from a digital representation of the merchant.

Element User Flow:

1. Users will approach a merchant's space in front of a backdrop featuring a large-scale graphic image of the King's Palace complex, which includes a stone shrine of the god Ganesh.
2. The merchant's space will be filled with items used as offerings by practitioners visiting the temples and shrines in Patan Durbar Square. Items could include leaf bowls, baskets of marigolds, other seasonal flowers, incense, rice, coconuts, local greenery, fruits, and clayware.
3. Centered behind a counter, users will see a video screen depicting the stall's merchant on a video loop, moving around as if she is preparing for visitors to her stall.
4. When the merchant speaks, she will be captioned.
5. When users approach the merchant space, a motion sensor will detect their presence and cue the merchant to welcome users with "Namaste."
 - a. The merchant will give background information about where she is and why she has a shop there.
 - b. She will prompt users to learn more about her wares by touching the items in the baskets on the counter
6. On the counter, users will see a selection of *puja* items in baskets, which will be equipped with sensors. A label will prompt users to touch the items to learn more.
7. The items will include marigolds, shankh shells, bronze *puja* plates, and tika powder. The items will be dimensional so that users can feel their texture to identify them by touch in addition to sight and sound.
8. When users touch an item, the merchant will name the item, describe its purpose, give an example of how it can be used, and invite the user to touch another item to learn more.
9. Once the user has touched all the items, the merchant will thank the user for visiting and say goodbye with a parting "Namaste."
10. To the side of the counter space, users will find aromatic *puja* items like flowers in baskets with lids. Labels will prompt users to lift the lid to smell the items.

Predicted Family Learning Behaviors:

Participate

A	Family members focus their observation, resulting in participation with the element by interacting with the vendor and learning more about the <i>puja</i> offerings.
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Accessibility Planning Tool 4

Prototyping Plan

What The prototyping plan is a list of all planned interactive elements along with key evaluation questions and prototyping needs identified by the staff. The prototyping plan can take a variety of formats, but generally the exhibit developer or the project's evaluator will bring the list of the planned interactives to a small group consisting of the project manager, designers, production lead, the accessibility representative, and the multimedia team.

The group walks through each component, articulating any evaluation questions or prototyping needs and at what stage in production those questions need to be answered. For example, a new puzzle style may need to be tested with a low-fidelity or paper prototype at an early design stage, while a touchscreen game may need to be built out to 90% completion before testing and refinements are made.

In addition to general usability questions, the team brainstorms concerns for specific accessibility audiences, like audiences who are blind or have low vision, those who are deaf or hard of hearing, or those with sensory sensitivities. For example, how will the puzzle be accessible to those who are blind or have low vision? For each interactive element, the team considers prototyping needs for a general audience and accessibility audiences. These decisions are recorded in the prototyping plan and mapped onto the timeline for the design and production stages.

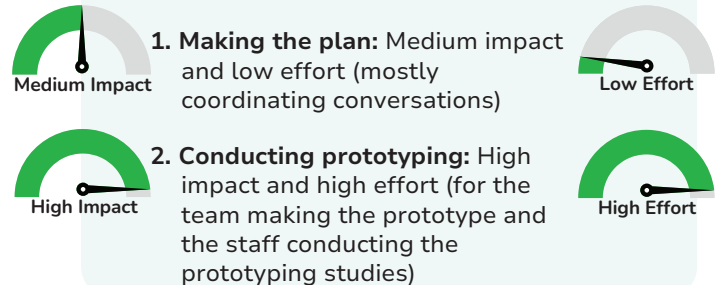
When Created in mid- to late-schematic design and continuously updated through the end of production

Who creates The exhibit developer and evaluation team

Who uses and why The prototyping plan is used by design and production team members, plus the accessibility representative and evaluation team, to highlight decision points in design and prototyping. It can serve as a continued point of conversation as the design progresses and changes. By calling out which interactive elements are a high priority for prototyping, the production team can make sure these builds are represented in their workflow. An interactive component requiring more prototyping would need to be designed and built earlier in the process. The research and evaluation team uses the plan to design visitor-facing studies and ensure the study results can influence future design stages.

Prototyping Breakdown

See this as two steps when considering Impact and Effort:



Lesson Learned

Prototype when it can do the most good.

The purpose of prototyping is to gather data to inform the team's next steps. Depending on what questions the team has about a particular interactive, prototyping may need to occur earlier or later in the design process. Whenever you prototype, give the team enough time after the prototyping to implement the findings, incorporating needed updates into the next stage. Asking families or advisors for feedback but not including it is a waste of everyone's time and can damage trust.

Why this is important to accessibility

Prior to the museum's recent IMLS grant, the prototyping plan focused almost exclusively on testing interactive elements with members of the exhibit's target audience. Since the target audience is usually an age range (e.g., children 3 to 6 with their adults), prototyping would focus on seeking out museum visitors in the target audience to test the interactive. Any prototyping with subgroups or accessibility audiences was typically an afterthought. Sometimes the need wouldn't be recognized until the middle of prototype testing. Since accessibility audiences often have to be specifically recruited for prototyping, the last-minute need to include that audience often led to rushed recruitment, delays in the study, or even delays in the production of the interactive. By including accessibility in the prototyping plan, the team plans for recruitment from the beginning, ensuring that the feedback of families and children with disabilities can be incorporated into the final component.

Accessibility Planning Tool 4

Prototyping Plan

Example: Dinosphere® Prototyping Plan

The core team created this prototyping plan for the Dinosphere® renovation, which reopened in March 2022.

The plan was drafted by the evaluation team representative, accessibility manager, and interactive media project manager, then shared for review and input from other members of the core team. This group process is standard at The Children's Museum of Indianapolis and often includes the above team members as well as production, project management, the exhibit developer, and the 3D designer. In the past, we left the decisions on what was prototyped to one or two team members, but that process often led to fewer elements being prototyped and did not include the input of the accessibility manager. With a larger group involved, the team considers a wider range of usability concerns plus the feasibility of the prototyping approach.

In this example, the team considered both general audiences and accessibility audiences for each interactive (see the column labeled "Testing Audience"). The plan notes whether prototyping was needed with each audience and the rationale. This level of detail allows team members who were not involved in the conversation, such as the project manager, to review the plan with the rationale in mind. They know that various audience types were considered for each interactive, which can provide confidence in the decisions made and support specific questions they may have. Note that the plan also includes reviews by accessibility advisors, in this case, local professionals with expertise in disability. The team decides to include advisors on a case-by-case basis, often inviting advisor input at the schematic design stage. The team seeks out advisor input when a question arises that cannot be answered through internal expertise or when there are differing opinions on how to proceed. Family feedback is sought throughout an exhibition's development, with a focus here on the prototyping stage.



Tips

- **Clarify with the team on what will be included in the plan.** At the minimum, it should include the needs for prototyping with public audiences. However, the team may also decide to note other internal needs around testing materials or functions by staff as the prototype component is being built.
- **Build a shared vocabulary for prototyping within your team.** Identify the key types of prototyping and stages that are important to your project. Then make sure that these are continually communicated to keep everyone on the same page.
- **This plan is continually evolving and should be kept up to date as materials and designs change.**



Lesson Learned

Involve a larger group in the discussion of what gets prototyped. One team member is the document's owner or creator, but many team members have insights on prototyping needs and priorities.



Accessibility Planning Tool 4

Prototyping Plan

Dinosphere® Prototyping Plan

(Example is a portion of the Dinosphere® Prototyping Plan)

Area and Element	Evaluation Needs	Testing Audience	Timeline for Testing
Ramp > Sauropod Sound and Light Show	Captions and ASL: readability, placement, speed, size, etc. (early as possible in February) Sensory-related elements: lights and sounds and their related labels	Accessibility advisors Accessibility advisor families: focus group families who reviewed the storyboard, plus others as needed	Broad timeline from vendor: A full version to view on Feb. 14, another draft on Feb. 25, project completion on March 11
Giants of the Jurassic > Bone Structure Puzzle	Contextual prototyping to determine intuitiveness of activity, understanding role of adults, and refine the labels and visuals; general usability for visitors who are blind or low vision plus above considerations	Visitors off the floor: preschoolers (3–6) and their adults Accessibility audiences: elementary-aged children (Grades 1–3) who are blind or have low vision	Physical prototype needed for testing; December (on-site/preschoolers) and January (19 and 20 on-site/preschoolers and 28 at ISBVI with their students)
Giants of the Jurassic > Baby Sauropod Touchscreen	Contextual prototyping for understanding how all the aspects of the interactive work together; usability and confirmation that directions and activity are clear	Visitors off the floor: Target age: 6 to 8 years (likely appeals to the younger side of this age group)	75% finished stage delivered from vendor needed for testing; on-site/playable starting Jan. 21
Giants of the Jurassic > Diplo Digestion Interactive	Usability and understandability for visitors who are blind or have visual impairments; how do the combination of touchable dino, tactile labels/braille, and video work together	Accessibility audiences: elementary-aged children or adults who are blind or have low vision Visitors off the floor: If we have time, but there are no anticipated issues for them	75% finished stage of video delivered from vendor PLUS touchable model made in-house by production with raised numbers and braille numbers; scheduled for early February



Real-Life “What if” Scenarios

- **What steps do you take if your exhibition is already in production?** It happens! This is where you need to lean on prototyping or invited feedback from advisors or community members. Prototyping: What works-in-progress could you take out onto the floor of the museum? Could you take a prototype to a local school or a community group that serves individuals with disabilities in the age range you are designing for? Advisors: Can they visit the shop (in person or virtual) to see the work in progress? Could you give them an overview using floor plans, sample labels, and drawings?
- **What if you get conflicting feedback from multiple families and advisors?** This is a tough situation but relatively common. The museum team will have to make the judgment call because, as staff, you have the high-level goals in mind and know how the whole exhibition fits together. At The Children’s

Museum, our goal is to create an exhibition with a variety of ways to access the main messages, so we reflect on how the advice adds to that big picture of the exhibition as a whole. If there is conflicting advice, how does each option feed into the overall plan? Is one option more likely to support diverse ways to access the main messages? If so, that is usually the advice we choose to implement.

- **What if your design changes over time?** Changing expectations and designs are part of the natural progression of developing an exhibition. Don’t try to fight change. Instead, document it by revising the tools we highlight in this tool kit. Update the interactive journeys and prototyping plan so that they are current. You might consider annotating why changes were necessary, especially if those changes impact accessibility. This can help with planning and design for the next project.

Conclusions and Next Steps

We believe efforts to create accessible exhibitions are founded on changing your processes and mindset. The exhibition development tools in this tool kit offer ideas for making accessibility part of your planning and design process. However, process improvement alone will not achieve the accessibility results needed to create real change. Combine the process improvements with a mindset of championing accessibility and listening to your community, and you will have a recipe for enhancing accessibility in your organization’s exhibitions.





Creating Accessible Exhibits



Tools for Exhibit Developers

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