

PLUM LANDING Explore Outdoors Toolkit:
Scale-Up Study

Education Development Center, Inc.

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INTRODUCTION

Education Development Center (EDC) serves as WGBH’s research partner for the NSF AISL project, ***PLUM RX: Researching a new pathway for bringing active science exploration to urban families***, a project that makes use of public media resources to create innovative opportunities to bring environmental science learning to the hard-to-reach audience of urban families. Drawing on previous evaluations of *PLUM LANDING*, as well as our past and ongoing partnerships in developing curricular programs for young learners that make use of transmedia, we worked in partnership with WGBH and informal education (IE) programs nationwide to (1) develop a new pathway for bringing active environmental science exploration to urban families with children ages 6-9; (2) expand *PLUM LANDING*’s media assets to support urban families and informal educators when engaging in environmental science activities; and (3) inform the field about the institutional circumstances and educator practices that support effective integration of digital media and science activities to spark and sustain urban families’ exploration of core environmental science concepts in natural environments. The result of this participatory research and development process is the *PLUM LANDING Explore Outdoors Toolkit*, a collection of digital media resources, hands-on activities, and implementation guidelines for informal education programs that wish to get urban children and families outside, physically active, and investigating science.

In response to concerns about rising rates of obesity, anxiety, depression, and other health epidemics affecting children, a number of initiatives have launched in recent years with the aim of getting children active, outdoors, and connected with nature. Outdoor prescription programs constitute one promising approach, in which healthcare providers write children “prescriptions” for outdoor activity, and informal educators “fill” these prescriptions by facilitating their participation in outdoor activities.¹ By partnering with three outdoor prescription programs at the outset of the project and involving them as development partners, we designed *Toolkit* materials to address the needs of those programs as well as a wider range of IE programs who face similar challenges with regard to getting urban families outside, active, and engaged with science.

Our research activities involve six phases of work. During **Phase 1**, we identified assets and barriers that promote and prevent urban families from engaging in and persisting with outdoor science activities, as well as assets and constraints that outdoor prescription programs face integrating environmental science learning into their outdoor programming. These included program constraints such as access to technology, staff capacity, and curriculum resources, as well as family obstacles such as access to safe outdoor spaces, inconsistent technology access, and low interest in and/or little experience with science, outdoor exploration, and physical activity. During **Phase 2**, we conducted a resource review with informal educators to identify the extent to which a set of proposed resources were primed to address the constraints, barriers to participation, needs, assets, and preferences identified during the first phase of work. The information gathered provided rich feedback on the areas in which informal educators felt those needs and goals were met, as well as the areas in which they thought modifications could be made. This feedback was used by WGBH to make revisions to the resources in preparation for the Phase 3 pilot study.

¹ Hamblin, J. (2015, October). The nature cure: Why some doctors are writing prescriptions for time outdoors. *The Atlantic*. Retrieved from: <https://www.theatlantic.com/magazine/archive/2015/10/the-nature-cure/403210/>; Jaffe, E. (2010). This side of paradise: Discovering why the human mind needs nature. *APS Observer*, 23, 10–15.

During the **Phase 3** pilot study, initial drafts of *PLUM LANDING Explore Outdoors* hands-on activities, along with pre-existing *PLUM LANDING* digital resources, were implemented in three partner outdoor programs as we gathered evidence about the usability of the activities and resources, their appeal to informal educators, children, and families, and the comprehensibility and accessibility of the target content and concepts. During **Phase 4**, findings from the pilot study informed revisions to the *PLUM LANDING Explore Outdoors* activities, as well as the development of additional hands-on activities and new digital resources.

In **Phase 5**, we conducted an implementation study in which 10 informal education organizations implemented the revised *PLUM LANDING Explore Outdoors Toolkit*. The goal of the study was to examine the extent to which, and ways in which, the *PLUM LANDING Explore Outdoors Toolkit* supported informal educators, children ages 6-9, and their families as they engaged with science concepts and science practices across a range of informal, outdoor contexts. In addition to examining evidence of promise, the implementation study guided final revisions to the *PLUM LANDING Explore Outdoors Toolkit*.

Also in Phase 5, our research team conducted a scale-up study of the *PLUM LANDING Explore Outdoors Toolkit*. The goals of the scale-up study were to assess the applicability and appeal of the *Toolkit* to a broad range of informal education organizations, as well as to inform revisions in preparation for national dissemination of the *Toolkit* as part of **Phase 6** dissemination activities. Included in this report is information about the *PLUM LANDING Explore Outdoors Toolkit*, the scale-up study, and its findings.

THE SCALE-UP STUDY

Our EDC research team conducted the *PLUM LANDING Explore Outdoors Toolkit* scale-up study from November 2016 to January 2017. We set out to answer the following research question:

To what extent is the *PLUM LANDING Explore Outdoors Toolkit* applicable to a broad range of organizations who offer informal education programs? What aspects of the *Toolkit* have the most and least scale-up potential?

To answer this question, 11 reviewers from 10 organizations were recruited to review the *PLUM LANDING Explore Outdoors Toolkit* and provide feedback on it. WGBH made the *Toolkit* available on a secure WordPress site. The *Toolkit* brought together all of the *PLUM LANDING Explore Outdoors* resources that were available for use in the Phase 5 implementation study. Those resources were designed for use by one of three implementation models, including an Afterschool model (in which children participate in afterschool activities facilitated by an educator), a Family-Facilitated model (in which families with children participate in educator-facilitated activities), or a Self-Guided Family model (in which families conduct activities on their own). In addition to these model-specific resources, the *Toolkit* contained introductory information, an explanation of the health benefits of outdoor exploration, written tips and video tips that offered educators training on leading science activities in the outdoors, and videos to inspire and prepare caregivers to explore nature and the outdoors with their children. [Table 1](#) below specifies what was included in each *Toolkit* component:

Table 1: Toolkit Contents

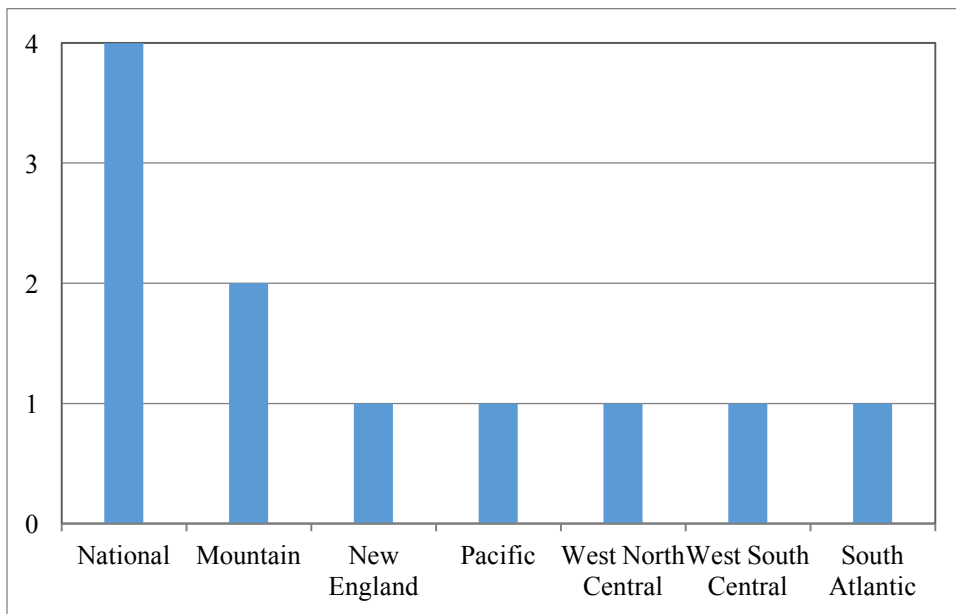
<p><i>Toolkit</i> Introduction</p>	<ul style="list-style-type: none"> • Welcome • Health Benefits of Being Outdoors • About this <i>Toolkit</i> • Description of the <i>Toolkit</i> Resources
<p>Tips for Educators Working with Kids and Families</p>	<ul style="list-style-type: none"> • Written Tips
<p>Educator Videos (approximately 1:30-2:00 minutes long)</p>	<ul style="list-style-type: none"> • Preparing for an Outdoor Science Activity • Supporting Science in the Outdoors • Engaging Kids’ Interest in the Outdoors • Managing Group Exploration of the Outdoors
<p>Materials for Afterschool Programs</p>	<ul style="list-style-type: none"> • 8 Hands-on Activities • 3 Related Educator Handouts • 4 Related Take-Home Handouts for Caregivers (English and Spanish versions) • Flyer with Links to 4 Caregiver Videos (English and Spanish versions)
<p>Materials for Family-Facilitated Programs</p>	<ul style="list-style-type: none"> • 8 Hands-on Activities • 4 Related Take-Home Handouts for Caregivers (English and Spanish versions) • Flyer with Links to 4 Caregiver Videos (English and Spanish versions)
<p>Materials for Self-Guided Programs for Families</p>	<ul style="list-style-type: none"> • 12 Hands-on Activities (English and Spanish versions) • 4 Related Take-Home Handouts for Caregivers (English and Spanish versions) • Flyer with Links to 4 Caregiver Videos (English and Spanish versions)
<p>Animated Videos (approximately 1:30-5:00 minutes long)</p>	<ul style="list-style-type: none"> • 12 animated video clips designed to introduce the environmental science concepts featured in the Hands-on Activities
<p>Caregiver Videos (approximately 2:00-3:00 minutes long)</p>	<ul style="list-style-type: none"> • 4 Caregiver Videos to inspire caregivers to explore the outdoors and nature with their children (English and Spanish versions)

WGBH identified and extended invitations to potential reviewers to participate in the study. Those willing to participate signed informed consent forms and were asked to spend 2-3 hours over the subsequent two weeks reviewing the *Toolkit*. We provided a Reviewer Checklist so that reviewers could keep track of what they viewed and document their impressions of the various *Toolkit* components. Additionally, we asked reviewers to complete an online survey to provide background information about their organization. Finally, we asked reviewers to participate in a one-hour, one-on-one interview with a member of the research team to share their feedback on the *PLUM LANDING Explore Outdoors Toolkit*. Reviewers were offered a \$150 stipend from WGBH for their efforts.

All 11 reviewers participated in the interview; nine completed and shared their Reviewer Checklist, and seven completed the online survey prior to the interview. Those who did not complete the survey before the interview responded to survey questions during the interview itself, which enabled us to gather survey data from all 11 reviewers. Once all data collection was complete, we conducted a mixed methods analysis of the data, tabulating survey data as well as completing content analyses of open-ended survey and interview questions. We identified themes and patterns in the data overall, as well as by the type of organization represented by reviewers.

Reviewers came from three different types of organizations: those focused on the outdoors and environment (4 reviewers); comprehensive community programming with the overarching goal of reducing poverty (4 reviewers); and youth development (3 reviewers). Reviewers had leadership roles in their organizations. They were senior administrators (6 were Directors, Executive Directors, or Vice Presidents), and program managers (4 reviewers). One reviewer was a service provider who worked directly with educators and families (1 reviewer). Reviewers' organizations came from the following U.S. Census regions ([Figure 1](#), below):

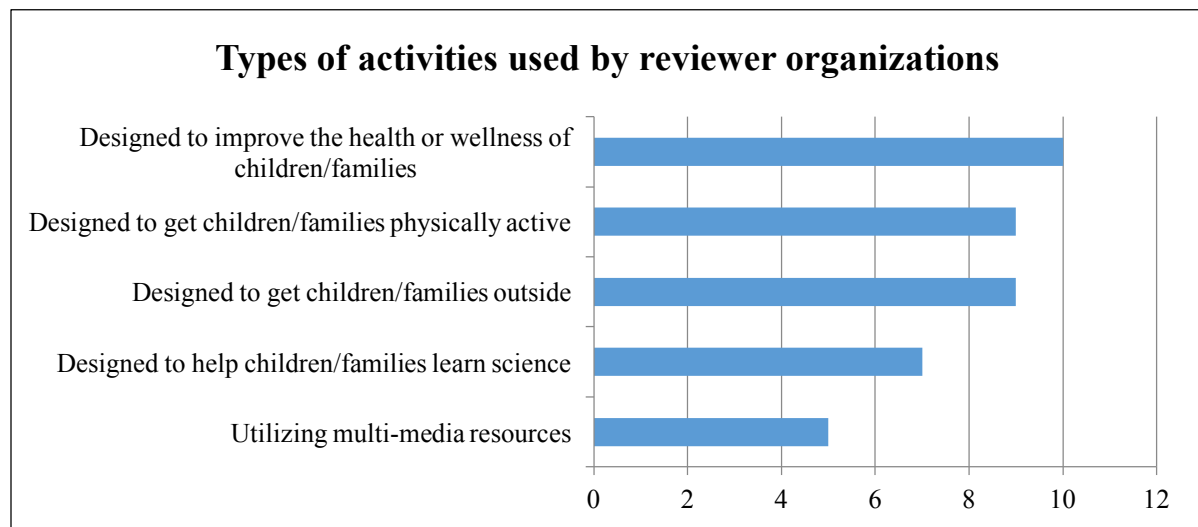
Figure 1: Location of Reviewer Organizations



Six of the 11 organizations primarily delivered services directly to children or families, while five were from “backbone” organizations that primarily work through partners like community-

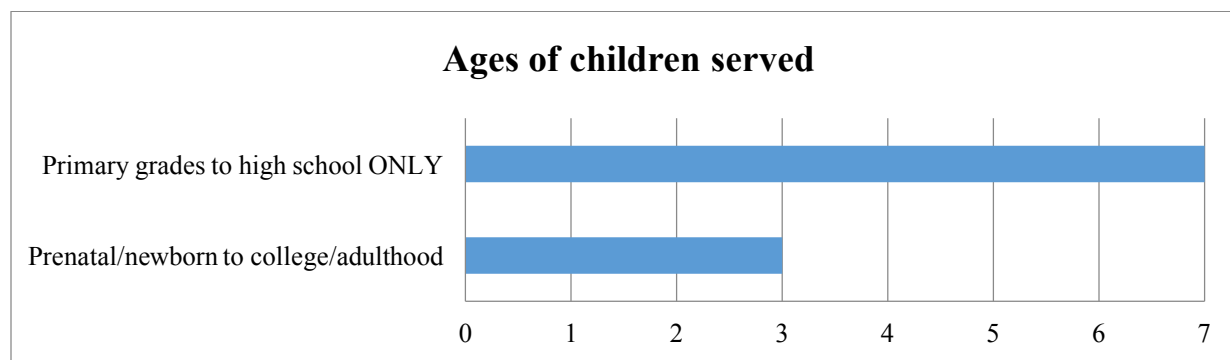
based organizations or schools to provide resources or information to children and families. In the five years prior to the study, 10 of the 11 organizations provided educator-facilitated activities for children or families and 8 of the 11 provided self-guided activities for families. Eight of the 11 organizations provided both during that time period. Seven of the 11 organizations had locations with outdoor spaces for child or family activities. [Figure 2](#) shows the number of reviewer organizations whose specific services align with those promoted by the *PLUM LANDING Explore Outdoors* implementation models.

Figure 2: Types of Activities Used by Reviewer Organizations



All of the organizations aimed to serve low-income children or families. In addition, organizational missions included serving children at high risk for academic failure (6 organizations); children with special needs (6 organizations); and children living in urban areas (9 organizations). Although 8 of the organizations indicated their mission was to serve particular racial/ethnic groups, interviews revealed this was a *de facto* occurrence rather than an integral part of their mission (e.g., by serving low-income families in urban areas, they often served African-American or Latino families). The majority of the organizations served high percentages of families speaking languages other than English; 8 served Spanish speakers, 1 served Mandarin speakers, and another served Diné speakers (the language of the Navajo people). [Figure 3](#) summarizes the ages of children served by the organizations.

Figure 3: Ages Served at Reviewer Organizations



Research Instruments

Two protocols were developed for use in the scale-up study:

- Reviewer Checklist: This was designed to help educators keep track of the *Toolkit* resources they reviewed and document the thoughts they wanted to share during the interview.
- Interview Protocol: This was a semi-structured interview protocol. Questions were designed to elicit feedback about the quality, comprehensibility, and promise of the *Toolkit*, as well as identify its appeal to a broad range of organizations.

FEEDBACK ON THE TOOLKIT

This section presents findings from the scale-up study.

OVERALL FEEDBACK

In general, all of the reviewers had favorable reactions to the *Toolkit* resources. In one reviewer’s words, “I felt that everything was there. It was very well put together, easy to navigate... It really had me from hello.” Reviewers appreciated different aspects of the *Toolkit*. One strength they cited was the variety of resources included, such as tips and guidance for caregivers and facilitators, hands-on materials for use during activity sessions, and take-home activities. All reviewers thought the tips for educators were useful: they reported that the tips presented new information for novice educators and could serve as reminders for more seasoned outdoor or environmental organization educators. The diversity of media used also resonated with reviewers; the majority said that they or their partners prefer a range of formats in order to ensure that educational content can be accessed and understood by facilitators, caregivers, and children. Other feedback coalesced around a few topics.

Toolkit implementation

When asked hypothetically if they would implement *PLUM LANDING Explore Outdoors* or refer the *Toolkit* to their partners (e.g., schools, community-based organizations), all reviewers affirmed that they would adopt all or the majority of its components. Reviewers reported that they would adopt particular components by selecting those that align with their existing programming (for example, they would not implement the program in accordance with the Afterschool model if they did not have a pre-existing Afterschool program), align with

existing policies around screen time, and address relevant content (for example, reviewers would curate materials to ensure alignment to the local environment).

Toolkit language

Overall, reviewers felt the language used in the various *Toolkit* resources was clear and accessible in English and Spanish. They praised the ethnic and racial diversity of adults and children represented in the videos and animations, which they felt would help the materials resonate with the educators and families they served. Similarly, they found the live-action video narrators (both English and Spanish) to be relatable and passionate speakers who would be appealing to caregivers and educators.

Toolkit usability

Another strength was the *Toolkit's* design that could be used in a variety of implementation models and in a variety of settings. Most reviewers reported that their organization or their partners could implement *PLUM LANDING Explore Outdoors* using two or more implementation models (e.g., Afterschool and Family-Facilitated). Furthermore, they reported that the resources could be curated or adapted to fit different settings, such as by focusing on activities that featured local flora and fauna. Hands-on activities also could be implemented over the course of a single session and multiple sessions, as part of an ongoing afterschool program, summer program, or one-off event. Reviewers believed the *Toolkit* could be implemented with relative ease, based on its “straightforward” language, applicability to nearby and everyday locations, and few additional material requirements.

Toolkit alignment

All reviewers felt that the *Toolkit* aligned with their organizations' missions, goals, or typical activities. All but one reviewer believed the *Toolkit*, or some components, could be integrated into existing facilitated programs or used by caregivers to augment activities they already do with their children. Additionally, some reviewers believed the *Toolkit* filled gaps in the field; first, by offering high-quality Science, Technology, Engineering, and Mathematics (STEM) activities (in this case, STEM activities that focused primarily on science) that do not require staff to have STEM backgrounds and, second, by bringing STEM learning together with physical activity. Reviewers also appreciated the recommendation to “make it local” with visits to neighborhood outdoor areas and inclusion of local species of plants and animals.

Constructive feedback

Reviewers offered constructive feedback about the *Toolkit* overall, ranging from minor corrections (e.g., correcting spelling errors) to a small number of concerns that were outside the scope of the project (e.g., a wish for live-action video footage from a greater diversity of environments, and one reviewer's concern that the animated videos portray a “humans vs. nature” dynamic, such as when an animated video shows characters fearful of insects or depicts cities as competing against plants). Those working with Spanish-speaking families hoped all of the resources would be available in Spanish or, in the case of the animated videos, include Spanish subtitles. Finally, a small number of reviewers cited technology access concerns, such as sites without internet access or restricted access to sites like YouTube. These reviewers recommended that all videos be downloadable as well as available on the *PLUM LANDING* website.

FEEDBACK ON SPECIFIC TOOLKIT COMPONENTS

Introduction

The written Introduction to the *Toolkit* was intended to orient reviewers to the *Toolkit* resources, as well as make the case for teaching science outdoors and through physical activities. The Introduction included the following sections:

- Welcome
- Health Benefits of Being Outdoors
- About this *Toolkit*
- Description of the *Toolkit* Resources

Reviewer ratings of the *Toolkit* Introduction ranged from a 3 to a 5 (a 1 was “Not At All Helpful” and a 5 was “Extremely Helpful”). They reported that the Introduction was “straightforward” and “simple,” with “very friendly language.” Overall, reviewers reported that the Introduction had useful information that set users up for success. For example, a reviewer explained, “The ‘About the *Toolkit*’ really lays out what the purpose is, who should use it, what the structure is. In the ‘Description of the *Toolkit* Resources,’ I like that it laid out the structure of facilitated programs. It tells you the program starts with the animated video, then a warm-up—it lets you know what would be involved in each section.”

Two reviewers described what they believed were unique strengths of the *Toolkit*. The first reviewer praised the language used to describe children’s relationship to the environment, referring to children as “caretakers” instead of protectors or preservers. This reviewer said this positioning could offer a new, empowering leadership role for children. The second reviewer valued the “connection between being outdoors, physical and mental health benefits, and using STEM to meet those goals.” According to this reviewer, “A lot of programs have STEM as a topic and I love that it hits on multiple issues in the field. I don’t know if that’s a connection people often make.”

Reviewers suggested a few changes to the Introduction to make it even stronger. The most frequent suggestion was to revise the “Health Benefits to Being Outdoors” subsection, which they reported was short and vague relative to the other sections. Some reviewers suggested folding the health benefits information into a different subsection, while others recommended adding more information, citations, and links to resources about the specific health benefits. In addition, most reviewers believed the Introduction had instances of redundant information (e.g., had information they felt was covered in other sections) and could be streamlined overall or could include tailored introductions targeted to specific audiences such as educators or caregivers.

Reviewers offered suggestions about particular topics or strategies addressed in the *Toolkit*’s Introduction. One reviewer suggested more fully describing the questioning techniques that facilitators and caregivers are encouraged to use. According to this reviewer, “the language around questioning and asking... needs to be more explicitly pulled out... The whole idea of asking questions and bringing questions to get kids to think—that is such a huge skill to have. It requires a lot of development to do.” This reviewer suggested the integration of “concrete examples” and explained, “Educators struggle with that because they haven’t gone to school with that style.”

Another reviewer advocated for more information about conservation, such as helping bees, bats, and native flora and fauna in general. Additionally, one reviewer reported that the

language at times was “hard” or “negative” (specifically citing words like “combat” and “unfortunately”) and could be softened with the incorporation of more positive words. Another reviewer suggested that the Introduction, and *Toolkit* overall, should consistently refer to STEM or “science” rather than use both terms (*Toolkit* resources focus primarily on science). Only one reviewer thought the Introduction needed a clearer overview of the *Toolkit* contents. Finally, a reviewer thought the Introduction could be improved by acknowledging the many types of outdoor spaces in which *Toolkit* activities could take place, including but not limited to local parks, state parks, and national parks.

Written Tips and Videos for Educators

The PLUM LANDING Explore Outdoors Toolkit included written tips and video tips for educators designed to prepare them for teaching science outside (Table 2):

Table 2: Contents of Tips and Videos for Educators

<p>Tips for Educators Working with Kids and Families</p>	<ul style="list-style-type: none"> • Top 5 Preparation Tips (aligns with video Preparing for an Outdoor Science Activity) • Strategies for Encouraging Kids and Families’ Science Skills in Nature (aligns with video Supporting Science in the Outdoors) • Strategies for Keeping Kids Engaged Outdoors (aligns with video Engaging Kids’ Interest in the Outdoors) • Exploring the Outdoors with Lots of People (aligns with video Managing Group Exploration of the Outdoors) • Adapting Activities on the Fly • Using Digital Tools to Enhance Nature Exploration • Helping Overcome Barriers to Getting Outdoors
<p>Educator Videos²</p>	<ul style="list-style-type: none"> • Preparing for an Outdoor Science Activity • Supporting Science in the Outdoors • Engaging Kids’ Interest in the Outdoors • Managing Group Exploration of the Outdoors

Reviewer ratings for the written and video tips for educators were favorable, ranging from 3.5 to 5 with 5 being “Extremely Helpful.” Several reviewers applauded the combination of text and video, such as one who said, “It’s great to have the videos and the written text paired with each other. The written text was expanding on the points on the video.” Another reviewer reported that the text and video combination would be especially helpful for younger educators and those new to the field. According to this reviewer, “I loved the way they break down the specific ideas and how to reinforce the science concepts especially for youth workers who still might be in college or high school. They’re just getting into this work of teaching and making lessons plans. I’m excited to show this to other people just to show that aspect.” A different reviewer noted that the tips would also be helpful for experienced teachers, who might make “a lot of assumptions about outdoor education, that it’s basically the same as indoors, but it’s not.”

² Since the completion of the Scale-Up study, WGBH has created more videos to align with the written tips provided with the *Toolkit*.

One reviewer praised the “intentionally supportive way” the tips addressed the issue of neighborhood safety and trauma. In reference to a tip that acknowledges how some neighborhoods do not always feel safe for families and children, this reviewer expressed appreciation for the concrete suggestions, such as to check out the space beforehand, to talk to residents near the park, and to ask participants about their experiences and feelings during the activity itself. According to this reviewer, “That seemed like a really unique and intentionally supportive way for healing to happen around traumatic events they may have experienced, like a neighborhood shooting.”

Reviewers indicated that all of the tips were useful, simple, clear, and necessary. Many called out tips that stood out as especially important to them:

- Overcoming the barriers to getting outdoors (“we don’t usually cover that in our materials.”)
- Keeping children engaged outdoors (“the strategies there are repeated in the activities themselves. The educators can read about it and then see it in the actual activity.”)
- Making activities local (this “can make these concepts relevant to people and kids.”)
- Ideas for incorporating technology.
- Acknowledging fears about the outdoors and neighborhood spaces that have been sites of violence.

We asked reviewers to contemplate how their organization or partners might orient educators in their programs to the major *Toolkit* components, including the tips for educators. Specifically we asked reviewers whether they thought their instructors would need additional professional development in order to effectively make use of the *Toolkit*, and if so, what supports they thought would be needed. A small number of reviewers believed educators would need “some kind of orientation to the *Toolkit*,” such as an in-person professional development session or online user group to make the most of the resources. When asked what type of professional development would be needed, one reviewer reported that valuable professional development would focus on how to promote “larger STEM skills like questioning, asking and observing.” Another reviewer reported that an orientation must cover the organization’s safety rules, which are more extensive than the ones featured in the tips that cover just “the basics.” One reviewer reported that its outdoor educators would not need professional development to make use of the *Toolkit* because they would already be familiar with the tips. Other reviewers noted that educators would need background knowledge of their local environment to make the science local.

Reviewers generated several ideas for improving and adding to the tips section, which can be integrated into text and videos:

- Provide more information about how one might adapt activities to outdoor spaces such as schools that only have a blacktop instead of a grassy play area, or urban parks without ponds, bushes, shrubs, or trees; facilitators may need help identifying an “equivalent” alternative to the “very particular kind of outdoor space” featured in the videos and referenced in activity descriptions.
- Add video footage from neighborhoods that look “much more urban,” without visible ponds and other natural features, to help the settings depicted resonate with more viewers.
- Provide videos featuring *Toolkit* activities being implemented “so facilitators could actually see what this would look like in an outdoor setting.”

- Add two additional tips to help make the science local: look up local environmental organizations (including local chapters of national groups) and meet up with a local environmental official “to learn what are the local issues and projects that are happening or upcoming” so educators can frame activities “around a real live thing happening.”
- Provide a checklist of items that educators might benefit from having in their backpacks, such as sunscreen and bug spray.
- Include practical tips like “taping the pens to the back of the clipboards so the kids don’t lose them running round.”
- “Make the case for how digital tools enhance learning outside” in order to combat the misconception that digital activities always have the effect of “adding one distraction to another.”

Instructional Materials (hands-on materials, handouts)

In the *PLUM LANDING Explore Outdoors Toolkit*, instructional materials were grouped by implementation model ([Table 3](#)):

Table 3: Materials Specific to Implementation Models

Materials for Afterschool Programs	<ul style="list-style-type: none"> • 8 Hands-on Activities • 3 Related Educator Handouts • 4 Related Take-Home Handouts for Caregivers (English and Spanish versions) • Flyer with Links to 4 Caregiver Videos (English and Spanish versions)
Materials for Family-Facilitated Programs	<ul style="list-style-type: none"> • 8 Hands-on Activities • 4 Related Take-Home Handouts for Caregivers (English and Spanish versions) • Flyer with Links to 4 Caregiver Videos (English and Spanish versions)
Materials for Self-Guided Programs	<ul style="list-style-type: none"> • 12 Hands-on Activities • 4 Related Take-Home Handouts for Caregivers (English and Spanish versions) • Flyer with Links to 4 Caregiver Videos (English and Spanish versions)

Ratings for the instructional materials ranged from 3-5 (1 was “Poor” and a 5 was “Excellent”). Reviewers described the instructional materials as “all great activities, a smorgasbord of things you can do,” and “really fun and creative.” They liked that the activities “encompassed a lot of different aspects of being out in nature,” “used a lot of movement,” “build nicely” from physical activities to handouts, and “focus on building critical thinking skills and not just testing skills.” For the most part, reviewers thought the activities “all would work very well, especially the [references to] plants and animals specific to regions. It’s a good way to localize the experience.” A few reviewers emphasized the versatility of the instructional materials. According to one

reviewer, “I like they planned for about 50 minutes but they’re broken down so you could choose to just do 1-2 of the smaller activities. Or if you need to get out of the building you can grab some of the materials on the fly and take a walk. It’s accessible the way it’s broken down.”

Some reviewers expressed reservations about some activities. One was concerned about activities in which children “are getting on your belly” or on the ground. The reviewer explained, “Honestly, that’s one of the things we struggle with in our parks, the safety piece. Sometimes there is drug paraphernalia on the floor” or ground. Another reviewer’s organization placed a strong emphasis on making connections between activities and identifying real-world applications and careers that relate to experiences that children have in the program. This reviewer wished for such connections to be made to careers, and would want to see that before recommending the *Toolkit* to partners.

Reviewers’ opinions about how to implement the instructional materials also varied widely. Some reviewers thought the instructional materials could easily be spread out over multiple, short sessions (as in Afterschool programs) and that facilitated activities for children could link to Self-Guided activities at home. This reviewer explained, “I could see us doing [the activities] as a group with the mothers and fathers with the children, going on expeditions together. And then we look at the next activities caregivers could do between sessions, week to week. And then they could report out, ‘This is what we did.’” Another reviewer thought their organization and partners would be unable to implement the instructional materials because they already had a science curriculum that they used, despite otherwise finding the *Toolkit* worthy of adoption. And a third reviewer regarded the materials as best suited for summer programs, rather than Afterschool contexts, because those programs typically run longer and could accommodate more activities.

Finally, reviewers suggested ways to improve the instructional materials. For the Self-Guided family activities:

- Include accommodations a caregiver could offer for a younger sibling or for children with disabilities to promote their participation.
- Ensure activity descriptions include sufficient background information so that caregivers without specialized knowledge can communicate science concepts to their children. For example, provide more information about native plants and animals.
- Be mindful that some organizations are located in areas with extreme winter or summer weather. One reviewer cautioned that “in one of the handouts for the parents for getting them going outside, it says something about weather not being an excuse. But a lot of our kids don’t always have the appropriate coats and gloves.”

For the rest of the materials:

- Make sure a session’s overarching learning goals “show up in every activity” included on the activity sheet. Some reviewers reported that the *Big Science Ideas* were not present throughout.
- Be aware that some programs are “highly regulated by the state and we could never let children explore on their own,” as was suggested in some activities.
- Provide “very specific information on the region or city” so staff do not have to do their own research prior to implementation.
- Explicitly align with state and/or city educational standards, whenever possible.
- Augment the Wrap-Up section of activities to include more connections to careers that help solve problems presented or discussed, and add “a few more processing questions” to help children connect concepts with real-world situations or careers.

Animated Videos

The *Toolkit* included 12 animated video clips, which were referenced in the Hands-on Activities and included in the Afterschool, Family-Facilitated, and Self-Guided implementation models. Reviewers had their most divergent opinions about the value of the animated videos; scores ranged from 2 to 5 (1 was “Poor” and 5 was “Excellent”). The majority of reviewers liked the videos and thought they would appeal to children. The animations were a “good length,” “established additional questions for the kids and really expanded on them,” and “emphasized more time outdoors for whatever topic you’re working on.” According to one reviewer, “I liked that they go back and forth between the mystery, we need to discover what is going on, to the longer episode scenario to doing songs in some of the shorter versions. I liked that the music switched up so there was a jazz vibe to one and then it was folksy for another, different genres. Cool characters, diverse and funny. The animation was beautiful.”

Two reviewers had less positive opinions of the animated videos. One reviewer who was part of an organization that served infants through 18 year olds thought they were best suited to very young children and was uninterested in viewing more than a single clip. The other reviewer felt that the animated videos tended to pit humans against nature in various ways, such as by showing the characters fearful of insects, and buildings competing against plants for space. In these ways, the reviewer reported that the videos’ “messaging was a little off” and should aim to get children more engaged in nature rather than depicting nature as “something that is scary or is in conflict” with people.

Reviewers also offered suggestions about how to implement the animated videos. In addition to using them as part of the Warm-Up for facilitated activities, reviewers suggested that educators and caregivers watch them in order to gain background knowledge and see models for how to explain science concepts to young children. They proposed that families watch them together at home or as part of a group facilitated activity (especially as an activity warm-up), and children could watch them as a group or on individual tablets. Finally, partners like healthcare providers could play the videos in their waiting rooms. One obstacle to using the animated videos was that it required access to the internet or YouTube, which is blocked by some organizations.

Reviewers suggested some revisions to the animated videos, including:

- Revise the framing of nature in the animated videos, depicting nature more positively so “kids don’t see themselves in opposition to or afraid of nature.”
- Add Spanish subtitles, which would increase Spanish-speaking caregiver engagement in the videos.
- Provide links to the animations within the activity handouts to minimize the need to search for them online.

Caregiver Live-Action Videos

The *Toolkit* included four short, 2-3-minute caregiver videos meant to inspire them to explore the outdoors and nature with their children. Each video had an English and Spanish version. Reviewers were highly enthusiastic about the caregiver live-action videos, rating them 4-5 (1 was “Poor” and 5 was “Excellent”). They called out several strengths of the videos, including that they involved diverse, passionate, and relatable narrators who were also caregivers; they were a reasonable length that can easily be “watched over a lunch break to think about what to

do over the weekend in their backyard;” they focused on “what is accessible” (e.g., just getting outside instead of “finding a forest or national park”); they gave “reasons to get outside in the first place,” while being “simple enough so no one’s going to feel left out.” One reviewer praised the videos for “not shaming people for not taking their kids out” and, instead, took the approach of saying “this is available to you and maybe you didn’t realize it.” This reviewer also liked that activities did not mandate that caregivers go out all day (It “can be a 10 minute walk around the block. It can be a fun bonding experience with your kid.”). Additionally, a reviewer appreciated specific activity ideas like “sharing our childhood memories around nature and bringing your favorite indoor activity outside.” A small number of reviewers alluded to the potential for the videos to serve as “professional development for a caregiver on becoming a better caregiver,” and characterized them as providing caregivers with “best practices for exploring science with your child.”

Most reviewers envisioned using the videos as part of facilitated group activities with caregivers. In fact, all of the comprehensive community programming organizations said that this is the approach they would take, for it would ensure access and enable a facilitator to answer questions and guide caregivers’ thinking about the video content. These reviewers also said they would provide a link to the videos for caregivers to re-watch them at home. A small number of reviewers reported that they would take a more passive approach by passing the video links to partners, such as healthcare providers, for them to share with caregivers. One reviewer anticipated that video would be a difficult medium to share with caregivers, however, because there is little opportunity to do so during program pick-up and drop-off. This reviewer said that handouts would be more appropriate for distribution to caregivers.

Reviewers offered a few suggestions to improve the caregiver live-action videos:

- Do not assume all families have proper dress for going outside in any weather condition and be mindful that some weather can be dangerous or even deadly.
- Address the “important misconception” of some caregivers that places a “false separation between play and learning.” This would lay groundwork for getting families outside learning science while being physically active.
- Incorporate a greater variety of landscapes in the videos, especially “super urban” ones without a lot of green space, ponds, etc.

Findings by Organization Type

In addition to the overall feedback for the *PLUM LANDING Explore Outdoors Toolkit* and its components, the research team looked for patterns in the data based on the type of organization reviewers represented. Differences in feedback were generally minor, but some variations surfaced.

Comprehensive community programming: Reviewers from the comprehensive community programming organizations described their current programs, which were designed to build caregiver engagement and provide facilitated activities for families. These organizations worked more directly with families than the other organizations that reviewers represented. These organizations also relied on youth workers (teenagers who are eager to work with children in a professional capacity, but typically lack extensive prior experience leading groups of children or teaching STEM) in addition to afterschool educators and program staff. This introduced a unique set of challenges, such as workers having no instructional experience and thus needing “more focused” activity guides and ready-to-use materials to work with, as well as more information or links about the local environment. Additionally, comprehensive community

programming organizations worked with children and families living in current and/or formerly high-crime neighborhoods, so reviewers anticipated the need to contend with children's and caregivers' fears of being outside where violent acts had been perpetrated. Reviewers from these organizations were especially interested in the *Toolkit's* approach to acknowledging and beginning to alleviate trauma around violent acts in the neighborhood and within their urban communities.

Youth development organizations: A few patterns emerged in the feedback from reviewers from youth development organizations. Firstly, they tended to be cautious about screen time for children (e.g., one had a "no screen time" rule and thus reported that they would not use the animated videos). Secondly, all of these organizations offered programs that were implemented nationally and that were well-developed for use with children (although not family or caregiver engagement programs). And thirdly, youth workers, as well as afterschool educators with little science knowledge, were also part of the educator pool in these types of organizations, and as such, additional training and information for facilitators was desirable.

Outdoor education organizations: Reviewers from outdoor environmental organizations reported the least need for general tips or guidance to support outdoor education. Facilitators working at these organizations typically had prior science backgrounds or worked alongside staff who did. Although they envisioned their educators implementing the activities with little need for additional support with regard to the science content, they did find the *Toolkit's* blend of physical activity and science learning useful. These reviewers had the most to say about the video addressing challenges and fears of being outdoors. While they appreciated that barriers to getting outdoors were being addressed, two reviewers agreed that more could be included. One reviewer suggested, "Calling attention to the fact there may be fearful children right up front, get that out of the way, and [including] tips to help deal with that." A second reviewer proposed that the developers include a suggestion that educators talk directly to the families they serve about barriers to outdoor exploration, noting "I think it's really important to ask those involved what they perceive as barriers. Don't go in assuming what their barriers are."

Promotional Materials

In addition to gathering reviewers' thoughts about the *PLUM LANDING Explore Outdoors Toolkit*, we asked them to provide feedback on the promotional materials that WGBH proposed to develop in order to help organizations recruit the participation of children and families to programs that use *Toolkit* resources. Specifically, we asked reviewers which of the following materials their organization would find most useful: a promotional video, a fact sheet, a poster, a flyer, sample press releases and social media posts, and a style guide. Some reviewers indicated that they did not desire promotional materials, and said they would prefer a link to access the resources that they could share with partners and families. A small number of reviewers reported that a poster, flyer, social media posts, and video would be most useful. Finally, one reviewer suggested that "stories, testifying this is really working" would be the best promotional tool, and could be generated by opening an online platform for users to share photographs and testimonials.

CONCLUSION

Based on reviewer feedback, the *PLUM LANDING Explore Outdoors Toolkit* has applications across a wide variety of organizations and implementation models. Reviewers responded favorably to the *Toolkit* overall, as well as to its various components. They envisioned a variety

of ways in which *Toolkit* resources could be integrated into their existing programming and were pleased to learn that the videos and other materials will be available at no cost. Overall, the objectives and content of the *Toolkit* resonated with reviewers and aligned with their organizational missions, although some components (such as the animated videos) were less compatible with existing organizational policies, such as those relating to screen time restrictions at youth development organizations. The study overall indicates that the *PLUM LANDING Explore Outdoors Toolkit* has high scale-up potential for use by a broad range of organizations who offer informal education programs and use technology-based resources.