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FLIP CARD ACTIVITIES: BACKGROUND INFORMATION

Introduction

Flipping Through Nature: Card Decks to Guide Outdoor Exploration (Flip Cards) was built by the Center for Environmental Learning team on the foundation of the [BEETLES Project](#). Flip Cards invite learners to take an active role in their own outdoor explorations, support them in developing their own personal relationships with the outdoors, and encourage the development of skills that can be used across many outdoor settings. These activities are designed to be used by learners without the support of facilitation or interpretation by an educator; however, young learners in particular may benefit from adult support (a guardian, chaperone, etc.). While field tested and designed for use in nature centers and other outdoor exploration settings, they are versatile—you decide if they are appropriate for you, your setting, and your learners! Read on to learn more about why and how we designed them, as well as considerations for using them.

WHY ENGAGE LEARNERS WITH THE OUTDOORS?

Just being outdoors is linked to numerous mental and physical health benefits, such as decreased feelings of loneliness and anxiety; lower blood pressure; and increased feelings of connection, memory retention, and more.¹ Additionally, engaging in firsthand observation and exploration encourages a sense of wonder and awe, which can be a powerful, profound, and sometimes even transformative experience. These experiences can take place in the presence of the most subtle aspects of nature in our daily lives—if we pay attention. Time spent closely observing and exploring something as common as leaves—and discovering how intriguing, complex, and beautiful they are—can lead learners to experience awe, which can promote happiness, physical health, generosity, humility, and critical thinking.² It can also lead learners to develop emotional connections to the outdoors, which can lead to deeper understandings of the impact of human development on ecological systems and encourage critical thinking about climate change.

I think the kids will keep looking for acorns as well as look at acorns differently after we leave because of this activity. —participant, 2023 Field Testing

Flip Cards are specifically designed to provide structure and space for learners to build on their own relationships with the outdoors, without needing anyone else to mediate. By allowing learners to follow their own interests and curiosities and by providing scaffolding for learners to use outdoor exploration tools (including physical tools such as magnifiers as well as less tangible tools like knowing which kinds of questions to ask), utilizing Flip Cards supports a flourishing relationship with the outdoors.

Normally we just hike. This time I felt very active and we loved sharing what we found together. I also found it interesting that [the acorns] were so different. It helped me understand the forest a bit more. But the most fun was doing it with my mom. —participant, 2023 Field Testing

During the 2023 Field Testing process for these activities, feedback from learners and field testers alike highlighted the positive impact using these Flip Cards had on visitors' experiences, connections with the outdoors and with one another, and thoughts about how they might interact with the outdoors in the future. Engagement with these activities prompted discussion on the trail, supported intergenerational learning and connection, caused people to appreciate slowing down and noticing more details, and sparked different perspectives or thoughts in participants about how they might take the skills they practiced to explore outdoors elsewhere.

A lot of people's favorite [card] is the basic one on the flower color or pattern or shape, because it gets them to look closely. It's simple and the card itself doesn't make an explicit connection to a bigger topic, but [learners] like it because it helps them notice details they didn't before. —educator, 2023 Field Testing

Flip Cards are designed based on research about how people learn. Research on learning shows that learners need to become authentically engaged, dabble with ideas and interesting things around them, make sense of their experiences and phenomena, figure things out, build understanding of concepts, apply what they have learned to new contexts, and reflect on what experiences helped them to learn.³ Each flip card deck encourages these practices by being **learner-centered** and **nature-centered**. Together, these guiding principles

support activities that promote **equitable, inclusive, and culturally responsive** learning experiences.

The cards helped me realize that the general noticing of little details can be put to a purpose or can be focused to explore a particular topic, like pollinators or flower shapes, and this encourages me to do more focused observing rather than just general noticing when I'm outdoors . . . –participant, 2023 Field Testing

Learner-centered means that each deck generally follows the learning cycle, a research-based model for engaging learners in meaning-making and equitable, inclusive, and culturally relevant learning experiences. The Learning Cycle includes five phases of learning—invitation, exploration, concept invention, application, and reflection—which participants are guided through as they progress through a flip card deck. Learners are invited to become interested in and make their own observations of some aspect of the outdoors (such as a leaf, bird, or rotting log), ask their own questions, and construct their own explanations based on evidence from their observations. These science practices support the development of both increased understanding and an emotional connection with nature. Use of the Learning Cycle structure does not, however, preclude people from using the cards how they like. Younger learners, in particular, may skip around or only complete some of the cards within the card deck, and that's okay, too. Supporting participants to follow their interests and curiosity is part of what makes these activities learner-centered by design.

Nature-centered means that each flip card deck relies on the learner actively participating in observation and exploration of what is in front of them. This is in contrast to approaches that are instructor-centered or passive interactions with nature, which tend to be centered around the dissemination of information. While learners may walk away from instructor-centered experiences feeling impressed at all the facts an educator knows, they generally walk away from learner-centered experiences feeling impressed with how much *they* know! These activities provide learners the opportunity

to practice curiosity tools that enhance their connection with the outdoors and support independent learning: making direct, specific observations; asking questions; making connections to prior experiences; and reflecting on learning and meaning-making that are guided by learners' own interests and curiosity.

The following activities promote equitable, inclusive, and culturally responsive learning experiences in several ways:

- **They engage learners with commonly found parts of nature** (e.g., leaves), which contrasts the exclusionary idea that nature only exists in pristine wilderness areas, requires a panoramic view or unique geographic feature to be engaging, or is otherwise a place people need to go to as opposed to something that always surrounds them.
- **They use broad questions** that don't rely on learners having previous nature experiences in order to answer. This avoids the common pitfall of asking questions that privileges learners who have had those experiences or think of themselves as "naturey" or "outdoorsy."
- **They include prompts that encourage learners to connect what they are observing with their own lived experiences**, inherently sending a message that their lived experiences are valuable and important.
- **They focus on skills that are accessible** by people across a wide age range, creating opportunities for intergenerational learning.
- **They prompt people to use multiple senses**, providing engagement opportunities for people with some physical disabilities.
- **They encourage reflection and discussions based on observations made in direct engagement with nature**, ensuring that regardless of prior knowledge or experiences, participants can engage fully in the learning process.
- **They share curiosity tools and critical thinking skills that promote an inquiry mindset**, supporting independent learning in any context.

FOOTNOTES

1. Children and Nature Network. (n.d.). Benefits of nature. <https://www.childrenandnature.org/resources/category/benefits-of-nature/>
2. Allen, S. (n.d.). Eight reasons why awe makes your life better. *Greater Good Magazine*. https://greatergood.berkeley.edu/article/item/eight_reasons_why_awe_makes_your_life_better
3. Bransford, J. D., Brown, A. L., Cocking, R. R. (2000). *How people learn: Brain, mind, experience*. National Academy Press. Washington, DC. <http://www.nap.edu/catalog/9853.html>

Preparation

Before inviting learners to use Flip Cards, consider your goals, the characteristics of your space, your audience, and how staff or volunteers will be prepared. You will need an outdoor nature area for visitors to explore. While learners may find more wildlife in an outdoor space populated with native plants, these activities are designed to be effective almost anywhere (e.g., a parking lot with a bunch of acorns, a schoolyard). *Take into account any hazards present in your outdoor nature area, which may determine where and when these activities are offered. Offer guidance to visitors as is appropriate.*

CHOOSING THE APPROPRIATE ACTIVITIES

How many activities to offer at once? A variety of activities offers choice and agency, which is key to engagement. Offering too many activities when someone first approaches, however, can be overwhelming. We've found that it works well to feature no more than three or four activities at a time.

Which activities should be used? Choose activities based on your site's unique characteristics. Go out, explore your outdoor nature area, and take note of what is interesting and investigable by visitors without an interpreter. Choose activities connected to features of nature that learners can actively observe at that time in your outdoor nature area. For example, if there are no flowers or acorns present at the time, don't use those activities. If there are some flowers or acorns, but not a lot, you might still choose to offer those activities. You may need to offer appropriate expectations or provide context to excite visitors with the challenge of finding flowers or acorns. If learners choose acorns, for instance, you might tell them that there are very few *whole* acorns this time of year and invite them to explore the mysteries of acorns that are *partially eaten* or *broken open*.

Which activities are complementary to one another? You can think about Flip Cards in two broad categories that focus on either 1) something observable in the outdoors or 2) tools used in outdoor exploration. Any number of activities and activity combinations can be offered on a given day. To inform how you pair offerings, consider your goals for a given day. If you want to highlight the different types of organisms in your nature space, for example, you may choose to offer two or more of the

decks that are focused on observing a specific thing in nature (*Exploring Leaves*, *Exploring Acorns*, *Exploring Lichen*, *Exploring Flowers*). On the other hand, these more familiar topics of exploration may easily distract from the less obvious fun of using a potentially new and intimidating exploration tool such as in the *Writing Poetry Outdoors* and *Exploring Nature Journaling* activities. Experiment with different activity pairings at your site and see what works for your learners! Engagement in some activities may be boosted by dedicating a special day or theme to that activity and advertising the event.

ASSEMBLING THE FLIP CARD DECKS

The *Preparation and Engagement Guidance* for each activity includes assembly and printing instructions for the flip card decks. Following are a few additional tips:

- If laminating, ensure a good seal by
 - laminating cards either individually OR by leaving at least a ½" gap between each card.
 - leave a ¼" laminated border around each card.
 - hole punch pre-lamination and then again after lamination. If possible, use a smaller diameter punch post-lamination to make it more likely that the lamination stays sealed around the holes.
- Print cards single-sided.
- Some testing sites found success attaching flip card decks to magnifiers by using colorful lanyards.

MATERIALS

Using Magnifiers and Other Optional Materials

Choose additional materials you may want to offer along with Flip Cards. A few flip card decks require specific materials, all of which are listed in their accompanying *Preparation and Engagement Guidance* documents. Learning may also be enhanced by the use of magnifiers, Easy-Macro bands, clipboards, writing tools, watercolors, and/or field guides. You may need to experiment with what engages learners at your site.

Easy-Macro bands. Macrobands can be really fun and get learners excited, but they also tend to be a little finicky and may need more support to use than your site is able to offer. It's also difficult to get people to return them as they easily fit in pockets and, therefore, may not be an expense for which your site wants to budget. More information can be found in "Example Engagement

Display with Living Animals” (on page 5 of this document) and *Preparation and Engagement Guidance* for the *Exploring Outdoors with Photos/Videos* activity.

Identification guides. These can be useful scientific tools; however, we recommend offering guide books to learners *after* they use Flip Cards when their interest is piqued from observing and exploring.

Paper and writing utensils. Paper and writing utensils are required for the *Writing Poetry Outdoors* and *Exploring Nature Journaling* activities. However, if learners are excited about nature journaling, they can supplement any of the Flip Cards with some nature journaling time.

Magnifiers. Although not required, nearly all Flip Cards can be enhanced by using a magnifier (also called a hand lens). Using a magnifier helps learners directly engage with nature, look closely, and discover new worlds. Magnifiers provide learners with an immediately different perspective and allow the viewer to see details they otherwise wouldn't be able to see.

When offering magnifiers, keep in mind the following:

- **Both glass and plastic lenses work great.** For the long term, we recommend glass lenses (although they're more expensive) because plastic lenses become blurry over time from scratching, which eventually makes them unusable.
- **Put magnifiers on a thick cord to avoid tangling issues.** Tie with a large enough loop to fit over a learner's head. We've found that this leads to more use and fewer instances of magnifiers being left on the ground or having people accidentally walking away with magnifiers in their pockets.
- **We recommend 3x–6x magnification.** Some magnifiers have a larger lens with less magnification *and* a smaller lens with more magnification. We recommend encouraging younger learners to use the larger lens, since more magnification (with the smaller lens) makes it harder to focus.
- **Review the BEETLES activity and video [Hand Lens Introduction](#)** for more information on how to effectively and safely introduce hand lenses to learners.

Distributing Materials

As part of your preparation, consider how you will manage, store, and/or ask for items to be returned.

Magnifier Warning. When the sun is out and people have magnifiers in their hands, invariably someone will focus sunlight to burn things. It's up to your program to decide how you want to deal with this issue. Below are some suggestions.

- **Allow learners to monitor themselves.** If adults are present, they will likely prevent potentially dangerous sunlight-focusing by young learners, and you might choose to leave it to them—although a brief warning to adults can also be helpful.
- **Provide a fire safety warning, with a clear consequence.** If you have groups of unchaperoned young learners, explain that they are never to use their magnifiers to focus sunlight, which is dangerous and can result in fires, injury, or death. Be clear that if a learner uses a magnifier to focus sunlight, they will immediately lose their magnifier privilege.

Distribute activities by using:

- **the honor system.** Offer items for learners to borrow and ask them to return the items when they are done. A verbal and/or written reminder helps learners remember to leave behind objects and materials from the site.
- **a checkout system.** Visitors can be asked to leave their keys, photo IDs, or other important items in exchange for borrowing materials for the activity. They then must return the borrowed items to the same location when they are done.
- **contact-free Activity Return Boxes.** Set up weatherproof boxes in key locations where visitors can deposit activities when they are done. This requires staff or volunteers to later check and collect items from the return boxes; this can be an effective strategy if visitors tend to enter and exit your center in different locations.

DISPLAYING FLIP CARDS FOR LEARNERS

Location

The location you choose to offer/display these activities matters and can greatly impact the level of engagement. Choose a location that will be commonly frequented by visitors and where they might be open to engaging

Example Engagement Display with Living Organisms

If staff or volunteers are stationed at a display table, live organisms may be used to invite engagement. This example display uses roly polies to catch visitors' interest and generate curiosity. **If roly polies don't live in your area, find another small local organism that doesn't fly, is slow, and that people tend to think of as cute and harmless.** Introducing visitors to a living organism is a great way to engage visitors in the *Exploring Outdoors with Photos/Videos* activity.

MATERIALS

- **Approximately 10 roly polies.** Roly polies are also known in some areas as pill bugs. Sow bugs—their flatter-bodied, faster, light-avoiding cousins (aka rock lice)—could also work, but they dry out more easily and may die without care. Sow bugs can't roll into a ball; roly polies can. Roly polies are harmless and intriguing to people.
- **Easy-Macro bands (used to add magnification to lenses on phone cameras) and magnifiers.** Place 2 on the table display and set aside the others out of public view. As visitors borrow them to explore, replace them so you always have 2 Easy-Macro bands and magnifiers out.
- **Container with a thin layer of dirt for roly polies.** A paper bowl with dirt placed inside of a wider box or display container without dirt works well. Roly polies will gather in the flat area and then walk around, exploring the edges. The surface should have some dirt on it. Without dirt (or duff or things to grab onto), roly polies may get stuck upside down and eventually dry out and die. Keep an eye out for any that “escape” to the display container and “rescue” them back into the bowl.
- **Spray bottle filled with water.** If the dirt looks dry, give it a squirt now and then, but don't overdo it.

NOTES ON ACQUIRING ROLY POLIES

- **Finding roly polies.** Roly polies often dig down into soil to wait out dry or cold seasons, but they can be plentiful at other times of the year. During those times of the year, they can often be found walking around on sidewalks and paths or when people are weeding and planting gardens. They can also often be found in compost bins.
- **Raising roly polies.** It can be challenging to find roly polies in the wild during the time when you need

them. Roly polies are easy to raise. You need a small terrarium with dirt and decomposing leaves in it and a few pieces of wood for them to hide under. Occasionally add pieces of lettuce and carrot. Use a spray bottle or mister to keep the dirt from drying out, but don't keep it too moist. Catch a bunch of roly polies and put them in. Eventually, they will multiply.

- **Purchasing roly polies.** It's best to use local roly polies, but if there aren't any during the current season, you can purchase them through [Carolina Biological Supply](#). Avoid releasing these into the outdoors!

IF SOMEONE APPROACHES THIS STATION, OFFER:

- **Wanna check out the roly polies in here?** They may be surprised to see that there's something living in the bowl.
- Guide visitors how to use their cell-phone cameras or a magnifier to observe the roly polies close up and/or take close-up photos and slow-motion videos.
 - Note that Easy-Macro bands do not work on all cell phones.
 - **If the cell phone has 1-2 lenses,** then the Easy-Macro band should work. Strap it onto the phone, with the plastic lens directly over one lens (usually the lens toward the top), with the curvy side of the lens facing away from the phone.
 - **If the cell phone has 3+ lenses,** the Easy-Macro band won't work, but the phone's magnification should be strong.
- Move the phone camera (or a magnifier) slowly forward and backward until the roly poly comes into focus. When it comes into focus say, **“Whoa!”**
 - Note that if the subject is blurry while using an Easy-Macro band, it probably means that the lens is not close enough to the subject. Easy-Macro bands work best when the lens is 1” or less away from the subject.
- Ask follow-up questions and make comments that fuel curiosity, such as, **What do you notice?**
 - See the “Asking Questions” section (beginning on page 7 of this document) for more examples.
- Encourage visitors to use their camera phones or magnifiers in the outdoor nature area with one of the Flip Card activities.

in a new activity (often the entrance to a space or an intersection of trails). One field tester in 2023 noted that they had most engagement in areas that catch people “in the exploration stage of their visit, not in the arriving or departing stages.” Another field tester observed “how much less visible and approachable the activities are when they are offered inside, or without someone sitting at the table (visually signaling: something interesting is happening here).”

Developing an Engaging Display

After considering location, there are a number of methods and strategies to display the flip card decks. Consider the unique characteristics of your site and the needs of your community to determine the method best suited for your site. Following are some tips, tricks, and recommendations we gathered during the activity testing period:

- **Folding display tables** are a simple and effective way to display flip card decks, if you have the floor space, and can be easily moved where they are needed. We recommend positioning staff or volunteers at or near the tables to actively introduce the activities to learners. Review the *Preparation and Engagement Guidance* document for details for each Flip Card activity.
- **Display sample nature objects related to each activity.** For example, gather acorns of different sizes and states to display with the *Exploring Acorns* activity. With *Exploring Nature Journaling*, you might display a field journal entry in progress that demonstrates nature journaling is about recording information, not being a good artist.
- **Utilize eye-catching signage** to frame the activity or activities. For each Flip Card activity, we have provided a large printable Activity Sign, which mirrors the first card of the activity.
- **Add one or more Flip Card activities to a backpack** or similar resource that your site regularly allows visitors to check out or borrow when they go on walks, hikes, and explorations.
- **Offer Flip Cards to chaperones** of visiting groups of young learners as a way to help chaperones engage their groups on the trail.
- **Hang flip card decks on a peg board with signage** inviting learners to use and return them. This strategy can also be a supportive, contact-free invitation at nature centers that have uniformed

staff and learners that may be hesitant to approach people in uniforms.

- **Set up check-out stations** (or weather-protected boxes) at outdoor locations particularly conducive for use of one or more of the Flip Card activities, with an invitation for visitors to use the flip card decks in those locations. For example, if you have a wildflower meadow where visitors are welcome to roam, place the display box in that location and stock it with multiple sets of the *Exploring Flowers* flip card decks.

These are only a few possible methods. Don't hesitate to try out different locations, distribution methods, and invitation strategies. It may take a bit of experimentation to find what works best in your space and with your audience. The most important thing is to make the space and activity displays appealing and welcoming so learners will recognize it as a thing to do and wander over to fulfill their curiosity.

I tried a new location today and it worked much better than previous days. I was stationed near the entrance/exit to our Aviary and invited people to take the materials with them into the Aviary or come back when they were done with the birds . . . This location worked better because visitors were less single-minded than they are when they are coming through the front yard/entrance space determined to get to the Aviary.
—educator, 2023 Field Testing.

Using the Flip Cards

INVITATION TO THE ACTIVITIES

A welcoming, intriguing, clear, and BRIEF verbal invitation is an effective way to encourage learners to try using the Flip Cards. Visitors often choose one of the first activities to which you draw their attention. If they wander toward other activities you have displayed and show interest in these, invite them to experience those activities. For tailored invitation suggestions, take a look at the accompanying *Preparation and Engagement Guidance* for each activity.

Immediately telling visitors this was something that they [could] do on their own helped with engagement.
—educator, 2023 Field Testing

As you engage with learners, consider the following:

- **Greet visitors warmly** and then invite them to take a flip card deck and magnifier to guide them through their walk. Keeping the invitation more

casual seems to be the best way to avoid scaring off visitors.

- **Experiment with positioning yourself away from the table** and let the display draw in visitors instead. One field tester in 2023 found that “waiting until people were already engaged with the materials to go and talk to them helped as well.”
- **Frame the activities based on something participants showed an interest in.** For example, visitors who show more interest in using magnifiers than in an activity (generally young learners) can be invited to take a magnifier to the outdoor area and encouraged to still use one of the nature observation Flip Card activities or *Exploring Nature with Magnifiers* to hone their magnifier skills.

Telling visitors that the card deck was an exploration guide for them to borrow on their journey engaged them immediately. Waiting until they returned to draw attention to the display case gave them a better chance to share their findings . . . When the attention was on the display leaves, [shy participants] shared their findings and asked questions. –educator, 2023 Field Testing

Ahead of time, consider the following:

- **Review the Preparation and Engagement Guidance document for an individual activity** and/or keep it on the display table. This is especially helpful for staff/volunteers distributing these activities for the first time or those who are less practiced in engaging visitors in outdoor exploration.
- **Try roaming around with a basket of sample nature objects/organisms.** As you find visitors along the trail who are interested in something specific, encourage them to use an appropriate Flip Card activity to learn more. For example, if visitors are looking at a particularly large clump of lichen in your basket and ask what it is, share the *Exploring Lichen* card deck with them.
- **Advertise** in local newspapers, magazines, newsletters, shop windows, etc. to announce that your center will be hosting a special activity on certain days. Some nature centers found more engagement with *Exploring Nature Journaling* or *Writing Poetry Outdoors* when they advertised it ahead of time as a special offering.

- **Know your audience.** Visitors are more likely to engage with Flip Cards during their visit if they did not have a predetermined experience in mind. Feedback from field testing indicated that people coming to bike, swim, walk their dogs, etc. were less likely to be interested in self-guided activities. An educator shared, “It did not work to engage those with pets or other distractions.”

MANAGING DISTRACTIONS

Instructor-led activities, performances, captive animals, tablets, displays on flatscreens, etc. easily entice learners away from engaging with these self-guided activities. Those experiences are valuable, too! Allow those to be the focus of attention while they are going on; then, put them away to allow self-guided exploration with Flip Card activities to be the focus of attention at other times.

Similarly, magnifiers can be a powerful tool or a powerful distraction for learning. During the testing phase of developing these activities, we learned that if offered in a basket for free exploration near the self-guided activities, most visitors would grab a magnifier and not pay attention to the activities. If offered *along with* the activities, and not separately, most visitors engaged with the activities. We’ve found deeper and more extended engagement with nature when visitors use the activities vs. when they only use a magnifier.

ENGAGING IN DISCUSSIONS WITH LEARNERS

Asking Questions

Asking questions when visitors return from exploring helps them solidify their learning and begin to think about how to translate the skills they’ve practiced into other settings. We recommend asking a few broad questions when learners return materials, to help spark discussion and reflection.

Broad questions don’t have a specific answer and tend to encourage exploration, thinking, and discussion—for example, *What did you discover?* or *What made you think that?* Narrow questions—such as *Do you know the name of this flower?* or *Guess which animal this is from?*—which do have specific answers, tend to shut down reflection and divergent thinking, as people are focused on the one answer. If learners do not know the correct answer, it ceases to be a discussion and, instead, becomes centered around information dissemination by the authority. Consider your goals for learners when

choosing a question to ask. For more resources on asking questions, check out the [BEETLES Questioning Strategies: Professional Learning Session and the session handouts](#).

I Notice, I Wonder, It Reminds Me Of

Three broad questions are particularly helpful in a variety of situations: *What do you notice?*, *What do you wonder?*, and *What does it remind you of?* How to use these questions is fully described in the instructor-led BEETLES activity [I Notice, I Wonder, It Reminds Me Of](#). These questions are woven throughout the *Flipping Through Nature* activities.

Examples of Broad Questions

Questions to support exploration:

- What do you notice?
- What do you wonder about it?
- What does it remind you of?
- How does it compare to . . . ?
- How might you explain that?
- Ask any question you are really wondering about!

Follow-up questions:

- Say more about that . . .
- What makes you say that?
- What's your evidence for that?
- How could we be more sure?
- What do you think about . . . ?
- What else do you know about this?

Reflection/exit questions:

- What did you discover? Want to tell me about it or show me? What observations did you make? What questions are you still wondering about?
- What skills did you learn and use?
- Where can you keep exploring things like that after you leave here?
- Want to try another activity now? Feel free to come back later or on another day to explore more!

Answering Questions

When someone asks, “What is this?” our first impulse is often to tell them the name of whatever it is. This tends to close the episode, can shut down curiosity, and they often quickly forget the name anyway. Alternatively, you might respond, “Oh, cool! Let’s try to figure it out. What do you notice about it?” This engages the learner in making and sharing observations, asking questions about it, and sharing what it reminds them of—all of which leads to a potentially more meaningful experience. In this way, interest, curiosity, and connection increase.

After exploring for a bit, you can always share one or more names for an organism, including common names, Latin names, and/or Indigenous names. Names are important, but are often best revealed toward the end of an experience, rather than at the beginning. Avoid answering questions visitors ask that they can answer for themselves through an exploration activity or through observation.

Encouraging Sharing Within Groups

Sharing encourages teamwork, discussion, social connection, exchange of different perspectives, and learning. If learners from a single group each grab a magnifier, you might suggest they share one and that it might work better if they collaborated on one activity (or, if they are a large group, split into smaller teams). Working together as a pair or team tends to increase engagement, exploration, and learning.

Preparing Staff and Volunteers

Although *Flipping Through Nature: Card Decks to Guide Outdoor Exploration* are designed to be used by a learner without additional support, they are most impactful if staff and volunteers are familiar with the activities themselves and able to share additional context and engage learners in discussion. Staff/volunteers will be better positioned to engage participants in discussion after they have explored using one of the Flip Card activities.

To prepare your team:

- **Have your staff/volunteers try out one of the Flip Card activities in your outdoor area** so they have an understanding of the activity and how a visitor might experience it. Ideally, they should do this with a partner for at least 15 minutes (30 minutes is even better). Encourage them to really get into the activity. Over time, ask them to do this with

each Flip Card activity your organization will be using. This will increase their understanding of the activities and of what's available in your outdoor area. Also, creating time for staff and volunteers to have fun exploring and learning supports them in engaging learners who are asked to do the same.

- **Share the *Preparation and Engagement Guidance* documents with staff or volunteers** who will be engaging visitors in these activities. Ask staff/volunteers to read the document for each activity they are using.
- **Role-play.** Have one or two staff/volunteers play the role of “interested learner” while another plays the role of “educator.” Have the “educator” practice inviting learners to use Flip Card activities and asking broad questions that encourage exploration, thinking, and discussion. Debrief the role-playing so staff/volunteers can reflect on what worked and how they can continue to center the learner in the experience.

Key Takeaways

The recommendations for *Flipping Through Nature* activities outlined in this document were developed after multiple rounds of testing and with feedback from both learners and nature center educators. With this feedback, we were able to create activities that are effective tools to support independent learning and an evolving relationship to the natural world in a myriad of outdoor contexts. Although these activities require little to no instruction, they do benefit from thoughtfully designed systems to support their use (distribution and invitation methods, the training/resources provided to educators). As you build these surround systems, feel free to try out different locations, distribution methods, and invitation strategies. Keep in mind the core design principles of the *Flipping Through Nature* activities to guide your strategies—center learners and engage them directly with nature to support a learning environment that is more just, equitable, and culturally responsive.

The Center for Environmental Learning seeks field-wide systems change toward equity and justice as we advance environmental learning in education systems. We envision environmental learning spaces in which an individual's relationship with the outdoors can flourish through traditions, experiences, history, and learning, creating opportunities for our communities and our planet to benefit. Learn more at lwrnce.org/center-for-environmental-learning.

Our work and actions strive to manifest a future in which:

- Black, Indigenous, People of Color feel joy and liberation in the field of Environmental Learning.
- The field of Environmental Learning centers and affirms multiple ways of knowing, of doing science, and of understanding and connecting with the outdoors.
- Environmental teaching and learning are culturally relevant and sustaining, student-centered, and nature-centered.
- Environmental Learning is seen by the broader education field as integral to science, technology, engineering, and math (STEM) ecosystems.
- Individuals and communities possess the knowledge, skills, sense of agency, and critical consciousness necessary to mitigate the impacts of environmental injustice, human development, and climate change.



The Center for Environmental Learning

The Center for Environmental Learning is part of The Lawrence Hall of Science, the public science center of the University of California, Berkeley.



Acknowledgments

Funding for *Flipping Through Nature: Card Decks to Guide Outdoor Exploration* has been generously provided by Woka Foundation.

We are grateful to the following field test sites and over 200 learners at those sites who graciously tried out early drafts of these activities and provided invaluable feedback, insights, suggestions, and support for their development.

- Belle Isle Nature Center, Michigan
- Delaware Center for the Inland Bays, Delaware
- Hickory Run State Park, Pennsylvania
- Carl W. Kroening Nature Center, Minnesota
- Lake Superior National Estuarine Research Reserve, Wisconsin
- The Lodge and Learning Campus at Gulf State Park, Alabama
- Ponderosa State Park, Idaho
- Riverside–Corona Resource Conservation District LandUse Learning Center, California
- Shaver’s Creek Environmental Center, Pennsylvania
- Trout Lake Nature Center, Florida
- The Wildlands Conservancy, California
- W.K. Kellogg Bird Sanctuary–Michigan State University, Michigan