

Making Maps as Creating and Constructing Experiences in a Prekindergarten Forest Classroom

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ABSTRACT

Children are constantly working to make sense of themselves, their experiences, and their worlds. One way that children tend to do this is through creating artifacts. By engaging in discussions around, and interacting with these artifacts, teachers and educators are able to gain further insight into the experiences of children. Through observing children create and participating with them in discussions about their artifacts, the educator/researcher assembled a framework for understanding children's connection to created artifacts. The potential of mapmaking and artifact-based discussion to offer insight into experience are discussed.

Keywords: nature-based education, emergent curriculum, child-directed learning, participatory methods, ethnography, constructivism

One of the key mechanisms by which outdoor education is thought to have an impact on children's later dispositions toward nature is through the memories they create during their time in natural spaces (Chawla, 1998; Cleary et al., 2020), and through being outside more generally (Evans et al., 2018). Positive experiences in and memories of nature, then, may have important downstream impacts on attitudes toward the natural world (Broom, 2017). Therefore, assessing and creating rich experiences in outdoor contexts is an important component of early childhood educational initiatives, and a particular obligation of nature-based programs.

In this qualitative case study, I sought to discern the ways that a group of children (N = 9) interpreted their experiences in a forest during their days in an outdoor preschool program located in New Orleans. To do this, I invited the children to create maps of spaces within the arboretum where we spent our days. Some days, these maps were of places we set up class for the day, on other days the maps depicted the trajectory of our walks, or "wanders" through the forest. In particular, I wondered: What will the maps children co-create tell us about how the children are experiencing the forest? What use are these maps, these created artifacts, to the children in interpreting and processing their perspectives on the forest?

Nature School: An Overview

Context. Nature School is located in New Orleans, Louisiana—a mid-sized city in the gulf south region of the United States where average year-round temperatures rarely reach below freezing. Nature School is a primarily outdoor nature-based school that operates within a 60-acre public arboretum (henceforth "The Forest" or "the forest") in New Orleans' City Park (see Arboretum Map in Appendix). The green spaces (which the children refer to as "classrooms"), vary in size, yet are all defined by an abundance of Live Oak trees with branches that extend to the ground, the presence of nooks and alcoves created by smaller trees and shrubs, and proximity to water. The children in a given classroom are never more than a ten-minute walk from other classrooms. Nonetheless, there are a variety of ways through which one might navigate the trails through the forest. This means that depending on the choices made, a walk through the forest would take as little as ten or as long as forty-minutes.

Enrollment. At the time of this study, Nature School enrolled 32 children that ranged in age from 3- to 8-years and were distributed across three classes: two Pre-kindergarten classes (enrollment 10) with children between the ages of 3 and 5 years, and one Kindergarten/First Grade class (enrollment 12) with children between the ages of 5 and 8. The participants in this study were 10 children in one of the Pre-kindergarten classes. Of these 10 children, five attended for the full day which began at 8:00AM and ended at 3:00PM. The remaining five children attended for only half of the day which began at 8:00AM and ended at 12:00PM.

Philosophical Orientation. The Nature School day is grounded in open-ended, child-directed play. As such, it does not require educators to follow a particular curriculum. Each day, therefore, is guided by the interests of the children. Two co-teachers lead the classrooms, and decide in concert with one another, and through observing the children, the pillars of their curriculum over the course of a given day, week, month, etc. Through an abundance of shared experiences in the natural world where children create art and story with their bodies and words, where children brave new paths amidst the ever-novel familiarity of the forest, the children of Nature School are assembling a store of experiences that will serve them well throughout their lives (Chawla, 1998; Bögeholz, 2006).

Another bedrock of the philosophical orientation of Nature School is its dedication to reflective practice in its teaching teams, and its emphasis on valuing the lived experience of the child. Reflective practice in early childhood is broadly defined as a metacognitive process where an educator considers how the ideas, actions, and interactions that occur within a classroom influence the experiences, relational trajectories, and lines of inquiry pursued therein (see Meier & Stremmel, 2010 for a detailed exploration). A critical component of reflective practice, thus defined, is the experience of the child on both individual and collective levels.

Given the centrality of this conviction to the philosophical orientation of Nature School, it is perhaps unsurprising that a central conviction of the current work is that the experience of the child is valuable *as it is being lived* and *in a particular child's childhood*. While Nature School uses a variety of methods to both document, support, and encourage others to see the value in children's lived experiences, one that became particularly salient (and inspired the current study) was mapmaking.

Maps are Meaning-Making Tools that Support Children in Processing Relationships with the Natural World.

In both traditional and nature-based educational environments, maps are considered powerful tools that children use to connect with the spaces they inhabit each day. In *Coyote's Guide to Connecting with Nature* (Haas, McGown, & Young, 2010) mapmaking is included among what the authors refer to as the "Core Routines of Nature Connection" (pp. 58-59). A map, they assert is meaningful because it "brings the landscape [of our surroundings] to life as [a] diversity of natural signposts emerges through the connections [within the natural world]." (p. 58). Other research has also shown that children use maps to connect with and document their perspectives of classroom spaces in traditional school contexts (McCann, 2014), and as components of their reflections on outdoor spaces within their own preschool (Clark, 2007).

In the current study, I imagined that maps would occupy a space at the nexus of art and narrative, including observational drawings (art) and dictations (stories). While she refers to it as bookmaking, Carrie Green (2017), notes that invitations to create narratives of experience, and that creating art in forest contexts "provides a backdrop for children to reflect on the beauty and awe of nature," (p. 6). Maps, as conceptualized in this work, can be said to be books, or stories of a particular place or journey, and, therefore, avenues for reflecting on relationships with the natural world.

Maps are Tools for Developing Spatial Understandings

Maps, another framework asserts, can provide insight into and work to develop children's spatial understandings. Geist (2016) writes that "each time children make a map, either on paper or mentally, they reexamine their surroundings [and] their previous representation of their world," (p. 50). While Geist approaches maps from a Piagetian perspective, he essentially echoes the assertion of Young *et al.* (2010) in *Coyote's Guide* that maps are orienting tools that, over time, reflect spatial realities with increasing accuracy. Given the ages of the children in my

class, I did not expect that their maps would accurately reflect the spatial realities of the forest. Instead, I anticipated the children would focus primarily on their own movements. This expectation was consonant with my overarching goal of understanding the experience of the child, and was a further contributor to my decision to use maps as the tool of inquiry. Overall, it was my hope that in creating these maps, children would begin to assemble what McCann calls “a common image of shared experience,” (2014, p. 20).

Participatory Methods/Offer Insight into Experience

Participatory methodologies directly involve the subjects of research and the researcher in the creation of a body of evidence that addresses a particular line or lines of inquiry. The Mosaic Approach (Clark & Moss, 2018; Clark, 2007) was the primary methodological inspiration for the current study. This approach seeks to assemble an understanding of children’s experiences through collecting various artifacts and experiences that, taken together, create an informative ‘mosaic’ informed by children’s perspectives. The Mosaic approach is philosophically related to the Reggio Emilia approach (a central aspect of our school program) because of the emphasis it places on the collection of informative data via a variety of channels. In contexts inspired by Reggio Emilia, these channels are often referred to as the “Hundred Languages” (Edwards et al., 1998). Research shows that drawing and mark-making are powerful tools for both meaning-making and garnering perspectives in young children (Einarsdottir, Dockett, and Perry, 2009). Therefore, given the context of our school, the need to travel light, and the ready availability of paper and writing implements, I chose to present languages of visual expression—paper and pen—to the children to create their maps.

Materials and Methods

Participants

The participants in this study were 10 children (9 male, 1 female) between the ages of 3y 1m and 5y 3m. Children had been enrolled at Nature School anywhere from two years to two months. Five of the children attended Nature School for a full day, while five attended for only half. I (the author) was one of two teachers in this classroom. However, my co-teacher taught for only half of the day, meaning that I spent the afternoons with five of the children (the children whose work is represented primarily in the visual artifacts depicted in this work).

Materials

Paper and Clipboards. The primary material used to create maps were pieces of white paper. These white papers ranged from sheets of watercolor paper to printer paper—but all were white. Typically, these white pieces of paper were affixed to clipboards, meaning that we could travel lightly on our wanders (e.g., bringing a single clipboard rather than a heavy notebook). I carried all of the materials in a tote bag or backpack in order to allow the children to engage hands-on with the world as we wandered.

Felt-tip and Ball Point Pens. Black felt tip pens—referred to as “Teacher Pens”—were the primary writing implements children used during their creation of maps. These felt tip pens, and other ball point pens, were selected with the aim of maintaining the children’s awareness on the rendering they were creating (as opposed, for example, to the color or texture of the writing implement).

Invitations to Create Maps

Over the course of the second half of the school year, I consistently invited children to create maps. This invitation occurred primarily in the second half of the day—once the five children who attended only half days were picked up. However, mapmaking sometimes occurred in the morning. Mapmaking always occurred within the context of our Wanders.

Wanders

Mapmaking always began similarly. I began by inviting the children to “take a wander” through the forest aware that wandering through a natural space has the potential to spark interest and inquiry in a variety of domains. Haas and colleagues in *The Coyote’s Guide to Connecting with Nature* (2010) define “Wander” as an aimless walk through the forest during which children are free to experience and encounter the natural world. In our classroom, each Wander was an invitation that the children could accept or reject; and if the children decided against a Wander we did not go. However, when the children did decide to go on a Wander, we began by gathering the necessary materials. Typically, these included a clipboard, a few pieces of blank white paper, a felt tip pen or two, a roll of tape, and a nature guide (e.g., regional birds, insects, tracks and scat, and mammals). Often the children opted to bring along magnifying glasses or binoculars. Occasionally, we also bought an instant camera. Each of these tools was selected to invite children to take a close look at the world that surrounded them once something caught their eye.

Typically wanders began by defining an end goal—and these came in a few forms, none of which are mutually exclusive. Location-oriented wanders had the goal of arriving at a particular location. Observation-focused wanders were focused on finding examples of a particular plant, creature, or phenomenon—e.g. “I wonder how many birds we will find on our wander today?”. Aimless wanders were taken entirely—and explicitly—for their own sakes. Depending on the sort of wander—*location-oriented, observation-oriented, or aimless—the children decided how to begin—which way on a particular path to go.*

It is important to note, however, that the degree of a child’s participation in any act of the wander varied, and no pieces of a wander were ever compulsory. For example, on a wander that emphasized looking for various sorts of birds, some children declined to look. Some days, the children wanted to document many of the things they saw on a wander. On other days, they preferred to focus primarily on experiencing the wander firsthand.

Making Maps

Most of the maps were created on pieces of blank cream-colored paper that we carried around with us. When the children decided to begin a wander on which we would make a map, the children would start a map wherever we happened to be at that particular moment. Starting points did not always represent our point of disembarkation or origin. When the children would come across something they wanted to add to the map, I handed them the clipboard and a felt tip pen. The children would draw what they saw, and once they were done depicting it visually, I would invite them to write or to dictate any words relating to the subjects they had depicted. Those who could write certain words or letters had options: I could take their dictation as well, they could write their own words, or we could work together to create meaningful text.

On some occasions, tape was also used to add artifacts to the map, such as flower petals, leaves, sticks, bits of mulch, or other pieces of the natural world encountered on the wander. In these moments, too, the children were invited to write or dictate any words and to create marks or accompanying illustrations that they deemed relevant. This process continued until the children decided it was time to transition to a new activity at which time I would verbally confirm that we were finished our wander and map. Once the children all agreed, the map was put away.

Storing Maps

Once created, maps were stored in a half-inch binder. Each map was housed in a clear sheet protector with three rings punched out of either side. This collection came to be known as the “Book of Wanders” as it came to be called, was always with us. Children had the freedom to request maps at any time, to add other artifacts such as pieces of nature to the maps, and to add to any previous maps. We kept the Book of Wanders in a tote bag that I carried into the forest each day.

Results

Over the course of nearly eight weeks, the children created 10 maps that chronicled their wanderings throughout various areas of the forest. The primary question of this research asked: What will maps reveal about this group of children's experiences of the forest? A second question wondered: How, if at all, would these children use maps to interpret and process their experiences in the forest? Each of these questions will be addressed in turn.

Children's Use Nature, the Built Environment, Flora and Fauna to Ground Experiences

The children's maps revealed that they positioned themselves within the forest primarily in relation to (1) familiar natural landmarks and (2) features of the built environment. Maps also revealed that children were drawn to familiar flora and fauna. However, children did also include other initially less-familiar items—that, through the map, became familiar. Undergirding each of these was a sense of awe and enthusiasm for the mapmaking process. Tables 1 and 2 detail the particular features of children's maps and the instances of the appearance of each item.

Children Positioned Themselves in The Forest Nature using Natural Landmarks

Of the 10 maps included in the analysis, seven featured explicitly labelled natural landmarks. For the purposes of this study, natural landmarks are defined as features of the natural world that, in our class, comprised significant positional landmarks (e.g. the Climbing Tree; See **Table 1** for definition of the landmarks in more detail). Natural landmarks were particularly important to children because these were the landmarks used to reference position within the forest in our school culture. For example, a teacher might say "We are having class at the Climbing Tree", in order to refer to the location of their home base. These positional landmarks also helped children navigate their ways to specific locations and through the environment of the forest. For example, indicating that one left an item "near The Fallen Tree" or indicating that one should "turn right at Bob Sycamore" was the common way to refer to position. In their maps, the children demonstrate their internalization of this way of conceptualizing the space of the forest—as a collection of natural landmarks within which they move and between which they encounter features of both the built environment and of flora and fauna.

Table 1
Landmarks in the Forest

Natural Landmarks	Description	Appearances
The Climbing Tree	A large live oak with low branches upon which the children frequently climbed.	1/19
The Clearing	A large, cleared space in the forest with a swing, benches, and a fort made of fallen branches.	1/14; 2/11
The Super Tree	A large fallen tree that was particularly challenging to climb. Far from the path.	1/28
The Fallen Tree	A petrified tree, easy to climb, adjacent to path.	4/6
The Airplane Field	A mowed field where the local model airplane club frequently met to fly planes.	1/14; 1/19; 1/28

Children Positioned Themselves in The Forest using features of the Built Environment

Given the location of the Forest within a public park that was also an arboretum, the children came into contact daily with features of the environment that were not natural—that is, features created by human beings. These features, such as benches, bridges, docks, and picnic tables, are referred to as "the built environment" and are features in seven of the 10 maps included in the dataset. Similar to the familiar features of the natural environment, these pieces of the built environment also served as important positional markers within our school culture (some, for

example “The Benches” were also classroom sites). The map from 1/12 (Map Jan 12.) in particular illustrates children’s awareness of the built environment. It includes my own representation of the School Bus (our starting point), and the children’s depictions of “The Bridge” and “Bird Blind”. In addition to familiar natural landmarks and features of the built environment, children also depicted flora and fauna in their maps.

Children Are Drawn to the Flora and Fauna of the Forest

Eight of the maps include children’s depictions of at least one example of fauna or flora that is not the site of a classroom. Children typically depicted familiar flora and fauna (see Table 2).

Table 2
Flora and Fauna

Examples of Familiar Flora and Fauna	Appearances
Flowers	Wood Sorrels (1/20; 1/25; 4/6) Cana Lilies (1/20)
Trees	Oak (1/11); “With Fungi” (1/11); Cypress (1/12); Palm (1/11, 1/12); Willow (1/12); “Low” (1/19) Palmetto (Jan 25); Sycamore (2/22)
Mushroom	1/28
Snake	4/6
Seed Pod	2/22
Alligator	4/6
Dragonfly	4/6
Butterfly	4/6

Interestingly, of the eight maps that include flora, only one includes fauna (see Figure 1, Map of 4/6). This may have to do with the fact that the majority of the other maps were created during the wintertime, when, at the children’s eye level at least, fewer animals and bugs were immediately visible.

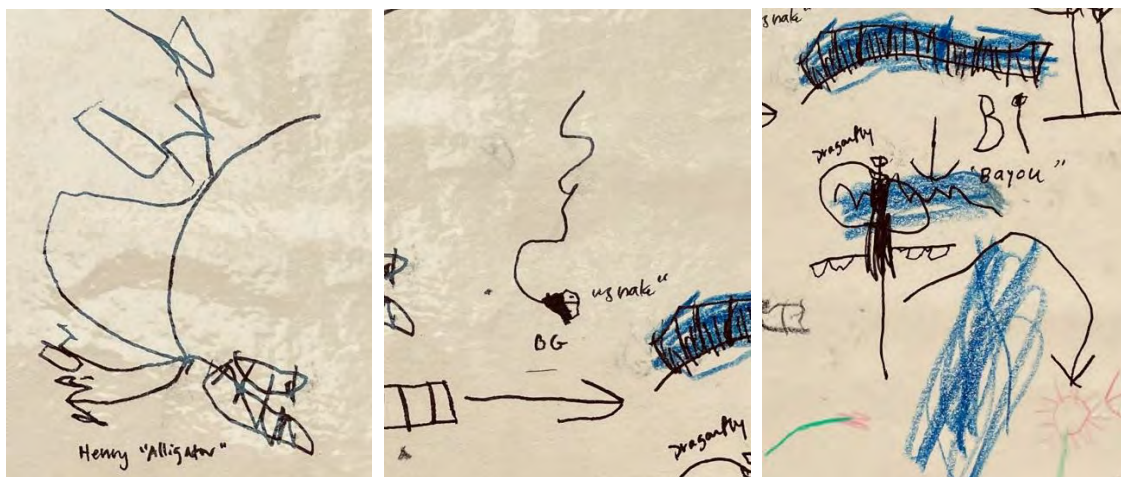


Figure 1: Details of Fauna from Map of 4/6 (Left to Right: Alligator by HE; Snake by BG; Butterfly)

Other Features Included in Maps

In addition to the aforementioned natural landmarks, built environmental features, and flora and fauna, children's maps occasionally included other aspects of the environment that did not fall into either of these categories. Animal tracks, rocks, and bunny scat all made at least one appearance in the children's maps. See Figure 2 (Map of Jan 11) for a detailed example.



Figure 2: Includes flora, duck tracks, moss, a feature of the built environment. Notably, this is the children's first map (Jan 11).

While the content of children's maps revealed that natural landmarks, the built environment, and flora and fauna figure heavily into children's relationship to the forest there is more to consider. Mapmaking was always a communal process that occurred within the physical space of the forest. As such, making maps was a doubly layered experience that constituted an important memory of itself *and* served as an occasion to process an experience either as it

unfolded or immediately after. What, then, did children’s maps have to say about the ways that they interpreted and processed their perspectives on and experiences within the forest? The data revealed that, for the children in this class, maps were chronological chronicles of their wonder and awe at the world. The data also revealed that the awe and wonder represented in these maps often provided children an opportunity to explore the complex act of the communal construction of knowledge through discussion.

A Chronological Orientation

While the content of the children’s maps revealed that they positioned themselves primarily in relation to familiar natural landmarks, built environmental features, and used each of these as grounding points between encountering familiar flora and fauna, the children’s maps revealed a deep chronological understanding of themselves within the forest space. Indeed, my hypothesis that children’s maps would be a primarily chronological exploration was supported. Only after many months did children’s representations begin to adopt a spatial perspective.

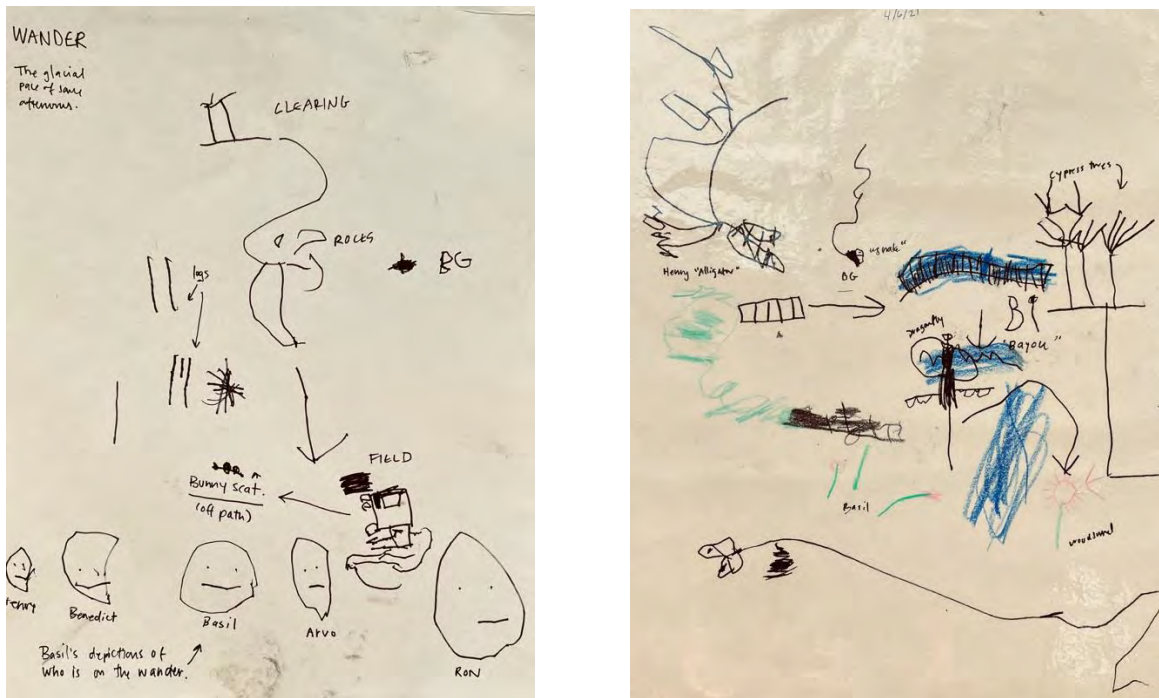


Figure 3: (Left; Map from 1/14/21) Children’s maps began as primarily chronological chronicles of experience. (Right; Map from 4/6/2021) However, after some time, children also experimented with spatially representing their positions within the forest.

For example, in Figure 3, the map from 1/14 begins with a picture of The Clearing (a familiar natural landmark). Next, it proceeds down the page to rocks (connected to the clearing by a long line representing the amble of the children’s path). Proceeding from the rocks is an arrow to The [Airplane] Field. However, there is also a picture of logs drawn adjacent to the rocks. At the bottom of the map is a depiction of all of the participants in the Wander on that day. In contrast, the map from 4/6 experiments with a more accurate spatial representation. This is the only such map that fully attempts to capture the relationship of space on the map—for example, depicting the bridge, cypress trees, and path in proportion to one another and attempting to show aspects of the Forest (e.g., “The Fallen Tree” and “The Loop”) in an accurate spatial relationship. It is important to note that the children’s chronological representations are not deficient, but are instead developmentally appropriate and suggest a priority for their maps that differs from those of adults.

Interacting with Maps: Rich Experiences in Communal Knowledge Construction

An analysis of the children's dictations related to and of their interactions surrounding the creation of the maps revealed that map creation was an occasion to capture wonder and to co-construct knowledge. A few of these instances of discussion are detailed below.

On January 20, (Map from Jan 20; also see Figure 4), the children took a wander that, according to the map and corresponding photos covered only a short distance. Nonetheless, that day provides a rich example of the ways that mapmaking within wanders provided opportunities for children to create knowledge with, challenge assertions put forth by, and transmit knowledge to their peers.

Beauty and Death. HE notices Cana Lilies beside the path we are walking on. HE pauses and looks closely at them, deciding to add them to our map. HE then remarks:

The flower petals, they're pretty. It's kind of dead.

Here, HE reacts to nature, and verbalizes his experience of two typically contradictory constructs—beauty and death. His friends gather around him and remark on the nature of the lilies—and question whether or not they are really dead. The brown markings on the leaves suggest that they are, indeed, dead. A nearby plant also confirms that the one under initial consideration is especially unhealthy.

Bunny Scat. Later, AR, HE, and BK are observing some bunny scat. HE lifts a stick and points to it. AR speaks first.

AR: They eat carrots, and they poop! Why do bunnies keep pooping?

HE: We poop a lot only when we eat food, so maybe they eat food!

In this exchange, AR implicitly refers to our previous sightings of bunny scat in the forest and wonders why there is so much. HE then attempts to explain this phenomenon by connecting to his own lived experience.

Pollinating. The children pause to observe wood sorrels growing at the base of a tree. A bee buzzes around the flowers.

BG: It's pollinating.

HE: That means it's spreading honey to eat, getting a little from its flowers, and heading back to the rest.

Each of these dictations shows a different aspect of children's experience within a single afternoon of mapmaking. While I was unable to capture the full extent of each of these discussions, these illustrations remain important exemplars of the sorts of experiences the children regularly had with one another.

Mapmaking is an Integrative Experience

Dictations revealed that children were making connections between their observations of physical characteristics of the forest and prior experiences. This supported my hypothesis that maps, for these children, would be rooted in place. Further, it suggests that maps reach across spaces and experiences, providing evidence that mapmaking may constitute an integrative experience for young children in outdoor educational contexts. For example, as early as January 12, the children noted "I think we've been this way before!" (BG). Although the data does not offer enough context to discern the accuracy of BG's statement, it nonetheless illustrates that the act of making maps invites children to reflect on things they have previously experienced.



Figure 4: Scat: 1/20 HE (right) pointing to the bunny scat on the log as AR (left) and BK (center) look on.

Discussion

Mapmaking and looking at maps reveal children’s relationships to and develop children’s relationships with spaces. In a 2015 paper, McQuarrie and colleagues assert that “nature [is a], setting and resource, afford[ing] flexibility in pedagogical practice and provid[ing] multiple possibilities for children’s learning and development.” The authors also elaborate many ways that natural settings become part of an emergent curriculum of sorts that structures children’s days and experiences within outdoor educational contexts. In place based educational contexts where children are intimately connected to the unique physical and natural features of the world around them, inviting children to reflect on and articulate their relationships to spaces is a critical component of both solidifying pedagogical understanding and the memories that are shown to provide an important base for connection to nature as children grow.

“I think it’s cool and also beautiful,” HE notes as we sit in front of a memorial fountain. We then discuss that a memorial fountain means that someone has died and that a fountain was built to honor their memory. In the midst of the fountain is a statue of a water nymph.

“I really miss that lady who got died,” BG adds, following a few moments of silence. “It could be a girl, or a kid.” (January 11, 2021)

For AR, the newest member of our class, the process of wandering through the forest on a mapmaking expedition led to a moment of important connection.

As we stop at a point on our wander, a bug finds its way onto a pair of our binoculars. A peer captures the bug in a jar, and it eventually makes its way into AR's hands. He regards the bug and remarks: "It's so cool, I want to keep it as a pet," (January 13, 2021).

A couple of weeks later, BG pulls out a map of the park before snack time. He and some peers spend some minutes around it.

"What are you looking at guys?" AR asks.

"A map," BG says. "We need to look for arrows."

"There's arrows!" AR replies, pointing to the map. HE also points a finger toward the map.

"It has every kind of thing you want to see," BG adds, poring over the details.

"This could be Cafe du Monde!" BG adds, and AR quickly echoes him.

It seems that BG understands the park as a large place that "has every kind of thing you want to see." As we spend more time with the map both in this moment and later on this same day, the children's attention shifts to the key. There are labels for parking lots, food and dining services, for stables, and for softball fields to name a few. The children ask me to read each of these in turn, and as we do I point out or proximity to (or emphasize our distance between) each.

Mapmaking honors the developmental levels of multiple children while giving them a chance to collaborate meaningfully in a shared artifact. In a classroom filled with only four-year-olds or one where the children range in age from barely three to nearly six, there are different strengths, interests, and capacities. One of the beauties of shared mapmaking is that children are invited to participate as much or as little, and in whatever way they feel most comfortable. On some days, children want to dictate, on others they prefer to draw a contribution. Sometimes, they want to write arrows, or merely describe the weather outside. Each 'language' (Edwards, Forman & Fyfe, 1998) of expression is valuable and contributes to the ongoing work we are conducting as our class embarks upon a shared experience (see Helm & Katz, 2011).

"Would you like to draw the people who are on the hike?" I ask BK (3y 9m) eager to give her an opportunity to participate in creating this chronicle of experience. She readily agrees, setting to work drawing each of the people on the hike. She starts with me, adds herself, and then the three other children on the hike.

BK's contribution was as important, informative about the experience, and valuable for our ongoing recollection as any of the landmarks her peers decided to add. Further, her contribution is honored as a piece of the official artifact her peers created (January 14, 2021).

"I don't know how to draw it," BK would often say, reluctant to visually depict particular stops on our hike. However, when looking at maps together, she was willing to share perspectives verbally. "It was all yellow--they painted!" BK said, in reference to a fence where we began our wander (January 13, 2021).

Not only are maps shared artifacts reflecting the children's different developmental levels with regard to mark making but they are also artifacts of the children's culture. According to Corsaro (2016) children's peer cultures are rooted in desires to wrest control from adults. In creating and dictating a map and its words, children are exerting power and influence over the physical environment and its officially documented public memory.

Maps provide an important catalyst for ongoing inquiry and reinforce previous experiences while integrating domains of learning. More often than not, as we travelled along our wanders, the children posed questions about the spaces we moved through and things we saw along the way. Other times, I invited questions designed to provoke curiosity, evaluate their knowledge, and encourage discussion and reflection. For example, on January 11 as we walked along the path, BG and HE noticed and drew tracks we saw in the mud. As they drew them, they also put their fingers in them, knelt down to get close to them, and wondered aloud what animals might have made the tracks. This multisensory experience was further aided by our use of field guides and our physical proximity to the waterfowl. These inquiry-based learning experiences, where children generate and answer questions collaboratively and with the help of multiple arenas of input, draw from and contribute to children's intrinsic motivation and dispositions toward focused work (Harris, Helm, & Katz, 2011; Stacey, 2018).

Conclusion

While educators ought to value children's perceptions of the world and of their places within it, coming to a true understanding of how children see things is a complex and multilayered process. In schools where curriculum is primarily emergent or child-centered, it is even more critical that adults responsible for guiding and supporting children have keen insight into the ways that children are constructing and creating knowledge. In this case study, I sought to integrate these two necessities through encouraging the children to create maps. This research adds to the established knowledge base on the potential of maps to provide rich insights into children's experience and to constitute an accessible and reliable way for children to share their experiences with the world.

Future research would do well to investigate ways that educators can transform experiences with maps such that maps become useful to children beyond the instance of creation. In environmental educational contexts where process-oriented approaches to young children's work are consonant established practices and pedagogies, using child-created maps extends the duration of a child's process with their created work. Children transition from the process of creating to the process of revisiting, revising, and extending knowledge. This, in turn, might further solidify their ownership of the knowledge construction-process. Future work might also seek out ways to incorporate maps more centrally into other parts of the day such as whole class meetings or on subsequent wanders where children use a child-created map to navigate to a particular location or recall a particular experience.

Maps were, this study revealed, a powerful stimulus for discussions about the natural world and promoted children's connections across time, place, and experience. As educators seek to explore mapmaking as a tool for reflecting on and reinforcing unfolding experiences, it is important to note that contextual features will play a large role in the particularities of its instantiation. For example, factors such as the time they have to dedicate to this experience, the affordances of their physical natural space (including the flora and fauna present and their relationship with the administrators of the space), and the interests of the children in their care will all determine what mapmaking looks like in a particular context. Nonetheless, when created with care, intention, and patience, they are also powerful records of children's abilities, inquiries, and experiences—and as such are potentially robust tools for ongoing, organic assessment, pedagogical documentation, and for those who wish to advocate for children's presence within natural spaces.

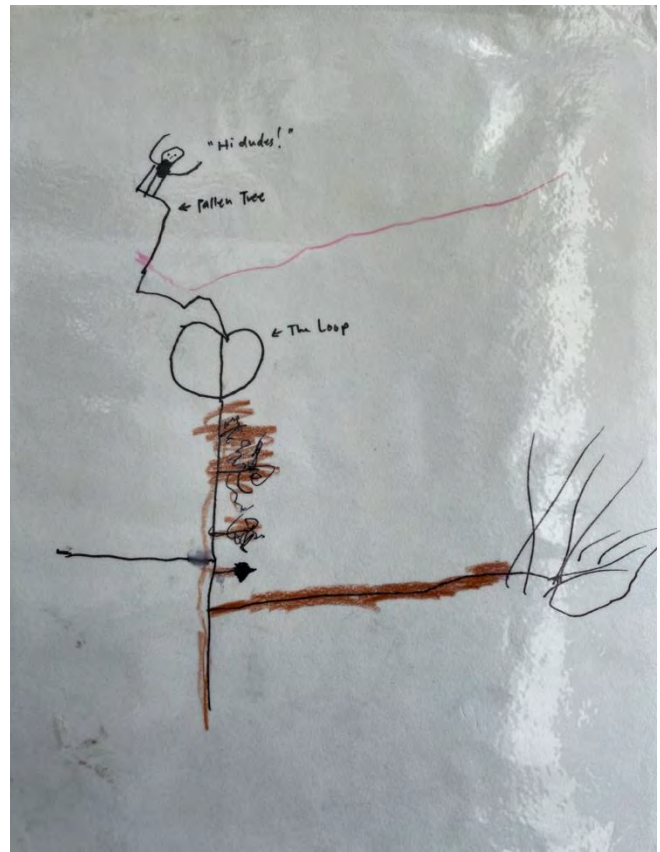
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Appendices and Figures

Map from 04/06/2021.

Note the children's inclusion of creatures, such as the alligator, snakes, and even themselves. As a map created in April, rather than in January, this map is more attuned to spatial relationships of various locations in the forest—for example, the directional arrows and the path in the map on the left that has particular branches leading to specific areas of the forest. It also reflects a refined level of fine motor and artistic skill.



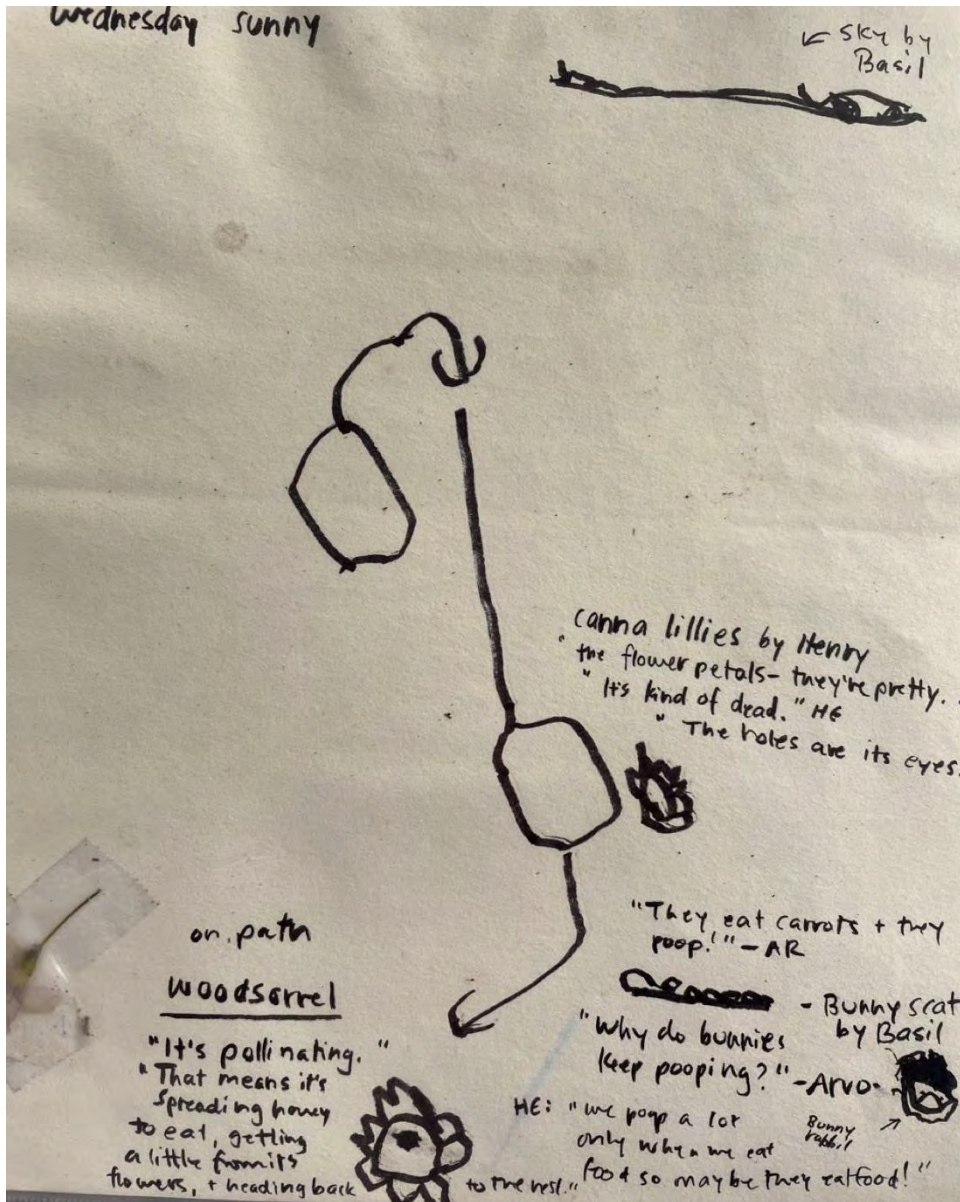
Map from 01/20/21.

This map captures some of the children's discussions. Particularly notable are their attempts to define pollination, and the connection between the observed bunny droppings and their own personal experience:

AR: "Why do bunnies keep pooping?"

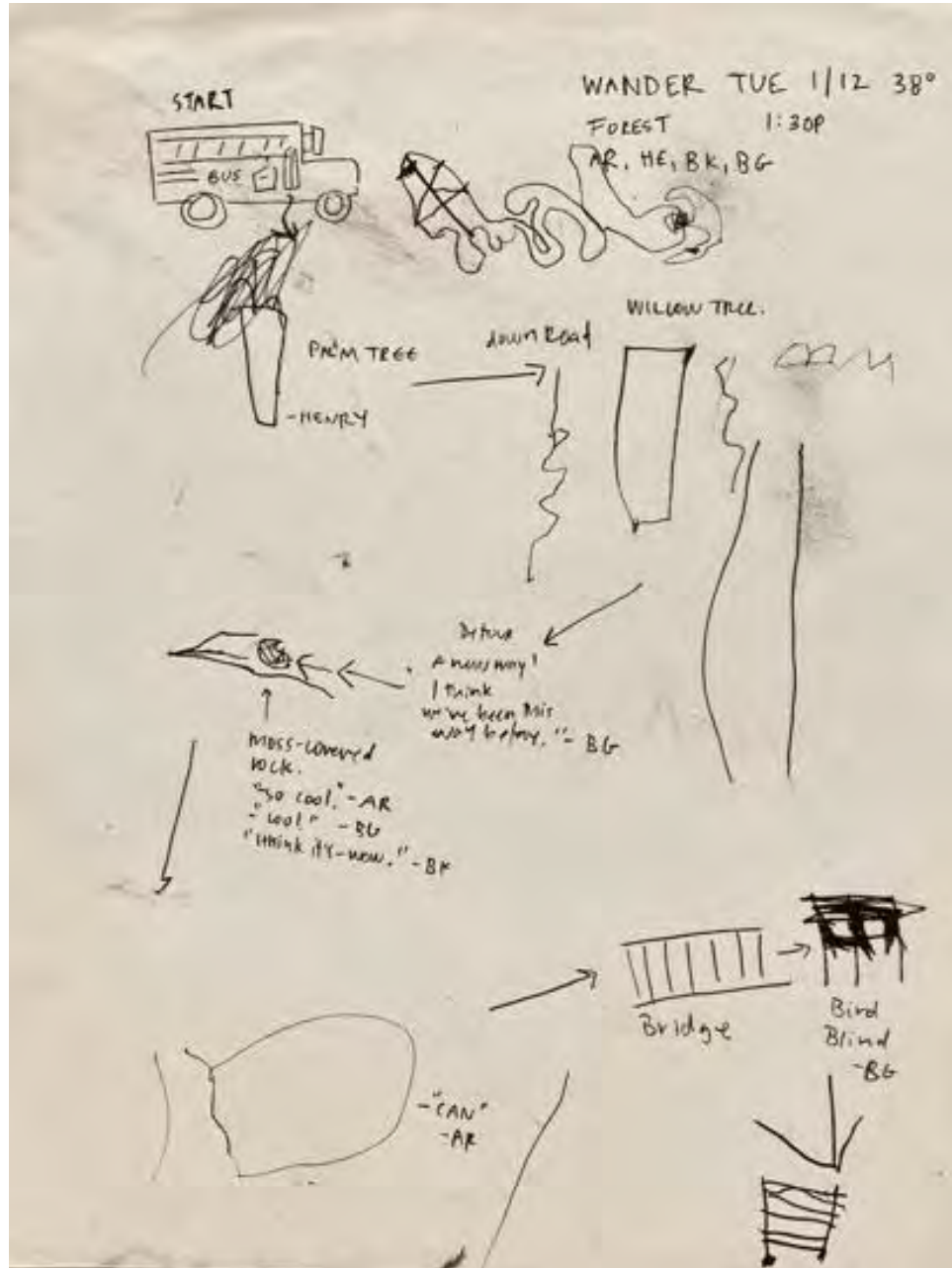
HE: "We poop a lot only when we eat food—so maybe they eat food!"

Despite the brevity of this wander, it contains important examples of the processes of knowledge construction, challenging, and transmission that occurred during mapmaking.



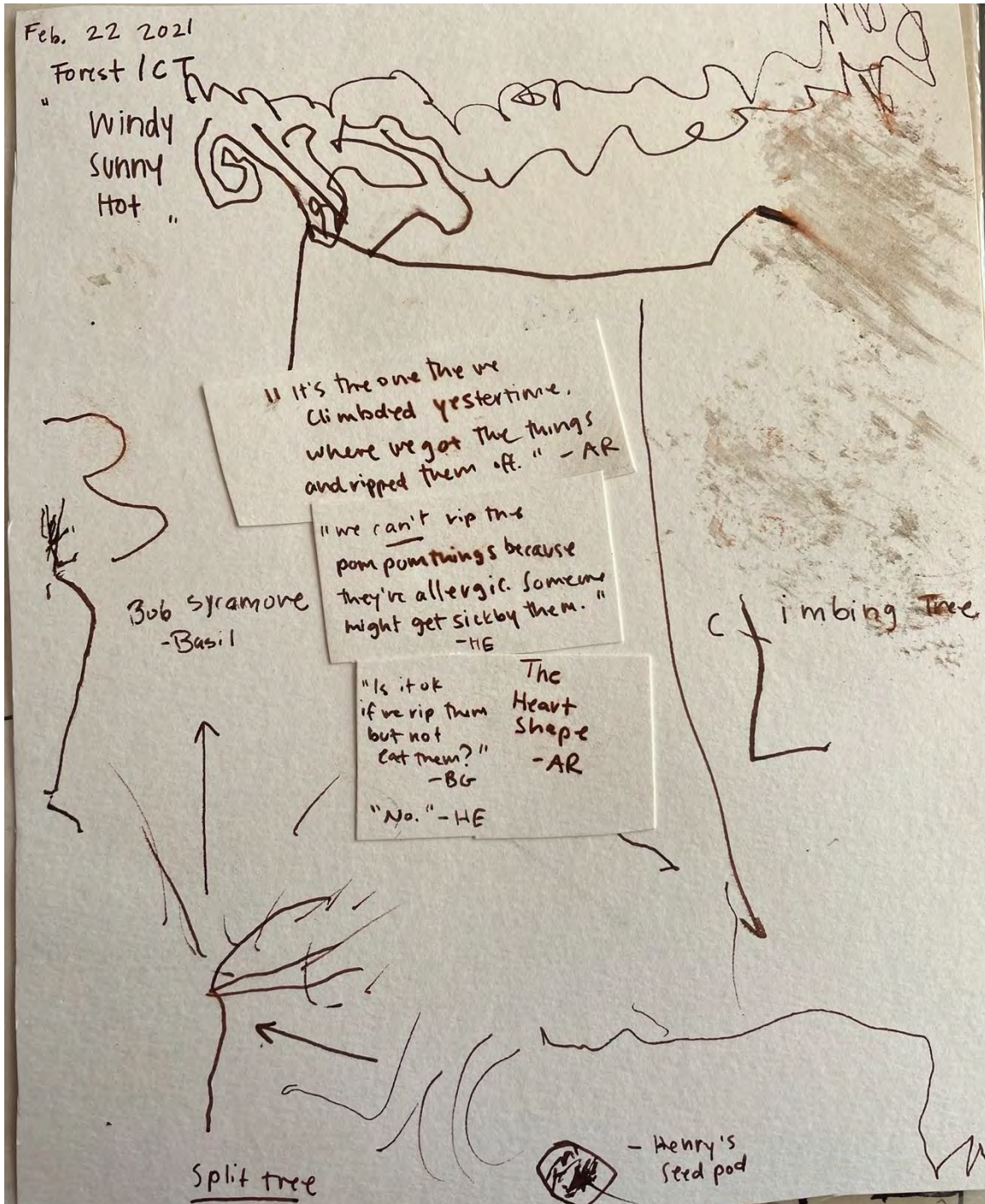
Map from 01/12/2021

Map detailing Wander of January 12. Of particular note is the lack of spatial coherence, the presence of flora (e.g., the pam tree) alongside aspects of the built environment (the bridge the road, and a can), The drawing of the bus (top left, underneath "START") was done by the children's teacher to start the mapmaking process.



Map from 02/22/21.

This map incorporates elements of the children's reasoning about the propriety and safety of touching and/or eating a particular part of a plant. It also includes their renderings of familiar locations in the forest.



Map from 01/14/2021

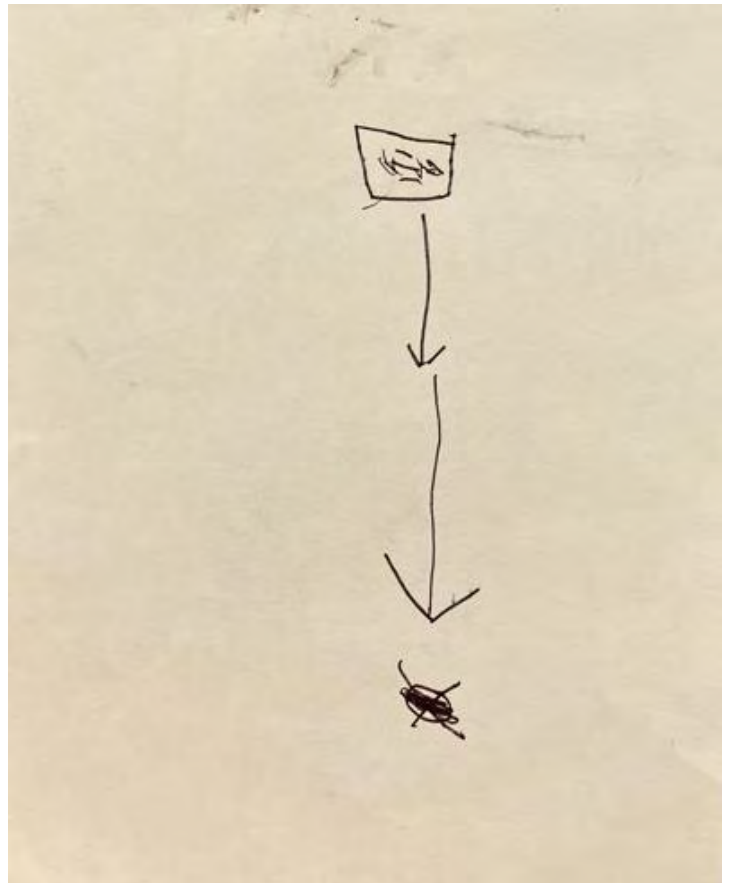
Notable because in this early phase of mapmaking the teacher's dictations are necessary to interpret the children's meanings (as opposed, for example, to the Map from 4/6/2021). Also includes depictions of the children on the wander—one of only two maps (the other being 4/6) to do so.

Note researcher's reflection "The glacial pace of the afternoons,".



Map from 02/01/2021

This map is an important example of a sparse map that the children created. Some maps included sparse details and only snippets from the children's interactions. Importantly, a sparse map does not necessarily correlate with a short wander or a lack of engagement. Young children's products, while informative, are only one aspect of a broader process that is constantly unfolding.





Top: AR adds a detail to a map on January 12.



Bottom: HE adds detail to a map on January 20.



Top Left: The children trace their trajectory on the wander.
Top Right: A detail of the children at work identifying the tracks using a field guide.



Bottom Left: BG draws a detail on a map.
Bottom Right: Goose tracks in the mud.





Top: BG shares a map (from January 11) with his peers on January 26.
Bottom: HE adds a detail to a map in the afternoon on February 1.



A Map of the Arboretum

Retrieved from: https://neworleanscitypark.com/files/in-the-park/couturie_forest_map.pdf (12.28.2021)



MAP KEY

-  Mulch Trail
-  Gravel Trail

TRAIL DISTANCE

- Couturie Forest Trail: 1 Mile
- Scout Island Trail: 0.5 Mile

