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USA



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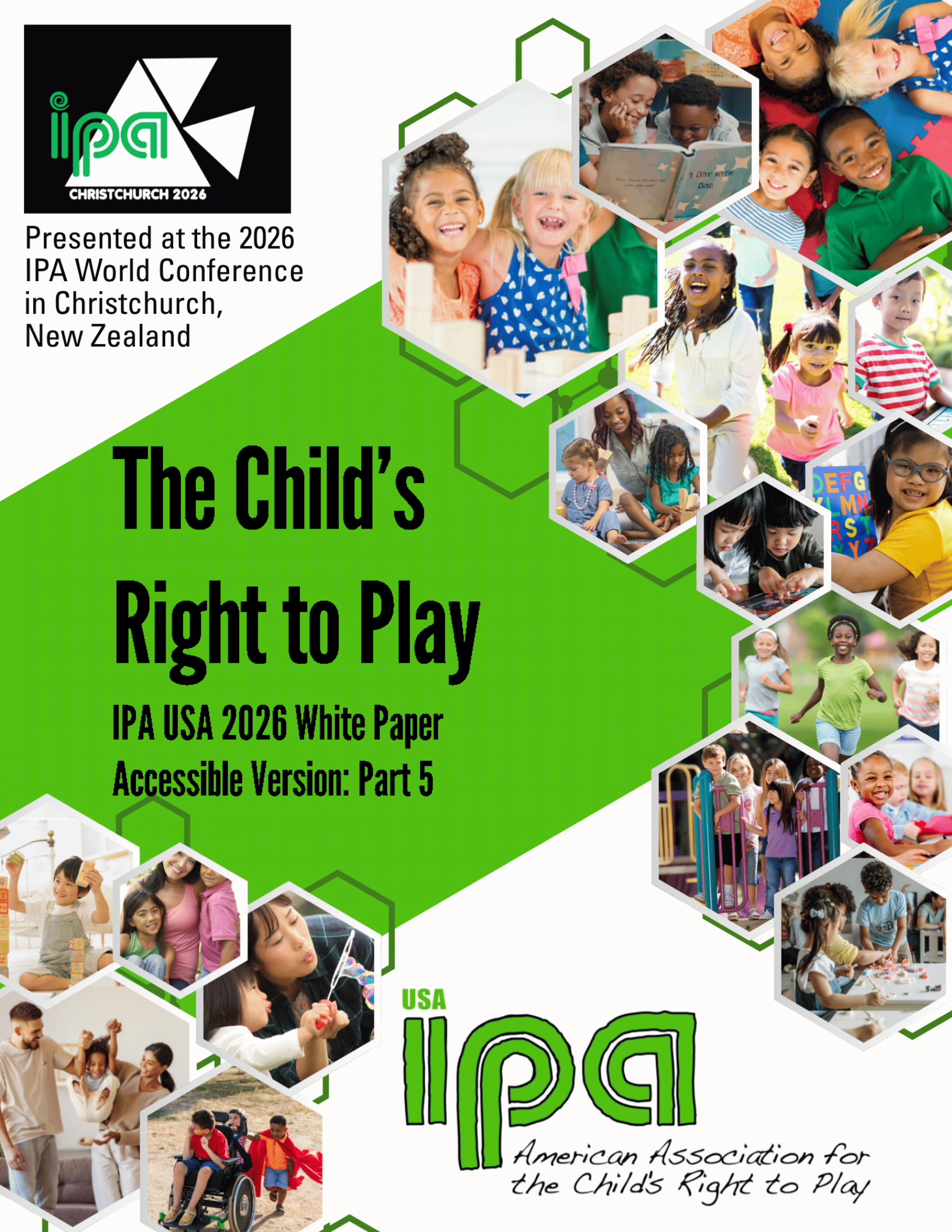


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Executive Summaries

Executive Summaries are organized by category, followed by author.



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Nature is Essential

Children are biologically connected to the natural world, yet opportunities to play, learn, and explore in nature continue to decline. Experiences in natural environments support children's physical, social, emotional, and cognitive development while fostering curiosity, empathy, environmental awareness, and a sense of belonging. The articles in this category examine how nature-based play and place-based education create meaningful opportunities for children to connect with their communities and the world around them. Drawing on perspectives from diverse cultural and geographic contexts, these authors highlight innovative approaches that support children's development while strengthening relationships with the natural environment. The research, frameworks, and practical strategies in these articles give readers tools to advocate for and create more meaningful opportunities for nature-based play and learning.

Authors

Fostering Young Children's Empathy through Nature Play

Julie Ernst, PhD & Claire Underwood, PhD

Nature-Based Play in Kenyan Early Learning through Play:

The Pendo Mazingira Framework

Dinah Awino Kawino, BS in Environmental Education

Nature and Place-based Environmental Education: A Primary Grade

Teacher Focused Group Case Study in Wilmington, NC

Christine Jie Li, PhD; Beth Saile, MS; & Callie Hendricks, BS

Fostering Young Children's Empathy through Nature Play

Julie Ernst, PhD & Claire Underwood, PhD

Introduction

Empathy is surfacing as an important driver of positive change in social and environmental contexts. There is a need to support the development of empathy in young children, given the time-sensitive period of early childhood and the relevance of empathy to social-emotional learning, which is an emphasis in early childhood education. This white paper provides insights into how nature play can be one of the strategies drawn upon to foster empathy in young children.

Conclusion

Children have a natural curiosity and desire to care for one another and the world around them, and they can be remarkably capable. By offering opportunities to practice empathy through nature play, children can learn to respond to one another with expressions and actions of encouragement, care, and support, as well as through shared problem-solving, which helps them connect with one another and the world around them. By responding to one another, children build emotional connection and resilience; they are reminded of their capabilities and learn that they do not need to rely solely on the teachers and caregivers supporting them and others, which in turn provides opportunities for and reinforces empathic responding. As such, nature play has great potential to foster the development of empathy during the critical period of early childhood. By creating opportunities for children's nature play and "stepping back" to make space for children's empathic responding, adults (teachers, researchers, and play workers alike) can leverage the affordances of nature play to nurture children's empathy development.

Nature-Based Play in Kenyan Early Learning Through Play: *The Pendo Mazingira Framework*

Dinah Awino Kawino, BS in Environmental Education

Executive Summary

Across the world, children's opportunities for free and meaningful play, especially in nature, are increasingly constrained by academic pressure, rigid routines, urbanisation, and compliance-driven systems. In Kenya, these conditions have contributed to early disconnection between children and the natural world, affecting both immediate wellbeing and the development of long-term environmental identity. This white paper presents practice-based insights from Pendo Mazingira, a nature-based eco-empathy and play framework facilitated in Kenyan early learning environments, including Montessori, community-based, and faith-affiliated schools. Developed through co-facilitation with qualified Early Childhood Development (ECD) teachers, Pendo Mazingira demonstrates how child-led, nature-rich play can be integrated into everyday school routines using low-cost materials and context-responsive approaches. Grounded in environmental education and community development practice, the paper addresses a critical gap in early childhood education: while environmental issues are widely discussed at policy levels, children's early relational experiences with land, water, air, plants, trees, animals, and natural resources are rarely prioritised as foundations for future care. Pendo Mazingira positions nature-based play not as an add-on, but as essential to children's emotional wellbeing, belonging, and eco-empathy. The paper introduces two core frameworks: The *Eight Nature Pendo*s, recognising diverse pathways to nature connection, and the *M.I.R.A.C.L.E Approach*, a facilitation ladder supporting sensitive adult presence and child agency. Field observations suggest that open-ended play and non-intrusive facilitation support calm, sustained engagement, social connection, and imaginative exploration, while also renewing teachers' appreciation for play as a relational practice. Rather than presenting large-scale evaluation data, this paper offers early insights grounded in observation and reflection. Focusing on the Children's Corner of Pendo Mazingira, it contributes to global conversations that recognise play in nature as a right,

a necessity, and a pathway to environmental care arguing for locally grounded, culturally responsive approaches within Kenyan early learning contexts.

Nature and Place-based Environmental Education: A Primary Grade Teacher Focused Group Case Study in Wilmington, NC

Christine Jie Li, PhD; Beth Saile, MS; & Callie Hendricks, BS

Introduction

This project examines how to make nature- and place-based environmental education more accessible in elementary classrooms, particularly in coastal North Carolina. Although research consistently shows that outdoor and locally grounded learning strengthens student engagement, sense of place, and pro-environmental attitudes, teachers face persistent barriers, including limited time, a lack of standards-aligned materials, and insufficient preparation resources. A five-day carnivorous plant unit was developed as a model for fully prepared, standards-aligned curriculum that integrates local ecology, hands-on activities, and clear instructional supports. During Fall 2025, a focus group of elementary teachers from New Hanover County Public Schools evaluated three coastal ecosystem lessons, highlighting strengths such as local relevance, engaging phenomena, strong content support, and opportunities for scientific discourse. Teachers also identified key needs, including explicit differentiation strategies, ready-to-use materials, pacing guidance, and integration of real data. Findings underscore the importance of designing phenomenon-driven, classroom-ready, locally grounded environmental education (EE) curriculum that aligns with state standards and supports teacher implementation.

The shift in how much time children spend outdoors has become one of the most talked-about childhood trends of the past decade (Waite, 2010). The author of *Last Child in the Woods* argues that children suffer from nature-deficit disorder when disconnected from the natural world. Other studies show that digital platforms compete directly with outdoor experiences and classroom instruction (Siskind et al., 2022). Urbanization and reduced green areas also add to the safety concern and keep children from exploring outdoors (Kabisch et al., 2017). Together, these ideas underscore a growing recognition of the need for nature and place-based education among elementary students, approaches that ground learning in real environments, local ecosystems, and hands-on experiences. This shift pushes back against overly test-driven

models by showing how outdoor, experiential learning supports academic growth, emotional well-being, and a deeper sense of stewardship for the places that children call home (Sobel, 2004).

Conclusion/Recommendations

Lessons Learned from the Teacher Focus Group. Focus group participants showed strong consensus on curriculum strengths and recommendations for improving classroom readiness. Participants emphasized that the lessons were engaging and locally relevant, while also identifying constraints related to time, materials, and instructional support. The following themes represent the most common findings:

1. Standards Alignment is Essential for Adoption. Teachers were clear that even high-quality environmental lessons cannot be used unless they are explicitly connected to state standards. Future curriculum development must center standards alignment from the outset.

2. Teachers Regarded the Lessons as an Integrated Whole Rather Than as Separate, Disconnected Sessions. Teachers described the lesson plans as functioning more like multi-day instructional units than single-day lessons. While they viewed this positively for its depth, teachers emphasized the need to frame the lessons as a unit that could be chunked across multiple days. A teacher identified as VM said, “I would not be able to get through all the components in one day in 45 minutes.” Teachers recommended implementing suggested stopping points, guiding questions for each section, and language that helps teachers decide how to pace lessons across days.

3. Participant Engagement Was Notably High, Particularly During Lessons that Incorporated Elements such as Fire, Location, and Structured Discussion. Teachers identified high levels of engagement in the lessons, with fire ecology and longleaf pine savannas emerging as particularly compelling because of their perceived “wow factor” and the concept of an environmental “phenomenon.” VM highlighted the importance of beginning each unit with a phenomenon that prompts students to notice, wonder, and investigate, and said, “Fire will captivate [students]. . . something that people deem bad actually helps the environment.”

Teachers also noted that the activities naturally encouraged scientific discourse and evidence-based reasoning, even when this was not a stated design goal. One teacher, AB, said, “We were engaged in argument – claim, evidence, reasoning – and that’s a science and engineering practice.” This suggests alignment with current shifts towards inquiry-driven science education.

4. Local Relevance Was a Major Strength and Motivator. Teachers emphasized that the place-based focus on coastal NC ecosystems was one of the curriculum’s greatest strengths, in contrast to broader programs that lack geographic specificity. They expressed that students benefit when lessons focus on species and ecosystems they can see in their own community. They described this local focus as a meaningful way to support environmental identity and community connection.

AB said, “That’s the biggest drawing factor for me... It’s specific to my area.”

EB said, “My students would like it because it’s about their hometown.”

Teachers stressed opportunities for students to learn outside of the classroom by visiting local parks or free public sites, increasing equity and accessibility.

“I can take my children to a place I don’t have to pay for, like a park,” VM said.

5. Teachers Equally Valued Content Support and Student Activities. Teachers stressed that they are not content specialists, and that the strong background information included with the curriculum gave them confidence and instructional effectiveness.

“There was a lot of information I learned today... It gave me the confidence to teach it,” VM said.

Teachers noted that background content, vocabulary, and key explanations should be explicitly included in written materials so they could anticipate student questions.

6. Accessibility and Differentiation are Attainable; But Must Be Clearly Defined. Teachers agreed that lessons were adaptable for diverse learners and multilingual learners, but emphasized that differentiation supports should be labeled and built in,

rather than assumed. Teachers identified visual supports, step-by-step instructions, and structured scaffolds as especially important.

7. Teacher Time Was the Main Barrier, Not Willingness. The most consistent barrier to implementation identified was time required to prepare materials. Teachers were clear that they would not implement lessons requiring extensive assembling, cutting, or prep outside instructional hours.

“If I have to create all the items . . . I don’t have the time, so I’m not going to do that,” VM said.

Teachers favored reusable, pre-made materials (i.e., card sets, posters) that could be stored easily and used year after year.

8. Teachers Requested More Data and Higher-Order Questioning Supports. Teachers emphasized the need to integrate real data, including charts and graphs, to support analysis and alignment with statewide assessment expectations. They requested pre-written higher-order questions and guidance on discussion trajectories to support standards-aligned conversations.

9. Community Partnerships Were Seen as a Major Opportunity. Teachers identified numerous local organizations, parks, and professionals that could meaningfully extend lessons, including state parks, conservation groups, arboretums, fire departments, and island education programs. Teachers cautioned that these extensions should be framed as optional, recognizing variability in scheduling and access.

Together, these insights highlight the importance of creating place-based curriculum that is phenomenon-driven, standards-aligned, fully prepared, and rooted in the unique ecology and nature of coastal North Carolina. We hope more educators will fall in love with taking students outdoors to explore their places and communities through nature exploration and outdoor learning.

White Papers



Nature is Essential

Fostering Young Children's Empathy through Nature Play

Nature-Based Play in Kenyan Early Learning through Play: *The Pendo Mazingira Framework*

Nature and Place-based Environmental Education: A Primary Grade Teacher Focused Group Case Study in Wilmington, NC



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Fostering Young Children's Empathy through Nature Play

Julie Ernst, PhD & Claire Underwood, PhD

Introduction and Problem Statement

Empathy is the knowledge and sharing of others' feelings (Knafo-Noam et al., 2009). It relies on the ability to perceive, understand, and care about another being's experiences or perspectives (Young et al., 2018). As part of a broader category of prosocial actions, empathy promotes human flourishing and serves as the foundation for ethical and humane action (MCC, 2018). Empathy also has significance in conservation contexts (Skibins & Powell, 2013). However, empathy has been declining, likely due to increased social media use, reduced family size, and changes in parenting styles (Konrath, 2011). Given its potential to motivate action and serve as a powerful driver for positive change in social and environmental contexts, there is a need to support the development of empathy, particularly during the formative period of early childhood.

Background: Empathy and Its Significance

Empathy includes both cognitive and affective components. Cognitive empathy encompasses perceiving cues from another person, understanding what that person is feeling and thinking, and perspective-taking, which involves placing oneself in another's mind and imagining what they are thinking or feeling (Cuff et al., 2014). Cognitive empathy is considered intentional, controllable, and teachable (Carr et al., 2003). Cognitive empathy develops alongside social-cognitive development and gradually increases from early to late childhood (Hoffman, 2000).

The affective domain of empathy includes emotional sharing, which is sensing or experiencing another's emotions, and empathic concern, which is the motivation to care (Cuff et al., 2014). Emotion regulation skills may contribute to emotional sharing, which may lead to empathic concern (Eisenberg, 2000; Hay, 2009). Mirror neurons in the brain are the origin of both affective and cognitive empathy (Goldman, 2014); thus, people generally have the capacity for empathy, yet certain biological conditions can affect how well mirror neurons function and develop (Gerdes et al., 2013). Affective

empathy generally develops very early in life and remains relatively stable across one's lifetime (Davidov et al., 2013).

Empathy's significance is twofold. First, empathy, which is described as "the spark of human concern for others, the glue that makes social life possible" (Hoffman, 2000, p. 3), is significant in the context of pro-social behavior. Empathy plays an important role in social interactions (Bernhardt & Singer, 2012). It is associated with comforting, altruistic, and responsive behaviors toward peers (Miller & Jansen op de Haar, 1997), as well as a propensity to relieve another's suffering through action (Pittinsky & Montoya, 2016). Empathy in childhood is also part of a larger prosocial personality trait that motivates helping behaviors into adolescence and young adulthood (Eisenberg et al., 1999).

The second aspect of empathy's significance is in the context of wildlife conservation and environmental conservation more broadly. Empirical evidence links empathy with wildlife to conservation behavior (Shelton & Rogers, 1981; Skibins & Powell, 2013; Young et al., 2018). Empathy with wildlife can be a catalyst for empathy with the natural world more broadly (Tam, 2013), which, in turn, predicts biospheric concern and is associated with environmental behaviors. However, researchers point out that while empathy for wildlife and/or nature can influence behavior, it is unlikely to be sufficient when barriers arise or when the desired behavior is complex (Young et al., 2018). While more research on the relationship between empathy for animals and conservation behavior is needed, empathy's value continues to grow among wildlife conservation organizations, given its potential not only to connect people with wildlife and nature more broadly, but also to motivate conservation behavior.

Further, many Indigenous traditions emphasize the interconnectedness of all beings, which calls for deep respect, reciprocity, and care (Kapyrka & Dockstator, 2012), offering additional insight into strategies for fostering the development of empathy. From an Indigenous perspective, empathy is described as a "relational and dynamic process of sharing feelings with others and acting compassionately for the good of a community." It is not an individual trait but something that arises from relationships and community (Dorlando, 2011, p. 43). Many Indigenous perspectives also recognize

an inherent responsibility, grounded in relationships, that flows from the deep interconnection between humans and the more-than-human world (Kapyrka & Dockstator, 2012). In this way, empathy is reciprocal, active, and shared (Ernst et al., 2023).

Strategies

Supporting Empathy Development in Children through Nature Play

Early childhood is a critical period for empathy development. While neural development, genetics, and temperament influence empathy development (Zahn-Waxler et al., 1992), socialization and developmentally responsive strategies also play a role (Goldman, 2014). For example, warm, positive early environments and secure attachment relationships provide an important foundation for empathy development (Kestenbaum, 1989). Empathy, particularly cognitive empathy, is considered teachable (Teding van Berkhout et al., 2016); thus, the early years are crucial for empathy development, as children's brains have greater plasticity. Supporting the development of emotional and behavioral regulation skills also promotes empathic capacities in early childhood, as these skills and capacities are intertwined (Eisenberg & Eggum, 2009; Song et al., 2018).

While research literature suggests supporting the development of children's empathy through behavioral and communication skills training (Teding van Berkhout & Malouff, 2016) and social-emotional learning curricula (Malti et al., 2016), play-based interventions can also be effective (Fisher, 1992). Through peer play, children develop a wide range of interpersonal and regulatory skills that help them relate to others and maintain relationships.

Nature play, or unstructured and open-ended playful interactions with and in nature, has been shown to foster social and emotional skills and prosocial behaviors, such as positive peer play behaviors (Burgess et al., 2020) and self-regulation (Ernst & Stelley, 2024), as well as cooperation, sharing, and helping behaviors (Brussoni et al., 2016). Beyond social and emotional learning more broadly, several studies suggest empathy is an outcome of nature play. For example, McArdle et al. (2013) found that outdoor play, in conjunction with a nurturing approach, fostered resilience, self-efficacy,

and empathy in young children. Additionally, nature play has been shown to support young children's cognitive and affective empathy toward wildlife, as well as their empathic behavioral intentions toward humans and animals (Ernst et al., 2022).

The dynamic nature of nature play offers many opportunities for risk-taking, problem-solving, and processing new information and constructing new meanings (Bundi et al., 2009). In nature play, teachers tend to provide less direct supervision and give children more autonomy. This allows children to rely on each other, rather than a teacher, to solve problems, assist one another as they encounter challenges, and comfort and help one another (Alme et al., 2021). This “stepping back” approach, which gives children room to respond to and care for one another, can be particularly effective in supporting the development of children's empathy. By “stepping back,” the teacher or caregiver makes space for the children to step forward, thereby creating opportunities to practice and develop empathy (Underwood et al., 2025).

Another aspect that supports children's empathy development is nature play's ability to foster community through cooperative-oriented play schemes that unfold, such as working together to move a giant log or ensuring everyone has something to “eat” in the mud kitchen (Underwood et al., 2025). Nature play also affords children's curiosity and questions, which, when followed by teachers' scaffolding to support empathetic responding, can serve as an avenue for developing empathy (Acar & Torquati, 2015). In doing so, children's empathy, confidence, and connection flourish. As such, while nature provides abundant opportunities, the teacher or caregiver is often instrumental in translating nature's affordances into opportunities to develop empathy (Underwood et al., 2025).

Nature play affords opportunities to experience stories embedded in the land and place, which can build empathy and connection (Anderson et al., 2017; Ernst et al., 2023). Teachers can model the practice of “listening with the ear of our heart” to experience nature and life itself, and prompt relational and responsive caring actions (Goulais & Curry, 2005). Since repeated opportunities to practice empathy skills are more effective than infrequent practice, and practicing empathy skills in real-life

situations is also particularly effective (Durlak et al., 2011), nature play may be particularly effective in fostering empathy when sustained over time.

Beyond the play aspect of nature play, time in nature is associated with reduced stress, anxiety, and depression (Dankiw et al., 2020). Nature has a soothing and healing effect on children, allowing their directed attentional capacities to recharge (Kaplan, 1995). University of Washington researcher Peter Kahn describes time in nature as a softener of negative-conditioned mental patterns: “If you can find nature, engage with it and get your heart rate down, then your mind begins to settle. When your mind is not ruminating, it can then open to a wider world, where there is great beauty and healing” (Ma, 2020, para. 13). As such, nature’s calming, stress-reducing, and healing qualities afford the opportunity to attend to the deeper, more emotional lessons of life, such as empathic responding.

Conclusion

Children have a natural curiosity and desire to care for one another and the world around them, and they can be remarkably capable. By offering opportunities to practice empathy through nature play, children can learn to respond to one another with expressions and actions of encouragement, care, and support, as well as through shared problem-solving, which helps them connect with one another and the world around them. By responding to one another, children build emotional connection and resilience; they are reminded of their capabilities and learn that they do not need to rely solely on the teachers and caregivers supporting them and others, which in turn creates and reinforces opportunities for empathic responding. As such, nature play has strong potential to foster empathy development during the critical period of early childhood. By creating opportunities for children’s nature play and “stepping back” to make space for children’s empathic responding, adults (teachers, researchers, and play workers alike) can leverage the affordances of nature play to nurture children’s empathy.

References

- Acar, I., & Torquati, J. (2015). The power of nature: Developing prosocial behavior toward nature and peers through nature-based activities. *Young Children*, 70(5), 62–71.

- Alme, H., & Reime, M.A. (2021). Nature Kindergartens: A Space for Children's Participation. *Journal of Outdoor Environmental Education*, 24, 113–131.
- Anderson, D., Comay, J., & Chiarotto, L. (2017). *Natural Curiosity 2nd Edition: A Resource for Educators: Considering Indigenous Perspectives in Children's Environmental Inquiry*. Ontario Institute for Studies in Education.
- Berenguer, J. (2007). The effect of empathy in proenvironmental attitudes and behaviors. *Environment and Behavior*, 39(2), 269–283.
<https://doi.org/10.1177/0013916506292937>
- Bernhardt, B. & Singer, T. (2012). The neural basis of empathy. *Annual Review of Neuroscience*, 35, 1-23.
- Brussoni, M., Ishikawa, T., Brunelle, S., & Herrington, S. (2017). Landscapes for play: Effects of an intervention to promote nature-based risky play in early childhood centres. *Journal of Environmental Psychology*, 54, 139–150.
- Bundy, A. C., Lockett, T., Tranter, P. J., Naughton, G. A., Wyver, S. R., Ragen, J., & Spies, G. (2009). The risk is that there is 'no risk': A simple, innovative intervention to increase children's activity levels. *International Journal of Early Years Education*, 17, 33–45.
- Burgess, E.; Ernst, J. (2020). Beyond traditional school readiness: How nature preschools help prepare children for academic success. *International Journal of Early Childhood Environmental Education*, 7, 17–33.
- Carr, L., Iacoboni, M., Dubeau, M., Mazziotta, J., & Lenzi, G. (2003). Neural mechanisms of empathy in humans: a relay from neural systems for imitation to limbic areas. *Proceedings of the National Academy of Sciences*, 100 (9), 5497-5502.
- Cuff, B., Brown, S., Taylor, L. & Howat, D. (2016). Empathy: A Review of the Concept. *Emotion Review*, 8, 144-153. Konrath, S. H., O'Brien, E. H., & Hsing, C. (2011). Changes in dispositional empathy in American college students over time: A meta-analysis. *Personality and Social Psychology Review*, 15(2), 180–198.

- Dankiw, K. A., Tsiros, M. D., Baldock, K. L., & Kumar, S. (2020). The impacts of unstructured nature play on health in early childhood development: A systematic review. *PLOS ONE*, *15*(2), e0229006.
- Davidov, M., Zahn-Waxler, C., Roth-Hanania, R., & Knafo, A. (2013). Concern for others in the first year of life: Theory, evidence, and avenues for research. *Child Development Perspectives*, *7*, 126–131.
- Dorlando, H. (2011). Communal Empathy in Native American Older Adults. Graduate Student Theses, Dissertations, & Professional Papers.
<https://scholarworks.umt.edu/etd/212>
- Durlak, J. A., Weissberg, R. P., Dymnicki, A. B., Taylor, R. D., & Schellinger, K. B. (2011). The impact of enhancing students' social and emotional learning: a meta-analysis of school-based universal interventions. *Child Development*, *82*(1), 405–432.
- Eisenberg, N. (2000). Emotion, regulation, and moral development. *Annual Review of Psychology*, *51*, 665–97.
- Eisenberg, N., & Eggum, N. D. (2009). Empathic responding: Sympathy and personal distress. In J. Decety & W. Ickes (Eds.), *The social neuroscience of empathy* (pp. 71–83). Cambridge, MA: MIT Press.
- Ernst, J., Curran, C., & Budnik, L. (2022). Investigating the impact of preschool type on young children's empathy. *Sustainability*, *14*(15), 9320.
- Ernst, J., Underwood, C., & Nayquonabe, T. (2023). Everyone has a piece of the story: A community of practice approach for supporting educators' capacity for fostering empathy in young children. *International Journal of Early Childhood Environmental Education*. *11*(1), 34-62.
- Ernst, J., & Stelley, H. (2024). Supporting young children's self-regulation through nature-based practices in preschool. *Behavioral Sciences*, *14*(11), 1013.
- Fisher, E.P. (1992). The impact of play on development: A meta-analysis. *Play and Culture*, *5*, 159–181

- Gerdes, K. E., Segal, E., Jackson, K., & Mullins, J. L. (2011). Teaching empathy: A framework rooted in social cognitive neuroscience and social justice. *Journal of Social Work Education, 47*(1), 109–131.
- Goldman, J. (2014, June 4). Mirror neurons are essential, but not in the way you think. Nautilus Science Connected. Retrieved July 26, 2020, from <https://nautil.us/mirror-neurons-are-essential-but-not-in-the-way-you-think-234953>
- Goulais, B., & Curry, D. (2005). *Debwewin: Three City Anti-Racism Initiative*. Debwewin Canada. <https://nordikinstitute.com/research/debwewin-report/>
- Hay, D. F. (2009). The roots and branches of human altruism. *British Journal of Psychology, 100*(3), 473–479.
- Hoffman, M. L. (2000). *Empathy and moral development: Implications for caring and justice*. Cambridge University Press.
- Kaplan, S. (1995). The restorative benefits of nature: Toward an integrative framework. *Journal of Environmental Psychology, 15*(3), 169–182.
- Kapyrka, J., & Dockstator, M. (2012). Indigenous Knowledges and Western Knowledges in Environmental Education: Acknowledging the Tensions for the Benefits of a “Two-Worlds” Approach. *Canadian Journal of Environmental Education (CJEE), 17*(0), Article 0.
- Knafo-Noam, A., Zahn-Waxler, C. & Davidov, M., Van Hulle, C., Robinson, J. & Rhee, S. (2009). Empathy in early childhood: Genetic, environmental, and effective contributions. *Annals of the New York Academy of Sciences, 1167*, 103–14.
- Kestenbaum, R., Farber, E., Sroufe, L. (1989). Individual differences in empathy among preschoolers: Relation to attachment history. *New Directions for Child Development, 44*, 5–64.
- Ma, M. (2020, April 16). *A dose of nature at home could help improve mental health and well-being during COVID-19*. University of Washington News. Retrieved

May 1, 2021, from <https://www.washington.edu/news/2020/04/16/dose-of-nature-at-home-could-help-mental-health-well-being-during-covid-19/>

Making Caring Common Project [MCC]. (2020) *Five tips for cultivating empathy*. Cambridge, MA. Harvard Graduate School of Education. Retrieved 7/26/2020 <https://mcc.gse.harvard.edu/resources-for-families/5-tips-cultivating-empathy>

Malti, T., Chaparro, M. P., Zuffianò, A., & Colasante, T. (2016). School-based interventions to promote empathy-related responding in children and adolescents: A developmental analysis. *Journal of Clinical Child & Adolescent Psychology*, 45(6), 718–731.

Miller, P. & Jansen op de Haar, M. (1997). Emotional, cognitive, behavioral, and temperament characteristics of high-empathy children. *Motivation and Emotion*, 21, 109–125.

Pittinsky, T., & Montoya, R. (2016). Empathic joy in positive intergroup relations. *Journal of Social Issues*, 72, 511–523.

Ruckert, J. (2016). Justice for all? Children's moral reasoning about the welfare and rights of endangered species. *Anthrozoos*, 29, 205–17.

Shelton, M. L., & Rogers, R. W. (1981). Fear-arousing and empathy-arousing appeals to help: The pathos of persuasion. *Journal of Applied Social Psychology*, 11, 366–378.

Skibins, J., & Powell, R. (2013). Conservation caring: Measuring the influence of zoo visitors' connection to wildlife on pro-conservation behaviors. *Zoo Biology*, 9999, 1–13.

Song, J., Colasante, T., & Malti, T. (2018). Helping yourself helps others: Linking children's emotion regulation to prosocial behavior through sympathy and trust. *Emotion*, 18(4), 518–527.

Tam, K.P. (2013). Dispositional empathy with nature. *Journal of Environmental Psychology*, 35, 92–104.

- Teding van Berkhout, E., & Malouff, J. M. (2016). The efficacy of empathy training: A meta-analysis of randomized controlled trials. *Journal of Counseling Psychology, 63*(1), 32–41.
- Underwood, C., Ernst, J., & Meyer, N. (2025). Nurturing empathy: Exploring teachers' insights from Minnesota's nature preschools. *Children, Youth and Environments 35*(1), 1–30.
- Young, A., Khalil, K., & Wharton, J. (2018). Empathy for animals: A review of the existing literature. *Curator: The Museum Journal, 61*(2), 327–343.

Nature-Based Play in Kenyan Early Learning Through Play: *The Pendo Mazingira Framework*

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Introduction

Worldwide, there is growing recognition that play is essential to children's wellbeing, development, and sense of belonging, supporting social-emotional learning when protected in everyday settings (Skene et al., 2022; UNICEF, 2024; Tuncdemir, 2025). Play in natural environments is particularly important, as it supports emotional regulation, social connection, and the development of eco-empathetic relationships that shape lifelong environmental identity (Chawla, 2023; Barrable et al., 2024). Yet in many school contexts, academic pressure, rigid routines, urbanization, safety concerns, and limited access to green spaces have increasingly constrained opportunities for outdoor and nature-based play (Patchen et al., 2024; Teeuwen et al., 2024). These constraints are often reinforced by curriculum demands that prioritise measurable academic outcomes over unstructured outdoor play, particularly in urban and low-resource settings (Prins et al., 2022). As a result, many children experience nature as distant, regulated, or instructional rather than relational and playful (UNICEF, 2025; Pereira et al., 2024).

Emerging research suggests that locally designed, nature-based play approaches are among the most effective ways to support children's relationship with the natural world, recognising that while the value of nature play is universal, children's pathways to connection are individual and culturally situated (Chawla, 2020; Barrable et al., 2024). Practice-based frameworks such as the ***Pendo Mazingira Framework*** respond to this insight by offering intentional yet flexible play structures that enable educators to engage children creatively with natural elements while adapting activities to local contexts, resources, and learner needs. By supporting multiple entry points to nature, such as land, water, air, plants, trees, animals, and natural resources this approach strengthens agency, emotional regulation, and eco-empathy more effectively than standardised or purely instructional models (Barrable et al., 2024; Tam & Chan, 2024). At the same time, the growth of locally developed nature-based play initiatives

highlights the need for supportive frameworks that recognise and legitimise context-specific methodologies, particularly where formal licensing pathways remain limited (International Play Association [IPA], 2023; Outdoor Play Canada, 2022).

This paper draws on my background as an environmental educator and community development practitioner, alongside collaborative facilitation with qualified Early Childhood Development (ECD) teachers across Montessori, community-based, and faith-affiliated schools in Kenya. Rather than positioning play as an external intervention, the ***Pendo Mazingira Framework*** is implemented through co-partnership with teachers, recognising their professional expertise while offering tools to observe, support, and extend children's nature-rich play. While this paper does not present large-scale evaluation data, it offers early practice-based insights grounded in observation, reflection, and participation. It proposes a theory of change in which low-cost, child-led nature play, supported by sensitive adult roles and teacher partnerships, fosters children's wellbeing, eco-empathy, and long-term environmental identity within the realities of Kenyan early learning spaces.

Problem Statement

Despite growing recognition of the importance of play, many children in their early years, particularly in formal school settings, experience increasingly limited and regulated contact with nature. In Kenya, rigid routines, academic pressures, and reduced outdoor time restrict opportunities for child-led, nature-based play, weakening children's emotional and relational connection to the natural world. Teachers, though highly trained and committed, often work under institutional constraints that position play as optional rather than essential. At the same time, environmental education is rarely integrated into early childhood practice in relational or playful ways, with responsibility toward nature introduced later through abstract instruction. Regulatory frameworks, while necessary for child protection, can further limit interdisciplinary collaboration. Together, these conditions highlight the need for low-cost, context-specific, and co-facilitated nature-based play approaches that expand children's everyday relationship with nature.

Background

Across the Global North, nature-based play initiatives such as bush kinders in Australia, outdoor nurseries in Scotland, and forest kindergarten models in Canada and the United Kingdom demonstrate how child-led play in natural environments can be embedded within early learning in context-specific ways (Speldewinde & Infantino, 2025; Outdoor Play Canada, 2022). While the developmental benefits of nature play are widely available, research shows that children's pathways to nature connection are shaped by culture, context, and individual experience (Chawla, 2020; Barrable et al., 2024).

This understanding is particularly relevant in African contexts, where formal, non-formal, and informal learning environments coexist and access to play infrastructure varies widely. Locally grounded frameworks such as the **Pendo Mazingira Framework** respond to these realities by offering flexible, low-cost approaches that prioritise cultural relevance, accessibility, and adaptability over replication. In doing so, they support nature-based play that is sustainable, meaningful, and responsive to the lived contexts of children and educators.

Appropriate Approaches and Strategies

Pendo Mazingira Framework is an eco-mentorship program developed by AkadiEco and Mentorship Ventures in 2024 to support environmental learning and relationship-building across children, educators, and communities. While the program integrates both pedagogy and andragogy (*a method and practice of teaching adult learners, focusing on self-direction, life experience, and practical problem-solving*), nature-based play sits within the Children's Corner as a key pathway for nurturing early eco-empathy and connection to nature. The program emerged from the recognition that limited opportunities for free play in nature during childhood can shape how people relate to the environment later in life. **Pendo Mazingira Framework** (Awino, 2026) responds by using gentle, playful experiences in nature to help children feel connected, cared for, and at home in the natural world, supporting the development of environmental identity through everyday play (Barrable et al., 2024).



Figure 1. Theory of Change: Nature-Based Play and Eco-Empathetic Outcomes

[See Appendix for long description of Figure 1](#)

Pendo Mazingira's Theory of Change (Awino, 2026) shows how low-cost materials, teacher co-facilitation, and open-ended play invitations support child-led nature play within school settings. Through sensitive adult observation and reflection, this approach promotes calm, engagement, and social connection, which foster agency, belonging, and eco-empathy. Over time, these experiences contribute to the development of environmental identity and stewardship.



Figure 2. The *Pendo Mazingira Framework*: Eight Pathways for Eco-Empathetic Nature Play

[See Appendix for long description of Figure 2](#)

Figure 2 presents the *Pendo Mazingira Framework* (Awino, 2026), an eight-element model that supports children's eco-empathetic connection with nature through play. The framework includes interconnected pathways focused on land, water, air, sky, plants, trees, animals, and natural resources, each offering a relational entry point shaped by children's interests and context. Rather than following a linear sequence, children move fluidly across elements through low-cost, open-ended play supported by teacher co-facilitation. Together, these experiences nurture eco-empathy, emotional regulation, and emerging environmental identity.



Figure 3. The M.I.R.A.C.L.E Approach: A Facilitation Ladder for Eco-Empathetic Nature Play

[See Appendix for long description of Figure 3](#)

Figure 3 presents the M.I.R.A.C.L.E. Approach, a facilitation ladder that guides adult engagement in nature-based play within the *Pendo Mazingira Framework* (Awino, 2026). The approach outlines a relational sequence that emphasises sensitive presence, emotional attunement, inclusion, and shared learning, supporting adults to scaffold play without directing it. Through repeated use, the MIRACLE Approach fosters children’s emotional regulation, belonging, eco-empathy, and emerging environmental identity (*Innovated by AkadiEco and Mentorship Ventures Kenya*).

Research consistently shows that early, sensory-rich nature experiences support lifelong environmental empathy, stewardship, and pro-ecological behaviour (Chawla, 2023; Beery & Jørgensen, 2023; Tam & Chan, 2024). Playful, place-based approaches

are especially effective in fostering emotional resilience, ecological literacy, and nature connectedness in early childhood (Barrable et al., 2024). Within the *Pendo Mazingira Framework* (Awino, 2026), the MIRACLE Approach positions eco-empathy as a core developmental pathway, enabling children to care for nature through relationship and belonging rather than obligation.

Ensuring School Adoption of Nature-Based Play Programs

For schools to adopt nature-based play programs, they must align with existing priorities such as children’s wellbeing, self-regulation, inclusion, and positive behavior, and be implemented through shared ownership rather than as add-on initiatives (IPA, 2023; UNICEF, 2024). Schools that already value child-led learning, such as Montessori, international, faith-based, and progressive centres provide conducive entry points for piloting such approaches. Co-facilitation with qualified teachers strengthens legitimacy by respecting professional expertise and embedding play within everyday routines. Evidence indicates that low-cost, teacher-supported outdoor play using locally available materials is most sustainable when integrated into regular school practices, such as recess, and supported through observation rather than rigid instruction (Outdoor Play Canada, 2022; IPA, 2023).

Co-Facilitating Nature-Based Play with Children and Teachers

Facilitating *the Pendo Mazingira Framework* (Awino, 2026) in Kenyan early learning centres has demonstrated that co-facilitation with qualified Early Childhood Development (ECD) teachers is both a practical and ethical approach to nature-based play. Rather than viewing regulatory requirements such as ECDA certification as barriers, the program works through partnership recognising teachers’ professional expertise while contributing a complementary nature-based play perspective. Play activities are offered as open-ended invitations, with adults adopting a non-intrusive role focused on safety, inclusion, and observation. This approach allows learning to emerge organically and supports children’s emotional regulation, cooperation, and imaginative engagement.

The work of AkadiEco and Mentorship Ventures (Awino, 2026) is grounded in environmental education and community development practice across formal, non-

formal, and informal learning systems. This interdisciplinary foundation integrates both pedagogy and andragogy, shaping play experiences that support children while respecting the educators who guide them. Early professional experience within institutions such as the Kenya Wildlife Service Education Department and the Kenya Organization for Environmental Education reinforced the role of nature as a primary teacher. It highlighted the importance of culturally responsive, relational approaches in school and faith-based settings. Advanced training in environmental studies and community development has further strengthened the program's capacity to facilitate participatory, context-sensitive learning spaces.

Across schools where the ***Pendo Mazingira Framework*** (Awino, 2026) is facilitated, nature-based play is observed to impact teachers as well as children. While educators are highly trained and committed, rigid curricular structures often limit playful engagement. Through co-facilitated play, teachers are supported in slowing down, observing differently, and reconnecting with more responsive and joyful learning environments. Positioned as co-partners rather than recipients of expertise, teachers engage in shared reflection and learning, strengthening both pedagogical practice and relational connection (Smedsrud, 2025). Overall, *Pendo Mazingira* (Awino, 2026) reframes facilitation as holding space rather than directing outcomes, demonstrating that effective nature-based play does not require replacing teachers, but strengthening collaborative, context-sensitive practice.

Play as a Pathway to Lifelong Environmental Identity

Through the *Pendo Mazingira Framework* (Awino, 2026), play is positioned as the foundation of a lifelong relationship with the natural world rather than as leisure alone. By engaging freely with elements such as land, water, air, trees, and animals, children develop care, familiarity, and respect that support future environmental responsibility. At the same time, reflective adult participation strengthens shared learning and connection (Hahn, 2021). Grounded in environmental education and community development practice, the program responds to early and often subtle disconnection from nature by framing nature connection as a lived, relational experience rather than a concept to be taught. This approach is operationalised through

the Eight Pundos Framework: land, water, air, sky, plants, trees, animals, and natural resources, which offers flexible, non-linear entry points for children's play based on interest and context. Using low-cost, locally available materials, the *Pendo Mazingira Framework* (Awino, 2026) reduces barriers to access while reinforcing the idea that nature is something to relate to, not consume. Together, these elements support early eco-empathy and environmental identity, positioning stewardship as a relationship formed through play rather than an obligation learned later.

Conclusion and Recommendations

Eco-Mentorship for the Next Generation

This white paper affirms that play in nature is foundational to children's learning, wellbeing, and long-term environmental identity. The *Pendo Mazingira Framework* (Awino, 2026) approach demonstrates how child-led, eco-empathetic play can be integrated into early learning spaces through low-cost materials, sensitive adult facilitation, and co-partnership with teachers. When children engage playfully with natural elements, they develop emotional regulation, a sense of belonging, and care for the natural world that extend beyond childhood.

Practice-based insights indicate that eco-empathy is most effectively nurtured early, through relationship rather than instruction. Nature-based play allows children to experience the environment as something they belong to, while co-facilitation also supports educators by creating space for reflection and renewed appreciation of play as an essential pedagogical practice.

The paper highlights the importance of context-specific play frameworks. *Pendo Mazingira Framework* (Awino, 2026) responds to Kenyan educational, cultural, and ecological realities, demonstrating why locally grounded approaches are critical for relevance, inclusion, and sustainability. Effective play initiatives do not replicate imported models but adapt core principles of child-led exploration and relational engagement to local contexts.

In conclusion, supporting nature-based, eco-empathetic play in early childhood is both an educational priority and a shared responsibility. When children are given time,

space, and freedom to play in nature, they develop the relationships and values needed to care for the world they inhabit.

References

- Awino, D. (2026). *Pendo Mazingira Framework: Innovated by AkadiEco and Mentorship Ventures Kenya. (2026). IPA USA White Paper.*
- Barrable, A., Friedman, S., & Beloyianni, V. (2024). Nature connection in adulthood: The role of childhood nature experiences. *People and Nature*, 6(4), 1571–1580. <https://doi.org/10.1002/pan3.10657>
- Barrable, A., Sobko, T., & Whitebread, D. (2024). Nature connectedness and play in early childhood: Pathways to wellbeing and sustainability. *Early Child Development and Care*, 194(2), 181–195.
- Beery, T., & Jørgensen, K. A. (2023). Children, empathy, and environmental identity: Towards relational sustainability. *Environmental Education Research*, 29(7), 975–993.
- Chawla, L. (2020). Childhood nature connection and constructive hope: A review of research on connecting with nature and coping with environmental loss. *People and Nature*, 2(3), 619–642. <https://doi.org/10.1002/pan3.10128>
- Chawla, L. (2023). Significant life experiences and the roots of environmental stewardship revisited. *Frontiers in Psychology*, 14, 1125473.
- Hahn, E. R. (2021). The developmental roots of environmental stewardship: Childhood and the climate change crisis. *Current Opinion in Psychology*, 42, 19–24. <https://doi.org/10.1016/j.copsyc.2021.01.006>
- International Play Association. (2023). The child’s right to play. <https://ipaworld.org>
- International Play Association. (2024). International Day of Play: Resolution adopted by the General Assembly (A/RES/78/268). United Nations Digital Library. <https://digitallibrary.un.org/record/4043249>

- Lee, E. Y., Lee, M., Lim, H., Silva, D. A. S., & Tremblay, M. S. (2021). Correlates of outdoor play and time among children aged 3–12 years: A systematic review. *International Journal of Behavioral Nutrition and Physical Activity*, 18, Article 41.
- Outdoor Play Canada. (2022). The role of nature-based early childhood education on children's physical, social, emotional and cognitive outcomes.
<https://www.outdoorplaycanada.ca>
- Patchen, A. K., Rakow, D. A., Wells, N. M., Hillson, S. L., & Meredith, G. R. (2024). Barriers to children's outdoor time: Teachers' and principals' experiences in elementary schools. *Environmental Education Research*, 30(1), 16–36.
<https://doi.org/10.1080/13504622.2022.2099530>
- Pereira, J. V., Vila-Nova, F., Veiga, G., Lopes, F., & Cordovil, R. (2024). Associations between outdoor play features and children's behavior and health: A systematic review. *Health & Place*, 87, 103235.
<https://doi.org/10.1016/j.healthplace.2024.103235>
- Prins, J., McFarland, L., Perrin, P., & Moulton, C. (2022). Nature play in early childhood education: A systematic review. *Frontiers in Psychology*, 13, 995164.
<https://doi.org/10.3389/fpsyg.2022.995164>
- Skene, K., O'Farrelly, C., Byrne, E. M., Kirby, N., Stevens, E. C., Ramchandani, P. G., & Fletcher-Watson, S. (2022). Can guidance during play enhance children's learning and development in educational contexts? A systematic review and meta-analysis. *Child Development*, 93(5), e895–e915.
<https://doi.org/10.1111/cdev.13730>
- Smedsrud, T. M. (2025). Supporting play: How early childhood teachers facilitate play through nature's affordances. *Journal of Outdoor and Environmental Education*. Advance online publication. <https://doi.org/10.1007/s42322-025-00216-5>
- Tam, K.-P., & Chan, H.-W. (2024). The psychology of nature connectedness: Implications for environmental education. *Journal of Environmental Psychology*, 93, 102297. <https://doi.org/10.1016/j.jenvp.2024.102297>

Teeuwen, R., Bozzon, A., & Psyllidis, A. (2024). Children's access to urban greenspace: A survey of factors and measures—Cities & Health. Advance online publication.

<https://doi.org/10.1080/23748834.2024.2387931>

Tuncdemir, T. B. A. (2025). Integrating social-emotional learning through play. Journal of Research in Childhood Education. Advance online publication.

<https://doi.org/10.1080/02568543.2025.2567504>

UNICEF. (2024, June 11). First-ever International Day of Play.

<https://www.unicef.org/stories/first-ever-international-day-of-play>

UNICEF. (2024). The importance of play in children's learning and wellbeing.

<https://www.unicef.org>

UNICEF. (2025, May 1). The importance of outdoor play (and how to support it).

UNICEF Europe and Central Asia.

<https://www.unicef.org/eca/stories/importance-outdoor-play-and-how-support-it>

UNICEF. (2025, June 11). Play is not just childhood fun – it is essential for learning, health and resilience [Press release].

<https://www.unicef.org/northmacedonia/press-releases/play-not-just-childhood-fun-it-essential-learning-health-and-resilience>

United Nations. (2024). International Day of Play.

<https://www.un.org/en/observances/international-day-of-play>

United Nations General Assembly. (2024). International Day of Play (A/RES/78/268).

<https://docs.un.org/en/A/RES/78/268>

Appendix

Long Description for Figure 1

This infographic illustrates a 5-step vertical "Theory of Change" model for nature-based early childhood education. Each step features a descriptive text box paired with a soft watercolor illustration showing children and educators interacting outdoors in Kenya, connected by downward green arrows.

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Header

- **Title:** Theory of Change
- **Subtitle:** A Facilitating Nature-Based Play for Eco-Empathetic Nature Play

Flowchart Stages

1. Inputs (Orange Header Box)

- **Text Points:**
 - Low-cost natural materials
 - Teacher co-facilitation
 - Open-ended invitations
- **Illustration (Right):** An adult co-facilitator kneeling on the ground with young children examining potted plants and outdoor flora.

2. Processes (Green Header Box)

- **Text Points:**
 - Child-led nature play
 - Sensitive adult role
 - Reflection / observation
- **Illustration (Left):** Children engaged in self-directed outdoor play with an attentive adult observing and interacting nearby under trees.

3. Immediate Outcomes (Blue Header Box)

- **Text Points:**
 - Calm / regulation
 - Sustained engagement
 - Social connection
- **Illustration (Right):** Three children sitting together peacefully on rocks in a natural setting.

4. Intermediate Outcomes (Gold Header Box)

- **Text Points:**
 - Eco-empathy
 - Agency
 - Belonging

- **Illustration (Left):** Two young children kneeling together under a bright sun, carefully cradling a small plant sprout in their hands.

5. Long-Term Outcome (Green Header Box)

- **Text Points:**
 - Environmental identity
 - Stewardship mindset
- **Illustration (Right):** Two older children working together in a sunny landscape to plant and nurture a growing seedling.

Footer - Organization: AkadiEco & Mentorship Ventures Kenya

Long Description for Figure 2

This circular infographic created by **AkadiEco & Mentorship Ventures** illustrates nature-based play prompts centered on environmental love and connection, structured as a floral wheel with a central heart, eight colored petals, and an outer ring of play invitations.

Center Core

- **Green Heart Icon:** "Pendo Mazingira" (*Love Environment*)

The Eight Petals (Environmental Themes)

Moving clockwise starting from the top:

1. **Top (Blue):** Pendo Maji — *Love Water* (illustrated with water splashes)
2. **Top Right (Yellow):** Pendo Hewa — *Love Air* (illustrated with blowing dandelion seeds)
3. **Right (Green):** Pendo Mimea — *Love Plants* (illustrated with sprouting leaves)
4. **Bottom Right (Brown):** Pendo Miti — *Love Trees* (illustrated with a child hugging a tree trunk)
5. **Bottom (Green):** Pendo Anga — *Love Sky* (illustrated with flowers and sky motifs)
6. **Bottom Left (Orange/Terracotta):** Pendo Ardhi — *Love Land* (illustrated with fallen leaves and soil)

7. **Left (Dark Brown):** Pendo Wanyama — *Love Animals* (illustrated with animal paw prints)
8. **Top Left (Bright Yellow):** Pendo Rasilimali ya Asili — *Love Natural Resources* (illustrated with honeycomb, roots, and bees)

Outer Ring ("Play Invitations Around the Wheel")

The outer ring lists specific interactive activities aligned with the nature themes:

- **Splash & Pour** (positioned above *Love Water*)
- **Blow & Chase** (positioned above *Love Air*)
- **Cloud Gaze** (positioned near *Love Air / Plants*)
- **Leaf Rub** (positioned near *Love Trees / Sky*)
- **Treasure Build** (positioned near *Love Sky / Land*)
- **Barefoot Touch** (positioned near *Love Land / Animals*)

Treasure Build (positioned near *Love Natural Resources*)

Long Description for Figure 3

This infographic presents a 7-level framework structured around the acronym **MIRACLE**, framed as a "Facilitation Ladder for Eco-Empathetic Nature Play." The graphic features stacked text blocks on the left aligned with a stone staircase on the right, surrounded by lush vines, yellow flowers, and a bright sun with a yellow bird perched at the top step.

Header

- **Title:** MIRACLE Approach
- **Subtitle:** A Facilitation Ladder for Eco-Empathetic Nature Play

The MIRACLE Framework Steps

- **M — Mingle Genuinely**
 - *Theme:* Trust & joy
 - *Approach:* Adult presence that is warm, attentive, and non-directive.
 - *Outcome:* Child gains emotional safety.

- **I — Illuminate Feelings**
 - *Theme:* Emotional awareness
 - *Approach:* Adults name and validate emotions observed in play.
 - *Outcome:* Child gains self-expression and regulation.
- **R — Respond to Needs**
 - *Theme:* Safety & care
 - *Approach:* Adults respond sensitively to physical, emotional, or social needs.
 - *Outcome:* Child gains security and confidence.
- **A — Anchor Trust**
 - *Theme:* Safety & autonomy
 - *Approach:* Adults remain consistent, calm, and predictable.
 - *Outcome:* Child gains freedom to explore independently.
- **C — Call to Belonging**
 - *Theme:* Inclusion & identity
 - *Approach:* Adults invite participation without pressure.
 - *Outcome:* Child gains sense of belonging and acceptance.
- **L — Learn Together**
 - *Approach:* Adults co-explore rather than instruct.
 - *Outcome:* Child gains confidence, inquiry, and voice.
- **E — Empower Regeneration**
 - *Theme:* Hope & stewardship

Footer - Organization: AkadiEco & Mentorship Ventures Kenya

Nature and Place-based Environmental Education: A Primary Grade Teacher Focused Group Case Study in Wilmington, NC

Christine Jie Li, PhD; Beth Saile, MS; & Callie Hendricks, BS

Introduction

This project examines how to make nature- and place-based environmental education more accessible in elementary classrooms, particularly in coastal North Carolina. Although research consistently shows that outdoor and locally grounded learning strengthens student engagement, sense of place, and pro-environmental attitudes, teachers face persistent barriers, including limited time, a lack of standards-aligned materials, and insufficient preparation resources. A five-day carnivorous plant unit was developed as a model for fully prepared, standards-aligned curriculum that integrates local ecology, hands-on activities, and clear instructional supports. During Fall 2025, a focus group of elementary teachers from New Hanover County Public Schools evaluated three coastal ecosystem lessons, highlighting strengths such as local relevance, engaging phenomena, strong content support, and opportunities for scientific discourse. Teachers also identified key needs, including explicit differentiation strategies, ready-to-use materials, pacing guidance, and integration of real data. Findings underscore the importance of designing phenomenon-driven, classroom-ready, locally grounded environmental education (EE) curriculum that aligns with state standards and supports teacher implementation.

The shift in how much time children spend outdoors has become one of the most talked-about childhood trends of the past decade (Waite, 2010). The author of *Last Child in the Woods* argues that children suffer from nature-deficit disorder when disconnected from the natural world. Other studies show that digital platforms compete directly with outdoor experiences and classroom instruction (Siskind et al., 2022). Urbanization and reduced green areas also add to the safety concern and keep children from exploring outdoors (Kabisch et al., 2017). Together, these ideas underscore a growing recognition of the need for nature and place-based education among elementary students, approaches that ground learning in real environments, local ecosystems, and hands-on experiences. This shift pushes back against overly test-driven

models by showing how outdoor, experiential learning supports academic growth, emotional well-being, and a deeper sense of stewardship for the places that children call home (Sobel, 2004).

Problem Statement

Despite evidence that place-based and outdoor learning enhances student engagement and pro-environmental attitudes, many classrooms still face barriers to implementing nature-based lessons. Research shows that environmental education (EE) can strengthen students' sense of place, especially when students engage directly with local ecosystems – even in highly urbanized settings (Kudryavtsev et al., 2012). However, classroom teachers often struggle to bring these experiences into their instructional practice.

One challenge is the inconsistent way that place-based education is implemented. Many environmental lessons created by informal educators in park, museum, and aquarium settings are high-quality, but are not designed with state curriculum requirements in mind. As a result, they frequently lack connections to required standards and learning objectives that classroom teachers must prioritize. This aligns with broader research showing that teachers often lack the time, training, and support needed to adapt EE lessons to school settings or align them with required curriculum (Guevara-Herrero et al., 2025).

A second barrier is the lack of classroom-ready materials. Studies show that preparation time, logistics, and insufficient resources are among the most pervasive obstacles to implementing EE whether in school or informal settings (Ding et al., 2025; Pereira et al., 2022). Teachers cannot devote personal time to assembling materials and activities or navigating complicated lesson structures.

Because of these structural barriers, most classroom teachers cannot integrate place-based learning into their instruction, even when they recognize its value. The disconnect between what research recommends and what standards-based teaching allows prevents students from accessing meaningful EE that connects them to their own communities. These barriers point to a need for high-quality, standards-aligned, fully prepared place-based curriculum that teachers can use without additional preparation.

Without resources designed specifically for classrooms, the benefits of place-based EE may remain largely out of reach for students.

Background

Recent research shows that the benefits of nature exploration and investigation are numerous and extensive. These benefits include cognitive, psychological, and physical gains for individuals in early childhood and beyond. Today, as children experience an increasing disconnect from nature (Driessnack, 2009), nature-based education can help address this issue and foster stronger relationships with the environment (Speldewinde & Campbell, 2024). The term nature-based experiences can mean many different types of activity, but generally includes interacting with natural elements, such as trees, plants, and water (Dankiw et al., 2020). In a systematic review studying the impacts of *unstructured nature play* on early childhood health, Dankiw et al. (2020) found consistently positive impacts on both physical activity and cognitive play. Nature play can help mediate different health issues like obesity, depression, cardiovascular disease, and anxiety (Frumkin et al., 2017). One identified barrier to nature exploration is perceived dangers to students, such as wildlife-related issues, hazardous plants, or possible injuries, but this also means more adult surveillance and attention are warranted (Speldewinde & Campbell, 2024). Even though nature experiences may require more attentive supervision, it helps students carry an appreciation of the environment into later schooling (Speldewinde & Campbell, 2024).

The issue of children not reconnecting with nature is increasingly prevalent, and a large body of literature addresses this trend. Today, children are more exposed to technology than ever, which can potentially cause negative physical effects and mood changes (Žulec et al., 2022), making it increasingly important to reconnect them with their natural environments. Another concern is that income is one of the biggest predictors of access to nature activities in both urban and rural communities, with students from higher-income families having more access to nature activities (Jensen et al., 2024).

Importantly, childhood interactions with nature can carry into a lifetime relationship with the environment (Barrable et al., 2024), in a snowball effect of sorts

(Jensen et al., 2024). Individuals with a lack of connection with nature report lower life satisfaction (Barrable & Booth, 2022), so fostering early relationships with the environment can have lasting benefits for emotional well-being.

Place-based education connects students to the physical place where they live (Yemini et al., 2023). School-based food forests are an example of this learning strategy that can help students deeply engage in hands-on, practice-based learning while participating daily in gardening activities (Gobs, 2025). A study using GPS technology for localized activities and games has shown it can help engage students with their local area (Isogai et al., 2012).

A noticeable gap exists in existing research on coastal place-based education, such as in North Carolina. This does not necessarily mean place-based education is absent in these coastal spaces; rather, the literature on the topic is limited. Many place-based education opportunities can help connect children to their coastal communities. Near the coast, educators can use marsh habitats and sandy beaches for a range of learning activities. Field trips to barrier islands are common in areas like coastal North Carolina, and students can interact with nature and living organisms. Masonboro Island, an undeveloped barrier island in southern North Carolina, is a site frequently used for place-based education. Students from elementary schools in the surrounding counties take boat rides to explore and learn about island habitats and participate in activities like net fishing and shark tooth hunting. Students can experience surrounding environments they may not access outside of school, fostering a relationship with their coastal homes.

Appropriate Approaches/Strategies

A Place-Based Education Program: Learning About the Venus Flytrap.

To illustrate how high-quality, place-based curriculum can be designed for formal classrooms, researchers developed a five-day instructional unit centered on one of coastal North Carolina's environmental highlights: Carnivorous plants. Carnivorous plants offer a compelling anchoring phenomenon: *Why did these plants evolve to eat bugs?* This phenomenon immediately sparks curiosity and encourages students to formulate a hypothesis based on observable natural events.

This unit engages students in exploring plant adaptations, nutrient-poor soils, fire-dependent ecosystems, and local conservation issues. Each day includes hands-on activities such as trap-identification challenges, habitat mapping using local geography, and creative projects that apply knowledge of carnivorous plant parts. This structure reflects research suggesting that experiential EE can deepen students' sense of place and personal value of the local environment (Kudryavtsev et al., 2012). Because teacher time constraints can hinder EE implementation (Ding et al., 2025; Pereira et al., 2022), the unit is fully classroom-ready. All materials (including lesson guides, student worksheets, visual supports, and optional extensions) are prepared for immediate use with no teacher assembly required. This directly addresses preparation-time and resource limitations that often prevent teachers from implementing EE lessons.

Figure 1

Demonstration: A Model of How the Venus Flytrap Works in Nature



Alignment to state curriculum standards was another design priority. Each activity in the unit directly corresponds with North Carolina's science standards. Concepts such as plant structures, adaptations, ecosystems, and human impact are introduced in ways that fit naturally within existing educational frameworks, helping teachers integrate place-based EE without sacrificing required academic outcomes.

Local relevance is woven throughout the unit. Students examine local maps of nature preserves to investigate where Venus flytraps grow in their own region.

Discussions about poaching, habitat loss, and fire suppression invite students to consider real conservation challenges affecting species that exist only miles from their homes. Research suggests that such localized EE can foster stronger connections between students and their home communities, which supports long-term environmental attitudes and awareness (Kudryavtsev et al., 2012).

Taken together, this unit demonstrates how standards-aligned, fully prepared EE curriculum can make place-based education both feasible for teachers and meaningful for students. It serves as a model for developing broader coastal North Carolina lesson sequences grounded in local ecology and designed for classroom realities.

Teacher Focus Group-Design and Implementation

A focus group was conducted with elementary educators in October 2025, during which they highlighted additional strategies for implementing the lessons (IRB #H25-0871). This focus group included five elementary educators from New Hanover County Schools. The researchers led the focus group using a pre-designed facilitation schedule. The sessions aimed to present, demonstrate, and gather educator feedback on three place-based environmental education lesson plans developed for upper elementary students in coastal North Carolina.

Participants received an overview of “Five Wonders of Coastal North Carolina.” Three lessons were selected for in-depth demonstration: *Carnivorous Plants*, *Native Plants and Animals of Coastal North Carolina*, and *Longleaf Pine Savannas and Fire Ecology*. Two additional lessons—*Wonderful Watersheds* and *Saltwater Marshes & Tidal Estuaries*—were acknowledged but not available because they were still in development.

Each demo followed a consistent structure: (1) an overview of lesson goals and NC standards alignment, (2) a short instructional presentation, and (3) demonstrations of selected student activities. Teachers participated in these activities and, after each lesson block, completed short mini-reflections to capture immediate feedback on each lesson's clarity, feasibility, and classroom fit.

The afternoon ended with a facilitated focus group discussion. Teachers responded to guided questions and open discussion regarding lesson strengths, barriers to implementation, materials, and time constraints. Teachers were referred to by initials to recognize individual perspectives without breaking confidentiality. The team is using feedback from the session to refine lessons and support future curriculum development for classrooms and educator training.

Conclusion/Recommendations

Lessons Learned from the Teacher Focus Group. Focus group participants showed strong consensus on curriculum strengths and recommendations for improving classroom readiness. Participants emphasized that the lessons were engaging and locally relevant, while also identifying constraints related to time, materials, and instructional support. The following themes represent the most common findings:

1. Standards Alignment is Essential for Adoption. Teachers were clear that even high-quality environmental lessons cannot be used unless they are explicitly connected to state standards. Future curriculum development must center standards alignment from the outset.

2. Teachers Regarded the Lessons as an Integrated Whole Rather Than as Separate, Disconnected Sessions. Teachers described the lesson plans as functioning more like multi-day instructional units than single-day lessons. While they viewed this positively for its depth, teachers emphasized the need to frame the lessons as a unit that could be chunked across multiple days. A teacher identified as VM said, “I would not be able to get through all the components in one day in 45 minutes.” Teachers recommended implementing suggested stopping points, guiding questions for each section, and language that helps teachers decide how to pace lessons across days.

3. Participant Engagement Was Notably High, Particularly During Lessons that Incorporated Elements such as Fire, Location, and Structured Discussion. Teachers identified high levels of engagement in the lessons, with fire ecology and longleaf pine savannas emerging as particularly compelling because of their perceived “wow factor” and the concept of an environmental “phenomenon.” VM highlighted the

importance of beginning each unit with a phenomenon that prompts students to notice, wonder, and investigate, and said, “Fire will captivate [students]. . . something that people deem bad actually helps the environment.”

Teachers also noted that the activities naturally encouraged scientific discourse and evidence-based reasoning, even when this was not a stated design goal. One teacher, AB, said, “We were engaged in argument – claim, evidence, reasoning – and that’s a science and engineering practice.” This suggests alignment with current shifts towards inquiry-driven science education.

4. Local Relevance Was a Major Strength and Motivator. Teachers emphasized that the place-based focus on coastal NC ecosystems was one of the curriculum’s greatest strengths, in contrast to broader programs that lack geographic specificity. They expressed that students benefit when lessons focus on species and ecosystems they can see in their own community. They described this local focus as a meaningful way to support environmental identity and community connection.

AB said, “That’s the biggest drawing factor for me... It’s specific to my area.”

EB said, “My students would like it because it’s about their hometown.”

Teachers stressed opportunities for students to learn outside of the classroom by visiting local parks or free public sites, increasing equity and accessibility.

“I can take my children to a place I don’t have to pay for, like a park,” VM said.

5. Teachers Equally Valued Content Support and Student Activities. Teachers stressed that they are not content specialists, and that the strong background information included with the curriculum gave them confidence and instructional effectiveness.

“There was a lot of information I learned today... It gave me the confidence to teach it,” VM said.

Teachers noted that background content, vocabulary, and key explanations should be explicitly included in written materials so they could anticipate student questions.

6. Accessibility and Differentiation are Attainable; But Must Be Clearly Defined.

Teachers agreed that lessons were adaptable for diverse learners and multilingual learners, but emphasized that differentiation supports should be labeled and built in, rather than assumed. Teachers identified visual supports, step-by-step instructions, and structured scaffolds as especially important.

7. Teacher Time Was the Main Barrier, Not Willingness. The most consistent barrier to implementation identified was time required to prepare materials. Teachers were clear that they would not implement lessons requiring extensive assembling, cutting, or prep outside instructional hours.

“If I have to create all the items . . . I don’t have the time, so I’m not going to do that,” VM said.

Teachers favored reusable, pre-made materials (i.e., card sets, posters) that could be stored easily and used year after year.

8. Teachers Requested More Data and Higher-Order Questioning Supports.

Teachers emphasized the need to integrate real data, including charts and graphs, to support analysis and alignment with statewide assessment expectations. They requested pre-written higher-order questions and guidance on discussion trajectories to support standards-aligned conversations.

9. Community Partnerships Were Seen as a Major Opportunity. Teachers identified numerous local organizations, parks, and professionals that could meaningfully extend lessons, including state parks, conservation groups, arboretums, fire departments, and island education programs. Teachers cautioned that these extensions should be framed as optional, recognizing variability in scheduling and access.

Together, these insights highlight the importance of creating place-based curriculum that is phenomenon-driven, standards-aligned, fully prepared, and rooted in the unique ecology and nature of coastal North Carolina. We hope more educators will fall in love with taking students outdoors to explore their places and communities through nature exploration and outdoor learning.

References

- Barrable, A., & Booth, D. (2022). Disconnected: What can we learn from individuals with very low nature connection? *International Journal of Environmental Research and Public Health*, 19(13), 8021.
<https://doi.org/10.3390/ijerph19138021>
- Barrable, A., Friedman, S., & Beloyianni, V. (2024). Nature connection in adulthood: The role of childhood nature experiences. *British Ecological Society*, 6(4)
<https://doi.org/10.1002/pan3.10657>
- Dankiw, K. A., Tsiros, M. D., Baldock, K. L., & Kumar, S. (2020). The impacts of unstructured nature play on health in early childhood development: A systematic review. *PLoS One*, 15(2). <https://doi.org/10.1371/journal.pone.0229006>
- Ding, H., Qiu, W., Deng, D., & Yan, M. (2025). Addressing challenges in on-campus and off-campus collaborative environmental education: Possible solutions from frontline teacher interviews. *Integrative Conservation*, 4(1), 33–37.
- Driessnack, M. (2009). Children and nature-deficit disorder. *Journal for Specialists in Pediatric Nursing*, 14(1), 73–75. <https://doi.org/10.1111/J.1744-6155.2009.00180.X>
- Frumkin, H., Bratman, G. N., Breslow, S. J., Cochran, B., Kahn, P. H., Jr., Lawler, J. J., Levin, P. S., Tandon, P. S., Varanasi, U., Wolf, K., & Wood, S. A. (2017). Nature contact and human health: A research agenda. *Environmental Health Perspective*, 125(7), 075001.
- Gobs, J. (2025). Planting futures: School-based food forests and their contribution to holistic education for sustainable development. *GAIA - Ecological Perspectives for Science and Society*, 34(2), 97-105. <https://doi.org/10.14512/gaia.34.2.20>
- Guevara-Herrero, I., Pérez-Martín, J. M., & Bravo-Torija, B. (2025). Teachers as promoters of transformative environmental education: Perceptions and classroom practices. *Environmental Education Research*, 1- 18.

- Isogai, A. D., McCarthy, D. D., Karagatzides, J. D., Vandenberg, S., Gardner, H., Edwards, V., & Tsuji, L. J. S. (2012). The collaborative-geomatics informatics tool: Engaging youth using place-based education. *International Journal of Technology, Knowledge and Society*, 8(1), 131–142.
<https://doi.org/10.18848/1832-3669/CGP/v08i01/56269>
- Jensen, J. K., Alkan Olsson, J., Post, M., & Isaksson, C. (2024). Reconnecting children to nature: The efficacy of a wildlife intervention depends on local nature and socio-economic context, but not on urbanization. *People and Nature*, 6(5), 1987–2000. <https://doi.org/10.1002/pan3.10702>
- Kabisch, N., van den Bosch, M., & Laforteza, R. (2017). The health benefits of nature-based solutions to urbanization challenges for children and the elderly—A systematic review. *Environmental Research*, 159, 362–373.
- Kudryavtsev, A., Stedman, R. C., & Krasny, M. E. (2012). Sense of place in environmental education. *Environmental Education Research*, 18(2), 229–250.
- Pereira, B. B., Silva, L. F., & dos Santos, J. R. (2022). Environmental Education and Complexity: A study based on Brazilian theses and dissertations. *Science & Education*, 31(1), 1–20.
- Siskind, D., Conlin, D., Hestenes, L., Kim, S. A., Barnes, A., & Yaya-Bryson, D. (2022). Balancing technology and outdoor learning: Implications for early childhood teacher educators. *Journal of Early Childhood Teacher Education*, 43(3), 389–405.
- Sobel, D. (2004). Place-based education: Connecting classrooms and communities. *Education for Meaning and Social Justice*, 17(3), 63–64.
- Speldewinde, C., & Campbell, C. (2024). Bush kinders: Building young Children’s relationships with the environment. *Australian Journal of Environmental Education*, 40(1), 7–21. <https://doi.org/10.1017/ae.2023.36>

- Waite, S. (2010). Losing our way? The downward path for outdoor learning for children aged 2–11 years. *Journal of Adventure Education & Outdoor Learning*, 10(2), 111–126.
- Yemini, M., Engel, L., & Ben Simon, A. (2023). Place-based education – a systematic review of literature. *Educational Review*, 77(2), 640–660.
<https://doi.org/10.1080/00131911.2023.2177260>
- Žulec, A., Varga, V., & Štefanić, L. (2022). Children’s and parents’ perspectives on the effects of children’s digital technology use. *Interacting with Computers*, 34(3), 73–84. <https://doi.org/10.1093/iwc/iwac035>