



# Nurturing Early Learning

Resources to Support Young Children's  
Learning in the Outdoors



JULY 2018  
Research Briefs

# Table of Contents

## Page 3

---

Why outdoor play?

## Page 5

---

Health and developmental  
outcomes of nature play

## Page 7

---

Educator well-being

## Page 9

---

Risky play and risk management

## Page 11

---

STEM outdoors and standards

## Page 13

---

Garden and farm programs

## Page 15

---

Translating to local contexts



## Why outdoor play?

Research reveals the importance of nature contact and outdoor play in supporting children's healthy physical, social and emotional, psychological, and cognitive development. However, sociopolitical and cultural factors are threatening children's access to nature experiences. Incorporating meaningful nature interactions into early childhood care and education settings is a powerful way to enrich children's learning and development.

A growing body of literature describes the many potent benefits of nature play. Outdoor play is associated with elevated activity levels that protect against physical health problems.<sup>1</sup> Nature contact supports psychological health, improves attention and focus, mitigates stress, and reduces risk of depression and anxiety disorders.<sup>2</sup> Spending time outdoors strengthens children's immune systems and play involving natural features such as uneven terrain and balancing logs facilitates gross and fine motor development.<sup>3</sup> Nature encourages children to engage in free play shaped by their own curiosity, and the play is highly physical and tactile, collaborative, and imaginative. In addition, when children learn to embrace the changes and challenges of the natural world, they

develop resilience, self-regulation, and the ability to assess and manage risks.<sup>4</sup> Nature experiences lay the foundation for children to thrive as learners, lovers of nature, and human beings.

Despite the recognized importance of nature experiences, children's access to outdoor play is drastically curtailed compared with previous generations.<sup>5</sup> Children in the U.S. exhibit a similar trend as adults in adopting a highly sedentary lifestyle. At the same time and almost certainly relatedly, there has been a sharp increase in health problems among children, including obesity and associated diseases, vitamin D deficiency, and mental health disorders.<sup>6</sup> This dwindling opportunity for nature

**“We need to give [children] time outdoors, where they can meet and savor the world that humans have not made – pill bugs on a sidewalk, a swarm of tadpoles in a puddle, a tree for climbing, a sky aflame with sunset, a kiss of wind.”**

**Scott Russell Sanders**  
“A Conservationist's Manifesto”

play results from a variety of social and political causes. High-stakes testing and accountability policies in education lead to the elimination of unstructured outdoor play time from classroom schedules in order to maximize academic learning.<sup>7</sup> Similarly, the practice of intensive parenting leaves even the youngest children with scarce free time.<sup>8</sup> At the same time, schools' and residential communities' fears of injury-related litigation also lead to restrictions on outdoor play.<sup>9</sup> Parents' perceptions of heightened social and physical danger drive them to keep their children “safely” indoors.<sup>10</sup> The pervasive presence of digital devices also detracts from children's motivation to spend time in outdoor play.<sup>11</sup> These shifting priorities and culture of risk aversion impede healthy development and harm children in the long run.

Fortunately, the growing understanding of the importance of nature interactions in child development and the concurrent diminishment of children's access to nature play have inspired families, educators, researchers, pediatricians, and non-profit organizations to advocate for reconnecting children with nature. The number of early childhood education programs that are centered around nature-based play and learning has rapidly increased in recent years. As of 2017, there are at least 250 nature preschools and forest kindergartens in the United States.<sup>12</sup> Washington State has begun a four-year pilot to determine licensing standards for outdoor, nature-based early learning programs. Washington State also offers state-based professional development opportunities such as the 2018 Early Achievers conference on the science behind children's play and learning in the outdoors.

## Reflection Questions

**To what extent do children in your program spend time outdoors? How can you increase children's opportunities for outdoor play and improve the quality of these play experiences?**

**While imagining possibilities for supporting nature contact, how can you embrace each child's personality and interests, family and home backgrounds, and cultural communities? How can nature contact include both bringing children into nature and bringing nature into indoor classroom spaces?**



## References

1. McCurdy, L.E., Winterbottom, K.E., Mehta, S.S., & Roberts, J.R. (2010). Using nature and outdoor activity to improve children's health. *Current Problems in Pediatric and Adolescent Health Care*, 40(5), 102-117.
2. McCurdy et al. (2010).
3. Hanscom, A.J. (2016). *Balanced and barefoot: How unrestricted outdoor play makes for strong, confident, and capable children*. Oakland, CA: New Harbinger Publications.
4. Sobel, D. (2016). *Nature preschools and forest kindergartens: The handbook for outdoor learning*. St. Paul, MN: Redleaf Press.
5. Louv, R. (2008). *The last child in the woods* (2nd ed.). Chapel Hill, NC: Algonquin Books.
6. McCurdy et al. (2010).
7. Sobel, D. (2016).
8. Brussoni, M., Olsen, L.L., Pike, I., & Sleet, D.A. (2012). Risky play and children's safety: Balancing priorities for optimal child development. *International Journal of Environmental Research and Public Health*, 9(9), 3134-3148.
9. Louv, R. (2008).
10. Brussoni et al. (2012).
11. McCurdy et al. (2010).
12. North American Association for Environmental Education (NAAEE). (2017). *Nature preschools and forest kindergartens: 2017 national survey*. Washington, DC: NAAEE.



## Health and developmental outcomes of nature play

The natural world affords diverse play opportunities that support children's physical, cognitive, and social-emotional health and development.<sup>1</sup> To prevent the serious health challenges associated with young children's sedentary, overscheduled, and restricted lifestyles, educators should work to incorporate active and unstructured nature play into early childhood education programs.

Children's play in outdoor settings is more vigorous, varied, and sustained than indoor play.<sup>2,3</sup> The prevalence of childhood obesity has greatly increased, and research indicates that unstructured active play is a powerful protective factor for young children.<sup>4,5</sup> Natural features such as uneven terrain and inclines support gross and fine motor development, including muscle and bone health, balance, coordination, endurance, spatial awareness, core strength, and postural control.<sup>6,7,8</sup> The natural world also offers rich and diverse stimuli that facilitate children's development of sensory capacities and sensory integration. According to the hygiene hypothesis, nature play also strengthens children's immune systems by exposing them to microorganisms and infectious agents in the early years of development.<sup>9,10</sup> In addition to these developmental benefits, activity levels in childhood are predictive of lifelong engagement in physical activity.

The diverse affordances of natural play settings contribute to the development of a wide range of cognitive abilities. Active play has been linked with self-regulation skills,

especially via neural associations between motor and cognitive development.<sup>11,12,13</sup> Natural settings contain an abundance of loose parts and open-ended materials that encourage children to engage in self-directed and imaginative play, which nurtures creativity, language acquisition, executive functioning, and abstract reasoning.<sup>14,15,16</sup> The dynamic features of outdoor settings also facilitate the development of children's observation and problem-solving skills.<sup>17</sup> In addition, nature contact restores attention and improves focus, particularly for individuals with ADHD,<sup>18</sup> and physical activity has an acute effect on children's concentration and cognitive functioning.<sup>19</sup>

**Nature “offers a multisensory smorgasbord of seeing, hearing, touching, and tasting, immersing children in a much grander world than can ever be captured indoors.”**

**Scott Sampson**  
*How to Raise a Wild Child*

Nature play also greatly benefits children's social-emotional development and psychological well-being. Through challenging and risky play experiences, children learn to assess and manage their interactions with their surroundings and cultivate resilience, independence, self-regulation, and self-efficacy.<sup>20,21</sup> Outdoor playscapes support collaboration, peer negotiation, and conflict

resolution because “the natural setting creates a calm, sensory-rich — but not sensory overloaded — environment” and a sense of expansive time that enable children to navigate social tensions.<sup>22</sup> In addition, research reveals the positive influence of nature contact on mood and psychological health, including reducing feelings of stress, anxiety, and depression.<sup>23,24</sup> Frequent positive experiences in outdoor settings nurture children's empathy for inhabitants of the natural world and emotional attachment to special places.<sup>25</sup> Nature play opportunities give rise to a love and respect for nature and environmentally responsible attitudes and behaviors.<sup>26</sup>

## Reflection Questions

**How can you encourage active play in your outdoor playspace? Who currently has access to active play and how can you support all children in the program to engage in active play?**

**How can you increase and diversify the affordances in your playspace?**

## References

1. 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.L., & Wood, S.A. (2017). Nature contact and human health: A research agenda. *Environmental Health Perspectives*, 125(7), 1-18.
2. Bell, A.C., & Dymont, J.E. (2006). *Grounds for action: Promoting physical activity through school ground greening in Canada*. Evergreen.
3. Tandon, P.S., Walters, K.M., Igoe, B.M., Payne, E.C., & Johnson, D.B. (2017). Physical activity practices, policies and environments in Washington State child care settings: Results of a statewide survey. *Maternal and Child Health Journal*, 21(3), 571-582.
4. McCurdy, L.E., Winterbottom, K.E., Mehta, S.S., & Roberts, J.R. (2010). Using nature and outdoor activity to improve children's health. *Current Problems in Pediatrics and Adolescent Health Care*, 40(5), 102-117.
5. Knight, S. (2016). *Forest school in practice*. Thousand Oaks, CA: SAGE Publications.
6. Hanscom, A.J. (2016). *Balanced and barefoot: How unrestricted outdoor play makes for strong, confident, and capable children*. Oakland, CA: New Harbinger Publications.
7. Fjortoft, I. (2004). Landscape as playscape: The effects of natural environments on children's play and motor development. *Children, Youth and Environments*, 14(2), 21-44.
8. Meyer, J., Müller, U., & Macoun, S. (2017). Comparing classroom context and physical activity in nature and traditional kindergartens. *Children, Youth and Environments*, 27(3), 56-77.
9. Sobel, D. (2016). *Nature preschools and forest kindergartens: The handbook for outdoor learning*. St. Paul, MN: Redleaf Press.
10. Hanscom, A.J. (2016).
11. Carson, V., Hunter, S., Kuzik, N., Wiebe, S.A., Spence, J.C., Friedman, A., Tremblay, M.S., Slater, L., & Hinkley, T. (2016). Systematic review of physical activity and cognitive development in early childhood. *Journal of Science and Medicine in Sport*, 19(7), 573-578.
12. Pesce, C., Masci, I., Marchetti, R., Vazou, S., Saakslähti, A., & Tomporowski, P.D. (2016). Deliberate play and preparation jointly benefit motor and cognitive development: Mediated and moderated effects. *Frontiers in Psychology*, 7, 349.
13. van der Fels, I.M.J., te Wierike, S.C.M., Hartman, E., Elferink-Gemser, M.T., Smith, J., & Visscher, C. (2015). The relationship between motor skills and cognitive skills in 4 - 16 year old typically developing children: A systematic review. *Journal of Science and Medicine in Sport*, 18(6), 697-703.
14. Barker, J.E., Semenov, A.D., Michaelson, L., Provan, L.S., Snyder, H.R., & Munakata, Y. (2014). Less-structured time in children's daily lives predicts self-directed executive functioning. *Frontiers in Psychology*, 5, 366-381.
15. Morrissey, A., Scott, C., & Rahimi, M. (2017). A comparison of sociodramatic play processes of preschoolers in a naturalized and a traditional outdoor space. *International Journal of Play*, 6(2), 177-197.
16. Tremblay, M.S., Gray, C., Babcock, S., Barnes, J., Bradstreet, C.C., Carr, D., Chabot, G., Choquette, L., Chorney, D., Collyer, S., Herrington, S., Janson, K., Janssen, I., Larouche, R., Pickett, W., Power, M., Sandseter, E.B.H., Simon, B., & Brussoni, M. (2015). Position statement on active outdoor play. *International Journal of Environmental Research and Public Health*, 12(6), 6475-6505.
17. Burdette, H.L., & Whitaker, R.C. (2005). Resurrecting free play in young children: Looking beyond fitness and fatness to attention, affiliation, and affect. *Archives of Pediatrics & Adolescent Medicine*, 159(1), 46-50.
18. Kuo, F.E., & Taylor, A.F. (2004). A potential natural treatment for Attention-Deficit/Hyperactivity Disorder: Evidence from a national study. *American Journal of Public Health*, 94(9), 1580-1586.
19. Palmer, K.K., Miller, M.W., & Robinson, L.E. (2013). Acute exercise enhances preschoolers' ability to sustain attention. *Journal of Sport & Exercise Psychology*, 35(4), 433-437.
20. Lester, S., & Maudsley, M. (2006). *Play, naturally: A review of children's natural play*. Bristol, England: Play England.
21. Floriani, V., & Kennedy, C. (2008). Promotion of physical activity in children. *Current Opinion in Pediatrics*, 20(1), 90-95.
22. Hanscom, A.J. (2016).
23. Burdette, H.L., & Whitaker, R.C. (2005).
24. Wells, N.M., & Evans, G.W. (2003). Nearby nature: A buffer of life stress among rural children. *Environment and Behavior*, 35(3), 311-330.
25. Lithoxidou, L.S., Georgopoulos, A.D., Dimitriou, A.Th., & Xenitidou, S.Ch. (2017). "Trees have a soul too!" Developing empathy and environmental values in early childhood. *International Journal of Early Childhood Environmental Education*, 5(1), 68-88.
26. Evans, G.W., Otto, S., & Kaiser, F.G. (2018). Childhood origins of young adult environmental behavior. *Psychological Science*, 29(5), 679-687.



## Educator well-being

Educator well-being is an important consideration in educational contexts because it is closely related to educator retention, quality of teaching practices, and student experiences in the early learning setting. Educator burnout and attrition are serious concerns at both the school and system level, and increasing educator well-being is one key way to confront these challenges. Educators with high levels of psychological well-being, strong social and emotional support systems, and appropriate coping strategies may build higher-quality relationships with learners, be more engaged in their teaching, and manage their early learning environments more effectively.<sup>1</sup> Educators' self-efficacy in particular is associated with benefits for students' academic and psychological well-being.<sup>2</sup> Many factors contribute to educator well-being, including social cohesion and social capital<sup>3</sup> — the extent to which educators feel a sense of belonging and mutual respect in their school community — and supportive professional learning communities.<sup>4</sup>

The natural world has a powerful influence on human health and psychological well-being.<sup>5</sup> Human relationships with nature include multiple dimensions. *Nature contact*

refers to discrete interactions with nature, which can be brief, intermittent, regular, or sustained. *Nature connectedness* describes the individual's subjective understanding of their connection with nature. Research indicates that both nature contact and nature connectedness are associated with hedonic well-being, or in-the-moment positive experiences, as well as eudaimonic well-being, which refers to deeper feelings of life meaning, autonomy, self-awareness, vitality, awe, spiritual transcendence, and prosociality.<sup>6,7</sup>

**“Theoretical perspectives suggest a range of possibilities: 1) contact with nature acts as a medium for restoration, 2) contact with nature provides an opportunity for emotional care, 3) nature provides a mirror for in-depth reflection or 4) contact with nature provides an opportunity to rekindle an innate union.”**

**Eric Brymer, Thomas Cuddihy, & Vinathe Sharma-Brymer**

*“The Role of Nature-Based Experiences in the Development and Maintenance of Wellness”*

Several theoretical frameworks help to explain the importance of nature for human well-being. The biophilia hypothesis proposes that humans have an innate and evolutionarily grounded tendency to affiliate with life and living things.<sup>8,9</sup> Attention restoration theory describes how the “soft fascination” of nature invites involuntary attention and restores individuals' cognitive resources that are depleted through everyday use of directed attention.<sup>10</sup> Stress reduction theory proposes that nature's positive effects on psychological well-being occur through a mechanism of improved stress recovery. In addition to these broad influences on psychological well-being, nature contact and connectedness also have positive effects on teaching practices in particular. Educators respond more favorably to playspaces with higher levels of vegetation<sup>11</sup> and green spaces increase educators' motivation to teach.<sup>12</sup> Teaching in outdoor environments can build educators' confidence and enthusiasm and facilitate their development of innovative pedagogical practices.<sup>13</sup> Thus, nature-enriched early childhood education has great potential to nurture educator well-being, improve their practice, and support child development.

## Reflection Questions

**What structures and strategies are currently in place at your program to support educator well-being? What personal well-being practices are educators currently enacting within and outside of the program setting?**

**How can nature experiences be incorporated into your program setting in order to improve educators' and children's well-being?**



## References

1. Skinner, E., & Beers, J. (2016). Mindfulness and teachers' coping in the classroom: A developmental model of teacher stress, coping, and everyday resilience. In K. Schonert-Reichl & R. Roeser (Eds.), *Handbook of mindfulness in education* (pp. 99-118). New York, NY: Springer.
2. Zee, M., & Koomen, H.M.Y. (2016). Teacher self-efficacy and its effects on classroom processes, student academic adjustment, and teacher well-being. *Review of Educational Research, 86*(4), 981-1015.
3. Roffrey, S. (2012). Pupil wellbeing - teacher wellbeing: Two sides of the same coin? *Educational & Child Psychology, 29*(4), 8-17.
4. Acton, R., & Glasgow, P. (2015). Teacher wellbeing in neoliberal contexts: A review of the literature. *Australian Journal of Teacher Education, 40*(8), 99-114.
5. 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.L., & Wood, S.A. (2017). Nature contact and human health: A research agenda. *Environmental Health Perspectives, 125*(7), 1-18.
6. Capaldi, C.A., Passmore, H.A., Nisbet, E.K., Zelenski, J.M., & Dopko, R.L. (2015). Flourishing in nature: A review of the benefits of connecting with nature and its application as a wellbeing intervention. *International Journal of Wellbeing, 5*(4), 1-16.
7. Brymer, E., Cuddihy, T.F., & Sharma-Brymer, V. (2010). The role of nature-based experiences in the development and maintenance of wellness. *Asia-Pacific Journal of Health, Sport and Physical Education, 1*(2), 21-27.
8. Wilson, E.O. (1984). *Biophilia*. Cambridge, MA: Harvard University Press.
9. Kellert, S.R., & Wilson, E.O. (1993). *The biophilia hypothesis*. Washington, DC: Island Press.
10. Roe, J., & Aspinall, P. (2011). The restorative outcomes of forest school and conventional school in young people with good and poor behavior. *Urban Forestry & Urban Greening, 10*(3), 205-212.
11. Herrington, S. (2008). Perspectives from the ground: Early childhood educators' perceptions of outdoor play spaces at child care centers. *Children, Youth and Environments, 18*(2), 65-87.
12. Dyment, J. (2005). *Gaining ground: The power and potential of school ground greening in the Toronto District School Board*. Evergreen.
13. Sampson, S. (2015). *How to raise a wild child*. New York, NY: Houghton Mifflin Harcourt.



## Risky play and risk management

Children need risky play for numerous reasons and they frequently seek out or create opportunities to fulfill their need for risky play. Outdoor settings afford a range of challenging play scenarios and require an approach to risk management that balances the developmental benefits of free play in risky environments with the maintenance of a hazard-free playspace.

Risky play is essential to children's learning and growth. Children develop risk management and decision-making skills by encountering risks in play settings and they build resilience, perseverance, confidence, and self-reliance through overcoming challenges.<sup>1,2</sup> Risky play supports other indirect benefits such as children's exploration of their physical abilities and limits, engagement in contextualized investigation of scientific concepts such as force and movement, and social skills like peer negotiation and mutual encouragement.<sup>3</sup> Risky play takes many forms such as handling dangerous tools, playing near dangerous elements (eg. fire, water), exploring heights, playing at high speeds, rough-and-tumble play, and playing on one's own away from direct adult supervision.<sup>4</sup> Risky play may be evolutionarily advantageous by reducing fearful responses and supporting children's courage and independence.<sup>5</sup> <sup>6</sup> Children have an innate desire for risk-taking and construct potentially dangerous situations if not provided with reasonable options for risky play.<sup>7</sup>

In the United States and many other Western nations, opportunities for outdoor risky play have diminished as a

result of overscheduled childhoods, increased traffic and high-density housing associated with urbanization, and a societal mindset of risk aversion that leads to hyper-regulated play environments.<sup>8,9</sup> Despite the relatively low dangers and significant benefits of risky play, parents are often risk paranoid.<sup>10</sup> Caregivers in the U.S. frequently attempt to eliminate risk entirely and childproof play settings rather than supporting children in learning to manage reasonable risks. The culture and regulatory approach of risk aversion is detrimental in the long run because it impedes children's physical, social, cognitive, and emotional development.<sup>11</sup> However, examples from Scandinavian early childhood programs demonstrate an alternative understanding of risky play and its positive outcomes. There is also a growing number of forest kindergartens and nature preschools in the United States that embrace risky play in outdoor settings as an opportunity for learning and healthy development.<sup>12</sup>

**“The benefits of taking some risks will usually far outweigh the dangers, and through this children are given a sense of independence, freedom and choice. They learn to make decisions based on their own opinions without intervention from adults; they work with others, share ideas. Children grow in confidence, develop a sense of trust of each other and learn through their own mistakes. Children learn to use tools with safety and care; they grow stronger and braver, share their experiences with others and develop into sensible explorers.”**

**Karen Constable**

*The Outdoor Classroom Ages 3-7*

A more balanced approach to risk management requires clarifying the difference between risks and hazards. In risky play, outcomes are uncertain and there is a possibility of injury, and children choose whether and how to engage. Research indicates that children are capable of monitoring and regulating their own engagement with risk, including sometimes withdrawing from risky situations, in order to maintain optimal levels of arousal, fear, and exhilaration.<sup>13,14</sup> In contrast, hazardous situations pose a high likelihood of harm and the dangers are invisible and can't be recognized and evaluated by children.<sup>15,16</sup>

Educators can do much to support risky play within their own program contexts without putting children in danger. They can scaffold children's engagement in risk-benefit assessments, which supports children's development of observation, decision-making, and planning skills. They can also nurture children's sense of responsibility by discussing the boundaries of play and conveying to children the importance of their own role in upholding the rules.<sup>17</sup> Educators can approach the creation of playspaces and facilitation of play with an attitude of “as safe as necessary” rather than “as safe as possible.”<sup>18</sup> Rather than trying to control children's outdoor experiences<sup>19</sup> educators can utilize a combination of risk management strategies, including keeping a close eye without interfering, choosing to sometimes be distant or not present, and contributing to or even initiating risky play, in addition to constraining play when it is genuinely necessary for children's safety.<sup>20</sup>

### References

- Constable, K. (2012). *The outdoor classroom ages 3-7: Using ideas from forest schools to enrich learning*. New York, NY: Routledge.
- Gill, T. (2007). *No fear: Growing up in a risk averse society*. London, UK: Calouste Gulbenkian Foundation.
- Brussoni, M., Gibbons, R., Gray, C., Ishikawa, T., Sandseter, E.B.H., Bienenstock, A., Chabot, G., Fuselli, P., Herrington, S., Janssen, I., Pickett, W., Power, M., Stanger, N., Sampson, M., & Tremblay, M.S. (2015). What is the relationship between risky outdoor play and health in children? A systematic review. *International Journal of Environmental Research and Public Health*, 12(6), 6423-6454.
- Sandseter, E.B.H. (2007). Categorizing risky play - How can we identify risk-taking in children's play? *European Early Childhood Education Research Journal*, 15(2), 237-252.
- Sandseter, E.B.H., & Kennair, L.E.O. (2011). Children's risky play from an evolutionary perspective: The anti-phobic effects of thrilling experiences. *Evolutionary Psychology*, 9(2), 257-284.
- Sandseter, E.B.H. (2013). Learning risk management through play. In O.F. Lillemyr, S. Dockett, & B. Perry (Eds.), *Perspectives on play and learning: Theory and research on early years' education* (pp. 141-157). Charlotte, NC: Information Age Publishing.
- Gill, T. (2007).
- Little, H., & Wyver, S. (2008). Outdoor play - does avoiding the risks reduce the benefits? *Australian Journal of Early Childhood*, 33(2), 33-40.
- Wyver, S., Tranter, P., Naughton, G., Little, H., Sandseter, E.B.H., & Bundy, A. (2010). Ten ways to restrict children's freedom to play: The problem of surplus safety. *Contemporary Issues in Early Childhood*, 11(3), 263-277.
- Sobel, D. (2016). *Nature preschools and forest kindergartens: The handbook for outdoor learning*. St. Paul, MN: Redleaf Press.
- Wyver et al. (2010).
- North American Association for Environmental Education (NAAEE). (2017). *Nature preschools and forest kindergartens: 2017 national survey*. Washington, DC: NAAEE.
- Sandseter, E.B.H. (2009). Characteristics of risky play. *Journal of Adventure Education & Outdoor Learning*, 9(1), 3-21.
- Sandseter, E.B.H. (2013).
- Greenfield, C. (2003). Outdoor play: The case of risks and challenges in children's learning and development. *Safekids News*, 21(5), 5.
- Sobel, D. (2016).
- Constable, K. (2012).
- Brussoni, M., Olsen, L.L., Pike, I., & Sleet, D. (2012). Risky play and children's safety: Balancing priorities for optimal child development. *International Journal of Environmental Research and Public Health*, 9(9), 3134-3148.
- Stan, I., & Humberstone, B. (2011). An ethnography of the outdoor classroom - How teachers manage risk in the outdoors. *Ethnography and Education*, 6(2), 213-228.
- Sandseter, E.B.H. (2009).

### Reflection Questions

**How does your program currently think about, talk about, and manage risk in children's play?**

**How can you incorporate outdoor risky play into your program's daily routines?**



**“It is a powerful catalyst for growth that helps them develop good judgment, persistence, courage, resiliency, and self-confidence.”**

**David Sobel**

*Nature Preschools and Forest Kindergartens*



## STEM outdoors and standards

The natural world is a rich resource for early childhood learning, especially in building a strong foundation for science, technology, engineering, and mathematics (STEM) thinking. Through educator-scaffolded as well as self-directed exploratory play, outdoor environments can support alignment with early childhood STEM standards and cultivate children's abilities and affinities in preparation for later learning.

When children engage in unstructured outdoor play, they often spontaneously enact scientific practices and construct deep, contextualized understandings of STEM concepts. These practices include comparing and classifying, measuring and enumerating, exploring and manipulating physical properties, collaborative investigating, and systematic inquiring and problem solving processes.<sup>1,2,3,4</sup> Children develop intuitive understandings of movement, spatial relationships, and other physical principles.<sup>5</sup> Free play in natural environments is powerful because it provides the time and space for children to become engrossed in meaningful, self-selected learning experiences.<sup>6</sup> Repeated immersion in an outdoor context over time allows children to construct knowledge through iterative experimentation.<sup>7</sup>

**“...under supportive conditions, even very young children are capable of building meaning around ‘big ideas’ in science, and exploration of the natural world provides the perfect setting for this to happen.”**

**Daniel R. Meier & Stephanie Sisk-Hilton**  
*Nature Education with Young Children*

Young children's nature experiences are most conducive to STEM learning when they are grounded in concrete, embodied activity. For example, active exploration and sensorimotor stimulation support verbal development through the co-activation of the brain's motor and linguistic areas, creating “physical associations that could make the concepts more visceral and intuitive.”<sup>8</sup> Motor engagement is particularly beneficial for acquiring language about actions, forces, and physical objects — language that is crucial for STEM learning. Educators' incorporation of embodied illustrations of scientific ideas such as evaporation can also enable young children to develop conceptual understanding and “talk science” without mastering technical terminology.<sup>9</sup>

More generally, authentic activity in outdoor settings gives rise to a local, personalized vocabulary that is a rich foundation for STEM learning.<sup>10</sup>

STEM learning in early childhood should focus on close-to-home settings rather than distant places and abstract ideas. Teaching of environmental knowledge and stewardship in early childhood should be rooted in empathy with the natural world and its more-than-human inhabitants rather than an overemphasis on facts.<sup>11</sup> Positive affective experiences in early childhood lead to wonder, curiosity, and a love of nature that can motivate ecological and STEM learning more broadly. Educators can scaffold and extend inquiry as it arises according to what is important to children in local settings — for example, by introducing ideas such as classification, part-to-whole relations, structures and functions, patterns, cycles, and systems.<sup>12</sup> Teachers should offer questions rather than answers and build a culture of collaborative discovery that encourages children to describe and investigate their noticings.<sup>13</sup> Nature journaling contributes to children's observation, multimodal representation, and record-keeping abilities.<sup>14</sup> These practices nurture STEM-related competencies through play and learning motivated by children's own curiosity.

## Reflection Questions

**How do educators in your setting incorporate STEM concepts and practices in children's play and learning in meaningful ways?**

**What are the challenges and opportunities for supporting STEM learning in children's nature play in your program?**



## References

- Constable, K. (2012). *The outdoor classroom ages 3-7: Using ideas from forest schools to enrich learning*. New York, NY: Routledge.
- McClain, C., & Vandermaas-Peeler, M. (2016). Outdoor explorations with preschoolers: An observational study of young children's developing relationship with the natural world. *International Journal of Early Childhood Environmental Education*, 4(1), 38-54.
- Sampson, S. (2015). *How to raise a wild child*. New York, NY: Houghton Mifflin Harcourt.
- Sobel, D. (2016). *Nature preschools and forest kindergartens: The handbook for outdoor learning*. St. Paul, MN: Redleaf Press.
- Dewar, G. (2016). *Learning by doing: How outdoor play prepares kids for achievement in STEM*. Natural Start Alliance.
- Sobel, D. (2013). *Beyond ecophobia: Reclaiming the heart in nature education* (2nd ed.). Great Barrington, MA: The Orion Society.
- Meier, D.R., & Sisk-Hilton, S. (Eds.). (2013). *Nature education with young children: Integrating inquiry and practice*. New York, NY: Routledge.
- Dewar, G. (2016).
- Karlsson, A.B. (2017). “It vapors up like this”: Children making sense of embodied illustrations of evaporation at a Swedish school. *International Journal of Early Childhood Environmental Education*, 5(1), 39-56.
- Sobel, D. (2016).
- Sobel, D. (2013).
- Meier, D.R., & Sisk-Hilton, S. (Eds.). (2013).
- McClain, C., & Vandermaas-Peeler, M. (2016).
- Johnson, K. (2014). Creative connecting: Early childhood nature journaling sparks wonder and develops ecological literacy. *International Journal of Early Childhood Environmental Education*, 2(1), 126-139.



## Garden and farm programs

Gardening in early learning contexts supports play and learning in a variety of ways, including fulfilling children's biopsychological affinity for interactions with living things and developmental need for a diversity of rich sensory stimuli.<sup>1</sup> Participation in garden programs is associated with greater knowledge about nutrition and healthy eating habits.<sup>2,3,4</sup> Gardening and farming also nurture children's understanding of ecosystems and food systems and their development of environmental attitudes, values, and behaviors.<sup>5,6</sup> In terms of curriculum content, gardening provides ample opportunity for experiential learning and exploration of math, science, and language concepts grounded in authentic activity.<sup>7</sup> Caring for a garden cultivates children's motivation, pride, and positive social relationships and fosters their holistic learning and growth.<sup>8</sup>

Creating a garden or farm program involves a number of considerations. In order to encourage children's sense of responsibility and stewardship, their agency should be foregrounded in all aspects of the planning, implementation, and maintenance processes.<sup>9</sup> The goals of the space should be co-constructed with stakeholders

**Gardens “offer up fonts of opportunity for adopting a place-based, science-as-wholes approach, underlining the interrelationships of everything.”**

**Scott Sampson**  
*How to Raise a Wild Child*



and clearly articulated – for example, will the program emphasize ecologically valuable plantings or schoolyard beautification? Will the space be used primarily for structured learning or unstructured play? Regardless of these factors, the garden should include a variety of features (eg. open areas and private spaces) and offer multiple modes of engagement (eg. water play, sensory play, exploration) that accommodate a range of ages and interests. Since “touching, tasting, smelling, and pulling apart are also vital,” multimodal interaction may often entail balancing the interests of the children and the space.<sup>10</sup>



## Reflection Questions

**What are the potential challenges and opportunities of a garden or farm program at your site?**

**What are the primary objectives for a garden or farm space in your community (including the perspectives of children, families, and program staff)?**

## References

1. Rivkin, M. (1997). The schoolyard habitat movement: What it is and why children need it. *Early Childhood Education Journal*, 25(1), 61-66.
2. Blair, D. (2009). The child in the garden: An evaluative review of the benefits of school gardening. *Journal of Environmental Education*, 40(2), 15-38.
3. Sampson, S. (2015). *How to raise a wild child*. New York, NY: Houghton Mifflin Harcourt.
4. Natural Learning Initiative. (2012). *Benefits of connecting children with nature: Why naturalize outdoor learning environments*.
5. Blair, D. (2009).
6. Sampson, S. (2015).
7. Meier, D.R., & Sisk-Hilton, S. (Eds.). (2013). *Nature education with young children: Integrating inquiry and practice*. New York, NY: Routledge.
8. Blair, D. (2009).
9. Rivkin, M. (1997).
10. Rivkin, M. (1997).



## Translating to local contexts

The implementation of nature-based early learning can take many forms and draw inspiration from several different models that share a belief in the value of frequent experiences in nature for children's learning and ecological consciousness.<sup>1</sup> At *nature preschools*, children spend 25-50 percent of the day outdoors and the natural world is utilized to enact high quality practices and support developmental goals from the fields of early childhood education and environmental education. Children in *forest kindergartens* are outside for 70-100 percent of the day regardless of weather conditions and learn through an emergent, child-centered curriculum. Other programs incorporate nature by building community partnerships and bringing children regularly to a nearby natural space.<sup>2,3</sup> Nature-centered learning can be tailored to the particular opportunities and constraints of each early childhood program. Natural play spaces are optimal for teacher-guided pedagogy as well as the unstructured, child-initiated play that is crucial for young children's health, well-being, and learning — balance between these priorities should be established by each program based on their own needs and objectives.<sup>4</sup>

**“Tune your sensibilities to seeing the affordances and opportunities in the niches and interstices of urban parks, suburban backyards, plain old marshy woods, cemetery edges. Often we don't need to spend lots of money to find suitably wonderful natural areas that allow children to spend a bit more time in Neverland.”**

**David Sobel**

*Nature Preschools and Forest Kindergartens*



The physical context of outdoor play should be designed with intentionality and through collaboration with stakeholders, including families, children, and staff. A natural learning space does not need to be expansive to serve as an exciting playspace for children; in fact, “ratty little thickets,”<sup>5</sup> unremarkable nooks, and enclosed hiding spots are often more special. If lack of space is a constraint, teachers can offer many of the benefits of nature play by introducing open-ended loose parts into the play area and coordinating trips to neighboring natural spaces. When imagining outdoor play spaces, educators should consider the overall character, the micro- and macro-context, the connectivity and clarity of spaces, the changes over time, and the availability of opportunities for children to challenge themselves and manipulate the environment.<sup>6</sup> Similarly, an analysis of existing outdoor classroom environments distilled a number of important design features: abundant choice, child-sized spaces, pathways and borders as playspaces, flexible spaces that can change over time, and community engagement and stewardship.<sup>7</sup> These design frameworks for children's playscapes offer adaptable principles to support the implementation of outdoor play in local contexts.

## Reflection Questions

**What opportunities for nature-centered play and learning are available in your program setting? What are some short-term and long-term initiatives you can enact to increase nature play?**

**How can you build connections with community stakeholders and partner organizations in order to support children's nature play?**



## References

1. Larimore, R. (2016). Defining nature-based preschools. *International Journal of Early Childhood Environmental Education*, 4(1), 33-37.
2. Constable, K. (2012). *The outdoor classroom ages 3-7: Using ideas from forest schools to enrich learning*. New York, NY: Routledge.
3. Bailie, P.E. (2010). From the one-hour field trip to a nature preschool: Partnering with environmental organizations. *Young Children*, 65(4), 76-82.
4. Hunter, J., Graves, C., & Bodensteiner, A. (2017). Adult perspectives on structured vs. unstructured play in early childhood environmental education. *International Journal of Early Childhood Environmental Education*, 5(1), 89-92.
5. Sobel, D. (2016). *Nature preschools and forest kindergartens: The handbook for outdoor learning*. St. Paul, MN: Redleaf Press.
6. Herrington, S., Lesmeister, C., Nicholls, J., & Stefiuk, K. (2007). *Seven C's: An informational guide to young children's outdoor play spaces*. Vancouver, BC: Consortium for Health, Intervention, Learning and Development (CHILD).
7. Dennis, S.F., Wells, A., & Bishop, C. (2014). A post-occupancy study of nature-based outdoor classrooms in early childhood education. *Children, Youth and Environments*, 24(2), 35-52.



With  
Support  
From



Cultivate  
**Learning**  
UNIVERSITY of WASHINGTON

**Developed By:**

Rachel Han,  
Research Assistant, Cultivate Learning

Stacey Berglind,  
Graphic Designer, Cultivate Learning

This is a publication from Cultivate Learning. Cultivate Learning is a research center led by Executive Director Gail E. Joseph, Ph.D., in the College of Education at the University of Washington.

This work was supported by funding from the Washington State Department of Children, Youth, and Families as part of the Quality Ratings and Improvement System Assessment, Ratings, and Training Contract #18-089-03.



## Cultivate Learning

[www.cultivatelearning.uw.edu](http://www.cultivatelearning.uw.edu)

+1 (206) 221-0569

[cultiv8@uw.edu](mailto:cultiv8@uw.edu)