

- **Natural Connections: Children, Nature, and Social-Emotional Development**  
by Janet E. Thompson and Ross A. Thompson
- **Nature – A Powerful Tool for Fostering Language and Literacy**  
by Ruth A. Wilson
- **Early Foundations: Music and Movement in the Outdoor Classroom**  
by Pamela VanGilder, Anne Wike, and Sean Murphy
- **Early Connections with Nature Support Children’s Development of Science Understanding**  
by Julie Thomas
- **Training Suggestions** by Kay Albrecht



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*A new Out of the Box Training Kit is available based on Ruth Wilson’s article “Nature – A Powerful Tool for Fostering Language and Literacy.”*

Nature teaches. A walk in the woods, climbing a tree, growing plants, or watching wildlife are powerful experiences filled with learning potential for all who experience them. This issue of Beginnings Workshop connects us with myriad learning opportunities ready and waiting for young children right outside the classroom door. Each developmental domain – social-emotional, language, physical, and intellectual – gets a good dose of encouragement from nature, while learning in the area of literacy, science, music, and movement are fostered and extended. Open the door – beauty, challenge, and lots of living things are just on the other side!

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# Natural Connections: Children, Nature, and Social-Emotional Development

by Janet E. Thompson and Ross A. Thompson

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Most people know intuitively that there is something magical about the experiences offered to children by the outdoors. We grew up hearing our parents and grandparents tell us stories about their childhood summers spent playing outside, interrupted only by a parent's call to come inside for dinner. It may have been a grandmother's accounts of life as a young child on an Iowa farm, exploring the fields, streams, and woods with her brothers and sisters. Or a father's nostalgic memories of summers spent tagging along with the neighborhood's "big kids" and being allowed to enter into their suburban "kid culture" of alleys and yards — building secret hide-outs, collecting treasures, and making up their own games.

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versity of California, Davis, where his research is focused on early parent-child relationships and the development of psychological understanding in young children. He was a member of the National Academy of Sciences committee that wrote *From Neurons to Neighborhoods: The Science of Early Childhood Development*.

But we who advocate for children's greater access to rich outdoor experiences can no longer rely only on nostalgic anecdotes. Even our first-hand observations of the children in our care are not enough. Our 21st century society demands research to give credibility to our practices. We must be able to show a link between young children's connections with nature and their healthy development. The good news is that we, as child developmentalists, can meet that challenge. We present here some of the links we can find when we apply knowledge from the substantial research literature on young children's social-emotional development to the much newer area of children's connections with nature.

Healthy social and emotional growth depends on young children's access to the kinds of social interactions, experiences, and environments that will support them. We believe that these appropriate supports are enhanced by the presence of a rich outdoor environment. Early experiences with nature, especially in the company of parents, teachers, and peers, often leave lasting impressions that make the

lessons learned there more salient and profound. Two basic conclusions from research guide our discussion of the ways children's connection with the natural world can foster their social-emotional growth:

First, young children acquire social and emotional competence in ways that are often different from how they acquire competence in tasks like naming letters or numbers. Social-emotional skills emerge through children's experience in close relationships and the varied activities that occur in relational experience, such as shared conversation, warm nurturance, and guided practice in learning capacities for sociability, responsibility, and self-control. Social and emotional skills also develop through the shared and solitary activities of a developmentally appropriate, enriched child care or preschool setting, including the opportunities for outdoor experiences that it provides. In such settings (as well as at home) young children develop understanding of other people's feelings and needs, are encouraged to feel empathy and caring, learn to manage their own behavior as responsible group members, and acquire a variety of other prosocial skills.

Second, and perhaps most importantly, *play* is a central context for social and emotional development in early childhood. Research shows that many kinds of play contribute to social-emotional competence in preschoolers; including pretend play, free exploration of objects in the environment, play through which children build and create (constructive play) and games with rules. Natural outdoor environments provide a context in which each kind of play is often more complex, extended, and self-determined. In natural spaces, children have a freedom to play in ways rarely possible in even the most developmentally appropriate indoor environments.



## Self

The development of *self* includes the process of gaining self-awareness, self-esteem, and developing an ever-deepening understanding of others. Research shows that in the course of their play and interactions, young children are developing an emerging awareness of their own characteristics, including likes and dislikes, abilities, differences from other people, and the ways that others value them. This process requires broad and varied experiences and the opportunity to pursue their own ideas and interests to find out where they lead.

Jane Perry writes of the features of the play yard ecology, in contrast to the classroom ecology. She reminds us that whereas the classroom ecology tends to provide children with explicit cues for activities and play scripts, the outdoor ecology provides more flexible cues, as well as invitations to invent more open-ended themes and roles. Loose parts and a lack of predetermined functions for the elements of a natural outdoor play space invite extended experimentation and adventurous exploration of one's own skills and dispositions, as well as those of one's playmates.

Growth of other competencies related to the development of self can also be positively associated with outdoor experience. We know from a large body of research that self-regulation requires the ability to sustain focused attention. Current research into

attentional disorders has shown that children who have available views of nature from their classrooms are better able to focus their attention and control their impulsive behaviors. Other studies show that children who have learning or behavioral challenges tend to perform better in a natural outdoor setting. Nature evokes positive feelings that generalize to children's interactions with other people and their activities. Larger outdoor spaces allow for privacy and observation from a distance for children with slow-to-warm-up temperaments. Children can also withdraw when social interactions become too

intense and find spaces in which to emotionally regroup.

The outdoors offers an implicit invitation to young children to explore and take initiative in their own learning. A teacher does not need to encourage a child to pick up a shovel and dig into wet sand, crunch through piles of fallen leaves, or take note of two squirrels chattering as they race up a tree trunk. And, of course, splashing through puddles after a rain engages all the senses and prompts a stream of "Why?" questions.

The development of self also involves social and emotional understanding. Capacities for empathy and caring can be seen most readily outdoors, even in children who may have a hard time being kind and gentle with their peers. Randy White, citing the writings of David Sobel, notes that children feel a natural kinship with animals, and invest in them emotionally. He contends that one of the best ways to foster empathy and a caring attitude during the early years is to provide opportunities for nurturing relationships with animals. Those of us who spend time with young children outdoors have ample opportunity to model a similar caring attitude and sense of responsibility toward other living things. Tending a vegetable garden, watering flowers, and taking care not to trample small plants are behaviors children readily imitate and then begin to initiate on their own.

Healthy social and emotional growth depends on young children's access to the kinds of social interactions, experiences, and environments that will support them.

## Social interaction

Social interaction is at the heart of young children's social-emotional development. This includes interactions with familiar adults, interactions with peers (including active and intentional cooperation, increasingly complex episodes of pretend play, and development of conflict resolution strategies), group participation, and developing cooperation and responsibility toward others. The outdoors is a setting that stimulates child-initiated interactions, especially with peers, and provides valuable opportunities for young children to experiment with the elements of peer culture.

The outdoors is the one place where adults are inclined to give groups of children freedom to choose their own partnerships and to play out the themes of cooperation and assertiveness, inclusion and exclusion that are new experiments for them, and are issues that will come to dominate their elementary school years. Children play chase, shriek in pretend terror, and shift scripts and roles frequently, giving each child the experience of being both the pursuer and the pursued, the tiger threatening to pounce or the mice scurrying to hide. They can finally use their "outside voices" and employ assertive language to make their feelings known to playmates. As Jane Perry points out, wild running games are the children's way of feeling connected.

Adults in an outdoor setting often relate to children more informally. They place props and other loose parts in the environment to provoke or build on observed interests. They assist children with language and other peer group entry skills. Beyond supportive functions, adults foster children's social development by becoming engaged in minor play roles from the sidelines, offering comments and questions to facilitate peer interactions and elaborating on children's themes. Research has shown that the longer the pretend play script is sustained, the more it contributes to children's social and emotional skills.

In the self-directed play of the outdoor play space, children are motivated to sustain social play for longer periods. In the process, they learn to rapidly interpret each other's cues, employ sophisticated perspective-taking skills, modify rules, and negotiate conflicts. Achieving proficiency in all of these areas is central to social-emotional growth.

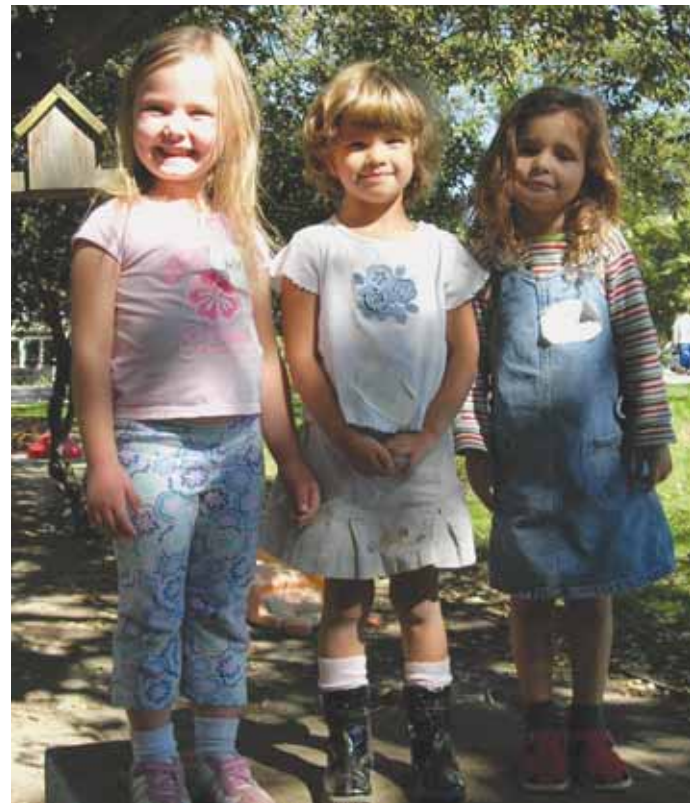
## Relationships

With relationships, we come full circle — back to the emotional salience of close relationships shared in those treasured outdoor places of childhood. Whether the relationships are attachments to parents, close relationships with caregivers, or friendships with special peers, young children need a deep reservoir of positive shared experiences with others in order to form meaningful, sustained relationships with them. These positive relational experiences can occur in any context — home, school, or outdoors. But outdoor play provides special opportunities for the development of close relationships with adults and peers.

In these contexts, adults are more likely to allow children to take the lead in shared activity, responding to the child's initiative with no predetermined agenda, and looking for learning opportunities in whatever has attracted the child's attention. Outdoor play is also likely to provide a foundation for deepening friendship with peers as children create their own adventures, discover another's complementary interests, and respond to another child's anger or distress with understanding. In many respects, the freedom of outdoor activity provides an inviting context for deepened understanding of another. Thus when we combine the crucial elements — sensitive, responsive interactions, extended child-directed imaginative play, motivation to pursue one's own learning, and situations that elicit empathy and caring — the evidence is strong that natural outdoor spaces can

Loose parts and a lack of predetermined functions for the elements of a natural outdoor play space invite extended experimentation and adventurous exploration of one's own skills and dispositions, as well as those of one's playmates.

PHOTOGRAPH BY JANET THOMPSON



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Natural outdoor environments provide a context in which each kind of play is often more complex, extended, and self-determined.



provide a provocative context in which to nurture children's close relationships.

## Conclusion

Although research on the influence of children's experiences with nature in the outdoors is only beginning, the wealth of research on social and emotional development suggests that perhaps our parents and grandparents were right. In the unstructured, self-determined, and sometimes unexpected opportunities of natural play settings, young children have a chance to discover more about themselves and other people, to learn how to interact constructively with others, and to create the foundation for close relationships in ways that are unique and developmentally valuable.

**A deep reservoir?:** Children need a "deep reservoir of shared positive experiences with others in order to form meaningful, sustained relationships." Thompson and Thompson make a case for using outdoor play to provide meaningful special opportunities to develop such relationships. Help teachers see the possibilities of sharing experiences during outdoor play as an easy to implement strategy for deepening the reservoir for both children and teachers.

**Where are you? On the bench or engaged?:** Engaging in play roles during outdoor play is teaching, say the Thompsons. Sustaining play between and among children supports social emotional development. So, find ways to get off the bench and into the play. Help teachers brainstorm ways to engage in the types of teaching behaviors that support rich, extended play (see page 48).

**Freedom, freedom!:** Explore with teachers the myriad ways that the outdoor environment provides more freedom than the indoor environment. Consider the amount of freedom in each setting. Then, when children and their teachers are outdoors, carefully observe children at play to make sure there are plenty of opportunities for complex, extended, and self-determined play choices.

Using Beginnings Workshop to Train Teachers by Kay Albrecht

# Nature – A Powerful Tool for Fostering Language and Literacy

by Ruth A. Wilson

Dr. Ruth Wilson has been actively involved in environmental education for young children for almost 20 years. She has written several books and numerous articles on linking young children and nature. Her most recent book, *Nature and young children: Encouraging creative play and learning in natural environments* (2008, Routledge), focuses on the power of nature to promote learning and development. Ruth recently received the Caroline French Morton Award from the National Arbor Day Foundation for her life-long achievements in linking children and nature. Ruth has been an educator and teacher educator for over 30 years. She lives in Bellevue, Washington and can be reached at [wruthwilson@aol.com](mailto:wruthwilson@aol.com).



One of the most dramatic stories I heard during my 35 years as an educator was shared by a preschool teacher working with children with special needs. This teacher, Linda, told me about a four-year-old girl with autism who had been in her classroom for three months before she spoke her first word or made any obvious attempt to communicate. The breakthrough came early in the day as the children were arriving at school.

Linda had emptied the water table and was now using it to incubate some duck eggs. Over the past several days, she had shared books about ducks and how they hatch. The children were excited and frequently checked on their progress. They knew what to look for because Linda had carefully explained how the baby ducks would peck their way out of the eggs.

Ellie, the little girl with autism, was one of the first children to arrive at school that day. Ellie's mother brought her into the classroom and was asking Linda about an up-coming event at the school. Ellie walked over to the duck eggs and cried, "Look!" One of the eggs had cracked, and a duckling's beak and eyes were clearly visible. Linda and Ellie's mother first looked at Ellie and then at each other. Neither one could believe what they just witnessed. Ellie had never used words at school before, and the few words she used at home were always rote and prompted by an adult. In response to the duckling beginning to hatch, Ellie had spoken spontaneously with a great deal of emotion. Linda and Ellie's mother were soon hugging each other and Ellie — all three of them contemplating the wonder of the moment.

A new living creature had just emerged from the confines of a physical shell, and a four-year-old child had broken through a formidable communication barrier.

## Fostering language development

I share this story of Ellie to draw attention to several concepts relating to language development and the power of nature. For language development, whether for children with special needs or typically-developing children, a key component in the process is having a message important enough to motivate a child to share it with others. For some, connecting with others in a social context is sufficient motivation to use language. When we say "hello" and share ideas with someone else, our "reward" is the connection we establish with another person. Children with autism usually do not find this connection rewarding enough to put forth the effort to communicate. Watching a duckling emerge from an egg, however, is exciting — in fact, exciting enough for Ellie to want to share her discovery with others.

Another story comes to mind — this one of Helen Keller. Helen was blind and deaf and using very limited language at the age of seven. Her teacher, Anne Sullivan, had been trying without much success to teach Helen to communicate by spelling out words in her hand. Helen did not fully understand the meaning of words and was resisting Anne's efforts to establish a way for her to communicate. All this changed when Anne led Helen to a water pump as someone was drawing water. Anne placed one of Helen's hands under the spout. She spelled the word "water" in Helen's other hand. As Helen herself later stated, it was at this moment that the mystery of language became clear to her (Royal National Institute of the Blind, n.d.). Within the next few hours, Helen learned the spelling of 30 new words and started using them in a meaningful way. Perhaps it was the rich sensory experience of cool water gushing over her hand that helped Helen make the connection between the word as it was spelled into her hand and the water itself.



life (Kellert & Wilson, 1993; Wilson, 1984). This natural affinity suggests that teachers and parents would do well to make the natural world their first choice for materials and experiences to support young children's language development.

## Fostering early literacy through nature-related experiences

Turning to the natural world for materials and experiences fosters learning in other areas, as well. It adds to the enjoyment factor of learning to read, write, and make sense of

the world (Kupetz & Twiest, 2000). It can also promote an enthusiasm for books (McKenna, 2001). Following are a few suggestions on how to use nature and the out-of-doors to foster early literacy:

■ **Establish an outdoor literacy center.** This involves selecting an appropriate location, providing a place to write and draw, and adding interesting literacy-related props. Props should include a variety of books (fiction and nonfiction) and materials for writing and drawing. Maps, brochures, photos, the weather section of the newspaper, field guides, seed catalogues, and magazines also make inviting props. At least some pictures and text should relate directly to what children are likely to see and experience in the outdoor setting, such as birds, trees, sky, rain, soil, and squirrels.

■ **Conduct "story time" outdoors.** Ideally, a special "gathering place" should be used for sharing books with a group of children. This place should be conducive to listening and discussion. While all types of books can be shared in an outdoor setting, books that focus on the natural environment will have special meaning.

■ **Provide an outdoor stage.** A stage, whether this is an actual platform or just a designated area, invites a performance. Performances often tell stories and may be based on a familiar children's book or "authored" by the children themselves.

■ **Post signs.** Outdoor signs can be used to label different activity areas (blocks, climbing area, art area) and elements of the natural world (maple tree, strawberry plant, sandy soil).

Sensory experiences paired with words give young children the foundation for learning language and related concepts. Children don't learn such concepts as "purple," "soft," "bird," and "jump" by listening to someone talking about what these words mean.

Children need direct experiences with these concepts for the words to be meaningful to them. Well-chosen materials for young children feature a variety of colors, sizes, shapes, and textures. Such materials also invite hands-on manipulation, giving children opportunities to pinch, poke, squeeze, taste, shake, and re-shape. As children manipulate these materials and interact with others, they learn related vocabulary and how to use words to communicate.

## Nature and children

While commercially-made materials are often designed to match the language and learning needs of young children, the richest source of materials for stimulating language and other areas of child development is the natural world (Wilson, 2007). The natural world is, in fact, "the most 'information-rich' environment we will ever encounter" (Kellert, 2002, p. 56). Natural materials are rich in sensory stimulation and invite exploration and experimentation. They also provide "especially distinguishable objects to differentiate and classify" (Kellert, 2002, p. 60). Fortunately, the world of nature is readily available, and children are naturally drawn to it.

E. O. Wilson, a scientist at Harvard University, indicates that humans have an innate affinity for the natural world. He called this attraction "biophilia" and described it as an urge to affiliate with other forms of

For language development, whether for children with special needs or typically-developing children, a key component in the process is having a message important enough to motivate a child to share it with others.

■ **Provide observational aids and recording tools, such as magnifying glasses, rulers, measuring cups, clipboards, pencils, tree and insect identification cards, and notepads.** These materials encourage children to look more closely and, in the process, develop such visual perception skills as attending, discrimination, identification, classification, and categorization. These skills are a part of visual literacy, which some researchers note is one of the critical areas in the language arts (Machado, 2007).

Sensory experiences paired with words give young children the foundation for learning language and related concepts.

## Multiple benefits of linking children and nature

Tapping into the power of nature to help children grow and develop offers special benefits to both children and the natural world. For the children, positive experiences with nature help them grow healthy in mind, body, and spirit. For the Earth, early positive experiences with nature promote a life-long appreciation and respect for the beauty, health, and integrity of the natural world.

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Using Beginnings Workshop to Train Teachers by Kay Albrecht

**Relieve the pressure!** Most teachers are feeling the pressure to embed and emphasize language and literacy in their curriculum plans. Isn't it wonderful that fostering both comes so easily outdoors? Use the list of suggestions on page 51 to foster literacy skill acquisition. Divide teachers into teams. Give each team the assignment to implement one of the outdoor suggestions for all to experience. Then, see what happens as a result of this collaborative work. Debrief after children have time to try out the "new" literacy experiences.

**Reflect on stories:** Wilson uses powerful stories to communicate the incredible ease with which young children can learn when experiences are real and meaningful to them. What did you learn from nature? Reflect on your own stories about how nature serves as the perfect environment to use language and learn literacy skills.

**Check it out:** Inventory the experiences a classroom setting provides for pairing sensory experiences with words. Then, go outside and do the same. What did teachers learn from the two lists of opportunities to make words meaningful? Discuss what you found out. Then make sure your curriculum plans offer many experiences, both indoors and out, to pair words with related sensory experiences.

**Maybe families could help?:** Enlist families to help you find the observational aids and recording tools needed to make the outdoor environment rich with literacy tools. Post the list (top of this page) conspicuously and see what happens. When family members inquire about why, share your ideas for connecting literacy and the outdoors.

# Early Foundations: Music and Movement in the Outdoor Classroom

by Pamela VanGilder, Anne Wike, and Sean Murphy

*In one corner of the Music and Movement Area of a well-equipped outdoor classroom, Imani improvises a tune on a natural wood marimba. "Listen," she calls to a friend. "Come hear my song!"*

*In another corner, Cody and Bobby jump and twist on a low wooden stage, enjoying the sounds that their shoes make when they connect with the hard wood. "It sounds like thunder," Cody says. "Let's call this our 'Thunder Dance.'"*

*Under a nearby tree, Shana and Jose wave colorful scarves, mimicking the movements of the tree's leaves as they sway in the wind.*

Experiences like these are what make outdoor classrooms a natural way for children to develop foundational movement and music skills that will aid them in all areas of development. Because an outdoor classroom can usually offer more space for large-motor movements than an indoor classroom, children are able to freely experiment with multiple locomotor and non-locomotor activities. And, because sounds are absorbed in the outdoors in a way that's impossible inside, children can create their own music without disturbing other children.

## A place for self-expression

Perhaps one of the most positive benefits of an outdoor music and movement area for children is that it provides a place for improvisation. Many parents and educators of young children feel it is very important that their toddler or preschooler has early exposure to dance and music through formal lessons. While many young children respond positively to a well-designed music/dance program, it is just as important that these young children experiment with movement and music making of their own choosing. Children gain

intrinsic confidence, true joy, and valuable skills through self-discovery.

Providing a designated space for improvisation allows children to apply learned skills in a new way, thus giving rise to their creative spark. The outdoors in particular provides a plethora of input to be interpreted by the young improviser. The flight of a bumblebee, the calls of birds, trees swaying gently in a breeze are all examples of input that may be interpreted through movement and music!

Professionalism of the arts in today's society has created a hands-off approach to music and movement. Children and adults are afraid to have fun making music and dancing freely. As an informal performance venue, outdoor music and movement areas encourage active participation by children and adults alike; and promote a low stress environment for experimentation.

## A place for developing musical understandings

The outdoors provides a natural place for experimenting with music. Looking at traditional music and dance from cultures around the world, one of the most common observations that can be made is that music and dance takes place outside. The Gamelan Gong of Bali, Samba of Brazil, and Native American Powwows are just a few examples of music and movement groups that perform in the outdoors.

One of the more obvious reasons for these outdoor ensembles is the noise factor. Obviously, teaching 20 children the Samba (using shakers, drums, bells, and whistles) in an indoor classroom is less than ideal. In an outdoor classroom, 20 young sambistas can play without disturbing others. Organized musical activities

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Sean Murphy is an ethnomusicologist, musician, composer, and educator.



Sean is co-owner of the fusion arts company Being:Art LLC. The company builds musical instruments for outdoor classrooms; and conducts workshops, residencies, and performances throughout the United States. He is a music/design consultant for the Dimensions Foundation.

like this foster cooperation, listening skills, and early math concepts such as pattern and repetition.

Outdoor spaces are ideal places for musical improvisation because sound is released into the air instead of bounced around a classroom. A group of children can develop a tune together on the marimba, play the bongos, and quietly manipulate a rainstick all at the same time and without disturbing one another. In the outdoors, the children can experiment as individuals or join together as they choose. Fine motor skills and auditory sensory stimulation of using outdoor musical instruments can occur naturally.

The outdoors in particular provides a plethora of input to be interpreted by the young improviser.

**Sean's story:** As an instrument-maker, musician, and teaching artist, I know from personal experience that an easily played and good sounding musical instrument will be used by children (and adults). Instruments should be made of quality materials designed for the outdoors using natural materials wherever possible. For example, I designed and built a huge marimba in collaboration with the staff at Arbor Day Farm in Nebraska City, Nebraska for their Nature Explore Classroom. The 25 foot marimba is made primarily of the nearly indestructible Brazilian hardwood ipe. The sound is resonant and beautiful and we have seen hundreds of children playing the instrument since it was installed over two years ago.

## A place for developing body competence

**Anne's story:** "Go outside and play!" How many of us have been told this and have said this to our own children or students? Some of my earliest memories are being outside by myself or with others exploring the environment by running, wandering, climbing, and observing nature firsthand. As a landscape architect, dancer, teaching artist, and mother, I have the highest regard for exploration of the world through the body. I know these early explorations of movement in the outdoors are the underpinnings of my professional pursuits.

Learning takes place through the senses and what better place to stimulate the senses than the rich environment of the outdoors? It is natural for children to experiment with a variety of movement while interacting with nature and with others.

Imagine several young children running, galloping, and spinning in a large open space. Large movements such as these stimulate the vestibular and proprioceptive systems, helping children gain a sense of gravity and balance as they tumble, slither, and roll in the soft grass. They jump, bounce, and skip forwards, backwards, and sideways on a large wooden platform, laughing and moving between one another while negotiating where their bodies are in space and in relationship to one another. These children are learning what their bodies can do; demonstrating their feelings and ideas through body language; while also maintaining their physical health.

Children will naturally gravitate to what interests them and most often to what they need. We as adults must become aware and honor these needs.

## A positive place for all learners

Movement, music, and sensory stimulation are vital in the brain development of all children, but in children with special needs they can open the door to learning and help the brain create important neurological connections that may have been missed during early development. Through our senses we take in information, interpret it, organize it, and respond to our environment. In children with special needs this organization of sensory input is out of sync, causing a variety of different challenges that can involve motor planning, coordination, balance, speech, vision, fear, anxiety, repetitive actions, over-activity, under-activity, and other behaviors.

**Pam's story:** As a movement specialist in a school for children with disabilities and a mother of a child with Down Syndrome, I have learned that careful observation of a child, his response to his surroundings, and his movement patterns can provide important clues to a child's sensory integration capabilities. When given the opportunity to explore and play in an outdoor classroom, how does the child respond? Does she prefer large, gross motor movements that include spinning, swinging, and running in curved pathways? Or does the child prefer to sit in a quiet, calm area? Is there a repetitive pattern to the child's movement choices? Is one side of the body more dominant than the other? If the child gallops, does he gallop with the same side leading each time? When interacting with the child, are



interpret slow and fast tree growth, old and young trees. Find other examples in nature that could be represented with these words: twist, stretch, bend, rise, fall, shake, wiggle, float, spin, etc.

**■ Experiment with locomotor movement**

Make animal dances. Invite children to move around the outdoor music and movement area as the animal of their choice. Have them

make the basic shape of the animal and use multiple levels. Encourage children to skip, gallop, leap, crawl, slither, creep, and walk in their animal shape. Have children move in different pathways such as zig-zag, curved, and multiple directions.

**■ Experiment with patterns in nature and interpret into music**

Help students to identify patterns in nature (the number of trees in the classroom, petals on a flower) and interpret these into musical patterns (clap the number of trees, a musical scale representing the flower petals). The patterns can become more complex (a clap could represent a tree and a stomp could represent a shrub) or take into account anomalies (skip a note in the scale for a missing flower petal).

**■ Encourage students to add words to individual songs they create**

Help students to create songs about their observations of nature (a squirrel collecting acorns). The melody could be something they know or something they make up. Let students perform for one another.

**■ Create group dances with music, using nature as the inspiration.**

We facilitated a performance with kindergarteners that sequenced a series of dances the children developed over a semester with their teachers. The children explored nature (animal movements and sounds, tree growth, forces of nature such as ice melting into water with fire, seasonal changes) and developed representational movements. The teaching artists and the children provided music and song. We invite you to use the ideas listed above, to help your students create their own performance.

Learning takes place through the senses and what better place to stimulate the senses than the rich environment of the outdoors?

you able to help the child gallop with the other side leading? Does the child swing her arms in opposition as she walks or runs? Does the child tend to bump into things or into other children? Does the child look out into the environment or is the focus close and within a small area? Does the child want to touch everything or perhaps put things in her mouth? Or does the child shy away from touching things with different textures?

As I observe, I make note of a child's preferences and patterns, and create movement experiences that will facilitate sensory integration. When introducing a new concept to a child with special needs, I often notice that they observe others several times before deciding to participate. Never underestimate the learning that takes place while a child is observing. Children seek patterns and organization as they try to make sense of the world. Anticipation and knowing what to expect will offer security and develop self-confidence in the child who is allowed to step forward when he is ready. All children, regardless of ability or disability learn to interpret the world as they experience it, and with our guidance they can learn to respond and interact with others and with their environment, especially the natural environment.

**Ideas for outdoor music and movement activities**

**■ Experiment with non-locomotor movement**

Make a tree dance. Have children find personal space in which to observe trees. Have them make the basic shapes of the tree trunk, its branches, its leaves. Encourage making shapes with different body parts, with the whole body, and change levels. Children may

The learning that takes place through these activities includes increased observation skills, new vocabulary, math and science concepts, positive social interactions, and increased self-esteem.

## A crucial part of a child's development

"Scientists now believe that to achieve the precision of the mature brain, stimulation in the form of movement and sensory experiences during the early developing years is necessary" (Greenough & Black, 1992; Shatz, 1992).

Providing nature-based music and movement experiences on a regular basis can help a child grow stronger in body, mind, and spirit. This kind of natural learning isn't simply "nice" for children to have, but indeed is foundational to their healthy development. And, an added benefit of dancing and making music in the great outdoors is that it's just plain fun for adults and children alike!

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Using Beginnings Workshop  
to Train Teachers  
by Kay Albrecht

**Add it now!:** Add outdoor movement and music areas to your playground. Start with one addition and then see where there is room for even more places for self-expression.

**Analyze this:** Identify noisy and disruptive activities that occur in the indoor classroom and systematically plan to move them to the outdoor classroom. Observe the differences in the activities in the two different environments.

**Also analyze this:** Facilitating sensory integration takes planning a match between interest, skill, and opportunity. Observe to uncover individual differences in movement preferences and patterns and use the observations to create additional experiences with similar patterns or preferences. Then, try some new patterns and experiences to help children integrate new sensory experiences into their skill repertoire.

# Early Connections with Nature Support Children's Development of Science Understanding

by Julie Thomas

Jane Goodall, best known as the “chimpanzee scientist,” showed considerable interest in science and nature as a young girl. In an often-told story, Jane remembers when her mother found a pile of earthworms under Jane’s pillow (1999). Though Jane was only two years old at the time, she well remembers that her mother did not scold her for the slimy mess in the bed. Rather, her mother explained that the worms needed to be returned to the out-of-doors, or they would die. In Jane’s mind, this guidance greatly influenced her thinking of science in her formative years. Even as a toddler, she was learning to understand the concepts about organisms and their environment. The worms, of course, needed the moisture and nutrients found in soil; but plants needed the benefit of the worms’ tunneling and animals looked to the worms as food.

Certainly, developing complex understandings of the interdependence of living things seems a lofty goal for preschool-aged children. However, guided nature studies can provide important, conceptual frameworks for later learning. This article provides some insight into these benefits and an understanding about how early nature experiences actually teach science concepts.

## What is science?

Science is a unique way of thinking and knowing about the world. Scientists use particular investigative processes such as observations, questions, and experiments to construct reasonable explanations of the world around them. Thus, science is understood as an evidence-based endeavor. Science knowledge has been generated over time; and this historic process of science inquiry has taught us much about natural objects, events, and phenomena. Scientists, however, continue to review and ask questions of

other scientists’ work. Thus, science will never be finished; much more remains to be understood (National Research Council 1996).

## Why science in preschool?

Rachel Carson (1956) expressed concern that young children have at least one adult to help them keep alive their “inborn sense of wonder” (p. 45) and enthusiasm for exploring the natural mysteries of the world. She pressed for adults to “pave the way for the child to want to know” explaining that:

“If facts are the seeds that later produce knowledge and wisdom, then the emotions and the impressions of the senses are the fertile soil in which seeds must grow. The years of early childhood are the time to prepare the soil” (p. 45).

Current brain research tells us that children are *wired to learn* from birth. From an early age, it is readily apparent that children are highly engaged when provided the opportunity to explore their natural world. Conezio and French (2002) have learned that preschool-age children are able to “create strong and enduring mental representations of what they have experienced in investigating the everyday world” noting they “readily acquire vocabulary to describe and share these mental representations and the concepts that evolve from them” (p. 12).

Preschool children follow a natural tendency to explore their surroundings – and even playtime activities easily engage them in science. Teachers can help encourage questioning and investigating as they introduce children to scientific thinking. In later years, school lessons will help children connect their naïve theories and experiences with the broad concepts of science. Klein and Hammrich (2000) argue that

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teacher-directed, hands-on learning allows young children to gain information, explore their surroundings, and develop meaning while honing their communication and problem-solving skills. As Henniger (1987) points out both directed and playful experiences provide “excellent opportunities for young children to learn about the world around them and to discover through exciting experiences many of the fundamental mathematics and science relationships necessary for later learning” (p. 168).

When preschool science experiences focus on science processes (such as observation and analysis), children have the opportunity to develop scientific understandings that are far more important than *right answers*. In this way, classroom dialogues encourage children to think, reflect, and verbalize the tenability of ideas. Pramling and Samuelsson (2001) suggest that, “It is through challenging the child’s thinking and encouraging the flow of ideas that the foundations for later scientific understandings can be developed” (p. 147).

Children’s awareness of developmental concepts can also be viewed as first steps toward learning a new language — a common language representative of certain knowledge shared by scientists. Gostev and Weiss (2007) noticed that as children increased understanding of the concepts of nature, so too did they begin to express their ideas in more sophisticated, scientific ways. “The children started to use resources around them without being reminded. Most significantly, the children developed the necessary language skills to communicate their ideas and their way of reasoning about the natural world around them” (p. 51).

## What are appropriate preschool nature experiences?

According to the National Science Standards (NRC, 1996), it is appropriate for young children to investigate earth materials, organisms, and properties of common objects. Although children will develop concepts and vocabulary from such experiences, they should also develop inquiry skills. Inquiry investigations (where children learn what constitutes evidence and to judge the strength of data used to make explanations) will help develop children’s ability to ask scientific questions, to investigate aspects of the world around them, to gather observations, and to construct reasonable explanations. Children should also begin to use data to formulate explanations.

Direct experience with living things, their life cycles, and their habitats will help children build understanding of biological concepts (NRC, 1996). These concepts can emerge from children’s natural sense of wonder about elemental things (such as how plants get food or what certain animals eat). An understanding of the characteristics of organisms — their life cycles and their complex interactions among all components of the natural environment — begins with the basic understanding of how individual organisms maintain and continue life. Children’s nature study, beginning with their immediate environment, will provide a concrete foundation for the progressive development of major biological concepts in the later grades, such as evolution, heredity, the cell, the biosphere, interdependence, the behavior of organisms, and matter and energy in living systems.

Young children’s ideas, about the characteristics of organisms, develop from basic concepts of living and nonliving. Just as young children may well give anthropomorphic explanations, such as attributing human emotions to explain animal behavior, they may associate “life” with all objects that move. This early understanding will later help children understand movement as a defining characteristic of life — and they will soon incorporate other concepts (such as eating, breathing, and reproducing) to define life.

Appropriate underlying biological concepts and principles may include the following:

- Organisms have basic needs.
- Plants and animals have different structures that serve different functions.
- Plants and animals have life cycles.
- Plants and animals closely resemble their parents.
- Many characteristics of plants and animals are inherited from the parents.
- Animals depend on plants.
- Plant and animal behavior patterns are related to their environment.
- Plants and animals cause changes in their environment.

## Learning science attitudes

Young children can successfully experience in-depth, scientific inquiry. Developmentally appropriate expectations for discussion, expression, data representation, and reflection can lead to interesting

and engaging explorations that help children make meaning and develop theories from their active work. Worth and Grollman (2003) suggest that “even the littlest learners are powerful thinkers and theory makers” (p. 11). Science attitudes, of curiosity and divergent thinking, enable very young students to explore phenomena and materials that draw upon their natural curiosity, captivate, motivate, and prepare them for later learning. Henniger (1987) suggests that play may be viewed as the highest form of research and notes that play serves as a powerful motivator for many children. In these freely chosen activities, the child feels more in control, more able to make decisions about the direction the play will take. Few children will experience failure or embarrassment over incorrect responses in the play setting. And, as Henniger further argues, “[Play] enables children to learn key concepts and develop essential attitudes

toward learning. Its value and importance to mathematics and science should not be overlooked” (p. 171).

## In conclusion

Certainly, nature studies are appropriate for preschoolers. These lessons can provide important foundation for children’s science learning over a lifetime. Such early learning experiences can help launch science interests for all children — and may even inspire the Jane Goodalls of the next generation! Perhaps the ideas and suggestions provided here will inspire preschool teachers to organize a plethora of preschool activities that encourage children to “think like a scientist” as they explore their natural world. The table below can be used as a guide to associate important science attitudes with appropriate preschool activities.

Current brain research tells us that children are *wired to learn from birth.*

Science Attitudes	Preschool Activity
Questioning is very important in science. Questions help lead scientists to answers in the world.	Help students create a “Questions Book” about nature.
Scientists don’t always find answers to all of their questions, but they ask lots of questions anyway.	Encourage dialogue that links children’s observations to new questions. “So, what are you thinking now?”
Scientists keep data logs to observe change over time.	Help children make science notebooks that are meaningful to them. Younger children can draw pictures to illustrate their observations.
Scientists use special tools to improve observations.	Provide children with rulers to measure the length, height, and depth of objects and materials; thermometers to measure temperature; watches to measure time; and magnifiers to observe objects and organisms.
Scientists develop explanations using observations (evidence) and what they already know about the world (scientific knowledge). Good explanations are based on evidence from investigations.	When children propose an explanation, encourage them to refer to their data to support their explanations. Documenting what they’ve seen will help children reflect on their experiences and deepen their understanding.
Scientific investigations involve asking and answering a question and comparing the answer with what scientists already know about the world.	Encourage children to check their explanations against scientific knowledge, experiences, and observations of others. Read informational books to help explain experimental results. Checking field guides models how to use books to find things out. Children will also enjoy looking and talking about the pictures with you and you can read or paraphrase certain parts.
Scientists make the results of their investigations public; they describe the investigations in ways that enable others to repeat the investigations.	Find ways to display children’s investigations and conclusions for others to review. Encourage continued dialog.

## Suggested resources and materials

Consider introducing the National Audubon Society's *First Field Guides*. Book topics include trees, wildflowers, birds, mammals, amphibians, and shells. These guides (useful both as study guides and field guides) are just the right size and format for young naturalists. The text is understandable (such as an explanation of the differences between broadleaf and needle trees), but the color photos alone will guide the learning of non-readers.

Books like *In the woods: Who's been there?* can help to improve children's observation and hypothesis building skills. Pictures and text teach children to look for evidence or clues of animals they may not actually see on a nature walk. The book guides children to note things such as an empty nest or a fallen branch with the bark gnawed off. Each story prompts the question, "Who's been here?" and the answer is revealed when you turn the page.

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When preschool science experiences focus on science processes ... children have the opportunity to develop scientific understandings that are far more important than right answers.

Using Beginnings Workshop to Train Teachers  
by Kay Albrecht

**Under your nose?:** Children begin to study nature by looking at their immediate environment. Take a close look, along with teachers, at the immediate environment of your outdoor space. Then, make a plan to help children "see" what is going on right under their noses.

**Field guides for here and now:** Help children create a field guide to their playground. Invite older children to introduce younger children to the environment with the guide.

**Assessing scientific knowledge:** Create an authentic assessment instrument using the list on page 58 as a basis. Identify what children are discovering, what scientific concepts they are learning, and how their scientific problem-solving skills are growing. Use the assessment to provide input to future planning and further curriculum development.

**Prop it!:** Create a prop box for each age group that supports the scientific attitudes listed.

**Brainstorm the possibilities:** Brainstorm many varied and interesting ways to use the preschool activities suggested on page 59. For example, find lots of ways to use question books outdoors or to display children's investigations. Commit to trying each of the ideas generated.