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NURTURING CHILDREN'S BIOPHILIA: DEVELOPMENTALLY APPROPRIATE ENVIRONMENTAL EDUCATION FOR YOUNG CHILDREN

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Extensive research in children's development and experience in early childhood education has shown that young children:

- Have unique learning styles that match their stages of development, which occur in an orderly sequence during their lives (Piaget 1952; Bredencamp & Copple 1997; Case & Okamoto 1996; Dyson & Genishi 1993; Erikson 1963; Gallahue 1993; Crain 2000) All domains of development—physical, emotional, social, language and cognitive—change in a predictable way (Bredencamp & Copple 1997; Carol 1997; Crain 2000).
- Form their values in their earliest years (Piaget 1952; Wilson 1994).

The way children learn is completely different than adults. To be effective, children's environmental education needs to be designed to match children's developmental needs, interests, abilities and learning styles (Bredencamp & Copple 1997). Young children are active learners (Bredencamp & Copple 1997). Their best learning occurs with hands-on, interactive play and self-discovery rather than on trying to impart knowledge to them (Piaget 1952; Fein 1981; Bergen 1988; Similansky & Shefatya 1990; Fromberg 1992; Berk & Winsler 1995; Bredencamp & Copple 1997). Young children have a natural curiosity that requires direct sensory experience rather than conceptual generalization. To be effective and engage children based upon their developmental abilities and ways of learning, their hands-on sensory experiences need to be immersive and open-ended rather than structured and scripted (Bredencamp & Copple 1997).

“Childhood has its own way of seeing, thinking and feeling and nothing is more foolish than to try to substitute ours for theirs.”

Jean Jacques Rousseau (Emile)

Children experience the natural environment differently than adults. Adults usually see nature as background for what they are doing, as a visual, aesthetic experience. Children experience nature holistically (Olds 1989) and not as background for events (Cohen & Horm-Wingerd 1993), but rather as a stimulator and experiential component of their activities (Sebba 1991). They look for its affordances, what it affords them to do (Gibson 1977; Kyttä 2003 & 2004). Children judge nature not by its aesthetics, but

rather by the manner of their interactions and sensory experiences with it (Cobb 1977, Gibson 1977; White & Stoeklin 1998).

Children have an innate, genetically predisposed tendency to explore and bond with the natural world known as biophilia, i.e. love of nature (Wilson 1993 & 1996; Tilbury 1994; Sobel 1996 & 2002; Kellert 2005). Evidence of biophilia has been observed in children even younger than two (Moore & Marcus 2008). For children's natural inclination of biophilia to develop they must be given developmentally appropriate opportunities to learn about the natural world based on sound principles of child development and learning (Kellert 1997; Sobel 2002; Chawla 2006).

If children's natural attraction to nature is not given opportunities to be flourish during their early years, biophobia, an aversion to nature may develop. Biophobia ranges from discomfort and fear in natural places to contempt for whatever is not man-made, managed or air-conditioned (Cohen 1992; Cohen & Horm-Wingerg 1993; Orr 1993 & 1994; Bixler et al 1994; White 2004). Biophobia is also manifest in regarding nature as nothing more than a disposable resource (Dutcher, Finley et al 2007).

John Burroughs (1919) cautioned that, "Knowledge without love will not stick. But if love comes first, knowledge is sure to follow." The problem with most environmental education programs is that they try to impart knowledge and responsibility before children have been allowed to develop a loving relationship with the natural world (Sobel 1996; Wilson 1997). Children's emotional and affective values of nature develop earlier than their abstract, logical and rational perspectives (Kellert 2002). We need to allow children to develop their biophilia, their love for the Earth, before we ask them to academically learn about nature and become guardians of it (Olds 2001; Sobel 2008).

A problem with most young children's environmental education programs is that they approach education from an adult's, rather than a child's perspective. Teaching nature abstractly in the classroom does not lead to pro-environmental behaviors in later life (Schultz 2000). Teaching children at too early of an age about abstract concepts like rainforest destruction, acid rain, ozone holes and whale hunting can lead to dissociation from nature and premature abstraction. When we ask children to deal with problems beyond their cognitive abilities, understanding and control, they can become anxious, tune out and develop a phobia to the issues. In the case of environmental issues, biophobia—a fear of the natural world and ecological problems—a fear of just being outside—can develop. Studying about the loss of rainforests and endangered species may be perfectly appropriate starting in middle school, but is developmentally inappropriate for younger children (Cohen & Horm-Wingerg 1993; Sobel 1996; Wilson 1997; Coffey 2001; Kellert 2002).

A risk of teaching children by using virtual nature of exotic and beautiful places that are not part of children's regular experience is that they can learn to think of those places as nature, diminishing their value of their local natural environments and reducing their future potential for protecting those areas (Chipeniuk 1995; Levi & Kocher 1999).

Children's experiences during early childhood should nurture the conception of the child as a part of nature. It is during early childhood when children's experiences give form to the values, attitudes, and basic orientation toward the world that they will carry with them throughout their lives (Wilson 1994 & 1996; Kellert 1997; Kahn 2002). Regular positive interactions within nature allow children to feel comfortable in it, develop empathy with it and grow to love it. No one can love what he or she doesn't know through intimate association. Not only are regular developmentally appropriate experiences in nature important for the development of pro-environmental values, but also adults, both parents and teachers, need to model enjoyment of, comfort with and respect for nature (Cohen 1992; Wilson 1996; Hart 1997; Phenice & Griffore 2003; Chawla 2007).

Research has substantiated that an empathy with and love of nature, along with later positive environmental behaviors and attitudes, grow out of children's regular contact with and play in the natural world. Children's understanding of humans' relationship to nature is both partially under development and complete during early childhood (Phenice & Griffore 2003). Recent research strongly suggests that the opportunity for children younger than age 11 to explore in wild, natural environments is especially important for developing their biophilic tendencies and that the type of play should be child-nature play, such as catching frogs in a creek or fireflies at night, versus only child-child play such as playing war games with walnuts. The best learning environments are informal and naturalistic outdoor nature-scapes where children have unmediated opportunities for adventure and self-initiated play, exploration and discovery. Such informal experiences stimulate genuine interest in and valuing of environmental knowledge that is provided in more structured environmental education programs. (Bunting & Cousins 1985; Chawla 1988 & 2006; Palmer 1993; Bixler 1997 & 2002; Wilson 1997; Palmer & Joy 1998; Corcoran 1999; Kals, Schumaker et al 1999; Bixler, Schultz 2000; Floyd et al 2002; Kals & Ittner 2003; Malone & Tranter 2003; Ewert & Place 2005; Hoff & Chawla 2006; Wells & Lekies 2006; Berenquer 2007; Vadala, Bixler et al 2007; Hinds & Sparks 2008; Sobel 2008; Thompson Aspinall & Montarzino 2008)

There are three basic stages for children's development of environmental values and their environmental education (Sobel 1996; Kellert 2002 & 2005):

- Early childhood (ages 3/4 to 7)
- Early/middle grade school (ages 7 to 11)
- Adolescence (ages 12 to 17)

Early Childhood—Empathy

During early childhood, the main objective of environmental education should be the development of empathy between the child and the natural world. In addition to regular opportunities to explore and play in nature, one of the best ways to foster empathy with young children is to cultivate relationships to animals. This includes exposure to indigenous animals, both real and imagined (Sobel 1996).

Young children have a natural curiosity and an affinity for animals and especially baby animals (Sobel 1996; Desouza & Czerniak 2002; Rosen 2004). Animals are an endless source of wonder for children, fostering a caring attitude and sense of responsibility towards living things. Children interact instinctively and naturally with animals, talk to them, and invest in them emotionally. A little-known fact about children and animals is that studies of the dreams of children younger than age 6 reveal that as many as 90% of their dreams are about animals (Acuff 1997; Patterson 2000).

Endangered species are not appropriate at this age. Rather, the common, everyday species that fill children's yards, neighborhoods and communities are the developmentally appropriate choice, as children can relate to them. Moreover, with children at this age, the environmentally correct notion of not anthropomorphizing animals doesn't apply (Sobel 1996; Kellert 2005).

Children's exposure to relationships with animals needs to be cultivated with live animal contact and animal-based stories, songs and other experiences. Developing an emotional connectiveness—empathy—to the natural world is the essential foundation for the later stages of environmental education (Sobel 1996 & 2008).

One of the best examples of developmentally appropriate early childhood environmental education are the "outdoors-in-all-weather nursery schools" and "forest kindergartens." Since the 1990s, parents and educators in Germany have established 700 *Waldkindergärten* where children ages 3 to 6 spend their entire day in the outdoors in all but the most extreme weather. Forest kindergartens are now found in many other countries including Scotland, Scandinavia, Switzerland and Austria (Esterl 2008; Moore & Marcus 2008).

The closest equivalent in the United States are nature center-based preschools, such as The Nature Preschool at the Schlitz Audubon Nature Center near Milwaukee, Wisconsin, where the curriculum includes daily outdoor nature discovery in the nature center's 185 acres of diverse habitat (Moore & Marcus 2008).

Early/Middle Grade School—Exploration

Exploring the nearby world and learning your place in it should be the primary objective for this 'bonding with the earth stage' of environmental education. This includes opportunities to explore and experience the surrounding wild and semi-wild natural world found in children's neighborhoods and communities. Developmentally appropriate activities include creating small imaginary worlds, hunting and gathering, searching for treasures, following streams and pathways, exploring the landscape (natural, not adult manicured landscapes), taking care of animals and gardening. Plants have substantial interest to children when they provide wildlife habitat (Sobel 1996 & 2008; Kellert 2002).

Adolescence—Social Action

Social action appropriately begins around age 12 and extends beyond age 17. As children start to discover the 'self' of adolescence and feel their connectiveness to society, they are naturally inclined toward wanting to save the world, assuming of course that they had the opportunities in their earlier years to develop empathy for and to explore the natural world. Their opportunities for environmental preservation should be focused at the local level where children can relate to the outcomes rather than in some far-off unknown rainforest (Sobel 1996; Kellert 2002).

The world once offered children the thousands of delights of the natural world. Children used to have free access to the outside world of wild nature, whether in the vacant lots and parks of urban areas or the fields, forests, streams of suburbia and rural areas. Children could explore and interact with the natural world with little or no restrictions or supervision. Nature-based childhood used to be the natural condition. (Rivkin 1990; Pyle 2002; Moore 2004; Louv 2005; Tai, Haque, et al 2006).

The lives of children today are much more structured, supervised and scheduled with few opportunities to explore and interact with the natural outdoor environment. Children's physical boundaries have shrunk. Childhood and regular unsupervised play in the outdoor natural world are no longer synonymous (Francis 1991; Pyle 1993 & 2002; Moore & Wong 1997; Kellert 2002; Kuo 2003; Brooks 2004; Kytta 2004;). Today, most children live what one play authority has referred to as a childhood of imprisonment (Francis 1991). Children are disconnected from the natural world outside their doors. Louv (2005) calls children's condition today *nature-deficit disorder*.

Early childhood and grade schools have the opportunity to help fill the void in children's lives of regular access to the natural world. With developmentally appropriate natural outdoor environments and programs, schools can help our children develop to become responsible stewards of the earth (Herrington Susan et al 1998; Malone, Karen et al 2003; Sobel 2004).

To accomplish this, children, as part of their daily life, need regular contact with natural environments that offer them opportunities for play and exploration, where they can explore and bond with nature, rather than the paradigm of recess on manufactured play equipment in a sterile or manicured landscape area. Rather than playgrounds, children need to be offered naturalized environments, the wilder the better, where they can interact with nature and the animals and insects that inhabit it. Children need to be given daily access to such outdoor natural environments for extended periods of time each day. (Moore & Marcus 2008)

Schools, early childhood educators and teachers need to free themselves from the paradigm of giving children indoor play and learning and manufactured outdoor playgrounds and instead allow children to reclaim the magic that is their birthright—the ability to play and learn outdoors in intimate daily contact with wild and varied nature through exploration, discovery and the power of their imaginations. It is only through such positive experiences in outdoor nature that children will develop their love of nature and a desire to protect it for their future and later generations.

“There's no way that we can help children to learn to love and preserve this planet if we don't give them direct experiences with the miracles and blessings of nature.”

Anita Olds (2001)

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