

2009

Curing Nature-Deficit Disorder: How Environmental Education Helps Kids Learn

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CURING NATURE-DEFICIT DISORDER: HOW ENVIRONMENTAL EDUCATION
HELPS KIDS LEARN

by

JAIME LEIGH LANGLEY

A Capstone Experience/Thesis

submitted in partial fulfillment of the requirements of

University Honors College at

Western Kentucky University

Approved by:

Kathleen Matthew

Marla Capper

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Under the Direction of Dr. Kathleen Matthew

ABSTRACT

Walk into any public school and talk with the children about their experiences in nature and you will begin to see a pattern. Children have made few connections with the world around them. They do not spend much time outdoors and the time they do spend outdoors is not spent interacting directly with nature. Why does this matter? Look at these same kids and you will see another pattern emerging: Attention-Deficit Disorder, depression, obesity, emotional problems, etc. While not all of these problems are directly caused by a lack of interaction with the natural world, current research shows that there is a link. This study examines that research in an effort to prove the growing problem that author Richard Louv calls Nature-Deficit Disorder, as well as examining how educators can help fix it. Nature-Deficit Disorder, though not a real medical condition, epitomizes the collective problems rising from the child-nature gap in today's schools.

INDEX WORDS: Education, Environmental education, Nature, Attention-Deficit Disorder, ADHD, Nature-Deficit Disorder, Curriculum

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May 2009

DEDICATION

This work is dedicated to my future children and the children whose lives I touch as a teacher. I promise to take this work to heart and to make sure that all children have the opportunity to interact with nature in a meaningful way.

ACKNOWLEDGEMENTS

I would like to thank everyone who helped me along the way by giving me advice, proofreading my paper, helping me find resources and giving me moral support. Thanks so much to my fiancé, Grayson Pare, who has probably heard more about this than he wanted to; Kirby Watkins, my friend and fellow Thesis survivor; my committee members, Dr. Kathleen Matthew and Dr. Terry Wilson; the Honors College at Western Kentucky University; Dr. and Mrs. Grady and Cindi Pare and Granite and Zena for being guinea pigs; and Dr. Wes Berry for inspiring me to write this in the first place. Your help means more to me than you know.

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Note: Throughout this paper, you will see the word “nature” used frequently. By nature, I mean outdoor expanses of green areas, large or small, left as wild and natural as possible. This could be a garden, a park, a field, a creek, a stand of trees down the street, or even just a drainage ditch at the end of a cul-de-sac. The only requirements are that it fosters imaginative play in children and is multi-use. A soccer field or constructed playground does not count.

INTRODUCTION

In the articles “Charlotte’s Webpage” by Lowell Monke¹ and “Leave No Child Inside” by Richard Louv², the two authors talk about how today’s kids are spending less time in nature and increasingly more time inside, in front of a computer or television screen. The problem is, the more time children spend playing video games and watching TV, the less time they will *want* to spend outdoors. Monke points out,

“Having watched Discovery Channel and worked with computer simulations that severely compress both time and space, children are typically disappointed when they first approach a pond or stream: the fish aren’t jumping, the frogs aren’t croaking, the deer aren’t drinking, the otters aren’t playing, and the raccoons (not to mention bears) aren’t fishing. Their electronic experiences have led them to expect to see these things happening—all at once and with no effort on their part.”

These children no longer *want* to interact with nature. They believe that what they see on the computer and TV screen is all they need. An increasing amount of adults agree with them. Parents today think that technology is a good thing—that it opens up the whole world to their children. They would rather have their child watch Discovery Kids for a few hours than actually take them on a hike in the nearby woods or even to the local zoo.

Busy school systems today are not helping much. The No Child Left Behind Act that passed in 2002 places greater accountability methods on public schools. While this sounds good in theory, in practice it means greater reliance on high-stakes testing. Children in every grade, even kindergarten, are required to take tests to assess if they really learned all they were supposed to. The funding that schools get depend on the results of these test. In an effort to get higher scores, teachers basically teach to the test. They know what is going to be on the test at the end of the year, so they focus solely on that. Anything that is not on the test is not important to know. The tests ask little about social studies, science, or the environment. The

sections that do pertain to social studies and science focus on being able to read charts, graphs, and maps. The tests do not even pretend to ask about the environment. As a result, teachers teach mainly math and language arts all day long, leaving little time for anything else. Schools are doing away with field trips, recess, and art and music classes. These “superfluous activities” eat up too much of the school day.

Many people are proposing an alternative to the education system proposed by No Child Left Behind. Their cry is that we should “Leave No Child Inside.” Instead of cooping children up all day and forcing them to take stress-inducing tests, we should actually let them be kids and have more hands-on activities and outdoor play. Many parents and activists are appalled at the way children today disconnect from nature and are working out ways for them to reconnect.

In the following pages, I will discuss the growing divide between children and nature, why that is a problem, how it became a problem, and steps that we can take to close the divide.

CHAPTER 1: THE WIDENING DIVIDE BETWEEN CHILDREN AND NATURE

“I like to play indoors better, ‘cause that is where all the electrical outlets are³.”

-Paul, a 4th grader from San Diego

I grew up in a suburban town just north of Nashville, TN, in the 1990s. The houses were a comfortable distance apart—not too cramped—and there was a lake just behind my house where we would sometimes fish. The yards were neatly manicured—the woods having been bulldozed down sometime during the 1960s when these houses were built. My brother and sister are much older than I am and there were not many kids my age in the neighborhood, so I was often alone, which was fine with me; I preferred to be alone—especially outside. When I was outside, I could let my imagination run wild. It is amazing what a few trees and a small expanse of grass can be. I was an explorer, a spy, a teacher, a mom, and a baseball player. With such a blank canvas, I could be anything I wanted to be.

My yard was not overly large, but I spent a lot of time in it. My favorite thing to do was climb trees. If the branches were close enough together, like in the pine trees between my neighbor’s house and mine, I could climb all the way to the top. I would sit there for hours, just swaying in the breeze, thinking about a million things, or, sometimes, nothing at all. When I was not in a tree somewhere, I could be found just lying in the grass. I would watch the clouds float by as I drifted off to sleep, taking catnaps in the warm sunshine.

But being outside did not just mean relaxing in the sun. I was also very active. I often rode my bike or walked to school and back if the weather was nice, and after school and during the summer, I rode my bike all afternoon, coming back only when the streetlights lit. There was not a lot of traffic on the back streets around my house, so I could ride on the road.

As I look back today and map out what were some of my favorite places to go, I realize that I often traveled several miles a day on my bike. I remember how slim and toned my calf muscles were from pedaling up all those rolling hills.

The outdoors was my refuge, my home-away-from-home. There were no pressures outside. There was nothing that I *had* to do. I was free to just be a kid. Nature soothed me. It was the one place that truly made me happy. That is what I remember most fondly about my childhood—all the time I spent outside, just playing. Richard Louv says it best in his book, *Last Child in the Woods*: “In nature, a child finds freedom, fantasy, and privacy: a place distant from the adult world, a separate peace⁴.”

The same was true for my parent’s generation. My dad reminisces about family vacations in the Airstream trailer, of fishing and catching frogs. He talks about walking to school and to his friends’ houses. He and his best friend even ran a newspaper route when they were younger and were out before dawn, taking in the fresh air. It was a simpler time, and he was often left to his own devices, which meant that he spent a great deal of time outside, where he was free from his parents’ supervision.

It was not just kids who were outside, either. It was parents, too. Adults used to spend more time out on the front porch (if they had one), actually using the front porch swing and rocking chairs. They talked to their neighbors over the fences and hedge rows. Everyone knew everyone else in the neighborhood. When my mom was growing up in a suburb of Chicago, her neighborhood used to throw block parties. The men would bring their picnic tables and grills out into the street, talking with each other while they waited for the coal to heat up. The women would bring out their best pies and potato salads, with fresh lemonade for everybody. The kids would all play with each other in the yards and in the street.

Everyone was just enjoying being outside in the nice weather, and enjoying the company of the friends and neighbors.

So many of my mom's childhood pictures include people that I do not know. My mom looks through them and reminisces. "Oh, yes, that is Judy Rosenberg. Her mom baked the best cookies!" "Look at Billy Westhouse! I had the biggest crush on him, even with those scrawny legs!" I, on the other hand, have no idea who my neighbors are. I have not even seen some of them. I just assume they exist because the yards stay mown. People do not know their neighbors because they are not outside.

It used to be that the whole family was outside. And, as a whole, the family was healthier. Nowadays parents might join a gym or be out jogging, but not kids. They "do not have to worry about that" until older. The result is a generation of kids who spent their childhood in front of a TV or computer.

When comparing generations, it is clear that this generation of kids are, as a whole, spending less time outside than previous generations. "Either indoor spaces have become more attractive, or outdoor spaces have become less attractive—or both," says Robin Moore, president of the International Association for the Child's Right to Play and director of the National Learning Initiative⁵.

The excuse that is most often used is that there simply are not as many natural areas to play in than there used to be. This is true. However, just because there are fewer areas does not mean that there are not any areas at all. Even in the most urban areas, there are parks and rooftop gardens. Sometimes it takes a little work to find a natural area, but It is worth it.

Bottom line is, we say nature is important, and we say that we should take care of it, but our actions and attitudes reveal that we are afraid of nature and want ourselves and our

children to stay detached from it. Children are growing up confused by nature, not really knowing their role in it. Nature has become this taboo thing, spoken of only in abstract terms. The environment has become such a hot issue, with so many people wanting to “save” it and “protect” it, but those who spend a large amount of time actually engaging directly with nature are still considered outsiders in our consumerist society. What message are we sending our children?

A Brief History of the Child-Nature Relationship

“In the space of a century, the American experience of nature has gone from direct utilitarianism to romantic attachment to electronic detachment⁶.”

Looking back at books from the past specifically geared towards young boys, like *Shelters, Shacks, and Shanties* by Daniel C. Beard, founder of the Boy Scouts, originally written in 1915⁷, shows us that young boys of that era were not only expected to spend a lot of time outdoors, but were also expected to be able to *interact with* the nature in a meaningful way. In his book, Beard expects boys to be able to actually build their own playhouses, sometimes by chopping down trees and nailing them together to make elaborate play cabins. This was considered entirely doable for young boys. Few boys nowadays would know the first thing about building a playhouse for themselves.

In 1893, during a celebration in Chicago of the 400th anniversary of Columbus’s arrival in the Americas, historian Frederick Jackson Turner delivered his “frontier thesis,” which, among other things, declared the “closing of the frontier⁸.” This had a more profound impact than anticipated because it basically signaled the end of the age of exploration. No

longer was there a huge rush of immigrants wanting to explore the western United States. It had been settled. This was a new age, one where farming played the chief role in connecting with the outdoors. This was also the time when city and National Parks were created. Now that the frontier was gone, the age had come when people began to romanticize about the frontier. Teddy Roosevelt exemplified this spirit. This was the age when every boy wanted to be a cowboy and every girl dreamed of having her own little house on the prairie.

This was also the time of the family farm. Those families not in city areas usually lived on a functioning farm. In those days, our relationship with the land was direct. People were often born on the land, lived on the land, worked the land, died on the land, and were buried on the land. They knew every nook and cranny of their property, every curve and dip of the nearby creek. They may not have known anything about the Amazon River or Sahara Desert, but the average person's knowledge of the place around them was far superior than what we see today. Even the kids who are more "environmental," who care about nature and what we are doing to our planet, tend to think of nature only in abstract terms. They speak of the ozone layer, of recycling, of rain forests, and of endangered species. Yet most of them could not describe to you the nearest natural area. Their grandparents knew how to interact with the land, how to use the land but not overuse the land. In a way, they knew a lot more than we know now.

One hundred years later, in 1993, the U.S. census bureau, after looking at the data from the 1990 census, declared that they would not be taking the time to survey farm households, effective at the next census. In the 90 years since the beginning of the century, farm population had gone from 40% of the total population to just 1.9%⁹. They were no longer worth surveying. Most Americans by the 90s were living in either urban areas or the

suburbs which surround them. Our last big connection to nature was gone. This generation of kids has by-and-large never lived on a farm, nor known someone who did. Gone were the days when kids spent the summer with Auntie and Uncle or Ma and Pa out on their farm. They now wrinkle up their noses when they hear stories of farm life—“you used to do *what* to cows?!” They are lucky if they briefly visit a farm on a school field trip. Those who do want to “get back to nature” often do so by driving through the countryside or national parks, taking pictures, while the kids watch movies on the flip down screen in the back.

Five Trends of the Child-Nature Gap

It is not just that kids are inside more that separate this generation of kids from past generations. There are other trends. Some of them are caused by lack of direct experience of nature, some of them widen the divide between children and nature, and some are both—a downward-plunging spiral with consequences we are only beginning to understand. Here are five of the trends, according to Richard Louv¹⁰, that people are beginning to notice:

1. This generation does not know where our food comes from. They do not know what country or region it was produced in, nor even how it comes to be. Few children really understand that their hamburger came from a cow that was butchered and their french fries come from a potato dug out of the ground. All they know is that it came in a wrapper in a fast-food bag. We have lost our connection to nature and to the family farm, where we grew our own vegetables and fruits and knew why it was best not to name the animals—Hilda the hen could very quickly become Hilda the chicken salad sandwich. Now, only a very small portion of American families raise animals, and an even smaller portion slaughters those themselves. Growing fruits and vegetables has become more of a hobby than a

necessity since even the smallest of towns has a grocery store full of produce—no work involved.

2. The lines between humans, animals, and machines have been blurred. It has become increasingly difficult to know where one ends and the other begins, or what exactly defines life. According to the International Center for Technology Assessment¹¹, “As of 2000, several hundred animals—patented life forms—had been genetically engineered or altered with human genes. Over twenty-four human genes—including those for human growth and nerves—had been inserted into rats, mice and primates to create creatures called chimera. These new creatures are to be used primarily for medical research, but some scientists seriously discuss the possibility of chimera someday existing outside the lab.” Researchers have also injected plants with viruses and bacteria that make them grow faster, create better products, clean the soil, and even to change colors to signal biological or chemical attack. This new ability to combine living and nonliving, animal and machine, has further removed us from the natural world. It causes us to view nature as a commodity only, something that must be added to and changed to be worthwhile. While older generations may view these changes as a disturbing mutation of life, for newer generations who do not know a world where these things do not exist, It is just a commonplace occurrence—the way life works.

3. Another trend, which perhaps stems from the blending of humans and animals, is a hyper-intellectualized view of animals. New research is coming out suggesting that animals have some of the same thought patterns and abilities as humans. While this research tends to increase our awe and respect for animals, it also increases our disconnect from them. If we anthropomorphize animals, we tend to treat them as we would other

humans. We leave them alone, we do not eat them, we do not touch them, and we sometimes do not even watch them. Extremists do not eat or wear any animal products and protest farms, zoos, and circuses. They believe that animals should be out in nature, and that we should do our best to stay out of nature so that we do not disturb them. And as the youngest generation grows up having close contact with only a family pet—if that—they are more apt to see animals in human terms. What they fail to see, however, is that humans are the only ones who do this. Most animals do not give each other space. They do not refrain from eating each other. Nature exists as a web, with interconnections that all influence each other. Animals are born, they eat each other, they migrate, and they die. Meanwhile, humans are afraid to interact with animals at all, thinking that they will spoil the “natural way” of things.

4. Animals are beginning to creep into suburbia. As suburbs expand and engulf what used to be the surrounding farmland, the edges now come in direct contact with what few wild areas remain. All the animals whose homes have been destroyed to create homes for these (supposedly animal-liberating) humans now have nowhere to go. The result is an overpopulation of deer, coyotes, and mountain lions, and stories in the news about one of the two latter attacking a human or carrying off a baby. These animals have nowhere else to go, and the web of life has been disturbed so much that they do not have food to eat either, so animals are adapting to live on city streets, scrounging for food out of trash cans, or eating family pets who were left in the back yard. The small areas of wild space that are left are nearly trampled down by nature-hungry people flock to it, running the wildlife out and unknowingly destroying some of the native plant species.

Restrictions enforced by law in order to protect wildlife also impose a problem, albeit a necessary one. These laws severely limit the degree to which people can impose on wildlife

and land, sometimes designating whole areas as “human-free” zones. This reduces the already sparse areas in nature that people can freely enjoy. However, these restrictions are in place in order to try to rebuild some of the habitat and population loss as a result of man’s lack of respect for nature.

5. Suburbia is less green now than it was in the past, and less green than most modern urban European cities. New suburbs that are cropping up focus on shopping malls, large houses on small lots (less yard maintenance), upscale stores, and designed “nature.” My hometown of Hendersonville, TN, is a prime example of this. Hendersonville used to be a middle class suburb just north of Nashville—two small peninsulas jutting off from Main Street, with farmland on the outskirts of town. Then it grew and Main Street became more and more run-down. So the city planners decided that Hendersonville needed an upgrade. They bought the farms, cleared the land, and flattened it out. They built a new multi-plex movie theatre, a big Super Wal-Mart, a dozen or so restaurants and several upscale stores, sprinkled in-between with condos, apartments, and office spaces. They said the new development would have a “town square” feel.

As planning for this new development was in the final stages, a town official came to our government class to talk about these “exciting changes.” He had maps and drawings of everything that they were going to do. I sat there and listened as he talked about the farms and fields that I knew—what he called “unutilized space”—and how they were soon to be nice condos with faux-stone sides and a few ornamental trees (the flowering kind, of course). Then came the question-and-answer part of the presentation. I raised my hand. “But where will the fields be? Is there any place that is just grass and trees?” He pointed to a small portion at the bottom left of the screen and explained that the new park will be here, complete

with soccer and baseball fields and an inline-skating area. He then moved on before I could explain that this is not what I meant at all. Years later, as the upgrade nears completion, the only green space that can be seen are small strips of land in-between stores—a nice place for an ornamental tree, lit nicely with spotlights and surrounded by rock walls.

Another problem with many of the new suburban housing developments are their homeowners' association's rules and codes. In the neighborhood my mother currently lives in, which has a lot of open space and is alongside a river with a walking trail around it, trees are not allowed to get above a certain height (which has created a new problem since there is nothing to buffer the wind gusts), you cannot build a free-standing structure (such as a playhouse or one of the aforementioned shacks), you cannot play in the river, you cannot be unsupervised in the common areas, and you cannot have any sort of basketball hoop or skate ramp (as if there was room enough in the yards and driveways to even do that)—in short, kids are not allowed to play outside unless they sit quietly on the sidewalk and do not make too much of a mess. A group of kids seen playing outside alone, without adult supervision, may be seen as a nuisance, or even worse, delinquents, especially after dark. The only time you see kids outside in that neighborhood, as full of natural areas as it is, is when their parents allow them to walk or ride their bikes along the walking trail with them...usually with headphones on so they can all listen to the music they like. They are never seen without their parents, out exploring and climbing on things. They are inside, where they can be entertained by the TV, the computer, and video games.

And this is not just in one neighborhood. This is in neighborhoods across the nation. Kids seen playing in “dangerous” ways like climbing trees or wading in a creek are stopped before they get hurt, and, if in a public area, give grounds for a lawsuit. We have become a

nation afraid of scraped elbows and bruised shins. Parents are so afraid of their kids skinning a knee, that they do not let them do the things that they did as children. The message we are sending our kids with all of this overdevelopment, rules, regulations, covenants, codes, and fear of litigation is that free-range play is not allowed, and that the only “right” way to play outside is to play in an organized sport on a regulation playing field.

So what does all this mean? Yes, we, as a nation, no longer spend time outside. But in our new, fast-paced society, we do not really need nature anymore—right? Wrong. “Based on...studies, we can definitely say that the best predictor of preschool children’s physical activity is simply being outdoors,” says James Sallis, program director of the Active Living Research Program for the Robert Wood Johnson foundation, “and that indoor, sedentary childhood is linked to mental-health problems¹².” It is becoming abundantly clear as new studies are coming out, that the less time children spend outdoors, the more problems they have with their physical and mental health. What is more, is that studies are also showing that exposure to nature has a calming effect on children with Attention-Deficit Hyperactivity Disorder (ADHD)—actually reducing some of the symptoms—and that it also reduces the effects of stress and depression, while improving children’s critical-thinking skills.

In light of these new findings, Richard Louv, one of the primary leaders in the child-to-nature movement, has coined the term “Nature-Deficit Disorder.” He stresses that this is not an actual disorder, but rather a way of expressing the phenomenon of children being so removed from nature that they start having physical and mental health problems. The cure for Nature-Deficit Disorder is, as one could imagine, simply getting outside and interacting with nature in a meaningful way.

CHAPTER 2: THE GROWING CHILDHOOD EPIDEMICS

“Man’s heart, away from nature, becomes hard; [the Lakota] knew that lack of respect for growing, living things soon led to lack of respect for humans, too.”

- Luther Standing Bear (c.1868-1939)

Researchers are just beginning to realize the consequences of the lack of direct experience in nature on mental health, particularly the health of children. Research was not done fifty years ago on the subject because nobody thought to ask—it was taken for granted that kids always played outside. We lack adequate research on the subject now because there is no financial reason to research it. Who would fund the research? Though published research is limited, the results that have been found are astonishing. It turns out that nature has a bigger effect on the human psyche than we realized.

In the over three hundred mental diseases the American Psychiatric Association’s Diagnostic and Statistical Manual, which lists every dysfunctional family and social relation that psychiatrists could think of, there is not one entry devoted to ‘dysfunctional environmental relations’¹³. However, Harvard University scientist and Pulitzer Prize-winning author Edward O. Wilson coined the term “biophilia.” He defines biophilia as “the urge to affiliate with other forms of life.” Wilson argues that humans have an inborn attraction to the natural world, probably a organically-based need vital to our development as individuals¹⁴. This biophilia theory, though somewhat controversial among biologists, is backed up by research spanning a decade that reveals how powerfully and positively people respond to natural areas and landscape views.

Historian and social critic Theodore Roszak takes Wilson’s idea further. In his book *Voice of the Earth*, Roszak argued that “modern psychology has split the inner life from the outer life, and that we have repressed our “ecological unconscious” that provides “our

connection to our evolution on earth¹⁵.” In recent years, the meaning of the term “ecopsychology” [coined by Roszak] has evolved to include nature therapy, which asks not only what we do to the earth, but what the earth does for us—for our health¹⁶.”

Professor Chawla, the international expert on urban children and nature, does not accept Wilsons biophilia hypothesis wholeheartedly, but recognizes “the positive affects of involvement with nature on health, concentration, creative play, and a developing bond with the natural world that can form a foundation for environmental stewardship¹⁷.” The outdoors has been recognized for centuries as a way to calm and restore a person to health, whether it be through gardening, talking walks, or moving to the seashore. Even one of our founding fathers, mental-health pioneer Dr. Benjamin Rush, declared digging in the soil to healing for the mentally ill. In the 1870s, the Quakers’ Friends Hospital in Pennsylvania turned fields, woods, and a greenhouse into therapy for its mentally ill patients. In World War II, psychiatrist Carl Menninger started a horticulture therapy program in the Veterans’ Administration Hospital System. By the 1950s, schools like Michigan State University began offering degrees in horticulture therapy. Now, such degrees are not uncommon¹⁸.

Though the curative effects of nature have been recognized for centuries, only now are we beginning to consider nature’s effect on children. According to data from the Centers for Disease Control (CDC), the percentage of overweight children between ages two and five in the U.S. increased by nearly 36% in the ten years between 1989 to 1999. Twenty percent of American children are clinically obese, four times the percentage recorded in the late 1960s¹⁹. “Two-thirds of American children can’t pass a basic physical: 40 percent of boys and 70 percent of girls ages six to seventeen can’t manage more than one pull-up; and 40 percent show signs of heart and circulation problems, according to a new report by the

President's Council on Physical Fitness and Sports²⁰." Children ages six to eleven in the U.S. watch, on average, thirty hours per week, or over 4 hours a day, watching TV or on the computer. The same study found that the time children spend in front of a screen directly correlates with the rise in childhood obesity rates. But what this also correlates with is a rise in the number of children participating in organized sports. What are kids missing that structured outdoor activities cannot give them?

Perhaps the answer can be found by looking at another documented correlation: a rise in childhood depression. "A 2003 survey, published in the journal *Psychiatric Services*, found the rate at which American children are prescribed antidepressants almost doubled in five years; the steepest increase—66 percent—was among preschool children²¹." This rise is due to a number of things, ranging from increased awareness about depression, the assumption that medication that works well for adults will work well for children, and commercials about medication popping up during TV shows. We have become a nation obsessed with fixing our problems with pills. "For the first time, spending on [psychotropic drugs—antipsychotics, benzodiazepines, and antidepressants]...surpassed spending on antibiotics and asthma medications for children²²,"

Meanwhile, nature therapy is being overlooked as an option. Studies have shown that spending time in nature can reduce some of the everyday stress that can trigger or intensify depression in children. In the book *The Human Relationship with Nature*, Peter Kahn pulls together the findings of over one hundred studies to show that spending time in nature does in fact reduce stress significantly for most people²³. In a study on rural children grades 3 through 5 by Cornell environmental psychologists, it was found that those students who had more natural environment around their homes rated a lower level of stress, less behavioral

problems, lower rates of anxiety and depression, and a higher degree of self-worth than their peers did. This indicates that even in areas where nature is abundant, *more* nature still has an impact.

Nature can even be used as tool during conventional therapy. Director of the Institute for Child and Adolescent Development, Sebastian Santostefano explains: “We have a small hill, a mound—and for one kid at a certain point in therapy it was a grave; for another, it was the belly of a pregnant woman,” he said. “The point is obvious: children interpret and give meaning to a piece of landscape, and the same piece can be interpreted differently. Usually, if you [use] traditional puppets and games, there are limits. A policeman puppet is usually a policeman; a kid rarely makes it something else. But with landscape, It’s much more engaging, and you’re giving the child ways of expressing what’s within²⁴.” He found that spending time in nature is how a child works through their problems. They have the peace and quiet they need to really think about things.

We can tell that children need nature by looking at two things: what happens when they are removed from nature, and what happens when they are immersed in nature. A child’s world lights up when they are in nature. When things are constantly going on around a child, their senses are dulled. Today, we are used to living a life with “narrow yet overwhelming sensory input²⁵.” But when you take all the noise away, It is like hearing a sudden sound downstairs in the middle of the night when the whole house is quiet—your senses are suddenly alive. You take in every sound, your eyes widening to try to see through the velvety darkness. The same is true when you take the distractions away in life. If you just sit still and let your senses take over in nature, you will be amazed at the things you discover.

Multisensory experiences in nature, according to Robin Moore, director of the National Learning Initiative, can help build “the cognitive constructs necessary for sustained intellectual development,” and that “Natural spaces and materials stimulate children’s limitless imaginations and serve as the medium of inventiveness and creativity observable in almost any group of children playing in a natural setting²⁶.” This is backed up by Swedish studies that report that children who play on asphalt playgrounds tend to play games in short bursts and then switch to another game. In contrast, those who play in natural settings may invent games that last for days, months, that have background stories and settings²⁷. Studies done in Sweden, Canada, Australia, and the United States also show that children who play on more natural playgrounds play more creatively than those who play on more constructed playgrounds²⁸. If you thumb through the biographies of some of the most creative and influential people, you will find that most of them were connected with nature at an early age and drew some of their inspiration from the awe that nature inspired in them²⁹.

Moore goes on to explain that:

“Children live through their senses. Sensory experiences link the child’s exterior world with their interior, hidden, affective world. Since the natural environment is the principal source of sensory stimulation, freedom to explore and play with the outdoor environment through the senses in their own space and time is essential for healthy development of an interior life...This type of self-activated, autonomous interaction is what we call free play. Individual children test themselves by interacting with their environment, activating their potential, and reconstructing human culture. The content of the environment is a critical factor in this process. A rich, open environment will continuously present alternative choices for creative engagement. A rigid, bland environment will limit healthy growth and development of the individual or the group³⁰.”

Yet, as the amount of information and technology grows, our lives seem to shrink. It loses dimension. It becomes a blur of facts and knowledge, gadgets and gizmos. We lose the

tangible side of life and are caught up in the abstract. We now have access to more information than we ever have about the outside world and about other continents and cultures, yet we know substantially less about the world around us. We can tell you about what is going on in the Congo, but we are unable to name what the local flora and fauna is or describe how the water of the nearby creek feels. We no longer live in a sensory world.

Technology, though useful in many ways, does have its drawbacks. There are not many studies being done on technology's impact on children, but there are studies on how it impacts adults. According to a controversial study done in 1998 by Carnegie Mellon University, people who spend at least a few hours on the internet a week experience higher levels of depression than those who rarely use the internet³¹.

Technology separates us from one another. We used to communicate primarily face-to-face. Then telephones were invented and people began calling their friends to chat instead of actually seeing them. After the internet became popular, phone use has diminished. Now we communicate primarily through email, instant messages, and text messaging. We seldom speak face-to-face. This physical disconnect is not without repercussions. In studies done with primates, it is noted that infant primates will die without physical contact. In adult primates, a lack of physical touch makes them more aggressive and violent. In the world of people, the lack of touch de-humanizes each other. We do not bond with others as well as previous generations. Psychologists say that it is no wonder there has been such a rise in violence.

Yes, new technologies are nice. I, myself, do not know where I would be without my cell phone or internet access. But we need to remember what we are trading for all this connectivity. We do not interact with each other face-to-face, we rarely use libraries or go to

museums, and we seldom go outside. We have disconnected from the world around us, and, more specifically, from nature.

Meanwhile, as the gap between humans and nature is widening, using “nature” in an aesthetic way is increasing. Upscale subdivisions and stores use natural or faux stones for the outside of buildings and for the entry signs. Malls include little streams surrounded by fake trees. Rainforest Cafés and Aquarium restaurants are popping up all over, which are designed to make the diners feel like they are in a rain forest or ocean rather than a chain restaurant. Soothing sounds of a rippling river or rushing waterfall are used as mood music in stores. My local chain grocery store even plays a sound of a thunderstorm before the sprayer mists the produce. We have inserted nature into our lives, but the nature we have inserted is a charade. We have taken a one-dimensional mock-up of nature and pasted it into places it does not belong. Yet we falsely feel that we are such nature-lovers for including these elements.

TV and computers are often the electronics blamed for keeping people indoors, but we are forgetting one important invention that may play a bigger role: air conditioning. In 1910, only 12 percent of households had air conditioning. By 1970, the number of homes with air conditioning was 72 percent³². People were no longer opening up the windows on nice days and cool nights to let in the fresh air. Windows are kept shut. When I was growing up, opening the window was a bad thing. “You’ll let out all the cool air!” “Do you want to air-condition the whole neighborhood?!” I never knew what it was like to fall asleep to the sound of frogs and nightingales, with the wind gently blowing my curtains.

Air conditioning is not just responsible for keeping a barrier between ourselves and nature. It actually keeps us in. On hot days in the 1960s, as my mom was growing up, everyone flocked to the neighborhood pool or ran through sprinklers in their yards. Even

further back, on the farm where my grandmother grew up, hot days meant going for a quick dip in the pond in between chores. Now, hot days mean staying inside, where there is cool air blowing on you, and a nearby fridge full of cold, refreshing drinks. Who in their right mind would go out in 100° Southern summer weather, when they could be sitting in a recliner in a 70°, temperature controlled environment?

I am not advocating getting rid of your air conditioners to live a life fully outside. I, too, enjoy the respite of a cool room on a hot day. But the effect air conditioners have on our daily lives can not be ignored. Living life to the fullest is about fully immersing yourself in life, using all your senses to experience everything you can. You need to taste, smell, hear, feel, and really see things. When thinking about the things I do indoors, few things come to mind where I am really engaging *all* of my senses. However, the moment I step outside, all of my senses are immediately engaged as I become aware that I am completely surrounded by a living, breathing, exciting world. I feel the cool breeze cutting through the dazzling warmth of the sun, high in the sky. I can hear the birds chirping and the new leaves rustling high in the trees. I can smell the enticing fragrance of a nearby honeysuckle bush, beckoning to me to come taste its sweet nectar. I am at once completely enthralled and completely at peace. All of the cares of the fast-paced, buzzing, beeping, whirling world are gone. I am alone. I am free. I am alive.

ADHD and Nature-Deficit Disorder: Is There a Link?

Since the No Child Left Behind Act went into effect, and more emphasis was put on state-mandated testing, about a dozen states have cut the amount of time spent on recess—some doing away with it altogether. It seems like there is no time for such a trivial thing as playing outside when there is work to be done! These kids need to know everything that is on

these tests by the end of the year, which means that so much time is focused on learning about reading, writing, and arithmetic, that there is no time left in the day for anything outside of the state-mandated curriculum. Many schools have also cut extracurricular programs such as music and physical education. As of 2005, only seven states had requirements about hiring certified physical education instructors. Meanwhile, the nation's children suffer from obesity at an increasingly alarming rate and more children are being diagnosed with stress disorders than every before.

Almost 8 million children in the U.S. today suffer from a mental disorder of some type—Attention-Deficit Hyperactivity Disorder (ADHD) being one of the most common³³. ADHD is usually diagnosed between the ages of eight and ten. The symptoms are restlessness, trouble focusing and paying attention, and trouble listening and following directions. Some children also exhibit violent and antisocial behavior³⁴. All of these combine to make academic success difficult. These children are often labeled as a behavior problem at a young age—a label that is hard to overcome, even as they get older. But these are not children who simply “need a good spanking.” These children truly have an organic disorder which impedes normal functioning. Some studies even link childhood diagnoses of ADHD with adult diagnoses of bipolar disorder³⁵.

Those with severe symptoms are prescribed either methylphenidates such as Ritalin or amphetamines such as Dexedrine. Critics charge that these drugs are often over-prescribed, possibly as much as 10 to 40 percent of the time. They point to the fact that the number of prescriptions of these drugs increased by 600 percent between 1990 and 1995. Spending for these drugs on preschoolers, which is far below the average diagnosed age, jumped up 369 percent between 2000 and 2003. Another factor to take into consideration is

that 90 percent of those prescribed are boys—most of these, I would guess, are simply “being boys” in a nation obsessed with tidiness and order³⁶. Another reason for this increase in diagnoses is recognition. ADHD was not recognized as a disorder until fairly recently, and the drugs used to alleviate the symptoms are now being advertised on TV.

TV may be a culprit in itself. According to a study conducted in 2004 by the Children’s Hospital and Regional Medical Center in Seattle, each hour of television that preschoolers watch per day increases their chances of developing concentration and hyperactivity problems by age seven by 10 percent³⁷. Television dictates thought, rather than thoughts being self-generated as they are during quiet moments. And the going-going-going tempo of TV and video games leaves kids bored and unengaged with the normal pace of life. They are always searching for more exciting stimuli. They, essentially, are becoming addicted to the highs of these stimuli, which may explain the rise in attention-deficit disorders, for kids who cannot pay attention when the stimuli is not there, and in depression, for those who are dissatisfied with their non-electrifyingly stimulating life. TV and video games provide so much stimulation on their own, that children do not learn how to generate their own stimuli.

Back in the days of family farms, these children would have directed their energy into doing chores, climbing trees, racing each other down the lane, and playing ball. Now, we ask children to sit still for long periods of time—something that most children may be incapable of doing.

The bright side is that nature can help. New studies suggest that nature can be used as therapy for children with ADHD³⁸. In mild cases of the disorder, nature therapy may be able to replace medications altogether. Even without these studies, anecdotal notes paint a

powerful picture. Parents and educators have been noticing for years the calming effects of nature. Children who could not listen to an entire lesson to save their lives can watch a butterfly flying from flower to flower to drink nectar for hours.

“The Restorative Environment”

In 1890, philosopher and psychologist William James outlined two types of attention: directed attention and fascination (involuntary attention). In the 1970s, Stephen and Rachel Kaplan, Environmental Psychologists at the University of Michigan (and husband and wife), inspired by James’s research, decided to do a 9-year study for the U.S. Forest Service. They worked in conjunction with a wilderness program, which took people into the wilds for up to two weeks. After the treks, the Kaplans would ask participants how they felt. The participants by and large reported a feeling of peace and restoration and that they could think more clearly after the program than before. The Kaplans began calling this effect the “restorative environment³⁹.”

According to the Kaplans, too much of the directed attention described in James’s research leads to a condition they call “directed-attention fatigue.” This condition is characterized by impulsive behavior, agitation, irritation, and inability to concentrate. It occurs when neural inhibitory mechanisms become fatigued from blocking competing stimuli (i.e. you are tired from focusing so much effort on concentrating). Stephen Kaplan explains, “If you can find an environment where the attention is automatic, you allow directed attention to rest. And that means an environment that is strong on fascination⁴⁰.” Nature is fascinating in itself, and therefore, according to the Kaplans, is restorative to those with directed-attention fatigue.

What is interesting to note is that, though this research was done long before ADHD became such a popular diagnosis, the symptoms that the Kaplans attribute to directed-attention fatigue are very similar to the symptoms of ADHD. And ADHD is in itself an inability to focus one's attention to something on command, which is essentially what directed-attention is. So, this research may be one of the first studies done on the nature's effect on concentration and attention-deficit disorders.

The studies by the Kaplans are corroborated by a 2001 study by Terry A. Hartig, an associate professor of applied psychology at the Institute for Housing and Urban Research at Uppsala University in Gävle, Sweden. In this study, the participants had to perform a sequence of tasks designed to drain their directed-attention abilities for forty minutes. At the end of that time, the participants were either asked to take a walk in a nearby nature preserve, walk in an urban area, or sit and read a magazine indoors for forty minutes. When their forty minutes were up, the participants came back and completed a standard proofreading task. Those who had walked in the nature preserve performed significantly better and reported feeling happier and less angry than those who had walked in an urban area or stayed indoors⁴¹. This shows, once again, that it is not just physical activity that is beneficial. It is nature.

Dozens of studies support this evidence. Some of the most significant studies were done by researchers at the Human-Environment Research Laboratory (HERL) at the University of Illinois. A recent study, for instance, found that natural spaces encourage creative play and relieve the symptoms of attention-deficit disorder. Conversely, indoor activities like watching TV and even outdoor activities in paved areas increased the symptoms of attention-deficit disorder. This study also found that, the greener the area, the

more benefits it had on the child⁴². Also, “studies over the past decade have shown that participants in adventure-therapy programs [which use nature to provide therapy for those with behavior problems] made gains in self-esteem, leadership, academics, personality, and interpersonal relations⁴³.”

Another interesting finding of the studies by HERL is related to gender. It was found that the impact of the environment is greater on females. The more time a girl spends interacting or even just viewing nature, the better her concentration is, the less impulsive she is, and the longer she can delay personal gratification. This translates to better performance in school, better handling of peer pressure, and an decrease in the likelihood that she will engage in risky or unhealthy behaviors.

Current medications for ADHD have side effects like sleep disruption, depression, and growth suppression. Behavioral therapies teach children to self-monitor their behavior, with mixed results. Researchers at HERL believe that their research, along with others, may propose a third alternative: nature therapy, either used in conjunction with or apart from the other two. This alternative has advantages that the other two do not: everyone can get it, It is inexpensive, It is free of side effects, and It is nonstigmatizing. All that they have to do is play outside.

If nature reduces the symptoms of ADHD, some researchers hypothesize that the converse might be true: maybe ADHD is caused by lack of nature. For the children who benefit best from behavioral and nature therapies, the disorder may be less organic and more external. If viewed in this way, ADHD may be, for some children, simply a form of the “directed-attention fatigue” noted by the Kaplans in their research from the 1970s. These children may be unconsciously crying out for more nature, their bodies and minds rebelling

against them until they turn to the natural order of things. It is not attention-deficit disorder, It is nature-deficit disorder.

If all of this research is true, than children's current access to nature needs to be improved.

CHAPTER 3: HOW WE GOT TO WHERE WE ARE

“[What is the] extinction of a Condor to a child that has ever seen a Wren?”

-Naturalist Robert Michael Pyle

Now that we have realized the importance of nature and our dwindling amount of experience in it, It is time we did something about it. But first we have to understand how we got to where we are. Only then can we overcome the obstacles in our way and rise on the other side.

One of the reasons children do not play outside anymore is the fear of litigation. Watch children play and you will find that children are most drawn to the rough areas of a park, the outer edges with wild vegetation, big rocks, and ravines. These are areas that kids could get hurt in, so when developers build new parks, they tend to grade the land, getting rid of rough areas, in order to diminish liability. The same thing is happening when developing playgrounds, schools, and subdivisions. No one wants to be sued for any accidents, so they reduce the chance of an accident to the point where creativity is also diminished.

Akin to the fear of litigation is the fear of “snatchers.” You would be hard-pressed to find a parent today who is not afraid of their child being kidnapped or killed by a stray crazy person. It is not just urban parents who are afraid of who is outside their door—It is also rural parents. A family member of mine lives in a semi-rural area outside of Bowling Green, KY. Her house backs up to the woods and she knows her neighbors well. Her two kids, whom she home-schools, play outside all the time and, as I found out, know more about nature than the average child (a nature walk with them is documented at the end of this piece as a case study). The family has a beautiful house complete with something that would be a dream for me: a screened-in porch with a daybed in it. I mentioned that I would have loved to sleep out

here as a kid and she replied that she would never let her kids sleep out here, because “you never know who might be lurking out there in the dark.”

A study published in 1991 that spanned three generations of 9-year-old kids found that the area around the home where these kids were allowed to venture had shrunk by 1990 to a ninth of what it had been in 1970. In a study published in 2003, 56 percent of today’s parents say they were allowed to walk or ride their bike to school when they were ten years old. Only 36 percent of those same parents would allow their children to do the same. Another study found that 41 percent of today’s children between the ages of eight and eleven worry about safety in their areas⁴⁴.

When researcher Robin Moore studied the problem in 1980, he found traffic to be the biggest factor in keeping children confined to a small area around their home⁴⁵. Since then, “stranger danger” has grown so much, that perhaps it surpasses traffic as the reason children are not allowed to roam free. But according to the National Incidents Study of Missing Children, children are most often abducted by a family member or a family friend, not a stranger⁴⁶. This means that the stranger-snatcher myth is just that—a myth. It is a rare occasion that a stranger simply comes and steals a child off the playground.

People are beginning to see normal social interactions as dangerous and forbidding their children to talk to anyone they do not know. The result is that the child does not learn to become self-confident, to judge character, or to interact with others. It also is a major contributing factor to communities not being as tightly-knit as they once were. This lack of community structure is a boon to sociopaths. When my mom was little, my grandparents could count on neighbors to report any suspicious activity. Everybody was watching out for everybody else. Even the neighborhood I grew up in had a “neighborhood watch” sign. Now,

it is very common to not know your neighbors at all. If your neighbors do not know you and your family, they would be less likely to report suspicious activity or to notice when something was not right.

In order to ease fear, parents are buying global-positioning bracelets for their children. At first glance, these seem like a great idea. A thin, lightweight, waterproof bracelet that your child wears at all times, which constantly tracks their movements and sets off an alarm to emergency operators if cut or removed. This basically insures that if your child is ever lost or abducted, you will be able to find him or her relatively quickly. However, one has to think about the impact these bracelets have on a child. That bracelet would give a child a false sense of security—that no matter what, he or she will always be safely returned to his or her parents. The children would be less likely to learn to be self-confident and self-sufficient, to know how to be safe on their own. They would not know how to exist in a world outside of their GPS bracelet.

We obsess so much about the safety of our children that we do not allow them to be kids anymore. Parents are not allowing their children to have even the same experiences they had when they were young. We have become so fearful of the unknown that nature presents, that many people's views of nature have gone back to the ancient view of the woods being a dark and dangerous place where only bad things could happen. "Children [and their parents] are so disconnected from nature that they either idealize it or associate it with fear—two sides of the same coin, since we tend to fear or romanticize what we do not know⁴⁷."

The truth is, there is not really all that much danger outside. Animals rarely attack humans; disease carrying bugs like mosquitoes can fly indoors, too; and one of the most poisonous animals, the brown recluse spider, prefer living indoors in dirty clothes heaps

rather than outside. What is more is that the Environmental Protection Agency has now reported that indoor air pollution may be two to ten times worse than outdoor air pollution, and is a bigger threat to health⁴⁸. It might actually be safer to be outside than in.

Time and Stress

Though the fear of litigation and strangers are two of the main reasons that children are not allowed outdoors anymore, they are only part of the problem. Even if you took those fears away, you would still find that children do not play outside. It is not just the lure of what is inside, either. Take those away, and you will find that children cannot play outside even if they want to. They simply do not have the time.

Children spend more time than ever on “being the best.” Parents used to let kids be kids, holding off worries until they got older. Now, parents are conditioning their children to be the smartest, the fastest, and the most popular. They are preparing their children for the fast-paced, dog-eat-dog adult world by instilling the competitive spirit in them while they are young. But what is the price?

A fourth-grade class at Kenwood Elementary School in Miami, Florida, was asked recently how many of them worried getting into good colleges or getting good jobs. More than half of the students raised their hands. One girl even went on to explain that you need to keep your mind on your work, not waste time daydreaming, because daydreaming will not get you into a good college⁴⁹. A study done at the Institute for Social Research at the University of Michigan showed that the amount of time children under the ages of twelve spent on studying jumped up 20 percent between the years of 1981 to 1997⁵⁰. Kids are feeling more pressure than ever before. They are taking advanced classes, competing in sports, learning different languages and instruments, studying for hours to get the best

grade—all while trying to maintain a cool, calm, and collected image. Inside, they are cracking under the pressure, deathly afraid of failing and letting their parents and friends down.

When I look back on my childhood, It is not the organized things that I remember most vividly; It is the moments that were spontaneous, the moments that I was alone in nature. It was the unstructured time that shaped me most as an individual. Today, we try to value and structure our time so much, categorizing anything that does not have some kind of profit as “wasting time.” Weekends are no longer used for recreation, but to get all the tasks done that you did not have time for during the work week. We do not view time spent in nature, simply unwinding and de-stressing, as important and valuable to our health. We need to move nature to the “health” category instead of leaving it in the “leisure” category. Multi-tasking by labeling organized sports as “outdoor time” is not enough. The rise in obesity and depression rates in children occurred simultaneously with a rise in participation in organized sports. Children—and adults—need time to be free out in nature.

The problem even extends to schools. As we focus more and more on testing, which keeps reading, writing, and math at the center, we one-dimensionalize education. We no longer give children the well-rounded education they one received. Multimedia usage goes hand-in-hand with this. We try to give children as much time using computers as possible, but a study published in 2001 by the nonprofit organization Alliance for Childhood, which looked at 30 years of computer usage in schools, determined that computer usage by students increases testing scores, but not more than simple one-on-one tutoring would⁵¹. Some experts even advocate putting a moratorium on computer usage until children are out of elementary school, because it has more potentially harmful side-effects than it does benefits. But the

problem is not technology, It is overdependence on technology; It is not know how to function without it.

Children in today's schools watch videos about the rain forest and are taught about the importance of recycling and water conservation—something that would not even been mentioned a generation or two ago. In theory, this will turn them into more environmentally-responsible citizens. However, this may not be the case. When we show children only negative views of nature, we are unconsciously putting them only in defense mode. Nature is something that they need to “do something about,” and these problems can even overwhelm some children to the degree that they end up giving up, convinced that no one will ever be able to solve all of the environmental problems facing the world today.

This is negative reinforcement—the same as punishing a child for doing wrong. Future educators are taught that negative reinforcement, while necessary, should not be your primary form of behavior management. Positive reinforcement is much more effective. If instead of constantly punishing a child who misbehaves, we are taught to praise them when they do right. The theory is that the child becomes hardened to the punishment, but seeks praise and approval so much that he or she will strive for that once you give them a taste.

Why do not we apply this same principle in nature education? Instead of teaching children only about what is wrong with the environment and how to help, why are we not teaching children to love the environment in and of itself? If children learn to view nature with awe and wonder, they will instinctively protect it without the doom-and-gloom side effects. We are teaching children to protect the environment in a fearful and disconnected way, but we need to be teaching them to protect the environment in a loving and thoroughly

connected way. They would not destroy something they view as part of themselves—something that is essential to life.

Educators already know that hands-on experience is much more conducive to lasting learning than second-person, textbook based experiences. But when it comes to learning about nature, for some reason educators shy away from taking their kids outside to get their hands dirty. It is much more easy to manage and less messy to watch a video about the life cycle of plants and animals or the different types of soil than it is to actually go out and experience it.

Yes, it will be hard to meet all curriculum requirements and instill a love of nature at the same time. But it can be done. The secret is to take little steps everyday, in the most simple of ways. Nature education can be inserted seamlessly into a normal school day with just a little bit of planning.

CHAPTER 4: A BRIGHT, GREEN FUTURE

“It is better to know one mountain than to climb many.”

-Native American saying

A professor of Environmental Studies from the University of Iowa conducted a study in 1978 of environmentalists across the world. He wanted to know what experiences made them care about the environment so much. Across the board, the overwhelming response was that fond memories of unstructured play and direct experiences in natural, nearly untouched, green areas as a child is what instilled a love of nature in them that carried through to adulthood⁵².

These findings are echoed in studies done by environmental psychologist Louise Chawla. She found that it was a combination of spending a lot of time outdoors in wild areas as kids and having an adult teaching you a love of nature that created most activists. It was that way with me. As a child, I loved playing outside and it was just a given to me that nature was a place of refuge. It did not occur to me to do anything about it until I had a course in Environmental Literature in college. I took the course because I liked the professor’s teaching style, a friend of mine was taking it, and it sounded like it might be interesting. Little did I know that that class would shape how I looked at my job as an educator and what I would do in the future. It was in that class that I learned that not everyone views nature the way I do, but that there are some who do. I, for the first time, began thinking of myself as an environmentalist. Suddenly it occurred to me: where will the next generation of environmentalists come from if this generation of kids is not allowed to play in nature?

Educational Reform

Howard Gardner developed a multiple intelligence theory in 1983 which has become extremely influential in the teaching profession. His theory is that there are seven different types of intelligences that a person may have. These intelligences are: linguistic, logical-mathematical, spatial, bodily-kinesthetic, musical, interpersonal, and intrapersonal. A person may have just one of the intelligences, but it is more likely that they are strong in a few different ones. This emphasizes the fact that people can be smart in different ways. Beethoven may not have been a great mathematician, but few would argue that he was not a brilliant composer. On the flip-side, there is Mark Twain, a highly gifted writer and orator who never once composed a symphony, yet was still a brilliant man.

These intelligences help educators pinpoint the way that their students are smart so that they can provide ways for each student to learn to their highest potential. For instance, if someone is gifted in the bodily-kinesthetic field, you may have him or her create a dance, a sport, or a game that would teach a certain skill or concept. For the same concept, you might ask a musically gifted student to write a song, or an intrapersonally intelligent student to reflect on how this concept has impacted them.

Recently, Gardner added an eighth intelligence to his multiple intelligences list: naturalist intelligence. According to Professor Leslie Owen Wilson of the School of Education at the University of Wisconsin, which offers one of the best graduate programs in environmental education, those children with the eighth, naturalist, intelligence share common traits. These children:

1. Display advanced sensory skills.
2. Use these sharp sensory skills to notice and categorize things in nature.
3. Enjoy being outside.
4. Notice patterns in their surroundings effortlessly.

5. Are interested in plants and animals.
6. Are aware of things in the environment that others are not aware of.
7. Keep some sort of record of nature, be it a scrapbook, journal, photographs, drawings, or collections of natural objects.
8. Are interested in various forms of media about nature.
9. Are concerned about the environment and about helping to protect the natural world.
10. Can learn about the characteristics of objects found in the natural world with little trouble⁵³.

The problem with creating such a category of intelligence is the obvious stereotypes that go along with it. It is easy to attach this eighth intelligence label to the girl who wants to be a veterinarian and the boy who spends his weekends fishing and building forts, but these are not the only kids who have this intelligence. You can foster and strengthen this intelligence in all students by simple tweaks in curriculum. You do not need to work harder, just work smarter.

A 2003 review by the Organization of Economic Cooperation and Development placed Finland's students as the top-ranking students in a range of 31 countries in literacy and within the top five in math. The United States scored in the mid-range. How can this be with the U.S. placing so much focus on testing, making sure even kindergartners know how to test well? Finland must be even more rigorous to get such great scores. Not true. It is not unusual to see such things in Finnish schools as having a 15-minute outdoor recess time after every 45-minute lesson so kids can "burn off steam." Instead of focusing so much on testing and external rewards and punishments if the child does or does not do well, Finnish schools focus on instilling in the child a love of learning and respect for the environment. And their kids are flourishing. We can do it, too.

Some schools are already being built in such a way to facilitate environmental education. These green schools, dubbed ecoschools, have nature-learning labs, walking trails,

outdoor classrooms, wildlife viewing areas, ponds or streams, and are filled with teachers who have a love of nature and are not afraid of giving their students plenty of hands-on experiences. Some of them are even built with eco-friendly, locally obtained materials. If it were up to me, all new schools being built across the nation would be required by law to be green schools. Such laws are already in place in the industrial sector of some countries—why not in education?

Even in schools that are already built, we can change a lot. The first thing is the way we look at our curriculum. We have become obsessed with having it all. We want our children to know all about every state and country, at the detriment of knowing everything there is to know about their area. Place-based education seeks to change that. Place-based education goes by many names. You may have heard it called community-oriented schooling, bioregional education, experiential education, or environment-based education. Whatever name it goes by, the premise is the same: to teach students in away that immerses them in their own community. According to the Center for Place-Based Education website, “[Place-based education’s] projects and programs encourage partnerships between students, teachers, and community members that strengthen and support student achievement, community vitality and a healthy environment⁵⁴.” This is something that every school could easily enact, but is it worth it?

In a ten-year study of 150 schools in sixteen different states, published in 2002, researchers found that schools with place-based programs have much better standardized-test scores across the board, better grade-point averages, and the students show better problem-solving, critical thinking, and decision-making skills than in the schools that do not use place-based programs⁵⁵. For example, at a middle school in Portland, aptly named

Environmental Middle School, 96 percent of students meet or exceed state standards in math, compared to a 65 percent average at nearby middle schools that do not use place-based education. A Texas elementary school changed to an environment-based curriculum and saw passing rates rise 13 percent, compared to a statewide average of 1 percent in the same period of time. The same school also saw a decrease in behavior problems. They once had 560 behavioral incidents reported to the principal's office in one school year. Just two years later, after changing to the new, place-based system, that number dwindled to fifty⁵⁶. The students do not have time to misbehave because they are so engaged in *learning*.

There is exciting new legislation that may make some of this possible. Since this Act is the brainchild of Richard Louv and his colleagues, I feel that his words express the excitement best:

“On September 18...the U.S. House of Representatives...voted to approve the No Child Left Inside Act of 2008. This was an extraordinary moment – symbolizing just how far the children and nature movement has come in just a few short years...As passage of the No Child Left Behind Act illustrates, new progress is taking place nationally, and also among state legislatures, schools and businesses, civic organizations and government agencies. In March 2007, the New Mexico state legislature approved the Outdoor Classrooms Initiative, an effort to increase outdoor education in the state. Then on April 21, John Muir's birthday, Washington Governor Christine Gregoire signed into law the Leave No Child Inside initiative, legislation that allocates \$1.5 million a year to outdoor programs working with underserved children. More legislation is on the way⁵⁷.”

This is a huge, exciting step in the right direction. However, teachers do not need to wait to begin incorporating nature education into the curriculum. They can start now by incorporating short nature-based activities into their lessons.

A Change We Can All Make

Nature-based education does not have to be a district-wide or even school-wide change. It can be small changes that a teacher makes in his or her own classroom. There are many ways that you can incorporate nature into the elementary school classroom. Here are a few ideas:

1. Take a daily nature walk. It does not have to be a long walk; it can just be one loop around the school after lunch.
2. Either during your nature walk or during another outdoor time, encourage children to observe everything around them. When they get back to the classroom, they can write about that they saw in a journal. They could even collect scraps of leaves and things to include in the journal. This could be a writing exercise.
3. Another writing exercise could be done whole-class. If you saw a butterfly on your walk, you could write this journal prompt on the board: “Where was that butterfly going to?” If you saw a caterpillar, you might write the prompt: “What did that caterpillar think when you picked him up?” Encourage students to be creative and to not just put “scientific” answers. They can use their imaginations!
4. Go on a plant walk or a tree walk. Use a graphic organizer to record your observations of the plants or trees. When you return to the classroom, you can look through books about plants and trees and use the characteristics you recorded to try to figure out what plant or tree it was that you saw. This type of graphic organizer is also useful when describing the characteristics of different bugs, to tell the difference between frogs and toads, etc.

5. Capture tadpoles from a local pond or order some online. Watch the tadpoles turn into frogs in a classroom aquarium. The students could write about it in their journals. This is a long-term project that would be good for students' portfolios.
6. Take your math class outside! Use materials found in nature to talk about addition, subtraction, multiplication and division. You can also talk about spatial reasoning, geometry, measurement, and number sense outside.
7. Have your class write letters/make posters to raise awareness about a local area that needs saving. This could also be a long-term project where students organize fundraisers to raise money for the space they are trying to save. This would relate to the social studies topics of civic awareness and economy.
8. During lessons on maps, you can take your class outside and have them make a map of the school grounds.
9. Teach your students about different kinds of clouds and have them become cloud-watchers. Every day, they can look at the outside and record both the current weather and the cloud formations. They can then predict what the next weather might be.
10. Use day-to-day occurrences in nature to teach. Did your students find a worm on the playground? Use that as an opportunity to talk about worms. Is there a rotting log on your grounds? You can talk about decomposition, scavengers, fungi, and what the inside of a tree looks like. Was there a big storm that day? Use that as an opportunity to talk about what creates storms. Every day can be a learning experience in nature if you look around!

These are just a few of the many ideas you can use every day to incorporate nature into the regular classroom. Teachers need not be worried about giving their students the

wrong information when they talk about nature, either. As Rachel Carson put it, “It is not half so important to know as to feel when introducing a young child to the natural world.” As long as you can teach with enthusiasm and encourage your students to ask questions and do research to find the answer, you will create an environment that facilitates learning rather than makes it hard for you as a teacher.

If you want to get educated about nature, there are several workshops you can participate in. Some of these workshops include Project Wet⁵⁸, Project Wild⁵⁹, and Project Learning Tree⁶⁰. There are many more. All of these workshops can be taken on the weekends or during summer and you receive a large activities guide at the end. These activities guides are full of ideas of ways to incorporate nature into your lessons. They even break down the activities by subject, by time it takes, and by age group.

Another way to easily incorporate nature into the classroom is by building a relationship with nature centers. Many schools just go to a nature center for a field trip, but many centers will cooperate with schools to provide nature education throughout the school year. Kentucky’s Mammoth Cave National Park has an International Center for Science and Learning. This center will work with your school to develop a field trip that fits into your curriculum. They will even provide curriculum materials to use before and after your trip, and you can schedule a park guide to come to your school on a semi-regular basis (like Wednesdays) to talk about a wide range of environmental topics. I found out by talking to other parks that they do similar things. Even small parks are willing to work with your class. A representative at Old Mulkey State Park in Tompkinsville, KY, told me that teachers use their park as an outdoor classroom during nice weather, and that if you plan ahead, the park employees will help you design a lesson in the park that goes along with whatever you are

teaching. These resources are invaluable and make a teachers' job much easier. You can even manage unstructured play time in the classroom. You just need to find a balance between adult supervision and the child's freedom—too much freedom, and you lose control of the class; too much direction, and the child loses their chance to be creative.

Overall, the newest research is proving that nature is one of the basic elements of human development. Without it, children display a multitude of problems, both physical and emotional. But when a child spends a lot of time in nature, they tend to flourish, developing heightened curiosity, self-control, and critical thinking skills and more self-confidence. These are the children that grow into happy, well-adjusted adults—the type of adults that this world needs. So we, as parents and teachers, need to work to incorporate nature as much as possible into the lives of the children we influence. We can think of it as a way to secure our future. And with nature, our future looks bright.

CHAPTER 5: THE NATURE WALK: A CASE STUDY

I was curious about how the child-nature gap worked in real life, so I asked some friends of mine if they would let me borrow their kids for a case study. This family lives in a middle-class neighborhood in a semi-rural area outside of Bowling Green, KY. Though the mother has a teaching degree, she decided to be a stay-at-home mom when her first child was born. When her children reached school age, she decided to home-school them rather than enroll them in the local school. She had many reasons for doing this ranging from wanting to keep her children near her to a general dissatisfaction with the post-NCLB public school system.

Because they are home-schooled and spend a lot of time outdoors in the woods behind their house, they know more about nature than most children do these days. I decided to let them take me on a nature-walk to teach me everything they know. I then sat down with them and their mother to talk about their experiences in nature.

As I pulled into the driveway, I saw Granite and Zena playing in the front yard. They were waiting for me. Zena was up in a tree, her long brown hair blowing in the wind. Granite was just coming around the side of the house, wearing his camo pants. They were ready for me. I parked the jeep and got out. “Well hello, missy moo, what’re you up to?” I asked Zena, who had run up to greet me. “Waiting for you” was her classic-Zena, stoic reply. Just then their mom, Cindi, came outside and said hello. She told me the kids had been waiting on the front lawn for half an hour and were eager to begin our walk. She handed me their “nature bag,” which had bug spray, suntan lotion, hats, sunglasses, and the bird book they had picked up from the bookmobile. After we had sprayed ourselves enough to smell like a bunch of citronella candles, we set out.

Granite and Zena ran as fast as they could to the opening of the trail at the back of their yard, behind the swing set. “Mush!” said Zena. They had been learning about the Iditarod races and Zena had found a new way to hurry people along. I finally caught up with them, making sure I did not trip over the various branches and rocks in the path. Before the kids had a chance to run off again, I explained to them that they were to be my tour guide for this journey. I had never been back here, so I wanted to see all their favorite parts. I wanted to know everything they knew about these woods, so they would have to stop and explain things to me along the way. Zena, who is very quick-witted for her age, turned to the nearest tree and said “Well, this is a tree.” Granite and I laughed and I asked her if she knew what kind of tree it was. She was not so quick to reply this time. I could not help them though—I had no idea what kind of tree it was, either.

We were in a bit of a clearing. Granddaddy had bush-hogged these trails and left a wide area here at the bottom of the hill. The trail ran straight ahead of me, but that was not the direction the kids were going. They were headed through the trees. The trampled plants and bent-back branches told me that the kids had gone down this self-created trail before. Up ahead, I could see something not of nature. Nestled among a grove of trees was a camouflage doghouse, used in hunting. The kids said they used it as their clubhouse sometimes. It did not look like it had been used in awhile—it had been knocked down by a storm.

Out of the corner of my eye, I saw something bright green poking out from behind the underbrush. I went over to investigate and found a discarded inchworm toy sticking out of the dirt. The kids told me that they found it one day when they were playing. Whoever lived here before them had left “treasures” all over the place. The kids seemed a bit dismayed at how some people think it is okay to leave their trash all over nature.

We left the toy and continued through the trees. I could smell the honeysuckle on the warm breeze. Remembering one of my favorite childhood memories, I asked “Do y’all ever eat the honeysuckle?” They both said yes, saying that they loved it because it tasted so sweet. Eventually, we got back to the trail. After walking along a bit, we got to a place where there was a bunch of maple trees. This was a kind of tree I could easily identify, so I quizzed the kids again. Zena got it right away. Granite was very pleased to find out that they had so many maple trees. “Now we can have as much syrup as we want for our pancakes!” The kids knew all about the process of tapping a maple tree, collecting the sap, and boiling it to make maple syrup. I was sorry to inform them that these trees were too small to tap. This got them on the lookout for older maples.

As we reached the bottom of the hill, we came upon a gate opening into a large field. The grass was over knee-high for me, waist-high for the kids. There was an old abandoned car in the middle, white and rusty. Of course, this was the way the kids wanted to go. We traipsed through the tall grass before we got to another trail. The kids told me about the deer they sometimes see back here. It was nearing dusk, prime time for deer. “I hope we see some,” Granite told me.

I looked up just in time to see a hawk circling overhead. I pointed it out to Granite and Zena just as it flew back into the trees across the field. Granite pulled out the bird book to get a closer look. Zena was trying to tell him where to turn, but Granite, being older, thought he knew best. The two of them eventually gave up and handed the book to me. After glancing at the index, I turned to the part about hawk-like birds, and we looked at the various types. Zena said that he was probably looking for a mouse to eat. Granite said he was more likely looking for a squirrel. “Either way,” I said, “hawks need sharp vision in order to see

such a small animal here among the leaves.” This got us into a discussion of the term “Hawkeye” and a list of all the characters they knew by that name. Granite said Hawkeye was a character in *Last of the Mohicans*. I was surprised he knew of that book/movie. Zena told me that it was also a character in her *American Girl* books, which are about girls in different time periods of American history. There are many stories of frontier life, which may be where Zena was getting some of her nature-smarts.

Granite and Zena ran up the trail, pushing each other good-naturedly and arguing about character names. I warned them to watch out where they were going, but I was too late. They both tripped and tumbled a few feet down the hill. They got up, laughing, and dusted themselves off—no broken bones or sprained ankles today. This was when Zena noticed that she had a “friend” on her. It was a tick. It had not made it to her skin yet, so I just flicked it off. Then she noticed one on me—then another, and another. There ended up being three ticks on me, two on Zena, and one on Granite. Only Granite’s had reached the skin. Thankfully, the kids were used to ticks and did not seem to be bothered much by them. They eagerly told me about how Grandma flushes the ticks down the toilet, Mom burns them with a lighter, and Dad cuts them in half with his knife. They did not like ticks any more than I did, but they knew that ticks were a part of life if you wanted to play in the woods.

After we had thoroughly investigated one another, we went on our way. Up ahead, the trail forked. Granite thought we should go to the left, but Zena thought we should go to the right. I decided to indulge Granite this time, so we took the left. About 200 yards ahead, we came upon some bushes. Most of them looked rather ugly, a bunch of sticks and dead leaves, but the kids seemed to be excited to show them to me. These were blackberry bushes. The kids told me that, in late summer, these bushes would be full of thousands of delicious

blackberries that they would come pick. “Does your mom make lots of blackberry pies?” I asked. “Not really,” said Zena, “I like to eat them right when I pick them.” “Yeah, sometimes we come back with only ten blackberries!” added Granite.

It occurred to me that most children probably do not know where blackberries come from (if they even know what a real blackberry looks like in this pop-tart and gummi-fruit world). Most kids probably would not even wonder where any fruit comes from because they would think they already knew—fruits come from Kroger. Granite and Zena not only know where blackberries come from, but also have no qualms about eating them straight off the bush. I think they might even prefer them that way.

After the blackberry bushes, we rounded the bend and we were back at the entrance to the field. “Where do y’all wanna go next?” I inquired. “You wanna see the coyote den?” Granite asked excitedly. Of course I wanted to see a coyote den. I had never seen one and thought it would be really cool. Granite explained that it was on their neighbors’ land, but that they did not mind if we came over. He said he was not sure if it was a coyote den or not, but that he thought that is what it was. I thought it was interesting that a seven year old would know anything about coyote dens.

There was no trail here. The kids took off in a hurry, crawling under branches and pushing vines out of the way. They left me behind, wondering how in the world I was going to get through there. I ended up passing the nature bag to Zena and belly-crawling several feet through thorns. Once I got through, the kids took off again, jumping over logs and keeping their arms up to shield their faces. I plodded along behind, being more careful. All of a sudden, we were there. At the base of a tree, there was a hollowed-out area. The roots were exposed and you could see a few tunnels going under the tree. It sure looked like a coyote

den to me, although it did not look like anything had lived there in a while. The kids explained to me that it was an old den—maybe even twenty years old. I am not really sure where they got that figure. Granite and Zena told me that sometimes you could hear the coyotes howling at night, but they did not know where they were living now.

After looking at the coyote den for a while, Zena remembered the baby birds. They were in a tree by the house, so we needed to get out of the woods. We carefully picked our way around the den, trying not to disturb it, and, thankfully, the kids picked a different way out of the woods than we had taken in. After taking a few steps, a squirrel jumped from a nearby tree limb. Granite was fascinated. We all stopped for a while so Granite could watch the squirrel jump through the trees. After it was out of sight, we continued on our way.

We came into a clearing and I realized that we were in somebody's backyard. The Pares lived two houses down, at the end of the cul-de-sac. With the tree in sight and the excitement of baby birds, the kids took off running again, with me following closely behind. "Guess which tree they are in, Jaime," quizzed Zena. The chirps gave it away rather quickly; it sounded like somebody was hungry. We pulled back the branches of the pine tree and there they were—three little robins snuggled tightly into their nest. I lifted Zena up so she could get a better look. They told me that some of the eggs had not hatched yet the other day, and that it looked like some of the birds had already left the nest. The three that were there were chirping their little hearts out with their mouths wide open, ready for their regurgitated worms. We were not mama birds, so we left them alone.

I assumed at this point that our trip was over, since we were back at the house. I was wrong. "You wanna see a dead deer?" asked Granite, being a typical boy. "Come on! It is in the sinkhole!" This time I told them they had to walk more slowly so we could look at things

along the way. Up ahead I saw an opportunity for another tree quiz. It was a birch. The kids did not know its name, but they were familiar with it. Zena said that she sometimes used its bark for paper. I told her that people used to do that way back in the olden times, but this was something she apparently already knew from her *American Girl* books. Granite informed me that Sequoia also wrote his Cherokee alphabet on birch bark, which was something I did not know. He then quizzed *me*—this time about Sequoia facts. He is a bit of a history buff, like me, and he was able to stump me on a few things.

We were in the woods now, heading down a trail. Granite cut his toe a little on a stick and Zena admonished him for wearing open-toed shoes on a hike. I was wearing my Chaco sandals, and actually ended up scratching my toes, too. Zena shot me an “I-told-you-so” look. We pushed through the saplings and there it was—a sinkhole with a pile of bones. This deer had been here for a while. Granite climbed in and showed me the skull. “That is pretty cool, buddy,” I said. Zena seemed less interested. I helped Granite out of the sinkhole and we walked a little farther down the trail to something else the kids wanted to show me. There was a tree that had fallen down over there that created a perfect balance beam about three feet off the ground. Zena hopped on the stump, and then climbed up onto the tree, wrapping her arms and legs around it and scooting along. Granite was more adventurous and wanted to try to walk along it, but Zena was in his way. After asking her to hurry up a few times, he gave up. “I can’t go any faster. It is hard to balance,” Zena explained. Granite walked over to a few straw bales that were there, left over from last Halloween. “This is my thinking spot,” he said. “What do you think about?” I asked. The question seemed to baffle him. He shrugged his shoulders. “Nothing. I just sit here,” he explained.

I helped Zena down from the tree, and we headed back to the house. When we got there, Cindi and Grandma Faye were sitting on the back porch, watching Granddaddy pull out the bushes with his tractor. The kids did not want those bushes to go. They had apparently complained about this before. Cindi explained to them that, this way, they could see into the woods from the back porch, and the kids could get back there easier. Zena was not so convinced. She watched Granddaddy sadly.

We got cold drinks and sat on the porch, cooling off from our walk. It was a hot afternoon, and we were all sweaty. Granite, an avid reader, quickly buried his nose in a book about Sammy Sosa. Zena, the talker, told her mom about our walk. It was obvious that she enjoyed it. She told Cindi about all the things they showed me. After Granddaddy pulled out all the bushes, we sat down to dinner—grilled chicken, mashed potatoes, green beans, stewed tomatoes, and rolls. For dessert we had brownies and ice cream. After our bellies were sufficiently full, I began my informal interview of Cindi and the kids to find out how they know so much about nature.

The Interview

Just recently, Zena won first prize at the science fair for her exhibit on pollination. The question she was trying to answer was “Are bees the only ones who pollinate?” She found out through her research that many different bugs and animals can pollinate flowers, and that sometimes flowers even pollinate themselves. She made a butterfly finger puppet and mixed oil and cornmeal for the pollen. She showed how the butterfly sweeps down onto one flower, gets pollen all over its body, and then lands on another flower, pollinating it. Granite’s project was answering the question “Why is the sky blue and the sunset red?” He

did not win a prize, but he learned all about light waves. I like how both of their projects centered around nature. It probably never would have occurred to them to ask something like “How do microwaves work?”

The kids also learn a lot about nature through the books they read. As I mentioned before, Zena likes the *American Girl* series. Granite has read *Swiss Family Robinson* and *Robinson Crusoe*. He has also read *My Side of the Mountain* by Jean Craighead George, which is about a little boy who runs away to the Catskills, and lives there for a long time, making friends with the animals. He learned a lot about what plants and animals are good to eat, how to cook those foods, and how to build a shelter. It sounded a lot like the book *Hatchet* by Gary Paulsen, so I recommended that book to him. The two of them both enjoy the *Magic Schoolbus* book series and TV program. These stories are about a crazy teacher who takes her students on wild fieldtrips in a magic bus to explore scientific principles like electricity and the water cycle.

One way that Zena learns about the environment is through her Girl Scout troop. The Girl Scouts of America prepare young girls to be responsible, caring, successful adults. They teach everything from literacy to the arts to community outreach to leadership skills. One of the categories they teach is Environmental Awareness. In the Environmental Awareness area, girls can earn several badges, including the Environmental Health Badge, the Get with the Land Patch, and the Water Drop Patch⁶¹. Through Girl Scouts, Zena has learned about recycling, conservation, hazardous chemicals, and pollution. She made cleaning products out of things from around the house, such as vinegar and lemon juice. She told me that if you have to cut down a tree, you should plant one tree for every tree you cut down. She also told

me that you should not burn coal because it pollutes the air. These are big ideas for a six year old. I was impressed.

Granite and Zena taught me that ecological literacy can be fostered at any age. We should not wait until people reach high school or college to begin telling them about the environment. It should start early, in preschool and kindergarten classes. Kids should grow up with a love for the world around them, and the know-how to protect it. If we do not teach our kids to appreciate the environment, there will be no one to protect it after we are gone. And what a sad world that would be for our kids.

ENDNOTES

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- ¹ Monke, L. (Sept 2005). Charlotte's Webpage: Why Children Shouldn't Have the World at their Fingertips. *Orion Magazine*.
- ² Louv, R. (2007). *Leave No Child Inside: The Growing Movement to Reconnect Children and Nature*. *Orion Magazine*.
- ³ Louv, R. (2005). *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder*. Chapel Hill, NC: Algonquin Books, 10.
- ⁴ Louv, R. (2005). *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder*. Chapel Hill, NC: Algonquin Books, 7.
- ⁵ Moore, R. C. (1997). The Need for Nature: A Childhood Right. *Social Justice*, 24, no. 3, 203.
- ⁶ Louv, R. (2005). *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder*. Chapel Hill, NC: Algonquin Books, 16.
- ⁷ Beard, D. C. (1992). *Shelters, Shacks, and Shanties*. Berkeley, CA: Ten Speed Press.
- ⁸ Turner, F. J. (Sept 1896). The Problem of the West. *Atlantic Monthly*.
- ⁹ Vobejda, B. (1993). Agriculture No Longer Counts. *Washington Post*, October 9.
- ¹⁰ Louv, R. (2005). *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder*. Chapel Hill, NC: Algonquin Books.
- ¹¹ The International Center for Technology Assessment. from <http://www.icta.org/biotech/index.cfm>.
- ¹² Louv, R. (2005). *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder*. Chapel Hill, NC: Algonquin Books, 32.
- ¹³ Kocian, L. (2002). Exploring the Link Between Mind, Nature. *Boston Globe*, May 30.
- ¹⁴ Wilson, E. O. (1984) *Biophilia*. Cambridge, MA: Harvard University Press.
- ¹⁵ Roszak, T. (Jan/Feb 1996) *Psychology Today*.
- ¹⁶ Louv, R. (2005). *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder*. Chapel Hill, NC: Algonquin Books, 44.
- ¹⁷ Louv, R. (2005). *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder*. Chapel Hill, NC: Algonquin Books, 44.
- ¹⁸ Louv, R. (2005). *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder*. Chapel Hill, NC: Algonquin Books, 45.
- ¹⁹ Hill, Wyatt, Reed, & Peters. (2003). Obesity and the Environment: Where Do We Go from Here?. *Science*.
- ²⁰ Louv, R. (2005). *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder*. Chapel Hill, NC: Algonquin Books, 131.
- ²¹ Delate, T., Gelenberg, A. J., Simmons, V. A., & Motheral, B. R. (April 2004). Trends in the Use of Antidepressants in a National Sample of Commercially Insured Pediatric Patients, 1998 to 2002. *Psychiatric Services*, 55, 387-391.
- ²² Johnson, L. A. (2004) Behavior Drugs Top Kids' Prescriptions. *Associated Press*, May 17.
- ²³ Kahn Jr., P. H. (1999). *The Human Relationship with Nature*. Cambridge, MA: MIT Press.
- ²⁴ From an interview in the online professional journal *The Massachusetts Psychologist*, <http://www.masspsy.com>
- ²⁵ Louv, R. (2005). *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder*. Chapel Hill, NC: Algonquin Books, 67.
- ²⁶ Moore, R. C., & Hong, H. H. (1997). *Natural Learning: Creating Environments for Rediscovering Nature's Way of Teaching*. Berkeley, CA: MIG Communications.
- ²⁷ Grahn, P., Martensson, F., Lindblad, B., Nilsson, P., & Ekman, A. (1997). *Ute pa Dagis. Stad & Land, Nr. 145*, (Outdoor Daycare. City and Country). Hasselholm, Sweden: Norra Skane Offset.
- ²⁸ Research to Note:
- Kirkby, M. A. (1989) Nature as Refuge in Children's Environments. *Children's Environments Quarterly* 6, no. 1, 7-12.
 - Malone, K. & Tranter, P. J. (2003) School Grounds as Sites for Learning: Making the Most of Environmental Opportunities. *Environmental Education Research* 9, no. 3, 283-303.
 - Taylor, A. F., Wiley, A., Kuo, F., Sullivan, W. (1998) Growing Up in the Inner City: Green Spaces as Places to Grow. *Environment and Behavior*, 30, no. 1, 3-27.
 - Herrington, S. & Studtmann, K. (1998) Landscape Interventions: New Directions for the Design of Children's Outdoor Play Environments. *Landscape and Urban Planning*, 42, no. 2-4, 191-205.

- ²⁹ Cobb, E. (1977). *The Ecology of Imagination in Early Childhood*. New York: Columbia University Press.
- ³⁰ Moore, R.C. (1997). The Need for Nature: A Childhood Right. *Social Justice*, 24, no. 3, 203.
- ³¹ Kraut, R., Lundmark, V., Patterson, M., Kiesler, S., Mukopadhyay, T., & Scherlis, W. (Sept 1998) Internet Paradox: A Social Technology That Reduces Social Involvement and Psychological Well-Being?. *American Psychologist*, 53, no. 9, 1017-1031.
- ³² Louv, R. (2005). *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder*. Chapel Hill, NC: Algonquin Books, 57.
- ³³ Greenhill, L. L. (1998). The Use of Psychotropic Medication in Preschoolers: Indications, Safety, and Efficacy. *Canadian Journal of Psychiatry*.
- ³⁴ <http://www.nimh.nih.gov/health/publications/attention-deficit-hyperactivity-disorder/complete-index.shtml>
- ³⁵ Wozniak, J., Biederman, J., Kiely, K., Ablon, J. S., Faraone, S. V., Mundy, E., Mennin, D. (1995). Mania-Like Symptoms Suggestive of Childhood-Onset Bipolar Disorder in Clinically Referred Children. *Journal of the American Academy of Child and Adolescent Psychiatry*, 34, No. 7, 867-876.
- ³⁶ Johnson, L. A. (2004). Behavior Drugs Top Kids' Prescriptions. *Associated Press*, May 17.
- ³⁷ Healey, J. M. (April 2004). Early Television Exposure and Subsequent Attention Problems in Children. *Pediatrics*, 113, no. 4, 917-918.
- ³⁸ Fitzpatrick, M. (2006). Nature Therapy. *The British Journal of General Practice*, 2006
- ³⁹ Kaplan, S. (1989). *The Experience of Nature: A Psychological Perspective*, CUP Archive.
- ⁴⁰ Kaplan, S. (1989). *The Experience of Nature: A Psychological Perspective*, CUP Archive.
- ⁴¹ Hartig, T. (1996). Environmental Influences on Psychological Restoration. *Scandinavian Journal of Psychology*.
- ⁴² Taylor, A. F., Wiley, A., Kuo, F., Sullivan, S. (Jan 2001). Coping with ADD: The Surprising Connection to Green Play Settings. *Environment and Behavior*, 33, no. 1, 54-77.
- ⁴³ Hattie, J. A., Marsh, H. W., Neill, J. T., & Richards, G. E. (1997). Adventure Education and Outward Bound. *Review of Educational Research*, 67, 43-87.
- ⁴⁴ Gaster, S. (Jan 1991). Urban Children's Access to Their Neighborhoods: Changes Over Three Generations. *Environment and Behavior*, 70-85.
- ⁴⁵ Moore, R. (1987). *Public Streets for Public Use*, Van Norstrand Reinhold.
- ⁴⁶ Louv, R. (2005). *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder*. Chapel Hill, NC: Algonquin Books, 126.
- ⁴⁷ Louv, R. (2005). *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder*. Chapel Hill, NC: Algonquin Books, 133.
- ⁴⁸ Davis, S. G., Corbitt, A. M., Everton, V. M., Grano, C. A., Kiefner, P. A., Wilson, A. S., & Gray, M. (Mar 1999). Are Ball Pits the Playground for Potentially Harmful Bacteria?. *Pediatric Nursing*, 25, no. 2, 151.
- ⁴⁹ Louv, R. (2005). *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder*. Chapel Hill, NC: Algonquin Books, 118.
- ⁵⁰ Brooks, D. (April 2001). The Organization Kid. *Atlantic Monthly*, 40.
- ⁵¹ Cordes, C. & Miller, E., eds. (2001) Fools' Gold: A Critical Look at Children and Computers. A web-published report by Alliance for Childhood, found at: www.allianceforchildhood.net/projects/computers/computers_reports_fools_gold_download.htm
- ⁵² Louv, R. (2005). *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder*. Chapel Hill, NC: Algonquin Books, 149.
- ⁵³ A note from professor of educational psychology at the University of Wisconsin Leslie Owen Wilson to author Richard Louv, published in his book, *Last Child in the Woods*, pages 72-73.
- ⁵⁴ The Center for Place-Based Education, <http://www.antiochne.edu/anei/cpbe/>
- ⁵⁵ Lieberman, G. (2002). Closing the Achievement Gap. State Education and Environmental Roundtable.
- ⁵⁶ Sobel, D. (2004). *Place-based Education: Connecting Classrooms and Communities*. Great Barrington, MA, The Orion Society and the Myrin Institute.
- ⁵⁷ Richer Louv's blog on the Children and Nature Network's website, <http://www.childrenandnature.org/blog/?p=43>
- ⁵⁸ Find out more at www.projectwet.org
- ⁵⁹ Find out more at www.projectwild.org
- ⁶⁰ Find out more at www.plt.org
- ⁶¹ www.girlscouts.org

REFERENCES

- Beard, D. C. (1992). *Shelters, Shacks, and Shanties*. Berkeley, CA: Ten Speed Press.
- Brooks, D. (April 2001). The Organization Kid. *Atlantic Monthly*, 40.
- Cobb, E. (1977). *The Ecology of Imagination in Early Childhood*. New York: Columbia University Press.
- Cordes, C. & Miller, E., eds. (2001) Fools' Gold: A Critical Look at Children and Computers. A web-published report by Alliance for Childhood, found at: www.allianceforchildhood.net/projects/computers/computers_reports_fools_gold_download.htm
- Davis, S. G., Corbitt, A. M., Everton, V. M., Grano, C. A., Kiefner, P. A., Wilson, A. S., & Gray, M. (Mar 1999). Are Ball Pits the Playground for Potentially Harmful Bacteria?. *Pediatric Nursing*, 25, no. 2, 151.
- Delate, T., Gelenberg, A. J., Simmons, V. A., & Motheral, B. R. (April 2004). Trends in the Use of Antidepressants in a National Sample of Commercially Insured Pediatric Patients, 1998 to 2002. *Psychiatric Services*, 55, 387-391.
- Fitzpatrick, M. (2006). Nature Therapy. *The British Journal of General Practice*, 2006
- Gaster, S. (Jan 1991). Urban Children's Access to Their Neighborhoods: Changes Over Three Generations. *Environment and Behavior*, 70-85.
- Grahn, P., Martensson, F., Lindblad, B., Nilsson, P., & Ekman, A. (1997). *Ute pa Dagis. Stad & Land, Nr. 145*, (Outdoor Daycare. City and Country). Hasselholm, Sweden: Norra Skane Offset.
- Greenhill, L. L. (1998). The Use of Psychotropic Medication in Preschoolers: Indications, Safety, and Efficacy. *Canadian Journal of Psychiatry*.
- Hartig, T. (1996). Environmental Influences on Psychological Restoration. *Scandinavian Journal of Psychology*.
- Hattie, J. A., Marsh, H. W., Neill, J. T., & Richards, G. E. (1997). Adventure Education and Outward Bound. *Review of Educational Research*, 67, 43-87.
- Healey, J. M. (April 2004). Early Television Exposure and Subsequent Attention Problems in Children. *Pediatrics*, 113, no. 4, 917-918.
- Herrington, S. & Studtmann, K. (1998) Landscape Interventions: New Directions for the Design of Children's Outdoor Play Environments. *Landscape and Urban Planning*, 42, no. 2-4, 191-205.
- Hill, Wyatt, Reed, & Peters. (2003). Obesity and the Environment: Where Do We Go from Here?. *Science*.
- Johnson, L. A. (2004). Behavior Drugs Top Kids' Prescriptions. *Associated Press*, May 17.
- Kahn Jr., P. H. (1999). *The Human Relationship with Nature*. Cambridge, MA: MIT Press.
- Kaplan, S. (1989). *The Experience of Nature: A Psychological Perspective*, CUP Archive.
- Kirkby, M. A. (1989) Nature as Refuge in Children's Environments. *Children's Environments Quarterly* 6, no. 1, 7-12.
- Kocian, L. (2002). Exploring the Link Between Mind, Nature. *Boston Globe*, May 30.
- Kraut, R., Lundmark, V., Patterson, M., Kiesler, S., Mukopadhyay, T., & Scherlis, W. (Sept 1998) Internet Paradox: A Social Technology That Reduces Social Involvement and Psychological Well-Being?. *American Psychologist*, 53, no. 9, 1017-1031.

-
- Lieberman, G. (2002). Closing the Achievement Gap. State Education and Environmental Roundtable.
 - Louv, R. (2007). Leave No Child Inside: The Growing Movement to Reconnect Children and Nature. *Orion Magazine*
 - Louv, R. (2005). *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder*. Chapel Hill, NC: Algonquin Books.
 - Malone, K. & Tranter, P. J. (2003) School Grounds as Sites for Learning: Making the Most of Environmental Opportunities. *Environmental Education Research* 9, no. 3, 283-303.
 - Monke, L. (Sept 2005). Charlotte's Webpage: Why Children Shouldn't Have the World at their Fingertips. *Orion Magazine*.
 - Moore, R. (1987). *Public Streets for Public Use*, Van Norstrand Reinhold.
 - Moore, R. C. (1997). The Need for Nature: A Childhood Right. *Social Justice*, 24, no. 3, 203.
 - Moore, R. C., & Hong, H. H. (1997). Natural Learning: Creating Environments for Rediscovering Nature's Way of Teaching. Berkely, CA: MIG Communications.
 - Roszak, T. (Jan/Feb 1996) *Psychology Today*.
 - Sobel, D. (2004). *Place-based Education: Connecting Classrooms and Communities*. Great Barrington, MA, The Orion Society and the Myrin Institute.
 - Taylor, A. F., Wiley, A., Kuo, F., Sullivan, W. (1998) Growing Up in the Inner City: Green Spaces as Places to Grow. *Environment and Behavior*, 30, no. 1, 3-27.
 - Taylor, A. F., Wiley, A., Kuo, F., Sullivan, S. (Jan 2001). Coping with ADD: The Surprising Connection to Green Play Settings. *Environment and Behavior*, 33, no. 1, 54-77.
 - Turner, F. J. (Sept 1896). The Problem of the West. *Atlantic Monthly*.
 - Vobejda, B. (1993). Agriculture No Longer Counts. *Washington Post*, October 9.
 - Wilson, E. O. (1984) *Biophilia*. Cambridge, MA: Harvard University Press.
 - Wozniak, J., Biederman, J., Kiely, K., Ablon, J. S., Faraone, S. V., Mundy, E., Mennin, D. (1995). Mania-Like Symptoms Suggestive of Childhood-Onset Bipolar Disorder in Clinically Referred Children. *Journal of the American Academy of Child and Adolescent Psychiatry*, 34, No. 7, 867-876.
 - Misc.:
 - The Intl. Center for Technology Assessment. at <http://www.icta.org/biotech/index.cfm>.
 - From an interview in the online professional journal *The Massachusetts Psychologist*, <http://www.masspsy.com>
 - National Institute of Mental Health. <http://www.nimh.nih.gov/health/publications/attention-deficit-hyperactivity-disorder/complete-index.shtml>
 - A note from professor of educational psychology at the University of Wisconsin Leslie Owen Wilson to author Richard Louv, published in his book, *Last Child in the Woods*, pages 72-73.
 - The Center for Place-Based Education, <http://www.antiochne.edu/anei/cpbe/>
 - Richard Louv's blog on the Children and Nature Network's website, <http://www.childrenandnature.org/blog/?p=43>

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- Project WET. Find out more at www.projectwet.org
 - Project WILD. Find out more at www.projectwild.org
 - Project Learning Tree. Find out more at www.plt.org
 - The Girls Scouts of America, www.girlscouts.org