



# Empirical Evidence Supporting Benefits of Outdoor School and Experiential Learning Programs

The following research brief outlines statements describing the benefits of outdoor school and experiential learning programs, followed by empirical evidence supporting each statement.

This brief draws heavily on a 2007 literature review conducted by the Washington State Office of Superintendent of Public Instruction, which looked at 76 articles examining the impacts of outdoor education programs. The review focused on studies that evaluated formal K-12 programs. Studies of outdoor and experiential education programs offered outside of school were also analyzed, including nontraditional programs such as hunting and fishing. Studies of programs in lifelong learning, home schooling, and pre-K were not included (Wheeler and Thumlert, 2007).

The benefits explored in this brief include:

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**Increasing Academic Achievement.** Specifically in Common Core Standards, critical thinking and fields related to science, technology, engineering and math (STEM), outdoor school helps kids stay more engaged in the classroom by making schoolwork more relevant and fun, through hands-on activities that show children how their lessons in school apply to the world around them.

- A 5-year study of 12,750 students in 8 California schools that compared students on the basis of environment-based education found that “treatment” students—those who had received environment-based education—performed significantly better than their “control” student peers at different schools who received no environmental education. (SEER, 2005)
  1. In 100% of reading assessments, treatment students scored as well or better than control students.
  2. In 92.5% of math assessments, treatment students scored as well or significantly higher than control students.
  3. In 95% of language assessments, treatment students scored as well or significantly higher than control students.
  4. In 97.5% of spelling assessments, treatment students scored as well or significantly higher than control students.
  5. In over 96% of all cases, treatment students scored as well or significantly higher than control students.
  6. In 42% of the cases, treatment students scored **significantly** higher than control students in reading, math, language and spelling.
  7. In 46% of reading test cases, treatment students scored **significantly** higher than control students.
  8. In 49% of math test cases, treatment students scored **significantly** higher than control students.
  9. In 40% of language test cases, treatment students scored **significantly** higher than control students.
  10. In 32.5% of spelling test cases, treatment students scored **significantly** higher than control students.

## Math Achievement

- Bartosh (2003) compared state standardized scores from 77 pairs of schools (with and without environmental programs) that had been matched using U.S. Census and other economic, demographic, and geographic criteria. Bartosh found that schools with environmental education programs consistently outperformed “traditional” schools on state standardized tests in math, reading, writing, and listening. Specifically, 65 percent of the schools with environmental education programs performed significantly better in math on the Washington Assessment of



Student Learning (WASL), and 58 percent of the schools with environmental education programs did better in math on the Iowa Test of Basic skills.

- A study of 400 Washington middle school students, half of whom were participating in environmental education programs, found that these students consistently and significantly outperformed students not involved in an environmental education program in the math Washington Assessment of Student Learning (WASL). (Bartosh, Tudor and Ferguson, 2005)
- A smaller study of 181 Grade 10 students in Washington State found that students in an environmental education program were significantly more likely to meet or exceed the state and school district average score on the math WASL (Bartosh, 2006). This study controlled for differences in pre-program achievement level, gender and education goals, therefore the findings can be considered strong evidence of the positive influence of environmental education on academic achievement.
- Lieberman and Hoody (1998) conducted four surveys and 665 interviews regarding student achievement at 40 elementary, middle, and high schools with environment-based programs across the United States. They found that 92 percent of educators reported that students demonstrated a better mastery of math skills.
- Two studies in California found that students involved in environmental education programs and programs that use hands-on outdoor education (academically known as the “Environment as an Integrating Context, or EIC) significantly outperformed students in traditional math programs on assessments. These studies compared twelve pairs of schools that had been matched using demographic and socioeconomic criteria and information about their environmental programs. (Lieberman, Hoody and Lieberman, 2000 and Lieberman, Hoody and Lieberman, 2005)
- Duffin, Phillips, and Tremblay and PEER Associates (2006a, b) explored the impact of Antioch New England Institute’s Community-based School Environmental Education (CO-SEED) on 3,395 students in New Hampshire and Massachusetts from 1993 to 2005. In New Hampshire, scaled math scores for environmental education students increased by an average of twelve points from Grade 3 to Grade 6, while state scores decreased by four points. Similarly in Massachusetts, the study showed increased student achievement in math, mostly for upper-level grades but also for Grade 4, which outperformed both the district and the state in 2004.
- In a study of 18,982 students in 176 schools from Alaskan school districts that used the Alaska Rural Systemic Initiative (AKRSI), a place-based, systemic approach, Emekauwa (2004a) compared performance on the state math tests to results from 28 non-AKRSI schools and data for the Native Alaskan student population as a whole. Grade 8, 10 and 11 students performed better on the state math tests than

students from traditional programs. AKRSI students in 2001 also showed improvement over Alaskan Native students as a whole. Improvements were seen in the percentages of AKRSI students moving into the highest quartile and out of the lowest quartile.

- A study of over 2,000 middle- and elementary-school students conducted in a Louisiana school district investigated the district's place-based program. The study found that the percentage of students performing at unsatisfactory levels on the Louisiana Educational Assessment Program for the 21st Century (LEAP 21) decreased more in participating schools than in the state as a whole in four areas. In particular, the percentage of students receiving a score of unsatisfactory in math declined by 14.1 percentage points among participating students, compared to a 3.6-point decline in the state as a whole.
- Danforth (2005) compared students' achievement in math and reading in three pairs of Texas schools (306 students in the Schoolyard Habitat Program group and 186 students in traditional classes). The study found that the math scores on the Texas Assessment of Knowledge and Skills (TAKS) tests increased more on average for participating students than for students in traditional classes.
- Workman (2005) analyzed the performance of 941 Minnesota students, including some students who attended environmental education classes and others who did not, on the Minnesota Comprehensive Assessment. The study found that the students involved in environmental education classes significantly outperformed the other students in math 33 to 66 percent of the time.

## Science Achievement

- Bartosh (2006) analyzed the experiences of 181 students in one Washington State public high school and found statistically significant differences in the WASL science scores of students in environmental education classes compared to those in non-environmental education classes.
- Duffin, Phillips, Tremblay, and PEER Associates (2006a, b) also report increased student achievement, mostly for upper-level grades in two New Hampshire and Massachusetts school districts that participated in Antioch New England Institute's CO-SEED place-based education program.
- In one Louisiana school district with a place-based program, the number of Grade 4 students from environmental education programs scoring unsatisfactory decreased by 8.1 points between 1999-2000 and 2001-2002, while in the state overall, there was a 3.7- point decrease.
- A study of four outdoor schools in California (often referred to as outdoor science schools) conducted by the American Institutes for Research (2005) found that



students who attended outdoor programs improved their science scores significantly between the beginning and end of the program.

- Lewicki (2000) examined experiences of 14 high school students who participated in a long-term place-based program in Wisconsin, and found that science scores on the Iowa Test of Basic Skills increased by three grade points between the beginning and the end of the program.
- Lieberman and Hoody (1998) conducted four surveys and 665 interviews regarding student achievement at 40 elementary, middle, and high schools with environment-based programs across the United States. They found that outdoor education students performed better in three out of four science assessments. Anecdotally, 99 percent of teachers who completed the survey instrument reported increased student knowledge and understanding of science content, concepts, processes, and principles as well as their better ability to apply science to real-world situations.
- Results of the California Student Assessment project that compared results for eight pairs of schools (matched using demographic and socioeconomic criteria, and information about their environmental programs) suggest that EIC students performed better than non-EIC students in science assessments. (Lieberman, Hoody, and Lieberman, 2000)

## Language Arts Achievement

- Bartosh's (2005) study of 77 pairs of schools in Washington State found a significant difference between schools with environmental education programs and schools without environmental education in language arts performance on the Washington Assessment of Student Learning (WASL) and the Iowa Test of Basic Skills (ITBS). On the WASL test, 56 schools with environmental education did better in writing, and 51 schools with environmental education outperformed their counterparts in reading. On the ITBS test, 45 schools with environmental education performed better in reading.
- A study conducted in Washington State by the Pacific Education Institute found that middle school students from five schools with environmental education significantly outperformed "non-environmental education program" schools on the writing WASL (Bartosh, Tudor, and Ferguson, 2005). Students from environmental education schools also tended to outperform students from non-environmental education schools on the WASL reading tests. However, the difference on the reading tests was not significant.
- Lieberman, Hoody, and Lieberman (2005) compared four pairs of schools in California that had been matched using demographic, socioeconomic criteria and information about their environmental programs, finding that outdoor education students scored as well or significantly higher than non-outdoor education students



in language, spelling, and reading assessments; 93 percent of educators reported an improved development of language arts skills.

- Gorham elementary students in New Hampshire who participated in CO-SEED demonstrated improved scaled language arts scores by an average of 16 percentage points from Grade 3 to Grade 6, compared to a 2-point decrease in state scores during the same time period for students who did not participate in CO-SEED. However, the study does not indicate if the increase was statistically significant. (Duffin, Phillips, Tremblay, and PEER Associates, 2006)
- In one Louisiana school district, the percentage of Grade 4 students who performed at the unsatisfactory level in English Language Arts decreased 13.2 percentage points (from 32.6 percent in 1999 to 18.4 percent in 2002) for students participating in an environmental education program, compared to only a 6.5-point decrease for the state as a whole. (Emekauwa, 2004b)
- Bartosh et al.'s (2005) study of 181 students in Washington State found that students from schools with environmental education programs performed better on the reading and writing WASL.
- Workman's (2005) study of elementary schools in Minnesota found a significant difference in reading scores on the MCA test between students who participated in an integrated environmental education program and students from traditional classrooms, with "environmental education" students outperforming "non-environmental education" students 33 percent of the time.

## Social Studies Achievement

- In one Louisiana school district, analysis of student achievement on the LEAP 21 assessments indicates that between 1998 and 2000 there was an 11.3-point decrease in the number of students scoring unsatisfactory in social studies among students participating in a place-based program, compared to 3.2-point decrease at the state level. (Emekauwa, 2004b)
- Lieberman and Hoody's (1998) study of 40 schools across the United States found that in the two schools compared using social studies assessments, outdoor education students performed better than traditional students. Also, 95 percent of educators reported greater student comprehension of social studies content.
- A study of eight pairs of schools in California reports that EIC students performed better than traditional students in 8 out of 11 social science assessments. (Lieberman, Hoody and Lieberman, 2000)

## Critical Thinking

- Athman and Monroe (2004a, 2004b) found a strong positive correlation between participation in environmental education programs and improved thinking skills. The researchers compared students who participated in environment-based programs with students who attended traditional programs in the same school (404 students from 11 Florida high schools). The study found that students in programs designed around an environmental context tended to score higher on the Cornell Critical Thinking Test than students in the traditional classes.
- Cheak, Hungerford, and Volk (2002) investigated an inquiry-based environmental education program, called Investigating and Evaluating Environmental Issues and Actions (IEEIA), in a public elementary school in Hawaii, using qualitative and quantitative methods. Thirty-eight IEEIA students and 28 non-IEEIA students completed two assessments: the critical thinking test in environmental education and the middle school environmental literacy instrument. Students in the IEEIA program scored higher both on the critical thinking test and five out of eight components of environmental literacy instrument.
- Lieberman and Hoody's (1998) study of 40 schools across the United States found that 97 percent of educators reported that students receiving hands-on place-based curriculum had a greater proficiency in solving problems and thinking strategically.

## Grade Point Average

- Bartosh (2006) found the GPAs of 79 Grade 10 students in Washington State who participated in a year-long outdoor education program became significantly higher by the end of the year compared to GPAs of 102 students from traditional classes.

## Graduation Rates

- In the study of 18,982 high school students in 176 Alaskan schools from districts that used the Alaska Rural Systemic Initiative (AKRSI), a place-based, systemic approach, Emekauwa (2004) observed that reductions in the dropout rate are larger for AKRSI students than for students from 28 non-AKRSI schools. Dropout rates for Grades 7-12 in AKRSI schools declined from an average of 4.4 in 1995 to 3.6 in 2000, compared to a decrease from 2.7 to 2.4 for non-AKRSI schools over the same period. Furthermore, the first-time, freshmen enrolment at the University of Alaska from AKRSI districts increased by 49 percent in 2001 over the numbers enrolled in 1995.





## Classroom Engagement and Motivation

- Athman and Monroe (2004b) compared Florida high school students who participated in environment-based programs with students who attended traditional programs in the same 11 schools, finding that students participating in an EIC program scored significantly higher on the California Measure of Mental Motivation and the Achievement Motivation Inventory.
- Lieberman and Hoody (1998) conducted surveys and interviews regarding student achievement at 40 elementary, middle, and high schools with environment-based programs across the United States. They found that most outdoor education teachers reported growing enthusiasm and motivation to learn in social studies, science, math, and language arts.
- In three elementary and two middle schools in Maryland, student engagement within each school was statistically significantly higher for students who had more intense outdoor education experiences. (Secker, 2004)
- Teachers who taught in the Model Links Program in Washington State schools identified a range of benefits of environmental programs for students: improved student motivation, self-confidence, critical thinking, technical reading and writing skills, and decrease in behavior and discipline problems. According to the teachers, students were more engaged in hands-on learning and the program has also had a positive impact on the learning of at-risk populations. (Yap, 1998)



Teaching Children How to Collaborate and Build Community. Studies show that across cultural and economic differences, students participating in outdoor education programs demonstrated less aggression, better moods, impulse control, and better cognitive functioning and social skills.

- According to teacher assessments of students, children who attended a week-long residential outdoor school program showed statistically significant gains in all eight constructs tested, including self-esteem (9.65%), leadership (7.36%), relationship with peers (11.39%), motivation to learn (4.32%), cooperation (4.95%), conflict resolution (11.73%), problem-solving (20.44%) and behavior in class (3.4%). (Parrish, et al, 2005)
- A study of over 800 middle and elementary school students who attended the IslandWood residential outdoor program in Bainbridge, WA demonstrated increased positive behavior, environmental knowledge, and development of community among students. The percent of students who reported that their group was “not functioning well” dropped from 19% at the start to 7% at the end of the program. In addition, the number of students who indicated that other group members “aren’t nice/don’t treat them well” dropped from 15% to 10% by the end of the IslandWood outdoor school. (Kearney, 2009)
- Duffin, Powers, Tremblay, and PEER Associates (2004) claimed that participation in Place-based Education Evaluation Collaborative PEEC programs makes significant and positive contributions to student engagement in learning, student civic engagement, student time spent outdoors and student stewardship behavior.
- Cheak, Hungerford, and Volk (2002) investigated an inquiry-based environmental education program in a public elementary school in Hawaii, finding that participating students demonstrated improved personal characteristics and participatory citizenship in the community, based on data obtained from student and teacher interviews.
- In a report supported by the Pew Charitable Trust (Lieberman and Hoody, 1998), researchers found that teaching that employs natural and socio-cultural environments as the context for learning increased students’ interpersonal abilities. This study of 40 schools, 400 K-12 students, and 250 teachers also demonstrates that place-based learning is successful in improving student achievement in a variety of academic measurements:
  1. 98% of educators reported that students had a better ability to work in group settings.
  2. 94% of educators reported that students had stronger communication skills.
  3. 93% of educators reported an increase in the amount of students acting with greater civility toward others.

**Building Self-sufficiency, Self-esteem and Leadership Skills.** For many students, outdoor school is the first time they've ever been immersed in natural settings. For others, it is their first time spending the night away from their families. The skills and experiences gained through outdoor school instill self-confidence, help youth realize their leadership potential and make them more self-sufficient. Outdoor school also provides high school students with volunteer teaching opportunities, helping them become stronger leaders and more college and career ready.

- In the American Institutes for Research (2005) study of outdoor programs in four California elementary schools, students who participated in the course showed positive gains in self-esteem, leadership, cooperation, conflict-resolution and students' relationships with their teachers immediately after the program. Significant differences in cooperation and conflict-resolution skills were found between the participating and control groups 6 to 10 weeks later.
- Garst and Baker (2001) analyzed young people who participated in a three-day outdoor adventure program. Their study found that several areas of self-perception profiles, such as social acceptance and behavior conduct, increased immediately after the program, and that some behavior impacts may have remained four months after the trip. After conducting interviews with the participants, the researchers concluded that changes in self-perception occurred due to the novelty of the program experience and its duration.
- Cross (2002) analyzed seventeen pairs of high school students (half of whom participated in a rock climbing camp), reporting that although the two groups exhibited similar behavior before the treatment, the rock climbing group appeared to be less alienated and demonstrated a stronger sense of personal control after the program than did the control group.

Creating Good Stewards of the Land Who Know How to Use Our Natural Resources Responsibly. To appreciate the true value of Oregon’s natural resources, young people need to spend time in natural settings and understand the relationships between humans, plants, animals, water, land and air. Outdoor school fosters a lifelong appreciation for Oregon’s unique heritage, and teaches our youth about the role and responsibility of every Oregonian to be a steward.

- Students who participated in 3-day field trips sponsored by the Chesapeake Bay Foundation scored significantly higher on tests that measured environmentally responsible behavior than a comparison group. Students increased their mean pre-test score of “environmental sensitivity” from 19.94 to 21.85 on a post-test, a statistically significant difference from students who did not attend 3-day field trips, and a statistically significant increase from pre to post score. Students also increased their “knowledge of issues” from 13.02 to 15.68, also a statistically significant difference from the no-treatment group. Students who participated in the field trips also improved their scores in “personal responsibility” from 6.61 to 6.99, a statistically significant difference from the no-treatment group. (Zint, et al., 2002)
- In a study of 255 Grade 6 students from four elementary schools conducted by the American Institutes for Research (2005), students who attended the program showed increased concern about caring for natural resources.
- Siemer and Knuth (2001), who examined experiences of 619 Grade 6-8 students in the “Hooked on Fishing—Not on Drugs” program found that youth in fully implemented fishing programs demonstrated better fishing skills, better knowledge and awareness of aquatic environments and issues related to fishing, as well as a stronger commitment to limit their personal impact on nature while fishing.
- Research shows that the length of stay in an outdoor school produces different retentions of stewardship behavior. 5-day stays were associated with longer-term retention of awareness and knowledge increases among participants 3 months after the program’s conclusion. When evaluating pre-experience and post-experience index scores, researchers found gains in students’ connection to nature and stewardship. The average pre-experience score for the construct measuring connection to nature was 79. This grew to 81.1 in the post-experience scores. Pre-experience measurements of stewardship grew from 69 to 80.6 by the end of the program and environmental awareness grew from 60 to 74.4. (Stern, et al., 2008)
- Research from a study of 697 5th and 6th graders shows that after a residential outdoor education programs ranging in length from one to four nights, students have significantly more positive attitudes toward wildlife, and these attitude changes are retained for at least three months after the program. Researchers used Wilcoxon signed-rank tests to measure wildlife attitudes. Students who attended



residential outdoor school had a Wilcoxon score of .313 while the control group had a score of .158. (This is a complex statistical measurement that wouldn't mean much even to a reader with a basic understanding of statistical analysis.) (Dettmann,-Easler and Pease, 1999)



Gaining Future Employment Skills and Interest in Natural Resource Careers Like Farming and Forestry. Our state and its many natural resource-based industries are in dire need of a technically skilled workforce to solve current and future challenges that affect our communities. Outdoor school introduces our children to natural resource-based careers, augments science, technology, engineering and math (STEM) studies at school and drives increased interest in these professions.

- The National Environmental Education and Training Foundation (NEETF) and North American Association of Environmental Education (NAAEE) (2001) report notes that environmental education programs allow students to gain skills and abilities needed to be successful in the job market. While undertaking different projects in their communities, students learn problem-solving, communication and decision-making skills, and also develop the ability to work in groups.
- Seever (1991), who evaluated the Nowlin Environmental Science Magnet Middle School in Missouri, reports that about 45 percent of students reported that they learned about career opportunities in the field of environmental science through participation in the program. Furthermore, 23 to 30 percent of students in grades 6-8 said that they are thinking about a career in an environmental field.
- Outdoor school programs in Oregon often have a service-learning component, such as the volunteer high school counselors who develop practical skills while mentoring and teaching younger students. Grassi, Hanley, and Liston (2004), who examined 29 service-learning programs in Colorado, found that students reported having gained work experience, job skills, and career awareness through participation in service-learning. Parents and teachers also reported that students gained communication skills.
- Billig, Root, and Jesse (2005), who surveyed 1,000 students, including a group from schools with service-learning programs and a group from schools with a traditional curriculum, found that service-learning students significantly outperformed comparison students in the development of career and work skills.

**Accessibility for All Students.** Outdoor School is equally accessible to all students. Through small group learning, all students—whether or not they have disabilities, are English second language learners, or are gifted and talented—receive outdoor education that is tailored to their needs and learning styles.

- The 2005 study from the American Institutes for Research focused on 225 at-risk sixth-grade students from four California elementary schools, and the impacts of a week-long outdoor school experience. These schools serve a majority of Hispanic children, ranging from 69 to 89 percent of the student population. 81 to 100 percent of the students in this study also qualified for the free and reduced price lunch program.

According to teacher reports, among those students who attended the program, English Learner (EL) students demonstrated gains in cooperation of 7.81 percent; 10.63 percent gains in leadership; a gain of 15.35 percent in the construct measuring relationships with peers; an incredible 22.14 percent gain in the construct measuring problem solving; and a gain of 8.17 percent in motivation to learn. All of these gains were statistically significantly compared to the gains shown by non-EL students for those constructs.

This study also shows that Hispanic students increased their science scores by 3.6 points from pre-surveys to post-surveys after attending a week-long outdoor school program. Teachers qualitatively reported in this study that outdoor school puts children with special needs or disabilities on equal footing their peers. (Parrish, et al, 2005)

- For students with Attention Deficit Disorder (ADD), being outdoors in green spaces reduces their symptoms. Researchers show through regression analysis that there is a positive relationship between the greenness rating of their play setting and parents' severity of symptoms rating. Analysis showed a significant positive relationship of .08. In sum, this means that the greener the child's play environment the week before, the less severe their symptoms. This study only focused on play environments, but the main takeaway is that if students with ADD are in green spaces, like the ones outdoor school can provide, their symptoms—such as difficulty paying attention, inability to complete tasks, and being distracted easily—are reduced. (Taylor et al, 2001)
- A national study of 715 children ages 6 to 11 found that children from lower socio-economic backgrounds had greater media access in their bedrooms (52 percent had TV in their rooms, compared to 14 percent in higher income households; DVD players 39 percent versus percent; video games 21 percent versus 9 percent), highlighting the importance of exposing low-income children to the outdoors through formal outdoor school programs. (Tande et al., 2012)



- There are vast disparities in participation in outdoor recreation activities like those found in many outdoor school programs across the country. A study by the Outdoor Foundation found that 79 percent of outdoor recreation participants are Caucasian. Males make up 56 percent of outdoor recreation participants, also. (Outdoor Industry Foundation, 2010)
- A CDC survey found that 61.5 percent of children do not participate in an organized physical activity. This report additionally found that there were significant differences based on race and ethnicity, such as that parental concerns regarding barriers to participation (e.g., transportation or expenses) were reported more often by non-Hispanic black and Hispanic parents than by non-Hispanic white parents. (CDC, 2002)



**Developing Healthy Habits for a Lifetime.** Children are spending more and more time being sedentary in front of a screen. Outdoor School provides opportunities for Oregon students to be exposed to the health benefits of outdoor school and disconnect from technologies in ways that they may not encounter in traditional school settings or in their homes.

- Most American children spend 3 hours a day watching TV. Added together, all types of screen time can total 5 to 7 hours a day. Too much screen time can make it difficult for children to sleep, raise the risk of developing attention problems, anxiety and depression, and raise the risk of obesity. (Kaneshiro, 2014)
- Researchers recently sent 51 6<sup>th</sup> grade students to an outdoor education overnight camp facility, where they were not allowed to use any electronic devices for a week. Students engaged in typical outdoor school activities, such as learning about forest ecology and outdoor skills, orienteering and participating in hikes. When compared to a control group, researchers found that the students who went to outdoor school were much better at recognizing human emotion after being at outdoor school and not having access electronics than their peers who attended traditional school. (Uhls et al., 2014)
- The environment where students participate in play is a crucial motivator in how much physical activity they engage in. A study of Canadian K-8 students shows a 49 percent increase in vigorous activity and a 71 percent increase in moderate or light physical activity when students are surrounded by natural landscapes. Studies also show that even moderate to light activity can reduce obesity among children. Bell and Dymment, 2007)
- The American Public Health Association recently adopted 17 new policy guidelines—among them, “encouraging land use decisions that prioritize access to natural areas and green spaces for residents of all ages, abilities, and income levels.” (Louv, 2013)
- A survey of over 800 mothers in the United States found that children in the early 2000s spent less time playing outdoors, participated in fewer organized youth sports and participated in more indoor activities than outdoor play activities. Seventy percent of mothers reported playing outdoors every day when they were young, compared with only 31 percent of their children. When asked about this, almost all mothers recognized the diverse benefits of outdoor play. In fact, 97 percent of mothers agreed that outdoor play offers children an outlet for reducing everyday stress, but obstacles such as television, computers, and concerns about crime, safety and injury prevented their children from engaging in outdoor play. (Clements, 2004)



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