Nature Nurtures:
Investigating the Potential of School Grounds

Part of the Tool Shed Series

Toyota Canada Inc. and its Dealerships – Proudly supporting outdoor classrooms in Canadian schools.
Evergreen and Toyota Canada Inc. with its Dealerships are working together to ensure that children’s school environments are as nurturing as possible. The Toyota Evergreen Learning Grounds Program represents a commitment to contribute positively to the health and well-being of future generations by educating children about the importance of restoring and preserving the environment. Teachers, students and community members are invited to participate in a nation-wide effort to reclaim Canada’s school grounds and to create healthy learning environments.

**Toyota Evergreen Learning Grounds Charter**

The Evergreen and Toyota Canada Inc. partnership represents a shared commitment to positively contribute to the school grounds, environment and emotional and physical development of Canada’s children.

We believe that the provision of educational resources and the support of caring citizens will transform school grounds into healthier, more dynamic places for learning.

We believe that by combining Toyota’s commitment to corporate social responsibility with Evergreen’s ecological restoration practices we will enhance our combined reach and the quality of business, community and learning.

We commit our organizations to lead by example, and to provide measurable and meaningful resources and support to Canada’s schools and to the communities in which we work.

It is our sincere intent to foster a new spirit of community involvement and environmental stewardship within the hearts and minds of Canada’s future: children and youth.

Geoff Cape, Executive Director, Evergreen
www.evergreen.ca

Yoshio Nakatani, Chairman, Toyota Canada Inc.
www.toyota.ca

Published by Evergreen
Evergreen is a national non-profit environmental organization with a mandate to bring nature to our cities through naturalization projects.

**Credits:** Principal writer and researcher: James Raffan, Ph.D. Additional researchers: Christine Robertson, M.Ed.; Helen Batten, M.L.A.; Paul Young, B.L.A. Reviewers: Anne Gillain Mauffette, M.Ed.; Rita L. Irwin, Ed.D. Project Manager: Cam Collyer. Editor: Seana Irvine. Illustrator: Ferruccio Sardella

Copyright © 2000 Evergreen. All rights reserved. Reproductions of small portions of this book (except photographs) for use in classrooms or newsletters or for other educational purposes is permitted and encouraged, provided appropriate acknowledgement is given. Photographs within this book have been provided for a one-time use only and cannot be re-used for any other purposes.

Canadian Cataloguing in Publication Data
Nature nurtures: investigating the potential of school grounds

(Learning Grounds Tool Shed series) ISBN 0-9681078-5-0


SB56.C3N38 2000 371.61 C00-901272-9

This book is printed on 100% recycled paper (including 100% post-consumer fibre) that is both non-bleached and non-deinked.
**Seeds and Soil of Wisdom**

“If facts are the seeds that later produce knowledge and wisdom, then the emotions and the impressions of the senses are the fertile soil in which the seeds must grow. The years of early childhood are the time to prepare the soil. Once the emotions have been aroused — a sense of the beautiful, the excitement of the new and the unknown, a feeling of sympathy, pity, admiration or love — then we wish for knowledge about the object of our emotional response.”

*Rachel Carson, in The Sense of Wonder*

**What Else Is There?**

“TV, bed, TV, school, TV, bed, TV, school, that’s how it is. We don’t want to become telly addicts, but what else is there?”

*Elementary school student,*

*in Special Places; Special People*
Preface

*Nature Nurtures: Investigating the Potential of School Grounds* is a comprehensive review of the literature pertaining to school ground naturalization. *Nature Nurtures* explores the range of benefits that results when a whole school community participates in improving its school ground. In particular, the benefits of introducing natural elements such as meadow, woodland or food growing gardens that stimulate both play and learning, are examined.

This report is the result of a collaborative effort between Evergreen and a team of researchers led by Dr. James Raffan. Production was made possible thanks to the generous support of a number of our sponsors and supporters.

Evergreen commissioned this literature review because we have witnessed the variety and depth of ways that students and entire school communities can be positively influenced when engaged in making improvements to their school grounds. Our observations have led us to believe that it is not merely the addition of physical elements such as trees, hills and play structures that improve school grounds, but equally important is the process that engages students in the design, building and maintenance of this space.

*Nature Nurtures* indicates how school grounds are often overlooked and undervalued places at our schools that deserve greater attention from school administrations, teachers, parents and the community at large. We hope this report will aid in the efforts of those who are working toward creating more nurturing and stimulating outdoor environments for the generations to come.

Evergreen
Table of Contents

SECTION 1: INTRODUCTION ..................................................................................................................1
   A Growing Phenomenon .....................................................................................................................1
   Clarification of Terms ........................................................................................................................1
   Purpose of This Report .....................................................................................................................1
   Structure of Report ..........................................................................................................................1

OVERVIEW ...........................................................................................................................................2
   Historical Context ............................................................................................................................2
   Why Focus on School Grounds? ........................................................................................................2

SECTION 2: THE LITERATURE: A SUMMARY OF KEY FINDINGS ..................................................3
   Learning Through Landscapes ...........................................................................................................3
   Diversity Is Key ................................................................................................................................4
   The Importance of Middle Childhood ..............................................................................................4
   Children Prefer Naturalized School Grounds ...................................................................................4
   Restorative Aspects of Nature ...........................................................................................................4
   Enhanced Academic Performance and General Health ....................................................................5
   Closing the Achievement Gap ..........................................................................................................5

SECTION 3: THE BENEFITS ..................................................................................................................6
   Student Benefits ................................................................................................................................6
      MORE MEANINGFUL PLAY AND LEARNING ..............................................................................7
      SAFER AND LESS HOSTILE OUTDOOR ENVIRONMENTS ............................................................8
      MORE GENDER-NEUTRAL PLAY SPACES ....................................................................................9
      LOWER EXPOSURE TO TOXINS ..................................................................................................9
      EXPERIENTIAL LEARNING OPPORTUNITIES .............................................................................10
      IMPROVED ACADEMIC PERFORMANCE ....................................................................................10
      GREATER PRIDE AND OWNERSHIP IN LEARNING .................................................................10
      A CHANCE TO PARTICIPATE IN DEMOCRACY .........................................................................11
      BETTER UNDERSTANDING OF CULTURAL DIFFERENCES ....................................................11
      CREATION OF SENSE OF PLACE ..............................................................................................11
   Teacher Benefits .............................................................................................................................12
      NEW CURRICULUM CONNECTIONS .............................................................................................13
      INCREASED MORALE AND ENTHUSIASM FOR TEACHING .....................................................13
      NEW REASONS TO GO OUTSIDE ..................................................................................................13
      INCREASED ENGAGEMENT AND ENTHUSIASM FOR LEARNING .............................................13
      REDUCED DISCIPLINE AND CLASSROOM MANAGEMENT PROBLEMS ..................................13
   School Benefits ...............................................................................................................................14
      CURRICULUM CONNECTIONS .....................................................................................................15
      REDUCED DISCIPLINARY REFERRALS, ABSENTEEISM AND DROPOUT RATES ............................15
      REDUCTION OF ANTISOCIAL BEHAVIOUR ON SCHOOL GROUNDS ..........................................16
      BETTER CONNECTIONS TO COMMUNITY ....................................................................................16
      INCREASED PRIDE IN SCHOOL ......................................................................................................16
      RESTORATIVE EXPERIENCE ......................................................................................................17
# Table of Contents (cont’d)

Community Benefits ........................................................................................................... 17
- STRONGER SENSE OF COMMUNITY ............................................................................. 17
- INCREASED COMMUNITY SATISFACTION ...................................................................... 18
- BANKED SOCIAL CAPITAL ............................................................................................. 18
- CREATION OF HEALTHY LAND ETHIC/ENVIRONMENTAL CITIZENSHIP ..................... 18
- BETTER COMMUNITY HEALTH ....................................................................................... 19
- ACTIVE INVOLVEMENT FOR PARENTS IN CHILDREN’S SCHOOL ............................... 19
- BETTER NATURAL ENVIRONMENT ............................................................................... 19
- POSSIBLE FINANCIAL SAVINGS ................................................................................... 19

THE COSTS .......................................................................................................................... 20

SECTION 4: SAMPLE APPROACHES .................................................................................. 23
- The Peace Garden ............................................................................................................ 23
- The Owl’s Nest .................................................................................................................. 24
- The Pond Project ............................................................................................................. 25
- The Learning Playground ............................................................................................... 26

SECTION 5: CONCLUSION .................................................................................................. 27

SECTION 6: BIBLIOGRAPHY ................................................................................................. 29
Section 1: INTRODUCTION

A Growing Phenomenon
In the year 2000, students, teachers and community members in approximately 10 per cent of Canadian schools are involved in the improvement of school grounds. These improvements may be as simple as planting annuals outside a classroom window, making outdoor seats and building a fire pit for outdoor classes, or as elaborate as removing asphalt and concrete surfaces, making paths and ponds and planting designs of perennials or native species.

Examples from over 1,000 schools involved to date include the following:

- Starting on Earth Day 1991, Alex Hope Elementary School in Langley, B.C., set out to restore a green belt between the school and a main highway, with each class planting a small cedar tree.
- Runnymede Public School in Toronto created a nature study area, choosing native plants that would provide food and shelter for the birds.
- Springbank Middle School in Calgary planted a windbreak to make their prairie school ground more habitable.
- Students at Harry R. Hamilton School in Middle Sackville, Nova Scotia, restored a small pond on the school property and created a rich, new hands-on learning space (see Section 4: Sample Approaches for details of this project).

Clarification of Terms
Because many of these projects involve gardening or planting, a common term used to describe them is school ground naturalization. However, these projects are also referred to as school ground development, improvement and/or transformation. The terminology can be confusing.

This report defines school ground naturalization as the following:

A process involving students, teachers and community volunteers, in the collaborative improvement of school grounds for the purpose of addressing the healthy physical, social, emotional and intellectual development of students. Central to this process is the creation of more natural conditions through the introduction of trees, shrubs and wildflowers that are native to the area.

The process is school ground naturalization, even though in some cases planting is only a very small part of the project. The product is the creation of a landscape that has a rich diversity of play and learning opportunities. Indications are that this emerging educational phenomenon has significant educational benefits and positive outcomes in areas of child development and community health.

Purpose of This Report
The purpose of this report is to examine the research and writing relevant to the creation of natural and diverse school grounds and to determine the veracity of some of its benefit claims. The report was written with three objectives in mind: (1) to increase general awareness of the attributes of naturalizing school grounds and the importance of the school ground environment in the context of childhood; (2) to promote and encourage school ground naturalization by evaluating and documenting the environmental, economic, social and health benefits that it provides; and (3) to provide school board administrators, principals, teachers, parents and other interested parties with justification for undertaking school ground naturalization projects.

Structure of Report
This report provides a brief overview of the literature of school ground naturalization, followed by a detailed consideration of the benefits and costs of school ground naturalization. It also includes a description of four sample projects. The report has been prepared so that both the literature review and discussion of benefits sections can be read as stand-alone pieces or as part of the full report. In addition, an annotated bibliography can be found along with the full report on Evergreen’s Web site in the Learning Grounds section (www.evergreen.ca).
OVERVIEW

Historical Context

School ground naturalization is rooted in the Progressive Education Movement of the 1930s. As conventional public schooling developed from 1850 onward, there were always teachers and administrators drawn to the philosophies of Jean Jacques Rousseau (1712-1778), Johann Heinrich Pestalozzi (1746-1827) and Friedrich Wilhelm Froebel (1782-1852), who decried rote learning and the tired conventions of manual training schools, believing instead that children should be free to develop individually. These voices were the rallying cry of the Progressive Education Movement, which was inspired, in its heyday, by American teacher and philosopher John Dewey (1859-1952).

According to Dewey, education worked best when it started within a child’s own experience. He believed that experience had to be given equal billing with texts and teachers and that authoritarian teaching methods had to be abandoned for learning through experimentation and practice. He argued that educational experiences that did not go beyond the simple transmission of knowledge and into the realm of the overall health of the individual were of little abiding significance or, worse, “miseducative,” meaning contrary to the greater good of society. Although Progressive Education more or less fizzled out by the Second World War, its ideals have never died. Arguably, one of the most persistent contemporary echoes of Progressive Education is school ground naturalization.

Why Focus on School Grounds?

The first systematic investigation of school ground naturalization was a landmark British study conducted between September 1986 and May 1989 called the Learning Through Landscapes Project. On the basis of observations from hundreds of British schools involved in school ground naturalization, researchers observed a wide range of outcomes from school ground development that sounded strikingly similar to the claims of progressive educators of the 1930s. But this study also highlighted the possible miseducative effects of expanses of close-mown grass and asphalt. The austere messages of conventional school grounds were observed to run contrary to classroom outcomes. The hidden messages of school grounds were a significant force in children’s educational lives. Eileen Adams, author of the Learning Through Landscapes Report, wrote:

It is evident that young people interact with the whole environment. School grounds function as a setting for the formal and informal curriculum in schools, but also as a medium for the transmission of messages and meanings inherent in the hidden curriculum of schools…The appearance of the school grounds…reflect[s] the ethos of the school and communicate[s] in subtle ways something of its attitude to young people and the value we place on them (Adams, 1994).

In a two-year follow-up study, conducted by one of the Learning Through Landscapes researchers, the importance of the hidden curriculum of school grounds was crystal clear. Wendy Titman concluded:

• School grounds, by their design and the way they are managed, convey messages and meanings to children that influence their attitude and behaviour in a variety of ways.
• Children read these messages and meanings from a range of signifiers, which frame the cultural context of the environment. This constitutes the Hidden Curriculum of school grounds.

The Things Children Need

“The school and its grounds should be a complete environment for learning. It should stimulate the process of child development. The landscape in which the school stands is important and, at best, can provide a rich and stimulating resource and setting for learning and teaching. Financial constraints and traditional management practices mean that many are, at worst, close-mown, sterile, windswept spaces or tarmac expanses making little contribution to the school curriculum or to the environment in general.”

Eileen Adams, Learning Through Landscapes Report
• The Hidden Curriculum has considerable influence, in a range of subtle but significant ways, on the operation of all schools.
• It is within the power of those who manage schools to determine the nature of the Hidden Curriculum of their school grounds (Titman, 1994).

Recent estimates indicate that Canadian elementary school students spend as much as a quarter of their day on school grounds, assuming 15 to 30 minutes before school, 30 minutes for recesses and 30 to 45 minutes for lunch (Cheskey, 1996). If students spent little time on school grounds, their austere hidden curriculum would not be a detrimental force; however, with substantial time outdoors at school, in spaces that have been compared to prison yards “designed primarily for surveillance” (Cheskey, 1994), school grounds have definite potential to adversely affect learning.

Statistics show that conventional school grounds also put students at physical risk. The Canadian Hospitals Injury Reporting and Prevention Program, for example, reports that 53,000 children were injured on playgrounds in Canada between April 1990 and August 1995. Of these injuries, 62 per cent occurred in school, daycare or preschool grounds, and 38 per cent occurred in public parks. Nearly 3,000 of these children required hospital admission. The most common injury: falls from playground equipment onto hard surfaces that result in head injuries and broken bones (Mauffette, 1999).

Qualitative data generated in the Learning Through Landscapes studies indicate that naturalizing school grounds and, by softening the play surfaces, can reduce the incidence of injury as well. But early indications from these British studies are that participation in school ground naturalization projects can have more far-reaching spinoffs in the areas of overall child health.

Section 2: THE LITERATURE: A SUMMARY OF KEY FINDINGS

Learning Through Landscapes (Adams, 1990) and Special Places; Special People (Titman, 1994) are the first documents in what is now a continuum of program descriptions and qualitative studies that draws on interview and observational data. Canadians have contributed a number of publications by seasoned practitioners (Coffey, 1994, 1996; Cheskey, 1993, 1994, 1996; Reading and Taven, 1996; Aboud and Kock, 1996). Acknowledged as a founding voice, however, is Edith Cobb, a researcher who interviewed adults about their experiences with nature as children and demonstrated that vibrant mental health in her subjects was closely linked to creativity. In her seminal book The Ecology of Imagination in Childhood (1977), Cobb concluded that creative expression is rooted in a child’s relationship with the complexity, plasticity and manipulability of the environment.
the natural world. Among others to be inspired by Cobb’s early work were Roger Hart (1982, 1987, 1987, 1988, 1992) and Robin Moore (1986, 1986, 1986, 1989, 1989, 1996), as well as many of the participants and researchers in the British studies that kick-started the current enthusiasm for school ground naturalization. In the best instances, these investigations elevate findings from strictly anecdotal reporting to well-founded conclusions about the costs and benefits of various types of school ground projects.

Diversity Is Key
A main conclusion arising from Robin Moore’s research is that school grounds with increased diversity of choices for children engender more creative play, which in turn facilitates better social interactions, increased facility with language, better on-the-spot problem solving and enhanced self-concept. In her recent book, Sharon Stine further explores the notion of diversity in school grounds, drawing on research in a wide range of learning institutions (preschools, elementary, middle and high schools), and comes to the conclusion that optimal play and learning on school grounds occur when students are actively involved in the creation of these spaces and when there are features that present a range of options for students. Stine concludes that learning grounds should have accessible and inaccessible areas; places for passive and active play; elements that are risky and others that are repetitive and secure; hard and soft surfaces; and natural and built elements (Stine, 1997).

The Importance of Middle Childhood
Related writing focuses on the diversity in outdoor learning spaces created by additional vegetation (Nabhan and Trimble, 1994; Harvey, 1989, 1989; Sobel, 1996, 1998). David Sobel, for example, studied 90 children in England and 125 children in the West Indies and came to the conclusion that giving children the chance to create private outdoor worlds in middle childhood (six to 13) builds environmental awareness, sense of place and sense of self in community — all of which extend into adulthood. He writes:

Middle childhood is a critical period in the development of the self and in the individual’s relationship to the natural world. By not recognizing the unique biological and psychological characteristics of the individual during this period, educators fail to provide a curriculum that is optimally attuned to the nature of the unfolding self. And it is children’s interest in shaping the world, constructing small places for themselves that gives us one of the major clues to the nature of this period (Sobel, 1993).

Children Prefer Naturalized School Grounds
Building on Robin Moore’s interest in empirical research on school grounds is a second tier of investigators who are starting to generate statistical data to add to the anecdotal and qualitative findings of earlier research. MaryAnn Kirkby, for example, studied a group of elementary school students in a naturalized playground and showed a dramatic preference on the part of these children for places of natural refuge on school grounds. Her data show that although refuges occupied only 10 per cent of the total space of the school grounds, activity in these places took up almost half (47 per cent) of the total time students spent outside (Kirkby, 1989). This message is implicit in the observations of many other authors and researchers as well, detailed later in this report.

Restorative Aspects of Nature
Research in the area of environmental psychology is
also relevant to this report. It indicates that proximity to vegetation has a host of benefits. Leading these investigators are Rachel and Stephen Kaplan, who began investigating the psychological benefits of gardening and moved on to research the restorative aspects of nature (Kaplan, 1973, 1985; Kaplan and Kaplan, 1989, 1990). Related research shows that being in or near nature (meaning vegetation) can speed recovery from mental fatigue (Hartig et al., 1991), improve health of inmates in penal institutions (Moore, 1982), speed postsurgical healing (Ulrich, 1984), reduce stress (Ulrich et al., 1991; Ulrich and Parsons, 1992), increase social interaction (Coley et al., 1997) and enhance community satisfaction (Taylor et al., 1998).

**Enhanced Academic Performance and General Health**

Jacquelyn Alexander showed that school gardening enhanced academic performance and general well-being of students, increased positive interactions with parents and other adults and inculcated respect for living things (Alexander et al., 1995). In a study involving 845 children at 21 junior schools in England, Margarete Harvey demonstrated with quantitative data that experiences in naturalized school grounds boost the botanical knowledge and environmental attitudes of schoolchildren (Harvey, 1989, 1989). In a related study in which adults were asked to illustrate and discuss their “healing places,” Anita Olds concluded that nature was strongly associated with healing in her experimental group, and that this restorative connection with the outdoors was probably a result of direct experiences with the natural world during childhood. She writes: “…preventing ‘dis-ease’ [sic] by making nature the child’s playscape is far less costly monetarily and emotionally than trying to cure the effects of such deprivation later” (Olds, 1989). These demonstrated connections between nature (plants), positive environmental attitudes and good health are strong.

**Closing the Achievement Gap**

To date, the most comprehensive study with conclusions relevant to school ground naturalization is a recent American nationwide exploration of the environment as an integrated context for learning (EIC). This study, carried out by the State Education and Environment Roundtable, explores the experience of students, teachers and administrators in 40 elementary, middle and secondary schools that include the natural environment as a curriculum element. Schools in this study were not necessarily involved in school ground naturalization but used nature as a “framework for learning in all areas; general and disciplinary knowledge; thinking and problem-solving skills; and basic life skills, such as cooperation and interpersonal communications” (Lieberman and Hoody, 1998). Like much of the rest of the related research, the EIC methodology was largely based on sound observational and interview data. However, the study also produced convincing quantitative data as well through a survey of more than 100 educators involved in a variety of EIC projects. Fourteen of the schools tracked overall school performance in standardized test scores. They also administered a Learning Survey to more than 100 of the teachers involved. Numerical findings about EIC benefits as perceived by these teachers were quite striking as the following chart illustrates.
Further to these survey results, standardized test scores for students involved in EIC learning in these schools showed improved performance in reading, math, science and social studies. In 92 per cent of comparisons made between the academic scores of EIC and non-EIC students, using both comprehensive and subject-specific standardized assessments, EIC students outperformed non-EIC students in reading, writing, mathematics, science and social studies. These are convincing findings that speak to the possible power of taking learning outside of the classroom, but they also highlight the need for this type of research conducted directly within the context of school ground naturalization.

As indicated in this brief overview, there is a broad range of literature pertaining to school ground naturalization, from descriptions of existing and proposed projects to prescriptions for future initiatives, as well as a variety of investigative research. With the exception of Closing the Achievement Gap, which had strong quantitative evidence for the value of learning grounds, the bulk of research presently available is anecdotal, qualitative and conducted in non-Canadian contexts. Nevertheless, this literature does relate to Canadian school ground initiatives, conceptually at least, and there is good reason to accept that benefits and costs described or demonstrated in other jurisdictions can be applied to projects in Canada. A detailed assessment of benefits and costs follows.

Section 3: THE BENEFITS

Benefits of school ground naturalization have been organized in four clusters: student benefits; teacher benefits; school benefits; and community benefits. In appreciating these, two points should be kept in mind at all times: (1) all research is context bound, therefore, making generalizations or assumptions about the universal nature of a process on the basis of specifics recounted in the literature must be done carefully; (2) benefits tend to flow from one locus to another. For example, improved academic performance as a result of involvement in a school ground naturalization project on the part of a student, may have direct effects on a teacher’s enthusiasm for teaching, which in turn will affect the morale of the school, which in turn may increase enrollment or enhance public perception of the school, which in turn may encourage community members to become involved in school affairs or give them a heightened sense of community satisfaction.

Student Benefits

Research shows that the benefits to children arising from the inclusion of nature in their school grounds differs depending on the age of the child. For young children, adding natural elements to play spaces improves the quality of their play. Children are more inclined to “pretend” when they have lots of different places to stimulate their imaginations. Simply changing from hard play surfaces to soft play surfaces, such as wood chips or sand, can reduce the severity of damage from falls, the leading cause of playground injury. Likewise, the addition of trees or bushes slows down the speed of travel on a school ground, and this too reduces injury. But developmentally, there is excellent evidence that the diversity added to playgrounds through the process of naturalization improves the intellectual, moral and physical development of young children—benefits that continue as children grow older.
It is for children in middle childhood that naturalized school grounds have the most significant developmental and educational effects. This is the time in a child's development when the full diversity of life and form in nature registers, forms patterns, sets priorities and establishes the building blocks of adult sensibilities about self, others and the world at large. The literature — work by David Sobel and Robin Moore in particular — shows that if there is one time in a child's life when interacting with nature in a school yard is crucial, it is middle childhood. In doing so, children develop an appreciation for living things. But the outdoor learning of middle childhood is not just about nature. This learning is linked to establishing ethical principles, learning to get along with others, understanding delayed gratification and building the language and social skills to negotiate a place in the world.

For children of high school age, the literature shows that participation in school ground naturalization can mediate fundamental shifts in orientation to education. Getting involved in a school ground naturalization project often means being an active participant in decision making about the creation, planning and management of activities that are tangible. Moving studies from classroom or laboratory to the out-of-doors makes learning much more relevant, to the extent that students are involved in real problems, with real people, real actions and lasting consequences. The benefits for high school students are evident, whether the outcomes are greater pride in and ownership of learning, improved academic performance, positive effects of working as equals with new adult role models, or creation of a lasting sense of place.

**MORE MEANINGFUL PLAY AND LEARNING**

This benefit of school ground development is derived largely from the increased diversity that results from the inclusion of plants, places and structures of refuge, different textures and opportunities for play. Leading this research is Robin Moore (1989), who emphasizes a child's right to a diverse environment, stating that the best way to increase outdoor environments for play is to diversify the space, and the best way to do that is to naturalize.

Taylor et al. (1998) also build on the diversity argument and show a link between creative play, as engendered by naturalized outdoor play spaces, and the development of language. Coming from a slightly different angle is Ray Chipeniuk (1994), who develops an analytical argument for the importance of natural or naturalized environments as places for children to develop their own versions of reality. This is also supported by other findings (Adams, 1990; Cheskey, 1996; Cobb, 1959, 1997; Dillard, 1987; Nabhan and Trimble, 1994; Sobel, 1993).

In a related finding, Lieberman and Hoody (1998) report that EIC learning increased the ability of students in all grades to think creatively. It is interesting to link this finding to those of Moore and others, who argue that naturalized playgrounds increase the amount of creative play. Real-life, real-time interaction with naturalized school grounds seems to provide this benefit no matter what the age or developmental state of the learner.

In fact, there are many researchers (Altman and Wandersman, 1987; Mauffette, 1999; Kaplan and Kaplan, 1989) who demonstrate developmental benefits of various kinds. David Uzzell (1988) goes so far as to suggest that “learning” through landscapes is a misnomer and that what goes on in naturalized school yards should really be called “development” through

---

**Playgrounds and Imagination**

"Any kind of playground which disturbs, or reduces, the role of imagination and makes the child more passive, more the recipient of someone else's imagination, may look nice, may be clean, may be safe, may be healthy — but it just cannot satisfy the fundamental need, which play is all about. And, to put it bluntly, it is a waste of time and money. Huge abstract sculptured play lands are just as bad as asphalt playgrounds and jungle gyms. They are not just sterile; they are useless. The functions they perform have nothing to do with the child's most basic needs."

Christopher Alexander, architect, *A Pattern Language*
landscapes. Physical development that comes from outdoor activity is mentioned throughout the literature, but there is also good indication of cognitive and affective developmental benefits as well.

Particularly strong is the evidence about the importance of natural refuges in middle childhood, as introduced by David Sobel (1993). And in her study of adults relating to healing places, Anita Olds shows the importance of natural refuges and how the kinds of experiences they provide can help children to “achieve a personal centering that is a prerequisite for activity in a social world” (Olds, 1989). In another study of adult gardeners, Mark Francis also indicates that places in childhood gardens favoured by his informants were the locations that were “protected, sheltered or hidden” (1995). The importance of refuges is supported by other literature as well (McAndrew, 1993; Blume, 1996).

Guy (1997) describes the importance of healthy relationships in overall child health, and emphasizes the development of moral intelligence and how this type of knowing is a consequence of learning how to be with others. Case studies of school ground naturalization have much to say about children interacting with each other, with teachers and administrators, with parents, community volunteers and local experts. All of these interactions constitute a potent laboratory for “learning how to be with others,” which helps develop what some call moral intelligence.

For example, Lieberman and Hoody (1998) detail what teachers observed about the improvements of interpersonal skills of students in EIC programs. The majority of teachers surveyed (70 to 98 per cent) reported improvement in the following areas attributed directly to using the environment as an integrated context for learning: collaborating on projects with others (this was the highest at 98 per cent); functioning democratically; communicating with others; improved behaviour and self-discipline (this was the lowest at only 70 per cent); giving care to self and others; and practising civility toward others.

Alexander et al. (1995) found moral benefits of school gardening as well, including delayed gratification, independence, cooperation, self-esteem, enthusiasm/anticipation, nurturing living things and exposure to role models from different walks of life. Likewise, Mattson (1992), in summarizing the benefits of horticultural activity as described by practitioners at the Activity Therapy Department at the Vermont State Hospital, in Waterbury, Vermont, highlights the importance of gardening in channelling aggressive behaviours through physical work, managing impulsive behaviour through the delayed gratification inherent in gardening, and increasing frustration tolerance in learning to deal with the unexpected and uncontrollable aspects of gardening.

SAFER AND LESS HOSTILE OUTDOOR ENVIRONMENTS

Robin Moore (1989) reports that less asphalt on school grounds means fewer injuries, but his research also indicates that the high accident rate on hard surfaces is due only in part to the unforgiving nature of the material (see also Mauffette, 1999). Moore asserts that hard surfaces also have a psychological and behavioural effect on students. He suggests that school yard fighting and competition could well be an artifact of jockeying for limited resources. Titman (1994) also links the presence of tarmac on school grounds with aggression.

The corollary of this claim is that added diversity increases resources for learning and thereby reduces aggression, although there is, as yet, very little hard data to quantify this claim. Moore (1989) makes a general statement on his lifetime of research that “poor environmental quality goes hand in hand with a poor safety record.” Drawing from his extensive experience in school ground naturalization and from related studies (Harvey, 1989, 1989; Weinstein and Pinciotti, 1988; Moore, 1986; Rivkin, 1995), Edward Cheskey makes a similar general statement that “increasing vegetation complexity and structural diversity of school yards reduces incidents of aggression and violence, and promotes positive values” (Cheskey, 1994).
An anecdotal report from Ann Coffey (1996), on the basis of her experience with school grounds in Ottawa, indicates that physical movement on the school grounds is slowed by obstacles such as trees in planters, paving paintings, movable building objects and informal seating arrangements for passive pursuits, and that this “child-calming effect” has cut down the number of knock-and-bump accidents in paved playgrounds by 80 per cent. Gordon (1994) talks about how planting made her prairie school ground more habitable because the trees broke the searing wind. A generative corollary here is the finding of Lieberman and Hoody (1998), who report in Closing the Achievement Gap that 93 per cent of teachers responding to a Learning Survey agreed that students acted with more civility toward others after the adoption of EIC approaches.

One of the most instructive pieces of evidence that school ground improvement makes a less hostile environment arises from the simple fact that many schools have made “peace gardens” on their grounds. There is, in fact, a long-standing connection between gardening and absence of hostility (McKean, 1989), quantitatively proven by the work of environmental psychologists such as Rachel and Stephen Kaplan. Through several organizations, including International School Peace Gardens (ISPG), spearheaded by Canadian Julia Morton-Marr, many schools in Canada and elsewhere in the world have used gardening for this express purpose. ISPG espouses many benefits of making a peace garden on school grounds (hard evidence of these benefits is yet to be posted online, but there is convincing anecdotal and descriptive evidence of the benefits of peace gardens in John McKean’s 1989 book, Places for Peace). A prominent virtue examined in organizational literature is the creation of school peace gardens as a strategy for “managing school bullies” (Morton-Marr, 1999). A peace garden at Gananoque Secondary School in Gananoque, Ontario, is described in more detail in Section 4: Sample Approaches.

In Our Promise to Children, Kathleen Guy draws from a broad array of recent research to conclude that when working with a variety of adults in a school context — teachers, administrators, community volunteers, parents — measurable benefits accrue from situating a child within a caring community. This, too, as a spinoff of school ground development, is linked to less hostile school experiences for children. She writes: “Changes may occur in a child’s life because of this caring community, including motivation and self-esteem, increased literacy, reduced dropout rates and reduced rates of school violence. Ultimately, more productive members of society are created” (1997).

MORE GENDER-NEUTRAL PLAY SPACES
Robin Moore (1989) has shown that traditional playgrounds tend to favour the aggressive and competitive behaviour of boys, and goes on to make the point that adding diversity to school grounds can diminish this tendency. Ted Cheskey (1996) discusses his research for a video on school ground naturalization, in which he learned of the gender bias of traditional play spaces. One of his female informants said, “If only the girls could have a cubbyhole where we could go and talk, without the boys hearing us.” The inference connects with research into the diversity of naturalized play spaces: a variety of children can create a variety of circumstances for play.

LOWER EXPOSURE TO TOXINS
Coffey (1996) reports that shade trees in her study...
schools in the Ottawa area reduce children’s risk of exposure to harmful ultraviolet radiation and help filter dust and pollutants from vehicle exhaust. This is a strictly anecdotal finding that is echoed by work in urban Chicago by members of the Human Environment Research Laboratory (Taylor et al., 1998; Coley et al., 1997).

Guy (1997) refers to the desirability of decreased use of pesticides and herbicides — many school ground naturalization projects decrease the amount of turf and thereby reduce the amount of weed killer that might be required. More to the point, however, is that many naturalization initiatives are predicated on a healthier relationship with nature, an offshoot of which is a philosophical thrust away from chemicals toward natural strategies of pest control (Titman, 1994; Coffey, 1996).

EXPERIENTIAL LEARNING OPPORTUNITIES
Involving students in school ground development can require participation in the planning and organization of the projects, as well as actual hands-on contributions to the furthering of collaborative designs. This shift in perspective and position in the learning process can be as simple as a teacher changing from “What do I want my students to know?” as a central, organizing question in lesson planning to “What do I want my students to do?” as the place to begin curriculum design (Raffan, 1995).

In their EIC research, Lieberman and Hoody (1998) allude to this shift, detailing collateral benefits such as cross-disciplinary instruction; improved thinking and problem solving; rich hands-on experiences; more community-based learning; and integration of diverse viewpoints, perspectives and approaches. They conclude that involvement in real-world, project-based activities seems to help students refine their abilities in scientific observation, data collection, analysis and formulation of conclusions (Lieberman and Hoody, 1998).

IMPROVED ACADEMIC PERFORMANCE
Moore (1989) mentions increased academic performance by students involved in school ground transformation efforts — a qualitative inference not supported with numerical data. Again, new EIC data provide strong quantitative evidence of the same point.

Lieberman and Hoody (1998) report that 14 of the 40 schools (including elementary, middle and high schools) in their study of the environment as an integrated context for learning (EIC) generated quantitative data on academic achievement, including standardized tests and grade-point averages. Their finding was that all of these 14 schools found that quantitative measures of achievement affirm the academic benefits of EIC-based learning. Specifically, 92 per cent of comparisons made between the academic scores of EIC and non-EIC students, using both comprehensive and subject-specific standardized assessments, indicated that EIC students outperformed non-EIC students in reading, writing, mathematics, science and social studies.

At Jackson County Middle School in McKee, Kentucky, for example, students in Grades 7 and 8 who moved into an EIC program, tracked from 1992 to 1996, registered an average 10 per cent increase over their previous scores in the Kentucky Instructional Results Information System (Lieberman and Hoody, 1998).

GREATER PRIDE AND OWNERSHIP IN LEARNING
Lieberman and Hoody (1998) also report that teachers responding to an EIC Learning Survey said that students involved in EIC were more likely to display a sense of pride and ownership in their work than students in more traditional school settings — whether it was restoring wetlands, creating butterfly gardens, or participating in environment-based service-learning projects. This finding is echoed in just about every other piece of literature. The question, however, is not whether students develop greater pride and ownership...
in what they are learning as a result of highly experi-
ential projects on the grounds of their schools —
because evidence shows quite clearly that this is the
case — rather it is which students and under what
kind of learning conditions does this benefit accrue?
This question is yet to be answered convincingly. Is it
just the student who would take pride in any kind of
learning, in school or out, or is this a benefit available
to students who have difficulty taking pride in any-
thing related to school? These are questions for which
answers are lacking in the current literature.

A CHANCE TO PARTICIPATE IN DEMOCRACY
Hart (1992) develops an eight-step ladder of participa-
tion in learning — from manipulation through assign-
ment, consultation, all the way up to the highest
form of school involve-
ment, which is child-initi-
ated activity and the dem-
ocratic sharing of decision
making with adults. This is
a condition that is report-
ed in case studies of many
successful school ground
naturalization projects,
especially those reported
by Adams (1990), Titman
(1994) and Stine (1997). Glazer and Glazer talk about
the importance of participating in decision making,
calling this a “living context” that allows citizens to
turn away from trust in experts and bureaucrats and to
rely more on their own wisdom and sensibilities. If this
argument is extended, the extent to which students
participate in a school ground transformation decision
is a significant measure of overall community health:
“...social connectedness, or social capital, is a indica-
tor of the health of society, and a powerful predictor of
the quality of public life” (Glazer and Glazer, 1998).

Wendy Titman confirms, on the basis of her two-year
qualitative study, which followed the Landscapes for
Learning initiative in Britain, that the one critical fac-
tor in influencing overall school behaviour is active
involvement in the planning, execution and care of
naturalized school grounds. “For our research, the
active involvement of children constantly emerged as
a critical factor influencing their behaviour and also
their attitude, not only in terms of the grounds, but in
relation to themselves and the school as a whole”
(Titman, 1994).

BEFTER UNDERSTANDING OF CULTURAL
DIFFERENCES
Coffey (1994) reports that in an Ottawa school with a
large multicultural population, school ground natural-
ization was a way to create understanding of the rela-
tionships between human food needs, organic food
waste, the land and the complexity of organisms, and
to learn about cycles of life, death, decay and regen-
eration — lessons that trans-
lated into a broader respect for
cultural differences and other
creatures’ needs.

CREATION OF SENSE OF
PLACE
There is much anecdotal evi-
dence about how outdoor expe-
tiences build sense of place
(Sobel, 1993, 1996; Golley,
1998; and many others). When
Wendy Titman writes about
building connections to landscapes in Special Places;
Special People, she refers to the totality of the experi-
ence of developing a school ground. Working on school
grounds affords children the opportunity to learn
about the passage of time through changes in nature
that they can see with their eyes and feel with their
hands. With this work, Titman affirms the findings of
other researchers like John McKean, who talks about
an experiential process of attaching symbolic meaning
to places through plants. McKean gives the example of
planting a cherry tree on school grounds to mark an
important occasion (McKean, 1989). Robin Moore is of
similar conviction when he writes, “...vegetation is
one of the most ignored topics in the design of play
environments...it marks the passing of the seasons,
introducing a sense of time into the child’s environ-
ment” (Moore, 1989).
As many writers and researchers have concluded, sense of place — based on affect as well as cognition — is the essential ingredient in environmental literacy, which in turn is the basis of informed environmental action (Raffan, 1990; McClaren, 1998). The moment that creation of good future citizens is acknowledged as a desirable educational outcome (as it is in most jurisdictions), building sense of place becomes an obligation. The literature shows that this can only be done effectively through first-hand experience in the outdoors. The frightening aspect of this conclusion hearkens back to the notion of hidden curriculum and the extent to which conventional unimproved school grounds contribute to placelessness or, as one author put it, how schooling taught him “contempt for the Earth” because of the absence of nature in his curriculum (Nixon, 1997).

There are many reasons for students to become involved in school ground improvement projects, but this final point about building environmental responsibility in future citizens is one that should not be lost in the mix of other outcomes. When Calgary teacher Tamara Gordon writes about her school ground project, the main benefit that she reports is the creation of “…a group of fiercely devoted student environmentalists who have pledged themselves to the care and protection of a group of courageous plants” (Gordon, 1994).

**Teacher Benefits**

Involvement in a school ground naturalization project involves time and energy (Adams, 1990; Berman, 1997; Blume, 1996; Chen, 1999; Cheskey and Pearce, 1994; Collyer, 1996; Humphries and Rivkin, 1998; Kerr and Harrison, 1996; Knoop, 1996; and Reading and Taven, 1996). The benefits of this effort, however, accrue from year to year, in the sense that word of good teaching spreads, and the new teaching space that is created matures and lives on. In every published teacher’s account of school ground naturalization, there is a common thread: it matters not what curriculum application is made in the outdoor context; any topic or subject can come to life when a teacher moves to enhance the hidden curriculum of school grounds. For teachers, moving into the outdoors necessarily involves shifting from traditional to more experiential teaching methods, a change that the literature shows quite clearly has an abundance of collateral benefits, not the least of which is often renewed enthusiasm for the act of teaching (Lieberman and Hoody, 1998).

The literature also shows that teachers know the outdoors is a potentially productive learning space but many are concerned about discipline, safety, control or the perception on the part of colleagues or administrators that outdoor learning is somehow not respectable. Although still in the early descriptive stages, first-hand accounts of secondary school experiences in outdoor teaching in natural settings indicate that these fears are not borne out in reality. Research shows that when students get involved in outdoor projects, their level of engagement and enthusiasm for learning goes up, not down, and that this situation, for teachers, translates into significantly reduced discipline and class management problems (Lieberman and Hoody, 1998). Research from environmental psychology (Ulrich, 1983; Ulrich et al., 1991; Ulrich and Parsons, 1992) demonstrates that a calming effect of vegetation on schoolchildren helps us under-

---

**Kinship with Nature**

“Perception and culture-bound values apart, it remains true that the human body evolved biologically in close association with nature’s animate and inanimate elements. Human beings are predisposed in their favour. A sense of kinship with nature is universal. Children can easily be taught to appreciate hunting and to develop a close, if not sentimental, relationship with animals and growing things. Children the world over seem to enjoy playing with such basic earth substances as water, clay and sand; they like to climb trees and slide down slopes. Nature has few ‘do’ and ‘don’t’ signs posted by adults. It is a relatively unstructured environment in which children’s carefree vigor can be allowed full play.”

*Vi Fu Tuan, Children and the Environment*
stand one element of how and why interaction with nature can have such benefits.

NEW CURRICULUM CONNECTIONS
Case studies mentioned in Adams (1990), Titman (1994) and Stine (1997) and cross-curricular academic achievement data (Lieberman and Hoody, 1998) demonstrate quite clearly that regardless of subject, unit or topic, school ground transformation projects can be effectively worked into any and all aspects of curriculum. This is a fact that has long been described in the outdoor and experiential education literature (Raffan, 1995).

For example, in her empirical study of students, teachers and parents involved in elementary school gardening, Jacquelyn Alexander shares as emblematic of teachers’ views about gardening and curriculum, the following teacher’s words: “My biggest reason [for supporting it] is the academic end of it correlates to what I do in all of my subjects” (Alexander et al., 1995).

INCREASED MORALE AND ENTHUSIASM FOR TEACHING
Data from the EIC study shows that incorporating the natural environment into lessons increases the engagement of students but also increases teachers’ enthusiasm for teaching. Educators reported that as a result of using EIC approaches, they experienced increased engagement in and enthusiasm for teaching; improved interactions with students and colleagues; expanded opportunities for professional development and personal growth; greater willingness to use innovative instructional strategies; and a noticeable growth in the support of their administrators (Lieberman and Hoody, 1998). Edward Cheskey’s observation report of a naturalization initiative improving overall staff morale (Cheskey, 1996) affirms this broadly-based benefit of the creation of learning grounds.

NEW REASONS TO GO OUTSIDE
Harvey (1989) concludes that children’s experiences with vegetation shape their environmental attitudes, and that transforming school grounds through planting vegetation creates a new set of curricular reasons to go outside, not the least of which is the students’ enthusiasm for going there.

INCREASED ENGAGEMENT AND ENTHUSIASM FOR LEARNING
One of the prime benefits of experiential teaching methods is increased engagement and general enthusiasm for what is being learned (Kraft and Kielsmeier, 1995). Why this might be the case has to do with relevance of the subject matter to daily lives, the perception on the part of students that what they are doing has meaning beyond school and that educational pursuits are inherently fun, especially when they involve new constellations of people and new levels of input on the part of the students in designing their learning circumstances. These characteristics of experiential learning are reflected in many case studies of school ground transformation. On the basis of the congruence between qualities of experiential education and features of school ground development, it should come as no surprise that 98 per cent of teachers involved in EIC projects (Lieberman and Hoody, 1998) reported increased enthusiasm and engagement on the part of their students following the implementation of an EIC program.

REDUCED DISCIPLINE AND CLASSROOM MANAGEMENT PROBLEMS
Demonstrated student benefits — reduced aggression, improved academic performance, greater pride and
Ownership in learning — appear to combine with the participation of a teacher to reduce discipline and classroom management problems. Although this is not clearly documented or articulated in the literature, extrapolation from existing accounts leads to the conclusion that just as improvement projects add diversity to school grounds, these initiatives also add diversity to schooling, meaning that students who are bored by one type of activity might be engaged by another. And just as Robin Moore has argued that lack of diversity on traditional asphalt and grass school grounds may in fact be a cause of aggression and antisocial behaviour, one might argue after reading the available case studies, that a lack of curricular diversity may have exactly the same effect in the area of class management. This point, however, remains to be established with solid data. The one point that is amply proven in the literature is that if a school ground improvement project involves the planting of trees, bushes or other vegetation, then it will likely have a “child calming” effect on students (Coffey, 1996; Ulrich et al., 1991).

**School Benefits**

At the school level, the benefits of school ground naturalization begin with the creation of a living context for learning, which can be used to create a variety of new curriculum connections but which has also been shown to enrich the overall ethos of the school. Naturalized school grounds are safer and less violent than conventional expanses of grass and asphalt, but changes in individuals have resulted in significantly reduced indexes of social pathology at schools, including disciplinary referrals, absenteeism, truancy and dropping out. These benefits, combined with increased school pride and increased staff and student morale, can transform a school.

Although evidence is scanty about the movement of benefits up the administrative line to include school governance or political influence on curriculum design, Adams (1990) and Titman (1994) in the European context and Cheskey (1993, 1994, 1996) Coffey (1994, 1996) and Collyer (1996, 1999) in the Canadian context create a reasonable expectation that benefits observed at the school level eventually register at school board level and have effects on curriculum design at governmental levels. Although politicians often speak of education as a shared community responsibility, often the school and its community are worlds apart. Likewise, the transfer of curriculum from government to governance council to classroom, from education ministry to board of education to school administration, from bureaucrat to board member to teacher, is often seen as an imposition from on high. School ground transformation projects, which often include students, teachers, principals, board personnel, parents and community members, appear to have the potential to reverse this trend.

When school grounds are shared spaces, they become physical connecting zones, places for overlap between community and school. Evidence in the literature shows that when this physical connection occurs, other types of connections occur as well. Information begins to flow through this zone of overlap, strength-
ening connections between teacher and administrator, between school and board, between board and government — connections that can result in new thinking about the nature of curriculum (formal, informal and hidden) and about the real meaning of education as a collaborative venture. The most convincing evidence of this in the literature to date is contained in Learning Through Landscapes (Adam, 1990) and Special Places; Special People (Titman, 1994).

Perhaps the most significant way in which schools become beneficiaries of the creation of learning grounds is through new and positive connections to the communities of which they are a part. When projects work, they often involve experts, parents and/or volunteers from the local community. These adults enrich the learning environment for students but also make a human link between schools and communities. Case studies (Stine, 1997) indicate that in many cases these links translate to improved relations between school and community, and when problems do arise that create friction, the social capital banked through the process of collaboration on a naturalization project makes a difference in the amicable and expeditious resolution of school/community issues. What follows is a summary of individual benefits to schools.

CURRICULUM CONNECTIONS

In writing about the ways in which neighbourhood and community environments are established, environmental psychologists Altman and Wandersman conclude that “Where we live is a statement of who we are” (1987). Adams (1990) and Titman (1994) proved quite convincingly that the hidden curriculum of school grounds exists, and they further demonstrated that if these messages contradict the formal (teacher-controlled) curriculum of the school, then a degenerative situation exists. Adams suggests that naturalizing school grounds can allow the formal, informal and hidden curricula of schools to be seen as “…part of the continuum of learning experience inside and outside the classroom, a means of ensuring educational opportunity through the extension of the learning environment out of the school building into the sunshine classroom, the outdoor laboratory or nature reserve” (1990).

Drawing on the literature of environmental education and environmental literacy, Bogner (1998) shows that short-term outdoor ecology education has effects on students’ environmental perspectives but suggests that “…training in environmental citizenship is without doubt as complex a procedure as it is a long-term one.” Referring to the “foot-in-the-door” effect of short-duration outdoor education, he concludes that to translate this knowledge into effective environmental citizenship, sustained exposure to the natural environment is required, as in regular classes in a naturalized school ground. And while this sounds like a connection to the science curriculum, demonstrated developmental, social and behavioural outcomes of student activity in naturalized school grounds produce benefits across the entire curriculum. Harvey (1989) makes a complementary finding.

REDUCED DISCIPLINARY REFERRALS, ABSENTEEISM AND DROPOUT RATES

Anecdotal reports from Coffey (1996) affirm a decrease in absenteeism and dropout rates in schools with naturalized grounds. In another anecdotal reference, Collyer (1996) reports that creation of learning grounds increased school enrolment at a Toronto elementary school, because naturalization increased the attractiveness of the school to prospective students and parents. Kathleen Guy concludes that when home and school create a caring and supportive community that surrounds a child, this has measurable benefits, one of which is reduced dropout rates (Guy, 1997). The only quantitative data supporting this factor comes from the EIC study, which records impressive...
improvements in student behaviour at Hotchkiss Elementary School, in Dallas, Texas. During the first three years of a new EIC project, disciplinary referrals totalled 560 in the first year, 160 in the second year and only 50 in the third year, tracked from 1994 to 1997. This constituted a 91 per cent decrease in disciplinary referrals (Lieberman and Hoody, 1998). This finding was echoed in other EIC schools, although not with such dramatic numbers.

REDUCTION OF ANTISOCIAL BEHAVIOUR ON SCHOOL GROUNDS

In addition to research reported under student benefits, such as Ann Coffey’s findings that school ground naturalization resulted in reduced antisocial behaviour (i.e. aggression), physical speed of play in the school ground, knock-and-bump accidents, absenteeism and dropout rates, there is other evidence from the Human Environment Research Laboratory (ACES, 1999). In treed public housing developments in Chicago there was decreased incidence of violence and increased perception of safety compared with untreed developments. Coffey has also noticed in her own experience that during periods of school gardening, there is less juvenile delinquency in the schools where she works (Coffey, 1996), a finding that is mirrored in an American study, which reported that each year since the establishment of school ground gardens at Raymond, DuSable and Austin schools in ghetto areas of Chicago, “...the number of broken windows in the school has been reduced” (Lewis, 1992).

Zeisel (reported in Titman, 1994) concludes that much of the damage sustained by schools is caused by lack of recognition of the need to plan and design for the informal and social needs of the users, as well as for formal educational needs. The message here, of course, is that including students in the care of school grounds increases their understanding of space planning and decreases their urge to vandalize. Environmental psychologist David Uzzell, for example, explains how this might work. Using Newman’s Theory of Defensible Space, Uzzell argues that opening school grounds to community use makes these semi-public spaces better known, and encourages a “high degree of social responsibility and personal safety,” which in turn are community forces that curb vandalism (Uzzell, 1988).

BETTER CONNECTIONS TO COMMUNITY

The school grounds as a zone of productive overlap between school and community is implied in much of the British research and elsewhere as well. Marietta Stonehouse-Kish (1994), for example, concludes that including local experts in a school ground naturalization project at her school in Millgrove, Ontario, not only enhanced her students’ learning experience but strengthened ties to the community as well. For more details about the Millgrove project, see Section 4: Sample Approaches. Similar school/community ties were reported by Charles Lewis in a paper entitled “Effects of Plants and Gardening in Creating Interpersonal and Community Well-Being.” Lewis quotes a college president from upstate New York who said, “The Class Trees planted on campus not only provide beauty for the beholder, they also create a link to alumni who enjoy a return to Vassar in part to see their particular trees” (Lewis, 1992).

INCREASED PRIDE IN SCHOOL

Throughout Robin Moore’s research (1989), in much of the British experience and in case studies like those in Stine (1997), emerges a tremendous sense of pride on the part of students who have been involved in vari-
ous school ground naturalization projects. Although this is not a stated curriculum goal in very many jurisdictions, this literature leaves one with the conclusion that pride in accomplishment, pride in collective action, pride in nurturing living things and pride in making something for the collective good is a noticeable benefit when school yards are transformed into learning grounds.

**RESTORATIVE EXPERIENCE**

Francis (1995) summarizes the research of other researchers such as the Kaplans (1990) and Roger Ulrich (1993) to make the point that plants and vegetation play a significant role in the creation of restorative experiences of adults, but then goes on to say that this connection between nature and people in adulthood is predicated on connection to nature as children. McAndrew (1993), drawing from Kaplan (1973, 1985) and Kaplan and Kaplan (1989, 1990), concludes that “research confirms that the nature one experiences need not be spectacular — even the most common instances of nature, such as an ordinary tree or a small piece of open land, can be quite satisfying.” Hartig et al. (1991) conducted a series of experiments to explore the restorative aspects of nature and determined that induced cognitive fatigue was best offset by a peaceful nature walk, moreso than by walks in an urban setting or a period of relaxation in a comfortable chair. The point here is that personal connection with nature is good for the soul, and that happy souls make good students and exemplary citizens.

**Community Benefits**

There is much research into the benefits of “greening” communities through the planting of trees and the creation of areas of natural refuge. There is not a lot of research yet on the community effect of school ground naturalization in particular. But what the general literature shows is quite convincing: increased naturalization of a community and more community involvement in planning and creation of these spaces means a stronger sense of community and higher levels of community satisfaction.

And just as there are benefits for students’ and teachers’ general health, both mental and physical, from interaction with natural spaces, the restorative aspect of nature can have similar effects on the overall health of a community. Just as potted plants in offices have been shown to improve the social context of a working environment (Ulrich and Parsons, 1992), and gardening has been demonstrated to have a multitude of health benefits (Berman, 1997; Francis, 1995; Heffernan, 1994; Kaplan, 1973; Lewis, 1990; and Toronto Board of Education, 1997), so too does naturalizing a school ground. And when school grounds are considered in the full constellation of green spaces in a community, this network of natural connections has been shown to measurably affect the overall health of a community (Taylor et al., 1998). For example, research shows that people love the presence of green space in a community but they will only walk three minutes to access it. If more schools naturalize their grounds there will be less distance between green spaces in a community which, in turn, results in more people taking the three-minute walk to enjoy the natural environment down their street.

**STRONGER SENSE OF COMMUNITY**

The Agriculture, Consumer and Environmental Sciences (ACES) Team at the Human Environment Research Lab (1999) has studied the effect of trees and green spaces in urban Chicago and concludes that, on the basis of self-reports by residents, neighbourhoods in Chicago housing developments with more trees have a stronger sense of community than those with fewer trees. Vegetation invites people to dwell outdoors (shade and shelter), which in turn adds a feeling of
safety to the space; that translates into communication and that, in turn, to a heightened sense of community. In another study, Coley et al. (1997) reports that trees promote increased opportunities for social interactions as well as better monitoring of outdoor areas and supervision of children in impoverished urban neighbourhoods. Taylor, Wiley, Kuo and Sullivan (1998) report that Chicago’s green spaces attract adults as well as children, and that children in naturalized spaces tend to get more access to adults, which may also contribute to a sense of community.

**INCREASED COMMUNITY SATISFACTION**

Community satisfaction — the extent to which residents feel settled where they live — is linked to the presence of nature, particularly trees and gardens. Rachel Kaplan, for example, found that for multi-family housing at nine sites in Michigan, the most important factors in neighbourhood satisfaction were the availability of nearby trees, well-landscaped grounds and places for taking walks (Kaplan, 1985). To give some sense of where this effect of vegetation might fit in with whether or not people are happy about where they live, Fried (1982) shows in a questionnaire study that community satisfaction was ranked as more important than marital or work satisfaction as elements of overall satisfaction with life.

**BANKED SOCIAL CAPITAL**

Social capital, or the willingness and capacity to work for the collective good of a community, also appears in this literature as a collateral benefit of school ground naturalization. Olds (1989) identified the importance of natural refuges in formative outdoor experiences and concluded that these kinds of experiences can help children to “…achieve a personal centering that is a prerequisite for activity in a social world.”

This is a benefit that appears to have its genesis in shifting the power base of decision making in school from teacher control toward student control. Glazer and Glazer (1998) identify participation in decision making as a key to banking social capital, calling this a “living context” that allows citizens to turn away from trust in experts and bureaucrats and instead to rely more on their own wisdom and sensibilities. These social environmentalists conclude that the extent to which people do this is a significant measure of community health: “…social connectedness, or social capital, is an indicator of the health of society, and a powerful predictor of the quality of public life” (Glazer and Glazer, 1998). This finding is echoed in Our Promise to Children (Guy, 1997).

The most convincing evidence of the building of social capital from school ground development projects comes from Closing the Achievement Gap. Drawing from observations at 40 schools, researchers found that these learning opportunities help students better understand political decision making. They conclude that “These projects encourage students to become involved…and to be active, contributing citizens and adults” (Lieberman and Hoody, 1997).

**CREATION OF HEALTHY LAND ETHIC/ENVIRONMENTAL CITIZENSHIP**

Aldo Leopold, the renowned writer and ecologist, asserts that “…the most serious obstacle impeding the evolution of a land ethic is the fact that our education and economic system is headed away from, rather than toward, an intense consciousness of land. Your true modern is separated from the land by many middlemen, and by innumerable physical gadgets” (Leopold, 1949). If there is a resounding chorus in the literature of school ground naturalization, it is that these educational efforts remove the “middlemen” and put children into direct contact with nature.

McClaren is convinced of the importance of hands-on experiences with nature and their necessity for informed environmental decision making. He calls for a balance between study in virtual worlds (he includes texts in this category) and study in the “unrendered” worlds of real plants, animals and people. He writes: “By contributing to the store of information about the environment and struggling to make meaning of it, and by deciding what needs to be done, students become part of [an] important cultural conversation. To exclude them is to diminish the ultimate task of
schools and other forms of education of the young — namely preparation for full, responsible adult membership in society” (1998). Rivkin (1995) concludes on the basis of her research that “…for the long-term conservation of the world…children need a strong base of first-hand knowledge.”

Convincing evidence of this comes from studies of environmental activists (Glazer and Glazer, 1998; Bunting and Cousins, 1983; and Chawla, 1986), which shows quite clearly that it is childhood experiences with nature — middle childhood experiences to be precise — that make the difference.

**BETTER COMMUNITY HEALTH**

Although any kind of empirically demonstrated causal relationship between school ground naturalization and community health has yet to be determined, research into the restorative powers of nature (Hartig et al., 1991; Ulrich, 1983; Moore, 1982; and Kaplan and Kaplan, 1989) provides adequate reason to expect that there is a correlation. E.O. Moore’s work in prisons (Moore, 1982) and Roger Ulrich’s work in hospitals (Ulrich, 1984), all of the research into the health benefits of gardening (Kaplan, 1973, 1985; Lewis, 1990, 1992, 1994), and Anita Olds’ contention that exposure to natural outdoor light is linked to good health — all of these findings make believable Olds’ conclusion that the benefits of naturalized school grounds far outweigh the costs of trying to cure the effects of deprivation later on (Olds, 1989). Quantitative data, however, is needed to confirm this.

**ACTIVE INVOLVEMENT FOR PARENTS IN CHILDREN’S SCHOOL**

Alexander reports from her empirical study of the parents of 52 school gardeners that “Parents became more actively involved with school matters and their children’s experiences at school. [As a result of this involvement] children were found to have a sense of being part of a larger community, as they and their families found satisfaction from caring for gardens on weekends” (Alexander et al., 1995). Like many of the benefits, this spinoff of school ground naturalization affects everyone involved, and in largely intangible ways. Issues like well-being are difficult to measure. Again, more research in this area is needed to clarify the size and significance of this particular community benefit.

**BETTER NATURAL ENVIRONMENT**

Cheskey (1994) talks about how planting decreases runoff. Alexander (1997) shows from his research that people enjoy green space but that they will not walk more than three minutes to access it. More naturalized school yards means more green spaces for public use, which means more people will get out into nature and reap the demonstrated benefits of this kind of interaction. Work in urban settings by researchers at the Human Environment Research Laboratory (ACES, 1999) mention a wide variety of benefits to the environmental conditions of communities when trees are added to cityscapes, including reduced storm runoff, increased shade in the summer, better air to breathe and higher levels of community satisfaction.

**POSSIBLE FINANCIAL SAVINGS**

Adams (1990) estimates that school ground maintenance represents 20 per cent of the annual maintenance costs of school sites and buildings. With reduced outdoor areas to maintain (smaller amount of grass to cut, fewer areas for snow clearing), savings could be realized, but there is really no specific evidence in the literature, just conjecture by participants in various research projects such as Learning Through Landscapes.

School ground transformation often results in the sharing, or the potential total shift, of responsibility...
for at least some school ground maintenance. The sharing and shifting go from the custodial staff of a school to the teaching staff and students, provided that union-specified work roles can be clarified. When added to the demonstrated reductions in littering and vandalism when students get involved and take ownership of aspects of school ground maintenance, these savings can be noticeable.

One of the biggest possible financial benefits, identified but not quantified, is in the area of improved human health. The restorative powers of nature, improved school morale, general enhancement of mental and physical health are all elements that could be investigated as a source of significant savings in health care costs, school employee absenteeism and sick leave, as well as reduction of school ground accidents. At best, research in this area would be based on extrapolation from various types of empirical data. But, as yet, the studies have not been done.

The Canadian Hospital Injury Reporting and Prevention Program, as cited in Mauffette (1998) is an example of the type of data that could eventually help researchers assign numbers to the financial savings in the area of human health. If, as is expected, naturalization of school grounds has similar benefits to greening initiatives elsewhere in communities, the potential for savings is excellent. A Human Environment Research Laboratory report concludes “…trees have the potential to reduce social service budgets, decrease police calls for domestic violence, strengthen urban communities, decrease incidence of child abuse” (ACES 1999:2).

And finally, it is useful to remember that as with other small-scale changes in any large system, cumulative effects must be taken into account as well. While there is no specific data concerning school ground naturalization, the following example of the effect of trees elsewhere gives real indication that substantial savings are possible. In the City of Milwaukee, engineers estimate that trees in full summer canopy reduce the flow of storm water by 22 per cent and, as such, save the municipality the estimated $15.4 million it would take to build storm water retention capacity for this amount of flood water. In a somewhat related finding, Moll and Young (1992) present an anecdotal finding that naturalizing school grounds reduces by measurable amounts the energy and water used for lawn maintenance, builds water retention capacity on school property, improves air quality and even moderates the local microclimate. These findings would also be much stronger with quantitative data to back them up.

The literature of school ground development has very little to say as yet about the costs associated with this activity, financial and otherwise. Financially, transforming school grounds can result in savings in services such as grass cutting, weed control and snow removal. While savings might be realized in school maintenance costs, more often school ground transformation might simply result in the reallocation of funds with no net new expenditures or savings, depending on the type of development project undertaken.

As for the costs of materials, labour and machinery, it is important to point out that the cost of school

Mission: To Find and Create Private Worlds

“Education in harmony with development should, among other things, create adults with both a sense of individual initiative and a sense of responsibility to the natural and social worlds. How do we accomplish this? One small way we can help is to acknowledge, in our education, the world-making tendencies of the individual. In middle childhood this means allowing the child to find and create private worlds. If we allow children to shape their own small worlds in childhood, they will grow up knowing and feeling that they can participate in shaping the big world tomorrow.”

David Sobel, Children’s Special Places
ground naturalization is typically not borne entirely by the school. These projects tend to be incremental (meaning funding is raised as required to realize the steps of a plan in sequence) and the money tends to come from outside sources as well as from school coffers.

The perception of funding agencies is that school ground naturalization projects tend to deliver excellent value (Adams, 1990; Titman, 1994). Keeping in mind that benefits flow through a chain of influence from the school ground through students, teachers, school, community and beyond, it is possible to imagine that a dollar spent on planting one tree outside a kindergarten room in an urban setting would have a host of dividends.

As for other costs — some might think of these as “negative benefits” — they are mentioned in the literature, but as often as they are mentioned, there is invariably an assertion or research finding that counterbalances. Part of the reason for the existence of this rosy picture is the fact that people involved in school ground transformation seem not to be moved to write about the drawbacks of this activity. Researchers who have interviewed adult participants have revealed a few glimmers of cost but, again, without data to support the claims, these seem trivial bordering on insignificant. Worry about pollen and allergies in the outdoors is mentioned in a couple of places, but one is likely to find much more data in environmental science literature about “sick building syndrome” and the indoor allergens. Without question, being outdoors exposes students to a host of airborne and surface toxins, but with prudent application of safety practices already in place, this risk can be reduced to completely acceptable levels.

Several authors mention teacher time as a significant cost of school ground development (Alexander et al., 1995; Dankert in Nixon, 1997; Collyer, 1996; Simmons, 1998). It is a problem, of course, if one teacher takes on a project and it becomes dependent on that person’s energy alone — especially if the teacher in question moves or is transferred to another school. Likewise, a problem can emerge if demands on teacher time are increased or intensified due to curriculum or administrative changes, leaving less time for tending to the school ground project. Although there is no hard data about the amount of time teachers spend on their outdoor projects, the literature indicates that these are labours of love (i.e. happy combinations of work and play) for students, teachers, administrators and community members, who freely give their time. It is likely, however, that regardless of the benefits, the creation of learning grounds adds time pressure to already busy lives.

Maintenance of school ground projects is also a potential cost or problem, although only one mention of this was found in the literature (Pope, 1998). During the summer months, when students and teachers are away from the school, there always seem to be questions about who will water the plants. The Gananoque Secondary School Peace Garden (see Section 4: Sample Approaches) solved this problem the way that many schools evidently do, and that was by setting up a roster of students, parents, community members and school summer maintenance staff living nearby to do the necessary weeding and watering. All schools have groundskeepers assigned to do maintenance throughout the year, who will likely be at the school anyway through the summer months, and whose help has been enlisted on occasion, as described in the case study literature (Stine, 1997).

The case study literature distinguishes between preschools and private schools, which are open 12 months a year, and public schools, which are usually active for only 10 months out of 12. Year-round schools have a much wider range of options available
for planting, largely because of the steady availability of people to perform routine maintenance tasks. With vegetable gardens, for example, which are traditionally planted in the late spring for summer harvest, there is a problem of waste if no one is there to pick the produce when it is ripe. Many schools have overcome this problem by planting early and late-harvest varieties, which provide both summer and fall produce, available for distribution to the community via students. One teacher in the Toronto area, Dagmar Bauer (Collyer, 1996), mentions the problem of waste, explaining that she writes off the vegetables — she digs what’s left into the garden in September — and thinks of it as a “sacrifice” in the name of the other virtues wrought in her students’ lives by the experience of gardening. For Bauer, the principle benefit of gardening is not product, but process. As with many school ground naturalization projects, the learning is in the doing.

Additional costs of school ground development are more or less absent in the written record. Uzzell (1988) suggests that for many children from urban backgrounds, the natural environment is a source of fear. Available case study data indicate that this is not the case, at least if urban nature means naturalized school grounds. Again, the fact remains that this possible cost has been identified but not quantified. One piece of related anecdotal data, from an early study that observed inner-city children who daily coped with the dangers inherent in their home turf, provides an indication that the fear hypothesis may have something to it. The tough inner-city children were brought to a patch of woodland and were terrified of the threats that might be lurking there. For these children, the woodland was an alien world, leading the research team to suggest that school gardening might be a preferable way to connect urban children to the restorative powers of nature.
Section 4: SAMPLE APPROACHES

Project: The Peace Garden
School: Ganoque Secondary School (G.S.S.), Upper Canada Board of Education
Address: Gananoque, Ontario
Students: 20 to 30 high school students from a total enrolment of 800
Setting: Suburban (small town)

Project Overview: Perennial beds, paths, benches and shade trees set in an 80-metre-square quadrangle at the rear of the school. Before improvements, the ground was covered with grass bisected by an asphalt delivery access way and apron outside the school cafeteria. Actual working area of first phase of Peace Garden is about 25 by 25 metres. Further improvements planned.

Date Highlights
March 1995:
• Idea emerges from English class looking out onto the gradrangle.
• Permissions secured from principal and board maintenance supervisor.
April 1995:
• On Earth Day, students in English class and school outdoors club lift sod.
• A photo and caption make the local paper.
• Local nursery owner offers to help; topsoil arrives.
May 1995
• Free wood chips from local power company are delivered for paths.
• Perennial plants arrive from parents, teachers, community gardeners.
• Under the headline “Peace Garden Is School Effort,” the project is featured again in the local paper, this time with big photo and three-column story.
September 1995
• Coordinating teacher’s essay wins the makings of a tulip garden from contest held by Canadian Living magazine and other sponsors.
October 1995
• 400 tulip bulbs are planted in a new bed adjacent to the existing Peace Garden. Event draws many dignitaries and is covered beforehand and after in local newspaper, as well as by regional radio and television stations.
1996-1998
• Use of garden by different classes increases.
October 1998
• Peace Garden coordinator helps nearby elementary school to start a Peace Garden.
February 1999
• University students make and donate cedar benches to the Peace Garden.
April 1999
• G.S.S. student is killed in a car accident; other students decide to honour him with two memorial benches in the Peace Garden.
June 1999
• Student council organizes talent show and silent auction and raises $1,200, which is donated to the Peace Garden.
• Retiring teacher makes $500 donation to Peace Garden.
September 1999
• Local landscaping contractor installs limestone paths for the cost of materials.

Connections Through Experience in Nature
“[School ground naturalization] has become synonymous with a movement that has reasserted the value of experiential learning outdoors, the power of landscape and the need to reconnect a generation of young people to the soil, to share with them the value of growing things.”

Bill Lucas, “Grounds for change: Learning through landscapes in Britain”
**Summary:** This project began with an idea that germinated in one English class. It was facilitated by a teacher with an interest in gardening but was driven by the students’ energy. The project was collectively nurtured by a revolving group of teachers, students, parents and interested community members. The idea drew interest from all quarters: from the people who made unsolicited contributions of advice, labour, money and/or plant material, to the cafeteria cook who used herbs grown by students to add Peace Garden Soup to the G.S.S. lunch menu, to the members of the student council who organized a coffee house and silent auction of student services — piano lessons, wood cutting, tutoring, art lessons, catered picnics — which were auctioned to raise money for the Peace Garden. Coordinating teacher Gail Simmons remarked, “The Peace Garden brings the best out of people.”

**Project:** The Owl’s Nest  
**School:** Altadore Elementary School, Calgary Board of Education  
**Address:** Calgary, Alberta  
**Students:** K to 6  
**Setting:** Urban

**Project Overview:** This was a project to offer students, teachers and the community learning opportunities through the restoration and integration of a natural habitat within an urban setting. Over a two-year period, a total of 637 plants found a new home at Altadore, including 70 species of flowers and grasses, 23 species of shrubs and three species of trees native to southern Alberta. Other features of the project include pathways, rocks, a storytelling stone, a weather station, bird nesting boxes and feeders, compost bins, a log pile, a butterfly house, bird baths and stumps.

**Date**  
**Fall 1996**  
**April 1997**  
**Winter 1998**  
**May 1998**  
**June 1998**  
**Fall 1998**  
**January 1999**  
**May 1999**  
**August 1999**  
**September 1999**  
**November 1999**  
**December 1999**

**Highlights**  
- Research, proposal writing, fundraising and planning phase.  
- Award of Excellence in School Ground Naturalization from Evergreen for outdoor classroom plan.  
- Honourable Mention, National Wildlife Week Awards Program, Canadian Wildlife Federation.  
- Ground-breaking event.  
- First planting.  
- Project placed on hold as Calgary Board of Education reviews guidelines for ponds on school properties.  
- New Calgary Board of Education Guidelines established; pond eliminated.  
- Story Stone circle installed and berms built to replace pond.  
- Second planting.  
- Altadore is listed as a prizewinner in the Calgary Horticultural Society’s Annual Garden Competition.  
- Weather station installed.  
- Altadore is featured on the CTV national news.  
- Benches completed.  
- Bird baths added (replacement for pond).

---

**Things Kids Need**

“Kids don’t need equipment, they need opportunity.”

Ellen Shell, in Smithsonian
Summary: Says an organizer: “The road to success has not always been an easy haul. The Owl’s Nest has had lessons for all parties concerned. The project has been an incredible success by any measure; the look of excitement the children have when the first flower bursts into bloom; the discovery of a two-spotted ladybug sleeping in the mulch after a cold Calgary winter; the sighting of a centipede scurrying away from the sun as a rock is gently overturned; or when a butterfly, hatched in the classroom, is released with the sound of music in the background. The Owl’s Nest has inspired a return to the Earth School Program, a trip to Zoo School (part of the Chevron Open Minds Program) by the Grade 6 classes, a Winter Solstice Celebration and Christmas Bird Count. The challenge facing students, parents and staff in years to come is to continue finding creative ways to keep the Owl’s Nest in the curriculum and to keep the project’s energy alive.”

Project: The Pond Project
School: Harry R. Hamilton Elementary School, Halifax Regional School Board
Address: Middle Sackville, Nova Scotia
Students: K to 6
Setting: Rural

Overview: The school is adjacent to a woodlot, a stream and a pond, and the initial plans in 1993 were to plant trees, shrubs and perennial flowers around the school grounds. This plan was expanded to include a pond restoration and amphibian habitat project and a butterfly garden in 1995.

Date Highlights
Spring 1993
• Grant from Evergreen to support the initial plantings of trees and shrubs.

1995
• Grant from Evergreen for Butterfly Garden and Amphibian Pond plantings.

Fall 1995
• The Pond Project is featured in Evergreen’s The Outdoor Classroom newsletter.

1996
• Environment Canada - Action 21 approves funding for the Pond Project.

June 1997
• Harry R. Hamilton Elementary School receives the Nova Scotia Environmental Award in the education category in recognition of the valuable contribution made to the preservation and enhancement of the environment, and receives the Evergreen Award of Excellence.

Summary: Writes organizer Jill Grady: “The discovery of a small, neglected pond on school property brought the school and the community together to strive for its restoration. After much planning, The Pond Project officially got under way on Earth Day 1995. A general cleanup of the school property and pond area took place, including the removal of an old wrecked car that had been contaminating the water. Resistance to The Pond Project has been minimal. The fact that a thriving amphibian pond need only be 18 inches deep has alleviated any fears concerning safety. The project is a good example of how real-life experiences lend themselves to integration with the school curriculum. Students learn firsthand the importance of preserving natural biodiversity. All the children have been involved in observing, identifying,
surveying, recording and problem solving, as well as writing poetry, stories, letters, reports, and drawing cartoons. They have constructed bridges and built sailboats. The students’ active involvement in all aspects of the project has developed within them a sense of commitment to the future of the pond.”

**Project:** The Learning Playground  
**School:** Millgrove Public School, Hamilton  
Wentworth Board of Education  
**Address:** Millgrove, Ontario  
**Students:** K to 5  
**Setting:** Rural

**Overview:** An asphalt and grassed field area was transformed, with the following natural features introduced: butterfly garden, vegetable garden, large shade trees, a maze, berms, woodlot, peace garden and Carolinian restoration. Built features include a shade structure, seating areas with picnic tables and benches, asphalt paintings, nest and habitat boxes, pathways and a creative sand/play area. A recent survey indicates that the percentage of teachers using the Millgrove school ground for curriculum-based activities rose from less than 25 per cent before the naturalization project began to an estimated 75 per cent or greater following naturalization.

**Date**  
**Highlights**
1992  
- Project planning and research begins.
April 1993  
- Carolinian Forest Ecological Restoration Area dedication.
Spring 1994  
- Evergreen school ground grant received.
Fall 1994  
- Second restoration area dedicated on the west side of the school.
1995  
- Peace Garden dedication; butterfly and vegetable gardens added.
- Millgrove School publishes a special news bulletin — *The Learning Playground* — and a community outreach brochure (hand-coloured by the students), which are distributed to the school community to solicit parent support and to recognize community donations.
January 1996  
- Learning Playground Symposium — every teacher and student was asked for input.
Winter 1997  
- Millgrove School is featured in *The Outdoor Classroom* newsletter published by Evergreen.
May 1999  
- International School Grounds Day — school assembly to recognize the many community members who have contributed to the Learning Playground endeavour.

**Summary:** Organizer Marietta Stonehouse-Kish writes: “The idea of a regeneration garden started after participation in the ‘Save the Don’ project in Toronto. After participating in this restoration — not only of the environment but of the community and its people — I decided that our students in Millgrove should have a similar opportunity. I was not knowledgeable about native species, planting or landscaping, but once a decision was made, many ‘experts’ came forward and volunteered their time and expertise. On Earth Day 1993, a back corner of our playground became our garden. Little did we know as we huddled all of the children from kindergarten to Grade 5 onto one small piece of land that day, that just one year later we would have such a beautiful place as this garden. Children love to work in the earth and to explore their world. I am convinced that if we teach them why, and how, to restore the Earth, things may turn around.”
Section 5: CONCLUSION

The most compelling conclusion arising from the literature of school ground transformation is that there exists a hidden curriculum in school grounds — a potent educational force, which, if based on traditional expanses of asphalt and grass, can have detrimental effects on the education, health and well-being of children. However, if a naturalized school ground becomes the basis of these subtle cultural messages, then the hidden curriculum creates an impressive web of benefits for students, teachers, schools and the communities of which they are a part. The benefits can be summarized as follows:

For Students
- more meaningful play and learning
- safer and less hostile outdoor environments
- more gender-neutral play spaces
- lower exposure to toxins
- experiential learning opportunities
- improved academic performance
- greater pride and ownership in learning
- a chance to participate in democracy
- better understanding of cultural differences
- creation of sense of place

For Teachers
- new curriculum connections
- increased morale and enthusiasm for teaching
- new reasons to go outside
- increased engagement and enthusiasm for learning
- reduced discipline and classroom management problems

For Schools
- curriculum connections
- reduced disciplinary referrals, absenteeism and dropout rates
- reduction of antisocial behaviour on school grounds
- better connections to community

- increased pride in school
- restorative experience

For Community
- stronger sense of community
- increased community satisfaction
- banked social capital
- creation of healthy land ethic/environmental citizenship
- better community health
- active involvement for parents in children’s school
- healthier natural environment
- possible financial savings

While there is some quantitative data and a slightly larger body of qualitative evidence supporting these benefits — notably from the recent study by the American State Education and Environment Roundtable on using the environment as an integrating context for learning — more research pertaining directly to the school ground transformation context is needed. This literature raises as many questions as it answers.

Some examples: Are all students equally engaged by participation in these projects? What about academic achievement? Does the EIC data hold for all school ground naturalization initiatives? Is it better to use school ground development as a builder of self-confidence and social currency that can then be taken back into the classroom for study in the traditional disciplines or should conventional subjects be integrated into outdoor projects? What about evaluation of the projects vis-à-vis stated objectives, and of student involvement in the projects? What about the ongoing life of these projects? What is the longitudinal expectation of success? What happens when pivotal teachers get tired, move schools or retire?

And what about the teachers who are doing this work? What kind of training and background do they have? Where did they get the confidence to try such a radical idea? Should techniques for organizing school ground naturalization be part of the teacher development curriculum at faculties of education across the country?
And what about curriculum? Does it matter, for example, that all of the British schools involved in the creation of learning grounds work under a national curriculum when schools in Canada do not? And what does the literature not contain? Are there examples of spectacular failures in school ground transformation? What about the nitty-gritty details of getting jobs done outside conventional disciplinary boxes, in places where traditional job descriptions overlap? For example, what do the maintenance unions and the insurance companies have to say about students and teachers participating in non-traditional school activities? Future research in the Canadian context should address these questions for a start in order to build a domestic scholarly literature in the area.

These questions notwithstanding, there is plenty of evidence to conclude categorically that school ground naturalization is an exceedingly worthwhile expenditure of energy, time and money. By turning the web of benefits on its side, layers become visible. The first layer of benefits has to do with shifting from conventional discipline-bound teaching to integrated, experiential project-based teaching. And while it is possible for this shift to occur inside a traditional classroom, moving education from indoors to outdoors seems to expedite and assist the pedagogical transition. The fundamental shift seems to be from asking “What is it that I wish my students to know?” as a central organizing question (from which subject-specific learning then flows), to “What is it that I wish my students to do?” as the origin of school ground learning. And when this shift occurs, the literature indicates that students become more involved in their own learning; from this inclusion flows a variety of positive outcomes, from increased engagement and enthusiasm for learning to heightened appreciation of democratic decision making.

The second layer of benefits has to do with a new notion of curriculum in the minds of teachers and of students. School ground learning appears to be predicated on a tripartite conception of curriculum and gives the hidden messages of school grounds and the informal agendas of students parity with the formal discipline-bound curriculum. For teachers, this reconceptualization of curriculum can result in a new appreciation of the learning potential of participation in gardening, digging sod, lifting asphalt or building arbors or benches. For students, participation in school ground activity appears to give purpose, meaning and relevance to the learning, whether it’s measuring land to draw maps for new play spaces or being encouraged to find refuges at recess or build dens in their outdoor time.

Also relevant to the rethinking that happens when the hidden curriculum of school grounds is embraced is the unavoidable appreciation of the school ground as a place of overlap between school and community. The literature shows quite clearly that when school grounds become part of learning, the roster of possible players in the learning process quite naturally expands to include members of the community as well as school personnel. Adults from the community at large can take on more diversified and more meaningful roles in the education of students in particular, and in the life of the school in general.

A third layer of benefits is linked to the inclusion of nature in curriculum. Evidence is strong that merely being in the presence of nature has measurable positive restorative effects on people of all ages. And when proximity to nature is extended to include gardening, planting or some kind of hands-on nurturing activity, it has been shown to exponentially amplify benefits, especially in the area of human health. Although not all school ground transformation projects involve purposeful encounters with plants, the ones that do demonstrate planting as a paramount benefit. As such, although a teacher can shift to experiential pedagogy, move from a classroom to the outdoors and invite students to participate in the shaping of their own learning, and thereby reap some of the demonstrated benefits described in the school ground transformation, readers should make no mistake about this one point: connecting students to nature — to plants, to ponds, to birds, to the non-human world — in school ground projects makes a world of difference. This is, after all, the main point of
the landmark EIC study. Every single benefit described, from increased standardized test scores to banking of social capital and development of environmental literacy, was linked to one common factor: the natural environment as an integrating context for learning.

A fourth layer of benefits occurs at a meta level and is a synergistic blend of the other three: experiential teaching, rethinking of the nature of curriculum, and connection to nature. When, through the creation of learning grounds, these three layers of benefit combine, then and only then do social and community benefits begin to accrue. These meta benefits include increased community satisfaction, better community health and the banking of capacity for individuals to attend to the common good.

There are those who might argue that such lofty goals should not be the province of educators, and there are those who also say that schools nowadays are failing at teaching students to read before they graduate. These are people for whom the existing literature related to school ground naturalization should be of greatest interest. In study after study, the message is that school ground naturalization can be smoothly integrated into existing formal curricula — at minimal cost, staying more or less within conventional norms and expectations about what teachers and students should do in a day — and still have huge potential educational, social and environmental gains. The Child Welfare League of Canada argues that this type of initiative would constitute a noticeable leap toward what schooling in Canada should be.

*Education of Canadian children must transcend the traditional boundaries of our educational systems. If the mandate of education within the meaning of the UN Convention on the Rights of the Child is to be addressed — including development of the child’s personality, talents and mental and physical abilities to their fullest potential and preparation of the child for responsible life in a free society — then the participation of various jurisdictions beyond education must be increased. Only through such collaboration can we address equitably the well-being of children across this nation. (“Les enfants du Canada/Canada’s Children,” Child Welfare League of Canada, 1996)*

**Section 6: BIBLIOGRAPHY**


Cohen, Stewart and Trostle, Susan L. “Young children’s preferences for school-related physical-environmental setting characteristics.” Environment and Behavior, 22(6), 1990.


Grant, Tim and Littlejohn, Gail. “A breakthrough for environmental education.” Green Teacher, Issue 56 (Fall), 1998.

Nature Nurtures: Investigating the Potential of School Grounds


Ulrich, Roger S. “View through a window may influence recovery from surgery.” Science, 244, 1984.


Wilson, Frederic R. “Streams.” Green Teacher, Issue 59 (Fall), 1999.


About the Research Team
James Raffan is an independent writer and researcher from Seeley’s Bay, Ontario. Christine Robertson is an independent environmental researcher living in Waterloo, Ontario. Helen Batten is principal landscape architect at Basterfield and Associates in Peterborough, Ontario. Paul Young is a Toronto-based landscape architect.
Evergreen is a national non-profit environmental organization with a mandate to bring nature to our cities through naturalization projects. Evergreen motivates people to create and sustain healthy, natural outdoor spaces and gives them practical tools to be successful through its three core programs: Learning Grounds (transforming school grounds); Common Grounds (working on publicly accessible land) and Home Grounds (for the home landscape). We believe that local stewardship creates vibrant neighbourhoods, a healthy natural environment and a sustainable society for all.

**Toyota Evergreen Learning Grounds Program**

Learning Grounds brings teachers, students and neighbours together to transform traditionally barren asphalt and turf school grounds into natural outdoor classrooms. By planting trees, shrubs and wildflowers, planning meadows or ponds and creating murals, sculptures, vegetable gardens and other theme areas, the learning opportunities literally come alive. These outdoor classrooms provide students with a healthy and safe place to play, learn and develop a genuine respect for nature and each other.

**Evergreen Tool Shed**

The Tool Shed is an integrated collection of resources designed to inspire, educate and guide students, teachers, planners, community groups and individuals through all stages of a school, community or home naturalization project. The Tool Shed series includes guide books, instructional and inspirational videos, fact sheets, case studies, newsletters, research reports and an on-line registry. For the latest information on Evergreen’s Tool Shed resources, check out our Web site at www.evergreen.ca.

Evergreen is funded by the generous support of individual Canadians, foundations, businesses and various government agencies. Major funding partners include:
“This text is of interest to all agents in the field of education. It will help any group interested in initiating a project justify the time, energy and financial investments that [naturalizing school grounds] requires. The publication of this piece is timely: the educational system in our country, and in other parts of the world, is adopting a ‘new’ vision of the kind of learning it should provide. From what we read here, naturalization is key to achieving this vision.”

Anne Gillain Mauffette
Associate Professor of Education, The University of Quebec at Hull
Author of “Revisiting Children’s Outdoor Environments: A Focus on Design, Play and Safety”

“As an educational researcher, I was impressed with the review of the available literature. The writers of the report present the material in a comprehensive, easily accessible manner that can speak to a variety of audiences. The structure of the report affords the reader an opportunity to clearly understand how such projects can affect students, teachers, schools and the community. The writers clearly uncover the hidden curriculum of the asphalt/lawn grounds and point to a variety of ways that schools can embark on naturalization projects of their own.”

Rita L. Irwin
Professor and Head, Curriculum Studies, Faculty of Education, University of British Columbia