WHERE DO OUR CHILDREN PLAY?

THE IMPORTANCE AND DESIGN OF SCHOOLYARDS

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New Jersey Appleseed
Public Interest Law Center

ACKNOWLEDGEMENTS

Published by
New Jersey Appleseed Public Interest Law Center:
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Susan Lederman, Secretary
Walter Schauben, Treasurer

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Photo Credits:
Selim Iltus: pp.
2,3,6,7,8,9,10,11,12,14,15,16,18,19,20,22,32,34,36,39,40,41,42,47,49,51,57,62,63,71,74
Elizabeth Johnson: pp. 5,33
The Trust for Public Land: pp. 21,37,38,39,61

Schoolyard layouts on pages 60 and 66 are based on designs prepared by CoDesign Inc. CA, for PS 185 and PS 208 in New York.

Publication of this booklet has been made possible with funding from the Geraldine R. Dodge Foundation, and the support of the John S. Watson Institute of Public Policy at Thomas Edison State College.

ISBN: 0-9748028-0-8

New Jersey
APPLESEED

INTRODUCTION

Children need a physical and social environment that supports their growth and development. School-age children spend a significant part of their day in school, often beyond the hours of the regular school day. The quality of the school environment influences their development academically, socially and physically. Their school experiences are a major factor in their social integration and self-esteem throughout life.

The State of New Jersey has embarked upon an unprecedented endeavor that will dramatically alter the indoor school environment for over 267,000 of its poorest students in thirty school districts that have been designated as under-financed. Over the next ten years, the State will spend over $6 billion in these districts to renovate, expand, and replace unsafe and inadequate buildings. This landmark building initiative will have a tremendous impact not only on the school children, but also on the neighborhoods where the schools are located. It will include facilities to house programs for students aged from three to eighteen.

While there is an ongoing debate over the design of the physical structures that will be built or renovated, there has been very little discussion of the need for facilities for outdoor activities, including recreation, education, athletics and play. These facilities as well as other essential site improvements such as parking areas, bus drop-off points, walkways, etc. are critical and must also be planned.

Monumental school buildings usually contrast with open and empty schoolyards

At the same time, on-going expert analysis reminds us of the increasing importance of developing healthy lifestyles early in life. Research on the number of overweight and diabetic children, the importance of daylight to health, and the positive relationship between a child's social and cognitive development and access to play opportunities all point to the importance of adequate outdoor facilities. While many suburban school districts have excellent outdoor facilities, as well as quality public parks, most urban districts increasingly lack both. Schoolyards are often bare asphalt, and public parks are often in poor condition, considered unsafe or non-existent. Opportunities to learn through play and recreation and to exercise are often thus severely limited. Without good

planning, this situation may worsen as urban districts struggle to find land for new construction.

The construction of new school facilities throughout New Jersey creates an enormous opportunity to address the need for outdoor facilities in our State's poorest districts. The document produced herein summarizes some of the most relevant research on the need for outdoor educational facilities and provides design guidelines for those wishing to incorporate such facilities into their school building plans.

Every outdoor school site presents valuable educational opportunities. Child development theorists have emphasized the importance of play and other recreational activities.[1] Certain features of the physical environment, such as types of equipment, materials[2] and the quantity of trees and grass in outdoor space have been found to affect play behavior.[3]

Scholars like Rubenstein have stressed "the value of active exploration and intimate encounter with a natural landscape as crucial to mental and physical health,"[4] especially for children. It has also been noted that the younger the child, the more she learns through sensory and physical activity; thus, the richer and more varied the natural setting (e.g., rocks, running water, richness of color and sound within a wide range of permitted activities), the greater its contribution to her physical, cognitive and emotional development.[5] Another body of research specifically indicates that students better absorb and retain those math, science, language and other skills which draw upon a richer sensory environment and thus excite a more acute overall response.[6]

Similarly, Professor Jerry Schierloh, a veteran schoolyard site specialist working in New Jersey, has noted:

> The sights, smells, sounds and tactile stimuli of a school's outdoor environment can help greatly to enhance a child's perception of the elements of his environment that can enrich his world. When the senses become dulled through lack of use at a young age, a child may lose, forever, meaningful ways to derive satisfaction from his surroundings.[7]

The importance of outdoor play areas and athletic facilities for the cognitive, academic, social and physical development of children has been acknowledged by social scientists working in the areas of child psychology, education and envi-

1 E.g. (Piaget, 1962); (Biber, 1984); (Isenberg & Jalongo, 1997); (Bruner, Jolly & Sylva, 1976); (Barnett, 1991); (Sutton-Smith, 1979); (Vygotsky, 1994).

2 (Campbell & Frost, 1985)

3 (Taylor, Wiley, Kuo & Sullivan, 1997). See generally (Levy, 1978); (Rivkin, 1995); (Moore, 1997); (Moore, 1986); (Stine, 1997); (Vance Bibliographies, 1982).

4 (Rubenstein, 1998).

5 (Moore & Wong, 1997)

6 (Lieberman and Hoody, 1998)

7 (Schierloh, 1998)

8 A study conducted in 1987 indicated that all of the sixty teachers interviewed felt that play should be an integral part of the school curriculum; however only 20% of that total indicated that play actually held such a role in their school day. (Rothlein & Brett, 1987).

ronmental sciences. Teachers[8] and parents often share that conviction, but have not been able to get school administrators and government officials to treat outdoor facilities as essential components of a state's educational obligation to its children. It is the need to justify the integral educational role of outdoor play space and to offer guidance on the types and quality of recreational facilities considered adequate and age appropriate by professionals that constitute the purpose and goal of this booklet.

9 The relevant portion of Principal 7, addressing the rights of education, states: The child shall have full opportunity for play and recreation, which should be directed to the same purpose as education; society and the public authorities shall endeavor to promote the enjoyment of this right.

THE NEW JERSEY CONTEXT

Despite the explicit educational value given to play and recreation in Principle 7 of the Declaration of the Rights of the Child,[9] unanimously adopted by the General Assembly of the United Nations in November 1959, no state within the United States has yet to explicitly establish a legal basis for the acquisition and development of outdoor recreational facilities as part of its educational mandate.

PJ Hill Schoolyard in NJ. The cracked concrete and minimal opportunities for play and socializing are typical for many similar schools.

It is our intent to do just that within the context of New Jersey's legal framework governing the State's educational obligations to children in grades pre-kindergarten through twelfth grade. Although our argument, reflecting social science research, focuses on New Jersey, it should be applicable in any state where there exists a constitutional or statutory mandate to provide an efficient, appropriate, effective or adequate education for all children.

In New Jersey, the State Supreme Court held in a case titled Abbott v. Burke, 119 N.J. 287, 392 (1990) ("Abbott II") that a "thorough and efficient education"[10] requires the provision of adequate physical facilities.[11] In 1997, the Court repeated its holding that "the condition of school facilities always has been of constitutional import" and that most urban schools "lack adequate physical education and equipment." Abbott v. Burke, 149 N.J. 145, 195-96 (1997)("Abbott

10 The New Jersey Constitution mandates that the "Legislature shall provide for the maintenance and support of a thorough and efficient system of free public schools for the instruction of all the children in the State between the ages of five and eighteen years." N.J. Const. art. VIII, §4, 1.

11 The Abbott litigation in New Jersey constitutes a series of opinions in which the New Jersey Supreme Court has grappled with the measures that the State must take and the resources it must allocate in order to ensure that public school children from the poorest urban communities receive the educational entitlements the Constitution guarantees them.

IV"). More recently, the Court again concluded that the "State's constitutional educational obligation includes the provision of adequate school facilities," which requires a "commitment to provide facilities that are educationally adequate to permit Abbott children to reach the [Core Curriculum Content Standards] CCCS." Abbott v. Burke, 153 N.J. 480, 525 (1998)("Abbott V").

Pursuant to the CCCS, the New Jersey Department of Education promulgated educational adequacy standards that require all schools to contain, at a minimum, a gymnasium. Neither the Court nor any of the parties to the litigation directly addressed the issue of whether outdoor space is required to meet the core content standards for comprehensive health and physical education.[12] Such standards, however, recognize the integral role of play and other recreational activities to the healthy development of children, and also the importance of organized sports and other physical activities to their psychological and physical well-being. Therefore, although the standards are silent as to the physical infrastructure needed to achieve these goals, the Court has recognized that teachers require adequate facilities to carry out programs related to all required educational goals.

Thus, by presenting within the legal framework delineated by the New Jersey Supreme Court the findings of current social science research regarding the established relationship between learning, play, athletic activities and green space, it can be demonstrated that New Jersey's or any other state's constitutional mandate to provide a "thorough and efficient education" includes the provision of outdoor space and other outdoor recreational facilities.[13]

12 New Jersey Core Curriculum Standards require schools to provide a physical education program that develops children's ability to engage in a "physically active lifestyle," "perform a variety of physical activities," and "understand the benefits of involvement in physical activity." Comprehensive Standard 2.5 specifically mandates that all students will learn and apply movement concepts and skills that will "enhance the likelihood of independent learning and participation on physical activity throughout life."

13 As a result of Abbott V, the Abbott school districts were required to submit a Five-Year Facilities Management Plan to the New Jersey Department of Education ("DOE"). The Court directed local school districts to review their local conditions to determine whether schools were to be remodeled or new facilities constructed, and the DOE was directed to review the requests by local districts with deference. Abbott V at 522-23. To date, no dispute between school districts and the DOE with respect to constructing or renovating particular facilities has been litigated. The primary battle has occurred in the legislature with respect to the financing of the plans emerging from the Abbott districts as a result of the Court's directives.

With respect to the legislative process, however, the New Jersey Supreme Court specifically stated:

Requests by the Commissioner [of Education] that funds be appropriated to implement educational programs deemed essential on the basis of demonstrated need [documented by local districts] will be the measure of the State's constitutional obligation to provide a thorough and efficient education, and we anticipate that the Legislature will be fully responsive to that constitutional call.

PLAY IS ESSENTIAL FOR APPROPRIATE COGNITIVE AND SOCIAL DEVELOPMENT OF CHILDREN

Many child development theorists consider play and recreation necessary developmental activities. Those adopting the perspective of Jean Piaget, the preeminent developmental psychologist of the twentieth century, emphasize the importance of play as a means through which a young child's emerging representational abilities may be expressed, and through which a child learns to construct workable ideas by resolving conflicts that arise between his/her thought and action, as well as conflicts that arise in interaction with peers.[14] On the other hand, theorists who adhere to the explanations offered by L.S. Vygotsky[15] view activity as responsible for the motivation and content of thought, and thus hold play action and purpose generally as a catalyst for cognitive development.[16] Though constituting radically different schools of thought, both theoretical perspectives, and the empirical studies they inform, place action and play activities at the center of development.

Play generally has been linked to creative thinking, problem solving, ability to cope with tensions and anxieties, acquisition of new understandings, ability to use tools, and the development of language.[17] Specifically, dramatic and make-believe play has been found to contribute to a child's later ability to deal with abstract symbols,[18] hypothetical reasoning,[19] problem solving[20] and understanding of logical transformations.[21] Researchers have further found a positive relationship between symbolic play and early language levels,[22]- meaning that the more children use symbolic play, the more and more easily they progress in their language development. This finding leads us to an apparent continuity between the symbolic skills used in play and those required for reading and writing.[23]

Play generally has been linked to creative thinking, and problem solving ability

14 (Piaget, 1962, 1965, 1976a, 1976b),

15 (Vygotsky, 1978)

16 Yet a third conception of play is the vaguely Freudian notion that children must have an opportunity to let off steam. Although this hydraulic depiction of the psyche has been discredited, the notion that physical activity or a significant change of activity may be invigorating for subsequent classroom work has been shown to be empirically accurate. See infra.n.39-42.

17 (Christie & Johnson, 1983)

18 (Fein, 1981a, 1981b;Pellegrini, 1980)

19 (Fagen, 1976)

20 (Sylva, Bruner & Genova, 1976)

21 (Golumb & Cornelius, 1977;Salts, Dixon & Johnson, 1977)

22 (Nicolich, 1977; Fein, 1979). Other researchers have found not only a relationship between symbolic play and language development, but also other cognitive skills. (Becher & Wolfgang, 1977; Rubin & Maioni, 1975; Goodson & Greenfield, 1975)

23 (Pellegrini, 1980)

Play has also been used successfully to motivate children to explore new materials and ideas and to enable children to remain longer on an assigned task.[24] Still other researchers, primarily psychologists, have concluded that play helps develop social skills of cooperation, altruism, concern for others, flexibility to interchange social roles and self-control.[25] Each of these aspects of development - cognitive, language, motivational and social - is affected by the extent and quality of play in which a child engages and each will be addressed separately.

24 (Iverson, 1982)

25 (Coplan & Rubin, 1998; Damon, 1978; Howes, 1992; Piaget, 1976a; Rubin, Fein, & Vandenberg, 1983; Shantz, 1975)

Cognitive Skills

Much of the social research literature on play focuses on its contribution to a child's thinking capacity. By touching, seeing, smelling, exploring and experimenting with the physical environment, through play, a child starts to understand the world. Although thought is most commonly portrayed as a matter of information acquisition, storage and retrieval, it is also seen as requiring active coordination skills,[26] somewhat analogous to the physical coordination skills required to engage in an activity such as swimming. This characterization of thinking as an active process emphasizes the role of different processes for the actual coordination necessary for problem-solving, using objects and explicit thought about those objects.[27] Such differentiation of thought processes highlights the importance of action for the development of essential cognitive skills.

26 (Piaget, 1976a)

By touching, seeing, smelling exploring and experimenting a child starts to understand the world.

Similarly, special attention has been given to the role of play activities in nurturing the thought processes that result in present artistic creativity[28] and to certain play environments in stimulating children's curiosity and interest which may lead to "creative" responses in the future.[29] By the time students have completed many years of traditional schooling, many have learned to just follow rules and memorize, rather than to think critically and creatively.[30] Nonetheless, creativity has been observed in the unstructured play and storytelling of older children,[31] and is widely seen among young children when they engage in spontaneous play activities such as "let's pretend" or when they incorporate and use available materials in their play.[32]

27 (Piaget, 1965)

28 (Winner, 1982; Wolf, 1985)

29 (Csikszentmihalyi, 1996)

30 (Gardner, 1991)

31 (Kessel & Goncue, 1984)

32 (Fein, 1981a,1981b)

Although a comprehensive review of the empirical research that studied the subjective experiences of hundreds of youngsters (under 14 years of age) about their personal experiences in physical activities, spontaneous play, informal

games and organized sports has not revealed the precise way that play and games influence the cognitive development process, it does suggest that activity settings that do not allow for the "manipulation and control of the environment by those involved. . . [are] unlikely to provide anything beyond a relatively restricted learning experience."[33] Conversely, it has been concluded, based on a review of a large number of studies looking at the relationship between exercise and sports participation levels and academic performance, that physical exercise may improve a child's intellectual performance if such movement requires the child to think, select, plan and solve problems.[34] In this way, a game of football on a field (in contrast to simulated video) requires application of critical thinking skills, since it involves a situation in which one's decisions have immediate consequences; the more real the game, the more likely it is to assist in this kind of development.

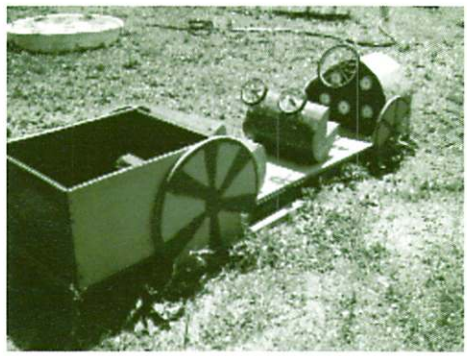
Accordingly, informal games and play activities known to foster creativity and enable youngsters to interact spontaneously with their environment, as well as those organized sports activities that require them to think through performance patterns before engaging in motion, must be given a role in their formal education.

33 (Coakley, 1980)

34 (Cratty, 1972). Although many studies that seek to correlate participation in physical activity and academic achievement and/or intelligence either fail to distinguish between "athletes" and "physically active youth," (e.g., Gaskin, 1971; Jeffries, 1978; President's Council on Physical Fitness and Sports, 1998) or control for other variables such as economic background (e.g., Ruffer, 1965), or simply arrive at conflicting results for different ethnic groups (e.g., Fejgin, 1994), Cratty's conclusion that physical activity that requires a child to strategize before execution may develop the same structural and functional mechanisms that are used when learning to read and write is generally supported in the literature. (E.g., Kiphard 1970)

Language Skills

Language is used and elaborated in establishing fantasy contexts



Many theorists have discussed the importance of play for language comprehension and production.[35] Play has been shown to influence language development in two major ways. One is the use of language in peer negotiations such as those situations in which rights are asserted (e.g., turn-taking or verbal defense of ball possession) or where rules of a game are specified. Language is also used and elaborated in establishing fantasy contexts, such as creating parameters for "pretend" space travel, and in telling stories.[36] Although such language skills are often used in a traditional classroom setting, fantasy and story telling tend to be richer and more spontaneous in peer-oriented outdoor play settings.[37] Yet another reason to create such play opportunities for children as part of their educational experience.

35 (Piaget, 1927); Werner & Kaplan, 1963; Collier, 1979; Garvey, 1974,1979; Lovinger,1974; Reynolds, 1972; Smilansky, 1968).

36 Herrington and Studtmann (1998)

Ability to Focus on Learning

In pre-school settings, researchers have found that providing children with enough space in which to move around and make choices, plus clear boundaries and pathways, helps children focus their attention.[38] Similarly, older schoolchildren are better able to pay attention after they exercise. Several studies show that play and exercise can improve learning by boosting academic performance and improving attention levels.

For example, the academic performance in grades 2 through 6 of children who had received an additional 5 hours of physical education per week was found to be superior to that of a control group of children who had received no physical education.[39] A recent study of fourth graders in an urban school conducted by Olga Jarrett of Georgia State University indicates that fidgeting and a general inability to focus are dramatically reduced on days when children are given the opportunity to go outside and play.[40] In yet another study of primary school children, it was found that attention to standardized tasks was higher after recess than before.[41] It is findings such as these that support the conclusion that physical activity during the school day has the capacity to improve a child's ability to focus on a routine task and thus enhance his ability to learn and perform academically.[42]

Play and exercise can improve learning by boosting academic performance

Social and Emotional Development

Children practice many important skills while playing informally with one another without adult supervision, playing games that require rule-following behaviors and engaging in team sport activities that require cooperation. Piaget[43] cited important differences in a child's interaction as between unequals (i.e., adults) and peers.[44] In contrast to interactions with adults, interactions with other children (either the same age or slightly older or younger) afford a child the best

37 (Kessel & Goncue, 1984). In general, it has been demonstrated that the physical environment has a significant independent effect on an infant's language performance (Wachs & Chen, 1986) so that informal settings such as a schoolyard set up the stage for a child's willingness to engage in verbal communication.

38 (Isenberg & Jalongo, 1997)

39 (Shephard, 1983; Volle et al., 1982)

40 (Meltz, 1999)

41 (Pellegrini et al., 1995a) However, here, the authors concluded that a break between tasks, not just physical activity per se, was responsible for increased attention capacity.

42 Running enough so one has to stop and catch one's breath has also been shown to improve the symptoms of hyperactivity, enable learning disabled children to control internally behaviors that were previously controlled externally, and permit the reduction of psychotropic medications to emotionally handicapped children. (Hinkle 1988; Shipmar, 1984)

43 (Piaget 1932/1965)(noting that children are less likely to work things out for themselves when interacting with adults)

44 (Selman, 1980; Youniss, 1985)(providing empirical demonstrations of Piaget's insights)

opportunity to test his understanding of the social world and confront viewpoints that differ from his own.[45] It is during periods of informal play, with minimal adult intervention, that children are able to confront and resolve emotional issues such as feelings of sadness, anger and frustration, provide sympathy and comfort to each other, manage interpersonal conflicts and gain a sense of what is right and wrong and what is fair.[46] It is through such play situations that children develop leadership skills,[47] the ability to encode and decode social signals,[48] the ability to be sociable (i.e., share, take turns, respect someone else's perspective, learn the rules of play, etc.),[49] and the ability to resolve conflict —which is often an element of fun.[50] While conflicts are known mechanisms through which children arrive at a more mature understanding of social rules, including their origins, workings and changeability,[51] most commonly, where peer disagreements do occur, it is in the playground situation that playmates most quickly move on to common ground and become friends.[52]

Games, with rules, and participation in team sports offer another avenue for social development. Piaget discusses at length how children use the game of marbles to conceptualize a moral principle such as fairness and how they work together to resolve any ambiguities that may arise as to the way the rules of the game should apply.[53] Other authors[54] emphasize the acquisition of social knowledge[55] in the course of game playing among peers.

Interactions with other children offer the child the best opportunity to understand the social world

Organized group sports activities, on the other hand, allow for the acquisition of many social skills such as sharing, cooperating, turn taking and the most fundamental social skill - the ability to understand the rules of play itself.[56] There is little doubt that in most team sports, individual participants must engage in negotiation and compromise among themselves in order to function as a team as well as learn to coordinate with each other to devise and implement offensive and defensive strategies. It is these very social skills that some researchers have found lacking among certain teenagers who have been classified as "anti-social youth;"[57] and thus, a certain level of participation in team sports throughout a

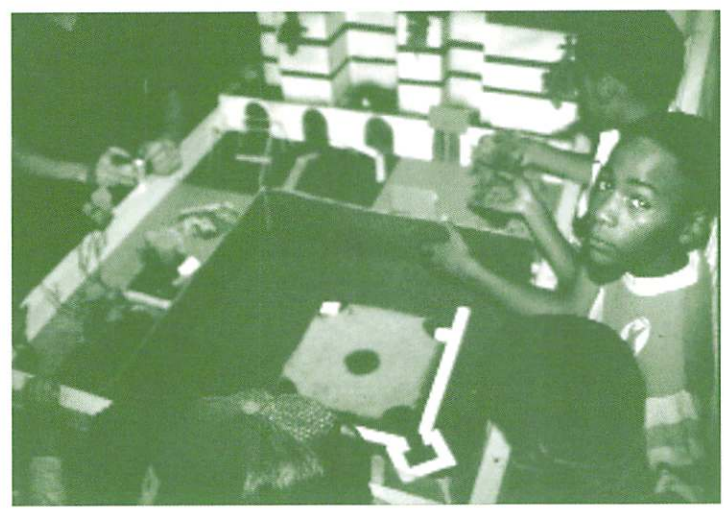
45 (Doise & Mugny, 1984; Tudge & Rogoff, 1989)
46 (Piaget & Inhelder, 1969; Shantz, 1975)
47 (Hartup, 1983)
48 (Pellegrini & Smith, 1998)
49 (Pellegrini, 1995b; Vaughn & Waters, 1991)
50 (Goodnow and Burns, 1988)
51 (Piaget, 1932/1965; Sullivan, 1953)
52 (Gottman, 1983)
53 (Piaget 1965)
54 (Vygotsky, 1978; Tudge, J. & Rogoff, B., 1989)
55 Social knowledge includes the rules, agreements, conventions and other kinds of customs that are used by people in a given society in order to function, live, and move around in their everyday lives. In the case of children, one can talk about very specific rules and conventions particular to a specific game or activity in the context of one classroom, gang, neighborhood or the whole culture of childhood.
56 (Garvey, 1974)
57 (Asher & Gottman, 1981; Berndt & Ladd, 1989; Patterson, 1990)

child's schooling may serve as an antidote to some forms of juvenile delinquency.

In addition to positively affecting the development of a child's interaction with peers, play activities have been found to benefit the development of a child's self-image. A long tradition of social thought has emphasized the role of feedback from others in developing concepts of self.[58] Play activities, such as collaborative construction, which enhance the quality of children's interactions with each other, are likely to influence positively how they see themselves. A more recent line of inquiry finds importance in exposing children to opportunities for building a sense of self-efficacy in health development.[59] Accordingly, informal or organized play activities that give youngsters the opportunity to master new challenges, such as running faster or climbing higher, contribute positively to a child's discernment of self.

Unstructured play and informal games have also been shown to enable children to express themselves and to experiment with personal styles and techniques, without the threat of real consequences. Specifically, it has been noted that a "game situation with its separateness from reality and [clear] boundaries allows for self-expression and experimentation in a safe context with peers who are making judgments only in that context."[60]

It is thus essential for schools to provide the appropriate spaces in which the young can engage in various forms of play such as to facilitate their development of important social skills and modes of self-expression.[61]



58 (Mead, 1934)(generally discussing the mutual influence existing in social interaction)

59 (Bandura, 1977)

60 (Kleiber, 1976)

61 A recent study has found that playground design influences children's social as well as physical skill development by facilitating or constraining the strategies they use to manage their play with peers. (Barbour, 1999) For example, playgrounds that emphasize exercise play encourage gross motor activity as the means for children to interact with their peers, and tend to segregate children according to their level of physical skill. On the other hand, outdoor settings that provide diversified types of equipment and materials, such as dramatic play structures, tire swings, wheeled vehicles designed for more than one child and water play support numerous options for peer interaction and are likely to encourage cooperative, rather than competitive play. These latter settings are also more likely to engage children in various activities through which they can exhibit various skills and thus gain recognition by peers. Id.

OUTDOOR PLAY AND NATURAL ENVIRONMENTS FACILITATE THE COGNITIVE AND SOCIAL DEVELOPMENT PROCESSES OF CHILDREN

Outdoor settings provide unique qualities that are not found in most indoor recreational environments. The schoolyard, with its varied spaces for both organized sports and informal play, offers children of all ages a place in which to exercise decision-making and important social skills, experiment with others in complex forms of social organization and engage in aerobic activities beneficial to their general physical health, self-esteem levels and motor development. The natural elements found within an outdoor play space, such as trees, bushes, rocks, water and light, have also been found to have a positive influence on the level and type of activity that occurs.

Increased Opportunities for Creativity and Social Interactions

It is generally believed that some outdoor environments, such as playgrounds and parks, which provide relatively unconstrained play spaces and settings with minimal adult intervention, provide children with the opportunity to create, organize and control their own play experiences in ways that a gymnasium cannot.[62] These spaces facilitate not only the learning and practice of important social techniques, but also the exercise of decision-making and risk-taking[63] and other cognitive skills (previously noted) that will be used throughout one's life.[64]

The relatively large physical space typically offered by outdoor playgrounds allows for varied, high-density interactions and social decision-making as well as the opportunity for children to remove themselves from communal play activities.[65] Children in outdoor places usually have considerable freedom to select their companions and their activities as well as to determine the length of their interaction,[66] and in this way to generate their own play. The "rough and tumble" play, such as wrestling, grappling, kicking and tumbling, that integrates exercise with social pretend[67] is also more likely to occur in outdoor settings; and these less fettered venues are shown to be more conducive to peer interaction.[68]

62 (King, 1987)

63 (Smith, 1990)(in which the author suggests that risk-taking is one of the main features that attract children to playgrounds)

64 See (Henniger, 1994)(asserting that the high level of references to outdoor play made by adults when asked to recall their favorite childhood memories is a result of the "sensory stimulation, space and risk-taking" opportunities offered by such outdoor play)

65 (Bell & Walker, 1985; Henninger, 1985)

66 (Hartup & Laursen, 1993)(noting play opportunities for children to solve disagreements and manage conflict)

67 (McCune, 1998)

68 (Burstein, 1986)(showing pursuant to a study of peer interaction in three different school settings that differed in grouping, supervision and teacher direction that non-handicapped children interacted more frequently with peers in outdoor play settings than in indoor ones)

Generally, the most engaging features of the great outdoors — trees, rocks, sand, water, — present an enchanting ever-changing landscape with which children may interact through play and exploration. In a recent study undertaken at Iowa State University, researchers found that installation of plant material and other landscape elements in children's play environments provided for additional realms of development which were not found in schoolyards without these natural elements.[69] For example, the introduction of natural paths, enclosures and stepping stones resulted in children ages 2-6 using spaces that had been typically left unused and exhibiting more cooperative play activities requiring both planning skills and physical strength. Plant-vegetative rooms became prime areas for socialization and fantasy play in which the social hierarchy that developed was based on command of language and creativity in imagining what the space might be.[70]

Trees, rocks, sand and water present an ever-changing landscape with which children may interact through play and exploration

Similarly, research at a primary schoolyard in Berkeley, California that transformed part of its asphalt into a meadow with woods, streams, ponds and flowers revealed that children had more positive social relationships in such natural areas and exhibited more creative play.[71] Although no research to date has examined systematically the effect of vegetation on children's play activities in multiple, comparable spaces, there is some indication that children's play is more dramatic[72] and creative[73] in "green" spaces. One can therefore make the argument that outdoor playgrounds, with natural elements and well-designed equipment, are able to promote complexity and creativity in play that is beneficially related to children's cognitive and social development.[74]

Exercise and the Potential for Increased Learning

There is an emerging area of research that asserts that the brain and body are interdependent systems that have connections that strengthen the development of each. Specifically, stimulation to the cerebellum through exercise enhances certain intellectual capabilities.[75] Exercise has been found to change the chemical balance in the brain to make it more efficient,[76] whereas only spontaneous play provides brain connections that stimulate learning.[77]

69 (Herrington & Studtmann, 1998)

70 Id.

71 (Moore & Wong, 1997)

72 (Harvey, 1989)

73 (Moore, 1986)

74 See (Henniger, 1994)(finding in a study of adult perceptions of favorite childhood play experiences, involving 115 participants ranging from their early 20's to mid-40's who were predominantly female, that they frequently cited rocks, trees, leaves, dirt and water as the type of material that they had incorporated in their play in a variety of creative ways)

75 (Healy, 1990)

76 (Meltz, 1999)(Hollmann and Strüder, 1996)(noting that during physical exertion, the increased release of serotonin in the limbic system causes a positive mood)

77 Id. See also (Hinkle, 1988)(noting that certain types of exercise such as participating in running programs have been shown to improve academic learning and creative thinking)

Some studies conducted in France, Belgium, and Canada on the effects of physical activity programs in schools have reported improvement in certain measures of academic performance,[78] whereas a randomized trial study involving Australian 10-year-olds showed improvement in teachers' rating of classroom behavior, providing a plausible mechanism through which physical activity might have an effect on academic performance.[79]

78 E.g. (Shephard et al., 1982)

79 (Dwyer, Blizzard & Dean, 1996)

Other researchers interested in understanding environmental influences on brain development cite the plasticity of the human mind, particularly at the early ages,[80] and contend that exposure to rich environments during childhood, such as the outdoor settings described above, may contribute to the growth of more complex networks in the developing brain. In this way, play and exercise in outdoor settings may contribute to schoolchildren's potential for learning and academic performance.

80 (Savage-Rumbaugh, 1998; Tomasello, 1999)

Recreational Facilities and the Potential to Decrease Violent Behavior

At this time, we have identified one study that seeks to draw a connection between the presence of trees in a residential community, stronger neighborhood ties and lower levels of violence among family members.[81] There exists another body of literature that describes the role of community gardens in revitalizing inner city urban neighborhoods,[82] and in preventing crime.[83]

These studies focus on the role of vegetation in influencing behavior in a positive manner. Together with evidence emerging from community-based initiatives that suggests that access to recreational facilities would "decrease violent crime among youth and improve the urban quality of life,"[84] a strong justification may be established for the provision of "green" schoolyards that are open to children of all ages at varying times during a day.

81 (Sullivan & Kuo, 1995). See also (Mooney & Nicell, 1992; Rice & Remy, 1998)(showing a connection between trees and lower levels of violence among Alzheimer patients and prison inmates, respectively).

82 (Francis, Cashdan & Paxson, 1984)

83 (Trust for Public Land, 1994)

84 (House Report: H.R. 4034, 1994) See also (Trust for Public Land, 1994)(In Phoenix, when recreational facilities stayed open late, juvenile crime decreased by 55%; and in Philadelphia, the creation of new spaces for recreational activity may have led to a 90% decrease in crime in the affected precinct.)

Studies show a positive relationship between community gardens and reduction of crime

OUTDOOR PLAY AND EXERCISE BENEFIT PHYSICAL HEALTH AND MOTOR DEVELOPMENT

The typical schoolyard, with its large open spaces, also provides the opportunity for the aerobic activity and display of gross-motor skills that are needed for a child's general physical and emotional health.

Physical Health

Recreational programs in schools have been shown to affect the "longevity and health" of children.[85] The 1996 Surgeon General's report on physical activity and health reveals that physical activity reduces risks of chronic disease including hypertension, type 2 diabetes, high blood lipids, cardiovascular disease and obesity. The report states that physical activity can prevent or delay the development of hypertension in children and adolescents and maintain their blood pressure at normal levels. Recreation is also important for children in order to promote "weight control through caloric expenditure" and is particularly important for the large number of children who are overweight.[86]

Although studies have clearly shown that involvement in high-intensity endurance training programs, such as running, improves children's cardio-respiratory functions[87] and that participation in organized sports significantly improves their motor fitness capacity,[88] free play has also been found to have a positive influence on a child's motor development capacity. For example, giving preschool and elementary children the opportunity to play during recess has facilitated their physical fitness and motor development skills.[89] Kindergarten children participating in free play periods in

Physical activity reduces the risk of chronic disease

85 (Hinkle, 1988)

86 (U.S.Surgeon General, 1996)

87 (Rowland, 1985; Simons-Morton, O'Hara, Simons-Morton & Parcel, 1987; Lussier & Buskirk, 1977)

88 (Beedle, 1981)(Dwyer, Blizzard & Dean 1996)(noting, based on findings from the Australian Schools Health and Fitness Survey which was conducted on a representative sample of Australian schoolchildren aged 7-15 in 1985, that physical activity is associated with physical capacity measured as endurance fitness and both were associated with reduced body fatness)

89 (Myers, 1985)

which they were given a choice of outdoor equipment have been observed to display more motor and locomotive behaviors, as well as engage in more social interaction than during formal physical education classes.[90] Generally, several studies have concluded that a comprehensive outdoor play environment that provides children with spaces, equipment and material for opportunities to engage in physical, social, creative and quiet play enhances their opportunity to develop motor, locomotive, balancing and eye-hand-foot coordination skills.[91] The findings of these studies should be heeded, because they have implications not only for improved young people's development but also for decreased community health costs associated with chronic disease.

90 (Hartle & Johnson, 1993)

91 (Aronson, 1988; Bennett, 1980; Moore et al., 1987; Seefeldt, 1984; Staniford, 1979)

Self-Esteem and Confidence

Some researchers have also noted that aerobic activities are associated with enhanced self-esteem and confidence levels in school-age children.[92] Athletic activities and outdoor games are considered to be "indirect psychotherapies" insofar as they have been found to promote relaxation, self-control, self-esteem, determination, and a sense of accomplishment.[93] Similarly, among a group of boys aged 8-20, participation in organized sports was found to better their perception of their own athletic and scholastic competence, physical appearance and general self-worth.[94] In a study of approximately 1,000 high school students in Toronto, regular participation in vigorous physical activity was found to be associated with the children's beliefs in their own capacity to meet situational demands — a concept referred to as "self-efficacy."[95] Moreover, one investigator even claims that participation in outdoor games plays a role in preventing and remedying addictive behaviors such as drug and alcohol use.[96]

Whether or not this latter claim can be replicated, it is certain that the general health benefits that may be derived from a well-designed physical activity program include improvement in self-esteem and body image, relief of anxiety, stress and reactive depression and maximization of one's psychomotor development—all of which contribute to a "healthy mind."[97]

92 (Hinckle, 1988)

93 (Peiffer, 1969)

94 (Seidel & Reppucci, 1993); see also (Jambor, 1990)(noting that when children develop coordination, confidence and self-control in their motor activity, their sense of competence and accomplishment is usually carried over into other development areas such as their interaction with peers, athletic accomplishments, judgment skills and academic performance).

95 (Allison, Dwyer & Makin, 1999)

96 (Klingemann, 1995)

97 (Shephard, 1983)

Natural Environments and the Importance of Light

Empirical research also suggests that experiences in natural environments, rich in private spaces, peaceful settings and malleable elements are important not only for one's understanding and appreciation of "nature," but also for fostering one's self-identity, self-esteem and ability to deal with stress.[98] Studies of adults who have regular contact with outdoor natural environments indicate increased levels of enjoyment, health, relaxation, and lower levels of stress.[99] In addition, there is some independent anecdotal evidence that these beneficial effects also apply to children.[100]

For many, nature per se is considered a healing agent. When adults were asked to give a free artistic rendering of "healing spaces," 75% of the respondents drew outdoor settings featuring trees, grass, water, sky, rocks, flowers and birds. Even among the remaining drawings that depicted interior spaces, elements related to the outdoors such as indoor potted plants and flowers, a garden visible through a window and sunlight were always included.[101]

Specifically, the importance of natural light for the well-being and health of children (and adults) cannot be overstated. According to Richard J. Wurtman, a nutritionist at Massachusetts Institute of Technology, "[l]ight is the most important environmental input, after food, in controlling bodily functions."[102]

Natural light is critical for enjoyment, health and relaxation

Research has demonstrated a positive relationship between natural light deprivation and depression.[103] Electric light, which is deficient in certain wavelengths of light energy, appears to suppress the secretion of melatonin, which, in some cases, has led to a condition called Seasonal Affective Disorder (SAD). That is, through-

98 (Raymund, 1995)

99 (Kaplan & Kaplan, 1989). Kaplan further states: "for some, nature is a source of tranquility," and the "absence of confusion" associated with a "nature experience" can be highly pleasurable, if it occurs "at a time when issues of identity and one's relationship to the environment are pressing, could have a lasting impact on the character and functioning of the individual." (Kaplan, 1977)

100 (Rivkin, 1997)

101 (Olds, 1989; Henninger, 1994)

102 (Gruson, 1979)

103 (Rosenthal, et al., 1985

out the autumn and winter months, when people tend to spend more time indoors, those with SAD, including children, suffer from profound mood changes, depression, lethargy and carbohydrate cravings.[104] Similarly, it has been suggested that the trend for human beings to spend more hours indoors than in earlier generations under the partial spectrum of fluorescent bulbs has increased the incidence of headaches, arthritis, diabetes, hay fever, infertility, hormonal imbalances, tooth decay and other maladies experienced by individuals in our "office" society.[105]

Whether or not lack of natural light is responsible for many of our daily health problems, recent research in California has linked school performance to natural light levels in classrooms. After controlling for other factors that affect test performance, such as family income, investigators with the Heschong Mahone Group, an energy-consulting firm, found that students exposed to the most daylight also had significantly higher test scores.[106] The thrust of these various studies on the health effect of natural sunlight seems strongly to suggest that one of the most important elements in children's overall health, the opportunity for outdoor play, is not only crucial, but, in its least encumbered implementation, entirely free.

104 (Olds, 1989)

105 (Ott, 1973)

106 (Pacific Gas & Electric Co., 1999)

OUTDOOR SETTINGS PROVIDE EFFECTIVE ENVIRONMENTS TO TEACH TRADITIONAL AND INTERDISCIPLINARY CURRICULA

Yet another team of researchers[107] has focused on problems some students have in integrating formal classroom knowledge with practical understanding of how to apply it. Their studies suggest that knowledge of facts, formulas or equations is insufficient to meet a satisfactory definition of learning. Educational theorists have long recognized this conclusion relating to the application of knowledge;[108] but, the notion that a child's interaction with different materials in a variety of ways enhances her capacity to learn (such as her ability to transfer knowledge to a less similar problem)[109] has only recently gained wider acceptance.[110]

For many children, hands-on activities in outdoor settings are more effective environments for teaching science, math, and multi-disciplinary approaches to problem solving.[111] Such outdoor sites can be designed with features that can be interpreted through a variety of curricular windows (i.e., science, math, history, language, fine arts, etc.).[112] When young people learn about their environment through different subject areas, their understanding of it is reinforced and more readily comprehended.[113] Furthermore, outdoor school sites offer the opportunity to "act out" solutions to problems through active manipulation of learning materials, and thus enhance a child's discovery, investigation and experimentation skills.[114] Outdoor school sites of the type recommended above would be a major step towards enabling a young child to cultivate a sense of wonder for her surroundings, whereas older children may learn about important ecological phenomena, their communities' physical, cultural and spatial place in the world as well as the impact that human activities are having on the physical

Outdoor environments are ideal for teaching many subjects

107 (Gardner, 1991, 1993; Scribner, 1984)

108 (Dewey, 1963; Duckworth, 1996)

109 (Basile and Copley, 1997); (Gardner, 1993)(delineating his theory of "multiple intelligences"); Cronin-Jones (2000)

110 (Pica, 1997)(noting that studies of how young children learn have proven that they acquire knowledge experientially — through play, experimentation, exploration and discovery,— and use their visual, auditory, tactile and kinetic abilities, to varying degrees)

111 (Lieberman and Hoody, 1998)

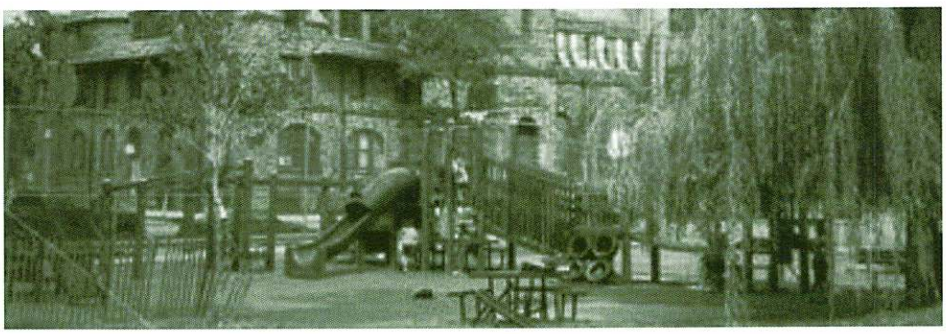
112 A survey undertaken by the U.S. Fish and Wildlife Service showed that in 1996 there were approximately forty organizations that were devoted to enhancing school grounds or sponsoring programs to promote such empirically based learning. Many of the organizations listed have a traditional wildlife conservation mission, while others have developed a variety of connections among university science and education departments, state school systems, natural science museums, arboreta and conservation organizations (U.S. Fish and Wildlife Service, 1996). See also (Taylor & Vlastos, 1975)(in which the authors demonstrated a way of using curriculum as a design determinant and suggested ways to modify indoor and outdoor educational spaces so that they are an integral part of the learning process).

113 (Shierloh, 1998)

114 Id.

world.[115] There is some evidence that middle childhood, ages 6 through 11 years, provides a unique period during which a positive relationship between a person and the natural world may be fostered.[116]

In addition to providing a plentiful resource for the formal school curriculum, outdoor school ground projects have been found to improve the quality of the environment and hence the appearance, image and popularity of a school.[117] Dramatic improvements in pupil behavior and attitude as well as the development of a better school ethos that stresses care, ownership and responsibility have also flowed from outdoor projects that have integrated the school "playground" into the educational life of its students.[118]



115 Id. See also (Naylor, 1985; Schafer, 1977)(in which the authors argue that adults will not make intelligent decisions about the use, management and protection of air, water, soil, flora and fauna systems, unless they gain an appreciation of the dependence of human life on natural environments at an early age; (Theodori, et.al, 1998)(finding, pursuant to a random study of four communities in Pennsylvania, that there was a positive association between participation in outdoor recreational activities and pro-environmental behavior); (Harvey, 1989)(finding, in accordance with a survey of 995 school age children between the ages of 8 and 11 in the south of England, that any aspect of a child's experience with vegetation, be it the variety, the frequency of contact or the enjoyment derived, exerted a positive influence on that child's attitude to outdoor open spaces and a negative influence on his or her desire to dominate nature); (Haury, 1998)(digest summarizing literature on education for environmental sustainability).

116 (Chawla, 1992)

117 (Learning Through Landscapes website: www.ltl.org.uk)

118 Id.

SCHOOLYARDS PROVIDE A CRITICAL RESOURCE FOR OUTDOOR PLAY AND RECREATION

Over the years, in certain western societies, and especially in the United States, there has been a significant erosion of outdoor play opportunities for children.[119] Research conducted in North-West England indicates that over the past 20 years fewer children have been playing outdoors and that the outdoor play that does occur is centered around the home rather than in public spaces such as streets.[120] A study that compared the type and level of outdoor play of today's children in Leeds, England to that of their parents has further concluded that children are becoming increasingly alienated from natural environments, especially for purposes of play.[121]

119 (Henninger, 1994; Valentine, 1997; Katz, 1995; Raymund, 1995)

120 (Valentine & McKendrick, 1997)

121 (Freeman, 1995)

Similarly, in the United States, the conclusions of a study that looked at adults' favorite childhood play experiences suggest that children may be having fewer outdoor play activities.[122] All the participants in the study, which included a group of college and graduate students, agreed that parents are generally less eager to allow their children to play outdoors in settings without security personnel, due to a perceived threat of kidnapping and child molestation. Because parents' fears of danger appear to influence children's outdoor play activities,[123] there is a need to create safe outdoor play spaces.

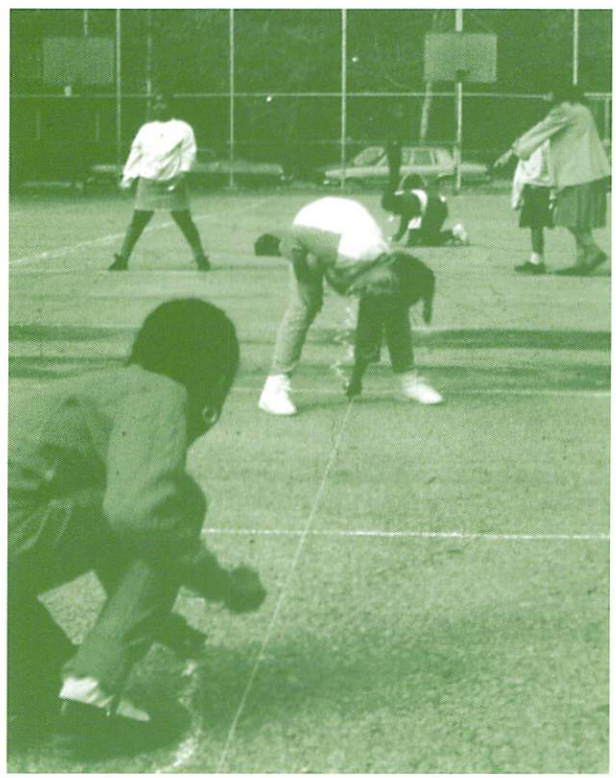
122 (Henniger, 1994)

123 (Blakely, 1994)

In New Jersey's urban school districts, the lack of safe, outdoor recreational space is an acknowledged problem. [124] Communities such as Paterson, Newark, Camden, Asbury Park and Trenton face a scarcity of safe, outdoor spaces, including the barren, asphalt schoolyards that are often used for teachers' parking lots or garbage dumpsters.

124 (USPIRG, 2002)

Given the documented reduction in safe, public play environments, together with the positive relationship between play and cognitive and social development that we have noted, schools have a responsibility (and an opportunity) to convert their valuable resource -the schoolyard - into a rich, educationally beneficial setting for children of all ages.



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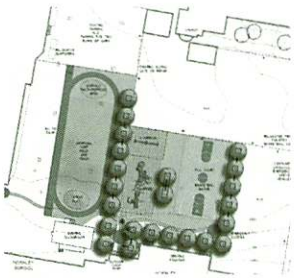
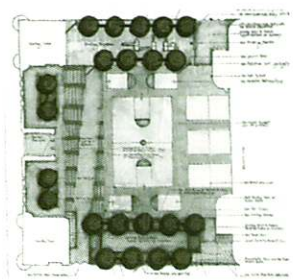
DESIGNING SCHOOLYARDS





This section of the booklet will provide some ideas and direction to people who are engaged in the planning and design of schoolyards. It is not intended as a definitive guide, nor is it a series of standards. A comprehensive guideline and standards for schoolyard design would have been a hefty volume that goes well beyond the scope of this booklet.

Any reader will immediately recognize that a lot of technical information that is necessary for designing a schoolyard is not included in this booklet. This information such as dimensions of equipment and basketball court sizes, or safety standards are widely available elsewhere and key references and web addresses for finding them are included at the end of this booklet.

What we hope this document will provide is a set of ideas organized under headings that would act as an detailed checklist that school administrators and schoolyard designers could use as a starting point for building their schoolyards. It should also be noted that size, operational issues, and maintenance concerns would likely prevent some of the design ideas stated here from being implemented in actual plans. What is important is for the designers to understand the need for the variety of features that would result in a playground that promotes healthy development of children while providing them with a setting for a diverse educational experience. The scientific case why this is so important is clearly stated in the first section of this document.

BACKGROUND

A typical schoolyard

While schoolyards have been a feature of U.S. public schools since the nineteenth century, they have not been designed to support the activities of children which we now know to be so important to their development: play, social interaction and exploration and manipulation of the physical environment. In many schools, it is possible to find bare asphalted lots with minimal play equipment and few landscape features. This situation remains a problem nationwide but is particularly acute in inner city areas, low income neighborhoods and in places where concerns for safety and vandalism are high. Unfortunately, these are the same areas where children have few opportunities for safe and stimulating outdoor play.

As cities become more dangerous and children's freedom for outdoor play is more restricted, school playgrounds offer a strategic opportunity for expanding children's play options. Many schoolyards serve the recreational and open space needs of both schools and their communities. While designing a schoolyard, designers should take into account not only its use during recess, but also its use the before and after school as well as its potential use for weekend and summer activities.

GENERAL PRINCIPLES

Play opportunities in most schoolyards are severely limited

The key for designing a successful schoolyard requires a thorough understanding of children's play as well as the unique dynamics of each school. The schoolyard should offer ample opportunities for a variety of play and other social activities to take place simultaneously. This is essential for the simple reason that a school playground

is much more than just a play setting. As established herein, it is also a social and educational environment.

A well-designed and well-managed play environment should provide children with developmental opportunities such as:

- motor skill development
- social development
- learning
- decision making
- fantasy play
- playing to have fun

Careful attention to these different types of activities require the development of "play zones" in schoolyard design. Basic principles in designing these zones will be discussed in coming sections.

Key concerns in designing all types of schoolyards

Conflict over existing space is a natural part of schoolyard reality. If one looks closely at play and use patterns in any schoolyard, it will be clear that different groups do take over different parts of the playground. While it is impossible to resolve all these conflicts through design, it is very important to be sensitive to the rights of all groups in the school.

Gender differences

Basketball is one of the most common features in schoolyards

In most schoolyards, a majority of the yard is generally under the control of boys. This is mostly due to the fact that boys have control of the basketball courts, that typically take up significant amount of space in the schoolyard. As a result, girls usually become the "spectators" especially during the periods where the demand for the courts are high, like recess time. To balance this, the design should allow areas that can be used and territoralized by girls. The most common activities for girls are jumping rope, floor games, and social interaction. Open areas suitable for these activities, surrounded by benches with good visibility, will allow the girls to have their own "space" in the schoolyard. However, this does not pre-

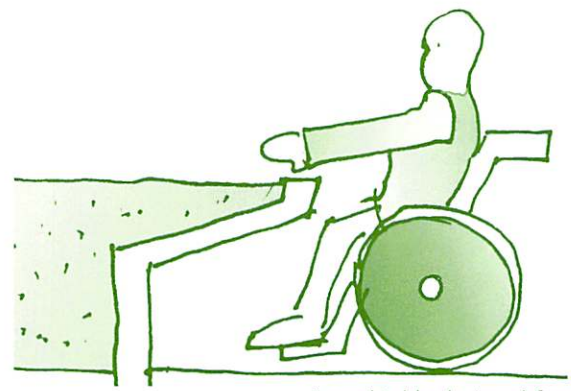
clude participation of girls in basketball or soccer games, or the use of space for board games by the boys.

Age differences

Similar to gender, the tendency of older children to "take over" the space and not allow freedom to younger children is a common phenomenon. It is possible to partially address this issue by sensitive design features. For example, older children usually do not like to play on play equipment designed for younger children. Such equipment is not challenging enough for them and they also see it as "babyish." In a schoolyard design, where equipment for older and younger children co-exist, it is very likely that older children will stay away from the younger children's area allowing them freedom to play without interference.

Children with special needs

All schoolyards should be designed with sensitivity to the needs of the children with disabilities. Americans With Disabilities Act (ADA) has special requirements for disabled children. These mostly apply to play equipment and features such as drinking fountains. When disabilities are mentioned, it is common for many designers to think only of children in wheelchairs. Children with other disabilities such as visual and hearing impairments are usually ignored. Schoolyards can easily be improved significantly by surface treatments and sound elements to make them more welcoming for all children with special needs.



A sand table designed for all children is not only fun but also creates new play opportunities

Existing "ecology" of the schoolyard

Creating schoolyards usually requires the redesign of an existing schoolyard. In these instances, it is critical to understand the full ecology of that schoolyard. If the activities in such a schoolyard are studied carefully, the viewer will see a range of patterns in use. The older boys play in some locations, girls sit together in other locations, some parts of the schoolyard are avoided altogether. Such patterns of use are not accidental. They usually have many logical explanations which cannot be understood by a casual observer. In our research, we have found that locations where teachers congregate, the availability of sun and shade,

as well as surface quality determined where children play, sit in groups, or just "hang out" within the schoolyard. Similarly, avoidance of areas alongside the sidewalk was the result of nervousness about strangers passing by the fence. Any design that does not take these and similar factors under consideration is bound to fail. However, finding out about the existing "ecology" of a schoolyard is not an easy task. This is why the design process should include participation from as many groups as possible, including, students, teachers, administrators, parents and custodians.

Importance of the Participatory Process

In any schoolyard design, some form of participation is critical. In many cases however, designers are usually not given the chance to work directly with the school. When they do, it is usually the principal who must approve the final design. While the principal's input is critical, it is mostly the students, and the teachers who use the schoolyard on a daily basis. Therefore, their input is very important. While it is impossible to have the school engage in a very detailed and time consuming participatory process, it is possible to ensure quality input by working intensely with a small number of volunteer children in the form of a "schoolyard committee." An important point is to make sure that such a committee is well balanced to represent all ages, both genders and children of varying skills and inclinations.

Involving children in the design ensures that the playground will be used as planned

Once the schoolyard committee is established, its members can help to clarify the "current use" of the schoolyard as well as develop a master plan for the new design. It then would be the architect's task to generate a plan that incorporates key ideas derived from the participatory design process.

Developing Zones for Play

Play zones are the basic building blocks of any schoolyard design. In a successful design, these zones are arranged in a way to support each other and not to allow conflicting activities to overlap. The size of each zone depends on the type of the activity taking place in that zone. Zones are not necessarily separated by any physical barrier; by using colors, textures and various design elements such as plants and benches, a designer is able to clearly identify where a zone ends and a new one starts.

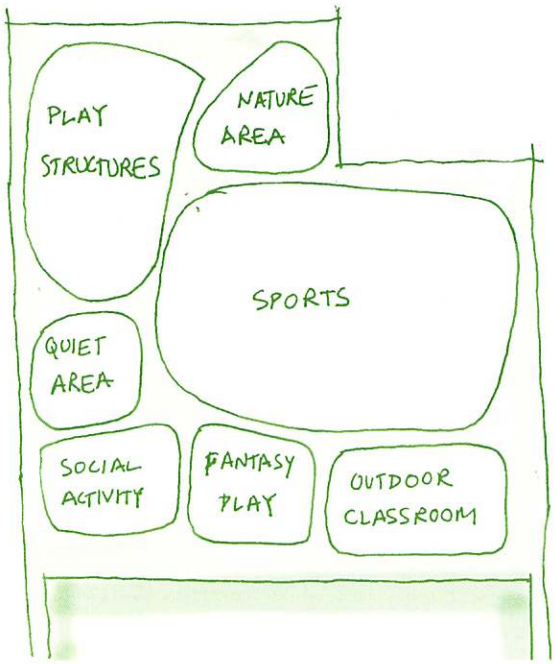
Some considerations for assigning activity zones are as follows:

- Areas of very active play and active circulation should not invade the areas designed for more sedentary activities.

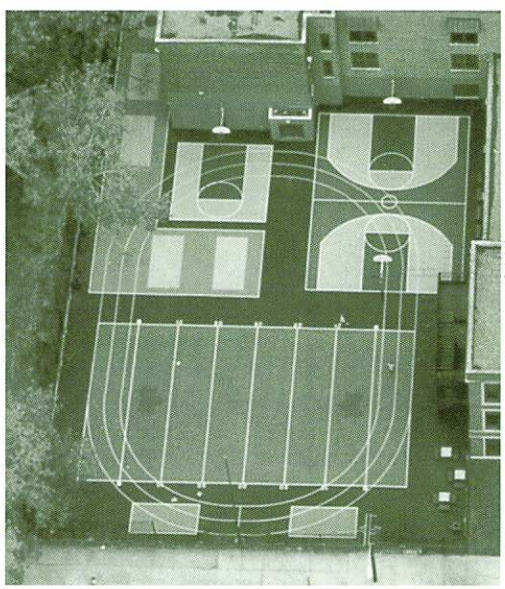
- Younger children should be able to play in areas which are less likely to be dominated by older children.

- All areas should be designed without blocking adult view of the area.

- There should also be areas within each schoolyard which encourage mixing of age groups as well as boys and girls.



Identifying different play zones is a critical step for designing schoolyards



- Areas expected to be very noisy should not be located next to the classrooms as play will sometimes be taking place when classes are in session.

- Quiet areas designed for individual and small-group conversation should be separated from areas that are expected to be noisy.

- The dividers between zones should not be hard barriers which may facilitate entrapment.

Play Zones That Should be Considered in Schoolyard Design

Organized games and sports

It is a fact that a very large section of any U.S. schoolyard is reserved for areas related to organized games and sports. The most popular of these is basketball. Following basketball, you can observe handball, softball, soccer, volleyball and tennis. Any schoolyard will end up with a combination of the above because they are most popular among boys as well as girls. Here are some key points for incorporating organized sports in schoolyards:

- Depending on the availability of space, try to include as many half courts as possible in addition to a full basketball court. This will allow multiple groups to play together.

- Spectators are as important as the players. Design natural sitting and viewing places (steps, benches, etc.) alongside the courts.

- Try to design courts for multiple-use. With the addition of proper nets, basketball courts can be converted into volleyball, tennis, badminton courts, etc.

Gross-motor activities

In addition to organized sports, a lot of free play and physical activity takes place on the school playground. These range from just running around to tag, skating, and pretend games such as cops and robbers, etc. While many of these activities look arbitrary, children usually have very detailed rules about each of these games. We have observed that certain lines and geometric shapes on the ground, as well as other features such as garbage cans, drinking fountains and benches are commonly used to set up these rules, territories and boundaries.

While planning, it is important to leave ample amount of unobstructed open area for this type of spontaneous play. Children should be allowed to run freely in the space, without being blocked by poles, planters and other dangerous objects. Traffic patterns should be studied so they do not interfere with this type of play.

Play structures

Manufactured play structures are one very common element in all playgrounds. Designers should not assume that they are needed in all schoolyards. In some cases, children may prefer to have sports or open areas instead of play structures. Important considerations while selecting play structures are as follows:

Play structures incorporate many forms of play but are mostly designed for active play.

Play structures should be age appropriate. Six-year-olds and 10-year-olds cannot share the same structure. If the school has young and older children, two areas with separate structures with different levels of challenge should be built.

Play structures should provide multiple choices. They should not be linear. Children should be allowed to take different paths while climbing or coming down.

Structures should not have any "dead-ends." Options for escape should be available in many locations.

Structures should be safe and durable. Strict guidelines about safety surfaces that must be placed under the play equipment should be heeded.

The capacity of the structure should be appropriate for the size of the schoolyard. If the demand is high for a small play structure, this can cause overcrowding that may result in a drop in the quality of play as well as a high possibility for injuries.

Outdoor classrooms

A corner of the schoolyard can also serve as an outdoor classroom. These spaces can incorporate art, exercise, performance and nature exploration

There is no reason why, from time to time, outdoor space cannot be used for teaching by the teachers. In current schoolyards, many teachers do not even attempt to use the outside as an alternate classroom. The basic reason for this is that they believe that they would not be able to control the children in such a vast and boundryless space.

Outdoor classrooms can be designed with clear boundaries, enough seating for a group of children, and additional features such as art surfaces and natural elements. They do not need to be dedicated spaces. They can be multipurpose and can be used as social/gathering areas at other times.

Art and performance spaces

A performance space can be designed as a simple raised stage or a more elaborate amphitheater. The existence of such an area can also encourage the school to organize structured plays, concerts and shows. On the other hand, it can also be used for spontaneous dance and other performance. In general, girls tend to be more excited about such spaces than boys.

In addition to performance purposes, an outdoor art area can be created in a schoolyard. This can be as simple as a part of a wall that is designed on which to hang some easels. Such a space may be conceived as a part of an outdoor classroom, or incorporated into the design of an amphitheater.

Natural areas

Shrubs, trees and flowering plants are highly valued by children and adults. They provide sensory diversity and enable children to contact natural materials on a daily basis. They can soften and shade the harsh environment and provide soothing spaces for quiet activities. A small garden offers excellent opportunities for environmental education.

Social activity spaces

If one observes the activities of any schoolyard, s/he will immediately see that sitting together in small groups is a favorite activity. Unfortunately, very few schoolyards have appropriate seating arrangements to encourage social interaction. Usually, seating is thought of as a series of benches lining the perimeter of the schoolyard.

- A good seating area should be L or U shaped to encourage conversation.

- It should be somewhat isolated from noise and traffic, but in a good position to view the activities in the schoolyard.

- Seats should be comfortable preferably with backs.

- Some seating should be arranged around a table to encourage reading, writing, boardgames, etc.

-There should be different size groupings ranging from individual to relatively big groups of 10-12 children.

- Since it would not be possible to

have benches or other manufactured seats to meet all the demand for their use, seating edges should be created in various locations. These edges can be created by manipulating steps or incorporating very low walls around some activity zones such as the garden area.

Sand play and Water play

Playing with sand and water is extremely valuable especially for young children. These materials give children opportunities for free constructive play opportunities. The most valuable form of sand and water play is when children collaborate to build things.

Unfortunately, due to sanitary and practical reasons, there is not an easy way to introduce sand and water into schoolyards. The most practical way of doing this can be through sand and water tables. While sand tables can be wheeled away, or if stationary, can be covered and locked, water tables can be filled from time to time.

Storage for loose parts

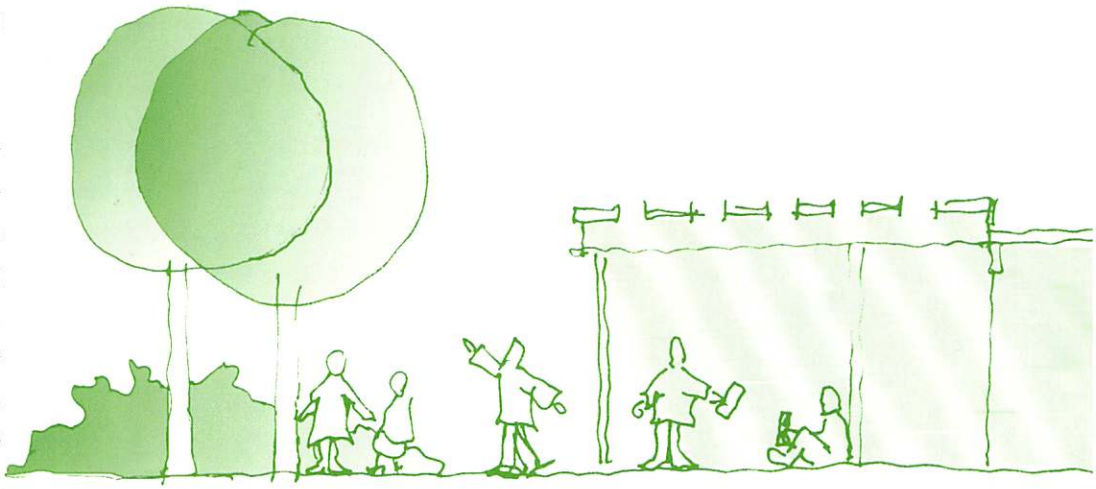
Many items required for play cannot be left on the schoolyard after school hours. Therefore, because play periods are brief, storage for loose play items such as balls, hoops, wheeled toys, rubber mats, etc. must be easily accessible to the yards.

Storage areas should be highly resistant to theft and vandalism. In order to facilitate the participation of children in the provision and return of play materials, they should be designed so that once opened, they are visually and physically accessible to the children.

Secure outdoor storage required for maintenance tools should be separate and not be confused with storage for play equipment.

Shelter/shade structures

It is the desire of many children to have a shade/shelter structure where they can gather and create a "club house." In some schoolyards, which are highly exposed to direct sunlight and there are no trees, it is also a necessity to create some shaded play and sitting areas.



There are many different ways to generate shade

Shade structures effectively define a "social" sitting zone. However they can easily be taken over by the most powerful group in the school. Therefore it is important to design more than one such structure in any schoolyard.

These structures should be open or partially open on the sides to permit adult supervision.

Shade structures also double as quiet sitting areas for small groups.

Construction of shade structures is critical. They should be sturdy and durable. One common danger is for children to perceive it as another game structure and attempt to climb on it. The design of the structure should preclude such activity.

Fantasy play

Very few playgrounds offer opportunities for fantasy play. In order to stimulate the imagination of children, features much more complex than a few abstract concrete shapes may be necessary. Thematic play structures such as boats, trucks, trains etc. create excellent fantasy play environments. In these cases,

children in groups will create a "story" that goes with the setting. Such games stimulate social interaction and develop inter-personal skills.

BASIC PRINCIPLES FOR DESIGN OF OUTDOOR SPACES FOR PRESCHOOLS

Introduction

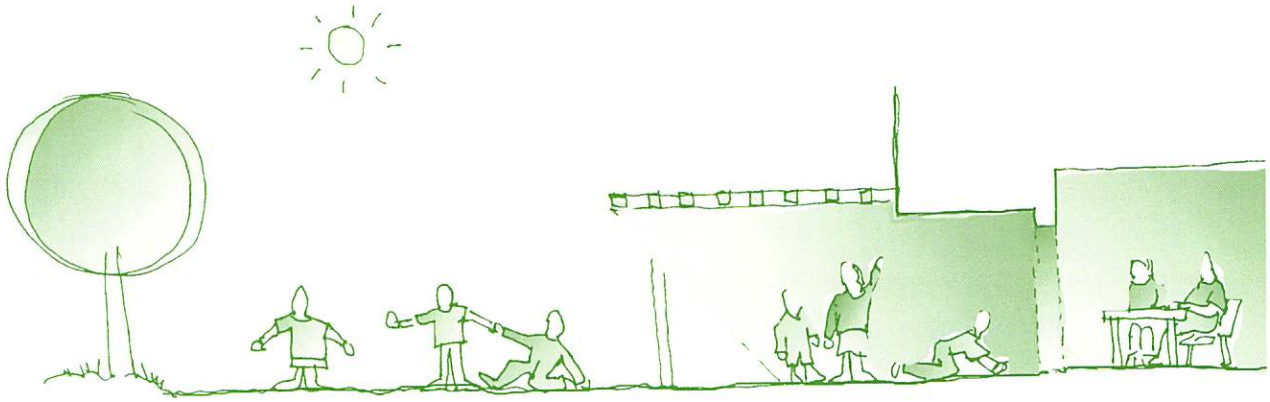
The preschool environment is one of the most critical settings for the physical and mental development of children. Outdoor environments for preschools are probably the most challenging to design, since they need to address a much wider range of developmental needs compared to elementary and middle schools.

In terms of physical activity, preschool children need an environment where they can comfortably walk, climb and swing. In terms of cognitive development, pre-school yards should provide opportunities for the children to manipulate small objects, understand cause and effect relationships, encourage role playing and help them to conduct imaginative play activities.

While designing such an environment is a significant challenge, preschools also provide some advantages. First, compared to elementary and middle schools, they are smaller in size. The outdoor areas are also smaller and well defined. Since use of the area would need heavy supervision by the staff, it is possible to install furniture and equipment that are not totally hard and vandal-proof. Also, many natural elements including grass, bushes and small trees are likely to survive much better in a preschool environment.

Site considerations: The indoor-outdoor continuum

Especially for preschool settings, it is very desirable for part of the outdoor yard to be a natural extension of the indoor classroom. In the cases where the building is already designed and built, this may be impossible to accomplish. However, any direct or indirect access from the classrooms to the outside should be a major design goal.



Classrooms should be designed so that in good weather an outdoor area should act like an extension of the indoor space

Ideally, in preschools, all classrooms should be connected to an immediate small and well-defined outdoor space. The connection should be through large glass doors that can be opened in such a way that in good weather, indoor and outdoor space can be used as one continuous setting. These small classroom-specific outdoor spaces then can be connected to a larger yard that is shared by the whole school.

The same principle should also be applied, in the cases where direct access to the outside from the classrooms is not possible. The outdoor environment should be designed as a combination of a number of smaller defined areas, designed for individual and small group activities including exploration and sensory-motor stimulation. These small areas should then be connected to a larger space designed for gross-motor activities and active play. More traditional play equipment designed for climbing, sliding etc. should be placed in this larger area.

Activity Areas

Paved extension of the classroom

The paved area designed closest to the classrooms should be used as an outdoor extension for classroom activities. In good weather, it can be set up with tables and chairs to conduct more traditional classroom activities. For example, it can be used for art (by setting up easels), for group meetings, drama, etc.

Once cleared from obstructions, the paved surface can be utilized for playing with building blocks, wheeled toys and various construction activities.

Paved hard surface is essential for wheeled toys, block play and tables and chairs

It is important to provide shade, at least partially in this area. This can be done by using a canopy or taking advantage of the shade of the building.

Active play zone: Open areas for active play

For preschools, active play is mostly free large muscle activity, such as running, jumping, climbing and sliding. For preschool children, this can be best achieved in an unobstructed open grassy area. While grass is relatively hard to maintain, this can be done more easily in kindergarten settings due to size and smaller numbers of children. This should be the largest zone in the yard.

Keep the play area free of obstructions but provide a buffer space around it by using fences, shrubs and other design features. This prevents balls and other flying objects from entering the protected more quiet play spaces.

Most designs do not take full advantage of topographical features of open spaces. While a section of these areas can be left flat, it is a good idea to create some gentle hills for climbing, sliding, etc. Mounds and small slopes, not only help with drainage, but also generate excellent play opportunities. Some sections of the mound can include hard surface for rolling down wheeled toys and sliding objects. A series of stepping stones built into the mound can assist with climbing. Such a mound can provide play opportunities not only in good weather but also in winter when it snows.

Various equipment for active play such as slides, swings and climbing structures can be integrated into this area or can be placed in an adjacent location within easy access. However, this should be done after careful study of circulation patterns since most of this zone should be devoid of barriers and tripping hazards as much as possible.

Physical activity is essential for healthy development of young children. In schoolyards (as in many public playgrounds) this need is addressed by play structures. These structures incorporate functions for climbing, sliding, balance and other physically challenging activities. Since they involve active play, these structures are also the most risky elements in the schoolyard in terms of injuries. To avoid possible legal action in the case of mishaps, almost all designers have no option but to use components being marketed by various play equipment manufacturers. Equipment manufactured by these companies follow the American Society for Testing and Materials (ASTM) standards put forward by the U.S. Consumer Product Safety Commission (CPSC). As landscape architect Donna Walcavage states:

> On one hand these guidelines have put together a great body of knowledge in one place. On the other it has made it much more difficult and anxiety inducing to design custom play equipment. And almost no one will build it for you. A whole industry has been created of play equipment manufacturers whose business is based on modular equipment—that makes it economical to build— and meets the guidelines. The manufacturers are in the business to make money, not to promote creative play. I don't mean to put them down. Physical play is important too—kids do need the kind of activities the best of them provide. But this is what most clients have opted for in playgrounds: it's safe, it's as close to indestructible as you can get, it's clean. And if you're a designer, you get the same fee if you custom design or if you use the services of one of these companies. They'll let you play with the modules and the colors and a little of what it looks like and then give you AutoCAD drawings all ready to insert into your construction documents.

Designers should follow some basic rules while selecting and assembling equipment from manufacturers. These are:

Continuity of play

The play structure should provide continuity of play. It should have multiple entry and exit points and should not have dead ends. Children should be able to move from one activity into another flawlessly such as climbing, balancing and sliding down.

Age appropriateness

Most manufacturers' catalogs associate different play structure components with different age groups. For selecting equipment for a specific age group, the catalogs' age recommendations should be taken into consideration. However, if the equipment is not challenging enough, children will be bored by it very quickly.

Durability/maintenance

Since they are more durable, and require less maintenance, most of the available play structures are completely made out of metal and plastic. These structures with very bright and attractive colors eliminate problems of splinters and cracking associated with wood structures. As such, they are appropriate for high volume areas that get a lot of abuse. For preschools, this may not be necessary. It is possible to find some manufacturers, that produce excellent wood structures designed more creatively than others. The final decision on selecting a manufacturer should be done jointly with the staff and administrators of the school.

Size and scale

Two factors that dictate the size of the play equipment are likely to be cost and available space. Even if both of these factors are not an issue, do not let the play structure dominate the whole open area of the preschool yard. Many children enjoy running on grass or climbing natural hills as much as they enjoy play structures. On the other hand, if the play structure is too small, it could create

crowding and severe competition among the children during play. By talking to staff, estimate the number of children likely to be using the play equipment at the same time, and plan accordingly.

Sensory stimulus

Select equipment that incorporates elements that stimulate children during play and engage them in activities beyond simple climbing, sliding and swinging. These may include moving wheels, sound generating elements, peeping tubes and other features that typically stimulate fantasy play and development of play scenarios.

Safety

A safety surface below the play equipment is essential to prevent injuries resulting from falls. CPSC recommends that surfaces around playground equipment have at least 12 inches of wood chips, mulch, sand, or pea gravel, or are mats made of safety-tested rubber or rubber-like materials. The protective surfacing should extend at least 6 feet in all directions from play equipment. Detailed guidelines regarding safety are described in CPSC's "Handbook for Public Playground Safety."

Accessibility for all children

Equipment should be usable by children with disabilities. For children in wheelchairs, it should provide transfer points. Certain sound-creating features also make them more attractive to children with visual disabilities.

Swings

Some play structures may also incorporate a couple of swings in their design. This is not a good idea. While swings are historically one of the most popular play element and loved by children, they also pose a serious safety threat especially in a crowded playground. If you want to incorporate swings in your play scheme, consider the following:

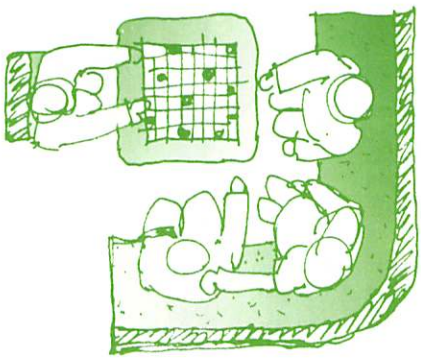
- Do not combine swings with other play features. Design a separate swing area.

- Surround the swing area with a low fence to prevent trespassing. Most injuries occur when swings hit a passerby.

- Place gated entry and exit points to the swing area. Make sure they do not lead directly into the path of the swings.

- Provide an appropriate safety surface under the swings. .

Small group seating



Game tables can be easily incorporated into group seating areas

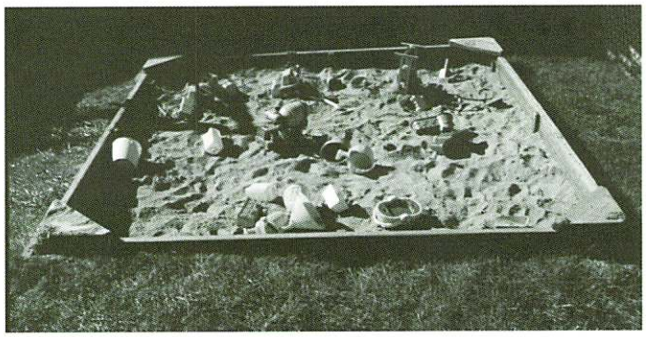
The need for comfortable and protected spaces where children can sit and play in small groups and engage in quiet activities is frequently overlooked in schoolyard design. Small group meeting areas of various sizes are essential for kindergartens. While they should have visibility, it is desirable to give some privacy to these areas by using a variety of natural elements such as trees and bushes. Children also frequently use these areas for solitary play.

Another common mistake done by designers is in the way the seating is arranged in these areas. The best way to do it is to arrange the seating in a "centripetal" position where children can easily see each other and communicate. Linear designs or seating around trees that look out in all directions are not desirable.

Sand and Water

Sand and water are two very critical play elements for the development of young children. Unfortunately, they have almost completely disappeared from many playgrounds because they pose serious maintenance challenges. While they may not be practical for older age groups, they are a must for preschools.

Sand and water play area should be clearly defined and separated from the rest of the schoolyard. They should not be placed in close proximity to active play areas.

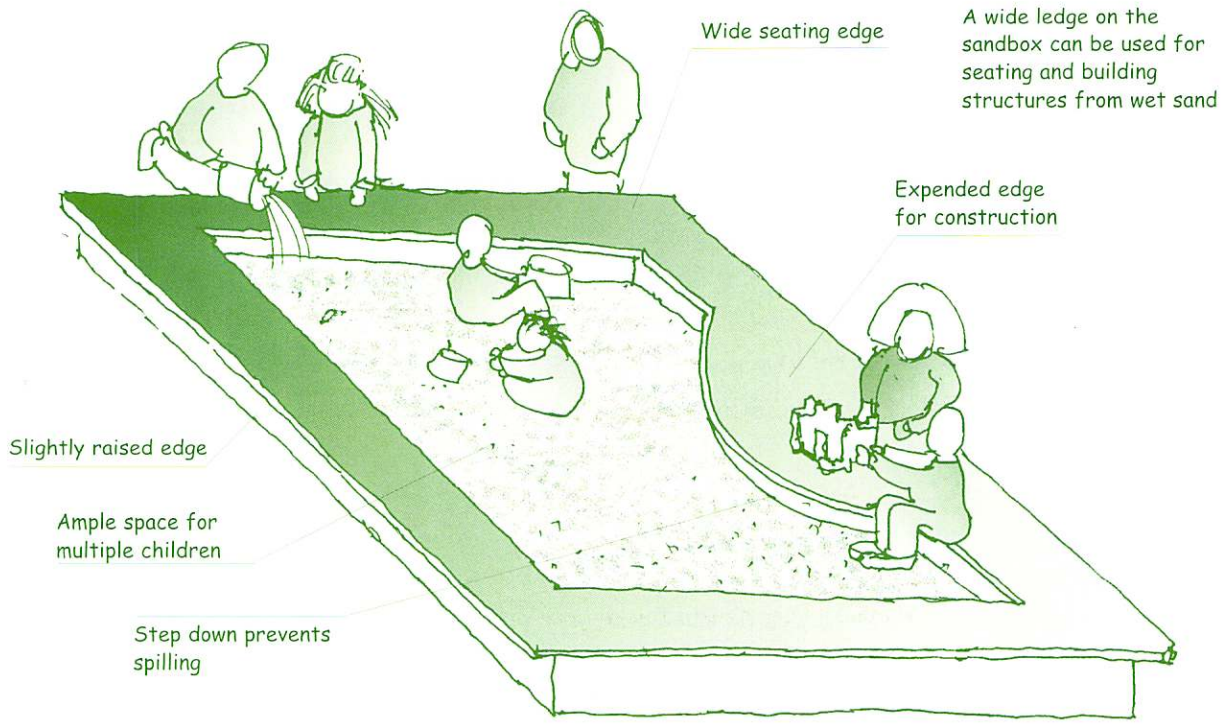


Sand

The most common use of sand in a playground is the sandbox. A well-designed sandbox for a preschool should be big enough to allow at least 10-14 children to play simultaneously.

The sand area should allow children to work together in small groups. There should be a flat area adjacent to the sandbox to construct things.

Keeping the sand clean is the biggest issue. A common problem is to keep stray animals out of the sand. Otherwise, the sandbox quickly can turn into a litter box. This can be achieved by designing a cover for the sandbox that can be installed



when the sandbox is not in use. Other options include fencing the sand area or designing raised sand tables.

The best approach is to work closely with the staff of the preschool while designing the sand area. In well-maintained schoolyards, where the sand can be periodically washed with chlorinated water, many of the above mentioned precautions may be unnecessary.

Design considerations for the sand area

The sand area should be placed in a sunny location. While some trees or other shade structures can be used to protect the children from the sun during hottest times, sun rays should be able to reach and purify all of the sand area at least during certain times of the day.

Drainage is critical. The sand should be deep enough to allow children do some digging. The depth of the sand should range from 1.5' to 3'. A good drainage system below the sand is essential.

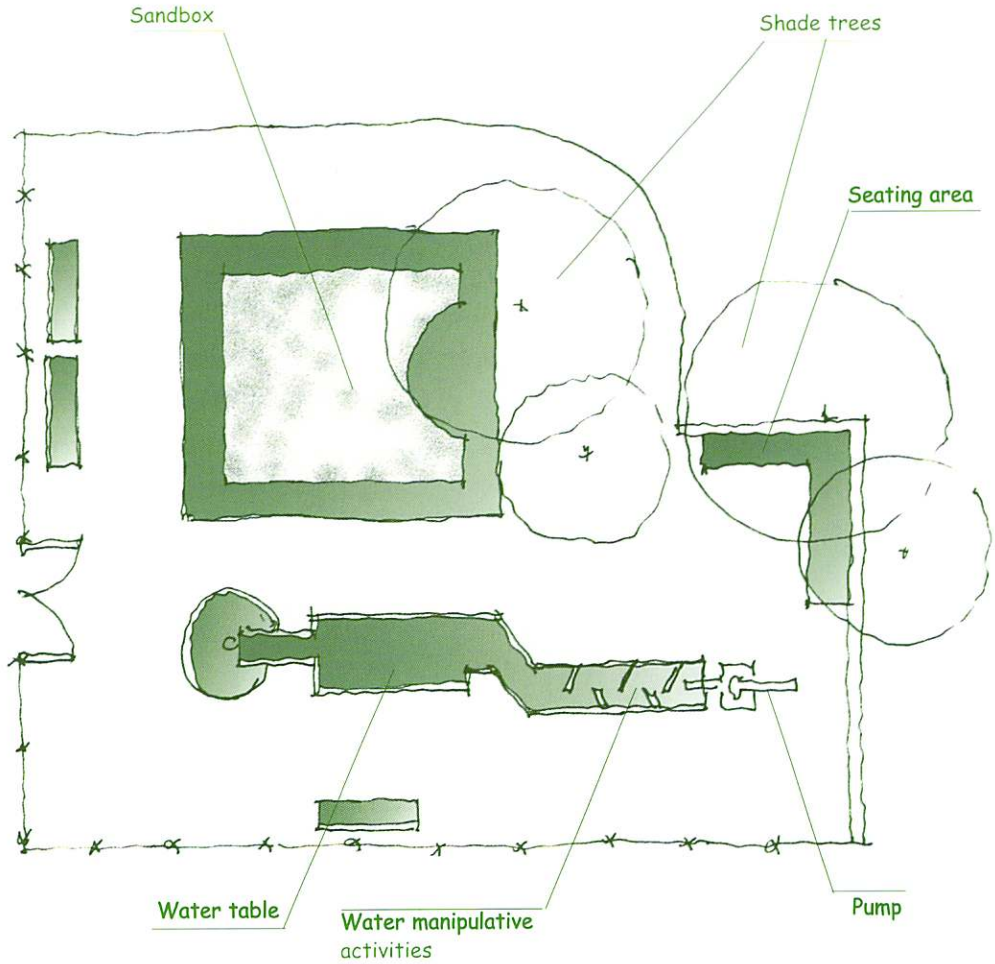
Water play

Water can be introduced into the play area in several different ways. A water play area with limited quantities of water allows children to manipulate the water by scooping it, channeling it, floating objects on it, etc. This type of water play should not be confused with sprinklers or wading pools designed for active play in the hot summer days.

One way to achieve this type of play is through a water table. In this solution, water is raised from the ground, so children stand around it during play. Some play equipment manufacturers have introduced various water table designs. More creative results can be achieved through custom designs. At the end of the day, the water table needs to be drained properly and cleaned.

Mixing water and sand

All children know that totally dry sand is not fun to play with. The real value of the sand area is its potential for allowing children to build things. To do that, sand should be dampened during play. However, placing sand immediately next to running water will result in too much water and a lot of mud and dirt. To prevent that, the design should allow water to be introduced in smaller and controlled quantities. This can be done by making children work hard for the water, instead of providing them with a faucet or a water hose. A small hand-operated water pump is excellent for filling up buckets or getting water flow through the water table. If this is not possible, a large container filled with water will do the trick. Children can then carry water in small buckets, dipping pans or paper cups from the container to the sand area.



SAMPLE PLAN FOR A SAND AND WATER PLAY AREA

Shelter structures

Small, well-defined spaces allow children to play with their friends or "hide" when they want to get away from the others. All children love these special spaces. Best shelter spaces are created by natural materials such as willow trees.

However, for preschool yards, it may be necessary to build them using manufactured elements.

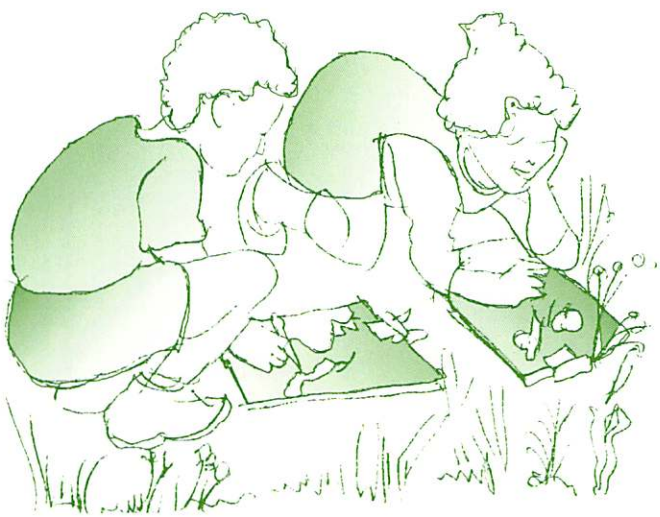
The shelter structure should be partially open to provide visual access from the outside; yet it should provide a sense of privacy and seclusion. It should have more than one entrance/exit to prevent children from blocking each other. In a preschool setting, the shelter structure should be big enough to accommodate at least four or five children at one time. During social play, the shelter structure can function in many ways ranging from an imaginary store, to a playhouse.

Natural areas

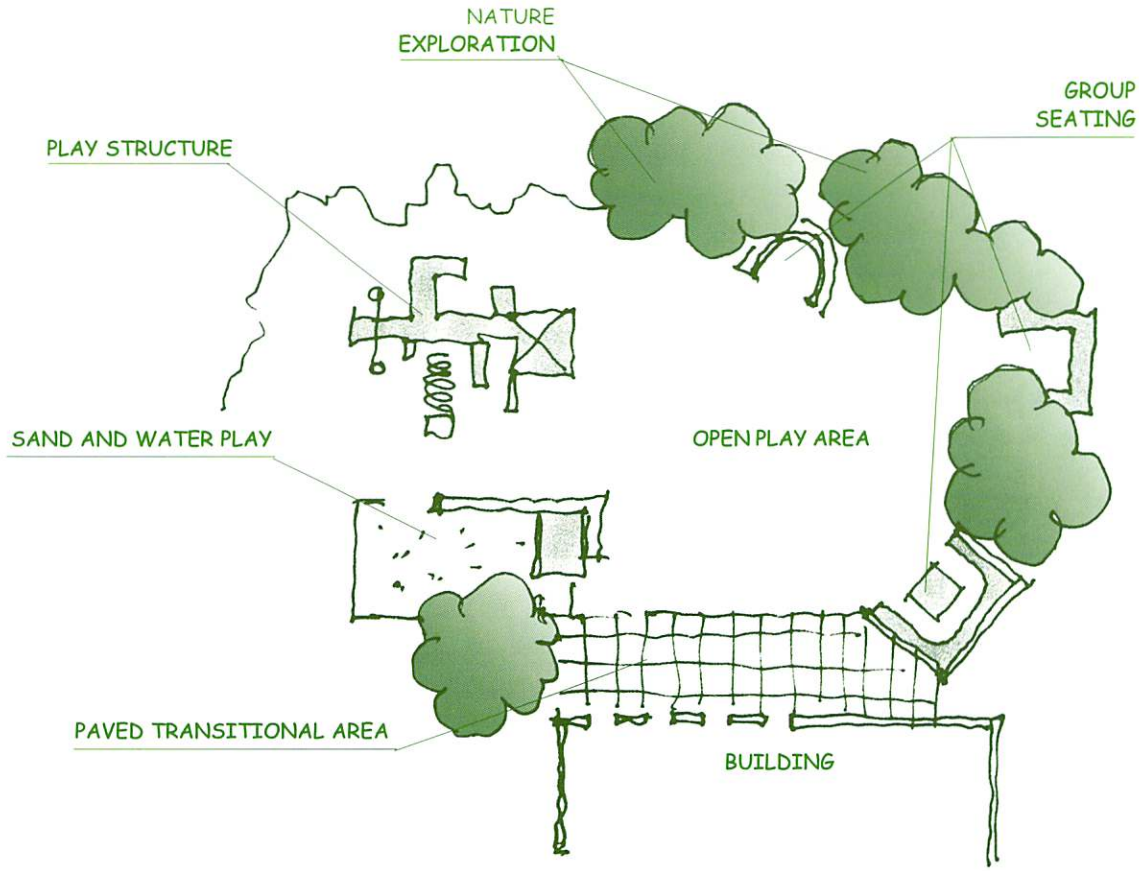
Even the smallest schoolyards should have a nature area to allow children to explore. An activity such as classifying plants, looking for insects and worms is not only educational, but also can extend the formal school curricula.

Even a small natural area can give children opportunities to explore plant and insect life

The natural area can have wild flowers, bushes, trees and interesting rock formations. Bird feeders can be introduced to this area. Based on the site conditions, it may also be possible to introduce other design elements such as a small pond. With some seating in a clearance, this area can double up as an outdoor classroom. If the nature area is big enough, short paths can be designed to improve access. In some cases, leaving a corner of the schoolyard in its natural state may be the best design approach. While this may take some time, letting nature take over the area will result in an interesting and valuable resource for the school.



SAMPLE SKETCH OF A PRESCHOOL OUTDOOR AREA



PRINCIPLES FOR DESIGN OF OUTDOOR SPACE FOR ELEMENTARY SCHOOLS

Introduction

Outdoor play area needs for elementary school aged children are almost as varied as the needs for younger children. One significant challenge in designing outdoor play areas for elementary schools is related to the age range involved. Children develop very quickly during this period, and the interests and physical capabilities of first graders are usually much different from fourth or fifth grade children. Therefore designing an outdoor space where both groups can play and enjoy together requires careful planning and multiple zones within the schoolyard.

Design zones

The following are the zones that ideally should be included in the design of elementary schoolyards. Circulation among these zones is critical and poses a serious design challenge. Any untrained observer of activities on an elementary schoolyard during recess would have trouble detecting a pattern within the chaotic setting. However, a closer examination would start to reveal a set of patterns. In the middle, a group of boys and girls might be running in every direction, in another corner, a group of girls might be jumping rope and talking in small groups. Children, even in a schoolyard, with minimal features and uninspiring design create their own ecology. It is important for designers to understand this before attempting to redesign a schoolyard. This knowledge can be gathered by observing and talking to children and staff. It is best to conduct interactive planning workshops with these groups.

The most common sets of activities - and therefore zones- that should be located in an elementary schoolyard are outlined below.

Active play area

The active play area should be a paved multipurpose space that is mostly used for running, and used for games such as tag. Since the organized play areas

such as the basketball court are mostly used by older children who are good in these games, it is not unusual to see younger children utilize this open space for different versions of basketball, football, and handball.

This area is going to be the noisiest section of the schoolyard. It should be free of obstructions and surrounded by some seating for other children to sit and watch the activity taking place within the demarked court.

Lining up

While not related to play, lining-up before classes is something many schools take very seriously. A significant portion of the active play area can be used for this purpose. Some small lines or numbers on the ground will speed up this activity and shorten the time required for orderly transfer of the students into the building.

Running Track

A formal running track indicated by the painted lines on the floor allows the children to compete in realistic ways and provides the physical education classes with a valuable resource. The use of the track is likely to be limited to programmed hours. Therefore if space is tight, it can overlap other sports areas such as basketball courts.

Play structures

In an elementary schoolyard, play structures are likely to be a central feature. However, they should be placed carefully, not to block and hamper the open play area, where a lot of running and ball playing occurs. If the school has both lower and upper elementary classrooms, it is necessary to create two zones, one with equipment more challenging than the other. This way, it is possible to avoid older children taking over the whole play structure. It is very likely that older children will avoid the less challenging section, since they would find it "babyish." While these two areas can be adjacent, it is important to clearly delineate them using design features such as seating or planters.

Play structures should be big enough in order to prevent conflicts and give children enough options to engage in a range of activities

While selecting play equipment, designers should follow the same principals described in the preschool section of this booklet.

Water Spray

It is becoming more and more popular to use a spray type water feature in public playgrounds. This type of water which sprays upward from a spout in the ground allows children to cool down in very hot days and creates new play opportunities. In schools, however, this may not be very practical. For one thing, most of the school is likely to be closed in summer months. Also, usually the administrators do not welcome the idea of children getting a little wet during recess. You should discuss this with teachers and administrators.

If the schoolyard is going to be used heavily by the community during weekends and summertime, a water spray is a desirable feature. The spray can be made more interesting by giving children more control over the flow of water during play. Such feature should be used to encourage collaboration among children. For example, if the water flow can be increased by the number of children simul-

Sprinklers could be designed to allow children to control the direction and volume of water. This feature enhances coordination and play options.

taneously pushing or pulling levers that are located apart, this would make the play much more interesting.

The water spray area should be drained properly, and school maintenance should have the control over the master shut-off valve.

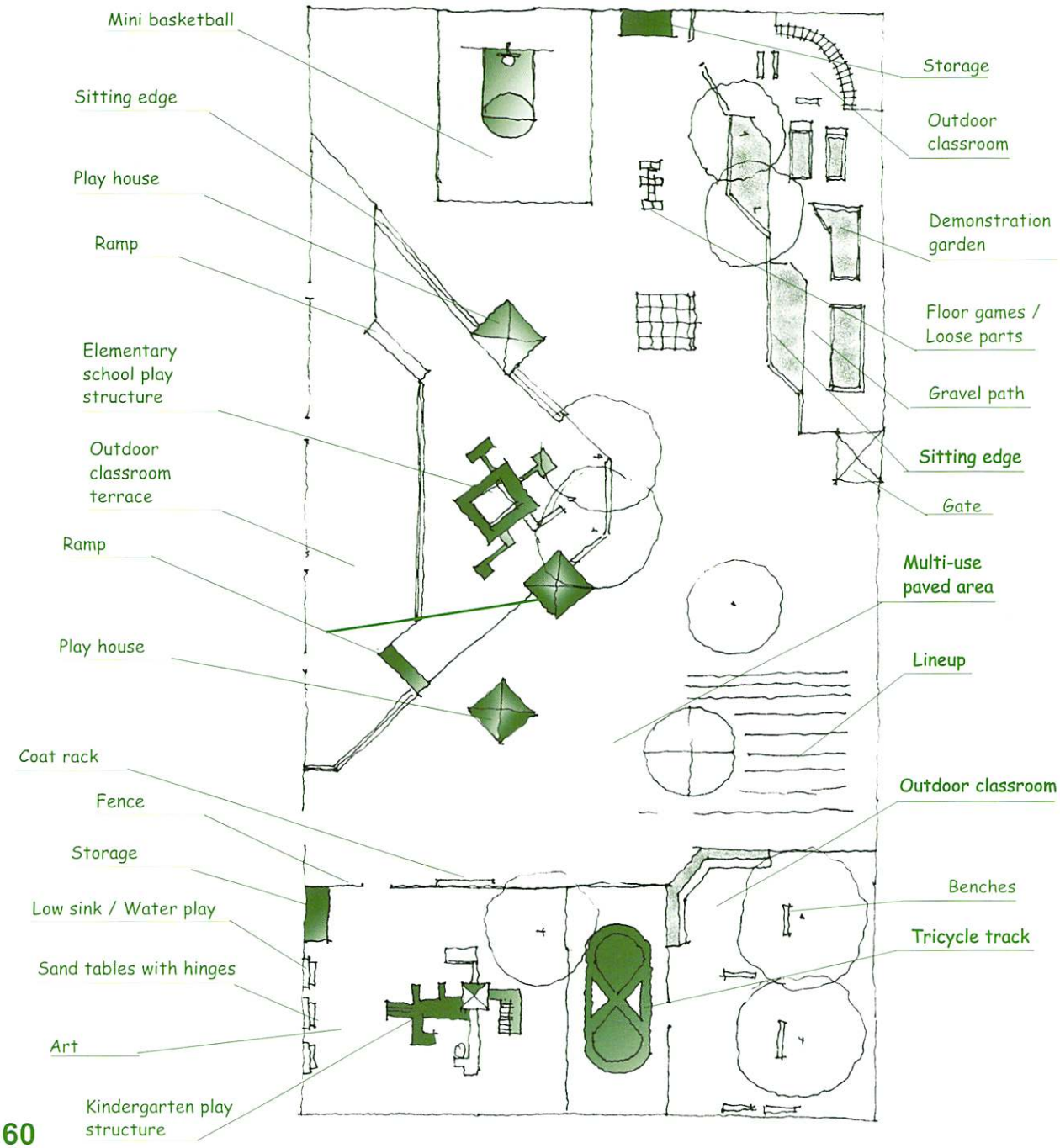
Organized play

At this age, children also start engaging in organized sports activities in the playground. Basketball is by far the most common activity. Unfortunately, it also takes up a significant space on the playground. Depending on the size of the schoolyard, you should try to place a number of half-court basketball areas as well as one full-court basketball. Expect to see the full-court to be dominated by the oldest and best players. In tight schoolyards, a number of hoops around the perimeter increases play opportunities for younger children. Another option is designing lower hoops for the younger age group. This will eliminate the chances of "serious" players dominating the areas where they are placed.

Do not forget that designing for spectators is as important as designing the field itself. This is achieved by providing benches, a seating edge along a low wall or more formal bleachers. To prevent injuries, there should be ample space between the edge of the field and any seating.

Basketball, of course is not the only sport that should be considered for the schoolyard. Other alternatives include handball, softball, soccer, football, volleyball and tennis. Handball courts can be created easily by using the school building wall when available. One common problem with freestanding handball courts is that they create dead spaces behind the wall where visual access is not available.

SAMPLE LAYOUT FOR A LOWER ELEMENTARY SCHOOLYARD



Softball is also popular, however, it requires so much space that usually it is not possible to place a softball diamond in the schoolyard unless the yard is very big. Regardless, children often attempt to play softball; whenever possible it is a good idea to build a batter's cage in one corner of the schoolyard.

Soccer is becoming more and more popular among young children. Popularity of soccer in Europe and South America has resulted in increased interest towards the sport among Latino youth. In many cases, a reduced soccer field in the form of painted lines can be accommodated on the playground. Similarly, in many cases, such an area can double up as an area to play simplified versions of football. Experience has shown us that children are very creative in devising alternate rules and adopting the game to the schoolyard, given some reference points in the form of painted lines on the ground.

Volleyball and tennis, sports that are usually more popular with girls than boys, are unfortunately not easy to implement in schoolyards. First, in order to be effective, they usually need to be organized within the context of a club or teacher supervised activity. Also, the hard concrete surfaces of most schoolyards are not suitable for volleyball and can cause injuries. Designers should assess if there is interest among the students and staff towards these sports and try to incorporate them in their designs.

Due to size limitations, it is necessary to design many of the sports fields in an overlapping pattern. Such an arrangement does not allow multiple sports to take place simultaneously, but still provides richness in activities at different times. Basketball fields heavily used during recess can become a section of the softball during after school and can double as a volleyball court during the weekend.

One way of creating this flexibility is by providing properly covered recessed holes that can be used for inserting the poles that are necessary for volleyball or tennis. The poles, nets and other equipment for these sports should be stored in an accessible secure storage so they can easily be introduced to the playground when necessary.

School gardens

School gardens should be an indispensable feature of all elementary schoolyards. Shrubs, trees and flowering plants provide sensory diversity and enable children to contact natural materials on a daily basis. Even when the space is very limited, try to provide a small natural area for school gardening. A small garden offers excellent opportunities for environmental education and for an outdoor curriculum that can strengthen and enhance the existing one. Some considerations for designing school gardens are the following:

Plots for gardening are ideal for organized gardening programs and as an after school activity

- The garden should be separated from the rest of the schoolyard by a low fence or wall to make clear that it is not a part of the active play area.
- Seating within the garden should be provided to allow quiet conversation as well as group activities. A garden is an excellent place to locate the outdoor classroom.
- Planting beds in the garden can be adopted by different classes or a gardening club.
  Competition for the best beds is a potential way to sustain the garden in the long run.

- Shrubs and the garden should be planted in such a way that children can not trample in them in the course of their play in order to prevent dirt from being tracked into the building.

- Visual access into the garden should be provided and hidden corners or dark shady areas should be avoided.
- Large trees are more desirable and will survive better, but the cost may be prohibitive.

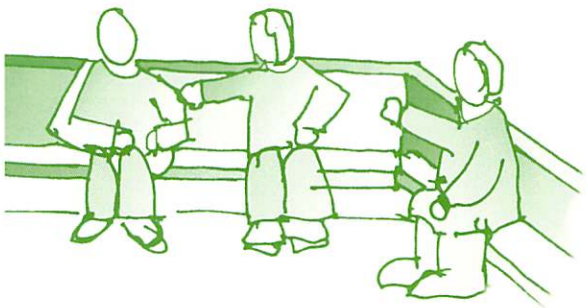
Outdoor classrooms

Any well-defined section of the schoolyard, with appropriate group seating, can be used as an outdoor classroom. Outdoor classrooms present new opportunities for learning and exploring. Teachers of all grades can use these spaces for teaching, discussions and story-telling, nature study and art making.

One of the common concerns of teachers who use the schoolyard for teaching is the fear that they will lose control of the class in a large, wide-open space. Furthermore, children are used to an active pattern of behavior when they are in the schoolyard, and are likely to continue this even with the teacher. For these reasons, the outdoor classroom must be well-defined, surrounded by a low wall, fence or bushes. While it should have visual access from the outside, it also should provide some privacy. Group seating for a full class should be provided around the edges, while the center should be left open for a variety of activities.

Some groups are currently developing curricula for outdoor classrooms so that they can be used as an extension of the regular classroom. These spaces can be enriched by introducing various features that would enhance teaching. Science is the most obvious example. A small tube can act as a telescope. A simple weather center can incorporate a weather-vane, and a thermometer placed in a secure casing or a traditional balance scale can be used for weighing rocks, etc.

Seating areas



Seating should be designed to encourage social interaction

There should be ample seating in the schoolyard for small groups and individuals to sit, observe and converse. All the seating need not be in the form of benches or manufactured seating arrangements. Designers can provide a variety of seating opportunities, in the form of low walls or by creating a seating edge along a level change.

Note that at this age children start to establish social groups based on gender and age. Each group tends to territoralize a seating area in a repeated pattern. If there are not enough areas, this may result in conflict. The most popular of these areas are the ones that have visual control over the rest of the playground. Children like to sit and observe the whole setting while talking among themselves.

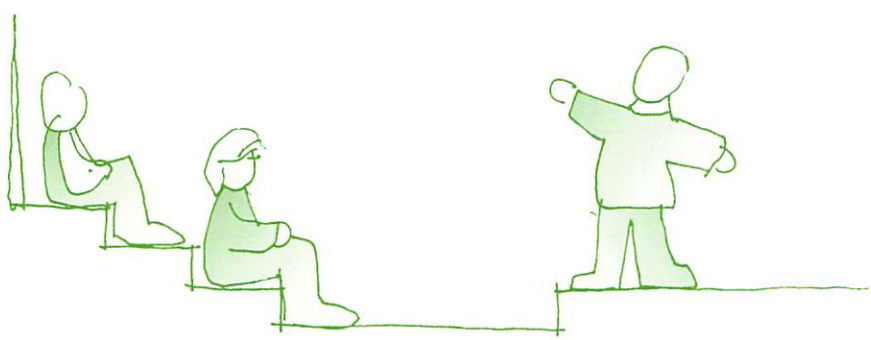
Game tables

Some of the seating should incorporate regular or game tables. Game tables that can be used for chess or backgammon are also able to be used for eating snacks or writing.

Performance spaces

A group of the seating in the schoolyard can be designed as a small amphitheater to encourage performances and community-wide events. In the past, these types of spaces were built in some schoolyards with mixed results. While chil-

Even a few steps is enough to create a small stage and audience area

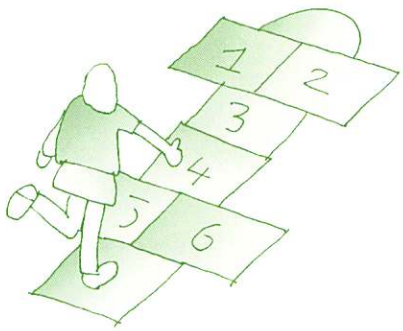


dren generally have an interest in such a space, wider use requires full support of teachers, school administrators and the community. Since this may be a considerable investment, both in terms of cost and space, make sure that the school and community has an interest in creating such a space and that it will be used regularly for planned events.

Floor games

Typically, elementary schoolyards provide ample opportunities for activities that are traditionally dominated by boys, such as basketball and tag. On the other hand, girls have their own gender-specific activities. The most common of these are jumping rope and floor games such as hopscotch.

Because these activities do not involve any "structures" a common error that is made in schoolyard design is not to allocate any dedicated floor space to these activities. This forces girls to share the common activity spaces with boys may result in the girls getting hit, trampled, or pushed away.

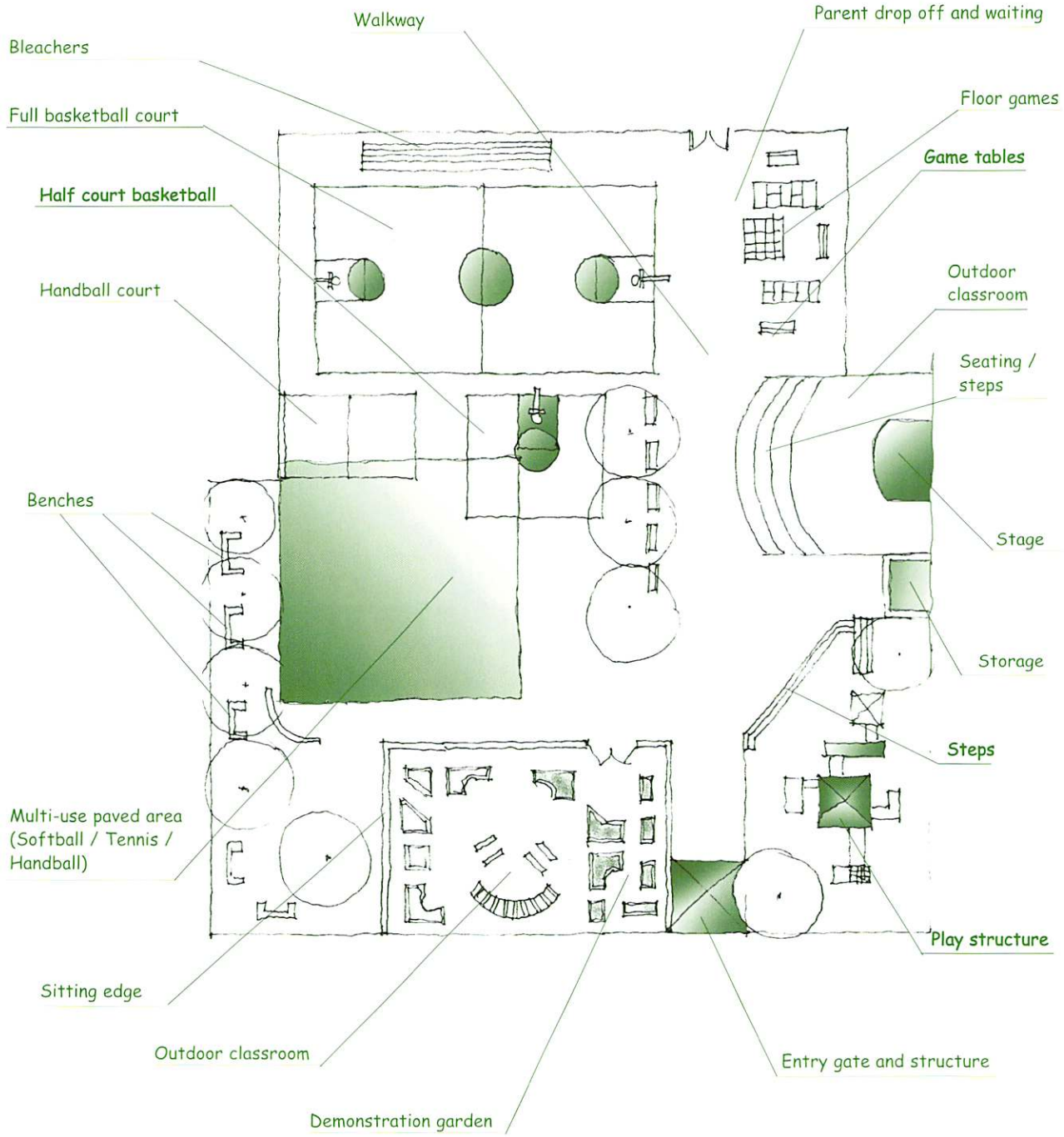


Provide a dedicated floor games area, and to make it clear, provide necessary lines on the ground. Similarly, some painted boxes on the ground can designate rope-jumping areas. Make sure to conduct workshops with girls in order to be able to draw the hopscotch lines properly. There is no set standard and the size and number seems to change from region to region and even from school to school.

Fantasy play

With the introduction of manufactured play equipment, features that provide opportunities for fantasy play have almost completely disappeared from playgrounds. Children, however, love realistic props such as a castle or an old boat to stimulate their imagination and develop their own games. While some of these features may pose safety concerns, others such as an old rowboat can provide children with excellent play opportunities that would last a long time. Designers should keep an open eye to include these features into their designs.

SAMPLE LAYOUT FOR
AN UPPER ELEMENTARY
SCHOOLYARD



BASIC PRINCIPLES FOR DESIGN OF OUTDOOR FACILITIES FOR ATHLETICS AND ENVIRONMENTAL EDUCATION FOR MIDDLE AND HIGH SCHOOL STUDENTS

Introduction

At the middle and high school level, the focus of schoolyard design should be primarily on organized sports. The design should attempt to use the available space in the most efficient way so no child is left out, regardless of their ability to participate in sports. This can be achieved by providing a large variety of sports opportunities as well as multiple settings for each sport.

In addition to organized sports, the two other key functions that are critical for middle and high school yards are social interaction and environmental education. Yards should also incorporate features that address these two areas.

Organized sports

Basketball is likely to be the dominating sport for these schoolyards. At this age, serious games and competitions are to be expected. Provide at least one full-size basketball court, and a number of additional half-courts and hoops to eliminate conflicts and congestion.

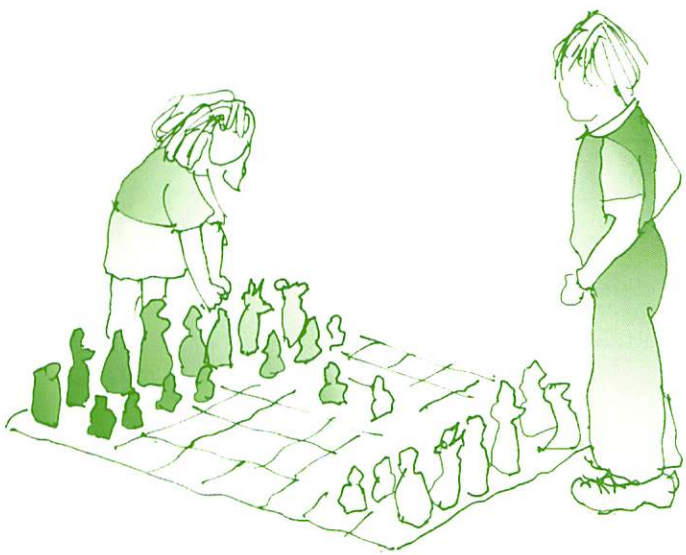
In order to accommodate spectators, bleachers or other form of courtside seating is necessary. These should be designed to maximize visibility.

Similar to elementary schoolyards, other sports that can take place in the yard include handball, softball, soccer, football, volleyball and tennis. The actual number and combination of these facilities is likely to change from school to school and would be based on student and staff interest as well as cultural and ethnic breakdown of the community. Therefore, designers should approach this through workshops and/or surveys so they can judge the best combination for any specific school.

As always, in order to get the maximum benefit from schoolyards, designers should consider overlapping different courts and fields with the assumption that

a) the area allocated for sports is a paved hard surface and different sports areas are indicated by lines drawn in different colors; and,
b) all of these sports activities will not take place simultaneously, but will occur at different times.

Social gathering spaces



In addition to sports, the other most important consideration in the design of middle and high schools is space for social interactions. These spaces should be designed mostly as small group gathering areas that are somewhat private, comfortable and have a good view of the rest of the yard.

Group seating areas can be enhanced by introduction of natural elements such as bushes and shade trees. Seating should be arranged in a way to encourage conversation.

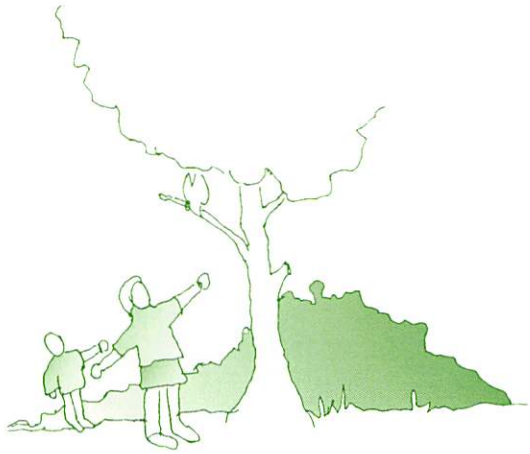
Tables, including game tables and other writing surfaces, are more critical for higher grades since they are more likely to engage in board games as well as homework while sitting in the schoolyard.

Natural areas for environmental education

A very critical component for middle and high school yards is a natural area that is to be used as a learning environment. While there are many ways to design this area, common elements in all should include:

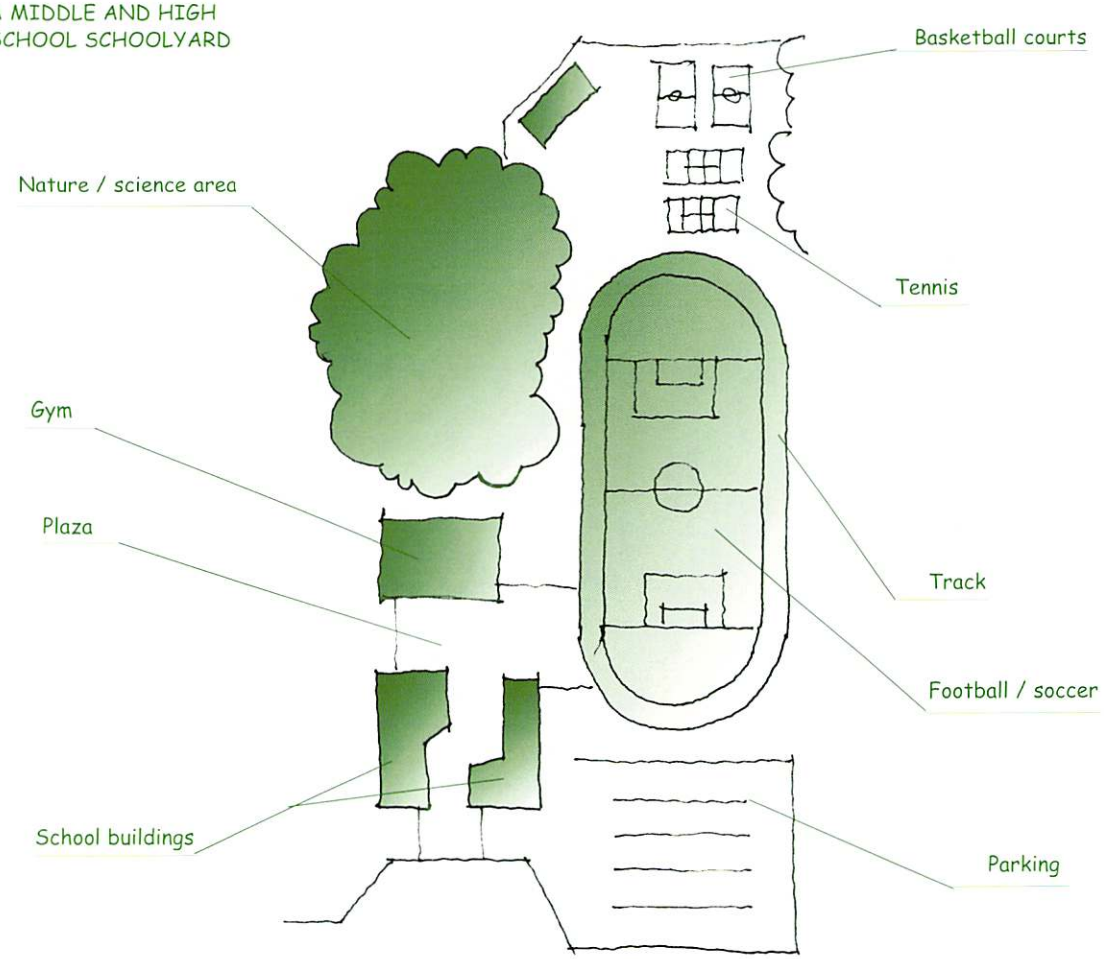
- A group seating area surrounded by natural elements (trees, bushes, flowers, etc.);
- Some planters for gardening and growing plants, vegetables, etc.;
- A wildlife area where issues about natural ecology, sustainability, climate and conservation are discussed and illustrated.

Teachers should use this area to supplement their teaching in a variety of ways. Subjects would range from art, nature studies and science to literature.



Studying nature on the schoolyard should become an integral part of the environmental education curriculum

SAMPLE LAYOUT FOR A MIDDLE AND HIGH SCHOOL SCHOOLYARD



ADDITIONAL DESIGN CONSIDERATIONS FOR MOST SCHOOLYARDS

Multiple ground textures

It is important to include a variety of ground coverings in different parts of the schoolyard. Most urban schoolyards are fully paved and this limits the number of activities that will take place. The biggest issue with ground textures is the ease of maintenance. Surfaces like dirt or grass have the potential to become a maintenance nightmare, especially when broken glass and other sharp metal objects get into it. However, if the size of these surfaces is limited to where it is essential to use them, it would be possible to maintain them effectively. Another alternative is to include raised planters and gardening beds over a paved surface.

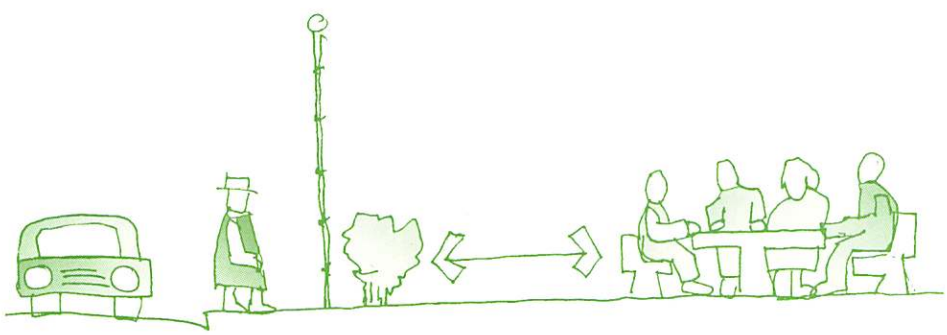
Barriers/privacy

Safety is a big concern in most playgrounds. While providing privacy, make sure not to create hidden corners or dark locations that are likely to become hiding spots. Usually a low wall or fence or a series of bushes is enough to provide a sense of privacy. Another option is to design a roof with open sides. Such a feature also generates a sense of private space

Boundaries and perimeter

Many schoolyards have a long perimeter alongside a street. It is necessary to enclose the schoolyard within some kind of a fence. Wrought iron fences or

Use bushes and other plantings to create a buffer between the street and the yard



steel fences that look like wrought iron are the best but may be financially prohibitive. In those cases, a chain link fence is the only alternative.

Discuss safety issues in the neighborhood with staff and children. In most cases, it is very easy for strangers to approach the perimeter fence and converse with the children. To avoid this, do not place seating adjacent to the perimeter fence. Use bushes or another form of buffer between the seating and the perimeter fence.

Lighting

There are two types of lighting that should be considered for schoolyards. In order to maximize the use of the schoolyard and allow after school use, it is necessary to provide good activity lighting. This type of lighting is directed towards sports courts and game areas so they can be used after dark. Many schools, however, want to limit the use of the schoolyard to daylight hours and do not install these types of lights.

It is not a good idea to leave the schoolyard in total darkness. Security lighting that provides enough light to see what is going on but is not bright enough for sports or games should be installed in all schoolyards. Such lighting allows neighbors and passers-by to keep an eye on the schoolyard and discourage undesirable uses such as drug-dealing or drinking. While installing this type of lighting make sure that it is not shining directly into the neighboring homes in a way to disturb them.

Trash Cans

Provide ample trash cans in strategic locations. Most of the time, the garbage - including broken glass - on schoolyards is not a result of intentional student behavior but is due to a lack of appropriately placed trash receptacles. Choose sturdy large models, preferably with removable inserts. Make sure that the school custodian is part of the discussions about the selection and location of trash receptacles.

Another feature that is most likely to effect the design is the placement of dumpsters. Most schools do not have a separate service entrance where the dumpsters can be located. The tendency is to locate them on the yard, close to the cafeteria. In such a design, garbage trucks need convenient access into the yard. The design should address access issues and also prevent unsightly dumpsters from becoming a major feature in the schoolyard.

Coat Racks

If you visit a schoolyard in the spring during recess you will inevitably see piles of coats on the ground. This is because, during active play, most children remove their coats but have no place to put them other than piling them on the floor. The design should address this issue by providing a convenient place for the children to hang their coats and keep their books and bags during play. Since there does not seem to be any equipment or outdoor furniture from the manufacturers at this time, designers need to come up with creative solutions on their own. The building wall and interior fences can be modified for this purpose.

Bicycle Racks

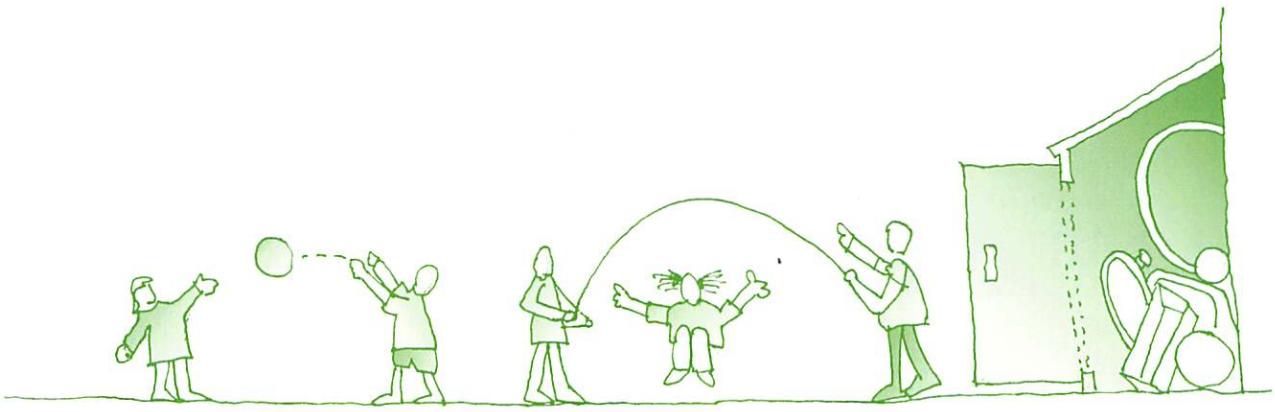
For an active living model, the use of bicycles needs to be encouraged both for children and adults. Provision of bicycle racks on the schoolyard is the first step towards this goal. There are many excellent bicycle rack models available from various manufacturers. Make sure that they are located near an easily accessible, but highly supervised location such as outside the windows from the main office.

Gender issues

The involvement of girls in the planning and design of the schoolyards is very critical. This is because girls' activities on the schoolyard are less sports-oriented and more subtle. As such it is easy to overlook them. Girls need their own gathering spaces, areas for performance, jump rope and floor games. Experience has shown that if girls participate in design workshops together with the boys, they are likely to be overwhelmed or keep quiet. For this reason, conduct separate meetings with the girls, and make sure that you understand their issues.

Storage areas (Secure locked storage)

All schoolyards become alive by the introduction of loose parts such as balls, wheeled toys or gardening tools. Without these, even the best-designed playgrounds cannot be utilized to their full potential. All these items, however, cannot be left on the schoolyards due to vandalism or theft. Easily accessible secure storage for these items is the only solution.



Storage space should open directly into the schoolyard and should be secured during after school hours

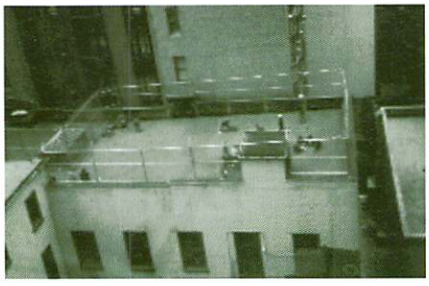
If the building does not have a secure storage room opening directly onto the schoolyard, the design should include such a feature. In order to facilitate the participation of children in the provision and return of the play materials, the storage facility should be designed so that once opened it is visually and physically accessible to them.

In its storage, an elementary school should have the following:

- Balls
- Buckets
- Gardening tools
- Nets and poles for volleyball or tennis
- Racquets
- Rubber gymnastic mats
- Jump ropes
- Durable musical instruments
- Art supplies
- Simple scientific equipment
- Props, masks and costumes for performances

The secure storage for the children should not double up for storage of the maintenance equipment for the yard that is used by the staff. The two functions are completely separate.

Rooftop Playgrounds



When outdoor space is at a premium, rooftops can be used for outdoor play and recreation. Perimeter security is most critical in this case. A high non-climbable fence should surround the whole perimeter. Even with the fence, rooftops are more appropriate for quieter activities than active play. Outdoor classrooms, art spaces, and small planting areas are ideal uses. For preschools, sand and water features can easily be incorporated in the rooftop design.

USEFUL WEB SITES

The Handbook for Public Playground Safety by CPSC is available on web www.cpsc.gov. The handbook can also be obtained by calling the Office of Public Affairs (301) 504-0850.

For a city-wide schoolyard reconstruction project, see Boston Schoolyards Initiative site: www.schoolyards.org.

Evergreen Foundation site www.evergreen.ca/en/index.html has resources for outdoor classrooms and environmental education.

A good place to find a listing of web resources on environmental education, developed by the Green Teacher Magazine, Green Brick Road and the Center for environmental education is
weblinks.schoolsgogreen.org/links/weblinks_schlgrnd/

The Norwegian site home.c2i.net/swan/index.htm has good links to schoolyard-related projects around the world.