kids dig dirt! Green Paper

good to grow!

Association of Children's Museums

HOW TO USE THIS DOCUMENT:

The Kids Dig Dirt! Green Paper serves as both a resource and a tool for ACM museum members. The paper provides a collection of facts, guidelines and forward-thinking language that museums can draw on while developing their own outdoor spaces, proposals for funding or other materials. A detailed source list is included so that museums can cite original ideas and copyrighted information.

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The Kids Dig Dirt! Green Paper can be downloaded from the Museums section of the *Good to Grow!* Web site (http://www.goodtogrow.org/museum_member.aspx). Single print copies are available for purchase. Contact ACM for details:

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Digging in the Wild Place's Fossil Pit at the Children's Museum in Easton (MA).

About the Association of Children's Museums

Founded in 1962 and now serving 500 members in 21 countries across the globe, the Association of Children's Museums (ACM) is a professional service organization representing and advocating for the children's museum field. As one of the fastest growing cultural industries in the world, children's museums have expanded exponentially in the past two decades and now reach more than 31 million individuals each year. ACM member museums are unique places that celebrate the value of childhood, connect families and communities and inspire a passion for lifelong learning through play. By developing large-scale initiatives that leverage the collective power of the field, ACM helps shape the innovative ways children's museums serve their communities as town squares.

About the Civil Society Institute

The Civil Society Institute is committed to improving society with breakthrough thinking and creative action and employs a unique model for addressing society's most pressing problems. CSI's approach is to serve as a catalyst for change, especially in areas of critical need: science policy and regenerative medicine and climate change. In each of these areas, CSI seeks out examples of creative thinking and activities already underway, including those of individuals, community groups, businesses and the nonprofit and public sectors. CSI creates interactions among people, communities, government and business in order to link successful programs to groups who can use them to eliminate obstacles to success and to encourage informed debate of the issues.

About Moore Iacofano Goltsman, Inc.

ACM is delighted to have worked with a talented team from Moore Iacofano Goltsman (MIG) — which included Susan Goltsman, Robin Moore, Louis Hexter and Rebecca Colbert — on planning and facilitating the Kids Dig Dirt! Visioning Charette and writing the resulting Green Paper. For over 25 years, MIG, Inc. has specialized in creating environments and programs for children, youth and their families. With a multidisciplinary staff of 125, MIG projects are located around the world and include schools, museums, zoos, childcare and juvenile justice facilities, nature centers, parks and hospitals. MIG's work is grounded in human development with the goal of educating and training the next generation to be responsible and caring global citizens and stewards of the earth.

Acknowledgments

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Good to Grow! Advisory Board

The Good to Grow! Advisory Board provides guidance to ACM on the development and implementation of the overall Good to Grow! health initiative, which includes the Kids Dig Dirt! planning project and resulting Green Paper.

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Kids Dig Dirt! Visioning Charette Participants

On June 20, 2007, ACM convened the Kids Dig Dirt! Visioning Charette in Washington, DC. This day-long meeting, facilitated by MIG, brought together the following dynamic professionals to envision the next generation of outdoor spaces at children's museums that will inspire active play, exploration and respect for nature while improving the health of the community. ACM is grateful to these individuals for their candor, enthusiasm and insights during the Charette and in reviewing this Green Paper.

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▲
Examining nature up close in Earthworks at Santa Fe Children's Museum (NM).

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Exploring the prairie grass maze in Habitat Park at Kohl Children's Museum of Greater Chicago (IL).

INTRODUCTION

The Ottawa Charter published in 1986 both marked the beginning of a new international thrust of public health towards prevention of disease and promotion of wellness and recognized the interdependence of environmental and human health.[1] The Charter asserts that "the fundamental conditions and resources for health are: *peace, shelter, education, food, income, a stable eco-system, sustainable resources, social justice and equity.*" These are values that collectively all children's museums promote. The Charter defines five action areas for health promotion, all of which can be seen as relevant to the role of children's museums.[2] The second, "create supportive environments," is especially relevant because it emphasizes the protection of natural and built environments and the conservation of natural resources as crucial in any health promotion strategy. As the United States and the world at large recognize the reality of global warming and associated untenable environmental impacts, cultural and technological solutions must be found to redirect global development toward a life-enhancing course.

The Kids Dig Dirt! Green Paper is based on the belief that children's museums can play a critical role in shaping the healthy future of childhood by re-emphasizing the importance of active play, engagement with nature and the development of rich outdoor environments in children's museums. Four factors drive this new concern: lifestyle health issues, technology, the health impact of children's nature play and creativity.

The future health of planet Earth and its peoples rests on the shoulders of adults and institutions committed to guiding childhood along a new path of enlightenment. Informed, institutional action is required to ensure our future.

Lifestyle health issues. Today, twenty years after publication of the Ottawa Charter, societies around the world are facing massive health issues as a result of human lifestyle changes. Sedentary childhood has been diagnosed as a key cause of the burgeoning increase in adult and childhood overweight and obesity and resulting negative health secondary effects.[3] The fact is that children are not spending enough time outdoors engaged in high levels of physical activity. To add to the problem, children's food intake has increased substantially, including high-calorie carbohydrates. Children's energy equation has become dangerously unbalanced. Indoor activities have become more attractive than outdoor activities. Screen time (which includes recreational use of computers as well as watching television) has replaced outdoor playtime.[4]

Technology. Today's unprecedented, technological revolution obliges us for the first time in history to deliberately examine its positive and negative impacts on human development, and to consider policies that would amplify the positive and ameliorate the negative. Fundamental is our future relationship with planet Earth—our home in the universe. A large measure of consensus across the scientific community insists that the relationship is heading in a perilous direction. The most obvious evidence is global climate change, which is already causing economic disaster in some regions. An ever-worsening pattern seems likely to continue unless massive changes are made to redirect the unnatural course of human environmental impact.

The health impact of children's nature play. A growing body of research reveals the direct connection between daily exposure to natural environments and individual health.[5] For children, this means exposure to plants and animals through play. Play by its very essence leads to exploration, discovery and informal learning. Outdoor play and informal learning in natural environments can now be seen as crucial to children's health *and* as a self-motivating means of assimilating knowledge about the natural world.[6]

Creativity. Human creativity, the essence of play and the unique mark of our species, is an essential ingredient linking the learning potential of individuals and recent thinking about education for sustainability.[7] Success requires bringing both ends together to collectively shift human progress towards a sustainable path and away from the current "tragedy of the commons," where each individual tries to maximize his or her margin of utility rather than the social welfare of fellow humans.[8]

Playing in Earthworks' really big sand box at the Santa Fe Children's Museum (NM).

A TOOL FOR CHANGE

The Green Paper presented here is an outcome of the Association of Children's Museums (ACM) Good to Grow! initiative and Kids Dig Dirt! (a subproject of the whole focused on the creation of outdoor environments). In 2007, ACM convened two meetings of experts who, in the recognition of the interdependence of the health of our environment and the health of people, were challenged to find ways to turn this truism into action on children's health, conservation and sustainable development—specifically through creation of outdoor environments and programs.

The Green Paper is a tool to help children's museums and allied partners gather resources and activate change. The path to success requires a new, urgent focus on engaging children with nature. Powerful arguments are needed to support the addition, expansion or redevelopment of children's museums' outdoor environments and programs to support play and informal learning for health and sustainable development. The current generation needs to acquire habits of healthy living to become ecoliterate[9] citizens armed with sufficient passion and knowledge to counteract global health and environmental problems.

The Green Paper argues that children's museums—institutions dedicated to play and informal education of children and families—play a critical role in the following:

- Nurturing active, healthy children;
- Connecting children to nature in their daily lives; and
- Reconnecting adults to nature, by sharing children's experiences.

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- *Reconnecting adults to nature, by sharing children's experiences.*

In the longer term, nature-connected children will become healthy, conservation-minded adults who are passionate about the health of the biosphere and prepared to act to conserve life for future generations.[10]

How can this be achieved? How can children's museums contribute to the development of each child as a unique being and educate children collectively to be responsible for their own health and that of the planet? Children's museums must address the quality of children's environments as a central focus. A useful model is needed for those concerned that public education has de-emphasized the importance of outdoor education as an approach that can be especially helpful to children whose learning styles are not suited to the confines of the four walls of a classroom. Educational systems that encourage human solidarity and create a deep sense that "we are all in this together" are rare. Countering this negative trend, the Green Paper affirms that a new educational direction focused on healthy human development for all *is* possible.

The Green Paper proposes that children's museums integrate outdoor spaces and experiences that connect children and families to nature. It describes the crucial impact that hands-on, immersive nature play can have on individual health and the building of global solidarity towards sustainable development. It provides guiding principles for developing outdoor environments in children's museums and related examples. It presents the vision for a new trend in children's museums. Finally, it supplies resources to help achieve the vision of effective outdoor spaces.

Inspecting seeds in the Con Edison Greenhouse at Brooklyn Children's Museum (NY).

THE FUTURE CHILDREN'S MUSEUM

As future adults, children must learn to guide their own destiny—in partnership with adults, who should provide the best possible conditions for children-as-future-adults to redirect the course of cultural evolution.

With an annual reach of 31 million children and adults[11] around the world, children's museums are uniquely positioned to contribute to this new cultural imperative, along with other informal educational institutions such as botanical gardens, nature centers and zoological parks. Children's museums offer a special advantage as community-based "town squares" with a mission devoted to *children* and families. However, the value of outdoor environments in children's museums has not yet been fully realized. Outdoor play spaces are crucial—first, because that is where nature is, including human nutrition plants; and second, because outdoors is where children need to be to properly move their bodies.

Children's museums are institutions committed to serving the needs and interests of children by providing exhibits and programs that stimulate curiosity and motivate learning. In the United States, the children's museum movement began with the Brooklyn Children's Museum, which opened its doors in 1899. Societal views of childhood were shifting at the end of the 19th and the first quarter of the 20th century, which fostered the growth of the children's museum movement. At that time, people began to accept the idea that children have specific developmental needs and, for the first time, to pay attention to the young.[12] As institutions connected to their times, children's museums have been influenced by changing views of childhood, educational theory, societal issues and family patterns. However, their core guiding

As a community nexus, children's museums can become a new life force providing rich, natural, indoor-outdoor environments designed to enhance children's health and ecoliteracy.

mission to serve children remains the same. There is no reason why this tradition cannot be adapted to outdoor environments, where play and learning settings with more open-ended experiences are possible. Around the world, one-third of ACM's member museums have developed outdoor spaces[13] and some of these provide excellent precedents. Children's museums have a new responsibility to nurture ecoliterate citizens that understand the direct connection between individual behavior and global consequences that affect everyone on the planet.

The design of outdoor environments to immerse children in hands-on natural settings can be a challenge, especially in small, highly restricted urban sites (where in fact many children's museums are located). First-rate examples exist in children's museums as well as zoos, botanical gardens and nature centers but are scattered around the globe. Information about these environments needs to be compiled, evaluated and shared widely.

An equally important requirement is for a new type of outdoor professional—based on current museum education best practices, but expanded to encompass the knowledge of how children play and learn in nature. This new professional role will combine aspects of European "cultural animation"[14] and "playwork"[15] with a nature focus. This combination of methodologies draws from earlier models of outdoor environmental education—but with a stronger, informal, open-ended approach based on play. Although commonplace in Europe and South America, few precedents exist in the United States. Research suggests that children exposed to a combination of rich natural settings and caring adults can become lifelong conservationists.[16] Imagine the increased impact possible with enthusiastic, professionally trained, nature play animators at museums around the world.

Taking in the view from above in the Treehouse Village at Lynn Meadows Discovery Center (MS).

THE ESSENCE OF IMMERSIVE, HANDS-ON NATURE PLAY

Acknowledgement of the health benefits of nature has recently attracted broad professional and public interest, stemming mainly from the realization that too many children have little to no contact with the natural world in their daily lives. Not only are children losing the health benefits of time spent outdoors but the traditional educational value of nature is also disappearing. The wave of concern stimulated by the publication of the book, *Last Child in The Woods*, by Richard Louv,[17] has already resulted in dozens of regional and national initiatives and the number is growing daily. What lies behind this flurry of action? What does nature offer for the healthy development of children? Why is nature play important for sustainable development?

Benefits of nature play for children

1. **Nature play is intrinsically motivating.** More than any other form of play, provided it starts early in childhood, nature stimulates children's innate curiosity to explore, experiment with and express an infinite range of ideas that reflect the great diversity of nature itself.[18]

2. **Nature play is socially inclusive.** Hands-on, nature play settings provide a powerful focus to children's play more likely to attract a wide range of children of different ages, socio-economic-ethnic backgrounds and gender. Because it provides such diverse, open-ended play opportunities, nature play encourages more intimate social interaction and varied emotional expression compared to play settings where nature is absent.[19]

3. **Play with nature is more imaginative.** The diverse social interaction stimulated by natural settings produces richer, more extensive imaginative play unmatched by other environments.[20]

4. **Nature play responds to, extends and rewards variable skill levels.** The open-ended process of nature play offers children a matrix of possibilities for creative action without requiring preconditions for individual skill levels. Children learn from each other naturally, effortlessly.[21]

5. **Nature play enhances self-esteem.** Attributes of motivation, inclusiveness, imagination and skill enhancement provide feelings of self-efficacy, agency and accomplishment, all of which can boost individual feelings of self-esteem.[22]

6. **Nature play provides sensory stimulation for young children**, which supports sensory integration and healthy brain development.[23]

7. **Nature play can improve attention and cognitive functioning.** Scientific research shows that even small amounts of exposure to natural environments can reduce attention function disorders (ADD) and attention function hyperactivity disorders (ADHD).[24] These remarkable findings suggest that hands-on nature play may support basic attentional functioning, helping the child to focus, thus facilitating general cognitive functioning.

8. **Nature play reduces rates of common ailments.** When children play outdoors, they are less likely to get sick[25] by catching ailments from children indoors.[26]

9. **Nature play can stimulate physical development** by stimulating physical activity—the motivation to move.[27]

Benefits of nature play for sustainable development

1. **Nature play offers tacit knowledge about the workings of nature** that provides the motivational base for later cognitive understanding. Through hands-on, immersive experience, children gain a lifelong intuitive sense of nature's living processes, materials and objects, which may inspire a later desire for further study or action to protect nature.[28]

2. **Nature play and learning for older children provides opportunities for interdisciplinary study**, particularly in science and conservation.[29]

3. **Nature play connects children to their local, natural ecosystem.** Hands-on immersive interaction allows children to explore small-scale versions or aspects of the larger ecosystem where they live, thus helping them build an understanding of the bigger picture of the natural world that may be extended through formal, school-based learning.[30]

4. **Nature play encourages solidarity** focused on the local natural world and, by extension with age and increasing knowledge, to the world at large. Nature play provides children with common themes and a sense of collective understanding about their world regardless of socio-cultural background, more likely to lead to environmental concern and citizen action on behalf of nature.[31]

Each of these contributions to sustainable development may be extended or enhanced through the involvement of trained museum professionals whose task is not to "instruct" but to facilitate children's experiences by asking questions; by encouraging deeper, more intensive exploration; and by encouraging verbal, graphic and dramatic expression.

Engaging the senses in the sculpture garden at Kohl Children's Museum of Greater Chicago (IL).

ACHIEVING THE VISION FOR CHILDREN'S MUSEUMS

Knowing that children's museums are uniquely positioned to connect young children and their families to nature and thus nurture ecoliterate citizens, ACM partnered with Civil Society Institute (CSI) to launch a planning process that would become known as Kids Dig Dirt! As part of ACM's Good to Grow! initiative, Kids Dig Dirt! was conceived to leverage the attributes of children's museums and CSI's emphasis on global stewardship in order to nurture active, healthy children. In March 2007, a planning meeting was convened with experts in fields connected to children's museums such as children's play, design and informal learning. The given task was to propose a set of guiding principles that would position children's museums as community education change agents to respond to issues of human health, global change (including climate) and environmental conservation.

Building on this conversation, the Kids Dig Dirt! Visioning Charette[32] was hosted by ACM in June 2007 and was attended by representatives of children's museums and closely allied informal education institutions with experience in outdoor environments. The group reviewed and refined the guiding principles and proposed a course of action to advance the Kids Dig Dirt! project. While still open to modification, the current guiding principles are described below.

Kids Dig Dirt! Guiding Principles

The guiding principles are intended to aid museums in the design (or redesign) and development of outdoor nature play experiences.

1. **Authentic Experiences in Nature.** Museum environments and programs are based on authentic experience in and with nature. Museum settings contain

living, growing nature. Children and their families engage in the exploration of nature through play.

2. **Access to Nature is Basic to Human Development.** The museum provides educational messages and outreach that support and explain why nature is critical to healthy human development. This includes healthy brain and body development, nutrition and prevention of disease, as well as general well-being.

3. **Play Deepens a Child's Experience.** Opportunities to play in nature are child-directed and unstructured as well as facilitated by trained play leaders. The play leader provides materials, consultation, collaboration and supervision to help the child deeply engage in the setting. The goal is to build on the child's curiosity and support exploration while not directing the play.

4. **Sense of Timelessness.** Immersive nature play that engages all the senses and the full attention of the child is so compelling that the child loses track of time. For this level of play to occur the child must have time to explore at her or his own pace, take risks and use available materials in her or his own way. To facilitate this timelessness, caregivers need to be engaged with the child or willing to give the child freedom to explore on his or her own.

5. **Grounded in Research.** All nature-based settings and programs are grounded in sound child development practices and state-of-the-art child environment research.

6. **Local Connection to Place is Key.** The nature-based settings and programs are designed to take advantage of local ecosystems and help connect the visitor to the physical place where the museum is located.

7. **Continuous Flow from Inside to Outside.** Museum settings maximize the relationship between the inside and outside through activities that take the inside out and the outside in. This continuum provides children with the understanding that inside and outside play are not separate. If possible, there should be an easy physical connection from inside to outside so children, staff and materials can easily move between both spaces.

8. **Sustainable and Green Cultivation.** When possible, each setting is designed with sustainability as a core approach. The building, outdoor spaces and exhibits should express resource conservation and environmental stewardship.

9. **Partnership with Local Environmental Organizations.** To further connect the museum's program and natural settings to the community, partnerships with local organizations that promote conservation education and environmental stewardship are actively pursued.

Applying the Principles

Kids Dig Dirt! Visioning Charette participants were asked to create scenarios for what the children's museum experience might include to support the growth of healthy, active children that engage in caring, responsible, active environmental stewardship. The discussion encompassed museum programs, settings, staff members, visitors and partners in order to create a museum-wide approach.

1. **Museum programs** focus on all aspects of child health from infancy to adolescence; the crucial connection between human and environmental health; and opportunities to engage children of all ages in hands-on activities in immersive, natural settings. Messages and materials are offered to adult family members, caregivers and educators with suggestions for take-home, childcare center and school-based activities and other community resources (i.e. public garden, nature center, etc.) to extend and deepen programmatic goals.

2. **Museum settings** maximize outdoor spaces, depending on spatial and climatic constraints. For example, in harsh winter regions, museum architecture is adapted to create a winter garden or conservatory-like natural setting so that hands-on, immersive activities can continue year round.

▲ *Climbing to new heights in the Wild Place at the Children's Museum in Easton (MA).*

Setting elements consist of plants and animals and the other basic materials of natural systems: water, precipitation, air, sunlight, rocks, soil and topographical variety, assembled in a multitude of forms depending on the programmed requirements. Food-producing plants are emphasized and featured throughout the whole environment—both outdoors and indoors.

3. **Museum staff members** are recruited because of their content knowledge about the natural world combined with experience in play programming. Educational backgrounds are likely to include horticulture, environmental education, early childhood education, playwork, museum education, design and the visual and performing arts. To synthesize these varying backgrounds, museums might host regional or national training programs to develop and demonstrate new baseline standards for outdoor play facilitation. ACM will be centrally involved in the development of these standards as an essential component of the overall Good to Grow! initiative.

4. **Museum visitors** experience nature in new ways while visiting the museum and are inspired to explore other area resources on their own. By adding or enhancing outdoor spaces or creating natural play settings indoors, museums increase their capacity and can seize the opportunity to expand their audiences. This is particularly relevant for urban settings where children may not have access to safe outdoor play spaces and for areas with high rates of overweight and obesity due to sedentary lifestyles and poor nutrition. Museum visitors can also nurture these spaces through involvement in the design and ongoing maintenance of natural spaces.

5. **Museum partners** include organizations and professional groups aligned with the overall values of child and environmental health, sustainability and stewardship. Included are partners from public health and environmental organizations, local schools and childcare centers, youth organizations, local colleges and universities (for research, training, professional development and volunteers), state and local government agencies (parks and recreation, environmental protection, health and human services, youth and family development), state cooperative extension services and others. Partners in the private sector include the Chamber of Commerce and other business organizations promoting the family livability of the region as attractive to business and enterprises engaged in and promoting "green" business practices.

▲
Cultivating the earth and ecoliteracy in the garden of Brooklyn Children's Museum (NY).

THE WAY AHEAD

The future health of planet Earth and its peoples rests on the shoulders of adults and institutions committed to guiding childhood along a new path of enlightenment.

ACM proposes a new vision for children's museums and a call for action to implement the vision across its membership. As a community nexus, children's museums can become a new life force providing rich, natural, indoor-outdoor environments designed to enhance children's health and ecoliteracy.[33]

Recognizing the critical role of children's museums in their communities, ACM invites its members to engage in concrete actions to stimulate children's play in nature by creating immersive, hands-on natural environments. Children and family members need reaffirmation of the importance of healthy lifestyles, appropriate use of technology and the value of play in nature as a wellspring of creativity. By working together, museum programs, settings, staff, visitors and partners can assert a vital influence on positive cultural evolution. Informed, institutional action is required to help ensure a healthy future for people and our planet.

APPENDIX

DESIGN CHALLENGES

Children's museums build or inherit buildings in a broad variety of contexts ranging from tightly constrained, small urban sites to spacious suburban and rural locations. Contexts vary by physiographic region and latitude, from the United States' hot dry Southwest to the northern extremes of New England. The diverse settings of children's museums range from Mexico through South America, north into Canada and across the globe ranging from Austria to Japan to Israel.

Many children's museums have no contiguous outdoor environment available. In this case, some museums have looked upward, using rooftop spaces as part of green building design as well as important exhibit space. Imagine Children's Museum in Everett, WA, and Minnesota Children's Museum in St. Paul increased their exhibit space by building interactive exhibits on their roofs. A major renovation and expansion project enabled Boston Children's Museum to install a green roof.

No matter what context, the design of the outdoor (or indoor) environment can be challenging. However, there are major differences between renovation and new construction—and also between a new addition on an existing site and new construction on a new site. In the latter case, it is clearly important to seek a site where there is sufficient land for an outdoor environment. Time invested in developing a draft design and program plan prior to seeking a site will assist in making a wise choice.

SELECTING A DESIGN TEAM

In addition to exhibit designers, educators and the architect, a key to success is the careful, informed selection of a design team including a landscape architect with equal standing and experience in design of informal education and family environments. Design teams must include expertise in outdoor environment safety, universal design and liability issues.

In the case of a museum addition or renovation, the same principle applies. The landscape architect should demonstrate skills in three-dimensional design of tight spaces. The architect should be experienced in day-lighting design that allows for the maximum penetration of life-giving, controlled natural light into the building. Inside and outside settings should flow imperceptibly into each other. As much as possible, the vertical dimension of space should be exploited when the land area (and probably sunlight penetration) is constrained.

Brainstorming the Kids Dig Dirt! Guiding Principles. Graphic illustrator: Lou Hexter, June 2007 Kids Dig Dirt! Visioning Charette.

Capturing ways that children's museums can help "grow" healthy children. Graphic illustrator: Lou Hexter, June 2007 Kids Dig Dirt! Visioning Charette.

MEETING THE KIDS DIG DIRT! GUIDING PRINCIPLES

In searching for children's environments that exemplify the Kids Dig Dirt! Guiding Principles, we have looked beyond the museum field to provide a global view. Details and pictures can be found in the Museums section of ACM's Good to Grow! Web site (www.goodtogrow.org).

Limited Space

Many urban children's museums have limited or no space outdoors. Overcoming tight space limitations requires especially creative design approaches to maximize program benefits. Rooftop spaces may be the answer, or courtyards or airy, glazed structures integrated into the museum building. Another model that thrives in Europe and Japan is the adventure playground concept, which allows for free creative play including the opportunity to build structures, work with natural materials, get dirty and problem-solve with peers, all of which is facilitated by trained playworkers.

Successful precedents that demonstrate effective site and setting designs that support Kids Dig Dirt! Guiding Principles on tight sites include the following: the Backyard at the Children's Museum of Pittsburgh in Pennsylvania; Our Backyard at the Long Island Children's Museum in Garden City, NY; and Kinderbauernhof Pinke-Panke, a children's farm and adventure playground in Berlin, Germany.

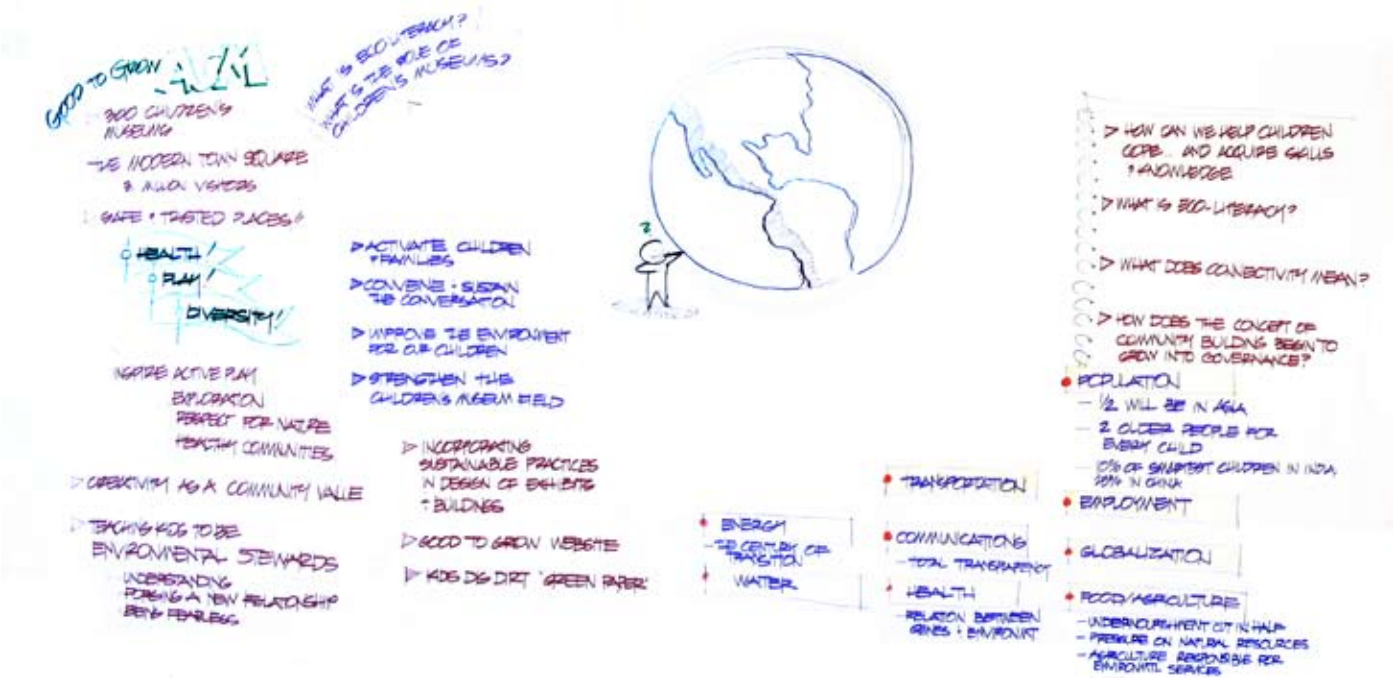
Less Constrained Space

When sites are not tightly constrained, the above recommendations regarding the choice of design team still apply. Although more setting options may be included in the design program, effective site design can still be challenging. As spatial constraints are less severe, circulation design, choices of setting sequencing and adjacency, age-appropriate configurations and integration of linear settings such as flowing water, present a complex multitude of design decisions, each with implications for functionality. Above all, the integration of live plant and animal settings that can be efficiently managed and flourish despite hands-on activity is paramount. A focus on food-producing plants should be emphasized.

Successful precedents that demonstrate effective site and setting designs that support Kids Dig Dirt! Guiding Principles on less constrained sites include the following: Earthworks at Santa Fe Children's Museum in New Mexico; Discovery Creek Children's Museum in Washington, DC; and Kidspace Children's Museum in Pasadena, CA.

Eco-architecture

Particularly in northern climates where winters are long and harsh or where space for an outdoor environment is unavailable, buildings must be designed to support living environments. Precedents exist in the form of



Considering global trends and the role of children's museums. Graphic illustrator: Lou Hexter, June 2007 Kids Dig Dirt! Visioning Charette.

conservatory and greenhouse architecture in most major cities around the world. Contemporary architecture has incorporated large-scale glazed spaces into commercial and institutional buildings. Although not child-focused, these include the Ford Foundation headquarters, an early example, and the National Audubon Society headquarters, both in New York City. The Eden Project, St. Austell, UK, with its huge, enclosed biome buildings is another impressive example. All demonstrate the possibilities of naturalized architectural space.

Successful precedents that demonstrate effective site and setting designs that support Kids Dig Dirt! Guiding Principles in eco-architecture applied to children's environments include the Con Edison Greenhouse at Brooklyn Children's Museum in New York and the greenhouse setting in the Hamill Family Play Zoo at Brookfield Zoo in Illinois.

Indoor-Outdoor Spaces

It is possible to visualize a future new form of indoor-outdoor landscape/architecture in warm climates, where buildings are semi-enclosed and year-round contact with nature is maximized.

Successful precedents that support Kids Dig Dirt! Guiding Principles and that demonstrate this approach, include the following: Prairie Ridge Ecostation for Wildlife and Learning, Museum of Natural Sciences in Raleigh, NC; Davis Waldorf School in Davis, CA; and the new California Academy of Sciences in San Francisco.

▶
Getting in touch with Animated Earth in the Backyard of the Children's Museum of Pittsburgh (PA).

Endnotes

[1] The first International Conference on Health Promotion, convened by the World Health Organization in Ottawa on November 21, 1986, produced the "charter for action to achieve Health for All by the year 2000 and beyond."

[2] The Ottawa charter for health promotion. Retrieved on May 13, 2008, from http://www.who.int/healthpromotion/conferences/previous/ottawa/en/.

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[6] Mårtensson, F. (2004). The landscape in children's play: A study of outdoor play in preschools (Doctoral dissertation, Department of Landscape Planning, Swedish University of Agricultural Sciences, 2004). *Agraria*, *464*.

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[9] For a definition of ecoliteracy, visit the Center for Ecoliteracy, Berkeley, California (www.ecoliteracy.org), built around the ideas and writings of Fritjof Capra.

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[11] Rajakaruna, C. (Ed.). (2006). *2006 membership directory*. Washington, DC: Association of Children's Museums.

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[13] Rajakaruna, C. (Ed.). (2006). *2006 membership directory*. Washington, DC: Association of Children's Museums.

[14] Defined as, "literally, to breathe life into some thing. A transformation is involved, what was still now moves. Here we explore its place in stimulating learning" (http://www.infed.org/animate/b-animat.htm). Cultural animation professionals apply this dynamic approach to community learning with a primary focus on cultural transformation.

[15] Defined as "what children and young people do when they follow their own ideas and interests in their own way for it's own sake and not necessarily for any external goal or reward." (www.skillsactive.com/playwork)

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[19] *Ibid*., particularly chapters 10 and 14.

[20] *Ibid*., particularly chapter 9.

[21] *Ibid*., particularly chapters 11, 12 and 13.

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[30] Wells, N. & Lekies, K. (2006). Nature and the life course: Pathways from childhood nature experiences to adult environmentalism. *Children, Youth and Environments, 16*(1), 1-24.

[31] *Ibid*.

Chawla, L. (2006). Learning to love the natural world enough to protect it. *Barn, 2*, 57-78.

[32] Charette, which originated in the architecture faculty, Ecole des Beaux-Arts, Paris, nowadays describes the coming together of a group of qualified experts for an intensive, interactive session to solve a problem (most commonly a design problem).

[33] Ecoliteracy "is to understand the principles of organization that ecosystems have developed to sustain the web of life." Capra, F. (1999). Ecoliteracy: The challenge for education in the next century. *Liverpool Schumacher Lectures*. Berkeley, CA: Center for Ecoliteracy.

RESOURCES

The following publications are a starting point for research into designing natural play spaces for children that incorporate the Kids Dig Dirt! Guiding Principles. More resources and information can be found online at ACM's Good to Grow! Web site (www.goodtogrow.org).

Books

Louv, R. (2008). *Last child in the woods: Saving our children from nature deficit-disorder* (2nd ed.). Chapel Hill, NC: Algonquin Books. (Original work published 2005).

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Moore, R. (1993). *Plants for play: A plant selection guide for children's outdoor environments*. Berkeley, CA: MIG Communications.

Moore, R., Goltsman, S. & Iacofano, D. (1993). *Play for all guidelines: Planning, design and management of outdoor settings for all children* (2nd ed.). Berkeley, CA: MIG Communications. (Original work published 1988).

Printed on 30% recycled post-consumer fiber paper, which was manufactured using biogas energy.

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