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roots

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October 2006

Environmental education and play

Aula verde

Playing wild

Creating a place for nature play

The phenomenon of the night safari



BGCI

Plants for the Planet



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Play and the environment

Editorial - English

Play is about exploring and experimenting. For children, it's an essential part of growing up. They develop an understanding of themselves and others, gain knowledge of the physical world, and expand their ability to communicate with peers and adults. The renowned Swiss biologist and psychologist Jean Piaget (1896-1980), who constructed a highly influential model of child development and learning, argued that play serves many purposes and, since children learn more effectively through activity rather than instruction, that play provides an excellent vehicle for learning.



This issue of Roots celebrates 'play' in the environment. Botanic gardens are wonderful venues for play and many gardens are increasingly conscious of the need to offer children opportunities

Editorial - Français

Le jeu a trait à la découverte et à l'expérience. Pour l'enfant, il s'agit d'un élément essentiel à sa croissance. Il développe ainsi une certaine compréhension de soi et des autres, acquiert des connaissances du monde physique, et élargit son aptitude à communiquer avec ses camarades et avec les adultes. Jean Piaget (1896-1980), biologiste et psychologue suisse de renom qui a bâti un modèle de poids en matière de développement et d'apprentissage de l'enfant, a proclamé que diverses fonctions étaient comprises dans la notion du jeu. En effet, étant donné que l'enfant apprend de manière plus efficace par le biais de l'animation que de l'enseignement, le jeu présente un excellent vecteur d'apprentissage.

La présente édition de Roots est consacrée au « jeu » dans l'environnement. Les jardins botaniques proposent un cadre exceptionnel pour le jeu. De nombreux jardins sont de plus en plus conscients du fait qu'il est nécessaire de créer des opportunités pour que les enfants découvrent leur environnement librement. Dans un contexte mondial qui tend à s'urbaniser davantage (l'an prochain, il y aura plus de personnes résidant en ville qu'en zone rurale, UN, 2006), le besoin d'accès aux espaces verts n'a jamais été aussi élevé. Dans son livre innovant, le journaliste Richard Louv (voir la rubrique des ressources) établit un lien de cause à effet entre le manque de nature dans la vie actuelle des jeunes générations américaines et certaines des tendances les plus dérangelantes parmi

Editorial - Español

Jugar es explorar y experimentar. Para la infancia es parte esencial de su crecimiento. Desarrollan la comprensión de sí mismos y del otro, conquistan el conocimiento del mundo físico y amplían sus habilidades de comunicación con tutores y adultos. El famoso biólogo Suizo y psicólogo Jean Piaget (1896-1980), que construyó un modelo del desarrollo y crecimiento infantil muy influyente, explicaba que el juego sirve a muy distintos fines, y dado que los niños aprenden más con actividades que con instrucción, el juego proporciona un excelente instrumento para el aprendizaje.

Este número de Roots celebra el 'juego' en el medio ambiente. Los jardines botánicos son lugares maravillosos para jugar y muchos jardines son cada vez más conscientes de la necesidad de ofrecer su espacio a la libre exploración de los niños. Con un mundo cada vez más urbanizado (el próximo año, la población urbana superará a la rural, ONU, 2006) la necesidad de espacios verdes nunca ha sido tan grande. En su rompedor libro, el periodista Richard Louv (ver recursos) elabora una relación causa efecto entre la falta de naturaleza en la vida de la actual generación de jóvenes americanos y algunas de las tendencias más preocupantes de la infancia en EEUU. Incluyen la epidemia de obesidad y el incremento de la incidencia del llamado Desorden del Déficit de Atención y la depresión infantil. Y algunas tendencias tienen alcance global, siendo la obesidad no solo un

to explore their surroundings freely. With our world becoming more urbanised (next year, more people will be living in cities than in rural areas, UN, 2006) the need for access to green spaces has never been greater. In his ground breaking book, the journalist, Richard Louv (see resources), makes a causal link between the lack of nature in the lives of today's generation of young Americans with some of the most disturbing childhood trends in the US. These include the obesity epidemic and increased incidences of Attention Deficit Disorder and childhood depression. And some of these trends have a global reach too, with obesity no longer just a problem for developed countries but also an increasing concern for many developing countries. In working to restore the link between humankind and nature botanic gardens cannot solve these problems alone, however, they are definitely part of the solution.

In our first article, Sandy Tanck, Director of Education at Minnesota Landscape Arboretum, highlights the need for 'wild nature play'— climbing trees, building hideouts, fantasy play, etc – and describes how the Arboretum is encouraging this form of play through its summer exhibition. As we cling to our learning goals and the view that children only learn if we provide them with information and structured activities, it is useful to be reminded how valuable unstructured play can be. Sally Jenkinson, lecturer and writer on early childhood issues, also makes a compelling case for providing time and space for children to play outside in all weathers; enabling them to become familiar with the seasons and develop an affinity for nature. Sergio Martín Barreiro Zamorano, Environmental Science teacher at Benemérita University Botanic Garden, Mexico, is another exponent of children learning outside. His aim, using a strategy of sensory education, is to involve children in environmental action and encourage them to engage with the concept of a more sustainable future. And we are fortunate to include an article by Fiona Danks and Jo Schofield, authors of a new book 'Nature's Playground' who offer us some delightful ideas for encouraging children to play outside in botanic gardens.

les enfants aux États-Unis. Ces tendances comprennent l'obésité épidémique et le taux d'incidence accru concernant le Trouble de Déficit de l'Attention et la dépression infantile. Certaines d'entre elles ont également un impact global, l'obésité n'étant plus simplement un problème propre aux pays développés, mais devenant aussi une source de préoccupation dans de nombreux pays du Sud. Dans leur effort de rétablir le lien entre l'homme et la nature, même s'ils ne sont pas en mesure de résoudre ces problèmes seuls, les jardins botaniques font définitivement partie de la solution.

Dans notre premier article, Sandy Tanck, directrice du service pédagogique au Minnesota Landscape Arboretum, souligne la nécessité de développer « le jeu dans la nature sauvage » (grimper aux arbres, construction de cabanes, jeu de fantaisie, etc.). Elle y décrit également la méthode employée par l'Arboretum pour encourager ce type de jeu, par le biais de son exposition estivale. Face à notre attachement aux objectifs d'apprentissage et à la position selon laquelle l'enfant n'est en mesure d'apprendre que s'il est confronté à des informations et à des animations structurées, il est utile que l'on rappelle à quel point le jeu non structuré peut jouer un rôle important. Sally Jenkinson, professeur et auteur de sujets liés aux problématiques de l'enfance, présente également un cas incontestable lié au fait de procurer aux enfants les moments et l'espace pour jouer dehors par tout temps, leur permettant ainsi de se familiariser aux saisons et de développer une affinité envers la nature. Sergio Martín Barreiro Zamorano, professeur des sciences de l'environnement au jardin botanique de l'Université Benemérita au Mexique, est également un promoteur de la formation des enfants à l'air libre. Son objectif, basé sur une stratégie d'enseignement sensoriel, est d'encourager les enfants à agir en faveur de l'environnement et à s'engager sur la voie d'un futur plus durable. Nous avons la chance d'inclure un article de Fiona Danks et de Jo Schofield, auteurs du récent ouvrage « Nature's Playground », qui nous proposent de merveilleuses idées afin d'encourager les enfants à jouer dehors dans les jardins botaniques.

problema de país desarrollado sino también para los países en desarrollo. En la tarea de restablecer el equilibrio en la relación de la humanidad con la naturaleza, los jardines botánicos son parte de la solución, aunque sean sólo una parte.

En nuestro primer artículo, Sandy Tanck, Director de Educación en el Minnesota Landscape Arboretum, destaca la necesidad del 'juego libre en la naturaleza'— subirse a los árboles, construir escondites, jugar a imaginarse, etc. – y cuenta cómo el Arboretum estimula esta forma de juego en su exhibición veraniega. Cuando más nos aferramos a los objetivos de aprendizaje y la idea de que sólo se aprende cuando la información se une con actividades estructuradas, es muy útil recordar el valor del libre juego sin estructura. Sally Jenkinson, disertadora y escritora de temas de infancia preescolar, también llama la atención sobre proporcionar tiempo y espacio a la infancia para jugar al aire libre sea cual sea el tiempo atmosférico; familiarizarse con las estaciones y desarrollar la simpatía por la naturaleza. Sergio Martín Barreiro Zamorano, profesor de Ciencias Ambientales en el Jardín Botánico Universitario de Benemérita, México, postula en el mismo sentido del aprendizaje al aire libre. Usando las estrategias de la educación sensorial, su meta es comprometer a la infancia en la acción medioambiental y en el concepto de un mundo futuro más sostenible. Y tenemos la suerte de incluir el artículo de Fiona Danks y Jo Schofield, autores del nuevo libro 'Nature's Playground', que nos ofrecen algunas encantadoras ideas para animar a los niños a jugar en los jardines botánicos.

Para los niños más crecidos ayuda en la visita a los jardines botánicos que el juego esté más estructurado. En el Fairchild Jardín Tropical, EEUU, hay un impresionante programa para adolescentes: el Reto del Fairchild. Caroline Lewis, Director de Educación del Jardín, describe el programa que ha crecido de unos 1.400 estudiantes de secundaria en el primer año a casi más de 16.500 anuales, incluyendo los de educación media. Y este número es solo la punta del iceberg, ya que los

For older children visiting a botanic garden, it often helps if play is more structured. At the Fairchild Tropical Garden, USA, an impressive programme has been developed for teenagers: the Fairchild Challenge. Caroline Lewis, Director of Education at the Garden, describes the programme which has expanded from 1,400 high school students in its first year to over 16,500 middle and high school students annually. And this number is just the tip of the iceberg – the results of the programme reach far into the community, to families, friends, neighbours and communities.

In considering play, we cannot escape the impact of technology. We live in an age where our lives are increasingly shaped by technology. We know that children watch more television and play more computer games than ever before. Where should botanic gardens stand on this subject? We asked Trevor Roach, Head of Education at the National Botanic Gardens of Wales and Marisa Cohen, President of the Assisi Nature Council in Italy to discuss whether botanic gardens should embrace technology in education. This engaging dialogue challenges us to think about a subject which has profound implications for education in the 21st Century.

In our final article, we explore the welcome notion that play is not merely for children! Play is a time when we feel most alive. Yet, as adults, it's something we often forget to do. Bernard Harrison, former Executive Director of the Singapore Zoological Gardens, describes the creation of a night safari – a very exciting project that enables visitors to view nocturnal animals under artificial lighting at a time when they are most active. Now, how fun is that?

Pour les enfants plus âgés qui visitent les jardins botaniques, il convient souvent de s'appuyer sur des jeux plus structurés. Le Jardin Tropical Fairchild, aux États-Unis, a développé un étonnant programme pour les adolescents : le Challenge Fairchild. Caroline Lewis, directrice du service pédagogique du jardin, nous donne une description de ce programme qui, sur une base de 1 400 lycéens la première année, s'est élargi à plus de 16 500 collégiens et lycéens par an. Et ce chiffre ne représente que le sommet de l'iceberg : ses résultats touchent la population dans son ensemble, les familles, les amis, les voisins et les quartiers.

Il est inévitable de mentionner l'impact de la technologie, lorsque l'on s'intéresse au domaine du jeu. Nous vivons une époque où nos vies sont de plus en plus modelées par la technologie. Il est évident que les enfants regardent la télévision et jouent à des jeux informatiques plus que jamais auparavant. Quelle doit être la position des jardins botaniques en ce sens ? Nous avons demandé à Trevor Roach, directeur du département de l'éducation au Jardin Botanique National du Pays de Galles, et à Marisa Cohen, présidente du Assisi Nature Council en Italie, de débattre sur le sujet – à savoir si les jardins botaniques se doivent d'intégrer la technologie à l'animation. Ce dialogue engagé nous stimule à réfléchir à un thème qui a de fortes implications quant à l'éducation au XXIe siècle.

Dans notre dernier article, nous examinons l'idée plaisante selon laquelle le jeu n'est pas simplement fait pour les enfants ! Le jeu correspond aux moments où nous nous sentons davantage animés. Et pourtant, en tant qu'adultes, nous avons souvent tendance à l'oublier. Bernard Harrison, ancien directeur exécutif du Jardin Zoologique de Singapour, nous décrit la création d'un safari nocturne. Un projet fascinant qui permet aux visiteurs d'observer des animaux nocturnes sous une lumière artificielle, lorsqu'ils sont le plus actifs. Alors, amusant?

resultados del programa alcanzan a la comunidad, las familias, amigos y vecinos.

Hablando de juego no podemos escapar a la influencia de la tecnología. Vivimos la era en que nuestras vidas/ espaldas están moldeadas cada vez más por la tecnología. Sabemos que nunca como ahora los niños han visto tanta tele y videojuegos. ¿Qué postura deben tener los jardines al respecto? Preguntamos a Trevor Roach, Jefe de Educación de los Jardines Botánicos de Gales, y a Marisa Cohen, Presidenta del Consejo para Naturaleza de Assisi, en Italia, para discutir acerca de si los jardines botánicos deben adoptar la tecnología. Este sugerente diálogo nos estimula a pensar en un tema de profundas implicaciones para la educación en el siglo XXI.

En nuestro artículo final, exploramos la bienvenida idea de que el juego no es sólo "cosa de niños". Jugar nos mantiene más vivos. Sin embargo, como adultos a menudo nos olvidamos de hacerlo. Bernard Harrison, antes Director Ejecutivo de los Jardines Zoológicos de Singapur, describe la creación del safari nocturno, un proyecto apasionante que permite al visitante ver a los animales con luz artificial cuando están más activos. ¿No es divertido?

Creating a place for Nature Play

Summary Richard Louv's recent book, *Last Child in the Woods: Saving Our Children From Nature Deficit Disorder*, confirms what many have already observed: today's children are more disconnected from nature than previous generations. Louv presents interviews of children, parents and teachers, analyzes research and current trends, and builds a compelling case for the negative impact this has had on children's health. By what ways may public gardens try to reverse this trend? Perhaps to present a conference that explores the issue, or to create programs that engage children and families in activities with nature and plants. At the Minnesota Landscape Arboretum, we have also created a temporary interactive nature-play space 'Under the Oak', where children may build simple forts, crawl through a willow tunnel, decorate a child-sized butterfly's wings, play at the log tea table or simply sit in the arbor to watch wildlife in the neighboring marsh. We hope it will provide enjoyment for visitors, and inspire others to create places for nature-play as well.

childhood obesity), parents' increased sense of 'stranger-danger' due to over-hyped media reports (the rate of kidnapping has actually dropped in the last 20 years), the disappearing vacant lots (land) and other semi-wild areas where children once played on their own. His survey of current research builds a case for the negative impact this has on the healthy physical and emotional development of today's children. It's a thought-provoking read; I recommend it highly for understanding our current times and the audiences with whom many of us work to create our programmes and exhibitions.

In his recent book *Last Child in the Woods: Saving Our Children from Nature Deficit Disorder*, Richard Louv confirms what many of us have already noticed: children in the U.S. today are more disconnected from nature than previous generations (Louv, 2005). They spend less time outdoors playing in nature and semi-wild places than most of us once did as children. He explores many social factors that contribute to the disconnect: over-structured time, the rise of organized sports (and concurrent rise in



Left: Woven willow tunnels invite children to enter the nature play area (Photo: Sandy Tanck)



Above: After designing the wings, a young girl finds out how it feels like to become a butterfly!
(Photo: Sandy Tanck)

Top: Children use 'nature findings' to create patterns on the wings of a child-sized butterfly
(Photo: Sandy Tanck)

Right: Children and adults alike, enjoy creating a den out of natural materials
(Photo: Sandy Tanck)

Louv's book has struck a chord with many. He has travelled widely since its publication to speak about it, and more importantly, to engage a broad spectrum of people in conversations about ways to address the issues he raises. During a recent visit to speak at an Arboretum conference for teachers, Louv asked for our thoughts about two points I'd like to share here. One was for help in developing a positive corollary to the term 'nature deficit disorder'. Hmm...should parents be encouraged to add another thing to their daily to-do list, to 'nature-nourish' their kids? Good food, enough sleep, exercise...and an hour of nature-time? Any thoughts on a clear, easy way to convey the idea are welcome! Louv also asked what we as public garden educators see as roles our gardens might play, a question that deserves careful consideration and to which there are many possible responses.

In the public policy realm, one role could be to create conferences and forums that bring educators, parents, park and school planners, legislators and other community leaders together to learn about the issues and to develop solutions in our own communities. Another approach might be to produce a steady flow of family programmes that immerse participants in hands-on fun with plants, gardens and nature, and that provide resources

for parents to continue experiences at home. And certainly our gardens are wonderful green places that families can spend time together exploring. Yet reflecting on what were the most powerful nature-connecting experiences from my own childhood, it was not family visits to a park or zoo that made an impact. It was the time I spent on my own or with friends, climbing trees, making a tree-house, damming up the stream with rocks, picking wild blackberries, swinging on vines, digging 'turtle-traps'...none of which would be permitted at most public gardens! A recent study at Cornell University supports the concept that 'wild nature play' (e.g. to hike, camp, hunt, play in the woods) is more likely than 'domesticated nature play' (e.g. to garden, pick flowers or produce, plant trees) to set an individual on a trajectory toward positive environmental attitudes and behaviors as an adult.



In recent years many public gardens have invested substantial resources in creating and operating 'children's gardens'. They often have colourful plants to touch and smell, water features, climbing structures, tunnels, topiary, ABC and pizza gardens, playhouses and tea-party tables, and are places of delight for millions of family visitors. Yet the kind of 'wild-nature play' I recall from childhood seems to be missing in many cases. We wanted to experiment, without committing to a permanent installation. Could we create a simple, interactive nature play space, where children could build and pretend, that would trigger parents (and grandparents) to recall their own forgotten pastimes, and that might inspire others to create similar places and experiences in their home gardens and school playing fields? Would such a place with 'loose bits' be feasible to run? And if so, would the enthusiasm of its users destroy it? As part of the Minnesota Landscape Arboretum's summer 2006 exhibition *Secret Gardens*, a juried competition of '20 curious spaces that delight the imagination', we've had an opportunity to try out the concept.

What did we create? 'Under the Oak' is a space of about 3600 sq ft tucked into the shade of a massive oak tree behind the children's education facility. At its entrance is a set of woven willow tunnels, with a hollow log to crawl through at each entry point, and log

benches for those who would rather watch than play. The fort-making area has a few 'starts' of various shapes to inspire and provide a framework for young builders' creative energies, including the Wigwam (woven from willow branches), the Cardtable (from ironwood) and the Den (from dogwood). Building materials are simple, a hollow-log holder filled with 5ft sticks for leaning and weaving, and some burlap pieces with a branch sewed onto either end for users to make fort walls, roofs and floors. Another area has a child-sized butterfly, its wings outlined with dogwood branches and attached flat to the ground, and its body a foam pad covered with landscape fabric. A bin filled with cones, small tree slices, and pieces of palm 'bark' provides an array of nature findings for creating patterns on its wings. We expected that children might lie down on its body afterwards for a photo, but have seen the occasional parent taking a comfortable nap as their fort-making session stretched on! Two other pretend-play areas are the Toad Abode (leave a note in the mailbox of the resident toad) and the Tea Table (unusual array of 'meals' served here).

Open just over a month at this writing, the response so far has been encouraging. First, thousands of visitors including families, daycamp and pre-school classes and other children's groups have passed through, and everything is still standing! The 'forts' are in a state of constant transformation; floors become walls, roofs come and go, stick-porches are added and removed, independent clusters of teepees spring up and disappear. Visitors seem to take in what others before them have created, then forge ahead to leave their own legacy with remarkably little destruction of materials. The only maintenance needed so far has been to periodically restock the 'butterfly bin', since the materials provided to decorate its wings have migrated to become 'stepping stones'/'plates'/'buffalo hides'/'provisions'/'lily pads'/'drums' in other areas. Imaginations are in active use daily ("You be the wild animal", "This is my fishing pole", "Let's dance in the bongo-gym!"). We have not been able to gather any structured data on visitor behaviour



yet, although we hope to do so. Anecdotal observations by staff so far show the area has appeal for a wide range of ages (with many stay-times of an hour or more), and that the answer to adults enquiring whether children are ready to move on to the next Secret Garden, is often "No!" It is common to hear comments from parents and grandparents like "This brings back memories; I used to build things like this".

It is certainly a challenge to create a play-space with loose natural materials that both encourages intended behaviours (fort-building, pretend-play) and discourages negative ones (sticks used as spears and swords, climbing on branch-structures not strong enough for it). We've been intrigued with the results of our experiment so far. Perhaps keeping the loose building materials very simple, adding features to the 'starts' that prevent climbing (e.g. a willow-woven wall attached to one side, small log rounds screwed onto the framework that also keep leaned sticks from sliding and falling) and creating small 'how-to' signs with photos of children using each area have all contributed to the initial success. There are probably similar spaces for children and their

families at public gardens in other places; if so, we invite others to share their insights from what has worked (and not worked!) for them. We would be happy to share more details about the design and operation of 'Under the Oak' at the Minnesota Landscape Arboretum with anyone who has an interest. It would be inspiring and exciting to see new ideas for fresh approaches and different activities emerge from others who share a similar goal.

Public gardens are truly places for plants...AND for people. Helping today's children form emotional bonds with green plants and nature is an undertaking that demands our best efforts, and an ongoing dialogue to be inspired by and learn from each other's successes and dead-ends. The health of today's children, the long-term health of our institutions, and indeed the health of the glorious planet we all share depend on it.

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- ➔ Louv, R., 2005, *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder*. Algonquin Books, Chapel Hill, North Carolina USA

Above: Primitive structures provide frameworks for children to build forts and wigwams (Photo: Sandy Tanck)

Right: 'Under the Oak' helps children form emotional bonds with plants and nature (Photo: Sandy Tanck)



➔ Wells, N.M., Lekies, K.S., 2006, Nature and the Life Course: Pathways from Childhood Nature Experiences to Adult Environmentalism. *Children, Youth and Environments* 16(1), 1-24

Résumé

Le livre récent de Richard Louv '*Last Child in the Woods: Saving Our Children From Nature Deficit Disorder*' (Dernier enfant dans les bois : sauvons nos enfants des troubles du déficit de la nature), confirme ce que beaucoup d'entre nous avons déjà remarqué: les enfants d'aujourd'hui sont plus déconnectés de la nature que les générations précédentes. Louv présente des interviews d'enfants, de parents et d'enseignants, analyse les recherches et les tendances actuelles et démontre les impacts négatifs de cette situation sur la santé des enfants. Par quels moyens les jardins publics peuvent-ils essayer de remédier à cette situation ? Peut-être en présentant une conférence sur le sujet ou en créant des programmes qui entraînent les enfants et les familles dans des activités avec la nature et les plantes. A l'Arboretum Paysager de Minnesota, nous avons aussi créé un espace temporaire de jeux-nature interactifs

'Sous le chêne', où les enfants peuvent construire de petites cabanes, ramper sous un tunnel de saules, décorer les ailes d'un papillon de la taille d'un enfant, jouer sur une table à thé faite de troncs ou simplement s'asseoir pour observer la faune dans le marais voisin. Nous espérons que cet espace procurera des moments agréables aux visiteurs et en inspirera d'autres pour proposer eux aussi des endroits de jeux-nature.

Resumen

El libro reciente de Richard Louv 'El último niño en los bosques: Salvando nuestros niños del desorden por deficiencia de la naturaleza' (*Last Child in the Woods: Saving Our Children From Nature Deficit Disorder*), confirma lo que muchos de nosotros hemos ya observado. Comparando los niños de hoy en día, con generaciones anteriores, nos damos cuenta que se encuentran mas desconectados de la naturaleza. Louv da a conocer entrevistas con niños, padres, maestros y profesores, y con ellas él hace un análisis, investiga las tendencias recientes y describe el impacto negativo que ocasiona en la salud de las generaciones de hoy en día.

¿Que medios puede proporcionar los jardines públicos para tratar de invertir esta tendencia a una positiva? Tal vez el presentar una conferencia de las actividades que los niños y sus familias pueden llevar a cabo con la naturaleza y las plantas. En el Arboretum en Minnesota 'Landscape Arboretum', nosotros hemos creado actividades interactivas que llamamos 'Naturaleza: espacio para jugar. 'Bajo el roble' ('Under the Oak'), es donde los niños y chicos de todas las edades, construyen pequeños fuertes, y pueden arrastrarse a través de un túnel de saules, decorado con alas de mariposas al tamaño niño, asimismo se puede jugar en la mesa de te fabricada de un tronco, o simplemente sentarse en una pérgola y observar la vida silvestre en la marisma de los alrededores. Con esto, nosotros tratamos de ofrecer atractivos a los visitantes además, de inspirar a otras personas a crear espacios similares para jugar en la naturaleza.

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Living in **real time**

Summary There are many types of learning and not all of them happen in the classroom. Children meet and learn about the natural world through direct engagement with their senses, as the educator Rudolf Steiner and environmentalist Rachel Carson were aware.

What you experience feel, and indeed love, in your early years remains as an attitude, a disposition throughout life. Childhood is the time for developing an ecological awareness which extends beyond our own species. Children today are bombarded with ‘instant’ experiences and expect immediate gratification. The slow rhythms of Nature provide them with a tutorial in patience and tolerance.



Left: ‘The best classroom and richest cupboard is roofed only by the sky’ (Photo: Katie Sharrock)

and the unknown, a feeling of sympathy, pity, admiration or love - then we wish for knowledge about the object of our emotional response. Once found it has lasting meaning. It is more important to pave the way for the child to want to know than to put him on a diet of facts he is not ready to assimilate.”

(Carson 1965)

Left: A young child enjoys making ‘soup’ out of natural materials! (Photo: Katie Sharrock)

Rachel Carson, the legendary environmentalist, whose passion was to introduce young and old to the miracles of nature, wrote about the importance of feelings because she recognised the sensory and emotional impact of nature on the growing child. She knew that the senses educate the inner feeling life and felt that if children were actively engaged with living experiences, they would have little appetite for ‘those activities that threaten the world’. She would, no doubt, have been saddened to see how much time children spend on formal learning, watching television or playing computer games today and

how difficult it has become for many of them to make a relationship with the natural world and to freely experience the outdoor environment.

“I sincerely believe that for the child, and for the parent seeking to guide him (sic), it is not half so important to know as to feel. If facts are the seeds that later produce knowledge and wisdom, then the emotions and the impressions of the senses are the fertile soil in which the seeds must grow. The years of early childhood are the time to prepare the soil. Once emotions have been aroused - a sense of the beautiful, the excitement of the new

Rudolf Steiner held similar views, believing that the education of the senses in the formative early years would shape and form the individual so as to be an education for life. Today, in rural and urban settings, Steiner educators make it a priority to provide time and space for children to play, both inside and outside, and in all weathers. In ‘kindergartens’ or children’s gardens, children meet the elements and experience the changing seasons. They get wet, windblown, and warm, they mess about in sand, mud and water; they make dens; plant, harvest and (eventually!) eat what they have grown. They physically extend themselves, run, jump, climb, discover.

They experience wonder. Gradually, they also begin to develop an affinity with the laws of the natural world.

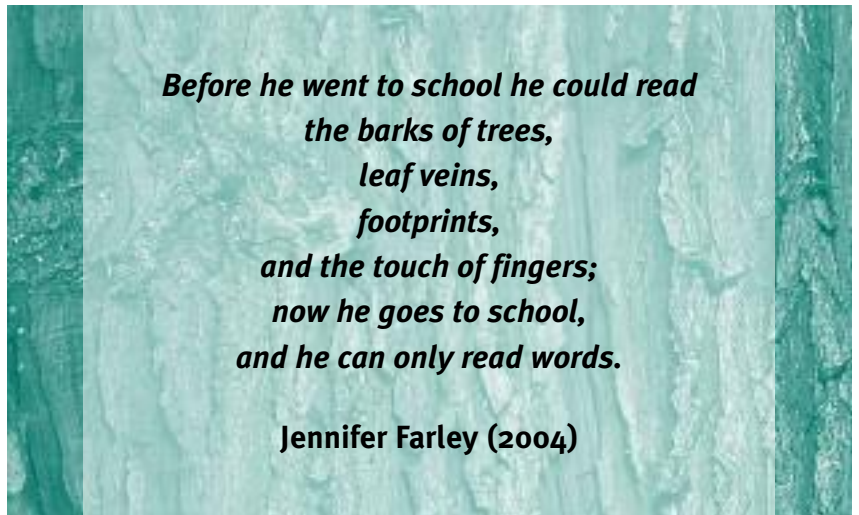
Meeting and learning to love the natural world, even in an urban setting, helps create a sense of responsibility towards it. Children's outdoor play, their sensory, participatory engagement with the world, can have long-term environmental and ethical consequences as many early years educators are aware. How we understand and relate to the world as adults – whether we care for it or disregard it – our ecological response to it, depends to some extent on our close encounters with it during the formative years of our childhood, as George Eliot, poignantly observed in *The Mill on the Floss*:

Below: Learning to love the natural world helps create a sense of responsibility towards it (Photo: Katie Sharrock)



"Life did change for Tom and Maggie and yet they were not wrong in believing that the thoughts and loves of these first years would always make part of their lives. We could never have loved the earth so well if we had had no childhood in it.... What novelty is worth that sweet monotony where everything is known and loved because it is known.... Our delight in the sunshine on the deep bladed grass today, might be no more than the faint perception of

Right: Children's outdoor play can have long term environmental and ethical consequences (Photo: Katie Sharrock)



wearied souls, if it were not for the sunshine and the grass in the far-off years, which still live in us and transform our perception into love."
(Eliot, 1860)

A catalogue for an exhibition entitled 'Secret Spaces of Childhood: Go Forth and Play', featured Roger Hart, Professor of Environmental Psychology at the City University of New York, who asked: "Should we worry that a world where children have minimal engagement with plants and animals might be dangerous to nature itself?" (Hart, 1998). There is evidence that children, under the age of nine years old, dream about animals: two thirds of their poems – and many of their drawings – are inspired by the natural world. It must be significant that their first artistic flow is connected to what they have loved in nature.

Despite this evidence, a survey conducted in 2003 by the Children's Society and the charity 'Young Voices' found that 80% of children aged between 7 and 16 have been told off for playing in the streets, on estates and even in parks (Times 6/08/03). There are a growing number of local



authority-inspired play bans. These include the erection of 115 'No Ball Games' signs on an estate in Offerton, Stockport. Tim Lineham said that Britain was in serious danger of becoming a child free zone peopled by adults intent on "...tidying our children away. Playing outdoors is a fundamental part of everyone's childhood, but that is being threatened by a culture of intolerance towards children's play in public".

The Secretary of the American Academy of Child and Adolescent Psychiatry, Dr Marilyn B. Benoit, highlights a positive outcome in tuning in to the slower pace of life and nature. The outdoor environment, she says, has a great role to play in developing what she calls 'frustration tolerance'. Benoit meets many children today who are unable to cope with the slightest of frustrations – when they are not satisfied immediately, they can lash out aggressively, they can be impatient, demanding, and – this is telling – at the same time, they are easily wounded (Benoit, 2000).

Benoit is fascinated by the role that nature can play in developing frustration tolerance. She suggests taking children on excursions into nature where they can spend time observing the plants and animals. In slow-paced activities: gardening, animal/bird watching, pond gazing: the natural world is a great teacher of tolerance. A tadpole will take its own time to become a frog - a tutorial in patience for the watcher. The benefits of a relationship with nature will help a

child temper some of the negative technological impacts of today. The instant fix of the remote control can give way to the deep, satisfying rhythms of real time. Information, via the computer screen, cannot ever replace experience. The British educator Margaret McMillan once observed: "The best classroom and richest cupboard is roofed only by the sky." (McMillan, 1921)). How right she was!

Simon Barnes, the author and naturalist, would agree with her. Writing about the discovery of a couple of newts lying, "like drowned dinosaurs" at the bottom of a pond by his son, who breathed: "Wow!" in delight, Barnes argues:

"It all depends on what you mean by education. Do we want to educate people to become a viable part of the economy? Or should the priority be to make them a viable part of the human race? It's a question of what we value. Your money or your life, if you like.

And how can anyone value what he has never seen? Getting children's boots muddy is not about recruiting tomorrow's conservation workers. Perhaps the test of being human is the extent to which we value things beyond our own immediate circle of concern: to value life beyond family, beyond nation, beyond race, beyond religion, beyond species. But you can't make the first step to understanding the non-human world if you can't say wow to a newt. It has become a political issue: every child has a right to say wow to a newt!]"
(Barnes, 2005)

Simon Barnes has captured something central to the Steiner philosophy: there is education for work, and there is education for life. We must avoid prioritizing one at the expense of the other.

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Résumé

Il y a de nombreuses façons d'apprendre et toutes ne se passent pas dans les salles de classe. Comme l'éducateur Rudolf Steiner et l'environnementaliste Rachel Carson le savaient bien, les enfants rencontrent et apprennent le monde naturel par un contact direct avec leurs sens. Ce que chacun vit, ressent et aime au cours de ses premières années, se retrouve dans ses attitudes et dispositions tout au long de sa vie. L'enfance est le bon moment pour développer une conscience écologique qui s'étend au delà de notre espèce. Les enfants sont aujourd'hui bombardés par des expériences instantanées et s'attendent à des retours immédiats. Par contre les rythmes lents de la nature sont un apprentissage de la patience et de la tolérance.



Left: 'Children today are bombarded with 'instant' experiences and expect immediate gratification. The slow rhythms of Nature provide them with a tutorial in patience and tolerance' (Photo: Katie Sharrock)

Resumen

Existen numerosas maneras de aprender y no solo en un salón de clases. Los niños se reúnen y aprenden del mundo directamente de la naturaleza, ellos se absorben con todos sus sentidos, así lo ha expresado el educador Rudolf Steiner y la ecologista Rachel Carson. Las experiencias que hemos tenido, sentido y de verdad amamos son aquellas de nuestros años tempranos, y estas permanecen como actitudes en nuestra vida adulta y nuestro temperamento a través de toda nuestra vida. La niñez es la etapa para desarrollar nuestra conciencia ecológica y extenderla más allá de nuestras especies. Los niños de hoy en día se encuentran bombardeados de experiencias 'instantáneas' y esperan una satisfacción inmediata. Los ritmos lentos de la naturaleza les proporcionan clases individuales de paciencia y tolerancia.

Sally Jenkinson is a lecturer and writes on early childhood issues. A former Steiner Waldorf Kindergarten teacher, Sally is the author of *The Genius of Play* (see resources) and was one of the founders of the Alliance for Childhood. She is a passionate advocate of children's play.

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Left: Children in Steiner schools are positively encouraged to experience the changing seasons with an aim of developing an affinity with the natural world (Photo: Katie Sharrock)

Aula verde

Derecho:
Actividades
temáticas
interpretativas
en el jardín
botánico
(Photo: Sergio
Martin Barreiro
Zamorano)

Resumen

La educación ambiental en aulas verdes, es una propuesta pedagógico didáctica cognoscitiva de enseñanza-aprendizaje en educación no formal, como apoyo a la educación formal, utilizando como técnica metodológica la interpretación en el Jardín Botánico de la Benemérita Universidad Autónoma de Puebla, vinculado al programa Estatal de educación ambiental y al programa escuela verde.

Se observó diferencia estadísticamente significativa antes y después de la interpretación que mejoró el nivel de aprovechamiento en alumnos que realizaron esta actividad, incrementó su motivación, estandarizó el conocimiento en la dimensión ambiental de los grupos académicos. La interpretación se traduce en actividades que divierten, sistematizan, transmiten, proyectan y evalúan los conocimientos útiles, que estimula el desarrollo de conciencia en el educando.

Concluimos que la interpretación ambiental utilizando aulas verdes, es una técnica pedagógica innovadora en la enseñanza de la educación ambiental no formal, motivó e informó al alumno de escuelas primarias de carácter público, privado y centros de atención múltiple y especial, concienciando el sentido de responsabilidad ética del educando en la importancia de conservar y respetar la diversidad biológica y cultural.

Introducción

El programa de interpretación en el Jardín Botánico de la Benemérita Universidad Autónoma de Puebla, es una propuesta pedagógica cognoscitiva que incluyó acciones concretas de la dimensión ambiental

en el ámbito local. Consideramos que ésta aporta inspiración e información, y es la llave para que el alumno despierte el sentido de observación y análisis, para querer conocer más a través de los sentidos, además provee un camino de comunicación entre el alumno y el Jardín Botánico que lo



vinculó con la naturaleza. La interpretación permitió trabajar de manera coordinada con los programas de educación formal, una interpretación efectiva motiva al educando a participar de manera activa mientras aprende y se divierte, formando un compromiso de cultura ambiental, ya que no podemos hablar de educación ambiental sin práctica.

La interpretación y educación ambiental

La interpretación ambiental es determinante para encausar el pensamiento del educando de manera positiva, enfatiza los asuntos y problemas ambientales locales y globales, al destacar el valor y respeto por la naturaleza promoviendo el desarrollo sustentable, procurando la toma de conciencia que destaque la importancia de respetar y conservar el bien común, en particular sobre la valoración de la biodiversidad vegetal y animal, los recursos naturales y en general el medio ambiente. Es una propuesta de apoyo al sistema educativo en su nivel básico para concienciar comportamientos de responsabilidad ética.

La educación ambiental es un elemento indispensable tanto para el crecimiento y desarrollo sustentable como para la toma de conciencia en una adecuada gestión ambiental que genere equidad para preservar el bien común y el patrimonio natural, para la presente generación y para las generaciones futuras.

Para construir el futuro hay que actuar hoy, de tal forma que se pueda apoyar un cambio de actitud de los educandos en favor del ambiente, por tal motivo el programa de interpretación que va más allá de las palabras, se traduce en acciones y actividades pedagógicas que divierten, comunican, sistematizan, transmiten, proyectan y evalúan los conocimientos útiles a la satisfacción de las necesidades sociales, para lo cual no es suficiente la simple aplicación de la experiencia cotidiana, por lo que la interpretación es una opción didáctica de educación ética, aplicable en nuestro entorno inmediato. Es fundamental tomar en consideración que México es un país con una gran diversidad biológica y cultural, lo que compromete y obliga a promover sociedades responsables que protejan y conserven dicho patrimonio, aportando alternativas didácticas de educación y se traduzcan en mejores condiciones de vida, pensando globalmente y actuando localmente.

La presente investigación con carácter multidisciplinario propone una visión distinta de enseñar educación ambiental a través de los sentidos como una técnica alternativa en el campo pedagógico que sensibilice la percepción en el educando su olfato, tacto, gusto, vista y oído, por medio de aromas, colores, formas y texturas



Izquierdo: El chaleco didáctico contiene elementos que muestran la diversidad de formas de hojas, tipos de semillas y aceites esenciales (Foto: Sergio Martín Barreiro Zamorano)

que facilitan el desarrollo de conciencia apoye al sistema educativo formal utilizando como herramienta el aula verde.

Materiales didáctico

Se empleó como herramienta el chaleco didáctico, el cual contiene elementos que muestran la diversidad de formas de hojas, tipos de semillas, aceites esenciales para que los estudiantes determinen aromas vegetales, el chaleco también contiene el monocular simulado (elaborado con el tubo de cartón del papel de baño común), el chaleco didáctico se utilizó en el programa de interpretación y se adaptó a las condiciones de la región con diferentes elementos naturales fabricados a partir de plantas como el juguete tradicional mexicano que muestra de manera clara y objetiva los materiales más representativos de la región. El chaleco didáctico se implementó en el Jardín Botánico del Instituto de Biología de la Universidad Nacional Autónoma de México desde los años noventas como una evolución de sus cajas didácticas (Linares, et al. 1994)

Los recursos adicionales y los materiales tradicionales utilizados en la interpretación como estrategia de enseñanza son herramientas que estimulan el papel cognoscitivo y constructivo del educando en su desempeño escolar, estos materiales didácticos ponen de manifiesto el saber tradicional y la diversidad Biológica

La bondad de vincular los espacios universitarios con el sistema educativo en su nivel básico, por medio de acciones de concienciación, diagnóstico, evaluación y seguimiento que promueva el razonamiento moral responsable y de respeto por la naturaleza, con actividades de tipo recreativo, didáctico e interactivo, como recurso pedagógico, que sensibiliza los sentidos en el educando.

Como resultado de la interpretación se mejoró el aprendizaje y se vieron incrementadas las potencialidades educativas, elevo el rendimiento en el alumno, ya que permitió el uso de mejores herramientas pedagógicas cognoscitivas para entender el mundo natural, la interpretación agudizó en el alumno sus sentidos, enfocando su visión observando con detenimiento la interacción entre plantas y animales, observando la diversidad vegetal de formas, aromas y colores, el alumno adquirió conocimiento, motivación y actitud favorable hacia el medio ambiente de manera significativa Con la interpretación ambiental los educandos mejoraron el conocimiento y la motivación, así como la toma de conciencia y el respeto por la naturaleza, a través de actividades

Izquierdo: Interpretación vinculada al programa estatal "Escuela Verde" (Foto: Sergio Martín Barreiro Zamorano)



Derecho: En el jardín botánico la interpretación es diversión (Photo: Sergio Martín Barreiro Zamorano)

donde el alumno desarrolló sus sentidos y capacidades, observando que con sus acciones puede mejorar el medio ambiente que le rodea en su casa, el barrio y la escuela, incorporando así la dimensión ambiental en su conocimiento, con mayor sentido de responsabilidad moral en su comportamiento.

Conclusiones

Se determinó de manera estadísticamente significativa que la interpretación es una herramienta pedagógica de comunicación que funcionó de manera coordinada con escuelas públicas y escuelas privadas, que en ambos casos mejoraron el aprovechamiento escolar, que motivaron en el educando la participación activa y tomaron acciones concretas de la dimensión ambiental en el ámbito local, reforzaron y fortalecieron el sentido de observación y análisis, y los concienció hacia el uso responsable de los recursos naturales, por medio del vínculo del Jardín Botánico como espacio para la interpretación del conocimiento natural y como centro de cultura ambiental como alternativa de apoyo al sistema de educación formal.

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Résumé

L'éducation à l'environnement, dans le cadre des classes vertes, est un programme didactique et pédagogique d'ordre cognitif destiné à l'enseignement non officiel, afin de compléter les programmes de l'éducation formelle. La méthodologie employée à cet effet se base sur l'interprétation au Jardin Botanique de l'Université Autonome de Puebla Benemérita, en lien avec le programme d'éducation à l'environnement de l'État et le programme des écoles vertes.

Suite aux activités d'interprétation, les chiffres ont montré une différence significative quant au niveau d'attention, plus élevé, porté par les étudiants qui y ont participé. En outre, cette animation a permis d'accroître leur motivation, et d'harmoniser les connaissances des groupes scolaires en matière environnementale. L'interprétation se réalise sous forme d'activités divertissantes, qui permettent de systématiser, de transmettre, de projeter et d'évaluer les informations utiles, ce qui stimule le processus de conscientisation chez les élèves.

Les conclusions que nous tirons de l'interprétation environnementale, par le biais des classes vertes, sont qu'il s'agit d'une technique pédagogique innovante en terme d'éducation non formelle à l'environnement qui permet de motiver et d'informer les élèves issus des écoles primaires publiques, privées ainsi que des centres d'enseignement spécial. Elle développe le sentiment de responsabilité éthique

chez l'étudiant, quant à l'importance de conserver et de respecter la diversité biologique et culturelle.

Summary

Environmental education in the Green Classroom provides students with an opportunity to learn in a non-formal education setting. The programme run at Puebla Botanic Garden is related to the State environmental education and green schools' programmes. Our aim is to support formal education using interpretative techniques.

We have found that the attention levels of students improve significantly following the use of interpretative techniques. We have also found that the use of interpretation increases student motivation and even environmental knowledge. Interpretation is carried out using entertaining activities that organise, convey, project and evaluate useful knowledge and stimulate students' awareness.

Our conclusion is that environmental interpretation used in the Green Classroom is an innovative educational technique, for non-formal environmental education situations. It generates motivation and encourages students in public and private primary schools, as well as special and multiple attention centres, to develop a sense of ethical responsibility and awareness towards conserving and respecting biological and cultural diversity.

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The Fairchild challenge: engaging teenagers, schools and communities

Summary The Fairchild Challenge is a competitive, multidisciplinary environmental education programme for teenagers, composing a series of dynamic activities and projects called Challenge options. These give teenagers opportunities to research, write, debate, create, perform, interview, imagine, speak out, design, build, conserve, and ultimately improve their botanical and environmental awareness, scholarship and stewardship.

The Fairchild Challenge is launched at the beginning of each school year, and ends with an awards ceremony in May where all schools surpassing the annual goal of points are presented with the Fairchild Challenge Award. The programme was initiated as a pilot in 2002 and the response by teachers and students has been heartening. From 1,400 high school students in its first year, the Fairchild Challenge now engages over 16,500 middle and high school students annually.



beauty and value of nature? What kind of programme would attract a diverse range of students with respect to interests, abilities, talents and backgrounds?

In order to address some of these issues, we designed and initiated the Fairchild Challenge programme to give teenagers opportunities to research, write, debate, create, perform, interview, imagine, speak out, design, build, conserve, and ultimately improve their botanical and environmental awareness, scholarship and stewardship.

"Thank you for giving our students open-ended educational opportunities, which inspire them to implement their talent and expand their knowledge"

Wafa Khalil,
MAST Academy teacher

Above: Karen Frey, Californian artist, working at Fairchild Tropical Botanic Garden with students involved in the art challenge option (Photo: Fairchild Tropical Botanic Garden)

Introduction

Fairchild Tropical Botanic Garden houses an impressive collection of tropical and subtropical plants and our programmes are designed to explore, explain and conserve these green treasures. At Fairchild, we measure success by the number of species saved and lives changed. Thus, we focus intently on conservation and education. Our conservation efforts occur locally, nationally and internationally and, for over 20 years, our school programmes have been engaging elementary school students in meaningful, hands-on, programmes and activities that stimulate these young learners at many levels.

History

As Fairchild's education programmes approached their 25th year, we identified a void in our audience of learners, namely, middle and high school students and their families, neighbours and communities. We then began asking the big picture questions: what appeals to students in the 11-18 age range? How can we engage teens and pre-teens in learning about things such as the importance of conservation, the role of wetlands, the value of renewable energy sources, the need to identify and control invasive species, the essential task of biodiversity monitoring, and all of the reasons why they might appreciate the

Right: A student discusses his solar cooker design with Dr Jack Fisher for the Fairchild Challenge research project option (Photo: Fairchild Tropical Botanic Garden)

"I learned to look at plants with a different perspective and to encourage others to do positive things for the environment"
**Miami Killian,
 Senior HS student**

Books like Richard Louv's *Last Child in the Woods*, *Saving our Children from Nature Deficit Disorder* (see resources section p31) reminds us that, in the words of Robin Moore, natural settings are essential for healthy childhood development because they stimulate all the senses and integrate informal play with formal learning (Louv, 2005, p 85-85).

The Fairchild Challenge programme

The Fairchild Challenge is a competitive, multidisciplinary environmental education programme for middle and high school students composed of a series of dynamic activities and projects called Challenge options. The programme was initiated as a pilot for high schools in 2002, and expanded, due to demand, to include middle schools in subsequent years. The response by teachers and students has been extremely heartening. From 1,400 high school students in its first year, the Fairchild Challenge now engages over 16,500 middle and high school students annually, and that number is likely to increase.

The programme runs annually and is composed of a series of multidisciplinary Challenge options. At the beginning of each school year,

teachers and students are given the year's specific Challenge options, requirements, point allocations, and deadlines.

Designed for students of diverse interests, abilities, talents, and backgrounds, this free annual competition offers separate but related Challenge options for middle and high schools, grades 6-8 and 9-12, respectively. Schools or students can choose to enter any number of the annual Challenge options. Best entries are sent to Fairchild to be evaluated and awarded points by panels of experts. The Fairchild Challenge is launched annually at the beginning of each school year, and ends with an Awards Ceremony in May.

All schools surpassing the annual goal of points are presented with the Fairchild Challenge Award at the Awards Ceremony. Additionally, top-scoring schools are awarded up to \$1,000 for their environmental programmes. Individual students and teachers also receive recognition, t-shirts, family passes to the garden, prizes and awards.

"I learned that any change in the environment no matter how miniscule can cause possible imbalance in the ecosystem and could even lead to the endangerment of certain species"
South Miami Senior HS student

The Fairchild Challenge options

The annual list of Fairchild Challenge competition options may include:

- create/restore/expand/interpret school gardens or natural habitats
- engage communities through environmental outreach
- investigate freshwater flow and quality
- write/perform original verse on environmental topics
- explore cultural uses of plants through intergenerational interviews
- create artwork inspired by tropical plants
- design and produce environmental skirts or public service announcements



- create Challenge t-shirt designs
- conduct field work during environmental Immersion Day
- link people and plants through photojournalism
- perform an outdoor theatre scene. Write to decision-makers on environmental issues
- describe plant/animal interactions.
- draw environmental cartoons
- exchange botanic information with students in other countries
- compare enviro-friendly/unfriendly products
- reduce/reuse/recycle at school or in your community
- write testimonials documenting a lifestyle change to better the environment
- produce research/opinion papers and projects.
- debate environmental issues and policies

Specific topics within the research and debate Challenge options may include: environmental justice, genetically-engineered plants, renewable resources, energy-efficient vehicles, native and invasive plants, Comprehensive Everglades Restoration Plan, sustainable development, comparison of local, national and global strategies, importance of wetlands, limited pesticide use, energy-efficient subsidised housing, alternative fuel sources, mass transit, the Kyoto Protocol, water conservation, solar cookers, native seed germination, climate change, LEED certified 'green' buildings, urban forestry, and ecotourism, to name a few.

The Fairchild Challenge, by design, seeks to foster interest in the environment by providing opportunities for teenagers to: appreciate the beauty and value of nature, develop critical thinking skills, understand the need for conservation and biodiversity, tap community resources, become actively-engaged citizens, and recognize that individuals make a difference.

Below: High school students put their points of view forward during a Fairchild Challenge debate competition (Photo: Fairchild Tropical Botanic Garden)





Clearly, the annual Challenge options are intended to **appeal** to students' sense of play and creativity, to **empower** them to seek information and voice opinions, and to **encourage** them to experiment with ideas, projects and skills.

During the last election year, one of the Challenge options asked students to write to elected officials, praising an environmental decision or expressing concern about one. More than 1,100 local students responded to that Challenge option and wrote letters, and many got responses. The Lifestyle Change Challenge option empowers students in different ways; some students time the length of siblings' showers, send us copies of water and electric bills, cultivate vegetable, butterfly and/or native plant gardens, badger (bother!) parents to trade their sports utility vehicles (SUVs) for hybrid cars, interview grocery stores, family members and neighbours about recycling practices, document parents' littering habits, and more. Other teens have participated in intergenerational interviews in English, Spanish and Haitian Creole with elders willing to share ethnobotanical stories with them; others exchanged botanical and environmental information with students in other countries. One student wrote that participating in the Fairchild Challenge made her feel important and needed. Last year's solar cookers were so impressive and effective that the best ones were sent to villagers in Haiti. At one high school,

teachers and administrators wrote about the profound connections established in the school's student body when regular classes teamed up with exceptional student classes to tackle the school garden Challenge option. Indeed, the ripple effect of this programme is far-reaching and difficult to describe or quantify.

"You are doing an important service for the community, showing everyone that science and nature are closely linked to everything else we do. I'm looking forward to another year of participation"
**Cathi Rivera, teacher,
 Glades Middle School**

Programme outcomes

Feedback from students, teachers, parents, donors, sponsors, evaluators, volunteers and others indicate that we are helping to build communities of learners who appreciate the beauty and value of nature. Indeed, the Fairchild Challenge is allowing us to:

1. Reach broad audiences of learners at the middle and/or high school level

In four short years, the programme is actively engaging over 16,500 teenagers with diverse interests, abilities, learning styles, and cultural backgrounds. An impressive 85% of

students stated that they would recommend the Challenge to other students. This feedback suggests that the diverse, interactive, open-ended and multi-sensory design of the programme appeals to students.

2. Promote civic-minded thinking on local and global issues

Many Challenge students are able to debate the social, economic, scientific and political aspects of a multitude of environmental issues and learn how to earn a voice in their communities. The programme challenges students to design and implement initiatives, and celebrates civic-minded young citizens who are working to improve their schools, homes, neighbourhoods and communities

3. Engage a wide variety of schools

The programme is designed to complement existing school curricula, and provide resources for schools to participate equitably. Teachers in large, small, public, private, and Title I schools (public schools where over 50% of students qualify for free or reduced lunch from the government) embrace the programme and enrol their schools annually. In addition, we work with the Miami-Dade County Public School supervisors

Left: A high school student helps restore a native habitat for the environmental immersion day challenge (Photo: Fairchild Tropical Botanic Garden)

Below: Middle school students visiting Fairchild's Chihuly exhibition of naturally inspired glass sculptures (Photo: Fairchild Tropical Botanic Garden)



Right: A high school student pointing to his artwork for this year's Challenge option 'The Art of Palms' (Photo: Fairchild Tropical Botanic Garden)



and specialists to identify and list all of the state educational standards addressed, in multiple disciplines, in the Fairchild Challenge programme. The language school administrators speak is curriculum standards. Therefore lists of these multidisciplinary standards serve as an important translator for the programme.

4. Influence pedagogy and promote interdisciplinary learning

Teachers and students repeatedly report that the open-ended learning opportunities often span the curriculum, forging connections among a broad cross-section of the school community. Interdisciplinary learning opens doors for what some call productive collisions, where learning is meaningful and sustained (Bransford, 2006). In addition, the multiple formats of the Challenge options appeal to different learning styles, interests and abilities. The net effect of the programme surpasses the individual projects as students and teachers work together across classrooms in cross-curricular projects with a real-world context that is meaningful to students.

5. Involve local organizations and institutions

Over 23 colleges, universities, nature centres, organisations, county offices, community centres, groups, etc. are involved at some level in the programme. Community involvement opportunities are numerous and inviting, and professionals from scientists to artists volunteer their time and talent

to work with Fairchild Challenge students and teachers. Their involvement ranges from hosting students during Environmental Immersion Day Challenge option and sitting on evaluation panels to serving on committees and celebrating the programme and its participants. These enthusiastic community volunteers allow Fairchild to offer specialty classes like our Art of Palms student workshop for over 250 students. Palm biologists and accomplished artists joined us to host students from each school who are attempting the Art of Palms Challenge option this year. Last year the art option focused on tropical fruit.

6. Include funders, sponsors, donors

Donors and potential donors have an interest in improving education and celebrating young people. They enjoy being a part of one or more of the many evaluation panels for the Challenge entries and events. Major donors are clearly affected by, and delighted with, first-hand knowledge of how engaged students are in the programme. The awards ceremonies are also very celebratory and inclusive.

7. Celebrate teenagers as gateways to communities

By nature, teenagers are bright, articulate, confident, assertive, fearless, and funny. But they are also confused, angry, shy, selfish, and narcissistic. Often, they are looking for something bigger than themselves to embrace, and, when their voices are heard, they feel

important and needed. The open-endedness of many of the Challenge options allows them to be creative and effective in asking and answering questions and solving problems. The celebratory nature of the programme, with built-in layers of success, promotes their sense of accomplishment and empowerment. In addition, student work and images are used frequently to showcase, celebrate and market the programme.

8. Promote the programme as a replicable model

Cities and towns nationally and internationally are seeking strategies to educate and engage their public. The Fairchild Challenge is proving to be a replicable model; more than 25 educators, representatives and others from cities across the country and as far as Canada, Costa Rica and Singapore, have participated in the first level of discussion and training required to replicate the Fairchild Challenge programme at their sites.

"So often teachers struggle to connect students with real life experiences in a vacuum but, through The Fairchild Challenge, we were able to bring the world to them in all its beauty and complexity. As an art teacher I would especially like to commend you on the magnificent interdisciplinary nature of the Challenge activities. They truly inspired creative thinking"

Art teacher

Ultimately, we think a programme like the Fairchild Challenge can help develop diverse populations of teenagers who are creative, civic-minded, critical thinkers. Teenagers are at an interesting time in their lives; many believe they can do anything, and they have passion, time and energy. The Fairchild Challenge sends a message to adolescents in transition to adulthood, namely: your opinion matters! And so we give them opportunities to research, build, debate, compose, perform, interview, advocate, persuade, create, dream, speak out, and, we hope, make a difference.

Conclusion

Fairchild Tropical Botanic Garden is committed to working with our community through our programmes, events, and volunteer opportunities. The Fairchild Challenge is proving to be an effective way to engage thousands of teens and pre-teens, and by extension, their schools, families, friends, neighbours and communities. We presented multidisciplinary opportunities for civic-minded engagement in environmental issues and were warmly and resoundingly welcomed.

As the Irish dramatist and poet William Butler Yeats (1865-1939) said: "Education is not the filling of a pail, but the lighting of a fire..." Here's to the millions of flames we will nurture if we can engage our communities in meaningful ways.

To learn more about the Fairchild Challenge: e-mail: challenge@fairchildgarden.org or log on: www.fairchildgarden.org

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"I learned that plants are extremely important to the survival of all living things"

McMillan MS student

Résumé

Le Défi de Fairchild est un programme compétitif multidisciplinaire d'éducation à l'environnement destiné aux adolescents. Il est composé d'une série d'activités et de projets dynamiques appelés options de défi. Ceux-ci donnent aux adolescents la possibilité de rechercher, de rédiger, de discuter, de créer, de mettre en scène, d'interviewer, d'imaginer, d'exprimer, de concevoir, de construire, de conserver pour finalement améliorer leurs connaissances et leur prise de conscience et de responsabilité en matières botanique et environnementale

Le Défi Fairchild est lancé au début de chaque année scolaire et se termine avec une cérémonie de remise de prix en mai, où toutes les écoles ayant atteint le score de points de l'année reçoivent le prix du Défi Fairchild. Le programme a été initié en tant que projet pilote en 2002 et la réaction des enseignants et des étudiants a été encourageante. La première année ils étaient 1.400 étudiants des classes supérieures, ils sont maintenant plus de 16.500 étudiants de lycées toutes classes confondues qui s'engagent dans le Défi Fairchild.

Resumen

El Reto Fairchild es un programa educativo multidisciplinario para adolescentes, se compone de una serie de actividades dinámicas y proyectos llamados 'retos opcionales'. En estos se da a los adolescentes la oportunidad de investigar, escribir, crear, actuar, entrevistar, imaginar, dar discursos, diseñar, construir, conservar y finalmente mejorar su conocimiento en botánica, medio ambiente, becas y responsabilidades.

El Reto Fairchild comenzó al inicio del año escolar, y termina con la ceremonia de premios en mayo, cuando todas las escuelas presentan la meta anual de puntos logrados y entonces se otorga el premio 'Reto Fairchild'.

El programa se inicio como piloto en 2002 y los maestros responsables han sido estimulados. Durante el primer año se comenzó con 1, 400 estudiantes de educación secundaria, a la fecha, cada año el Reto Fairchild atrae mas de 16,500 de estudiantes de escuelas secundarias y colegios.

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Left: Students display their LEED certified green building model for the Fairchild Challenge research project (Photo: Fairchild Tropical Botanic Garden)

Playing wild

Summary All children deserve opportunities to play in wild places, yet many of today's children do not have opportunities for free, unstructured play outdoors. Young children engage with nature through informal environmental play, hands-on activities and immersion in wild places. We aim to inspire and encourage families to explore wild places wherever they might be, introducing a wide range of fun ways to discover the natural world.

Botanic gardens provide magical oases of green – inspiring, accessible natural environments, and great places to play and have fun. Games and activities suitable for a botanic garden setting might include making elf houses, colour cards, natural fancy dress and natural collages.

Right: Children have used fallen leaves, seeds and cones to decorate the outline of a huge snake that winds its way through the woods. (Photo: Jo Schofield)

Introduction

Running through long grass, climbing among spreading tree branches, making dens in the bushes, mixing petal perfume or making the world's longest daisy chain – many of the most precious childhood memories are made up of outdoor experiences such as these. All children deserve opportunities to play in wild places – to have access to somewhere they can experience a sense of freedom, where they can become absorbed in exciting adventures, imaginary games and amazing discoveries, and grow up feeling comfortable with nature.



It might be lack of places to go, it might be fear of going into the woods or the park, it might be the irresistible indoor temptations of electronic gadgets and virtual worlds, or it might

be lack of time in a hectic scheduled lifestyle. Whatever the reasons, many of today's children do not have the opportunities for free, unstructured play outdoors that previous generations took for granted; they may have a greater awareness of global threats to the environment, but they probably have a very limited understanding

about what creatures live in the pond down the road, or what plants they might find in the park.

Our love of nature and desire to instil this in our own children inspired us to write *Nature's Playground*, (see resources section p31). We aim to inspire and encourage families to get outside to explore wild places wherever they might be - the back garden, a local park, open countryside, or perhaps a botanic garden. Informal environmental education introduces fun ways to explore the natural world. The most effective way to engage young children with nature is not necessarily through formal education programmes – they respond best to hands-on activities and immersion in wild places. By fostering and developing a child's innate

curiosity in nature, perhaps we can encourage them to grow up with a desire to look after the world; we don't just want them to learn *about* nature – we want them to learn *from* it.



Before doing this activity, prepare some colour cards from cardboard cut into small squares or rectangles; onto each piece of card stick a length of double-sided sticky tape. Provide each child with a card and remove the top layer from the tape to provide a sticky surface on which to stick tiny fragments of natural colour – they might collect fallen petals, seeds, leaves, flakes of bark or even soil or tiny stones. How many different colours and textures can they find? Can they make a picture or pattern? Can anyone find all the colours of the rainbow? How long will the colours last?

Left: Children are inspired by what they collect to produce 'natural' pictures and collages (Photo: Jo Schofield)

Below: A miniature world created at the base of a tree (Photo: Jo Schofield)



Natural fancy dress

Try weaving natural materials into imaginary games and adventures, perhaps some long leaves could become rabbit ears, forked twigs might become reindeer antlers or try transforming the children into birds with leafy wings. Or try creating something a little more ambitious by encouraging the children to collect natural materials from the ground, which can then be made into a leaf cape, a crown or a hat or some jewellery such as a necklace or a brooch. We celebrated autumn's colours one year by making hats and crowns; children of all ages joined in, creating all sorts of wonderful headwear by sticking leaves and seeds onto strips of cardboard covered in

Left: Many precious childhood memories are made up of experiences such as climbing among spreading tree branches (Photo: Jo Schofield)

Where do botanic gardens fit in?

Botanic gardens provide magical oases of green, often within urban areas – they are inspiring, accessible natural environments easily reached by large numbers of people who might otherwise find it difficult to get to the countryside. These safe but open spaces are not only wonderful places to learn about botany and ecology – but they are great places to play and have fun. Here children can run around, play hide and seek, use their senses to explore nature's diversity, and let their imaginations roam free.

Games and activities suitable for a botanic garden setting

Nature's Playground aims to introduce children to the natural world through a wide range of activities; whether they

have scientific or creative minds, whether they have lively imaginations or just like to run around and explore, we hope that each child will find something to suit them. Here are a few games and activities from *Nature's Playground* suitable for children and families to enjoy in a botanic garden.

Elf houses

It only takes a few tiny twigs, leaves and seeds, an inspirational setting and some imagination for children to start using natural materials to create miniature worlds. Perhaps they would like to create tiny houses or castles for elves, or a miniature table set for a fairy feast or a soft bed for a pixie to lie on. Stories of miniature people or worlds might be used to inspire this game, which encourages children to look at natural materials in new ways, using them to intricately construct little houses or forts, or whatever their imaginations demand.

Colour cards

The natural world bursts with colour in every nook and cranny – and encouraging children to look carefully and closely for fragments of colour opens their eyes to all sorts of other tiny details as well, such as a germinating seed, an ant collecting a piece of leaf, or a butterfly supping nectar from a flower.



Right: Exploring nature's diversity through hands-on activities – children exhibit the range of different colours and textures they can find. (Photo: Jo Schofield)

double-sided sticky tape. Some went on to thread seeds onto wool to make necklaces and made masks by sticking leaves over mask templates.

Natural Collages

Harcourt Arboretum, part of the University of Oxford Botanic Garden, is an inspirational place for children's games and activities; here we gathered sticks and made the outline of a huge snake winding through a woodland clearing. The children rushed off to collect fallen leaves, seed and cones, which they used to decorate the sections of the snake in intricate detail. One young boy and his dad decided to make their own picture, creating an elegant bird from cones, seeds, twigs and feathery conifer foliage.

Below: Mobiles made from materials, gathered from the forest floor, swinging in the wind (Photo: Jo Schofield)

Encourage children to collect fallen treasures and to create pictures and collages on the ground. They might want to use sticks to make a frame for filling with a picture, or they might want to make a pattern – let them be inspired by what they collect and by the garden around them.



Many children find it hard to leave their creations to the mercy of the elements, but try to record their handiwork by taking photographs.

For those who prefer to make something to take home, try making a mobile by hanging the collected treasures from a stick. A skewer or bradawl may be required to make holes in some of the seeds, which are then threaded onto wool or string.

For information about obtaining a copy of Nature's Playground please see resources section, page 31.

Résumé

Tous les enfants méritent d'avoir la possibilité de jouer dans des endroits sauvages, cependant un grand nombre d'enfants d'aujourd'hui n'ont pas l'occasion de jouer à l'extérieur librement et sans contraintes.

Les jeunes enfants se lient à la nature par des jeux environnementaux informels, des activités 'à toucher' et l'immersion dans des endroits sauvages. Notre livre '4 saisons d'activités nature en famille' voudrait inspirer et encourager les familles à explorer les endroits sauvages où qu'ils se trouvent, en proposant un large éventail de façons amusantes de découvrir la nature.

Les jardins botaniques offrent des oasis vertes magiques – des environnements naturels accessibles, inspirants et des endroits magnifiques pour jouer et s'amuser. Les jeux et activités qui conviendraient pour un

jardin botanique pourraient inclure la confection de maisons d'elfes, des cartes de couleur, des déguisements et des collages à base d'éléments naturels.

Resumen

Todos los niños merecen la oportunidad para jugar en lugares silvestres y naturales, a pesar de esto, no se les da esta oportunidad ya que no la tienen la libertad de jugar fuera de casa. Los niños pequeños se atraen a la naturaleza a través de actividades manuales y se absorben con los lugares silvestres.

Nuestro libro Juegos de la naturaleza tiene como meta inspirar y animar familias a explorar estos lugares silvestres dondequiera que estos se encuentren presentando un amplio rango de manera entretenida de como descubrir ese espacio silvestre y natural. Los jardines botánicos proporcionan oasis que inspiran, son el acceso mas fácil al medio ambiente natural, en pocas palabras son lugares extraordinarios para jugar y divertirse. Entre los juegos y actividades adecuadas se pueden incluir el hacer casas, tarjetas con colores, fiestas de disfraces y colages naturales.

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Night Safari

The phenomenon of the

Summary Most tropical mammals are nocturnal, unlike most birds, which are primarily diurnal. This fact has frustrated zoo directors and curators for years as many of their good-looking exhibit species like tigers and leopards spend their days asleep when the public are visiting. At the Singapore Zoological Gardens, we conceived the concept of a night safari, where guests would be allowed into a park at night to view nocturnal animals under artificial lighting, when they are most active. It was themed on a visit to a national park, being set in a lush tropical rainforest.

Design and construction took three years and the Night Safari, Singapore opened in 1994. It was developed on 40 hectares of forested and undulating land. It commenced with 1,000 specimens from 100 species of animals from Asia, Africa and South America. Such animals as the Asian elephant and the greater one horned rhinoceros were given four hectare exhibits in which to roam. Spacious areas were developed for tigers, lions, Nile hippopotamus, striped and spotted hyaena, sloth bear, leopard, giant anteaters and herds of deer & antelope.

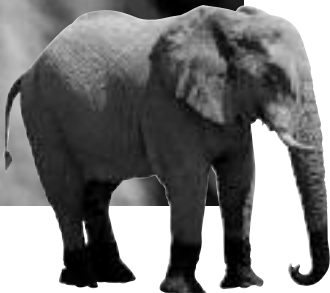
The Night Safari Singapore exceeded our expectations completely. Whereas we had been expecting to receive 180,000 visitors in the first year, we actually received 760,000. The highest visitor attendance in a year was 950,000.

Nocturnal houses

Most tropical mammals, with the exception of primates, are nocturnal, unlike most birds, which are primarily diurnal. This fact has frustrated zoo directors and curators for years as many of their good-looking exhibit species like tigers and leopards spend their days asleep when the public are visiting. Ernest Walker of the National Zoological Park in Washington, D.C. USA first started experiments with reverse lighting in the early 1940's. These experiments were imitated and improved at the Brookfield Zoo, Chicago, USA and at Chester Zoo,

Great Britain. Dr. Richard Clarke developed the first example of a nocturnal house at the Bristol Zoo Gardens, with reverse lighting in 1953. The phenomenon was soon reproduced in zoos all over the world.

The concept of reverse lighting *convinces* the nocturnal animal to change its circadian rhythm to be active during the day because it *believes* it is actually night. To achieve this illusion the differential between day and night lighting must be convincing. For instance in Singapore the lighting level at midday is 100,000 lux while a full moon is hardly 1 lux.



Thus, the biggest snag with nocturnal houses is that they cannot display large mammals, because of the amount of covered and illuminated space one would have to provide them while trying to simulate daylight.

Why did we set up the Night Safari?

I was the Executive Director of the Singapore Zoological Gardens from 1980 to 2003. Singapore is an island republic one degree north of the equator, where the difference between sunset times at the summer and winter solstice is barely 20 minutes. Thus, we are blessed with balmy evenings and although we receive 2,000mm of rain each year, most of it falls in the afternoon, leaving the evening dry.

One day in 1988, I received a call from our landlord - the Public Utilities Department - asking me what we intended to do with the yet undeveloped 60 hectares of undulating and forested land we had on long-term lease. My Executive Chairman, Dr Ong Swee Law, fearing they may want to take it back, set up a series of lunch meetings with captains of industry to generate ideas as to its use. Golf courses, fruit plantations, recreational facilities, a large day safari were suggested. Finally, it was our Sri Lankan zoo consultant, Lyn de Alwis,

who conceived the concept of a night safari, where guests would be allowed into a park at night to view nocturnal animals under artificial lighting, when they are most active. It was themed on a visit to a national park, being set in a lush tropical rainforest which fringed a huge body of fresh water – the Upper Seletar Reservoir.

It was a totally radical idea - a paradigm shift - the old paradigm was that zoos open from 9am to 5pm. This was a zoo which opened at 7.30pm, when already dark, and closed at midnight. Directors of temperate zoos may have thought about developing such a project, but in summer when it is warm in the evening it does not get dark until 10pm and in winter when it gets dark at 4.30pm, it is too cold for all but the hardiest animals to be out.

Financing

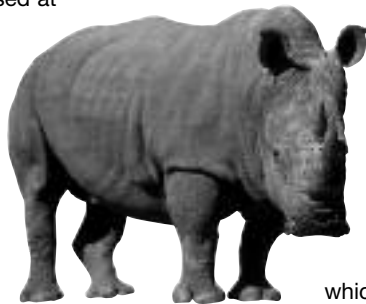
To make an idea *fly* (work) - timing is extremely important. It is not sufficient just to have a great idea. You also need to have other important people who like the idea, believe in it and are willing to finance it. The one single reason why so many great ideas around the world do not fly is insufficient financing. In the case of the Night Safari, we had the great idea, we believed in it, everyone who read the project proposal loved the idea and Singapore had just set up a S\$1 billion (US\$0.6 billion) fund for tourism development. Despite all this, it took the Singapore Government two years to approve the project funding which eventually amounted to S\$65 million. The reason for the rumination? The idea was untried and untested. Singapore is a risk adverse place!

Actually, although all of us involved with the Night Safari's conception believed in the idea, we had absolutely no idea how popular it would be. We estimated visitor attendance based on the Zoo's daytime figures of 1.2 to 1.5 million annually. Pannell Kerr Forster, marketing and financial specialists, whom we engaged to undertake a feasibility study concluded that we would receive 180,000 visitors in the

first year, which would level off to 40,000 to 52,000 per annum. Our political masters were more skeptical – some could not believe that Singaporeans would leave the comfort of their homes and televisions to visit a forest lit up at night!

The product

Design and construction took 3 years and the Night Safari opened in 1994. It was developed on 40 hectares of forested and undulating land. Initially it was called the Asian Night Safari, focusing on Asian species as a marketing and branding strategy. Later the scope was changed to the Night Safari, which opened up the range of species that



could be displayed. It commenced with 1,000 specimens from 100 species of animals from Asia, Africa and South America. Such animals as the Asian elephant and the greater one horned rhinoceros were given four hectare exhibits in which to roam. Spacious areas were developed for tigers, lions, Nile hippopotamus, striped and spotted hyaena, sloth bear, leopard, giant anteaters and herds of deer and antelope. It was radically different from a nocturnal house and our zoo colleagues from Europe and the USA were fascinated.

Many visitors come for dinner at the restaurants before or after a trip around the Night Safari. A tram takes visitors around the 3.5km route through selected 'national parks' in Asia, Africa and South America. There is a live commentator onboard and one stop, the East Lodge, at which the guests can alight and walk the 30 minutes 'Leopard Trail' and return to catch the tram again. The are other walking trails the guest can take, one dedicated to viewing a patch of five hectares of primary rain forest. Through advanced booking, groups can take the Gourmet Express, modelled on the Orient Express, a full diner served on a modified tram, with waiter service and a chef on board.

Lighting

Lighting was probably the single most debated and hotly argued topic. We hired Simon Corder, an English theatre lighting designer who specialized in outdoor theatre - *son et lumière*. He eventually convinced us that there should be two primary lighting principles and both were based on copying nature. The first was that light sources should come from above and shine down - as does the moon at night. Thus, this excluded debates about using up-lighting and search lighting, etc. The only exception to this ruler was in the Forest Giants Trail, where we found it more appropriate to up-light tall primary rain forest trees. The second lighting principle was that the colour temperature of the light should be the same as the moon (and sun) which is about 5000K°. This is a rather *flat white* light. Many people think of moonlight as being blue.

There was also debate on the distance at which animals can be viewed at night, whether there should be lots of light sources or fewer but larger light sources (such as football stadium lighting wash) and the intensity of the lights. After trials, it was established that the depth of the exhibits should not be greater than 50m and 30m is ideal. It was also agreed that there would be many smaller light sources allowing more lightscaping flexibility and the creation of a sense of theatrical drama. They were mounted on climbable poles ranging from eight to 12m in height. The second debate on light intensity was finally resolved: the lighting levels would be between 30 to 100 lux, sufficient to see the colour of the animals but still suitably subtle.

At earlier trials, we had established the benchmark of 30-60 lux for the general habitat wash lighting and 100 lux for hotspots where we wished to highlight such important areas as drinking holes, salt licks and favorite resting and feeding spots where we hoped the animals would frequent and be visible. Barriers such as walls, moats and fences were not illuminated, thus overall made invisible. However, the areas closer to these invisible barriers are also in darkness, hence animals can easily remain hidden if they wish.

To demonstrate how subjective such aspects of lighting are I will quote you one example. My Executive Chairman, Dr Ong Swee Law often came up at night to review lighting trials on prototype exhibits. When we were developing the fishing cat exhibit, he would come up each evening and complain that the lights were not bright enough, accuse us of being arty-farty and not considering the man in the street who wants to see animals and not artistic productions! We kept upping the lux level. Then one evening he came up and asked us why we had made the lighting levels so high! We were amazed and told him that this was the intensity he had ordered a few nights back. We found out later that he had just gone for a cataract operation and now had clear vision!

The success of the project

The Night Safari exceeded our expectations completely. Whereas we had been expecting to receive 180,000 visitors in the first year, we actually received 760,000! This took us completely by surprise and jammed our total operations. We just could not cope with this kind of crowd. On Saturday nights, we were getting 7,000 people. Our tram capacity was 3,500 seats a night and even this was an absolute figure based on opening from 7.30pm to midnight and running all trams non-stop. The problem is that visitors all arrived between 7.30pm to 9.00pm and wanted to get on a tram. We quickly ordered more trams and speeded up our leisurely tram ride around the park to be able to do a journey in 45 minutes. We eventually developed a capacity to handle 6,000 visitors in one night. The highest annual visitor attendance we have ever recorded is 950,000 which was in the third year of operation.

Market research

After several years of operations, we commissioned an extensive market research study to analyze our market size, potential and existing market segments. To our total surprise, the results differentiated the market into two broad camps. The first was what we refer to as the Caucasians (USA, Europe, Australia & Japan) and the second –the Asians (China, Taiwan and

so on). When asked what they thought of the Night Safari in exit surveys, the Caucasians said they loved the mystical ambience, the closeness of the animals and felt that the lighting was subtle and magical. The Asian segment said they found the experience too dark, there were not enough animals to see and there were too many mosquitoes! Initially I thought we were assessing two completely different products!

Besides the Night Safari in Singapore I have also been involved in planning the second Night Safari in Guang Zhou, China, the third in Chiang Mai, Thailand and the fourth at Greater Noida, New Delhi, India. So watch out there may be a Night Safari opening in a city close to you!

Résumé

La plupart des mammifères tropicaux sont nocturne, contrairement aux oiseaux qui sont principalement diurnes. Pendant des années, ceci a posé problème aux directeurs de zoos et conservateurs, puisque les espèces les plus spectaculaires, comme le tigre ou le léopard, passent leurs journées à dormir, pendant les heures de visites. Au Jardin Zoologique de Singapour, nous avons imaginé le concept de safari nocturne, où les visiteurs sont accueillis dans le parc la nuit pour voir les animaux nocturnes sous une lumière artificielle, alors qu'ils sont le plus actif. Le thème était une visite dans un parc national dans un décor de forêt tropicale luxuriante. Conçu et réalisé en trois ans, le Safari Nocturne de Singapour a ouvert en 1994. Il a été développé sur 40 ha de terrain boisé et vallonné. Il a commencé avec 1000 spécimens de 100 espèces animales d'Asie, d'Afrique et d'Amérique du Sud. Des animaux tels que l'éléphant d'Asie ou le rhinocéros indien ont été placés dans des enclos avec 4 ha pour se déplacer. Le safari nocturne de Singapour a totalement répondu à nos attentes.



Nous pensions accueillir 180 000 visiteurs la première année et nous en avons en fait reçu 760 000. Le record a été 950 000 visiteurs en une année.

Resumen

La mayoría de los mamíferos tropicales son nocturnos, a diferencia de la mayoría de los pájaros que son principalmente diurnos. Este hecho ha frustrado directores y curadores de zoológicos por muchos años debido a que sus hermosas especies en exhibición como los tigres y los leopardos se pasan el día durmiendo cuando el público los visita. En el Jardín Zoológico de Singapur, nosotros concebimos el concepto de safari nocturno, donde los invitados serían permitidos a entrar en un parque en la noche para ver los animales nocturnos en iluminación artificial, cuando ellos están más activos. El tema fue en referencia a una visita al parque nacional, establecido en un bosque tropical lluvioso.

El diseño y construcción tomó 3 años y el Safari Nocturno abrió en 1994. Fue desarrollado en 40 hectáreas de tierra forestada y ondulante. Comenzó con 1000 individuos de 100 especies de animales de Asia, África y América del Sur. Animales como el elefante asiático y el más grande de los rinocerontes con unicornados se colocaron en un exhibidor de 4 hectáreas para correr. El safari nocturno sobrepasó completamente nuestras expectativas. Mientras que esperábamos recibir 180,000 visitantes en el primer año, recibimos 760,000. La asistencia de visitantes en este año fue de 950,000.

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Technology for learning friend or foe?

Dear Marisa,

In case you picture me as a typical male with a love of technological toys, my original view on the use of technology in environmental education and in botanic gardens was in fact anti-technology. My own conversion to the use of technology is based firmly on the rule that I only ever use it if it is in an authentic context and not being used just because the budget is big enough or a grant is available to shower technological gizmos on a particular programme. So what is authentic use of technology in botanic garden education?

I believe that in our busy, often impersonalised lives, a botanic garden is a place of refuge as well as study. A garden liberally sprinkled with signs can conflict with this need to appreciate the plants and their setting. The search for the 'wow factor' or the big education message can sometimes



Summary We live in a technological age with devices on offer ranging from handheld computers and MP3's to digital cameras, high definition televisions and mobile phones with internet access.

All the information you ever needed is available at the touch of a button.

However, with our desire to instil a love of nature and educate the public about the need to live more sustainably, we need to consider whether botanic gardens should embrace technology. Do we see ourselves as offering a haven from the outside world or should we use technology to our advantage? What do you think? We invited two BGCI members with differing views to discuss this controversial subject. Their correspondence makes interesting reading and, we hope, will stimulate your thinking.

and wonder, to nurture an environmental memory that will motivate us in our every day actions.

override the more subtle need to create that space within us to develop awe

So, for example, the use of hand held computers and mobile phones can provide a situation where much of the clutter can be removed from gardens, freeing individuals and study groups to make their own choices as to how they wish to engage with the resources available to them.

At the National Botanic Garden of Wales we are investigating the use of hand held computers (PDA's) for use in our Mediterranean Great Glasshouse. The PDA can detect where in the glasshouse a person is and display information about the plant in front of them. The user decides the level of communication they want, which language, Welsh or English, which is invaluable in our bilingual society. Each plant description may also offer pictures, background information even digital film archive of its location in its natural setting. Any relevant or interesting data can be stored by the user and e-mailed back to their home computer before they leave the garden.



Our human history shouldn't be lost but remembered: all the stages which we went through in order to create civilisations and culture. We have a history of attachment to the world of plants, their symbolic, aesthetic and religious appeal, which is still buried in our consciousness. St. Gregory of Lissa, one of the Church Fathers said "Concepts are idols, only wonder is an instrument of knowing" Wonder is emotion. Should we ignore the perception of a reality of things that talk directly to our senses, and substitute it with theories which suffocate the innocence of the first encounter?

We live in a time of mass communication. Television and the internet broadcast ready-made concepts to everybody - ignorant and educators alike. If the explanation of a plant is superimposed on the plant itself, its magic retreats into a fog of abstractions. To go back to reality, to the first heart beat which tells us what is beautiful, is testimony to what we seek. Before embarking on the path to knowledge, we must stroll about in a garden without care and direction into a garden, as we did on that beautiful afternoon in a decrepit seventeenth century park in Provence.

*Marisa Cohen
Assisi Nature Council*

Dear Marisa,

I find myself in total agreement with your eloquent response, which is why I continue, undaunted, to espouse the role of 'appropriate' use of information technology. As you rightly point out, we live in a technological world, I see technology as merely a manifestation of our human desire to explore and inform. We cannot escape the reality of the present, but we must also acknowledge the essential human need to experience nature through emotional, spiritual and physical contact.

So, I refer back to my first example of the use of hand held PDA's. In the future, use of this technology will liberate gardens from interpretation clutter, allowing the visitor to have the personal and emotional experiences you describe. At the point when the

Wise use of technology opens so many doors to learning. I haven't had time to mention the role of interactive white boards, video conferencing and more. I'll save that until next time and await your reply with eagerness.

Kind regards, Trevor
National Botanic Garden of Wales

Dear Trevor

We were walking through a park just outside Aix-en-Provence in France, a historic landmark, in a state of romantic abandonment. The sun was shining on balustrades of stone with totemic lions, vestiges of an aristocratic era and the water basin, obviously the focal point of the whole enterprise was, alas, drained.

This wasn't everyone's idea of a botanic garden, there were no choices of plants with scientific labels nor guides, well-instructed in the art of communication.

My friend and I were there just enjoying the charm of this place. Still our 'professional' outlook, prompted us to ask the question "Why have botanic gardens at all, if we can so much enjoy visiting these places devoid of any scientific interest?" We discussed the matter, my friend taking the side of the scientific/technological approach and eschewing the element of pure enjoyment. "Bah", I said. "Where is the dichotomy between scientific approach and enjoyment? There should be none."

Botanic gardens today employ sophisticated communication skills, based mainly on web designs and interrelated information, and obsessive relevance to categories and hierarchical techniques. They have a necessary function because they impart knowledge and excite interest. They also awaken that part of the brain concerned with dexterity which is crucial in today's complex world of competition. However is this, the whole story?

Left: Back to basics: technology free teaching (Photo: Sarah Kneebone)

Left: Visitor's attention is attracted by character's voices and first hand narrative used in audio guides at the Morro Bay State Park Museum of Natural History in California (Photo: Sarah Kneebone)



learner is going to need to engage with a habitat or plant collection at a scientific or analytical level, information communication technology, in the form of hand held computers (PDA's) could come into their own. Even for poetic expression I subscribe to the view that - "if you don't know it, you can't say it!" How else would Wordsworth have conveyed his vision of a host of yellow flowers beneath the trees without the identification of the daffodils? It is at this point of needing to know, that the technology can be used to make information available.

An education visit to a botanic garden offers a special opportunity for an individual to experience the world of living plants. In our case, at the National Botanic Garden of Wales, groups can spend between one or two hours travelling from urban areas to get to us. It is part of my job to ensure that the learners are able to spend as much time as they can in the garden in contact with plants. It would be self

defeating if too much time was spent on didactic introductions, prolonged spells of filling in worksheets or, indeed, rushing the end of a visit in an attempt to collate information. So, I am now making increasing use of the interactive white board at the beginning of a visit to help focus the visiting learners on a topic or activity as quickly as possible. Here technology is being used to save valuable time. During the visit some activities require data to be recorded. Once again, this can be done on the interactive whiteboard as a collaborative exercise. This data can be captured on the computer and e-mailed back to the school for follow up work - arriving back in school before the learners have left the Garden!

I would advocate that botanic educators have to understand what information communication technology has to offer and to be able to skilfully evaluate its authentic use. I hope I have begun to show you that, just as

we understand the power of experiential learning and the value of living plant collections, technology can be a worthy servant and not the master of the learning process.

Trevor

Hello Trevor,

Your latest message knocked me off my righteous chair.

But I have some cards up my sleeve. I never denied the usefulness of information technology - all Western society is based on it. From the moment we became addicted to it, how could we live otherwise? Likewise, how could we live without fridges, cars, air travel, etc. (by the way, I live very well without a car, air conditioning, and I still can't use the dishwasher...)

The point is:

What is the purpose of education in a Botanic Garden? Is it to inform the visitors through the appreciation of a living plant collection, a task better served by technology? Or is it to experience the world of plants, their relation to one another, in a wider context of nature conservation? A more physical and active and participatory approach is suitable, in this case. There's no reason why both approaches shouldn't be used together. With a proviso: When using any NEW computer technology, a warning of danger against all the side effects that could arise from prolonged use, should be printed on the tool, as is done on cigarette packages. Why?

Has not every adult watched a young boy sitting in a car/train ignoring the stunning landscape outside, with eyes glued on his Playstation? Have you noticed that children go gaga when confronted with a screen that reproduces a natural something, as opposed to a 'real' natural phenomenon?

The much admired Ivan Illich, (1926 - 2002), who rose to fame in the 1970s with a critique of industrial technological development, deplored the tendency of modern industrial societies to organise themselves

around the possession of material objects, including learning tools, as a form of acquisition, rather than using it as facilitating the acquisition of knowledge. Against the 'Computer-Managed Society', he foresaw that all technologies have inevitably built in consequences that, once let loose, become separate from human dictates and desires. It is time to stop for a moment and reflect if we are at the point of being enslaved by our tools.

Coming back to the purpose of this discussion, certainly humanity has always used technology; even the pencil with which we draw a flower, say, is a technological tool. But it is the continuation of the hand, a more primitive and more attuned to our bodily sensitivity. The computer tends to substitute the function of the human brain with the rules of the machine. It is indeed a revolutionary step which affects intellectual work as the Industrial Revolution altered the physical nature of work. Do I sound like an enemy of progress, an unreconstructed, mystically oriented, sandal wearing Luddite? A propos, Luddites were right about the car, though for different reasons. If we look at the way auto transportation has changed our civilization, the way it has stretched our towns to the point of eliminating the social centre and destroyed our countryside, the paradoxical stand still of traffic jams, the pollution it engenders, the energy waste, the cultural and environmental damage. Were they not prophetic?

To summarise, yes, websites, interactive white boards, computer programmes, interpretation via mobiles, etc all have a useful function, so long as we do not forget to cultivate our natural skills.

Now arithmetic is done on a calculator. Motorcars are always preferred to walking or bicycling. In need of some exercise? Do it on a machine, indoors. In the case of visiting botanic gardens, I suggest re-activating complementary activities such as drawing. After all, Leonardo Da Vinci studied in depth everything he was drawing, but he loved every blade of grass; Linneaus the botanic genius when he wrote his famous eloquent demonstration for the existence of sexual apparatus in plants,

used a lyrical style which starts with "...Yes, love comes even to the plants ...". Meanwhile, Hopkins or Keats were scientifically unaware, but that didn't deter them from observing nature and inspiring subsequent generations. And because you brought in, at your peril, Wordsworth, he has something more to say on the approach, without tools, to nature "...we are out of tune: it moves us not- Great God ! I'd rather be a Pagan ..."

Does a PDA puts us in tune? Does it move us?

Yours, Marisa

Dear Marisa,

This is my final, brief, response in our fascinating exchange of thoughts on the use of ICT in botanic gardens. My feeling at this moment is that, with each exchange, our views are converging, and given time we would be occupying common ground on paper as we probably do in our minds and hearts.

I would never argue that technology should be a replacement for authentic environmental experiences. Indeed, I would keep young children as far away from technology as possible when providing them with what could be termed early environmental experiences. Nothing should be put in the way of young people exploring their relationship with the natural world, secondary information will never suffice. We can no longer expect children to be communing with nature in their free play time as I did when I was a child and we must therefore allow the time for this to happen during planned educational visits. I know when this is working when a child sends us a thank you letter saying that it's been the best trip they've ever been on.

I do still contend that when the learner needs to explore the world in which they live in more detail, technology can be of benefit, if used in a thoughtful manner. Botanic gardens have plant collections from all over the world. It is sometimes difficult to relate a group of plants to real global issues. Technology such as the PDA, e-mails and video conferencing can take us to places

where we cannot go, in a quest to understand global issues. A work card may inform me that deforestation has led to soil erosion and subsequent famine in a farming community in Kenya, but it can be a much more powerful tool to be able to communicate with contemporaries in such places and to explore together how the world might be managed more beneficially in the future. Once again, I am looking at how technology is used to extend learning in the context of a progression of environmental experiences from the intensely personal through to a more holistic appreciation of how the world works or disfunctions.

Are we two now in harmony?

Regards, Trevor

Dear Trevor

As the curtains falls on the final scene of a friendly match, we have no winners and no losers. Oh, if only all human disagreements followed such rational discourse and reached such a happy conclusion.

We set out to consider the pros and cons of two differing approaches to the subject; one taking advantage of technological aids to the acquisition of knowledge, the other based upon an updated version of old fashioned perceptions and hands-on methods of subjective experiences.

Both ways are appropriate, according to circumstances and with regard to differences of scope and taking into account the subjective experience of the observers. There is still much to say about the differences between the two methodologies and the benefits that they can offer to children and adults alike. Moreover, we did not begin at the very start of the educational process, which could have better explained the issues involved.

We never explored, for example, the biological relationship between the small child and nature; the first encounters that the child experiences and the later severance of that connection through socialisation, culture and formal education. This of course leads to an exhibition of familiar

Right: Biographies of artists, inventors and scientists demonstrate that a love of nature comes from having direct contact with nature as a child (Photo: Colombian Botanic Garden network)



behaviours in young people, such as a fear of spiders, disgust for earth worms, an insensibility to nature's colours and sounds, a preference for shopping malls and the allure of virtual reality.

Biographies of artists, inventors and scientists prove that the author's interest in nature is strongest when, as a child, they have once enjoyed direct and frequent contact with nature. Moreover, the naturalists of earlier centuries who observed plants and animals, were sometimes amateur scientists, moved by sympathy for the 'otherness' of the natural world. They did not have technological techniques, nevertheless they achieved important results, as a derivative of some form of general philosophical enquiry. Taking a cue from Aldo Leopold, we learn that the importance of the natural world is an ethical as well as a scientific matter, and maybe technology is not responding to that side of education.

All these considerations would be material enough for a book, and not just a simple exchange between two practitioners of education, concerned about the best way to bring out the naturalist in each of us.

*Thank you Trevor, and cheers
Yours, Marisa*

Resumen

Vivimos en la era tecnológica con instrumentos que van desde computadoras y MP3's, cámaras digitales, televisiones sofisticadas y teléfonos celulares con acceso a internet. Toda la información que necesitamos esta a la mano con solo oprimir un botón.

Sin embargo, nuestro deseo aun radica en el amor a la naturaleza y como educar al publico de esta necesidad de manera mas sostenible, así que tenemos que considerar que los jardines botánicos necesitan hacer una coalición con la tecnología. ¿Que visión podemos tener de nosotros usando la tecnología disponible como aliado? ¿Que pensamientos tenemos al respecto? Hemos invitado a dos miembros de BGCI con puntos de vista diferentes para discutir este controversial tema. Su correspondencia es interesante de leer y esperamos estimule sus puntos de vista en cuanto este tema.

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Résumé

Nous vivons à une époque technologique qui nous offre toutes sortes d'appareils, depuis l'ordinateur de poche et les MP3, jusqu'aux caméras digitales, les téléviseurs à haute définition et les téléphones portables à accès internet. Toute l'information dont vous avez jamais eu besoin est disponible en appuyant sur une touche.

Cependant, considérant notre désir d'inculquer un amour de la nature et d'éduquer le public sur la nécessité de vivre de façon plus durable, nous devons nous poser la question de savoir si les jardins botaniques doivent utiliser la technologie. Est-ce que nous nous voyons comme un refuge du monde extérieur ou est-ce que nous devrions utiliser la technologie à notre avantage ? Qu'en pensez-vous ? Nous avons invité deux membres de BGCI avec des vues différentes à discuter de ce sujet controversé. Leur correspondance fournit une lecture intéressante et, nous l'espérons, stimulera vos réflexions.

Resources

Resources

Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder

In his thought-provoking book, journalist Richard Louv highlights the gulf between children and the outdoors, linking the absence of nature to some of the most disturbing childhood trends, such as the rises in obesity, attention disorders, and depression. Louv uses the term Nature-deficit disorder to describe the human costs of alienation from nature. This is the first book to bring together a new and growing body of research indicating that direct exposure to nature is essential for healthy childhood development and for the physical and emotional health of children and adults. More than just raising an alarm, Louv offers practical solutions and simple ways to heal the broken bond. This is a powerful book that has significant implications for botanic gardens, particularly those located in urban environments.

Richard Louv, 2006
Algonquin Books of Chapel Hill, USA,
334 pp. ISBN: 978-1-56512-522-3
A division of Workman Publishing, 708
Broadway, New York, NY 10003.
www.algonquin.com

Nature's Playground: Activities, crafts and games to encourage children to get outdoors

This delightful illustrated book is a guide to introducing children to the great outdoors through fun activities in

Disponible

Dernier enfant dans les bois : sauvons nos enfants des troubles du déficit de la nature

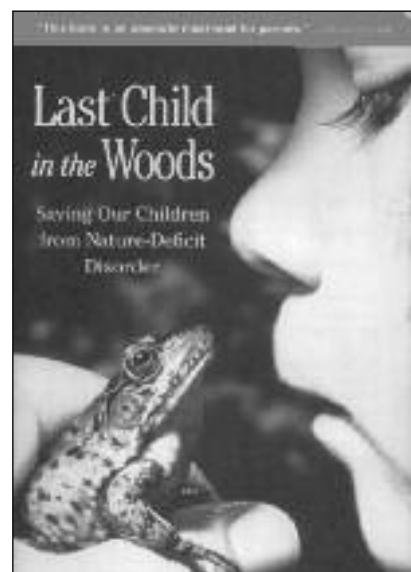
Dans ce livre qui incite à la réflexion, le journaliste Richard Louv met en lumière l'abîme qui existe entre les enfants et les activités de plein air, associant l'absence de nature à quelques-unes des plus inquiétantes tendances actuelles de l'enfance, telles que l'augmentation de l'obésité, des troubles de l'attention et de la dépression. Louv utilise le terme de *troubles du déficit de la nature* pour décrire les coûts humains de la désaffection de la nature. C'est le premier livre qui traite de ce nouveau secteur de recherche en pleine expansion, indiquant que l'exposition directe à la nature est essentielle pour qu'une enfance se développe sainement et pour une bonne santé physique et émotionnelle des enfants et des adultes. Cet ouvrage ne se contente pas de tirer la sonnette d'alarme, Louv y présente également des solutions pratiques et des moyens simples pour retisser les liens rompus. C'est un ouvrage efficace qui a des implications importantes pour les jardins botaniques, particulièrement pour ceux qui sont situés en zone urbaine.

Richard Louv, 2006
Algonquin Books of Chapel Hill, USA,
334 pp.
ISBN: 978-1-56512-522-3
A division of Workman Publishing, 708
Broadway, New York, NY 10003.
www.algonquin.com

Recursos

El último niño en los bosques: Salvando nuestros niños del desorden por deficiencia de la naturaleza

En su libro provocante del pensamiento; el periodista Richard Louv resalta el océano que existe entre los niños y el exterior, ligando la ausencia de la naturaleza a algunas de las más perturbantes tendencias de la niñez, tales como el incremento en obesidad, desordenes por falta de atención y depresión. Louv usa el término *Desorden por falta de contacto con la naturaleza* para describir los costos humanos de falta de relación con la naturaleza. Este es el primer libro que conjunta un nuevo y creciente cuerpo de investigación indicando que



nature. Designed for use by families, carers, play workers and teachers, the book sets out guidelines for safe and engaging play outdoors, with useful tips on how to hold children's attention on longer excursions. The book is divided into seasons, with activities appropriate to each. For example, in spring, children can explore aquatic life in ponds and streams, collect material to make birds' nests or look out for growing bulbs; in autumn they can collect berries or make collages with fallen leaves. Throughout the book, the emphasis is on helping children gain an appreciation of nature's patterns, giving them confidence in the outdoor environment in a way that is educational, safe and, above all, fun.

*Fiona Danks and Jo Schofield, 2005
Frances Lincoln, London, UK, 160pp
ISBN: 0-7112-2491-9
Frances Lincoln Ltd, 4 Torriano Mews,
Torriano Avenue, London NW5 2RZ,
UK.
www.franceslincoln.com*

Collapse: How Societies Choose to Fail or Survive

In this epic and absorbing book, Jared Diamond unravels the mysterious collapse of past civilizations and examines what this might mean for our future. He poses such questions as 'Why do some societies flourish, while others founder?', 'What happened to the people who made the long-abandoned statues of Easter Island or to the architects of the crumbling Mayan pyramids?', 'Will we go the same way, our skyscrapers one day standing derelict and overgrown like the temples at Angkor Wat?' Diamond brings together new evidence from a range of sources and pieces together the many influences that make societies self-destruct. He attempts to demonstrate that, how unlike our ancestors we can benefit from our knowledge of the past and learn to be survivors.

*Jared Diamond, 2006
Penguin, London, UK, 592 pp
ISBN 9780140279511
Penguin Group UK, 80 Strand, London
WC2R 0RL, UK
www.penguin.co.uk*

4 saisons d'activités nature en famille. Une mind d'activités de jeux, de créations en plein air pour toute la famille!

Ce livre délicieusement illustré est un guide pour inciter les enfants à profiter du grand air au travers d'activités ludiques dans la nature. Réalisé pour être utilisé par les familles, les gardes d'enfants, les animateurs et les enseignants, ce livre propose des conseils pour effectuer des jeux de plein air sans risque et attrayants, ainsi que de bons tuyaux pour maintenir l'attention des enfants lors d'excursions plus longues. Ce livre est divisé en fonction des saisons, avec des activités appropriées pour chacune d'entre elles. Par exemple, au printemps, les enfants peuvent explorer la vie aquatique dans les mares et les ruisseaux, ramasser les matériaux pour confectionner un nid ou rechercher les bulbes qui poussent ; à l'automne ils peuvent ramasser des fruits ou faire des collages avec des feuilles mortes. Tout au long de l'ouvrage, l'accent est mis sur la façon d'aider les enfants à acquérir une plus grande compréhension des différentes facettes de la nature, leur donnant confiance dans l'environnement extérieur par le biais de méthodes éducatives, sans risque et surtout amusantes.

*Fiona Danks, Jo Schofield et Alix Groid,
Fernand Nathan, Relations Enseignants
Nathan 75704 Paris, Cedex 13, France
www.nathan.fr/contacts*

Effondrement : comment les sociétés choisissent de s'éteindre ou de survivre.

Dans ce livre épique et passionnant, Jared Diamond explique les disparitions mystérieuses des civilisations du passé et examine ce que cela pourrait signifier au regard de notre futur. Il pose des questions telles que : « Pourquoi certaines civilisations se développent-elles alors que d'autres s'effondrent ? » ; « Qu'est-il arrivé aux gens qui ont fabriqué les statues de l'île de Pâques, depuis longtemps abandonnées, ou aux architectes des pyramides Mayas à présent en ruines ? » ; « Prendrons-nous le même chemin ; nos gratte-ciels demeureront-ils telles des épaves, recouvertes de végétation comme le temple d'Angkor

la directa exposición a la naturaleza es esencial para un saludable desarrollo de la niñez, para la salud física y emocional y como la forma mas simple de salvar el puente roto. Este es un libro poderoso que tiene implicaciones significantes para jardines botánicos, particularmente aquellos localizados en ambientes urbanos.

*Richard Louv, 2006
Algonquin Books of Chapel Hill, USA,
334 pp.
ISBN: 978-1-56512-522-3
A division of Workman Publishing, 708
Broadway, New York, NY 10003.
www.algonquin.com*

Juegos de la naturaleza: Actividades y juegos para animar a los niños a salir a actividades al aire libre.

Este magnifico libro ilustrado es una guía para introducir a los niños a las grandiosas y diversidas actividades en la naturaleza. Diseñado para usarse por las familias, niñeras, educadoras, y maestros, el libro establece lineamientos de seguridad y atraer el juego al aire libre, con ideas útiles sobre como mantener la atención de los niños en excursiones largas. El libro esta dividido en estaciones del año, con actividades apropiadas a cada una. Por ejemplo, en primavera, los niños pueden explorar la vida acuática en estanques y arroyos, coleccionar material para hacer nidos para pájaros o buscar por bulbos creciendo; en otoño ellos pueden coleccionar frutos o hacer collages con hojas caídas de los árboles. A traves del libro, el énfasis esta en enseñar a los niños a apreciar los patrones de naturaleza, dándoles confianza en el ambiente externo en una forma que es educativa, segura y sobre todo, divertida.

*Fiona Danks and Jo Schofield, 2005
Frances Lincoln, London, UK, 160pp
ISBN: 0-7112-2491-9
Frances Lincoln Ltd, 4 Torriano Mews,
Torriano Avenue, London NW5 2RZ, UK.
www.franceslincoln.com*

Colapso: Como las sociedades escogen fracasar o sobrevivir

En este exitante y absorbente libro, Jared Diamond revela el misterioso colapso de civilizaciones pasadas y examina lo que en esto puede

Planet in Peril: An Atlas of Current Threats to People and the Environment

Planet in Peril brings together a wealth of information from the most up-to-date sources on key issues such as climate change, access to water, exploitation of ocean resources, renewable energy, genetically modified organisms and urban development. Written by an international team of specialists, this Atlas uses text, maps, graphics and diagrams to illustrate the interplay of relationships between the world's population and its ecosystems and natural resources. Philippe Rekacewicz, geographer cartographer for the Atlas, writes that 'Understanding our troubled world is not an easy task and the pace of change is ever quickening'. This Atlas provides a sharp perspective on environmental issues and is an excellent resource for educators.

UNEP/GRID-Arendal and Le Monde diplomatique, 42pp
GRID-Arendal publications may be ordered or purchased through EarthPrint (www.earthprint.com), the official online bookshop of the United Nations Environment Programme.



Wat ? ». Diamond apporte de nouvelles preuves issues de diverses sources et expose les différentes influences qui sont à l'origine de l'autodestruction des sociétés. Il tente de démontrer comment, à la différence de nos ancêtres, nous pouvons bénéficier des savoirs de notre passé et apprendre à être des survivants.

Jared Diamond, 2006
Penguin, London, UK, 592 pp
ISBN 9780140279511
Penguin Group UK,
80 Strand, London WC2R 0RL, UK
www.penguin.co.uk

Planète en Péril : Un Atlas des Menaces Actuelles qui Pèsent sur les Gens et l'Environnement.

Planète en Péril apporte une profusion d'informations, provenant des sources les plus actuelles, sur des problématiques cruciales telles que le changement climatique, l'accès à l'eau, l'exploitation des ressources de l'océan, les énergies renouvelables, les organismes génétiquement modifiés et le développement urbain. Rédigé par une équipe internationale d'experts, cet Atlas s'appuie sur des textes, des cartes, des graphiques et des diagrammes pour illustrer les interactions entre les populations du monde et les écosystèmes et ressources naturelles de celui-ci. Philippe Rekacewicz, géographe-cartographe de cet Atlas, écrit que « La compréhension de notre monde perturbé n'est pas une tâche facile et la cadence des changements est en constante accélération ». Cet Atlas propose une perspective pointue des problématiques environnementales et représente une excellente ressource pour les animateurs des jardins botaniques.

UNEP/GRID-Arendal and Le Monde diplomatique, 42pp
GRID-Arendal publications may be ordered or purchased through EarthPrint (www.earthprint.com), the official online bookshop of the United Nations Environment Programme.

Le Génie du Jeu : célébration de l'âme de l'enfance.

« Le génie du jeu » s'intéresse à la notion du jeu, aux raisons de son rôle important et à la manière dont la vie

significar para nuestro futuro. Presenta preguntas como "Porque algunas sociedades florecen y otras se hunden?", "Que ha pasado a la gente que hizo las estatuas abandonadas de la isla de Pascua o al arquitecto de las quebrantadas piramides mayas?", "Vamos nosotros en la misma forma, nuestros rascacielos estaran abandonados y enerbados como los templos de Angkor Wat en Combodia?" Diamond presenta nueva evidencia de una variedad de fuentes y puntualiza las diferentes influencias que hacen que las sociedades se destruyan. El intenta demostrar que a diferencia de nuestros ancestros nosotros nos podemos beneficiar de nuestro conocimiento del pasado y aprender de los sobrevivientes.

Jared Diamond, 2006
Penguin, London, UK, 592 pp
ISBN 9780140279511
Penguin Group UK, 80 Strand, London WC2R 0RL, UK
www.penguin.co.uk

El Planeta en Peligro: Un Atlas de Amenazas Presentes a la Gente y al Medioambiente.

El Planeta en Peligro junta una gran cantidad de información de la fuentes mas actualizadas, sobre temas claves tales como el cambio climatico, acceso al agua, explotación de los recursos del oceano, energia removable, organismos geneticamente modificados y desarrollo urbano. Escrito por un equipo internacional de especialistas, este Atlas usa texto, mapas, gráficas y diagramas para ilustrar el interjuego de relaciones entre la poblacion mundial y sus ecosistemas y recursos natural. Philippe Rekacewicz, geografo y cartógrafo del Atlas, escribe que "El entendimiento de nuestro complicado mundo no es una tarea fácil y el ritmo del cambio es aún mas rapido". Este Atlas provee una perspectiva aguda sobre temas ambientales y es un recurso excelente para educadores.

UNEP/GRID-Arendal and Le Monde diplomatique, 42pp
GRID-Las publicaciones Arendal se pueden ordenar o comprar a través EarthPrint (www.earthprint.com), la libreria oficial en internet del Programa de las Naciones Unidas .

The Genius of Play: Celebrating the spirit of childhood

The Genius of Play addresses what play is, why it matters, and how modern life endangers children's play. Here is an outspoken 'Children's Play Charter' for parents and teachers, which celebrates the playful spirit of childhood. Sally Jenkinson asks:

- What do children express in their play?
- How does play develop empathy and social skills?
- How are children influenced by inappropriate toys, TV and consumerism?
- How does play develop children's imaginations?
- Why do children need adults who encourage play?
- How do lively childhood players become creative adult thinkers?

Sally Jenkinson, 2005
Hawthorn Press, 224pp
ISBN 1 903458 048
32 Finlas Street, Cowllairs Estate,
Glasgow, G22 5DU, UK
www.hawthornpress.com

Websites

Interpscan – an association for heritage interpretation
<http://www.interpscan.ca>

Interpretation Canada (IC) is a professional association of heritage interpreters run by volunteers. IC offers a range of benefits for international members, including:

- four issues per year of InterpScan, the quarterly journal of Interpretation Canada. "One of the best professional interpretation periodicals anywhere" (Sam Ham, 2005)
- networking opportunities
- online access to books and resources
- information about workshops, conferences and meetings.

Approximately 500 members participate in national programmes across Canada. IC's ultimate goal is to enhance the development of theory and practice in the field of heritage interpretation.

moderne compromet les jeux d'enfant. Il s'agit d'une véritable « Charte du jeu de l'enfant » qui célèbre l'âme enjouée de l'enfance, et destinée aux parents et aux enseignants. Sally Jenkinson pose les questions suivantes :

- Qu'est-ce que les enfants expriment dans leurs jeux ?
- Comment le jeu développe-t-il l'empathie et les aptitudes sociales ?
- Comment les enfants sont-ils influencés par des jouets inappropriés, la TV et la société de consommation ?
- Comment le jeu développe-t-il l'imagination des enfants ?
- Pourquoi les enfants ont-ils besoin des adultes pour les encourager au jeu ?
- Comment les jeunes joueurs enthousiastes deviennent-ils des adultes créatifs et contemplateurs

Sally Jenkinson, 2005
Hawthorn Press, 224pp
ISBN 1 903458 048
32 Finlas Street, Cowllairs Estate,
Glasgow, G22 5DU, UK
www.hawthornpress.com

Sites internet

Interpscan, une association pour l'interprétation du patrimoine.
<http://www.interpscan.ca>

Interprétation Canada (I.C.) est une association professionnelle composée d'interprètes du patrimoine et gérée par des bénévoles. I.C. propose une série d'avantages aux membres internationaux, notamment :

- 4 numéros par an de « Interpscan », le journal trimestriel d'Interprétation Canada. « L'un des meilleurs périodiques d'interprétation professionnelle au monde » (Sam Ham, 2005).
- L'opportunité d'intégrer un réseau
- L'accès en ligne à des références de livres et à de nombreuses ressources
- Des informations au sujet d'ateliers, de conférences et de rencontres

Environ 500 membres participent aux programmes nationaux au Canada. Le but ultime d'I.C. est d'accroître le développement de la théorie et de la pratique dans les domaines de l'interprétation du patrimoine.

El Genio del Juego: Celebrando el espíritu de la niñez

El Genio del Juego se enfoca a lo que es jugar, porque importa, y como la vida moderna pone el peligro los juegos de los niños. Aquí esta una 'Cartera de juegos para niños' para padres y maestros, la cual celebra el espíritu juguetón de la niñez. Sally Jenkinson pregunta:

- Que expresan los niños en su juego?
- Como el juego desarrolla compatibilidad y socialización?
- Como los niños son influenciados por juguetes inapropiados, Televisión y consumismo?
- Como el juego desarrolla la imaginación de los niños?
- Porque los niños necesitan adultos que los estimulen para jugar?
- Como jugadores de la niñez se convierten en adultos creativos y pensantes

Sally Jenkinson, 2005
Hawthorn Press, 224pp
ISBN 1 903458 048
32 Finlas Street, Cowllairs Estate,
Glasgow, G22 5DU, UK
www.hawthornpress.com

Sitios web

Interpscan – una asociación para la interpretación cultural.
<http://www.interpscan.ca>

Interpretación Canada (IC) es una asociación de intérpretes culturales manejada por voluntarios. IC ofrece un rango de beneficios para miembros internacionales, incluyendo:

- Cuatro números por año de InterpScan, la revista cuatrimestral de Interpretación Canada. "Una de las mejores revistas profesionales de interpretación en el mundo" (Sam Ham, 2005).
- Oportunidades de colaboración
- Acceso en línea a libros y recursos
- Información acerca de talleres, conferencias y reuniones

Aproximadamente 500 miembros participaron en programas nacionales a través de Canadá. El objetivo más importante de IC es resaltar el desarrollo de la teoría y práctica en el campo de la interpretación cultural.

A Goodman

<http://www.agoodmanonline.com/purple.html>

'A Goodman' is a communications consulting firm that helps public interest groups, foundations and progressive businesses reach more people more effectively. Their website contains several very useful publications. In particular:

- *Why Bad Presentations Happen to Good Causes*

Based on research into presentations given by nonprofits, foundations, and government agencies, this book shows why so many presentations fail to engage, educate or persuade and how you can avoid the most common mistakes.

- *Storytelling as Best Practice*

Written for public communicators, this booklet looks at why stories are your most powerful tool, how to build and use a story bank and how stories can make you a more effective presenter.

Wild About Play

www.playwork.co.uk/wildaboutplay

Wild About Play is a networking project based in south west England to support, develop and promote environmental play. Their new website contains several interesting articles. They also plan to include resources on a number of topics that will help facilitate environmental play, for example, activity ideas, ideas for environmental play, equipment and resources lists, health and safety information and funding sources.

A Goodman

<http://www.agoodmanonline.com/purple.html>

« A Goodman » est une entreprise de conseils en communication qui aide les groupes d'intérêt public, les fondations et les entreprises d'avant-garde à toucher un public plus large de manière plus efficace. Leur site Internet comporte plusieurs publications très intéressantes, en particulier :

- *Pourquoi de mauvaises présentations surviennent dans de bonnes causes*

Réalisé à partir d'études de diverses présentations données par des organisations sans but lucratif, des fondations et des agences gouvernementales, ce livre démontre pourquoi tant de présentations ne parviennent pas à créer l'adhésion, à informer ou à convaincre, ainsi que les différentes façons d'éviter les erreurs les plus courantes.

- *Le conte : la meilleure des pratiques*

Écrit pour les personnes qui communiquent en public, cette brochure expose les raisons pour lesquelles le conte représente l'outil de communication le plus puissant, la façon de compiler et d'utiliser une banque de contes, et comment le conte peut faire de vous un meilleur orateur.

La nature comme terrain de jeu

www.playwork.co.uk/wildaboutplay

« La nature comme terrain de jeu » est un réseau de projets basé dans le Sud-Ouest de l'Angleterre afin d'aider, de développer et de promouvoir le jeu environnemental. Leur nouveau site internet contient plusieurs articles très intéressants. Il est également prévu d'y inclure des ressources sur de nombreux thèmes qui aideront et faciliteront le développement de jeux environnementaux. Par exemple : idées d'activités, idées de jeux environnementaux, listes de matériels et de ressources, informations sanitaires et de sécurité, et sources de financements.

A Goodman

<http://www.agoodmanonline.com/purple.html>

'A Goodman' es una firma consultora de comunicación que ayuda a los grupos de interés público y negocios progresivos a alcanzar efectivamente mas gente. Su website contiene diferentes y varias aplicaciones útiles. En particular:

- *Porque malas presentaciones suceden a causas buenas*

Basada sobre investigación en presentaciones dadas por fundaciones no lucrativas, y agencia gubernamentales, este libro muestra porque muchas presentaciones fallan para atraer, educar y persuadir y como tu puedes evitar los errores más comunes.

- *Contar historias como buena practica*

Escrito para comunicadores públicos, este pequeño libro busca como historias are tu herramienta mas ponderosa, como construir y usar un banco de historias y como estas pueden hacer un presentador mas efectivo.

Siempre listo para jugar en la naturaleza (*Wild About Play*)

www.playwork.co.uk/wildaboutplay

Wild About Play es un proyecto en red basado en el Suroeste de Inglaterra para apoyar, desarrollar y promover el juego medioambiental. Su nuevo sitio web contiene diferentes e interesantes artículos. Ellos también planean incluir recursos sobre un número de temas que ayudaran a facilitar el juego medioambiental, por ejemplo, ideas de actividades, ideas para el juego ambiental, listas de equipo y recursos, salud y seguridad para cursos patrocinados.

¡Nuevo, ahora en español!



¡Déle vida a su jardín!

Interpretación Ambiental en Jardines Botánicos

Este es un recurso excelente, originalmente producido por La red de diversidad botánica en Sudáfrica (SABONET), el libro proporciona pautas básicas prácticas para desarrollar en tu jardín un programa de interpretación. Secciones de como planificar, caminatas guiadas, veredas autoguiadas, señales interpretativas y orientación a los visitantes. Este libro tiene ejemplos específicos como son casos de estudio de jardines botánicos sudafricanos.

Esta publicación se encuentra disponible en inglés y en francés en el CD-Rom de la BGCI 'Plants for the Planet; resource pack for botanic gardens'.

Nuevo

Educación para el Desarrollo Sustentable Lineamientos de Acción para los Jardines Botánicos

En los últimos años ha habido un creciente interés en la EDS por parte de los educadores de jardines botánicos. Estos lineamientos fueron desarrollados como una respuesta a ese interés. Las metas de estos lineamientos son:

- Proporcionar una explicación de por qué los jardines botánicos deben comprometerse con la EDS.
- Ofrecer una guía para que los jardines botánicos establezcan programas de EDS.
- Resaltar la importancia de la educación en jardines botánicos para la implementación de aspectos del desarrollo sustentable contemplados en las principales estrategias de conservación de la biodiversidad
- Enfatizar la contribución que pueden aportar los jardines botánicos a la Década de la EDS de las Naciones Unidas.

Nuevo



Las obras impresas en español se puede solicitar al e-mail education@bgci.org

How to join Botanic Gardens Conservation International

The mission of BGCI is to build a world network for plant conservation. It was founded in 1987 and now includes over 525 member institutions in 115 countries, working together to implement the *International Agenda for Botanic Gardens in Conservation* and the new *Global Strategy for Plant Conservation*.

Institutions can join BGCI for the following benefits:

- Membership of the worldwide plant conservation network
- Botanic Garden Management Resource Pack (upon joining)*
- Regular publications:
 - the regular newsletter, *Cuttings*
 - *BGjournal* – an international journal for botanic gardens (2 per year)
 - *Roots* - environmental education review (2 per year)
 - A wide range of new publications
- Invitations to BGCI congresses and discounts on registration fees
- BGCI technical support and advisory services

Institution Membership		£ Stlg	US \$	€ Euros
A	BGCI Patron Institution	5000	8000	7500
B	Institution member (budget more than US\$2,250,000)	600	1000	940
C	Institution member (budget US\$ 1,500,000 - 2,250,000)	440	720	660
D	Institution member (budget US\$ 750,000 - 1,500,000)	300	500	440
E	Institution member (budget US\$ 100,000 - 750,000)	160	250	220
F	Institution member (budget below US\$100,000)*	75	120	110
*Generally applies to institutions in less developed countries				

Other Membership Categories:

Membership benefits depend on category - see below. These can include:

- Regular publications:
 - the regular newsletter, *Cuttings*
 - *BGjournal* - an international journal for botanic gardens (2 per year)
 - *Roots* - Environmental Education Review (2 per year)
- Invitations to BGCI congress and discounts on registration fees

Individual Membership		£ Stlg	US \$	€ Euros
J	Conservation donor (<i>BGjournal</i> , <i>Roots</i> and <i>Cuttings</i> plus more)	160	250	220
K	Associate member (<i>Cuttings</i> and <i>BGjournal</i>)	35	60	50
L	Associate member (<i>Cuttings</i> and <i>Roots</i>)	35	60	50
M	Friend (<i>Cuttings</i>) available through online subscription only (www.bgci.org)	10	15	15

*Contents of the Botanic Garden Management Resource Pack: *The Darwin Technical Manual for Botanic Gardens*, *A Handbook for Botanic Gardens on the Reintroduction of Plants to the Wild*, *A CITES Manual for botanic gardens*, *BGjournal* - an international journal for botanic gardens (2 past issues), *Roots* - environmental education review (2 past issues), *The International Agenda for Botanic Gardens in Conservation*, *Global Strategy for Plant Conservation*, *Environmental Education in Botanic Gardens*, *BG-Recorder* (a computer software package for plant records).

Payment may be made by cheque payable to Botanic Gardens Conservation International, or online at www.bgci.org or by VISA/Mastercard sent to BGCI, Descanso House, 199 Kew Road, Richmond, Surrey, TW9 3BW, U.K or Fax: +44 (0) 20 8332 5956.

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Please clearly state your name (or the name of your institution) on all documentation. Please contact info@bgci.org for further information.

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BGCI

Plants for the Planet

**Botanic Gardens
Conservation International**

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1st Announcement



3GBGC

3rd Global Botanic Gardens Congress

*Building a sustainable future:
the role of botanic gardens*

Wuhan, China
April 16-20, 2007

Organized by

Wuhan Botanical Garden, CAS
Chinese Academy of Sciences
Hubei Provincial Government
Wuhan Municipal Government
Botanic Gardens Conservation International



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