roots

Botanic Gardens Conservation International Education Review

BOTANIC GARDENS

Education for Sustainability

- Biodiversity in the Kitchen
- Habitat-based and Story-driven
- Deep Ecological Thinking
- Teaching Ecological Concepts Around the World
- A Story from a Small Island

27

December 2003

Teaching Ecological Concepts

Contents

Subscriptions

Roots is published twice a year as a service to the BGCI education network. It is sent to member gardens as part of their annual subscription. For information on how to become a member please contact BGCI or refer to the inside back cover of this edition of Roots.

Forthcoming Issues

Roots 28 – Botanic Gardens and Tourism. Last submission dates: February 14, 2004
Roots 29 – Botanic Gardens and Zoos – Synergies for the Future. Last Submission dates: July 9, 2004

Combler la faille entre deux idéologies

Tendiendo puentes entre ideologías

Bridging the ideological gap

■ Editorial

The question whether we consider ourselves part of the natural world or separate from it, goes to the very heart of the way in which we relate to the environment. The contemporary scientific paradigm, which affirmed humankind's dominance over nature, may be traced back to the 18th Century and the so-called Age of Enlightenment. This heralded the start of the Industrial Age and a political/economic world-view that prevails even today. The benefits of this have, however, come at a cost and we are, as a result, facing an unprecedented global ecological crisis. Among those who are attempting to address this conundrum, an ideological fault line has opened up.

Orthodox thought argues that improved technology, better monitoring of species, increased public awareness, and so on, is the way forward. Ranged against this is a growing body of opinion, numbering in its ranks radical ecologists and green activists, which challenges the fundamental tenets on which the modern world has been built. This offers an alternative paradigm that locates humankind within the ecosystem and eschews the notion that *homo sapiens* is free to order the world as it chooses. So are these ideologies irreconcilable? And where does this debate leave botanic gardens, embedded in their tradition of modern scientific enquiry?

With these questions in mind, this issue of Roots focuses on how ecological concepts are taught. Satish Kumar, editor of Resurgence Magazine, contributes a thought- provoking article that champions the views of deep green ecologists. Joseph Cornell, naturalist and author, outlines his 'Flow Learning™' technique, designed to foster a child's engagement with nature. In the same vein, John Cree, a teacher at Bishopswood Centre in the UK, explores the deep green philosophy underpinning Earth Education, and presents a number of programmes that teach children how to 'live more lightly' on the Earth. David Hanschell, a primary school teacher in Scotland, describes an environmental project that attempted to

▲ Editorial

La question au cœur de notre relation à l'environnement est de savoir si nous nous considérons comme faisant partie intégrante de la nature ou comme étant séparés d'elle. Le paradigme scientifique contemporain qui affirme la domination de la nature par l'humanité prend ses racines au 18ème siècle, appelé siècle des Lumières. Ce dernier annonça l'ère industrielle et le point de vue politico-économique qui prévaut encore aujourd'hui. Le système a néanmoins atteint ses limites et nous en arrivons à une crise écologique globale sans précédent. Mais parmi ceux qui tentent d'aborder ce problème une faille idéologique s'est creusée.

La pensée orthodoxe soutient que pour s'en sortir, il y a besoin d'une technologie améliorée, d'une meilleure régulation des espèces, ainsi que d'une conscience publique accrue. A l'encontre de cette pensée s'élève une opinion grandissante dans les rangs de laquelle des écologistes radicaux et des militants verts remettent en question les bases fondamentales sur lesquelles notre monde moderne est bâti. Ce point de vue offre un paradigme alternatif qui situe l'humanité à l'intérieur de l'écosystème et qui renonce à l'idée d'un Homo sapiens libre d'ordonner le monde comme il l'entend. Ces deux idéologies sont-elles irréconciliables ? Où ce débat laisse-t-il les jardins botaniques qui, traditionnellement, ne veulent porter que l'habit de la recherche scientifique moderne ?

Avec ces questions en tête, ce numéro de ROOTS est focalisé sur les façons dont les concepts écologiques sont enseignés. Satish Kumar, éditeur de ' Resurgence Magazine', défend dans un article provoquant le point de vue des écologistes «verts foncés ». Joseph Cornell, auteur et naturaliste, présente sa technique 'Flow Learning'™, conçue pour tuteurer l'engagement d'un enfant vis à vis de la nature. Dans la même veine, John Cree, un enseignant du centre de Bishopwood en Angleterre, explore les philosophies «vert foncé », en reprend les enseignements sur la Terre et présente un certain nombre de programmes qui

● Editorial

Si nos consideramos parte del mundo natural o no, esa es la cuestión que va directamente al meollo de cómo nos relacionamos con el medio ambiente. El paradigma contemporáneo que afirmó la supremacía de la humanidad sobre la naturaleza procede del Siglo XVIII o de las Luces. Precursor de la Era Industrial y del punto de vista politico-económico que prevalece todavía hoy. Los beneficios de todo ello han tenido un coste y nos enfrentamos con una crisis ecológica global sin precedentes. Entre aquéllos que intentan comprender este rompecabezas se ha abierto una falla ideológica.

El pensamiento ortodoxo argumenta que las mejoras tecnológicas, un mejor control de las especies, un aumento de la conciencia pública y un largo etc. es el camino a seguir. Alineados en contra hay una corriente de opinión en crecimiento, entre la que se encuentran ecologistas radicales y activistas medioambientales, que desafían los dogmas sobre los que se ha construido el mundo actual. Ofrece un paradigma alternativo que establece a la humanidad dentro del ecosistema y rehúye la noción de que el *homo sapiens* es libre para ordenar el mundo a su capricho. ¿Son ideologías irreconciliables? ¿Qué espacio queda para los jardines botánicos en este debate, inmersos como están en su tradición de investigación científica?

Este número de Roots se centra, teniendo en cuenta estos interrogantes, en cómo se enseñan los conceptos ecológicos. Satish Kumar, editor de Resurgence Magazine, contribuye con un estimulante artículo que aboga en favor de los puntos de vista más ecologistas. Joseph Cornell, autor y naturalista, bosqueja su técnica 'Flow Learning ™', diseñada para fomentar el compromiso de la infancia con la Naturaleza. En la misma onda, John Cree, profesor del Bishopswood Centre del Reino Unido, profundiza en la filosofía que subyace en la Educación para la Tierra y presenta algunos programas que enseñan a la infancia a 'vivir leve' sobre el Planeta. David Haschell, un maestro de

■ Editorial

introduce children to the ideas of interdependence, sustainability and community.

Turning to botanic gardens, BGCI showcases a range of programmes designed to teach ecological concepts. Later Barbara Addelson of the Missouri Botanical Garden, USA, reports on a professional development programme in ecology that builds up to the concept of ecosystems. And Graham Phelps and Anne Scherer, of the Alice Springs Desert Park, Australia, reveal how the Park - comprising a botanic garden, zoo and cultural centre rolled into one - takes an ecosystem approach to interpretation.

Botanic gardens have to be some of the most 'natural' places to teach ecology. Given the ecological crisis we face, the need for this has never been more pressing. Recognised by governments worldwide, the primary framework for action under the Convention on Biological Diversity (CBD) is the ecosystem approach (see box). While the Convention's philosophy appears to be mainly 'reformist' there is certainly room for more radical thinking to influence practice, something botanic gardens may like to consider.

The ecosystem approach

The ecosystem approach is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. Application of the ecosystem approach helps to achieve a balance of the three objectives of the Convention - the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources. It recognises that humans, with their cultural diversity, are an integral part of many ecosystems.

Convention on Biological Diversity

▲ Editorial

apprennent aux enfants à vivre plus légèrement sur la planète. David Hanschell, un maître d'école primaire en Ecosse, décrit un projet sur l'Environnement qui tente d'initier les enfants à l'idée d'interdépendance, de communauté, et de ressources renouvelables.

En ce qui concerne les jardins botaniques, le BGCI présente une gamme de programmes conçus pour enseigner des concepts écologiques. Barbara Addelson du jardin botanique de Missouri, USA, rapporte un programme de formation continue en écologie qui amène au concept d'écosystèmes. Graham Phelps et Anne Scherer, du Parc Alice Springs Desert en Australie révèlent comment le Parc, comprenant un jardin botanique, un zoo, et un centre culturel réunis en une unité, a une approche écosystémique pour son interprétation.

Les jardins botaniques doivent être parmi les lieux les plus «naturels » pour enseigner l'écologie. Etant donnée la crise écologique à laquelle nous devons faire face, ce besoin ne s'est jamais tant fait ressentir. Reconnue par les gouvernements du monde entier, le cadre primaire pour l'action à travers la Convention pour la Biodiversité (CBD) est l'approche écosystémique (voir encadré). Alors que la philosophie de la Convention semble principalement «réformiste », il y a certainement de la place pour une pensée plus radicale qui influence les pratiques, et que les jardins botaniques pourraient bien considérer.

L'approche écosystémique

L'approche écosystémique est une stratégie pour une gestion intégrée de la terre, de l'eau et des ressources vivantes qui favorise la conservation et l'utilisation des ressources de façon renouvelable et équitable. L'application de l'approche systémique aide à atteindre un équilibre dans les trois objectifs de la Convention – conservation de la biodiversité, utilisation de façon renouvelable de ses composants, et partage équitable et juste des bénéfices résultant de l'utilisation des ressources génétiques. Elle reconnaît que les humains, avec leur diversité culturelle, font partie intégrante de nombreux écosystèmes.

Convention pour la Biodiversité

● Editorial

primaria de Escocia, presenta un proyecto que intenta introducir los conceptos de interdependencia, sostenibilidad y comunidad en la infancia.

Volviendo a los jardines botánicos, el BGCI exhibe un conjunto de programas diseñados para enseñar conceptos ecológicos. Barbara Addelson del Jardín Botánico de Missouri, EEUU, relata un programa de desarrollo profesional en ecología que se estructura hasta el nivel de ecosistemas. Finalmente Graham Phelps y Anne Scherer del Parque Nacional del Desierto de Alice Springs en Australia, descubren cómo este Parque que incluye un jardín botánico, zoo y centro cultural reunidos en uno, ha podido incorporar un enfoque a nivel de ecosistema a las técnicas de interpretación.

Los jardines botánicos tienen que ser el sitio más 'natural' para enseñar ecología. Dada la crisis ecológica a la que nos enfrentamos, nunca ha sido más urgente que ahora. Reconocido por todos los gobiernos del mundo, el esquema básico para la acción de la Convención sobre Diversidad Biológica (CBD) es el ecosistémico (ver cuadro). Si bien la filosofía de la Convención parece 'reformista', es seguro que hay espacio para el pensamiento radical capaz de influir en la práctica; una propuesta que los jardines botánicos pueden tener a bien considerar.

El enfoque ecosistémico

Es una estrategia para la gestión integrada de la tierra, el agua y los recursos vivos, que promueve la conservación y el uso sostenible de una forma justa. La aplicación de este enfoque facilita la consecución de un equilibrio entre los tres objetivos de la Convención: la conservación de la diversidad biológica, el uso sostenible de sus componentes, y el justo y proporcionado reparto de los beneficios originados por la utilización de los recursos genéticos. El enfoque reconoce que los seres humanos, en su diversidad cultural, son parte integrante de muchos ecosistemas.

CDB

Nouvelles

News

Noticias

up date

■ News

Revamping of BGCI Publications!

BGCI is currently reviewing its publications so as to ensure our members have access to current information. Consequently, the 'news' section of Roots and BGCNews will be removed and our members' news and events will be incorporated into a quarterly newsletter that will be sent to all BGCI members. Individuals will have the opportunity to join BGCI at a low cost and receive these quarterly newsletters. More information will be available to members in early 2004.

Meise Conference

In July the 2nd European Conference for Education in Botanic Gardens (BEDUCO) took place at the National Botanic Garden of Belgium, Meise. 57 delegates from various European countries met to network and participate in sessions on Fascinating Plants, Significant Plants and Edible Plants. Delegates remarked on the interesting contributions and the benefits of using emotional or artistic links between people and plants rather than purely focusing on the cognitive reproduction of facts. A session was also held to discuss the educational components of the Global Strategy for Plant Conservation. The outcomes of this session have been compiled into a document and this is enclosed for comment.

A highlight of the conference was a botanically themed 'pre- and post-1492' evening meal. The meal consisted of dishes using vegetables from the 'Old' and 'New' world to demonstrate how plants shape our world and history.

▲ Nouvelles

Restructuration des Publications du BGCI

Le BGCI modifie régulièrement ses publications afin de s'assurer que nos membres aient accès à des informations récentes. Par conséquent, la section 'Nouvelles' de Roots et de BGCNews seront supprimés et les nouvelles et les événements de nos adhérents seront incorporées dans une lettre d'information trimestrielle qui sera envoyée à tous les membres du BGCI. Les individuels pourront adhérer à un moindre coût et recevoir cette lettre trimestrielle. D'autres informations seront diffusées aux adhérents au début de l'année 2004.

Le Congrès de Meise

En juillet dernier, la 2ème Conférence Européenne pour l'Éducation dans les Jardins Botaniques (BEDUCO) s'est tenue au Jardin Botanique National de Belgique à Meise. 57 délégués de divers pays d'Europe se sont retrouvés pour échanger et participer à des séances sur les thèmes suivants : Plantes fascinantes, Plantes significatives et Plantes comestibles. Les délégués ont fait part de l'intérêt des contributions et le bénéfice d'utiliser les liens émotionnels et artistiques qui peuvent être créés entre les gens et les plantes plutôt que de centrer uniquement des interventions sur la transmission de savoirs. Un atelier-débat portait également sur la partie "Éducation" de la Stratégie Globale pour la Conservation des Plantes. Les résultats de cette séance ont été compilés dans un document qui est joint pour commentaires.

Le repas botanique 'pré et post 1492' fut un moment marquant de ce

● Noticias

¡Renovamos las Publicaciones de BGCI!

BGCI está revisando sus publicaciones para asegurar que todos sus miembros tengan acceso a información actualizada. Por tal motivo, la sección de 'noticias' de Rotos se eliminará y será transferida en un boletín cuatrimestral donde nuestros miembros podrán dar a conocer sus noticias y eventos. Se ofrece la opción de suscribirse a BGCI a título personal a un bajo costo para recibir este boletín cuatrimestral. Se brindará más información a nuestros miembros a principios del 2004.

Congreso en Meise

El 2º Congreso Europeo de Educación en Jardines Botánicos (BEDUCO) se llevó a cabo en julio en el Jardín Botánico Nacional de Meise, Bélgica. Cincuenta y siete delegados de diversos países europeos participaron en sesiones con temas como Plantas Fascinantes, Plantas Importantes y Plantas Comestibles. Los participantes enfatizaron en las interesantes contribuciones y los beneficios de emplear enlaces artísticos y emocionales en la relación hombre-planta más que el de basarse exclusivamente en el enfoque cognoscitivo de las plantas. Asimismo, se realizó una mesa de discusión sobre los componentes educativos de La Estrategia Mundial para la Conservación de las Plantas. Los resultados de esta sesión se plasmaron en un documento que se incluye para comentarios.

Llamó la atención la cena botánica del Congreso bajo el tema de 'antes y después de 1492', la cual consistió en

■ News

The conference was held jointly with the 3rd Eurogard Congress with the aim of facilitating a crossover between conferences. This worked with mixed success. Seeing directors participating in a workshop of how to make plants 'interesting' for teenagers was definitely a good experience for all involved. On the other hand when the participants of Eurogard discussed 'education' there was a noticeable lack of educators! The conference was a success but clearly highlighted the need for increased communication between educators and management.

Investing in Nature in Brazil

Belém do Pará in the heart of the Brazilian Amazon region was the setting for the recent 12th Brazilian Botanic Gardens Annual Meeting. The meeting was hosted by the Museu Paraense Emílio Goeldi (MPEG/MCT) and Belém City Council in partnership with the Bosque Rodrigues Alves. Managers and technicians from 28 of the 29 Brazilian Botanic Gardens attended the meeting and training course which focused on Ecotourism in Botanic Gardens.

The programme began with an inspirational lecture from Dr. Marcus de Barros, IBAMA's President. This was followed by lectures from representatives of the Spanish and Mexican Botanic Garden Networks who provided expertise on the relationship between botanic gardens, networks and tourism. The audience particularly enjoyed learning about the differences between European and Latin American cultures. Presentations on experiences with environmental tourism were also given by botanic gardens and Amazonian Organisations. Following the network meeting a one-day training course on ecotourism was conducted by Jorge Chavez Salas from the Universidad de La Molina in Peru. Staff from the 28 Brazilian botanic gardens attended, as well as tourism students from the local University and the MPEG and Bosque Rodrigues Alves guide team.

The involvement of foreign expertise in the meeting was made possible by sponsorship from the Brazilian

▲ Nouvelles

congrès. Le repas était constitué de plats à base de légumes venant de l'ancien et du nouveau monde pour démontrer comment les plantes façonnent notre monde et notre histoire.

Cette conférence se tenait en même temps que le 3ème Congrès Eurogard avec pour objectif de faciliter les échanges entre les deux congrès. Le résultat de cette expérience fut mitigée. Les directeurs ont participé à un atelier sur comment rendre les plantes 'intéressantes' auprès des adolescents et ce fut une bonne expérience pour tous ceux qui étaient présents. D'un autre côté lorsque les participants d'Eurogard discutaient d'Éducation, il y avait un manque criant d'éducateurs dans la salle. Le congrès a été un succès mais a clairement mis en lumière le besoin d'augmenter les communications entre les animateurs et les directeurs.

Programme "Investir dans la Nature" au Brésil.

Belém do Parà, au cœur de la région de l'Amazonie brésilienne, était le siège des récentes 12ème rencontres annuelles des Jardins Botaniques

● Noticias

platillos a base de vegetales del Viejo y el Nuevo Mundo para mostrar cómo las plantas moldean nuestro mundo y nuestra historia.

Dicho Congreso coincidió con el 3º Congreso Eurogard con el fin de permitir el intercambio entre ambos. Los éxitos fueron múltiples. Ver participar a directores de Jardines Botánicos en talleres para despertar el interés por las plantas en los adolescentes, fue en definitiva una excelente experiencia para todos los participantes. Por otro lado, cuando los participante de Eurogard tocaron el tema de "educación" , era notable la falta de educadores! Este último Congreso también fue un éxito pero se destacó la importancia de incrementar la comunicación entre educadores y directores.

Invirtiendo en la Naturaleza en Brasil

En el corazón del Amazonas, en Belém do Pará, Brasil, se llevó a cabo la 12º reunión Anual de Jardines Botánicos de Brasil. Los anfitriones fueron el Museo Paraense Emilio Goeldi (MPEG/MCT), el Ayuntamiento de la ciudad de Belém en colaboración con

Below: Members of the Brazilian Botanic Gardens Network explore the Jardim Botânico da Amazônia as part of their training course focusing on ecotourism and botanic gardens

■ News

petroleum company, Petrobrás S.A, and HSBC Holding plc, through the Investing in Nature Project. For further information contact: Dr Tânia Sampaio Pereira, Jardim Botânico do Rio de Janeiro, Rua Pacheco Leao 915, 22460-030, Rio de Janeiro, Brazil. Tel: 55 (0) 51 236 1479 Email: tpereira@jbrj.gov.br Web Site: http://www.jbrj.gov.br/rbjb/

Right: Mrs Agmar, from Itinga City in Brazil, is teaching the Caatinga project staff how to extract fibre (embira) from local bromeliads (caroá)

Award Winning Botanic Garden

The project 'Education for Conservation of the Caatinga' at the Botanic Garden of the Belo Horizonte Zoobotanic Foundation has been selected to receive the first award under the three year Investing in Nature Programme in Brazil, supported by HSBC (see Roots 24 p.4).

The project will sample the Caatinga vegetation from the north of Minas Gerais state, collect species of scientific and ecological interest for cultivation, and structure an ex situ programme in endemic and threatened species conservation. The educational component of the project will encourage people to become aware of the natural and cultural resources from the Caatinga and contribute to its ex situ and in situ conservation. For further information contact: Inês Ribeiro de Andrade, Project Coordinator, Belo Horizonte Zoobotanic Foundation, Avenida Otacílio Negrão de Lima 8000, 31.365-450, Belo Horizonte- Minas Gerais, Brazil. Email: inribeiro@hotmail.com

Translation of the EE Guidelines

BGCI's Environmental Education in Botanic Gardens Guidelines for Developing Individual Strategies has

▲ Nouvelles

Brésiliens. Ces rencontres étaient organisées par le Museu Paraense Emilio Goeldi (MPEG/MCT) et la mairie de Belém en partenariat avec le Bosque Rodrigues Alves. Les directeurs et les techniciens de 28 des 29 Jardins Botaniques Brésiliens ont suivi ces rencontres et les cours de formation dont le thème portait sur l'Ecotourisme dans les Jardins Botaniques.

Le programme a commencé par une communication très inspirée du Dr Marcus de Barros, Président de l'IBAMA. Celle-ci était suivie par les conférences des représentants du réseau des Jardins Botaniques Espagnols et Mexicains qui faisaient part de leurs expériences dans les relations entre les Jardins Botaniques, les réseaux et le tourisme. L'auditoire était particulièrement intéressé d'appréhender les différences culturelles existant entre l'Amérique Latine et l'Europe.

Des communications sur des expériences de tourisme environnemental ont été également données par des jardins botaniques et des organisations amazoniennes. A la suite de ces rencontres du réseau, une formation d'un jour sur l'Ecotourisme a été conduite par Jorge Chavez Salas de l'Université de la Molina au Pérou. Les personnels des 28 Jardins Botaniques Brésiliens étaient présent ainsi que des étudiants en tourisme des Universités Locales, des membres du MPEG et des guides de Bosque Rodrigues Alvez.

Les participations étrangères au cours de ces rencontres ont été rendues possible grâce au partenariat avec la compagnie pétrolière brésilienne Petrobràs S.A., et le groupement bancaire HSBC, par le biais du programme "Investir dans la nature". Pour plus d'information, prendre contact avec : Dr Tânia Sampaio Pereira, Jardim Botânico do Rio de Janeiro, Rua Pacheco Leao 915, 22460-030, Rio de Janeiro, Brazil. Tel: 55 (0) 51 236 1479 Email: tpereira@jbrj.gov.br Web Site: http://www.jbrj.gov.br/rbjb/

● Noticias

el Bosque Rodríguez Alves. Responsables y técnicos de 28 de los 29 jardines botánicos brasileños asistieron a la reunión y participaron en el curso de actualización de Ecoturismo en Jardines Botánicos.

El programa inició con una ponencia muy sensible del Dr. Marcus de Barros, presidente de IBAMA. Posteriormente, representantes de las Asociaciones Española y Mexicana de Jardines Botánicos compartieron su experiencia en las relaciones entre jardines botánicos, redes y turismo. Los participantes disfrutaron la experiencia al comparar las diferencias entre ambas culturas: la europea y la latinoamericana.

La reunión incluyó ponencias sobre experiencias de turismo ambiental de diversos jardines botánicos y organizaciones de la Amazonia. Posterior a la reunión de la Asociación, Jorge Chávez Salas de Perú impartió un curso de un día sobre ecoturismo. Participó personal de los 28 jardines botánicos, estudiantes de turismo de la Universidad local y el equipo de guías de MPEG y del Bosque Rodríguez Alves.

La participación de los expertos extranjeros fue posible gracias a la compañía de petróleo de Brasil, Petrobrás S.A y HSBC Holding plc a través del programa Invirtiendo en la Naturaleza. Para mayor información contactar a la Dra. Tânia Sampaio Pereira, Jardim Botánico do Rio de Janeiro, Rua Pacheco Leao 915, 22460-030, rio de janeiro, Brasil. Tel: 56(0) 51 236 1479 Email: tpereira@jbrj.gov.br Web Site: http://www.jbrj.gov.br/rbjb/

Apoyo Otorgado a Jardín Botánico

El proyecto "Educación para la Conservación de Caatinga" del jardín Botánico de la Fundación Zoobotánica de Belo Horizonte ha sido seleccionada para recibir el primer financiamiento por tres años en Brasil del programa Invirtiendo en la Naturaleza auspiciado por HSBC (véase Rotos 24 p.4).

■ News

been translated into Portuguese. As well as the 12 case studies from botanic garden around the globe, an additional eight Brazilian case studies have been included. The Portuguese translation was done as part of the HSBC Investing in Nature partnership. For further information contact: Dr Tânia Sampaio Pereira, Jardim Botânico do Rio de Janeiro, Rua Pacheco Leao 915, 22460-030, Rio de Janeiro, Brazil. Tel: 55 (0) 51 236 1479 Email: tpereira@jbrj.gov.br

Investing in Nature in Indonesia

Indonesian botanic gardens' staff members converged at the Bali Botanic Gardens to attend the 2nd National Training Course, made possible by HSBC's Investing in Nature Programme. The course was conducted from 19– 22 July and involved 36 staff from Cibodas, Bogor, Purwodadi and Bali Botanic Gardens and one member of staff from a new garden in Jambi, Sumatra.

The course focused on environmental education programmes in the Indonesian Botanic Gardens and consisted of activities conducted outdoors, in addition to classroom/lecture time. Local and foreign speakers contributed to a wide breadth of topics that included the basics of environmental education and

▲ Nouvelles

Prix Gagnant pour le Jardin Botanique

Le projet "Éducation pour la Conservation du Caatinga" au Jardin Botanique de la fondation Belo Horizonte Zoobotanic a été sélectionné pour recevoir le premier prix après les trois années du programme sponsorisé par la HSBC "Investir dans la Nature" au Brésil (voir Roots n°24, page 4).

Le projet vise à échantillonner la végétation du nord de l'état du Minas Gerais afin de collecter les espèces d'intérêt scientifique et écologique pour les mettre en culture et structurer un programme de conservation ex situ pour la préservation des espèces endémiques et menacées. La partie éducative du projet à pour but d'encourager les gens à devenir plus respectueux de la nature et des ressources culturelles du Caatinga et les encourager à contribuer aux programmes de conservation ex situ et in situ. Pour plus d'information, prendre contact avec : Inês Ribeiro de Andrade, Project Coordinator, Belo Horizonte Zoobotanic Foundation, Avenida Otacílio Negrão de Lima 8000, 31.365-450, Belo Horizonte- Minas Gerais, Brazil. Email: inribeiro@hotmail.com

Programme "Investir dans la Nature" en Indonésie

Les personnels des Jardins Botaniques Indonésiens se sont retrouvés au Jardin Botanique de Bali pour suivre le

● Noticias

El proyecto incluye un muestreo de vegetación de Caatinga, al norte del estado Minas Gerais, colecta con fines de cultivo de especies de interés científico y ecológico, la estructuración de un programa de conservación ex situ para especies endémicas y amenazadas. El programa educativo del proyecto consistirá en promover y concienciar a la población sobre el valor de los recursos de Caatinga y contribuir a su conservación *in situ* y *ex situ*. Para mayor información contacta a Inés Ribeiro de Andrade, Coordinadora del Proyecto, Fundación Zoobotanica Belo Horizonte, Avenida Otacílio Negrao de Lima 8000, 31.365-450, Belo Horizonte-Minas Gerais, Brasil. Email: inribeiro@hotmail.com

Invirtiendo en la Naturaleza en Indonesia

Personal de los jardines botánicos de Indonesia se reunieron en el Jardín Botánico de Bali para participar en el 2° Curso Nacional auspiciado por programa de HSBC Invirtiendo en la Naturaleza. Dicho curso se llevó a cabo del 19 al 22 de julio con 36 participantes de jardines botánicos de Cibodas, Bogor, Purwodadi, Bali, así como personal de un jardín botánico nuevo en Jambi, Sumatra.

El curso se centró en los programa de educación de los jardines botánicos de Indonesia Y consistió de actividades al aire libre y clases teóricas. Conferencistas locales y extranjeros trataron sobre una amplia gama de tópicos incluyendo aspectos básicos de educación ambiental y la transmisión de los mensajes ambientales. También se presentaron ejemplos de programas en Singapur, Adelaida (Australia) y de universidades y ONG's locales.

El curso se impartió de una manera informal con el fin de promover una relación más estrecha entre los conferencistas y los participantes. Al final del curso, los participantes de cada jardín ofreció una presentación en power point. Esto permitió una mayor apreciación sobre las fortalezas y debilidades de los diferentes jardines botánicos. Para más información

Left: Steve Meredith, from Adelaide Botanic Garden in Australia, shares techniques on learning through self discovery with staff from Indonesia's botanic gardens

■ News

packaging and delivering environmental messages. Examples of programmes in Singapore, Adelaide (Australia), local universities and NGOs were also presented.

The course was delivered in an informal manner to encourage a close rapport between participants and speakers. Towards the end of the course, participants from each botanic garden gave power point presentations. This resulted in a greater appreciation of the strengths and weaknesses of fellow botanic gardens. For further information contact: Mr Bian Tan, Kebun Raya Bogor (Bali Botanic Garden), Jln. Ir. H. Juanda No.13, Bogor, Indonesia. Email: Bian_Tan@bgci.org.uk

AUSTRALIA

15 Year Celebrations

Gladstone Tondoon Botanic Gardens celebrated its 15 year anniversary with a diverse entertainment programme for botanic garden visitors and community members. Activities included guided bush tucker walks, evening spotlight walks, art based activities for children and adults, and a dinner in the botanic garden with Australian television gardening expert Colin Campbell. Entertainment was also provided by the Gum Nut Theatre Group from Wollongong Botanic Garden whose creative performances entertain as well as educate the audience. For further information contact: Ms Merilyn Haigh, Visitor Services Co-ordinator, Gladstone Tondoon Botanic Gardens, PO Box 29, Gladstone Qld 4680, Australia. Tel: 61 (0) 749 793326 Email: visitor@tondoon.qld.gov.au

CANADA

A Path to Biodiversity

As part of Montreal Botanical Garden's ex situ conservation programme for threatened plant species in Southern Quebec, the garden is inviting visitors to follow local plants on their 'Path to Biodiversity'. On-site exhibit panels have been installed, featured plants are identified with distinct green labels, and guided tours are offered by the

▲ Nouvelles

2ème cours de formation mis en place grâce au programme de la HSBC "Investir dans la nature". La formation se déroulait du 19 au 22 juillet et concernait 36 personnes de Cibodas, Bogor, Purwodadi et du Jardin Botanique de Bali, incluant une personne du nouveau jardin de Jambi à Sumatra.

La formation était centrée sur les programmes d'éducation à l'environnement dans les jardins botaniques Indonésiens et comportait en des activités effectuées en plein air ainsi que des conférences en salle. La contribution d'intervenants locaux et étrangers a permis de présenter un large éventail de thèmes qui incluait les bases de l'éducation à l'environnement ainsi que des messages sur l'environnement. Des exemples de programmes conduits à Singapour, à Adélaïde (Australie), par des Universités locales et des ONG ont été également présentés.

La formation était donnée d'une façon informelle pour encourager des rapports plus proches entre les intervenants et les participants. En fin de formation, les participants de chaque Jardin Botanique ont donné une présentation sous power point. Cela a permis d'apprécier les points forts et les points faibles des Jardins Botaniques. Pour plus d'information, prendre contact : Mr Bian Tan, Kebun Raya Bogor (Bali Botanic Garden), Jln. Ir. H. Juanda No.13, Bogor, Indonesia. Email: Bian_Tan@bgci.org.uk

AUSTRALIE

Célébration des 15 ans

Le Jardin Botanique de Gladstone Tondoom a célébré son 15ème anniversaire au moyen de divers programmes de festivités destinés aux visiteurs du Jardin Botanique et aux membres des communautés. Les activités incluaient des visites guidées du bush avec pique-nique, des randonnées nocturnes à la lueur des lampes-torches, des activités artistiques pour les enfants et les adultes et un dîner dans le Jardin Botanique avec Colin Campbell qui est

● Noticias

contactar a: Mr. Bian Tan, Kebun Raya Bogor, (Bali Botanic Garden), Jln. Ir. H. Juanda N°. 13, Bogor, Indonesia. Email: Bian_Tan@bgci.org.uk

AUTRALIA

Celebración de 15 años

El Jardín Botánico de Gladstone Tondoon celebró se 15 aniversario con un programa de diversas actividades para los visitantes y miembros de la comunidad. Las actividades incluyeron caminatas guiadas al matorral, caminatas nocturnas, actividades artísticas para niños y adultos y una cena en el jardín con Colin Campbell, experto en jardinería de la Televisión Australiana como invitado. En la animación participó el Grupo de Teatro del Jardín Botánico de Wollogong cuyas representaciones tan creativas resultaron entretenidas y educativas para la audiencia. Para mayor información contacta a: Ms. Merilyn Haigh, Visitor Services Co-ordinator, Gladstone Tondoon Botanic Gardens, PO Box 29. Gladstone Qld 4680, Australia, Tel: 61 (0) 749 793326 Email: visitor@tondoon.qld.gov.au

BRASIL

Traducción de los Lineamientos de Educación Ambiental

BGCI recién terminó la traducción de los Lineamientos de Educación Ambiental en Jardines Botánicos para el Desarrollo de Estrategias Individuales al portugués. Se incluyeron los 12 estudios de caso de jardines botánicos del mundo, y se incluyeron estudios de caso de 8 jardines botánicos brasileños. La traducción al portugués se realizó como parte del financiamiento de Invirtiendo en la Naturaleza de HSBC. Para mayor información contactar a: Dra. Tânia Sampaio Pereira, Jardim Botánico do Rio de Janeiro, Rua Pacheco Leao 915, 22460-030, Rio de janeiro, Brasil. Tel: 55(0) 51 236 1479 Email: tpereira@jbrj.gov.br

CANADA

Senda de la biodiversidad

Como parte del programa de conservación ex situ de plantas

■ News

Left: Path to Biodiversity exhibit panels installed in July 2003

Friends of Montreal Botanical Gardens. An extensive section about the programme has also been added to the garden's web site.

The conservation programme involves botanists collecting seeds and cuttings from a number of vulnerable and threatened plant species. Some of the seeds are sent to the Plant Gene Resources of Canada Seed Bank at the Saskatoon Research Centre and to the Millennium Seed Bank Project at Royal Botanical Gardens, Kew, UK. The remaining seeds are propagated and transplanted in experimental and exhibition gardens for research and educational purposes. 66 new plants from the 243 provincially listed endangered or vulnerable species found in Southern Quebec, have been incorporated into suitable habitats in established display gardens.

'Path to Biodiversity' provides a unique opportunity for visitors to appreciate the wealth of local plant life and to get a closer look at plants that are difficult to observe in the wild. Its aim is to remind both visitors and staff of the importance of protecting natural habitats and promoting sustainable development practices. The programme demonstrates the role botanic gardens can play in balancing

▲ Nouvelles

expert en jardinage et animateur d'une émission de télévision. La bonne humeur fut également apportée par la troupe de théâtre Gum Nut du Jardin Botanique de Wollongong qui a réalisé une attraction aussi amusante que pédagogique pour le public. Pour plus d'information, prendre contact :
Ms Merilyn Haigh, Visitor Services Co-ordinator, Gladstone Tondoon Botanic Gardens, PO Box 29, Gladstone Qld 4680, Australia.
Tel: 61 (0) 749 793326
Email: visitor@tondoon.qld.gov.au

BRESIL

Traduction du Guide sur l'Education à l'Environnement.
Il y a peu, le guide du BGCI sur l'Education à l'Environnement dans les Jardins Botaniques pour développer une stratégie à l'échelle de l'individu a été traduit en Portugais. En plus des 12 études de cas prises dans des Jardins Botaniques du monde entier, 8 études de cas sur le Brésil ont été ajoutées. La traduction portugaise a été réalisée en partie grâce au partenariat avec le programme de la HSBC « Investir dans la Nature ». Pour plus d'information, prendre contact avec : Dr Tânia Sampaio Pereira, Jardim Botânico do Rio de Janeiro, Rua Pacheco Leao 915, 22460-030, Rio de Janeiro, Brazil.
Tel: 55 (0) 51 236 1479
Email: tpereira@jbrj.gov.br

CANADA

Un Parcours sur la Biodiversité
Dans le cadre du programme de conservation ex-situ du Jardin Botanique de Montréal portant sur les plantes menacées du sud du Québec, le Jardin invite les visiteurs à découvrir les plantes locales dans le « parcours pour la biodiversité ». Des panneaux ont été installés sur le site, les plantes caractéristiques sont identifiées avec des étiquettes vertes spécifiques et des visites guidées sont proposées par les Amis du Jardin Botanique de Montréal. Une section a été rajoutée pour présenter ce programme sur le site Internet du Jardin.

● Noticias

amenazadas del sur de Québec, el Jardín Botánico de Montreal invita a sus visitantes a seguir la "Senda de la Biodiversidad". Se instalaron carteles in situ con sus respectivas plantas rotuladas, y la asociación de Amigos del Jardín Botánico de Montreal ofrecen visitas guiadas. Asimismo, se añadió una sección correspondiente a este programa en el sitio web.

El programa de conservación involucra la colecta botánica de semillas y propágulos vegetativos de numerosas especies vulnerables y amenazadas. Algunas de las semillas se envían al Banco de Semillas de Recursos Genéticos Vegetales de Canadá, ubicado en el Centro de Investigación de Saskatoon y al Proyecto de Banco de Semillas del Milenio en el Real Jardín Botánico de Kew. Las semillas restantes se propagan y se trasplantan en exhibiciones experimentales del Jardín tanto con fines educativos como de educación. Sesenta y seis plantas de las 243 plantas del listado de las provincias que las reportan como amenazadas o vulnerables del sur de Québec se han incorporado a los hábitats adecuados de colecciones establecidas en el Jardín.

'Senda de la Biodiversidad' brinda una oportunidad única a los visitantes para apreciar el beneficio de la vida de las plantas locales y para conocer plantas difíciles de observar en su estado silvestre.

El objetivo es recuperar en el personal del Jardín Botánico y sus visitantes la importancia de la conservación de hábitats naturales y promover prácticas de desarrollo sustentable. El programa muestra el papel que los jardines botánicos pueden jugar en el equilibrio del desarrollo económico, la protección del ambiente y la conservación de la biodiversidad. Para más información: Montreal Botanic Garden, 4101, Sherbrooke St. East, Montréal, (Québec) Canada, H1X2B2.
Tel: (514) 872 1400
Fax: (514) 872 3765 Email: jardin_botanique@ville.montreal.qc.ca.
Web site: http://www.ville.montreal.qc.ca/jardin/urgence

■ News

▲ Nouvelles

● Noticias

Right: Alain Meilleur, Coordinator of the Ex Situ Conservation Programme, shows one of Quebec species-at-risk that has been propagated from wild collected seed and is ready for display

economic development, environmental protection and biodiversity conservation. For more information contact: Montréal Botanical Garden, 4101, Sherbrooke St. East, Montréal (Québec) Canada, H1X 2B2.
Tel: (514) 872 1400
Fax: (514) 872 3765 E-mail : jardin_botanique@ville.montreal.qc.ca
Web site : http://www.ville.montreal.qc.ca/jardin/urgence

GIBRALTAR

Recognising the Value of Botanic Gardens

The government's Department of Education has recently published a manual on Environmental Education Modules for Primary and Secondary Schools. One of the chapters of this manual is dedicated to using Gibraltar Botanic Gardens to support the teaching of environmental education and more specifically, education for sustainability. The chapter describes a series of activities that encourage discussion about the need for protected areas such as botanic gardens, parks, zoos and green areas, not only for aesthetics, but also for conservation purposes. The activities also aim to stimulate and develop a sense of responsibility in students for their local and global environment.

Le programme de conservation prévoit la collecte, par les botanistes, des graines et des boutures de nombreuses espèces vulnérables et menacées. Une partie des graines est envoyée au Plant Gene Ressources de la banque de graines du Canada au centre de recherche de Saskatoon, ainsi qu'au Millenium Seed Bank Project du Jardin Botanique Royal de Kew. Les graines restantes sont diffusées et transplantées dans des jardins expérimentaux et de démonstration avec des objectifs de recherche et d'éducation. 66 nouvelles plantes sur les 243 figurant dans les listes provinciales des espèces en danger ou vulnérables trouvées dans le sud du Québec ont été installées dans des jardins d'exposition comprenant des habitats aptes à les accueillir.

Le « Parcours de la biodiversité » fournit une occasion unique pour les visiteurs d'apprécier l'état de santé de la flore locale et d'observer facilement des plantes difficiles à voir dans la nature. Son but est de rappeler aux visiteurs et au personnel du Jardin l'importance de protéger les habitats naturels et promouvoir des pratiques de développement durable. Le programme montre le rôle que peuvent jouer les Jardins Botaniques dans un développement économique équilibré,

GIBRALTAR

Reconocimiento al Valor de los Jardines Botánicos

El departamento de educación del gobierno de Gibraltar publico recientemente un manual de módulos de Educación ambiental para escuelas primarias. Uno de los capítulos es dedicado al uso de los jardines botánicos en Gibraltar para apoyar la educación ambiental, más específicamente la sustentibilidad. El capitulo describe una serie de actividades que motivan la discusión acerca de las necesidades para áreas protegidas, como lo son jardines botánicos, parques zoológicos y áreas verdes, no solo por su escenario sino, también por su importancia en conservación. Las actividades que se llevan a cabo estimulan y desarrollan en los estudiantes el sentido de responsabilidad por el medio ambiente local y global. Para mayor información, contactar: Dr John Cortes, Gibraltar Botanic Gardens, PO Box 843, Gibraltar. Email: alameda@wildlife.gib.gi Web site: http://www.gibraltar.gi/almeda

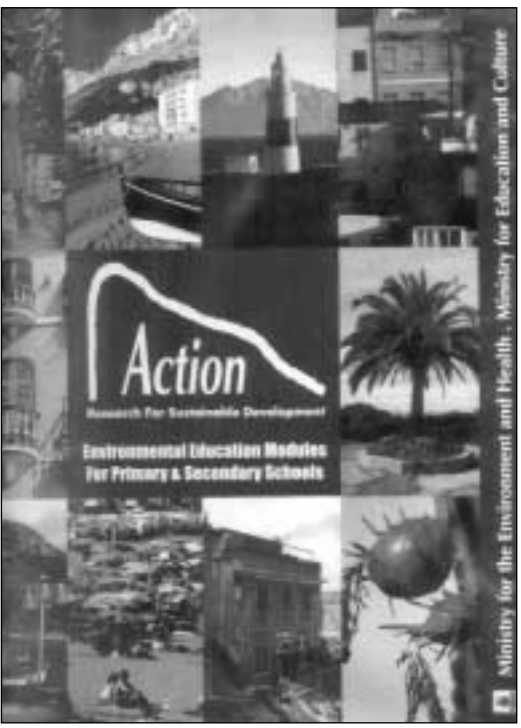
ITALIA

Biodiversidad en la Cocina: ¡es Materia de Gusto!

Este año 'Medieval Herb Garden', bajo la dirección de Assisi Nature Council, desarrollo un programa gastronómico en colaboración con el Assisi Institute para hoteles y manejo de restaurantes. *The Garden of Simples: usos de hierbas y plantas culinarias en la antigüedad* es un proyecto experimental que informa a estudiantes de cómo los jardines han usado las plantas como ingredientes de cocina desde los tiempos Romanos. El proyecto se enfoca a las propiedades que las plantas brindan a la salud, sus vitaminas y contenidos minerales, así como sus propiedades medicinales y en ayuda a la digestión humana. Esta información permite a los estudiantes elaborar una alimentación nutricional y bien balanceada. Al final del proyecto de 3er. año los estudiantes preparan un buffet medieval en el que se incluye vino aromático, a continuación se da la receta.

■ News

For further information contact:
Dr John Cortes, Gibraltar Botanic Gardens, PO Box 843, Gibraltar.
Email: alameda@wildlife.gib.gi Web site: http://www.gibraltar.gi/almeda



ITALY

Biodiversity in the Kitchen: It is a Matter of Taste!

This year the Medieval Herb Garden, managed by the Assisi Nature Council developed a gastronomical project in collaboration with the Assisi Institute for Hotel and Restaurant Management. *The Garden of Simples: culinary uses of herbs and plants in antiquity* is an experimental project which informs students about how the gardens' plants have been used as ingredients in cooking from Roman times on. The project focuses on the healthy properties of plants, their vitamin and mineral content, medicinal properties and their ability to aid digestion. This information enables students to produce a well-balanced nutritional meal. At the end of the project, 3rd year students prepare a medieval buffet and an aromatic wine:

▲ Nouvelles

la protection de l'environnement et la conservation de la biodiversité. Pour plus d'information, prendre contact avec : Montréal Botanical Garden, 4101, Sherbrooke St. East, Montréal (Québec) Canada, H1X 2B2.
Tel: (514) 872 1400
Fax: (514) 872 3765 E-mail : jardin_botanique@ville.montreal.qc.ca
Web site : http://www.ville.montreal.qc.ca/jardin/urgence

GIBRALTAR

La Valeur des Jardins Botaniques Reconnue

Le département de l'éducation du gouvernement a récemment publié un guide sur des modules d'éducation à l'environnement pour l'enseignement primaire et secondaire. L'un des chapitres du guide est consacré à l'utilisation des jardins botaniques de Gibraltar comme support pour l'éducation à l'environnement et, plus particulièrement, l'éducation au développement durable. Le chapitre décrit différentes activités qui encouragent la discussion sur la nécessité d'avoir des lieux protégés tels que les jardins botaniques, parcs, zoos et espaces verts, non seulement pour des questions esthétiques mais aussi pour des questions de conservation. Les activités visent également à développer et stimuler chez les étudiants le sens de la responsabilité pour leur environnement au niveau local et mondial. Pour plus d'informations, contacter : Dr John Cortes, Gibraltar Botanic Gardens, PO Box 843, Gibraltar. Email : alameda@wildlife.gib.gi Site Internet : http ://www.gibraltar.gi/almeda

ITALIE

La Biodiversité dans la Cuisine : une Question de Goût !

Cette année, le jardin des plantes médiévales, géré par le Conseil Nature d'Assise, a développé un projet gastronomique en collaboration avec l'Institut pour la Gestion Hôtelière et de Restauration d'Assisi. *Le Jardin de Simples : utilisation culinaire de plantes dans l'antiquité* est un projet expérimental qui informe les étudiants

● Noticias

Vino aromático:
Verter en un recipiente un cuarto de vino rojo agregar dos cucharadas pequeñas de miel, calentar lentamente en un fuego de leña y mezclar lentamente con una cuchara de madera hasta que comience a hervir. Al mismo tiempo para evitar que se seque agregar un poco más de vino, según se va éste evaporando. Removerlo del fuero y permitir que se enfríe, calentar de nuevo, repetir esto dos veces. Al día siguiente agregar pimienta molida, un poco de pistache [molido?], un poco de canela, azafrán y cinco libras de dátiles. Entonces agregar dos litros de vino joven en la mezcla y cocinar por otra hora. Si desea obtener más información relacionada a este proyecto en el uso de hierbas y bebidas de la edad media, contactar: Assisi Nature Council, C.P. 107, Assisi 06081 PG, Vicolo Steet, Stefano Italy
Email: edet@assissinc.ch

Left: Gibraltar Botanic Garden has been included in its government's Manual on Environmental Education Modules for Primary and Secondary Schools

Below: The Assisi Nature Council developed a gastronomical project to educate hospitality students about the diversity of herbs used in medieval cooking

■ News

Right: Students from the Assisi Institute for Hotel and Restaurant Management study the diverse range of herbs used in medieval cooking

Special aromatic wine:
Pour a quarter of red wine and two teaspoons of honey into a vessel, warm it up slowly on a wood fire and stir with a wooden spoon until it starts boiling. At this time pour in some more wine to prevent it from drying up. Remove from the fire and when it cools, reheat; repeat this twice. The day after add ground peppers, a little pistachio, a little cinnamon and saffron and five pounded dates. Then pour two litres of young wine into the mixture and cook for another hour. For more Middle Ages beverages that use herbs or for further information on this project please contact: Assisi Nature Council, C.P. 107, Assisi 06081 PG, Vicolo Steet, Stefano Italy
Email: edet@assissinc.ch

RUSSIA

Facilitating Biodiversity Conservation through Education

The Botanic Garden of Tver State University has begun a programme of environmental education with the aim of facilitating biodiversity conservation in the region. Special attention is paid to the specific characteristics of ecosystems and to the harmonious

▲ Nouvelles

sur l'usage des plantes du jardin dans la cuisine depuis l'époque des Romains. Le projet traite en particulier des propriétés diététiques des plantes, de leurs teneurs en vitamines et sels minéraux et de leurs propriétés médicinales et digestives. Ces informations permettent aux étudiants de préparer un repas bien équilibré. A la fin du projet, les étudiants de troisième année préparent un buffet médiéval et un vin aromatisé aux épices.

Vin aromatisé :
Versez un litre de vin rouge et deux cuillerées de miel dans un récipient, chauffez lentement sur un feu de bois en mélangeant avec une cuillère en bois jusqu'à ébullition. Versez encore un peu de vin pour empêcher que la préparation ne se déssèche. Enlevez du feu pour refroidir puis replacez sur le feu ; répétez l'opération deux fois. Le lendemain, ajoutez du poivre moulu, quelques pistaches et un peu de cannelle et de safran, ainsi que cinq dates pilées. Enfin, versez deux litres de vin jeune dans la mixture et faites cuire une heure. Pour plus d'informations sur le projet ou d'autres recettes de boissons aromatisées du Moyen-Age, contactez : Conseil Nature d'Assise, CP107, Assisi 06081 PG, Vicolo Street, Stefano, Italie.
Email : edet@assissinc.ch

● Noticias

RUSIA

Facilitando Biodiversidad y Conservación a través de la Educación

El Jardín Botánico de la Universidad del estado de Tver ha comenzado un programa de educación ambiental con la meta de facilitar [hacer accesible] la biodiversidad y conservación en la región. Se pone atención especial a las características de los ecosistemas y la interacción harmónica entre el hombre y la naturaleza. El programa se basa en cuatro principios fundamentales.

1) todas las actividades tienen que tener un enfoque regional.
2) La comunidad, educación y concienciación es desarrollada usando un método sistemático.
3) La interpretación del medio ambiente incluye una perspectiva humana.
4) Enseñando técnicas que desarrollan ideas constructivas

Con amplio rango de conciencia pública los eventos son empleados e incluidos en festivales, competencias de arte, exposiciones, juegos y producción de folletos de jardines (con la ayuda de la comunidad local), desarrollo de planes de acción del medioambiente y presentación de artículos y noticias locales. Estas actividades se extienden a incorporar cursos ambientales, trabajo de campo, practicas, paseos y seminarios con temas relacionados al medio ambiente.

Todas las actividades en el jardín botánico se complementan mutualmente. El trabajo de investigación sirve de base para la educación del público y programas de concienciación, en cuanto que las actividades educacionales dan un significado adicional a la investigación. La experiencia de clasificar la biodiversidad local ha conducido al personal del jardín a formar un grupo de investigadores profesionales in la región. También se logro que un miembro del personal trabajara con escuelas locales y agencias de protección ambiental. Para

■ News

interaction between humans and nature. The programme is based on four principles:
1) All activities must have a regional focus
2) Community education and awareness is developed using a systems approach
3) Interpretation of the environment includes a human perspective
4) Teaching techniques must develop constructive thinking.

A wide range of public awareness activities are employed including festivals and art competitions, exhibitions and games, production of brochures about the garden (with the help of the local community), development of environmental action plans and the submission of articles to the local media. This range is also being enlarged to incorporate educational courses, field trips, practical studies, thematic tours and seminars.

All activities in the botanic garden are complementary. The research work serves as a basis for educational and public awareness programmes, while the educational activities help to publicise the importance of research. The experience of classifying local biodiversity led garden staff to form a group of professional researchers in the region. This also resulted in supporting a member of staff to work with local schools and environmental protection agencies. For further information contact: Dr Yuri Naumtsev, Botanic Garden of Tver State University, Zheljabov Str., 33, Tver 170000 Russia. Tel: 7 (0822) 315318
Fax: 7 (0822) 321274
Email: garden@tversu.ru
Internet: http://www.garden.tversu.ru

U.K.

Celebrating Cultural Diversity

Chumleigh Multicultural Garden in South-east London was established and designed to reflect the diversity of the local community. In 2000, an area adjacent to the multicultural gardens was set up to concentrate on food production and medicinal plants and to

▲ Nouvelles

RUSSIE

Faciliter la Conservation de la Biodiversité par l'Éducation

Le Jardin Botanique de l'Université de l'Etat de Tver vient de débuter un programme d'éducation à l'environnement ayant pour objectif de faciliter la conservation de la biodiversité dans la région. Une attention particulière a été prêtée aux caractéristiques spécifiques des écosystèmes et aux interactions harmonieuses entre les humains et la nature. Le programme est basé sur quatre principes :
1) Toutes les activités doivent avoir un point de vue régional
2) L'éducation et la sensibilisation de la communauté sont développées de manière systémique
3) L'interprétation de l'environnement comprend la composante humaine
4) Les méthodes d'enseignement doivent développer une pensée constructive

Une grande variété d'activités de sensibilisation du public est utilisée : des festivals, des concours artistiques, des expositions et des jeux, la production de brochures sur le jardin (avec l'aide de la communauté locale), l'élaboration de programmes d'action environnementale et des articles dans la presse locale. D'autres activités viennent enrichir le programme : cours, voyages d'études, travaux pratiques, voyages thématiques et séminaires.

Toutes les activités dans le jardin sont complémentaires. Le travail de recherche sert de base pour les programmes de sensibilisation et d'éducation tandis que les activités pédagogiques donnent plus de sens à la recherche. La classification de la biodiversité locale a amené le personnel du jardin à rassembler un groupe de chercheurs de la région. Cette expérience a également permis de soutenir un membre de l'équipe pour travailler avec les écoles locales et les agences de protection de l'environnement. Pour plus d'informations, contactez : Dr Yuri Naumtsev, Botanic Garden of Tver State University, Zheljabov Str. 33, Tver

● Noticias

información adicional, contactar:
Dr Yuri Naumtsev, Botanic Garden of Tver State University, Zheljabov Str., 33, Tver 170000 Russia.
Tel: 7 (0822) 315318
Fax: 7 (0822) 321274
Email: garden@tversu.ru
Internet: http://www.garden.tversu.ru

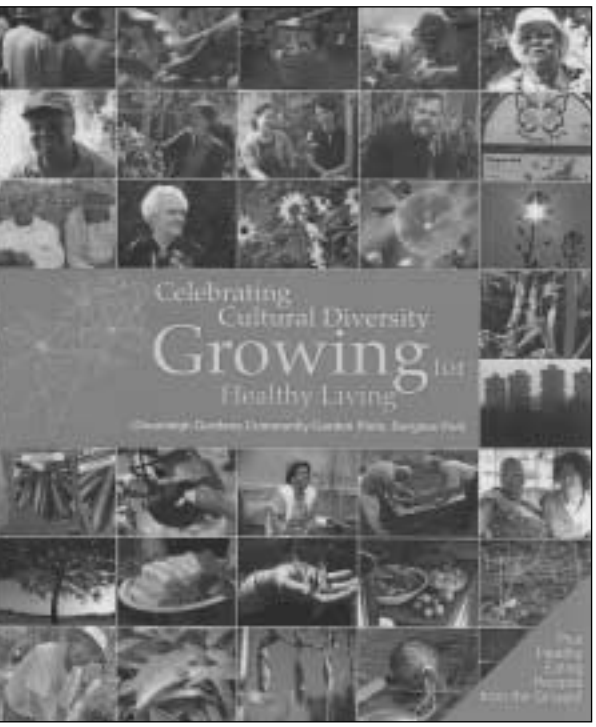
Reino Unido

Celebrando Diversidad Cultural

El Jardín Multicultural Chumleigh en el Sureste de Londres fue fundado y establecido para reflejar la diversidad de la comunidad local. En el año 2000, un área adyacente al jardín multicultural se delimito para concentrar la producción de plantas que permiten a los grupos locales participar activamente en sus comunidades. Las huertas muestran vegetales y hierbas que son crecidas en varios grupos, en estos se incluyen, la comunidad de Vietnam-China, la organización de ancianos del Sur de Asia, plantas medicinales de Sudáfrica y plantas de patrimonio cultural. Las huertas muestran como el cultivar plantas que proporcionan alimentos y medicina, nos dan también la oportunidad de efectuar ejercicio físico y actividades sociales, Al mismo tiempo que se aprenden nuevas destrezas, se comparte conocimiento y se disfruta una dieta sana. Cada grupo suministra su propia interpretación con un plan de trabajo.

Recientemente la Fundación de Desarrollo económico y social (SEED) proporciono financiamiento y asistencia para elaborar un cuaderno de trabajo y un video de jardines multiculturales. El cuaderno contiene artículos de varios grupos comunitarios, en el se describe como las plantas crecen y se cultivan en cada uno de ellos, además de que se incluye una dos sanas y deliciosas recetas de cocina. Para mayor información, contactar: Ms Christine Wildhaber, Chumleigh Gardens, Chumleigh Street, Burgess Park London SE5 0RJ U.K. Email: christine.wildhaber@southwark.gov.uk

■ News



Above: Booklet 'Celebrating Cultural Diversity Growing for Healthy Living'

Right: brochure for 'A Wild Community'

allow local community groups to play a more active role in their cultivation. The plots display vegetables and herbs grown by various groups including Vietnamese-Chinese Community, the South Asian Elderly Organisation, South African Medicinal Plants and Heritage Vegetables. The plots illustrate how growing food and medicinal plants can offer physical exercise and social activity as well as the opportunity to learn new skills, share knowledge and enjoy a healthy diet. Each group is also responsible for interpreting their planting scheme.

Recently the Social, Economic and Environmental Development Fund (SEED) provided financial assistance for the development of a booklet and video about the multicultural gardens. The booklet features articles on several of the community groups, describes the plants grown in each of the gardens and also gives one or two delicious and healthy recipes. For further information contact:
Ms Christine Wildhaber, Chumleigh Gardens, Chumleigh Street, Burgess Park London SE5 0RJ U.K. Email: christine.wildhaber@southwark.gov.uk

▲ Nouvelles

170 000 Russie. Tel : (0822) 315318
Fax : (0822) 321274
Email : garden@tversu.ru. Site Internet : http ://www.garden.tversu.ru

ROYAUME-UNI

Célébrons la Diversité Culturelle

Le Jardin Multiculturel de Chumleigh dans le sud-ouest de Londres a été créé et conçu pour refléter la diversité de la communauté locale. En 2000, une zone adjacente aux jardins multiculturels a été aménagée pour présenter en particulier les plantes alimentaires et médicinales, et permettre à des groupes locaux d'avoir un rôle plus actif. Les parcelles montrent des légumes et herbes cultivées par différents groupes, dont la communauté vietnamienne et chinoise, l'Association des personnes âgées d'Asie du sud, les plantes médicinales d'Afrique du sud et les légumes anciens. Les parcelles montrent comment la culture de plantes médicinales et alimentaires offre tout à la fois la possibilité de faire de l' exercice physique, d'avoir une activité sociale, d'acquérir de nouvelles compétences, de partager ses connaissances et de profiter d'un régime équilibré. Chaque groupe présente lui-même son projet de plantations.

Récemment, le Fond de Développement Social, Economique et Environnemental a apporté son soutien financier à l'élaboration d'un livret et d'une vidéo sur les jardins multiculturels. Le livret comprend des articles sur plusieurs communautés, décrit les plantes cultivées dans chaque parcelle et donne aussi une ou deux recettes culinaires, équilibrées et délicieuses ! Pour plus d'informations, contactez : Mme Christine Wildhaber, Chumleigh Gardens, Chumleigh Street, Burgess Park, Londres SE5 0RJ, Royaume-Uni. Email : christine.wildhaber@southwark.gov.uk

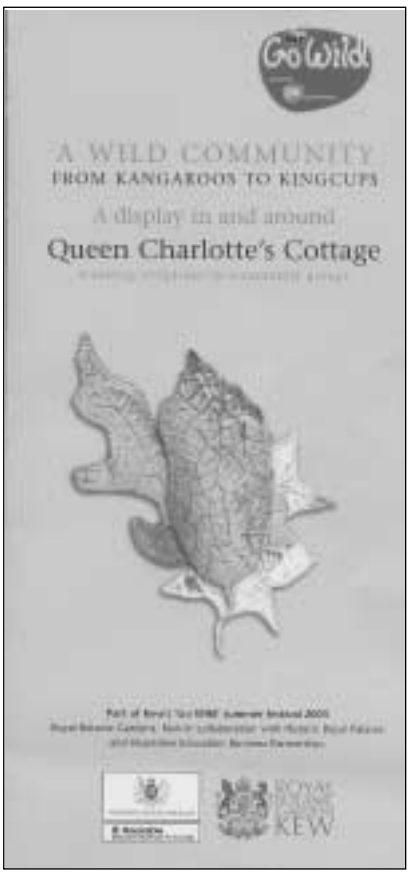
Nature Sauvage : des Kangourous aux Boutons d'or

Dans son festival d'été 2003, Kew Gardens célèbre la biodiversité riche et variée du Royaume-Uni. Le projet 2003

● Noticias

Comunidad Silvestre - desde Canguros a Hierba Centella

Kew Gardens celebrando la riqueza de la biodiversidad del Reino Unido y como parte de su festival de verano 2003 contribuyo con su proyecto de comunidad con dos temas: biodiversidad en el Reino Unido y patrimonio nacional, de una forma muy innovadora. El titulo del proyecto fue 'Una comunidad silvestre – desde Canguros a hierba centella [hierba palustre]'. Este consiste en una serie de esculturas en el área la 'casita' Queen Charlotte's. En este proyecto participaron mas de 120 estudiantes de todas las edades y destrezas, el trabajo se llevo a cabo con la artista Sofie Layton. Para esto un núcleo de estudiantes desde los 10 años la edad de niveles avanzados en Arte exploraron el área que rodea a la 'casita' Queen Charlotte's. Posteriormente diseñaron y construyeron estatuas usando elementos de tanto animales como plantas que alguna vez estuvieron



■ News

A Wild Community - from Kangaroos to Kingcups

Kew Gardens is celebrating the UK's rich and varied biodiversity as part of its 2003 summer festival. Kew's 2003 community project links the two themes, UK Biodiversity and UK Royal Heritage, in an innovative way. The project entitled 'A Wild Community – from Kangaroos to Kingcups' is a sculptural installation in the grounds of Queen Charlotte's Cottage. Over 120 students of all ages and abilities participated in the project, working with artist Sofie Layton. Students explored the site around the cottage, and designed and made statues that incorporated elements of design based on both U.K. plants and exotic animals that were once present on-site. For further information contact: Ms Gail Bromley, Education Development Manager, Royal Botanic Gardens Kew, Richmond, Surrey TW9 3AB, U.K. Email: G.Bromley@rbgkew.org.uk

Royal Botanic Gardens Makes World Heritage List

In July 2003, The Royal Botanic Gardens Kew became the second botanic garden in the world to be given World Heritage status; Botanical Garden (Orto Botanica) Padua being the first. World Heritage status gives recognition to Kew's historic landscape garden that features elements illustrating significant periods of the art of gardens from the 18th to the 20th centuries. In addition, recognition is given to the gardens notable and uninterrupted contribution to the study of plant diversity and economic botany, as well as its botanical collections (conserved plants, living plants and documents) which have been considerably enriched through the centuries and since their creation in 1759.

The World Heritage Convention, adopted by UNESCO (the United Nations Educational, Scientific and Cultural Organisation) in 1972, provides for the identification, protection and conservation of natural and cultural sites of outstanding universal value. For further information contact: http://www.rbgkew.org.uk or http://whc.unesco.org/

▲ Nouvelles

de Kew associe, de manière originale, les deux thèmes, la biodiversité du Royaume-Uni et le patrimoine royal. Le projet intitulé 'A Wild community : from Kangaroos to Kingcups' est une installation de sculptures dans les jardins du cottage de la reine Charlotte. Plus de 120 étudiants de tous âges et toutes compétences ont participé au projet, travaillant avec l'artiste Sofie Layton. Un groupe central d'élèves de la 2nd à la Terminale artistique - a exploré le terrain autour de la petite maison. Ils ont conçu et crée des statues en intégrant des éléments de design inspirés à la fois des plantes du Royaume-Uni et des animaux exotiques qui étaient présents autrefois sur ce site. Pour plus d'informations, contactez : Mme Gail Bromley, Education Development Manager,
Royal Botanic Gardens Kew, Richmond, Surrey TW9 3AB, RU.
Email : G.Bromley@rbgkew.org.uk

Le Jardin Botanique de Kew au Patrimoine Mondial de l'Humanité

En juillet 2003, le Jardin Botanique Royal de Kew est devenu le deuxième jardin botanique du monde à recevoir le statut de Patrimoine Mondial de l'Humanité après le Jardin Botanique de Padoue. Ce statut donne une reconnaissance au jardin paysager historique de Kew qui montre des éléments caractéristiques des grandes périodes de l'art des jardins du 18ème au 20ème siècle. De plus, c'est une reconnaissance de la contribution notable et ininterrompue du jardin à l'étude de la diversité végétale et de la botanique, ainsi que de ses collections botaniques (herbiers, plantes et documents) qui ont été considérablement enrichies à travers les siècles et depuis leur création en 1750. La Convention du Patrimoine Mondial, adoptée par l'UNESCO (Organisation des Nations Unies pour l'Education, la Science et la Culture) en 1972, permet l'identification, la protection et la conservation de sites naturels et culturels d'une valeur mondiale exceptionnelle. Pour plus d'informations,
contactez : http://www.rbgkew.org.uk ou http://whc.unesco.org/

● Noticias

presentes en el Reino Unido. Para mayor información, contactar: Ms Gail Bromley, Education Development Manager, Royal Botanic Gardens Kew, Richmond Surrey TW9 3AB, U.K. Email: G.Bromley@rbgkew.org.uk

El Royal Botanic Gardens ahora Incluido en la Lista d'el Patrimonio Cultural Mundial.

En julio de 2003, el Royal Botanic Gardens Kew paso a formar parte del patrimonio cultural mundial, siendo el segundo Jardín Botánico en la lista; el primero fué el Jardín Botánico de Padua (Orto Botanica). El patrimonio cultural mundial reconoció a Kew por las características históricas de su paisaje las cuales ilustran los periodos mas significantes en el arte de jardinería desde el siglo XVIII al siglo XX. También se reconoció a los jardines por su sobresaliente e interrumpida contribución al estudio de la diversidad vegetal y su importancia económica, además de sus bastas colecciones botánicas a través de los siglos desde su fundación en 1759.

La convención del patrimonio cultural mundial adoptada por la UNESCO (the United Nations Educational, Scientific and Cultural Organisation) en 1972 subministra la identificación, protección y conservación de los sitios naturales y culturales mas sobresalientes de valor a nivel mundial. Para mayor información, contactar: http://www.rbgkew.org.uk; http://whc.unesco.org/

EE.UU.

El Jardín Botánico de Chicago Logro su Objetivo de Elevar su Presupuesto con $100 Millón para el Año 2004

El Jardín Botánico de Chicago (CBG) ha recopilado ya 3/4 de $100 millón que se necesita para completar y desarrollar los servicios básicos de un centro de investigación mundial y centro académico vitalicio de arte botánico y ciencias. Hace seis años se inicio la escuela botánica de Chicago impartiendo clases para adultos. Hoy en día se tienen 7 600 gente registrada en 500 clases. A través de una

■ News

USA

Chicago Botanic Garden on Target for Raising $100 Million by 2004

Chicago Botanic Garden (CBG) has raised ¾ of the $100 million needed to complete and develop a world class research facility and academic centre of lifelong learning about botanical arts and sciences. Six years ago the School of Chicago Botanic opened, offering a series of classes for adults. Today it has 7 600 registrants for almost 500 classes. Through the capital campaign CBG will now have the resources to link up with other universities and take the lead in ensuring that there is a new generation of professionals trained for the future. The School of Chicago Botanic Garden will be renamed to honour the late Joseph Regenstein Jr, a renowned philanthropist, garden board member and passionate gardener. For further information contact: Dr Larry De Buhr, Vice President of Education and the School's Director, Chicago Botanic Garden, 1000 Lake Cook Road, Glencoe, Illinois 60022 USA. Email: LDebuhr@chicagobotanic.org

NETWORKS

Wordsmithing It's all about Communication!

The U.K. Botanic Gardens Education Network (BGEN) was hosted by the Glasgow Botanic Garden in October this year. BGEN works with educators in botanic garden, museums, environment centres, and similar organisations all over the U.K. The annual congress is an important opportunity for members to network, train and build their capacity in education. This year's programme focused on poetry, interpretation, storytelling and theatre, and literacy for adults and schoolchildren. For further information contact: Dr Erica Bower, Botanic Gardens Education Network, c/o Royal Botanic Gardens Kew, Richmond, Surrey TW9 3AB, UK Tel/Fax: 44 (0) 20 8241 8915 Email: bgen@kew.org

▲ Nouvelles

ETATS-UNIS

Jardin Botanique de Chicago - Objectif: Réunir 100 millions $ pour 2004

Le Jardin Botanique de Chicago a réuni les ¾ des 100 millions de $ nécessaires pour terminer et développer un centre de recherche d'intérêt mondial et un centre académique d'enseignement pour adultes sur les arts et sciences botaniques. L'Ecole de Botanique de Chicago a ouvert il y a six ans, offrant différents cours pour adultes. Aujourd'hui, ce sont 7600 inscrits pour presque 500 cours. Grâce à cette campagne pour réunir des fonds, le jardin aura les ressources pour se connecter à d'autres universités et être en tête pour assurer la relève avec une nouvelle génération de professionnels formés pour l'avenir. L'Ecole de Botanique sera rebaptisée en l'honneur du défunt J. Regenstein Jr., un philanthrope renommé, administrateur du jardin et jardinier passionné. Pour plus de renseignements, contactez : Dr Larry De Buhr, vice-Président de l'Education and Directeur de l'Ecole, Chicago Botanic Garden, 1000 Lake Cook Road, Glencoe, Illinois 60022 Etats-Unis. Email : L.DeBuhr@chicagobotanic.org

RESEAUX

La Communication, C'est la clé !

Le réseau d'éducation dans les jardins botaniques britanniques (BGEN) s'est réuni au Jardin Botanique de Glasgow en octobre de cette année. Il rassemble des éducateurs de jardins botaniques, musées, maisons de l'environnement et organisations semblables du Royaume-Uni. Le congrès annuel est, pour ses membres, une opportunité importante pour établir des liens, se former et consolider leurs compétences pédagogiques. Cette année, le programme était centré sur la poésie, l'interprétation, les contes et le théâtre, et l'alphabétisation des adultes et enfants. Pour plus d'informations, contactez : Dr Erica Bower, Botanic Gardens Education Network, Tel/Fax : 44 (0) 8241 8915 Email : bgen@kew.org

● Noticias

campaña capital, CBG poseerá los recursos para unirse con otras universidades y encabezar el liderazgo de las nuevas generaciones de profesionales a entrenar en el futuro. El Jardín Botánico de Chicago será nombrado en honor a Joseph Regenstein Jr, reconocido filántropo, apasionado por el jardín y miembro de la junta del mismo. Para información adicional, contactar: Dr Larry De Buhr, Director de la escuela y Vicepresidente de educación, Chicago Botanic Garden, 1000 Lake Cook Road, Glencoe, Illinois 60022 USA. Email: LDebuhr@chicagobotanic.org

RED DE JARDINES BOTANICOS

¡Fabricación de Palabras, Todo es Mas o Menos Comunicación!

La reunión de la red de educación en jardines en el Reino Unido (BGEN) tuvo sede en el Jardín Botánico de Glasgow en octubre de este año. BGEN trabaja con educadores en jardines botánicos, museos, centros del medioambiente, y organizaciones similares en todo el Reino Unido. El congreso anual es una oportunidad de importante entrenamiento y capacitación en educación para los miembros de la red. Este año el programa se enfoco a poesía, interpretación, narrativa, teatro, y alfabetización de adultos y grupos escolares. Para información adicional, contactar: Dr Erica Bower, Botanic Gardens Education Network, Tel/Fax: 44 (0) 20 8241 8915 Royal Botanic Gardens Kew, Richmond, Surrey TW9 3AB, UK Email: bgen@kew.org

Une réflexion **écologique** profonde

El pensamiento profundo **ecológico**

Deep Ecological Thinking

Summary

Often when we think of environment we think of it being 'out there'; something separate from us, to be protected for our use. Nature has value; mainly in terms of how useful it is for meeting human needs. We need to know nature to make use of it, even manipulate it and control it. But there is another view; it is ecological more than environmental. In this view all forms of life are deeply interconnected and nature has intrinsic value, irrespective of its usefulness to humans. This notion is known as deep ecology, which fosters a deep sense of respect to the earth and all beings upon it. This view considers earth as a living system – Gaia, and all forms of life are intrinsically connected with each other.

Much of our conventional education is learning 'about' nature. We study nature as something separate from us and as an object which is useful to us. We seem to consider ourselves either masters of nature or, if more enlightened, stewards of nature. We study nature because we wish to know our servant or our protectorate in order to make the best use of nature for a prolonged period.

When human beings consider themselves to be the masters of the earth and have dominion over it they are more likely to abuse it and exploit it. Therefore, the environmentalists take a step in the right direction by considering themselves as stewards of the earth. Stewardship entails responsibility. In such a view of the environment people are more likely to conserve and care. However, both these views are anthropocentric. From both these points of view human beings are a superior species, having a higher status. Norwegian philosopher Arne Naess has named such a human centred relationship with the natural environment as 'shallow ecology'.

According to Arne Naess human beings are a part and parcel of the natural world as any other species. No doubt human beings have their own outstanding faculties and qualities. They have their own highly developed senses, intelligence, consciousness and ability to communicate. But then other species too have their own particular, specific and unique qualities, which humans do not possess. Each and every species upon this earth, contributes in their own specific way, for the totality of existence, which evolves, unfolds and maintains its continuity. Therefore, all life, human and non-human, irrespective of their particular qualification, has intrinsic value. As all humans are born equal, irrespective of their class, status, education and wealth and as they have the right to life irrespective of their usefulness to society; in the same way all species have intrinsic value irrespective of their usefulness to humankind. Arne Naess calls it 'deep ecology'.

From this perspective human beings are not masters or stewards of nature but they are friends of nature. The word friendship can be used in two ways; firstly, we consider those whom we know as friends because we are acquainted with them, we go out with them, we spend some time together and support each other in time of need. But then there is another meaning of friendship; when we feel

Below: spider web in dew

Right: 'If we follow the patterns of nature there would be neither shortage, nor scarcity of anything, rather there will always be abundance'.

unconditional empathy and offer our affection without expecting anything in return, then we are in a state of friendship. In this second meaning of the word friendship is a sense of mutuality and reciprocity. When we are able to identify ourselves with the other, without any sense of superiority or inferiority, then we create a condition of friendship. That was the vision of the founders of the environmental organisation Friends of the Earth.

Friendship is the purest and noblest kind of relationship. In Buddhist language it is called metta. The Buddha throughout his life advocated his disciples to practice metta (i.e. friendship) with all sentient beings. The Buddha himself was called Maitreya which means Friend; not master, not prophet, not guru, just Friend. Friendship is the foundation upon which Buddhism is built. Friendship underpins the notion of non-violence and compassion. We will never harm or exploit or damage or denigrate someone who is our friend. We will receive the gifts given to us by our friends with thanks and gratitude. We will return our own gifts to our friends. Everything we receive from nature is a gift; whether it is food, water, sunshine or anything else; everything is a gift. This is the symbiotic relationship of deep ecology which equips us with humility, wonder and reverence. Nature is not there to be plundered or exploited rather it is there to be cherished and celebrated.

The moment we accept that all life has intrinsic value we begin to experience a profound feeling of reverence towards all life and being to experience the beauty, the integrity, the exuberance, the generosity and the economy which holds the entire web of life together. In place of controlling, owning or possessing we begin to participate in the process of the intricately woven web of life. We are no longer masters or stewards of the earth rather we are participants and co-creators of the earth. Of course, humans have their special place in the scheme of the universe, but so do the flowers, fruit, fungi, worms, butterflies, oceans, mountains and all micro and macro organisms.

When we view existence with such an expanded consciousness then it is possible to open our eyes and learn 'from' nature rather than learn 'about' nature. Nature is the greatest teacher. The Buddha learnt the reality of interdependence from a tree. While sitting under a tree and observing how everything was dependent upon everything else he was enlightened. Fruit came from flower, flower from branches, branches and leaves grow from the trunk, the trunk from the soil, the soil is nourished by the rain, the rain is held by the clouds, clouds are formed out of the sea, the sea receives the waters of the rivers and is held by the earth, the sea nourishes the earth and earth the sea and so it goes on. The Buddha's realisation of interdependence was perhaps the beginning of deep ecology and reverential ecology.

We don't need to go very far to learn from nature. Wherever we look with open eyes and a generous heart we will find nature as a teacher. Look at the honeybee; we can learn the lessons of transformation from the humble bee. It takes a little nectar from here, a little nectar from there, but never too much from anywhere. Never ever has a flower complained that a honeybee has taken too much nectar. In fact the flowers are grateful to the bee for helping them pollinate. When the bee has taken nectar it does not waste; it transforms the nectar into sweet, delicious, healing honey. If human beings learnt to design their systems on the lines of the honeybee there would be no depletion, no waste and no pollution.

Science writer, Janine Benyus, calls it 'biomimicry'; having observed the beauty, resilience and intricacy of spider silk and seashells she asks, "Why don't we humans observe nature and design our technology and tools like nature does?" If we follow the patterns of nature there would be neither shortage, nor scarcity of anything, rather there will always be abundance. How wonderful it is to observe that the nature designed seed has so much potential. From a tiny apple pip comes the seedling, from the seedling the plant, from the plant the tree, from the tree the apple fruit with many more pips within to produce many more trees for many more years. The leaves of the tree fall on the ground, decompose and become the nutrient to the tree and to the soil. Abundance all around. Nature knows no scarcity, because it knows no waste.

Such deep observation and deep experience is essential in order to get deep insights in the workings of nature. Here great science, great art and great spirituality converge. Scientists, artists, poets and mystics have found deep inspiration from close identification with nature. Nature identification is possible only when we are able to let go of our separation. To learn from nature we need to be in nature.

References

- Benyus, J. M (2002), Biomimicry: Innovation Inspired by Nature, Published by Perennial an imprint of Harper Collins. ISBN: 0060533226; 320pp

- Naess, A. (1990), Ecology, Community and Lifestyle, Published by Cambridge University Press. ISBN: 0521348730, 237pp

● Resumé

Souvent, quand nous pensons environnement, nous pensons que l'environnement est ailleurs ; quelque chose nous en sépare qui doit être réservé à notre usage. La Nature a de la valeur, principalement du fait qu'elle répond aux besoins de l'Homme. Nous avons besoin de connaître la nature pour l'utiliser et même la manipuler et la contrôler. Mais il y a une autre façon de voir les choses, plus écologique qu'environnementale. De ce point de vue, toutes les formes de vie sont fortement interconnectées et la nature a une valeur en elle-même, indépendamment de son utilité pour l'homme. Cette notion est l'écologie profonde, qui se nourrit d'un profond respect de la Terre et de tout ce qu'elle renferme. Ce point de vue considère la Terre comme un système vivant, Gaïa, où tous les êtres vivants sont intimement connectés entre eux.

▲ Resumen

A menudo cuando pensamos en el medio ambiente, pensamos que esta ahí fuera - algo bastante distinto a nosotros, que debe ser protegido para nuestro uso. La naturaleza tiene su valor - mayormente en términos de cómo de útil es para suministrar las necesidades del hombre. Pero hay otro punto de vista - que es mas ecológico que medio ambiental. Este dice que todas las formas de vida están profundamente interconectadas y que la naturaleza tiene un valor intrínsico, independientemente de su valor para el hombre. Esta noción se conoce como la ecología profunda, que fomenta un profundo sentido de respeto a la Tierra y a todos los seres que la habitan. Este punto de vista considera a la Tierra como un sistema viviente - Gaia - y todas las formas de vida están intrínsicamente unidas las unas a las otras.

Satish Kumar is the Editor of Resurgence Magazine and Director of Programme at Schumacher College. He can be contacted at Ford House Hartland, Bideford, Devon EX39 6EE, UK.
Tel: +44 1237 441 293.
Fax: +44 1237 441 203.
Email: www.resurgence.org.
His book 'You Are, Therefore I Am; A Declaration of Dependence'. Is published by Green Books: www.greenbooks.co.uk

Left: 'The moment we accept that all life has intrinsic value we begin to experience a profound feeling of reverence towards all life and being' Photo: Paul Turner

20

Partageant les **Joies de la Nature**

Compartir la **Alegría de la Naturaleza**

Sharing the **Joy of Nature**

■ Summary

Teaching ecological concepts can be challenging however, the Flow Learning™ technique developed by Joseph Cornell embraces tested educational principles and helps teachers and guides tune into a group's level of enthusiasm (or boredom!) and sensitively leads them into energized, enjoyable appreciation of the natural world. Flow Learning™ has four stages; Awaken Enthusiasm, Focus Attention, Direct Experience, and Share Inspiration. These carefully designed stages make it easy for educators to choose activities appropriate to a group's age, mood and physical environment.

Introduction

In today's world of overpopulation, and high consumption in some societies, it is essential that every effort is made to keep children in touch with the earth and to help them to become more aware of the world around them. The challenge is how to use nature to stimulate joyful, enlightening insights and experiences. Naturalist and author Joseph Cornell bases his teaching on five tenets that have helped him work with energetic, lively children:

1. teach less and share more
2. be receptive
3. focus the children's attention without delay
4. look and experience first; talk later
5. ensure that a sense of joy permeates the experience.

Cornell's experiences over the years in leading nature-based activities, led him to conclude that there is a sequence for using games and activities that works best, regardless of a group's age, its mood, or the physical setting. He was convinced that the reason people responded so well to this particular sequence was that it is in harmony with subtle aspects of human nature. In time, Cornell blended all the outdoor activities he had collected or created into this natural way of teaching.

Joseph Cornell's teaching philosophy, Flow Learning™, is a simple, yet subtle and powerful system of teaching based on universal principles of awareness and how people learn. It gently guides people, step by step, to deeper, more profound experiences of nature. Flow Learning™ is also very adaptable and can be used to teach any subject matter. Its goal is to give students intuitive as well as an intellectual understanding.

Flow Learning™ has four stages: Awaken Enthusiasm, Focus Attention, Direct Experience, and Share Inspiration which are described in detail below.

1. **Awaken Enthusiasm**
Children learn if the subject matter is meaningful, useful, fun, or in some way engages their emotions. Time spent in creating an atmosphere of curiosity, amusement, or personal interest is

Right: Pages from 'Sharing Nature with Children' by Joseph Cornell

invaluable because once students' enthusiasm is engaged, their energy can be focused on the upcoming lesson or experience.

2. **Focus Attention**
Some students' minds can be compared to a team of wild horses running out of control; without concentration no true learning can take place. The activities in this stage challenge the players in fun and creative ways. To successfully meet these challenges the players have to concentrate on one of their physical senses. In so doing they become calmer and more observant and receptive to their surroundings.

3. **Direct Experience**
Once students' interest and energy is awakened and focused, the stage is set for deeply experiencing nature. The experiential activities have a dramatic impact through involving people directly with nature. The games help students discover a deep, inner sense of belonging and understanding. If people are to develop a love and concern for the earth, they need direct experiences; otherwise, their knowing remains remote and theoretical and never touches them deeply.

An example of a Flow Learning™ Programme to teach ecological concepts:

Stage One: Awaken Enthusiasm

Natural Processes
Age: 7 years and older
Group Size: 12-18
Issues: Environmental concepts
Equipment: None

Instructions:
This activity can be used to review lessons that have been taught earlier. In this game the group acts out a natural process such as plant succession, the water cycle, the food chain or even photosynthesis. With fewer than 12 players there may not be enough players to take all parts; with more than 20 some may feel left out. Therefore, if you have a larger group divide them into sub-groups and allocate them a different process to act.

To play Natural Processes explain the game to all the participants and then divide them into groups. Meet with the small groups and assign them each a secret natural process. Set a time limit for preparing the performances and encourage groups to be creative as possible. When the groups have prepared their skits call them together to demonstrate their process. Tell the audience not to guess aloud until a group has finished its performance. This game runs more smoothly if one or more members already understand the process that has been assigned to them.

Stage Two: Focus Attention

Unnature Trail
Age: 5-13 years
Group Size: 1-12
Skills: Environmental awareness, observation, identification.
Equipment: Approximately 10-15 pieces of litter or unnatural objects of varying degrees of visibility

Instructions:
This game is played primarily to introduce the concepts of camouflage and adaptation. Choose a 15 metre section of path and place the pieces of litter along this section of trail. Some items should stand out brightly, like balloons, whereas others should blend with their surroundings and therefore be more difficult to see.

The group is to walk the trail, one at a time, with intervals between them, trying to spot (but not pick up) as many objects as they can. When they reach the end of the trail, they whisper in your ear the number that they saw. If no one saw all of them, tell them, 'There are still more!' and let them start again.

End the game with a discussion about the ways that colour camouflage helps animals. Then go on a search for small camouflaged animals (insects, spiders, etc.).

Stage Three: Direct Experience

Heartbeat of a Tree
Age 4 years and older
Group Size 1 or more
Skills: Appreciating nature, tree physiology
Equipment: Stethoscope

Instructions:
Choose a tree that is at least 15cm in diameter and has thin bark. Deciduous trees are generally better for listening to than conifers, and certain individual species may have a louder heartbeat than others. Press a stethoscope firmly against the tree, keeping it motionless so as not to make interfering noises. You may have to try several different places on the tree trunk before you find a good listening spot.

Children will also want to hear their own heartbeat. If possible, listen to the heartbeat of mammals or birds – the variety in sounds and rhythms is fascinating.

Stage Four: Share Inspiration

Recipe for a Forest
Age 7 years and older
Group Size 2 or more
Skills: Appreciating nature, ecology
Equipment: pencils and index cards

Instructions:
Give each child an imaginary deed to one square of land. On this virgin plot they will be free to create their own dream-forest, complete with as many trees, animals, mountains and rivers as they desire. Encourage them to let their imaginations run free and think creatively. You may suggest '…to make your forest beautiful and radiant, you might want to add things like waterfalls and windstorms, or perpetual rainbows…'

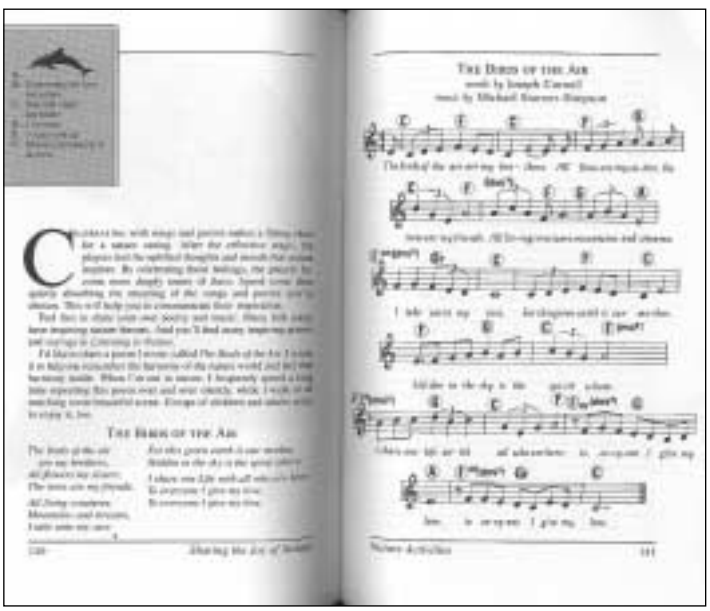
Ask them to list the ingredients of their forest, then let them draw a picture of it. End by discussing with them whether their individual forests are able to maintain themselves year after year. For example, see if they have chosen representatives of the food cycle: plant eaters, plants, and decomposers (e.g. ants, mushrooms and bacteria). Don't let them forget subtle factors like soil and climate.

4. **Share Inspiration**
This stage provides an interesting way for students to reflect together on what they have learned. In our fast-paced world, students and teachers alike often rush from one activity to another. Yet taking the time to reflect upon an experience can strengthen and deepen that experience. It need not take long; it can be as simple as responding to a few questions, writing a journal entry, or drawing a picture. Goethe said, 'A joy shared is a joy doubled'. Giving students the opportunity to share their experience increases the learning for the entire class. Sharing also brings everyone together and creates an uplifting atmosphere, making it much easier for the teacher to share inspirational ideas and stories.

It is important to provide a sense of continuity between Flow Learning™ activities. By weaving the activities together in a purposeful, carefully designed sequence people can have a far richer, more satisfying experience. In a well-designed session each activity builds towards an uplifting, memorable experience of nature.

Botanic gardens are much more than a collection of plants; they are a living environment that with time becomes a diverse ecological system teaming with life. Cornell's Flow Learning™ technique can help enliven teaching ecological concepts in botanic gardens, making it more dynamic, fun, and deeply inspiring.

Below: Pages from Joseph Cornell's books 'Sharing Nature with Children' and 'Sharing the Joy of Nature'



References

- Cornell, J. B. (1979) Sharing Nature with Children. Exley Publications, U.K.
- Cornell, J. B. (1989) Sharing the Joy of Nature. Dawn Publications, California USA.

● Resumé

Enseigner des concepts écologiques peut être un défi. La technique du Flow Learning, développée par Joseph Cornell, contient des principes d'éducation reconnus et aide les enseignants et les guide à s'adapter au niveau d'enthousiasme (ou d'ennui !) d'un groupe. Cela leur permet d'amener sensiblement le groupe à une appréhension du monde naturel stimulante et joyeuse. Le Flow Learning se fait en 4 étapes : Eveiller l'enthousiasme, Prêter attention, Expérience directe et Partager l'inspiration. Ces étapes, soigneusement conçues, permettent à l'éducateur de choisir facilement les activités appropriées à l'âge du groupe, à son humeur et à l'environnement physique.

▲ Resumen

La enseñanza de los conceptos ecológicos puede ser difícil. La técnica llamada Flow LearningTM ('El Flujo de la enseñanza'), desarrollado por Joseph Cornell, utiliza conceptos educativos ya comprobados y asiste a los profesores y a los guías en 'sintonar' al nivel de entusiasmo (o aburrimiento!) del grupo. Así les es posible dirigir el grupo con sensitividad hacia una comprensión energética y agradable del mundo natural. El Flow LearningTM tiene cuatro etapas - despertar el entusiasmo, enfocar la atención, dirigir la experiencia, y compartir la inspiración. Estas etapas cuidadosamente diseñadas les facilitan a los educadores a elegir actividades apropiadas para las edades, el humor, y el entorno físico del grupo.

Joseph Cornell is a naturalist and author who started the Sharing Nature Foundation to help him spread his work globally. His books are currently available in Chinese, Danish, English, French, German, Greek, Italian, Japanese, Portuguese, Russian, Slovene, Spanish, and Thai. This article has been prepared with the kind permission of Joseph Cornell using his books Sharing Nature with Children and Sharing the Joy of Nature and the Sharing Nature Foundation website. For further information contact: Sharing Nature Foundation, 14618 Tyler Foote Rd, Nevada City, CA 95959 Tel: +1 530-478-7650 E-mail: info@sharingnature.com Web: http://www.sharingnature.com

Teaching Ecological Concepts
– case studies from around the world

Summary

Using an ecological framework within which to teach about plants can help visitors understand the interdependency of all living things. The following case studies demonstrate the variety of programmes and activities currently on offer in botanic gardens: Teacher training workshops on the ecological foundations of environmental education at the National Botanic Gardens, Kenya; card games linking plants with their habitats from the Warsaw Botanic Garden, Poland; programmes on ecological concepts, including the water cycle from Tondoon Botanic Garden, Australia; role play to demonstrate how plants adapt to their alpine climate from the Botanical Garden of Innsbruck, Austria and; the creation of eco-murals that depict the components of soil at the Royal Botanic Gardens, Sydney, Australia. Botanic gardens are perfect places to teach ecological concepts, hopefully some of these ideas will inspire you to develop programmes in your garden!

Connecting with the Living Soil

Facing the challenge of disguising unsightly concrete retaining walls, Mount Annan Botanic Garden, the native garden of the Royal Botanic Gardens Sydney, installed a 20 metre colourful ecomural depicting the components of soil and the creatures that live in and on it.

The project was launched in Spring 2003 during a school holiday programme. Two creative artists/environmental educators assisted children (aged between 6-12 years) employ hand carved stamps on the mural, as well as create their own take-home art work. About 200 children (and their carers) successfully participated in the week-long activity.

About a month before the programme started, the Garden ran a promotional colouring-in competition based on the design of the mural, the winner receiving two free places on the programme. Overall the initiative may be considered a success: income was generated and the enduring art work is a very useful tool for teaching ecological concepts. For further information contact: Ms Janelle Hatherly, Royal Botanic Gardens and Domain Trust, Mrs Macquaries Road, Sydney NSW 2000 Australia. Email: Janelle.Hatherly@rbgsyd.nsw.gov.au

Left: Using art is one way for children to explore ecological concepts at Mt Annan Botanic Garden in Australia

24

Find Your Card – Interactive Trails for Botanic Gardens

The Environmental Education Section of Botanic Garden of Porto Alegre, Brazil has developed a didactic resource called Find your Card to support activities conducted on their interpretive trails. The object of the game is, by engaging participants in a humorous and enjoyable way, to develop their team-spirit, increase observational skills and foster their understanding of ecological concepts and knowledge of native flora and fauna.

Twenty photo cards were prepared for this activity, illustrating some of the natural phenomena to be found along the trails, such as trees, lichens, animals, habitats and ecosystems. The reverse side of each card carried relevant information. On receipt of their cards, participants walked the trails in the company of a guide, referring to the written information when they found a match for their photograph. The response from children who engaged in this activity was extremely positive. It was noted that children who matched their cards early in the exercise enthusiastically collaborated with their fellow pupils in completing the outstanding challenge.

For further information contact: Fernando Vargas or Daniel Araújo, Jardim Botânico de Porto Alegre, Rua Salvador Franca 1427, C.P. 1008, 90.690-000 PORTO ALEGRE- RS, Brazil. Tel: (51) 3320 2024 or Email:

Plants are More than Just Flowers

For many years Warsaw University Botanic Garden conducted education programmes aimed chiefly at university students. Recently, however, garden staff have been developing an integrated educational programme for the general public, especially children who visit the garden on school excursions. Unfortunately limited resources prevented the development of either an educational centre or the recruitment of permanent trained staff dedicated to work with the public. A programme was therefore designed that attempted to accommodate these limitations.

Supported by National Fund for Environmental Protection and Water Management, the core of the programme, which got under way in 2002, consists of seven self-guided trails located in the garden's park and greenhouses. The trails are described in the new 'Botanic Garden Guidebook' and separate leaflets. Interpretation is devoted to various aspects of plant ecology and biology ('Plants of various habitats', 'Pollination of flowers', 'Plants in travel'), nature protection ('Protected plants', 'Trees – nature monuments') and practical ways of using plants and plant materials ('Plants in use', 'Tropical economic plants'). Every trail stop is marked with a colour interpretation board and additional information. Every plant relevant to the topic of the given carries a colour-coded label.

A separate interactive trail has been prepared for 5-7 year old children and this has been described in a leaflet of a larger format.

The education programme incorporates two games that are played during the garden classes and also in many schools during biology classes. Peter the Green is a simple card game for 6-10 year old children (4-5 persons). It consists of three card packs, each referring to a different topic: common trees-tree branches and fruit, native crop-plant products, and tropical crop-plant products. By drawing cards from each other the children attempt to locate all the matching pairs of cards. The winner is the person who runs out of cards; the loser is left with 'Peter the Green'.

The second game, Green Dominoes, is targeted at children between 10 and 15 years old. Based on the traditional game of dominoes it is designed to emphasise the ecological linkage of plants with their environment. Tokens replace the conventional dots and these refer to plant species characteristic of particular plant communities, for example water (*Nuphar lutea, Nymphaea alba*), swamps (*Calla palustris, Caltha palustris, Iris pseudacorus*), peat bogs (Drosera sp., *Ledum palustre*, *Oxycoccus quadripetalus*) and deciduous forests (*Anemone nemorosa, Aruncus dioicus, Asarum europaeum*). The aim of Green Dominoes is to match the tokens with pictures of plants to their environment.

Right:
Domino cards

Both games contain short booklets with detail descriptions of all the plants and/or environments (plant communities) used on cards and tokens. For further information contact: Mr Marcin Zych, Dr Hanna Werblan-Jakubiec and Ms Mariola Kukier-Wyrwicka, Warsaw University Botanic Garden, Aleje Ujazdowskie 4, 00-478 Warszawa, Poland. Tel: 4822 6287514. Fax: 4822 6226446. Email: ogrod@bot.uw.edu.pl

Developing Ecological Themes with Teachers at Nairobi Botanic Garden

The National Museums of Kenya (NMK) Nairobi Botanic Garden offers many opportunities for ecological study geared towards environmental learning. This was demonstrated early last year during a two-day workshop for teachers on Ecological Foundations of Environmental Education. In addition to introducing teachers to new ideas and approaches on the teaching of outdoor ecological studies, the workshop also highlighted a range of ecological themes suitable for botanic garden teaching.

Following a brief guided tour, teachers were encouraged to develop appropriate ecological themes based on the Succulent, Quarry and Wetland sections of the garden. Some of these were then worked up into detailed learning activities by drawing on learning goals for environmental education. Suitable strategies to achieve these activities were also stated. An example of a theme and its possible learning activities on a pond ecosystem at the Quarry section of the garden is outlined in the Table below.

Discovery learning and project work with a particular emphasis on hands-on activities and group discussions were suggested by the teachers as appropriate approaches in the undertaking of the learning activities. Two modules, *Life in a Pond and Plant Adaptations*, for primary schools (12-13 year olds) and secondary schools (16-17 year olds) respectively, have been on offer since June 2003 as a follow-up to last year's workshop. For further information contact: Mr Abel Barasa Atiti, Education Officer, NMK Nairobi Botanic Garden, PO Box 40658, 00100 Nairobi. E-mail: batiti@hotmail.com

An example of a theme and learning goals and activities

Theme: This pond supports organisms that are useful to each other and humans

Learning Goals	Learning Activities
• Identify organisms living in the pond. • Appreciate the value of organisms living at the pond. • Measure the abiotic and biotic factors at the pond. • Gain an understanding of the interdependence of organisms at the pond.	• Using nets, learners to undertake pond dipping and identify the organisms present. Plants growing at the site to be identified using keys or books. • The learners to construct food chains and webs to illustrate the interdependence of the organisms at the pond. • Using thermometers, pH metres and hygrometers, learners to measure various physical factors like water temperature, pH, and humidity and then relate them to the pond conditions and their impact on the organisms. • Learners to discuss the socio-economic uses of the plants and animals in the pond.

A Trip to Mount Botanico

Innsbruck Botanical Garden has been famous for its Alpine Plant Collection since the middle of the 19th Century. Recently garden staff developed an educational role-play activity to aid children's understanding of how plants adapt to alpine climates. The children imagine they are adventurers preparing for a trip to Mount Botanico. They first decide what items are essential for their expedition – water bottle, jacket, scarf, lunchbox, sunglasses, suntan lotion, a jacket, hat and rope. These are placed in a backpack and the tour gets under way through the alpine plant section of the botanic garden. During the walk plants and their different adaptations to alpine conditions are studied. Expedition equipment is used to demonstrate a

Left: The two day workshop on Ecological Foundations of Environmental Education at the Nairobi Botanic Garden allowed teachers to explore new ways of teaching ecological studies outdoors

Top Right: Children huddle close together to simulate alpine plant dwarfism in the Botanical Garden of Innsbruck

Right: Children waive their scarves to attract the helicopter during their adventure

number of these adaptations: the lunchbox (filled with biscuits and apples) is used to illustrate special storage organs like tubers, rhizomes and thick roots; the rope simulates the vertical force taproots have to withstand; and sunglasses are used to discuss how long plants are exposed to the sun and the strength of UVB waves (the specific portion of the sun's energy reaching the earth's surface at 320-290 nanometers) at higher altitudes.

Suddenly the weather deteriorates and the adventurers have to find shelter. To keep warm they huddle close together and crouch down behind a large rock. Now the children feel warm and cosy like the cushion plants, leading to a discussion about alpine plant dwarfism. A 'helicopter' is sent out to rescue the group. To find its exact location the pilot needs to be attracted by coloured handkerchiefs that the group waves furiously as they pretend to be the flowers of Saxifraga sp. attracting rare insects for pollination. Eventually they are saved and brought back home. The pack is unloaded and the group reviews what has been learned. For further information contact: Dr. Suzanne Kapelari, Educational Officer, Botanical Garden Innsbruck, Sternwartestr.15, 6020 Innsbruck, Austria. Email: Suzanne.Kapelari@uibk.ac.at

Biodiversity of Foods

As part if its Botanical and Environmental Experiences Programme, Gladstone Tondoon Botanic Gardens offers a teacher programme: A Biodiversity of Foods for Years 4-7. This programme focuses on particular aspects of the Core Content from the Queensland Department of Education 1999 Science Syllabus. It is particularly relevant to the Strands of Life & Living and Place & Space. Students take part in a series of hands on activities and have an opportunity to study and experience:

- local fauna relationships to forest types and water ecosystems
- how trees support life through a study of food chains & webs
- creating simple food chains
- mapping relationships between living things in a habitat or ecosystem
- hands on involvement with science learning outcomes
- the value of botanic gardens.

For further information contact:
Ms Merilyn Haigh, Visitor Services Coordinator, Gladstone Tondoon Botanic Gardens, PO Box 29, Gladstone, Qld 4680 Australia.
Tel: +61 (0) 749 793326
Fax: +61 (0) 749 793057
Email: visitor@tondoon.qld.gov.au

● Resumé

Il s'agit d'utiliser une trame écologique basée sur l'idée que parler des plantes aux visiteurs peut les aider à comprendre l'interdépendance de tous les êtres vivants. Les études de cas qui suivent montrent la diversité des programmes et activités proposées dans les jardins botaniques:

- des formations sous forme d'ateliers pour les enseignants sur les fondements écologiques de l'éducation à l'environnement au Jardin Botanique National au Kenya
- des jeux de cartes mettant en correspondance les plantes et leur habitat au Jardin Botanique Warsaw en Pologne
- des programmes sur les concepts écologiques , dont le cycle de l'eau, au Jardin Botanique Tondoon en Australie
- des jeux de rôle pour mettre en évidence l'adaptation des plantes à un climat alpin, au Jardin Botanique d'Innsbruck en Autriche et
- la création de décors muraux représentant les différents composants du sol en el jardins botaniques royal au Sidney en Australie

Les jardins botaniques sont des lieux idéaux pour enseigner les concepts écologiques. Souhaitons que quelques-unes de ces idées vous inspirent pour développer des programmes dans votre jardin!

▲ Resumen

A los visitantes se les puede ayudar a comprender la interdependencia de todos los seres vivos utilizando una matriz ecológica para que aprendan sobre las plantas. Los ejemplos que siguen demuestran la variedad de programas y actividades actualmente en oferta en los jardines botánicos –

- Talleres de enseñanza de profesores sobre los cimientos ecológicos de la educación medio ambiental en los National Botanic Gardens de Kenya
- Juegos de cartas que conectan a las plantas con sus hábitats en el jardín botánico de Varsovia, Polonia
- Programas sobre conceptos ecológicos , incluyendo el ciclo de aguas en el Tondoon Botanic Garden en Australia
- Actuaciones para demostrar como las plantas se adaptan a su clima alpino desde el jardín botánico de Innsbruck, Austria, y
- La creación de eco-murales que representan la composición de la tierra en el Jardín Botánico Real de Sidney, Australia.

Los jardines botánicos son lugares idóneos para la enseñanza de los conceptos ecológicos. ¡Se espera que algunas de estas ideas os inspiren al desarrollar programas en vuestros jardines!

Natural Science Institute
for Elementary Teachers

Summary

Working with up to 25 teachers over the course of the winter and spring each year, the Missouri Botanical Garden strives to help elementary teachers understand the essential concepts and fundamental principles of ecology and environmental science. Through the 10 day long course at the Natural Science Institute in Botany and Ecology, we spend nearly 70% of the course engaging teachers in hands-on and/or inquiry-based activities to increase their ecology content understanding, while modeling the use of lessons they can take back to their classrooms. We meet for two consecutive days each month, allowing for reflective practice in between the monthly sessions. We provide teachers with journal assignments to assess both their content understanding as well as the impact of our methods on their own teaching strategies. In this way we maintain sustained and supportive contact with all course participants. This has proven to have a far greater impact than single, week-long workshops on the same or similar topics.

Introduction

For over fifteen years the Missouri Botanical Garden, USA, has been offering professional development workshops to teachers in ecology and environmental science. These workshops range from single-day sessions on particular ecosystems, such as wetlands or tropical rain

Left: Inquiry based learning is a key part of the natural science course

forests, to week-long courses on school-yard ecology. Courses are also offered to institutes and are held over a period of nine or 10 months.

Design Principles for Professional Development Programs

Single session workshops play an important role in introducing teachers to a particular topic and the garden's educational resources. They can also serve as a stepping-stone to professional development programs. However, while these courses are valuable in themselves, research indicates that their long-term impact is insubstantial. At MBG we found that by committing ourselves to long-term involvement in courses, both teachers and students benefited significantly. This is in keeping with the recommendations of the National Science Education Standards, published by the National Research Council in the United States.

In developing or modifying a long-term course in ecology we take into account the various design principles advocated in the National Education Standards, (see www.nap.edu/reading room/books/nses/html, National Science Education Standards, Section 4, Standard for Professional Development for Teachers of Science.) This involves more effort than designing a week-long workshop on the same topic, but the gains are significantly greater. (see Roots 21, December 2000, pp: 'Evaluation Gets Results' for more on the evaluation and success of this model).

Ten years ago, we set up the Natural Science Institute for Elementary Teachers. The major focus of the Institute is ecology, indeed, nearly 70% of the courses are devoted to the teaching of this science. Every year, 25 teachers meet for two consecutive days each month from February through to June. This provides them with an opportunity to assimilate the content between sessions and to teach some of the activities to their students. It also enables them to reflect upon both their understanding of ecological concepts and the pedagogy used to teach them. Journal assignments are used to assess the teachers' comprehension and give us an insight into how comfortable they feel in implementing the teaching strategies.

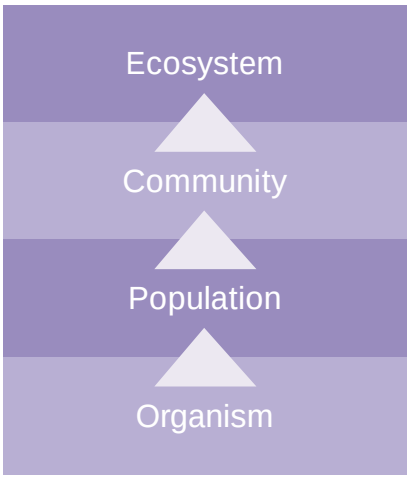
Content Sequencing

When we begin designing a course on ecology there is always a lot of discussion about what topics to cover and which activities to use. Virtually all our lessons use hands-on and/or inquiry based activities. The virtue of teaching this way is that you can provide teachers with a model of how to teach science effectively. In fact using the same lessons for teachers that are proposed for students has been found to be successful in getting the content across to teachers. In designing the course, we also have to be aware that it is easy to fall into the habit of designing a course based on the activities we like rather than carefully laying out the scope and sequence of the course first and then choosing the activities. One of our most important design practices is to determine which ecological concepts are the most critical to cover. We then sequence them so they flow in an order that will help teachers gain the

Right: Natural Science Institute teachers examining a layered soil sample as part of a woodland ecosystem investigation

greatest understanding of the content and allow them to build upon a firm foundation. This holds true for both the single daylong class on an ecology topic, or an extended course covering the major ecological concepts.
It is only when we have completed the framework that we review the wealth of exemplary ecology lessons we have available and select, based upon our time frame and audience, those lessons to be used to teach each concept.

Although there are many possible starting points for a course in ecology, we have tended toward focus initially on organisms and work our way up towards the concept of ecosystems, as shown in the diagram below.



In looking at the organism as a starting point, we focus not on its biology, but on the concepts of its habitat, the adaptations it has for living in its environment, and the niche or role of the organism in its environment. We spend a great deal of time and use an array of activities to address the concept of an adaptation as a structural or behavioral feature of an organism that enables it to live in its environment. Teachers, as well as students, often find this a complex idea, as many of them come with the misconception that an adaptation is a change an organism makes, and it can be hard to divest them of this idea. Review of their journal entries, in which they explain their understanding of the big ideas covered during the two-day meetings, enables us to check for comprehension and to see what further clarification is needed.

Once we cross the hurdle of adaptations, we delve into the process of natural selection within a population using simulation activities to illustrate the concept of change over generations and the eventual dominance of advantageous features. Other concepts related to a population of a single species of organism are covered, such as population distribution, fluctuations and carrying capacity. Next we begin to discuss populations of different species interacting and arrive at the concept of a community. Within the realm of communities we use activities to understand species interactions including food chains and food webs, predator-prey relationships and pollination. Finally we investigate the abiotic or non-living components upon which organisms rely and with which they interact in their environment. This interaction of living things with each other and with their non-living environment constitutes an ecosystem.

A variety of ecosystems are represented at the Missouri Botanical Garden and its satellite sites, Shaw Nature Reserve and Litzsinger Road Ecology Center. Teachers explore the tropical rain forest in the Garden's Climatron®, temperate deciduous forest at the Ecology Center and grasslands in the prairies at the Nature Reserve. In visiting the sites teachers learn about the influence of climate and soil conditions on the development of these ecosystems. The concepts learned earlier are also strengthened through exploring specific organisms found in each ecosystem and looking at the adaptations they have for survival as well as examining other food webs and species interactions that occur there.

All of this understanding is constructed during multiple sessions held over the course of five months, allowing the teachers to test their understanding and the activities with their students and reflect upon both. This intensive and prolonged methodology allows the staff of the Garden and the teachers to build strong and lasting relationships. It also creates a corps of teachers who can support one another in their professional practice. This model of professional development for teachers in ecology or any other science has proven to have a greater and longer lasting impact than any other model we have used to date.

Conclusions

Over the past 10 years we have found that the essential ingredients for a successful professional development program in ecology are using hands-on and inquiry-based activities that teachers can in turn use to teach their students. By carefully selecting and sequencing the concepts to be covered, the teachers' ability to build a strong foundation of understanding in ecology increases. Providing opportunities for teachers to test, assess and modify the activities to suit their students' needs and then write their reflections in their monthly journals appears to solidify their continued use of the lessons and the teaching strategies modeled throughout the course. In summing up, it is important to take careful stock of the teachers' needs as well as your goals in terms of content and teaching methods as you plan any professional development. The care you take in designing your course will go a long way to insuring its success.

References:

- National Research Council (1996) National Science Education Standards. National Academy Press, Washington, D.C. USA.
- DeBuhr, Larry E. and Addelson, Barbara. (2000) Evaluation Gets Results. Roots 21, 25-28.

Resumé

Travaillant avec plus de 25 enseignants sur une formation étalée sur l'hiver et le printemps de chaque année, le Jardin Botanique du Missouri s'efforce d'aider les enseignants de l'école élémentaire à comprendre les concepts essentiels et les principes fondamentaux de l'écologie et des sciences de l'environnement. Durant 10 jours à l'institut de sciences naturelles en botanique et en écologie, nous passons près de 70% de la formation à engager les enseignants dans des activités interactives et/ou de questionnement pour augmenter leur compréhension de l'écologie, le reste

du temps, nous leur expliquons comment utiliser cet acquis dans leurs classes. Les rencontres durent 2 jours consécutifs chaque mois ce qui permet un temps de réflexion entre les sessions mensuelles. Nous avons fourni aux enseignants un journal de bord pour évaluer à la fois leur compréhension des contenus et aussi l'impact de nos méthodes sur leur propre stratégie d'enseignement. En procédant ainsi, nous maintenons un contact qui soutient tous les participants de la formation dans la durée. Cela s'est avéré avoir un impact beaucoup plus grand qu'un atelier unique d'une semaine sur le même sujet ou un sujet similaire.

▲ Resumen

Cada año, el Missouri Botanical Garden trabaja con hasta 25 profesores durante el curso del invierna y la primavera con el motivo de ayudarles a comprender los conceptos esenciales y los principios fundamentales de la ecología y la ciencia de medio ambiente. En el curso de 10 días del Instituto de Ciencias Naturales en Botánica y ecología, nos pasamos casi el 70% del curso en actividades practicas y/u otras basadas en encuestas para aumentar su comprensión del contenido ecológico a la vez que se crean modelos de lecciones que puedan luego trasladar a las aulas. Nos reunimos durante dos días consecutivos cada mes, así permitiendo la reflexión entre las sesiones mensuales. Les facilitamos deberes a los profesores para poder asesorar su comprensión del contenido así como el impacto de nuestros métodos en sus propias estrategias educativas. De esta forma a la vez sostenemos y apoyamos a todos los que participan en el curso. Se ha probado que en este u otros temas, esto tiene un impacto mucho mayor que un solo taller de una semana.

Barbara Addelson is Senior Manager of Education at Missouri Botanical Garden, P.O. Box 299, St. Louis, MO 63166, USA.
Tel: (1) 314 577 5100.
Fax: (1) 314 577 9521. Email: Barbara.addelson@mobot.org

Top Right: Teachers explore the grassland ecosystem in the prairies of Shaw Nature Reserve

Right: The course focuses on the concepts of habitats and looking at specific organisms within the habitat

Basé sur l'habitat et guidé par une histoire

Basado en los hábitats; impulsado por las historias

Habitat-based and Story-driven

Summary

While the Alice Springs Desert Park can be said to operate as a botanic garden, zoo, natural history display and a cultural centre, the description does not present the total picture. It is a fully-integrated environmental education facility that takes an ecosystem approach to display and interpretation and an education approach to conservation.

The Desert Park displays the flora of Central Australia in three replicated habitats that include not only the flora but the fauna, the geology and the landforms of those habitats. The interpretation of these habitats also includes human aspects of the desert ecosystems, both indigenous and non-indigenous.

The Desert Park's 'habitat-based, story-driven' approach maximises its potential to help visitors to understand, enjoy and become excited and passionate about the Australian deserts. This enables the park to most effectively share environmental messages with its visitors that extend beyond the walls of the park itself.

The International Agenda for Botanic Gardens in Conservation (Wyse Jackson & Sutherland, 2000) lists three main elements of the global mission for botanic gardens in conservation:

- Conservation
- Research, monitoring and information management, and
- Education and public awareness.

The Alice Springs Desert Park as a locally focused environmental display, incorporating a botanic garden,

conducts and supports in situ and ex situ plant conservation and research; but its primary approach to being an effective conservation institution is through its role as an environmental education facility. The Desert Park uses the terms 'environment' and 'environmental' to encompass both the natural and cultural which are intimately interlinked.

Public environmental education is the essential underpinning for both community action for conservation and for the funding of the conservation and research activities of conservation institutions (Hamilton and Phelps, 1992). Botanic gardens world-wide attract more than 150 million visitors each year (Wyse Jackson & Sutherland, 2000) and this represents an enormous opportunity to influence public attitudes towards conservation and to stimulate community support and action.

The Alice Springs Desert Park takes a 'habitat-based and story-driven' approach to display and interpretation, which we believe maximises the Park's environmental education potential. Habitat-based means that the Park displays the flora of its local environment in carefully created habitats. These replicate those that visitors experience in the 'real world' of arid Australia outside the gates of the Park. Careful attention is paid to ensuring that plant associations and communities are accurately replicated and that the associated landforms and soils are appropriate. Further, the fauna of the habitats is also displayed in context as part of this integrated approach. The interpretation of these habitats takes a whole of system approach that incorporates living (eg. botanical, zoological and human) and non-living (eg. geological and climatic) elements and highlights the connections and interdependence of these elements.

The story-driven approach is fundamental to the Park. The Desert Park's Master Plan, prepared in 1994, clearly highlighted the Park's role as an environmental and cultural interpretation facility and an Interpretation Plan developed in 1996 became the prime determinant of the collection plans and of display policy and practice. Both of these documents continue to provide the direction for the Park. Park design,

Left: The most powerful and effective story-telling technique that the park uses is face-to-face interpretation; here Gerry Martin interprets the indigenous use and management of the Australian arid zone from her own cultural perspective

Below: Interactive displays are just one method used to interpret the desert environment

Right: Local flora is displaid in carefully created habitats to create an authoatic experience for visitors

species selection, display methodology and interpretation techniques are predicated on their ability to enhance the Park's ability to deliver its interpretive aims.

The importance placed on interpretation of the arid environment as a conservation tool and the desire to reach as many visitors as possible is demonstrated by the variety of media used to tell stories. These include traditional signs, film, interactive displays and an audioguide, but perhaps the most powerful and effective story-telling technique that the Park uses is a comprehensive daily program of face-to-face interpretation delivered by full-time professional guides. All of the techniques used, and particularly the guide presentations, accommodate different learning styles and knowledge levels. The integrity of the cultural interpretation is ensured by the close working relationship the Park has with the Aboriginal owners of the Park's land and by employing local Aboriginal people who are able to interpret indigenous use and management of the Australian arid zone from their own cultural perspective.

By adopting the 'habitat-based and story-driven' approach and by displaying and interpreting the desert ecosystems in their entirety including both biotic and abiotic elements, the Desert Park is an exemplar of the BioPark concept proposed for zoos, botanic gardens and museums by Robinson in the mid-1980s (Robinson 1987, 1988). Robinson postulated that the traditional separation of zoos, botanic gardens and natural history and cultural museums into separate institutions had resulted in a corresponding reductionist presentation of the environment to the visitors to these institutions. This reductionist approach did not present the environment as people encounter it in the real world and failed to show the inter-relatedness of all elements of ecosystems and therefore limited the environmental education successes of those institutions. The Desert Park was conceived as an amalgamation of a botanic garden, zoo and museum that would overcome these problems and provide an effective environmental education facility.

Right: Alice Springs Desert Park attracts an impressively high proportion of local visitors

The recent International Agenda for Botanic Gardens in Conservation itself reflects the way in which botanic gardens are moving away from the reductionist approach to environmental, or more accurately botanical, presentation and interpretation. For example, in the section on Public Education and Awareness, which covers more than a page, the words plant or plants are only used twice whereas the words environmental or environment are used dozens of times.

Although the Alice Springs Desert Park has received widespread acclaim from within its industry, the success or otherwise of the Park as a public environmental education facility for conservation is still to be fully tested.

The Alice Springs Desert Park is just six years old and is comparatively small on a world scale. Although its annual visitation numbers are 80 000-90 000, it reaches a very significant portion of its local audience, attracting approximately 30% of local residents and 30% of tourists to the area each year. The Park's reach into the local schools is even greater with 100% of local schools and over 30% of regional bush schools visiting the Desert Park each year. The Territory's Department of Education, Employment and Training has recognised the environmental education potential of the Park by locating one of its Environmental Education Curriculum Support Officers actually in the Park.

Monitoring of visitor responses to the Park through surveys, visitor books, interviews and anecdotal feedback from local teachers and Parks and Wildlife Rangers indicates that the visitors are responding positively to the BioPark approach and are recalling the key environmental messages that the Park presents. This is highly suggestive that this particular habitat-based story-driven environmental display is achieving its aims of being an effective public environmental education institution. Further research will continue to monitor the Park's progress. By utlitising the powerful combination of the audience reach of botanic gardens and the effectiveness of the BioPark model of environmental display and interpretation, botanic gardens such as the Alice Springs Desert Park are able to be significant forces for conservation in their local and wider communities.

References

- Hamilton, G. and Phelps, G.R. (1992) Zoos and Conservation Education. International Zoo Yearbook 31:97-98.
- Phelps, G. and Richardson, M. (1998) Planning Living Collections from Scratch. Australasian Regional Association of Zoological Parks and Aquaria/ Australasian Society of Zookeeping Conference Proceedings 86-90.
- Robinson, M.H. (1987) Beyond the Zoo: The Biopark. Defenders of Wildlife Magazine 62 (6)10-17.
- Robinson, M.H. (1988) The Once and Future Zoo. American Association of Zoological Parks and Aquariums Regional Conference Proceedings, 315-22. Wheeling, W.Virginia.

Left: The walk-through aviary demonstrates how the Desert Park has integrated the botanical and zoological aspects of habitat design

➡ Wyse Jackson, P.S. and Sutherland, L.A. (2000) International Agenda for Botanic Gardens in Conservation. Botanic Gardens Conservation International, U.K.

● Resumé

Le Parc du Désert d'Alice Springs peut être considéré comme un jardin botanique, un zoo, une exposition d'histoire naturelle et un centre culturel, mais cette description reste incomplète. C'est un dispositif d'éducation à l'environnement complètement intégré basé sur une approche de l'écologie du milieu en ce qui concerne la mise en scène et l'interprétation et une approche éducative en ce qui concerne la conservation.

Le Parc du Désert présente la flore du centre de l'Australie en trois habitats reconstitués, comprenant non seulement la flore mais aussi la faune, la géologie et les paysages de ces habitats. L'interprétation de ces habitats prend aussi en compte les aspects humains des écosystèmes du désert, tant indigènes que non indigènes.

L'approche « basé sur l'habitat et guidé par une histoire » optimise le potentiel du lieu pour aider les visiteurs à comprendre, prendre du plaisir et à s'intéresser et se passionner pour les déserts d'Australie. Cela permet au Parc de donner à ses visiteurs des messages sur l'environnement beaucoup plus efficaces et qui se répandent bien au-delà des murs du Parc.

▲ Resumen

El Parque del Desierto de Alice Springs se puede decir que opera como jardín botánico, zoológico, exposición de historia natural y como centro cultural, pero estas descripciones no presentan el cuadro total. Es una facilidad de educación medio-ambiental totalmente integrada que ataca a la exhibición y la interpretación desde un punto de vista de ecosistema y a la educación con una postura medio-ambiental. El Parque del desierto presenta a la flora de la Australia central en tres hábitats re-creados que incluyen no solo a la flora sino también a la fauna, la geología y el paisaje de estos hábitats. La interpretación de estos hábitats también incluye aspectos humanos de los eco-sistemas desérticos, tanto indígenas como no-indígenas. El principio basado en los hábitats, impulsado por las historias, realiza el potencial de ayudar a los visitantes a comprender, a disfrutar, a excitarse y a generar una pasión por los desiertos australianos. Esto permite al parque compartir sus mensajes mas efectivamente con los que lo visitan, y llevarlos mas allá de los limites del propio parque.

Graham Phelps is Park Manager for the Alice Springs Desert Park, PO Box 2130, Alice Springs NT. 0871. Tel: (08) 8951 8788 Email: graham.phelps@nt.gov.au

Anne Scherer is Environmental Education Curriculum Support Officer for the Department of Education, Employment and Training, which is based at the Alice Springs Desert Park. Tel: (08) 8951 8718 Email: anne.scherer@nt.gov.au

Left: Creating a setting to integrate botanical and zoological stories, and encourage the exploration of the desert, encapsulates much of what the Desert Park is trying to achieve

Manipuler avec les mains et avec l'esprit: une approche hardie de la compréhension de l'écologie

'Hands-on and Minds-on'

– an adventurous approach to ecological understanding

■ **Summary**

Earth Education is a process of helping people live more harmoniously and joyously with the natural world. One of the key components of earth education is helping people understand the major ecological systems and communities of the planet, rather than the individual parts of life. Many educators all over the world have been touched by earth education partly due to the innovative, dynamic ways in which ecological processes are conveyed.

The key processes that maintain all life on earth are energy flow (from sun to plants and on to animals), cycling (air, water and soil nutrients), interrelationships and change. These concepts are quite abstract. For example, when has anyone actually seen sugars being made inside a leaf? The key to developing a basic comprehension of such concepts is to make them concrete through learning by doing.

In Earth Education this involves: **Informing** learners with the big concept; **assimilating** the concept through the use of props and metaphor and; **applying** new understanding to the real world. This article takes a good look at how this conceptual approach helps aid accelerated learning and contributes to learners making decisions about living more lightly on the planet.

Can you remember being taught about one of the most amazing ecological processes on the planet - photosynthesis? How did you learn? Did you draw pictures, write biochemical equations or carry out experiments? I remember wrapping leaves in strips of tin foil, then after a couple of days finding brown stripes under the foil covered areas. While this left me with the lasting impression that if you wrap leaves in tin foil they die, it didn't really help me understand that green leaves use sunlight to make sugar from air and water.

Right: Each activity helps learners build up an emotional bond with the earth

Earth Education offers an alternative approach to the 'teacher-centred' experimentation approach – known as the **IAA** model. This involves:

- Information giving (including where it fits with the 'big picture')
- Assimilation of information through an activity to make the abstract concrete
- Application of the concept to the real world.

Through using this model, Earth Education encourages learners to live more harmoniously and joyously with the natural world. A key challenge for earth education is to help people understand the major ecological systems and communities found on our planet.

Earth Education goes to great lengths to craft programmes that incorporate the principles of 'good learning'. These include:

- understanding how and why our actions fit into a bigger picture.
- engaging both feelings and understanding
- applying learning to real life situations
- exposing learners to a range of learning styles – audio, visual and kinesthetic.

Focusing on teaching the concept of photosynthesis, learners are taken through the following stages of the IAA model:

Information

- Learners are given a key concept statement that summarises the 'big picture'. In Sunship Earth, a programme aimed at 9-11 year olds, the key statement is 'The sun is the source of energy for all living things'. To reinforce the concept of energy flow, this statement is reiterated on a number of occasions. For example

Left and Below: Learners are invited to venture inside a giant model leaf or 'food factory'

when looking at energy capture (photosynthesis), energy transfer (food chains) and energy use/loss (movement, eating, reproduction, etc.)

- Learners are given some basic information about the concept of photosynthesis – how green plants capture sunlight energy to combine carbon from air with hydrogen from water to make sugars.

Assimilation (through active participation)

- Learners are invited to venture inside a giant model leaf or 'food factory'. Their mission is to 'spy' on the chloroplasts to find out how green leaves make sugar using sunlight energy. Learners don green 'chlorospy' hats and crawl up the stem of the leaf, only to discover that they have to make the sugars themselves! This action takes the following form:
  - Air enters a hole in the side of the leaf (a giant stomata) in the form of two golf balls. These are attached to each other to represent a carbon dioxide molecule (balls are attached using a fabric called 'velcro').
  - Water rushes up the stem in the form of another two golf balls, again attached to each other.
  - Chlorospies have to join the carbon molecule to the hydrogen molecule. However, when they try to do this they learn that it is not possible. Realisation dawns on them that they need the suns' energy - again represented as a golf ball. This particular golf ball however, has the velcro attached in such a way that allows the carbon molecules to be joined to the hydrogen molecules with the oxygen still attached.
  - 'Hey Presto!' the chlorospies discover how to make a carbohydrate or sugar. These molecules are popped into a 'top secret' chlorophyll box – a large chloroplast.

- The remaining oxygen molecules are sent back out of the leaf through the exit hole.
- On finishing their mission, the chlorospies leave the 'food factory' where they are offered slices of orange or apple – a product of the process they've just been through.

Application

- Learners are asked to apply what they have just learnt to the world around them. They are asked to find something that converts sunlight energy into sugars and to identify the various stages involved in the process. It is essential to complete this stage of the learning process outside where photosynthesis is happening all around.

In Earth Education, the ecological story of life has been boiled down to four key concepts: Food Factory, Energy Flow and Cycling, Interrelationships and Change. At every stage we look at how humans are tied into these systems and the effects we have on them. Supporting each concept is a collection of activities designed to help learners build up an emotional bond with the earth and its life. These activities involve first-hand contact with nature and encourage learners to share their thoughts and feelings about the natural world. The essential ingredients of all activities, often referred to as 'the glue', are magic and adventure. In all programmes there is a final and all-important element that encourages the learners to examine their own lifestyles and how they can change to help maintain the ecological processes and share their experiences with others. This final stage is based on the understandings and feelings gained throughout the programmes. If you are interested in any of the programmes, activities, materials, training opportunities or the organisation, then please get in touch. We look forward to hearing from more practitioners.

Right: Giant model leaf or 'food factory'

Right: Chlorospies learn how a leaf makes sugar using sunlight energy

Resumé

L'éducation à la planète est un processus qui aide les gens à vivre plus harmonieusement et plus joyeusement avec le monde naturel. Un des composants clé de l'éducation à la planète est d'aider les gens à comprendre les principaux écosystèmes et communautés du monde, plutôt que des petites parcelles de vie. De nombreux éducateurs dans le monde ont été touchés par l'éducation à la planète, en partie grâce aux façons innovantes et dynamiques de présenter les processus écologiques.

Les processus clé qui permettent la vie sur terre sont l'apport d'énergie (du soleil vers les plantes puis vers les animaux), les cycles (de l'air, de l'eau et des matières organiques du sol), les inter-relations et les échanges. Ces concepts sont plutôt abstraits. Par exemple, qui a pu observer la fabrication de sucres à l'intérieur d' une feuille ? La solution pour permettre une compréhension minimum de tels concepts est de les rendre concrets au moyen d'un apprentissage par l'action.

L'éducation à la planète, cela implique : d'informer l'apprenant sur un concept important, d'assimiler ce concept en utilisant des accessoires et des métaphores et d'appliquer cette nouvelle notion au monde réel. Cet article donne une bonne vision sur la façon dont cette approche conceptuelle aide à un apprentissage rapide et permet aux apprenants de prendre des décisions pour agir avec plus de légèreté sur la planète.

Left: Chlorospies learn how a leaf makes sugar using sunlight energy

▲ Resumen

Earth education - la educación Tierra - es un proceso para ayudar a la gente a vivir con alegría y en armonía con el mundo natural. Uno de los componentes claves del earth education es el ayudar a la gente a entender los principales sistemas ecológicos y a las comunidades ecológicas del planeta, mas que los componentes individuales de la vida. Muchos educadores en todo el mundo han sido tocados por el earth education, en parte porque presenta los procesos ecológicos de una manera innovativa y dinámica.

Los procesos claves que mantienen a toda la vida en la tierra son el flujo de la energía (del Sol a las plantas y luego a los animales), los ciclos (de aire, agua y nutrientes del suelo), las interrelaciones, y el cambio. Estos conceptos son bastantes abstractos. Por ejemplo, ¿quien ha visto el desarrollo de los azucares dentro de una hoja? La clave para llegar a una comprensión de estos conceptos es la de convertirlos en realidad con las actividades de la enseñanza.

En earth education se informa sobre los grandes conceptos; se asimila el concepto con el uso de los objetos y las metáforas y se aplica lo que se ha aprendido al mundo real. Este artículo estudia con detalle como este método conceptual ayuda a acelerar el proceso de aprendizaje y contribuye a que los que aprendan puedan tomar decisiones que impacten menos sobre el planeta en el que vivimos.

Jon Cree is Co-International Training Co-ordinator for The Institute for Earth Education and Education and Training Officer for Bishops Wood Centre, Worcestershire Education Authority, UK. Jon can be contacted via email: training@earthed.org.uk.

For further information about the Institute contact www.eartheducation.com. Each major branch also has its own website.
The UK branch website is www.eartheducation.org.uk

Above: This practical activity was designed to help learners understand the concept of energy loss through the food chain

Une histoire venue d'une Petite Ile

Una historia desde una isla pequeña

A Story
from a Small Island

Right: Inspired by Marianne North - Leanne completes the decoration of her sunflower pot

■ Summary

David Hanschell is a teacher on the island of Bute, a small island off the west coast of Scotland. This article describes an environmental studies project carried out by a class of 16 seven to nine year old children, attending a semi-rural primary school on the island. The project's activities contributed to the implementation of the science components of the Science and Technology: 5-14 National Curricula. The objectives of these activities were to raise the level of the children's awareness to the vital importance of plants to their lives and to introduce the children, through these activities, to the ideas of interdependence, sustainability and communities. Through the various activities the children have actively been involved in developing a number of partnerships and the school has become more integrated into the community.

A class of sixteen primary school children from the Island of Bute, Scotland, embarked on an environmental project in August 2002 that had the twin aims of increasing the children's awareness of the importance of plants in their lives, as well as introducing them to concepts of interdependence, sustainability and community.

The project, managed by the class teacher, was also intended to conform to Scottish National Curriculum criteria on Environmental Studies. In particular, guidelines on 'developing an understanding of the interdependence of living things with the environment' and focussing on 'the conservation and care of living things' provided the conceptual framework for this project.

Learning outcomes, again informed by National Curriculum guidelines, were identified as follows, namely:

- developing informed attitudes and values relating to the care and conservation of the environment'
- gaining an understanding of issues relating to the use of resources and sustainable global development'
- becoming aware of the importance of active citizenship in a democratic society'.

The challenge for the class teacher was to convert these guidelines into meaningful activities for the children, whose ages ranged from seven to nine years old. A successful project might then form the model for an educational programme at the island's Ardencraig Gardens.

As part of their 'Disappearing Forest' environmental studies term topic the class investigated the viability of planting Scots Pine (Pinus Sylvestris) in the woods surrounding the village of Port Bannatyne. The success of such a venture would depend upon the availability of suitable trees and permission to plant them from the relevant landowners.

The Reforesting Scotland organisation provided a list of Tree Nurseries for the children to approach and one of these, Lunga Garden Nursery at Ardfern in Argyllshire, came back with an offer of Scots Pine seedlings. The next

Left: Surplus pipes from a recent island sewage scheme were placed adjacent to Port Bannatyne pier and filled with topsoil by the pupils

challenge for the project was to find a suitable planting site where the long term development of the trees could be monitored.

In January 2003, following a meeting with Argyll and Bute Council's department of Amenity Services, permission was granted for the children to transplant their trees in Ardencraig Gardens. Garden staff also agreed to help the children grow bedding plants for the Port Bannatyne Best Village competition, as well as introducing them to work being carried out elsewhere in the garden. By the end of March the children had transplanted their trees inside a large walled garden and assisted in the propagation of bedding plants. Surplus pipes from a recent island sewage scheme were also placed adjacent to Port Bannatyne pier, filled with topsoil by the pupils and planted with bedding plants, which they had grown from seed earlier in the year.

Left: Front cover of the class book which documents their environmental project

With the benefit of hindsight there may appear to be a coherent sense of order and sequence about the events described above. At the time the salient ideas and aims of the project seemed to emerge only as it unfolded and opportunities presented themselves.

That being said, the long-term goal of this project is now to establish a permanent educational relationship with Ardencraig Gardens. In the final analysis, the project's real value was the opportunity it afforded children to undertake constructive and creative learning in an environmental context. And most important of all, perhaps, the evident enthusiasm of this group for a project of this kind offers real potential for their future development.

Resources

- Billington, E.T (1968) Ecology Today. Kaye &Ward, London.
- Environmental studies 5-14(1991) The Scottish Office Education Department, Working Paper 13.
- Greig, S., Pike, G., Selby, D.(1987) Earthrights: Education as if the Planet Really Mattered. WWF and Kogan Page, London.
- Hobson,C.and Willison,J.(Editors) January 2001 Teaching for The 21st Century: Botanic Garden Education for a New Millennium. Proceedings of the Third International Congress on Education in Botanic Gardens. BGCI (U.S) Inc. New York
- Learning for Living: Environmental Education in Scotland (1985) edited by J.C.Smyth for The Scottish Environmental Education Council
- Medawar, J(1980) Lifeclass. Hamish Hamilton, London.

Right: The children's visit to the Ardencraig Gardens and involvement in the Eco School initiative made headlines in the local newspaper

- Rodrigo Perez, Julio D. y González Henriquez, Ma, N. (Editors) 1993, Cultivating Green Awareness, Proceedings of the Second International Congress on Education in Botanic Gardens, Jardín Botánico Canario, Viera y Clavijo, Las Palmas.

Web resources

- 5-14 Guidelines for Environmental Studies: http://www.ngflscotland.gov.uk/5-14/guidelines/htmlguidelines/index.htm
- Reforesting Scotland: http://reforestingscotland.org/
- The Post Code Plants Database: http://www.nhm.ac.uk/science/projects/fff/
- The Sustainability Education Center: http://www.sustainabilityed.org/
- Education for Sustainable Development: http://www.nc.uk.net/esd/index.html
- The Center for Eco Literacy: http://ecoliteracy.org/index.html
- Earth Day Network: http://www.earthday.net/
- Hands on Science Centers Worldwide: http://www.-2.cs.cmu.edu/~mum/sci.html


Tuesday 25th March 2003

Today we went up to Ardencraig Gardens and we saw some birds and lots of plants and we saw some cactuses some of them look like pineapples We got to plant some Wild cherrys Rowan and Alder.

The was a bird like an eagle and its name was a Tamboura. I liked everyting there

Right: Thoughts in words and pictures, from one child, following the class visit to Ardencraig Gardens

● Resumé

David Hanschell est enseignant sur l'Ile de Bute, une petite île au large de la côte ouest de l'Ecosse. Cet article décrit un projet d'étude de l'environnement mené par une classe de 16 enfants ages de 7 à 9 ans, fréquentant une école primaire semi-rurale de l'Ile. Les activités de ce projet ont permis l'introduction d'éléments de sciences et de technologie selon le Curriculum national 5-14. Les objectifs de ces activités étaient d'accroître la prise de conscience de l'importance vitale des plantes dans leur vie et d'amener les élèves, au travers de ces activités, à l'idée d'interdépendance, de développement durable et de communautés. Grâce à des activités variées, les enfants ont été impliqués activement dans la mise en place de partenariats et l'école est devenue beaucoup plus intégrée dans la communauté.


Eco schoolkids get hands on experience

▲ Resumen

David Hanschell es profesor en la isla de Bute, una pequeña isla cerca de la costa oeste de Escocia. Este articula describe un proyecto de estudios medio ambientales que llevo a cabo una clase de dieciséis niños entre las edades de 7 y 9 que asisten a un colegio primario un una zona semi rural de la isla. Las actividades del proyecto contribuyeron a la implementación de los componentes de ciencias del apartado de ciencia y tecnología del Currículo Nacional. Los objetivos de estas actividades eran los de aumentar el nivel de sensibilidad de los niños hacia la importancia vital de las plantas en sus vidas y de presentarles, a través de estas actividades, las ideas de interdependencia, sostenimiento y comunidades. A través de las varias actividades, los niños han participado activamente en el desarrollo de varias iniciativas de colaboración y el colegio se ha visto mas integrado en la comunidad.

David Miles Hanschell is a teacher on the staff of North Bute Primary School, Castle Street, Port Bannatyne, Isle of Bute , PA200LZ,Scotland. Tel.no.01700 50 3728, fax 01700 50 3728, Email: delhicot@aol.com or delhicot@hotmail.com

Disponible
Resources
Recursos

■ Resources

Herzlich Willkommen-und Dann?
Hethke, M. and Wöhrmann (2002) Published by Führungen im Botanischen Garten Planen Und Attraktiv Gestalten, Universität Kassel, Witzenhausen.
ISBN 3-89792-083-2 Cost: €9
German educators from the German Association of Botanic Gardens have produced a useful interpretive reference handbook for people guiding groups, especially in botanic gardens. The handbook gives helpful advice on planning tours, guiding techniques, the educational approach, developing themes for guided walks and evaluation. The handbook also includes a detailed reference list and practical examples of case studies from Germany.

Compendium of Symbolic and Ritual Plants in Europe
De Cleene, M. and Lejeune, M.C. (2003) published by Mens and Cultuur lutgevers n.v., Maaltebruggestraat 288, 9000 Ghent, Belgium. Email: info@man-and-culture.com Web site: http://www.man-and-culture.com Cost: €169
Few people realise that many European customs have their roots in age-old rituals that had symbolic value to our ancestors. This two-volume reference work features more than one hundred ritual plants (trees, shrubs and herbs) that are used in our daily lives. The authors have restricted themselves to plants that are either indigenous, or have become established in Europe (e.g. lime and rose), or that are exotic but have ritual uses in Europe (e.g.

▲ Disponible

Herzlich Willkommen-und Dann?
Hethke, M. and Wöhrmann (2002) Publié par Führungen im Botanischen Garten planen und attraktiv gestalten, Universität Kassel, Witzenhausen.
ISBN 3-89792-083-2 prix: €9
Les éducateurs allemands de l'association allemande des jardins botaniques ont produit un manuel de référence utile pour les gens guidant des groupes, en particulier dans les jardins botaniques. Le manuel donne des conseils sur la préparation des visites, les techniques de guidage, l'approche éducative, le développement de sujets pour des visites guidées et l'évaluation.
Le manuel contient aussi une liste détaillée de références et des exemples pratiques d'études de cas d'Allemagne.

Compendium of Symbolic and Ritual Plants in Europe
De Cleene, M. and Lejeune, M.C. (2003) publié par Mens and Cultuur lutgevers n.v., Maaltebruggestraat 288, 9000 Ghent, Belgium. Email: info@man-and-culture.com site Web: http://www.man-and-culture.com prix: €169
Peu de gens se rendent compte que beaucoup de coutumes européennes ont leurs racines dans d'anciens rituels qui avaient une valeur symbolique pour nos ancètres. Ce travail de référence en deux volumes présente plus de cent plantes rituelles (arbres, arbustes et herbacées) qui sont utilisées dans notre vie quotidienne. Les auteurs se sont restreints aux plantes qui sont

● Recursos

Herzlich Willkommen-und Dann?
Hethke, M. and Wöhrmann (2002) Publicado por Führungen im Botanischen Garten Planen Und Attraktiv Gestalten, Universität Kassel, Witzenhausen.
ISBN 3-89792-083-2 Costo: €9
Educadores alemanes de la Asociacion Alemana de Jardines Botánicos han producido un manual interpretativo de referencia para guias de grupos, especialmente en jardines botánicos. El manual da consejos útiles para la planeación de viajes, técnicas de guiado y evaluación la introducción a la educación, desarrollando temas para paseos guiados y evaluación. El manual también incluye una lista detallada de referencias y ejemplos practicos de caso de estudios de Alemania.

■ Resources

incense and rice). This is an academic survey of the knowledge of ritual plants over the centuries. As well as taking a broad view, it also looks critically at the correctness of plant species named in the literature.

Ecological Thought: An Introduction
Hayward, T. (1994) published by Polity Press, 65 Bridge Street, Cambridge CB2 1UR, U.K.
ISBN: 0745613209
This book offers an accessible introduction to the implications of ecology for social and political thought. It looks at a range of debates about values in nature, the meaning of sustainable development and such questions as whether human rights are compatible with ecological responsibilities.

We are all well aware that the damage we are inflicting on our environment and on other species, as well as our future prospects, requires an urgent response. Hayward examines the competing arguments to address this; from fundamentally challenging the attitudes and values that prevail in the West to finding a more consistent application of scientific reason. His own perspective is that a non-exploitative attitude to nature is consistent with a continued commitment to Enlightenment values such as democracy, human rights and the pursuit of knowledge.

This book is a fascinating read for anyone who wishes to gain a basic understanding of ecological controversies today.

The Nature of Wetlands – A Handbook of Wetlands in Kenya*
National Museums of Kenya (1999) published in association with Kenya Wildlife Service and Kenya Institute of Education. NMK Education Department, PO Box 40658, 00100 GPO Nairobi, Kenya. Fax: +254 (20) 3741424, Email: nmkeduc@museums.or.ke
Price KES 250

▲ Disponible

indigènes ou naturalisées en Europe (tilleul et rose), ou qui sont exotiques mais qui ont des utilisations rituelles en Europe (p. ex. encens et riz). Il s'agit ici d'une révision académique des connaissances sur les plantes rituelles à travers les siècles. Tout en prenant un point de vue élargi, il jette aussi un œil critique sur l'exactitude des espèces de plantes nommées dans la litérature.

Ecological Thought: An Introduction
Hayward, T. (1994) publié par Polity Press, 65 Bridge Street, Cambridge CB2 1UR, U.K.
ISBN: 0745613209
Ce livre offre une introduction accessible aux implications de l'écologie pour la pensée sociale et politique. Il traîte d'une série de débats sur les valeurs dans la nature, la signification du développement durable et des questions telles que si les droits de l'homme sont compatibles avec les responsabilités écologiques.

Nous sommes bien conscients que les dommages que nous infligeons à notre environnement, à d'autres espèces et à notre propre futur, nécessitent une réponse urgente. Hayward examine les différentes argumentations y relatives, depuis la mise en cause fondamentale des comportements et des valeurs qui dominent dans l'Ouest, jusqu'à la recherche d'une application plus consistente de la raison scientifique. Son propre point de vue est qu'une attitude non exploitante envers la nature va de pair avec un engagement continu en direction de valeurs spirituelles telles que la démocratie, les droits de l'homme et la recherche du savoir.

Ce livre représente une lecture fascinante pour tous ceux qui désirent acquérir une compréhension basique des controverses écologiques d'aujourd'hui.

The Nature of Wetlands – A Handbook of Wetlands in Kenya
National Museums of Kenya (1999) publié en association avec Kenya Wildlife Service et Kenya Institute of Education.

● Recursos

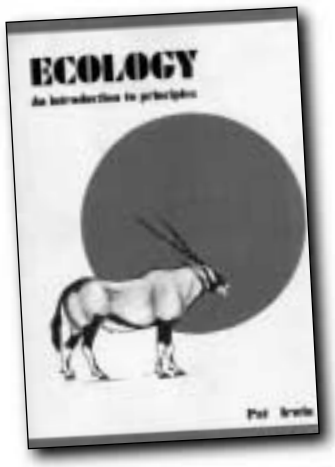
Compendium of Symbolic and Ritual Plants in Europe (Compendio de (Plantas simbólicas y rituals en Europa) De Cleene, M. and Lejeune, M.C. (2003) publicado por Mens and Cultuur lutgevers n.v., Maaltebruggestraat 288, 9000 Ghent, Belgium. Email: info@man-and-culture.com Web site: http://www.man-and-culture.com Cost: €169
Pocas personas se dan cuenta de que muchas costumbres europeas tienen sus raices en rituales del pasado que tenian valor simbólico para nuestros ancestros. Este trabajo de referencia en dos volúmenes describe mas de cien plantas rituales (árboles, arbustos e hierbas) que son usadas en nuestra vida diaria. Los autores se han restringido a plantas que son ya sea indígenas, o que se han establecido en Europa (ejemplo: lima y rosa), o que son exóticas pero tienen usos rituales en Europa (ejemplo: incienso y arroz). Esta es una investigación académica del conocimiento de plantas rituales sobre los siglos. Asi tambien como tomando una amplia visión, busca críticamente en la literatura, el correcto nombre de la especie.

Ecological Thought: An Introduction (Pensamiento Ecológico: Una introducción)
Hayward, T. (1994) published by Polity Press, 65 Bridge Street, Cambridge CB2 1UR, U.K.
ISBN: 0745613209
Este libro ofrece una introducción accesible a las implicaciones de ecología para el pensamiento social y político. Presenta un rango de debates acerca de los valores en la naturaleza, el significado del desarrollo sostenible y preguntas tales como la compatibilidad de los derechos del ser humano con las responsabilidades ecológicas.

Nosotros estamos bien concientes que que el daño que estamos inflingiendo sobre nuestro medio ambiente y sobre otras especies, asi como también de nuestros prospectos futuros, requiere de una respuesta urgente. Hayward examina los argumentos competentes

■ Resources

This A4 sized handbook contains information on aspects of wetland ecology with specific reference to the Kenyan context. The information has been drawn from current studies and ecological activities on Kenyan wetlands. The handbook first defines what a wetland is and then outlines the various types of wetlands and their distribution in the country. The values of wetlands from an ecological perspective are discussed and major threats facing wetland ecosystems articulated. The handbook further illuminates various measures towards the conservation of wetlands in general. A number of ecological activities that teachers and students may undertake to enhance the understanding, appreciation and conservation of wetlands within their local contexts are highlighted.



Ecology – An Introduction to Principles*
Pat Irwin (2001) published by the Faculty of Education, Rhodes University, PO Box 972, Grahamstown, 6140, South Africa. Tel: +27 (46) 622 4800 Email: p.irwin@ru.ac.za
Price: 10 Rand
This booklet provides an introduction to the basic principles of ecology and ecological processes, in an accessible and understandable format for the average learner. Ecological principles on trophic levels, energy flow, material cycling, limiting factors and change are elaborately discussed. Pat first defines some of the useful ecological and

▲ Disponible

NMK Education Department, PO Box 40658, 00100 GPO Nairobi, Kenya.
Fax: +254 (20) 3741424, Email: nmkeduc@museums.or.ke
prix: KES 250
Ce manuel de format A4 contient des informations sur l'écologie des milieux humides avec des références particulières au contexte du Kenia. Les informations sont tirées d'études récentes et d'activités écologiques dans les milieux humides du Kenia. Le manuel commence par donner une définition des milieux humides, pour ensuite décrire les différents types de milieux humides et leur répartition dans le pays.

Les valeurs des milieux humides d'un point de vue écologique sont discutées et les menaces principales auxquelles les écosystèmes des milieux humides font face sont articulées. Le manuel illustre par ailleurs diverses mesures de conservation pour les milieux humides en général. Un certain nombre d'activités écologiques que les enseignants et les étudiants peuvent entreprendre pour augmenter la compréhension, l'appréciation et la conservation des milieux humides dans leurs contextes locaux sont accentuées.

Ecology – An Introduction to Principles
Pat Irwin (2001) published by the Faculty of Education, Rhodes University, PO Box 972, Grahamstown, 6140, South Africa. Tel: +27 (46) 622 4800
Email: p.irwin@ru.ac.za
Price: 10 Rand
Ce livret donne une introduction sur les principes fondamentaux de l'écologie et des processus écologiques, dans un

● Recursos

para dirigir esta; desde fundamentalmente retando las actitudes y valores que prevalecen en el Occidente para encontrar una aplicación de razones científicas mas consistente. Su propia perspectiva es que una actitud de no-explotación hacia la naturaleza es consistente con un continuado compromiso para resaltar valores tales como la democracia, derecho humanos y el propósito del conocimiento.

Este libro es una lectura fascinante para cualquiera que desea ganar un entendimiento básico de las controversias ecológicas de hoy.

The Nature of Wetlands – A Handbook of Wetlands in Kenya (La naturaleza de los humedales – Un manual de humedales en Kenya) National Museums of Kenya (1999) publicado en asociación con el Servicio para la vida Silvestre de Kenya y el Instituto para la Educación de Kenya. NMK Education Department, PO Box 40658, 00100 GPO Nairobi, Kenya.
Fax: +254 (20) 3741424, Email: nmkeduc@museums.or.ke
Precio KES 250
Este manual en tamaño A4 contiene información sobre aspectos de ecología de los humedales con referencia específica al contexto Kenyano. La información ha sido derivada de estudios presentes y actividades ecológicas sobre humedales de Kenya. El manual primero define que es un humedal y luego describe los diferentes tipos de humedales y su distribución en el país. Se discuten los valores de los humedales desde una perspectiva ecológica y las principales amenazas hacia los mismos son articuladas. El manual da idea sobre varias medidas hacia la conservación de los humedales en general. Un número de actividades ecológicas que los maestros y estudiantes pueden realizar para realzar el entendimiento, apreciación y conservación de los humedales dentro de su contexto local, son resaltadas.

■ Resources

environmental terms that have not been covered in the text. The booklet's text has key terms in bold *italics*, while ordinary *italics* are used either for emphasis or for works with non-English origins. The booklet provides a first step in the development of informed opinions, and where necessary and appropriate, informed action. It also aims to provide teachers of all learning areas with basic information. Consequently, a large number of diagrams have been used and teachers are encouraged to reproduce them for educational purposes. However, Pat Irwin writes with the belief that environmental education and awareness is not only the responsibility of teachers, important as their role is, but of every citizen in whatever niche of the society they function.

Enviro-Picture-Building Resource*
Developed by Share-Net with funding from Green Trust and WWF-South Africa, PO Box 394, Howick, 3290, South Africa, Fax: +27 (332) 304676
Email: sharenet@futurenet.co.za
This simple, exciting and flexible resource aims to encourage learners to build pictures on different environments, to explore key ecological ideas, to discuss environmental issues and to encourage local action. It has the potential of opening up an interactive search for insight into ecological processes that shape our environment and the problems that confront us. The resource consists of picture-building packs on four different environments: *The City, Rural, River Catchments and Reserves*. Each pack has a set of 28 picture cards with information on environmental issues, ideas for investigation, project work, fieldwork and local action research referenced on the back. In addition, each pack has two small pictures and two enviro-picture-building boards. Instructions on how to use the packs are given. Three features of teaching and learning ecology are the focus of the Enviro-Picture-Building resource. To introduce key ecological concepts, an interactive

▲ Disponible

format accessible et compréhensible pour l'étudiant moyen. Les principes écologiques sur les niveaux trophiques, les flux énergétiques, les cycles de matériaux, les facteurs limitants et les changements sont discutés minutieusement. Pat définit d'abord quelques termes écologiques et environnementaux utiles qui ne sont pas couverts par le texte. Le texte du livret montre les mots-clé en italique gras, alors que les italiques sont utilisés ou bien pour accentuer ou bien pour les travaux d'origine non anglaise. Le livret présente un premier pas vers le développement d'opinions informées et le cas échéant vers l'action informée. Il vise aussi à fournir une information de base aux enseignants de toutes branches. Par conséquent, un grand nombre de diagrammes ont été utilisés et les enseignants sont encouragés de les reproduire à des fins éducatives. Néanmoins Pat Irwin écrit avec la conviction que l'éducation et la conscience environnementales ne sont pas la responsabilité uniquement des enseignants, même si leur rôle est important, mais de tout citoyen, quelle que soit la niche de la société qu'il occupe.

Enviro-Picture-Building Resource
Développé par Share-Net avec le soutien financier de Green Trust et WWF-South Africa, PO Box 394, Howick, 3290, South Africa, Fax: +27 (332) 304676
Email: sharenet@futurenet.co.za
Ce matériel simple, excitant et flexible cherche à encourager les étudiants à créer des images sur des environnements différents, à explorer des idées-clé écologiques, à discuter des sujets environnementaux et à encourager des actions locales. Il a le potentiel d'initier une recherche interactive pour la compréhension des processus écologiques qui forment notre environnement et les problèmes auxquels nous sommes confrontés. Le matériel consiste en paquets pour la construction d'images sur quatre environnements différents : la Ville, Rural, Bassins fluvatiles et Réserves. Chaque paquet comporte une série de 28 cartes d'images avec des

● Recursos

Ecology – An Introduction to Principles (Ecologia – Una introducción a los Principios)
Pat Irwin (2001) publicado por Faculty of Education, Rhodes University, PO Box 972, Grahamstown, 6140, South Africa. Tel: +27 (46) 622 4800
Email: p.irwin@ru.ac.za
Price: 10 Rand
Este pequeño libro proporciona una introducción a los principios básicos de ecología y procesos ecológicos sobre los niveles tróficos, flujo de energía, reciclado de material, factores limitantes y cambio, son discutidas elaboradamente. Pat define primero algunas de los útiles terminos ecológicos que no han sido cubiertos en el texto. El texto del libro tiene terminos clave en ***italicas*** resaltadas, mientras *itálicas* son usadas ya sea para enfatizar o para trabajos con origen no-inglés. El libro provee un primer paso en el desarrollo de opiniones informadas, y donde sea necesario y apropiado, acción informada. También persigue proover a los maestros de todas las areas del aprendizaje con información básica. Consecuentemente, un gran número de diagramas han sido usadas y maestros son animados a reproducirlos para propósitos educativos. Sin embargo, Pat Irwin escribe con la creencia de que educación y alerta medioambiental es no solo la responsabilidad de los maestros, importante como su papel es, pero de cada ciudadano en cualquier nicho de la sociedad que ellos funcionen.

Enviro-Picture-Building Resource (Construcción de Pinturas-Ambientales como un recurso)
Desarrollado por Share-Net con financiamiento del Green Trust y la WWF-South Africa, PO Box 394, Howick, 3290, South Africa, Fax: +27 (332) 304676
Email: sharenet@futurenet.co.za
Este simple, excitante y flexible recurso pretende estimular estudiantes para construer pinturas sobre diferentes ambientes, para explorar sus ideas ecológicas, para discutir temas ambientales y promover acción local.

■ Resources

starter orientation activity in which learners are divided into two teams for a question and answer challenge is used. To explore key environments and ecological problems, learners are then encouraged to match words found on the enviro-picture-building boards with appropriate picture cards. Finally, learners are involved in building pictures of their local environments with sketches drawn using improvised sketching scopes (viewers). The sketching scope acts as a visual organising framework. Instructions on how to make a sketching scope from a small milk cartoon are provided.

* These resources were kindly reviewed by Mr Abel Atiti, Education Officer, National Museums of Kenya, Nairobi Botanic Garden in Kenya.

Web Sites

http://www.sharingnature.com
Established in 1979 by naturalist and author, Joseph Cornell, the Sharing Nature Foundation uses creative nature activities to give people enjoyable and inspirational experiences of nature. The foundation believes that only by uplifting people's consciousness can educators change the way people look at, and relate to the world around them.

The foundation promotes the Flow Learning™ technique which is a simple, yet subtle and powerful system of teaching based on universal principles of awareness and how people learn. It gently guides people, step by step, to deeper, more profound experiences of nature. The strategy is very adaptable and can be used to teach any subject matter using its four main stages for teaching: Awaken Enthusiasm, Focus Attention, Direct Experience, and Share Inspiration.

Examples of activities from Joseph Cornell's book Sharing Nature with Children (1998) are given on the web site and these guide readers through the Flow Learning™ style of teaching. Each activity gives a quick overview of its Flow Learning™ stage, the concepts, attitudes and qualities it

▲ Disponible

informations sur les thèmes environnementaux, des idées d'enquète, de projets, de travaux sur le terrain et d'actions locales sur le verso. En plus, chaque paquet présente deux petites images et deux supports de montage pour des enviro-images avec les instructions pour l'utilisation des paquets. Trois dispositifs pour l'enseignement et l'étude de l'écologie sont au centre du matériel enviro-images. Pour introduire les principaux conceptes écologiques, une activité interactive d'orientation initiale est utilisée, dans laquelle les participants sont séparés en deux groupes pour un jeu de questions-réponses. Afin d'explorer les principaux problèmes environnementaux et écologiques, les étudiants sont ensuite encouragés à mettre en relation les mots qu'ils trouvent sur les supports de montage avec les cartes-images appropriées. Finalement, les étudiants sont entrainés à construire des images de leur propre environnement local avec des esquisses faites à l'aide d'un visionneur improvisé. Le visionneur sert comme cadre d'organisation visuelle. Des instructions sont fournies pour faire un visionneur à partir d'une boite à lait.

Sites Internet

http://www.sharingnature.com
Établie en 1979 par le naturaliste et auteur Joseph Cornell, la Sharing Nature Foundation utilise des d'activités nature créatives pour faire vivre aux gens des expériences agréables et inspirantes dans la nature. La fondation est convaincue que c'est uniquement en élevant la conscience des gens que les éducateurs peuvent changer la façon dont les gens regardent et se mettent en relation avec le monde qui les entoure.

La fondation favorise la technique du Flow Learning™, qui est un système d'enseignement simple, mais subtil et puissant, basé sur les principes universels de la prise de conscience et de la façon dont les gens apprennent. Les gens sont menés étape par étape à une expérience de plus en plus profonde et plus vaste de la nature. La

● Recursos

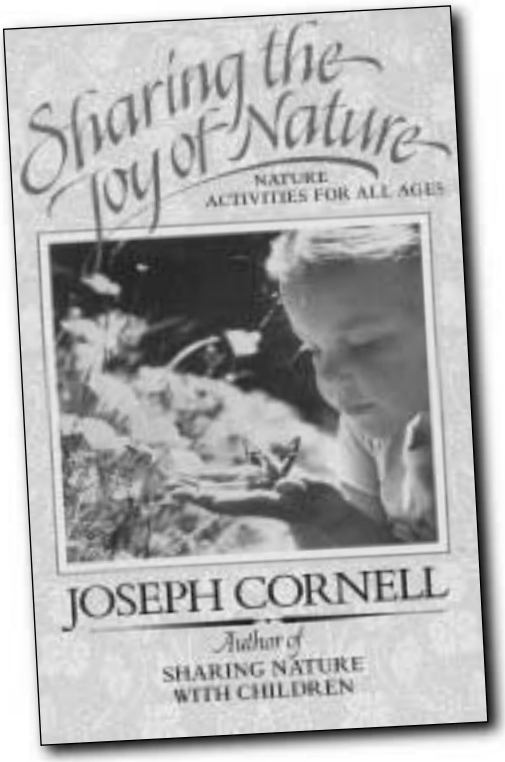
Esto tiene el potencial de abir una búsqueda interactiva para buscar dentro de los procesos ecológicos que moldeen nuestro medioambiente y los problemas que confrontamos. El recurso consiste de paquetes con pinturas para construir sobre cuatro diferentes ambientes: La ciudad, Riveras de ríos y Reservas. Cada paquete tiene un conjunto de 28 tarjetas con pinturas con información sobre temas ambientales, ideas para investigación, proyecto de trabajo, trabajo de campo y de investigación sobre acción local en la parte trasera. Además, cada paquete tiene 2 pequeñas pinturas y 2 marcos para construcción de las pinturas ambientales.
Tres características de enseñanza y aprendizaje de ecología son el foco del recurso de las pinturas ambientales . Para introducir los conceptos ecológicos, se usa una actividad interactiva introductiva en la cuál los alumnos son divididos en 2 equipos a través del reto de la respuesta a una pregunta. Para explorar los ambientes clave y los problemas ecológicos, los alumnos son estimulados a ligar las palabras encontradas con las tablas de pinturas-ambientales con las tarjetas apropiadas. Finalmente, los alumnos son involucrados en construcción de pinturas de sus ambientes locales con historietas dibujadas utilizando observadores improvisados en la misma historieta. Los actos de historieta actuan como una estructura de trabajo organizada. También se proporcionan la instrucciones sobre como hacer una observador de la historieta a partir de un pequeño carton de leche.

Web Sites

http://www.sharingnature.com
Establecido en 1979 por el naturalista y autor, Joseph Cornell, la Sharing Nature Foundation usa actividades naturales crerativas para dar a la gente experiencias disfrutables e inspiracionales de la naturaleza. La fundación cree que únicamente elevando la conciencia de la gente los educadores cambiaran la forma en la la gente observa y relaciona el mundo con ellos.

■ Resources

teaches, when and where it can be played, the number of players required and the age that it suits as well as any special materials that are needed.



http://cpreec.org/
The CPR Environmental Education Centre has been set up to increase consciousness and knowledge about the environment and the major environmental problems facing India today. It has been conducting a variety of programmes to spread awareness and interest among the public, particularly among NGOs, women, youth and children.

The web site features a range of environmental education publications for sale focusing on topics such as communication techniques for environmental awareness raising, biodiversity, and understanding of the Nilgiris. The publications are available at basic, intermediate and advanced levels. In addition, display materials such as posters are available in Tamil, Hindi, English, Malayalam and Telugu.

The Centre also publishes a quarterly newsletter Econews. Back issues are available on the web and include many

▲ Disponible

stratégie est très facilement adaptable et permet d'enseigner n'importe quel sujet en utilisant ses quatre étapes d'enseignement principales : Éveiller l'Enthousiasme, Concentrer l'Attention, Expérience Directe et Partager l'Inspiration

Sur le site on trouve des exemples d'activités tirées du livre Sharing Nature with Children (1998) de Joseph Cornell, qui guident les lecteurs à travers le système d'enseignement du Flow Learning™. Chaque activité est présentée avec un rapide aperçu de son étape Flow Learning™, les conceptes, aptitudes et qualités qu'elle enseigne, où et quand elle peut être jouée, le nombre de joueurs requis et l'âge approprié, ainsi que le matériel spécial nécessaire.

http://cpreec.org/
Le Centre d'éducation environnementale CPR a été mis en place pour augmenter la conscience de et la connaissance sur l'environnement et les problèmes environnementaux majeurs auxquels l'Inde fait face aujourd'hui. Il a réalisé des programmes variés pour étendre la prise de conscience et l'intérêt au sein du public, en particulier les ONG, les femmes, les jeunes et les enfants.

Le site présente un choix de publications d'éducation environnementale à vendre sur des thèmes comme les techniques de communication pour élever la conscience environementale, la biodiverité et la compréhension des Nilgiris. Les publications sont disponibles pour les nivaux de base, moyen et avancé. En plus il y a des matériaux de présentation, p. ex. des posters, en Tamil, Hindi, Anglais, Malayam et Telugu.

Le Centre publie aussi le bulletin trimestriel Econews. Les anciens numéros sont disponibles sur Internet et contiennent de nombreux articles sur les plantes. Un numéro récent (Vol.8 No. 2) traîtait des droits de propriété intellectuelle, de plantes trouvées dans des plantations sacrées et de la plantation et de l'entretien

● Recursos

La Fundación promueve la técnica Flow Learning™ que es una técnica de enseñanza simple, subjetiva y poderoso sistema de enseñanza basado sobre los principios universales de conciencia y de aprender de la gente. Guia a la gente paso por paso, a cada vez a experiencias profundas de la naturaleza. La estrategia es muy adaptable y puede ser usada para enseñar cualquier tema, usando sus cuatro principales pasos para la enseñanza: Despertar el entusiasmo, Enfocar la Atención, Experimentar directamente y Compartir inspiración. Ejemplos de actividades del libro de Joseph Cornell, Sharing Nature with Children (1998), se presentan en el web site y estas guian a los lectores hacia el estilo de enseñanza del Flow Learning™ . Cada actividad da un panorama rápido de su estado en Flow Learning™, los conceptos, actitudes y cualidades que enseña, cuando y donde pueden jugarse, cuantos jugadores se require y las edades a las que se ajusta, así también los materiales que se requieren.

http://cpreec.org/
El CPR (Centro de educación ambiental) ha sido creado para incrementar la concienci y conocimiento acerca del medio ambiente y los principales problemas ambientales que India enfrenta hoy dia. Ha sido conduciendo una variedad de programas para diseminar la conciencia e interes entre el público, particularmente entre NGOs, mujeres, juventud y niños.

El web site describe un rango de publicaciones de educación ambiental para venta, enfocadas en topicos tales como tecnicas de comunicación y incremento de la conciencia, biodiversidad, y entendimiento de los Nilgiris. Las publicaciones son disponibles a niveles básicos, intermedios y avanzados. Además, se despliegan materiales como posters en lenguas como Tamil, Hindu, Inglés, Malayo y Telugu.

El Centro también publica un boletín cuatrimestral Econees. Temas atrasados son disponibles en el web e

■ Resources

articles on plants. A recent issue (Vol.8 No. 2) addressed intellectual property rights, plants found in sacred groves, and tree planting and aftercare as well as other topics relevant to botanic gardens such as a critical appraisal of the 2002 Johannesburg Summit.

http://www.rbgkew.org.uk/ksheets/index.html
The Royal Botanic Gardens Kew web site has a range of well presented and useful education resource information sheets. The sheets are categorised under several key criteria such as Basic Botany, Economic Plants, Cellulose and Plant Fibres, Ornamental Plants, Rainforests and Adaptations to Environment. Within these categories, sheets on specific topics can be printed or downloaded; there is a particular emphasis on tropical and subtropical plants such as rattans, papaya, and coconut palms. The specific plant resource sheets cover where the plants come from, what they look like, their uses and where to find additional sources of information. In addition, the web site has information sheets on CITES and the Royal Botanic Gardens Kew, the garden's history and its role.

http://www.arkive.org
The Wildscreen Trust describe their ARKive initiative as the Noah's Ark for the 21st century. This site brings together the world's finest wildlife films, photographs and sound recordings to create quality, fact-backed, multi-media portraits of plants and animals at risk of extinction that are freely available on line. ARKive is leading the virtual conservation effort - finding, sorting, cataloguing and copying the key records of species, and building them into a comprehensive and enduring audio-visual record.

Although British plants and animals are a key feature, part of the site also features a globally endangered chapter and the detailed information is authenticated by a species expert. Examples of species are the vulnerable *Ariocarpus trigonus*, a cactus from Mexico, and the critically endangered Wollemia noblis, the *Wollemi Pine* from

▲ Disponible

d'arbres, ainsi que d'autres sujets d'importance pour les jardins botaniques, comme par exemple une évaluation critique du Sommet Mondial 2002 de Johannisburg.

http://www.rbgkew.org.uk/ksheets/index.html
Le site Internet des Jardins Botaniques Royaux de Kew offre un assortiment de fiches d'information bien présentées et utiles sur les ressources éducatives. Les fiches sont groupées en plusieurs catégories telles que Botanique de Base, Plantes Économiques, Cellulose et Fibres Végétales, Plantes d'Ornement, Forêts Vierges et Adaptations à l'Environnement. A l'intérieur de ces catégories, des fiches sur des sujets spécifiques peuvent être imprimées ou téléchargées, il y a une emphase particulière sur les plantes tropicales et subtropicales telles que les rotins, la papaye et le cocotier. Les fiches d'information spécifiques des plantes indiquent d'où elles viennent, à quoi elles ressemblent, quelles sont leurs utilisations et où on peut trouver des sources d'information supplémentaires. En outre, le site Web présente des fiches d'information sur CITES et les Jardins Botaniques Royaux de Kew, l'histoire du jardin et son rôle.

http://www.arkive.org
Le Wildscreen Trust décrit son initiative ARKive comme étant l'arche de Noé pour le 21e siècle. Ce site rassemble les meilleurs films, photos et enregistrements sonores de la nature pour créer des portraits multi-média de qualité, basés sur les faits, des plantes et animaux en risque d'extinction, qui sont disponibles librement en ligne. ARKive mène l'effort de conservation virtuel, en trouvant, triant, cataloguant et copiant les enregistrements-clé des espèces et en les intégrant dans un enregistrement audio-visuel complet et durable

Bien que les plantes et animaux britanniques soient un élément clé, une partie du site comporte aussi un chapitre 'mondialement en danger' et l'information détaillée est vérifiée par un expert de l'espèce. Des exemples

● Recursos

incluye muchos artículos sobre plantas. Un creciente numero (Vol. 8 No. 2) habla sobre los derechos de propiedad intelectual, plantas encontradas en tumbas sagradas, y plantado de árboles y su cuidado, así como otros tópicos relevantes a jardines botánicos tales como apreciaciones críticas de la cumbre 2002 en Johannesburg.

http://www.rbgkew.org.uk/ksheets/index.html
El web site de los Jardines Reales de Kew (RBGK) tiene un rango de útiles hojas informativas educativas bien presentadas. Las hojas estén ordenadas bajo diferentes criterios claves tales como Botánica básica, Plantas económicas, Celulosa y Fibras, Plantas ornamentales, Bosque tropical y adaptaciones al medio ambiente. Con estas categorías, hojas sobre sobre tópicos específicos pueden ser impresas o bajadas del internet; hay un enfasis particular sobre plantas tropicales y subtropicales tales como el rattan, la papaya y la palma del coco. El recurso específico de la planta cobre donde las plantas vienen, su aspecto, sus usos y donde encontrar información adicional. Ademas, el web site tiene hojas de información sobre CITES y los Jardines Botánicos Reales de Kew, la historia del jardín y el papel que juega.

http://www.arkive.org
El fondo Wildscreen describe su iniciativa ARKive como el Arca de Noe para el siglo 21. Este sitio junta las mejores películas sobre vida silvestre , fotografias y sonidos grabados para recrear calidad, respaldo de hechos, multimedia portraretratos de plantas y animales en peligro de extinción que se distribuyen gratuitamente en el sitio. ARKvive guia el esfuerzo de conservación encontrando, sorteando , catalogando y copiando los registros claves de especies y construyéndolos dentro de un registro audio visual comprensible y duradero.

A pesar de que las Plantas y animales son una característica clave, una parte del sitio tambien describe un capítulo globalmente en peligro y el detalle de la información es verificada por un

■ Resources

Australia. It is ARKive's ultimate aim to compile an audio-visual record, where possible, for the 11 000 animals and plants threatened with extinction, according to the World Conservation Union's (IUCN) Red Lists of Threatened Species.

http://www.arkiveeducation.org
Forming part of the ARKive initiative, ARKive education is a resource for educators. As well as lesson plans and ideas for field and project work, there are downloadable support materials, including fact summaries. The educational resources concentrate on habitats but there are plans to expand and include themes such as camouflage, food chains, extinction and life processes. Linked to this site is Planet ARKive (http://www.planet arkive.org) which is the children's zone created specifically for 7-11 year olds. Children have the opportunity to design a habitat, do a habitat word puzzle and look for clues to solve a mystery in the forest.

▲ Disponible

d'espèces sont l'*Ariocarpus trigonus*, un cactus du Mexique vulnérable et le pin Wollemia *Wollemia noblis* d'Australie, en danger critique. Le but d'ARKive est de créer si possible un enregistrement audio-visuel pour chacun des 11000 animaux et plantes menacés d'extinction selon la liste rouge des espèces menacées de la IUCN.

http://www.arkiveeducation.org
Faisant part de l'initiative ARKive, ARKiveeducation est disponible aux éducateurs. A part des plans de leçons et des idées de travaux sur le terrain ou en projet, il y a des matériaux de support comprenant des fact-sheets à télécharger. Les ressources éducatives se concentrent sur les habitats, mais il y a des plans d'extension pour inclure des thèmes comme le camouflage, les chaînes alimentaires, l'extinction et les processus de la vie. Lié au site est Planet ARKive (http://www.planetarkive.org), qui est une zone pour enfants créée spécialement pour les enfants agés de 7 à 11 ans. Les enfants peuvent conciper un habitat, faire des jeux sur les habitats et essayer de trouver les indices nécessaires pour résoudre une énigme dans la forêt.

● Recursos

experto de especies. Ejemplos de especies son el vulnerable *Ariocarpus trigonus*, un cactus de México, y el Pino de Australia *Wollemia noblis* reportado en peligro crítico. ARKive clama compilar un registro audiovisual, donde sea posible para 11000 animales y plantas amenazadas con extinción, de acuerdo a la lista Roja de las especies amenazadas de la World Conservation Union's (IUCN) .

http://www.arkiveeducation.org
Formando parte de la inciativa ARKive, Educacion ARKive es un recurso para educadores. Asi tambien como planes de lecciones e ideas para proyectos de trabajo y de campo, hay materiales accesibles en linea que incluyen hechos resumidos. Los recursos educativos se concentran sobre habitats pero hay planes para expanderlos e incluye temas tales como camuflaje, cadenas alimenticias, extinción y procesos de vida. Ligado a este sitio Planet ARKive (http://www.planetarkive.org) el cual es la zona creada para niños específicamente para niños de 7-11 años de edad. Los niños tienen la oportunidad de diseñar un habitat, hacer un rompecabezas de palabras del habitat y buscar por pistas para resolver un misterio en el bosque.

Design: Seascape. Email: studio@seascape.fsnet.co.uk

Editors: Julia Willison and Lucy Sutherland

BGCI would like to thank the co-editors for their work in the production of Roots:

For the French Section:
Allison Marshall Planète Sciences Méditerranée, France
Françoise Brenckmann, Muséum National d'Histoire Naturelle, France
Thierry Helminger, Musée National d'histoire Naturelle, Arboretum Kirchberg, Luxembourg
Gaud Morel Museum National D'Histoire Naturelle, France
Loïc Ruellan, Conservatoire Botanique de Brest, France

For the Spanish Section:
Maricela Rodriguez Acosta, Herbario y Jardín Botánico de la Benemérita Universidad Autónoma de Puebla, México
John Cortes, Gibraltar Botanical Gardens, Gibraltar
Veronica Franco, Centro de Investigación Cientifica de Yucatán, A.C. (CICY) Mexico
Antonio J. Lopez-Quintana, Euskal Herriko Univertsitatea, Universidad del Pais Vasco, Bilbao Spain
Lordes Rico-Arce, Royal Botanic Gardens Kew, U.K.
Fredrich Schlegel_Sachs, BGCI, U.K.

Published by:
Education Programme
Botanic Gardens Conservation International

Roots is an official publication of BGCI and BGCI (U.S.) and supported by both organisations.

BGCI is an independent charity registered in the United Kingdom. Charity Registration No: 328475
BGCI (U.S.) Inc. has 501 (c) (3) status in the United States.

Botanic Gardens Conservation International
Descanso House
199 Kew Road, Richmond
Surrey TW9 3BW United Kingdom
Tel: (020) 8332 5953
Fax: (020) 8332 5956
e-mail: bgci@rbgkew.org.uk
http://www.rbgkew.org.uk/BGCI

Printed on 100% Recycled Paper

ISSN 0965-2574