Green Teacher

EDUCATION FOR PLANET EARTH

$7.95 Canada
$7.50 U.S.

Winter 2006–07

Issue 80

Growing Art in School Gardens

Social Justice & Language Arts

Winter Camps for Teens at 40 Below

Pretend Games for Young Children

Farm to School Programs

0 74470 82478 7 01

PM40069238 R08981

Immerse your class in an unforgettable week of learning at the Aquarium.

A week of learning that will last a lifetime. AquaSchool provides grade 4 to 7 teachers the opportunity to move their classroom to the Aquarium for a week of unique hands-on discovery. Our AquaSchool coordinator will help design a program to meet each teacher's goals within a long-term, interdisciplinary unit.

AquaSchool students will:

- Observe live plants and animals at the Aquarium
- Meet with Aquarium staff and volunteer experts
- Use Aquarium galleries for teacher-led lessons
- Interact with live invertebrates and animal artifacts

The program cost of $550 includes:

- Bus pickup between school and Aquarium for all five days
- AquaSchool coordinator as a year-long resource
- VIP treatment all week

Interested teachers are requested to attend one of the upcoming orientation sessions on March 28 at 6:00-7:00 pm, or March 31 at 12:00-1:00 pm.

For more information please phone 604.659.3493 or email aquaschool@vanaqua.org
To RSVP for an orientation session please call 604.659.3552.

vancouver aquarium

Making waves for seals

FREE Education kit!

Our **FREE** "*Making Waves for Seals*" Education kit includes:

15-minute Video

❑Learn about the many types of seals around the world
❑See seals in their natural habitats
❑Understand the threats facing seals and actions to protect them

Seals Guide for Kids

❑12-pg booklet for grades 6 to 12
❑Full-colour calendar poster for your classroom

Teacher-Student Guide

❑8-page info booklet for teachers
❑Fun activities and quizzes to photocopy

IFAW.org

Animal Action Week
www.ifaw.org

To receive your **FREE** "*Making Waves for Seals*" Education kit, please call **1-888-500-4329** or email **info-ca@ifaw.org** or www.ifaw.org to download materials. We'll send a kit to you right away!

Page 6

Page 22

Page 33

Green Teacher

Issue 80, Winter 2006/2007

Features

Departments

Green Teacher is published quarterly in September, December, March and June.
Subscriptions: Canada-Cdn$28.30 plus $1.70 GST/$4.21 HST; USA-US$28; all others Cdn$45/US$40 surface, Cdn $50/US$44 air mail
ISSN 1192-1285; GST Registration No. 124125337; Canada Post Publications Mail Agreement No. 40069238; PAP Registration No. 08981
USPS 010-954. US office of publication: c/o DDM, 1175 William St., Buffalo, NY 14206; Periodicals postage paid at Buffalo, NY
US Postmaster: Send address changes to Green Teacher, PO Box 452, Niagara Falls, NY 14304-0452.
Canada Post: Send address changes to Green Teacher, 95 Robert St., Toronto, ON M5S 2K5. Return postage guaranteed.
Printed in Canada.

Green Teacher

Issue 80, Winter 2006/2007

Office
95 Robert St., Toronto, ON M5S 2K5, Canada
Phone: (416) 960-1244 Fax: (416) 925-3474
E-mail: info@greenteacher.com
Internet: www.greenteacher.com
U.S. mailing address: PO Box 452, Niagara Falls, NY 14304-0452

General Editors
Tim Grant, Gail Littlejohn

Editorial Assistant
C. Valiquette

Regional Editors

Canada

Bob Adamson	Manitoba (204) 261-7795
Janet Barlow	Nova Scotia (902) 494-7644
Ann Coffey	Ontario (613) 746-8668
Steve Daniel	Northwest Territories (867) 873-7675
Barbara Hanbridge	Saskatchewan (866) 254-3825
Susan Hawkins	PEI (902) 566-4170
Tina Jory	Québec (514) 633-9412
Remy Rodden	Yukon (867) 667-3675
Ian Waugh	Alberta (780) 486-4160
Craig White	Newfoundland (709) 758-2372

United States

Kim Bailey	Georgia (770) 888-2696
Tim Brown	Utah (801) 596-8500
Cynthia Carlisle	South Carolina (864) 882-3052
Shelene Codner	Iowa (319) 267-9946
Bob Coulter	Missouri (314) 577-0219
Helen de la Maza	California (714) 838-8990
Anne DiMonti	Rhode Island (401) 245-7500
Laura Downey-Skochdopole	Kansas (785) 532-3322
Deborah Hall	North Carolina (919) 613-8700
Francine Hutchinson	Alabama (256) 236-7942
Sue LeBeau	New Jersey (732) 922-8246
Emily Lin	Nevada (702) 895-2960
Nalani McCutcheon	Minnesota (507) 332-7151
Rosalyn McKeown-Ice	Tennessee (865) 482-6535
Yvonne Meichtry	Kentucky (859) 572-6380
Cathy Meyer	Indiana (812) 349-2805
Karen Schedler	Arizona (602) 266-4417
Susie Shields	Oklahoma (405) 702-5166
Mary Lou Smith	Connecticut (860) 455-0707
Phillip Smith	Florida (850) 526-3226
Steve Spurger	Texas (972) 395-3449
Catherine Stephenson	Pennsylvania (724) 357-5689
Erica Zimmerman	Vermont (802) 985-8686
Dennis Yockers	Wisconsin (715) 346-4943
Bob Zuber	New York (212) 662-6238

Board of Directors
Judith Benson (SK), Pat Clarke (BC), Cam Collyer (Ont.), Tim Grant (Ont.), Gail Littlejohn (Ont.), Monika Thoma-Petit (Qué.), Della Webster (NB)

Design and Production
Cover illustration by James Paterson; cover design by Michael Kelley; printing by General Printers, Oshawa, Ontario, on chlorine-free 100% recycled paper with 30% post-consumer waste. Circulation: 7,300 copies.

Green Teacher is indexed in the Canadian Periodical Index, the Canadian Education Index, and ERIC.

Green Teacher is an incorporated non-profit organization. This issue is supported in part by the International Development Research Centre. Mailing costs in Canada are supported by the Government of Canada through the Publications Assistance Program.

Editorial

AFTER BACKPACKING ACROSS southeast Asia for seven months in 1984, we arrived in China, a country that had been closed to foreigners for decades. Having witnessed the crumbling infrastructure and extreme inequalities that existed in many other Asian countries at that time, we were impressed with China's clean, well-run trains and ferries, the efficient agricultural systems, the seemingly equitable division of wealth, the high level of literacy, the widespread use of bicycles for transportation, and the nearly complete lack of throwaway anything. Everywhere we traveled during our six weeks there, we met people who expressed hope for their future.

It is sobering to see what has happened in China in the two decades since. Rampant economic growth has indeed raised the standard of living for many, but it has also created unprecedented levels of pollution and land degradation. Sixteen of the world's 20 most smoggy cities are in China, water scarcity or water pollution affect more than 75 percent of the population, forests are in decline, and desertification lays claim to 2,500 square kilometers of land each year.

Of course, China's environmental problems have not developed in isolation from the rest of the world. A large part of the country's economic growth is export-oriented, and inevitably many of the industries poisoning the air and water in Chinese communities are the same ones providing us with the profusion of consumer and industrial goods that fill our homes and workplaces. And since China recycles 50 percent of the world's discarded computers — a toxic trade that compromises the health of both workers and watersheds — it is very possible that the heavy metals in the last computers we junked are now leaching into a stream on the outskirts of Shanghai. Our resources, our wastes, our environment, and our survival are inextricably connected.

In a very real sense, China now represents the planet's worst nightmare and greatest hope. The present fossil-fueled and resource-gobbling model of development — that is, *our* model — can lead nowhere but to environmental catastrophe. It is a crisis looming everywhere, but it is writ large in China where, by its gravity and accelerated pace, it will necessitate charting a greener course sooner rather than later. Already there are hopeful signs of this. Two years ago, the Chinese government decreed that ten percent of electricity must come from wind and solar energy by 2010, a tenfold increase. Starting this year, new "green taxes" will reward energy- and resource-efficient companies and penalize wasteful ones. Most important, the government is awakening to the need for environmental education and, as Jane Sayers describes in our lead article, has given the nod to many NGO-sponsored initiatives that are training teachers and implementing programs for children around the country.

These are small steps, but they are noteworthy. China's development challenge is enormous: to raise the living standard of 1.3 billion people without laying waste to the natural environment upon which everything depends. But it also presents an opportunity to change direction, to turn to renewable sources of energy, to develop greener industrial processes, and to implement environmental education. Of course, we in the West face the same challenges. If our species is to continue to survive and thrive on this great green-blue planet, it will only be through finding more sustainable modes of meeting our basic needs and working cooperatively to achieve that end.

— Tim Grant and Gail Littlejohn, Co-editors

Thank You! Green Teacher's Supporters

Our sincere thanks to the many individuals who pay a little extra for their subscriptions to help keep Green Teacher afloat. You can join the list! Watch for the Supporting Subscription option on your next renewal form.

Leslie Adams, ON
Robert Adamson, MB
Dan Allison, NV
Rita Banach, ON
David Barnes, MB
Laura Berman, ON
Peg Beute, TN
Evelyn Boss, MI
Tim Brown, UT
Lisa Brukilacchio, MA
Karen Campbell, ON
Kathy Cash, TX
Pam Clark, NC
Lillian Colon-Vila, FL
John Dooley, VA
Dori Drachman, NH
Catherine Dumouchel, QC
Earth Day Canada
Leo Elison MA
Sid Farrar, MN
Janet Fennerty, IL
Kristi Rennebohm Franz, WA
Patty Gavin, MN
Jed Goldberg, ON
Brenda Hans, NT
Anne Hansen, ON
Gordon Harrison, ON
Trisha Healy, ON
Amy Hemmert, CA
D Arthur Howell, ON
Sheila Jones, NC
Susan Kiil, ON
David Love, ON
Brian Mack, ON
Lori Mann, CA
David Martin, ON
Monette Meo, CA
B.A. Mitschke, SK
Robin Moore, NC
Kerrie Mortin, BC
Paul Mudroch, ON
Ford Nicholson, MN
Lois Nixon, NC
Jeannine Palms, MI
Annette Payne, ON
Alysia Perry, CO
Teresa Root, MN
Constance Russell, ON
Susan Santone, MI
JoAnn Schneider, NY
Scott Slocombe, ON
Harry Smaller, ON
Mark Sommer, ON
Gareth Thomson, AB
Heather Walter, AB
Dawn Watson, BC
Emilio Williams, MD
Ursula Winkler, AB
Karen Woolf, NH

Announcements

New Jersey EE conference

The annual conference of the Alliance for New Jersey Environmental Education (ANJEE) will take place February 1–3 at Princeton University with the theme "Bringing the Lessons Home." Among the expected highlights are plenary panels on climate change education and the benefits of wild nature play, and pre-conference workshops on illustration, bird "skinning," and nature journaling. For details, visit <www.anjee.net> or call (908) 706-5787.

Conservation ed workshop in Iowa

"Wilderness and the Wildness Within" is the theme of the Iowa Conservation Education Council's annual Environmental Education Workshop taking place February 2–4 in Indianola. Stipends are available for students and new attendees. For more details, visit <www.iowaee.org> or contact Heather Niec at (319) 848-7019.

Maryland EE conference

The annual conference of the Maryland Association for Environmental and Outdoor Education (MAEOE) will be in Ocean City on February 2–4. Actress Kaulani Lee's rendition of Rachel Carson's life and poet Michael Glaser's keynote are expected highlights. The conference will address the ways that nature can inspire learning and advance technological innovation, and how the arts and sciences are rooted in nature. For more details, visit <www.maeoe.org> or call (410) 827-7145.

EE Expo in Oklahoma

"From Dust to Dreams" is the theme of the Oklahoma Association for Environmental Education's annual EE Expo in Norman on February 8, featuring workshops, awards presentations, and exhibits. Registration costs $25 before January 26 and $40 after. For details, visit <www.okaee.org> or contact Richard Bryant at (405) 744-8005.

Student Art and Poetry competition

Students ages 5 to 19 are invited to submit art and poetry focusing on watersheds to the international River of Words competition. One international winner and eight U.S. winners (four each in poetry and art, from different age groups) will be invited to an awards ceremony in Washington D.C. The deadline for submissions is February 15 for U.S. students and March 1 for others. For details, visit <www.riverofwords.org> or call River of Words at (510) 548-7636.

Nominating Young Eco Heroes

Youth ages 8 to 16 who have initiated creative projects in environmental health, advocacy, research, or protection — and whose efforts would inspire others — are invited to apply for (or be nominated for) a Young Eco-Hero Award sponsored by Action for Nature. The application deadline is February 28. For guidelines, visit <www.actionfornature.org> or call Action for Nature at (415) 421-2640.

Texas EE conference

"Growing the Seeds of Environmental Education," the spring conference of the Texas Association for Environmental Education (TAEE), will be held at Camp Olympia from March 2 to 4. It will include a keynote by John Herron of the Texas Nature Conservancy, and numerous field trips and workshops on local wildlife, natural history, orienteering, and habits of mind. For more information, visit <www.statweb.org/TAEE/>.

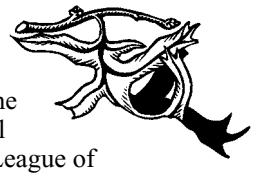
Massachusetts EE conference

"MEES at 30...Exploring our Past, Present & Future" is the theme of this year's conference of the Massachusetts Environmental Education Society on March 8 in Worcester. Visit <www.massmees.org> or contact Maria Beiter-Tucker at (617) 678-5461 for details.

Promise of Place in Vermont

The fourth Promise of Place Conference will take place March 15–17 in Fairlee, Vermont. Sponsored by the Northern Forest Center and the Center for Place-Based Learning and Community Engagement, this regional conference will celebrate place-based education in three days of workshops and networking. For more information, visit <http://promiseofplace.org> or call Pat Straughan at (802) 985-8686 ext. 43.

EE conference in Florida



March 15–18 are the dates for the annual conference of the League of Environmental Educators of Florida (LEEF) taking place near West Palm Beach. Among the expected highlights are a keynote by Denny Olson, a concert by Grant Livingston, and a Muir Trek. For details, visit <http://leeflet.brinkster.net> or contact Marcia Bisnett at (305) 652-3305.

Georgia EE conference

"Connecting Environmental Education to My Students, My Community and My World" is the theme of the Environmental Education Alliance of Georgia's annual conference on Jekyll Island from March 30 to April 1. For more details, visit <www.eealliance.org> or contact Walter Lane at (770) 784-3059.

Connecticut EE conference

"Achieving Diversity in Environmental Education" is the theme of the Connecticut Environmental Education Association's annual conference taking place March 30 in Hampton. Among the features are a keynote speech by Dorceta Taylor and a film festival paired with the tasting of local fare. Visit <www.coeea.org> for more details.

PAEE conference

"No Child Left Inside" is the theme of the Pennsylvania Association for Environmental Education's annual conference taking place in Wilkes-Barre from April 13 to 15. Addressing this theme will be singer-songwriter Don Shappelle and keynote speakers Patricia Vathis, Robert Hughes, and Green Teacher's Tim Grant. Full registration costs $150 and scholarships are available. For more information, visit <www.paee.net> or call Judith Gratz at (215) 646-8866.

Transformative Learning in Toronto

The Transformative Learning Centre's conference "One Earth Community: Sharing Our Stories" will take place in Toronto on April 20-22. A collaboration of *Resurgence Magazine* in the U.K., the Paulo Freire Institute in Brazil, Mpambo Multiversity in Uganda, and York University and U. of T. in Toronto, this biennial event will bring together a number of notable speakers, including David Abram, Maude Barlow, Zenobia Barlow, Satish Kumar, Chief Oren Lyons, Vandana Shiva, and Starhawk. For more details, visit <http://tlc.oise.utoronto.ca/gathering2007> or call Todd at Transformative Learning Centre, (416) 923-6641 ext. 2342.

EE conference in Ohio

"A Golden Path to a Healthy Planet" is the theme of the 40th annual conference of the Environmental Education Council of Ohio taking place April 26–29 near Dayton. For more details, visit <www.eeco-online.org> or contact Tom Hissong at (937) 890-7360.

AEOE conference in California

This year's conference of the Association for Environmental and Outdoor Education takes place in Sonora from April 27 to 29. Addressing the theme "Connecting with Community" are keynote speakers Carlos Cortéz and Julia Parker. For more information, visit <www.aeoe.org> or contact Traci Fesko, Sierra Outdoor School at (209) 532-3691.

EE conference in Minnesota

From April 28 to 29, the annual conference of the Minnesota Association for Environmental Education will be held in Alexandria. This year's theme is "Back to the Basics" and the keynote speaker is Marty Main. For more details, visit <www.naaee.org/maee> or call Amy Rager at (320) 589-1711.

Colorado EE conference

The annual "Teaching Outside the Box Conference" will take place April 27–29 in Winter Park. Sponsored by the Colorado Association for Environmental Education, the conference will include over 50 sessions and a keynote by award-winning author Gary Ferguson. For more details, visit <www.caee.org> or call (303) 273-9527.

EE conference in Ontario

"Be the Change You Wish To See" is the theme of the annual conference of the Ontario Society for Environmental Education taking place April 28–29 north of Peterborough. For more details, visit <www.osee.org> or call Liz Straszynski at (705) 652-0923.

Canadian EE conference in Alberta

From May 24–27 in Kananaskis, the "Trails to Sustainability" conference will feature 19 full-day sessions on different themes; dozens of workshops; keynotes by Hunter Lovins, Steven Lewis, David Schindler, and Karsten Heuer; and field trips that take advantage of the spectacular mountain setting. The event is jointly sponsored by EECOM (the Canadian Network for Environmental Education and Communication), the Alberta Council for Environmental Education, and the Global, Environmental, and Outdoor Education Council of the Alberta Teachers Association. Registration costs $210. For more details, visit <www.trailstosustainability.ca> or call the Friends of Kananaskis Country at (403) 678-5500 ext. 279.

World Congress in South Africa

The next World Environmental Education Congress takes place July 2 to 6 in Durban, South Africa, featuring the theme "Learning in a Changing World." Hosted by the EE Association of Southern Africa as part of its contribution to implementing the UN Decade of Education for Sustainable Development, this year's congress will launch the World Environmental Education Association. For more details, visit <www.weec2007.com> or call (011) 27-31-303-9852.

NAAEE conference in Virginia

The North American Association for Environmental Education will hold its annual conference in Virginia Beach, Virginia, from November 13 to 17. This year's event is titled "Come to the Coast: Explore New Horizons for Environmental Education," and will have strands on marine education and service learning, among others. Visit <www.naaee.org> for details.

The Start of Something Big:
Environmental education in China

Li Lei

More and more people immigrate to China's big cities to pursue dreams of good jobs, better housing, and vehicles, but the rapid population increase imposes increasing pressures on the environment.

by **Jane Sayers**

ON MARCH 12TH EACH YEAR, China celebrates National Tree Planting Day. Participation is generally high, as all Chinese citizens between the ages of 11 and 60 are required to plant 3 to 5 trees each year and most fulfill this obligation on the designated day. Schoolchildren are often bused to large planting sites that have been prepared for them in advance. I visited such a site just outside Beijing one year, and witnessed 4,000 students descend upon a dry, barren field in which rows of holes had been dug. Next to each hole was a mound of earth, and irrigation ditches ran between the rows. At the head of each row a bundle of long sticks had been placed — these were the trees to be planted, although, to my eye, they more closely resembled supporting stakes. They were poplar trees that had been stripped of all their branches and most of their roots in preparation for planting.

The students formed lines at the head of each row and their teachers issued instructions and shovels. They then formed pairs and tore off down the rows, making for the end of the field furthest from the watchful eyes of teachers and local officials. Once a hole had been agreed upon, one child held the stick upright while the other shoveled the pile of the earth into the hole. It was evident that planting was not a common activity for these children, as the trees were going in at all angles and the earth was predominantly placed on the side of the hole closest to where the mound had been located rather than all the way around the tree. Most tried to get their trees to stand as quickly as possible so that they could chase each other around the field, flinging dirt and threatening to push each other into the irrigation ditches.

The children were having a fine time, but I was somewhat skeptical of the educational value of the exercise. I asked the man who was standing next to me about this and was sincerely assured that this event was raising the children's

awareness of environmental issues. Through the act of planting, the children would learn to value the environment, he told me. He was a local resident and had been involved in preparing the site — digging the holes and counting out the stick-trees at the head of each row. I asked him what would happen with the trees that had been planted at odd angles. Would they be replanted or staked in place? Neither, he told me. Those poorly planted would be pulled out. It wasn't the trees that were important; it was raising the children's awareness that mattered. For this man, it didn't matter if the trees lived or died; the awareness-raising dimension of the planting was the focus of the event, and the long-term connection between planting, land rehabilitation, and sense of agency for the children was absent.

Guo Tielui, IFAW

During a New Year's celebration in Yunnan Province, a young woman in festival costume plays an elephant conservation game created by the International Fund for Animal Welfare.

Chinese environmental activists can rarely address issues in the head-on way that is common in Western democracies; to achieve meaningful change, they need to work within the avenues to which the state grants them access.

This exchange highlighted for me the challenge that environmental educators face in China. Most government-organized environmental education activities are more about publicity than education, as the story of National Tree Planting Day reveals. On the 20th anniversary of the event in 2001, the National Greening Commission announced that 35 billion trees had been planted during the campaign. With a figure like that, China should be covered in trees, but the same report also announced that the average annual rate of desertification was 2,460 square kilometers, and that soil erosion accounted for the degeneration of a further 10,000 square kilometers.[1] These figures indicate that tree planting efforts are failing to address land degradation, and such failures convey no good message to the children (and adults) who take part in tree planting activities each year. Indeed, they are more likely to give a message about the futility of individual action.

I give this example in order to set the political scene for environmental education in China. The country faces immense environmental challenges: land degradation, air pollution, water shortages, and loss of biodiversity, just to scratch the surface. Most urban Chinese have no sense of "nature" that has not been ordered by humans, and little idea of what a healthy environment might look like. Environmental issues have not been a high priority in education, which is why it is only recently that the Ministry of Education has taken much responsibility for providing guidelines or training for environmental education (one example of the Ministry's action in this area is evident in their collaboration with World Wildlife Fund, as discussed below). Over the past decade environmental education has been the domain of the State Environmental Protection Agency (SEPA), which established a government-organized non-government organization to implement environmental education initiatives. The organization, named the Center for Environmental Education and Communication (CEEC), is staffed by government employees who are largely responsible for raising their own funds for implementing national policy.[2] This arrangement means that the CEEC has been limited in what it can achieve, as it is a small organization charged with a daunting task.

This official framework for environmental education in China does not reflect the interest and enthusiasm of many educators. Teachers find it difficult to access materials that would support the delivery of environmental education, as the limited number of textbooks that are produced tend to have very small print runs, and it is difficult to purchase such materials outside large cities. But there is strong evidence that a growing number of teachers and other educators make use of the opportunities that do come their way, and it is in this fact that we find hope. In what follows, I will share a few examples of these efforts with you.

Green Schools

One initiative of the CEEC is the Green Schools program, which is similar to other such programs around the world. To become a Green School, a committee must be set up within the school, ideally made up of the principal, teachers, students, parents and environmental experts. This committee evaluates the environmental conditions within the school and develops an action plan to address any areas of need. The assessment looks at issues concerning building materials and design, green space within the school, waste and

Yan Baohua

Students from Liu Li Qu Primary School in Beijing making wonderful discoveries.

resource management, professional development of the staff, curriculum content, and the provision of extracurricular activities. Once assessed, the school can apply for a Green School evaluation. An inspection team comes to the school to evaluate the action plan and progress made in implementing this plan. If all is deemed satisfactory, the school is granted Green School status for a two-year period, after which the school is reevaluated. There are a number of levels within Green School accreditation — city, county, provincial, and national — and schools are encouraged to work their way up through the levels. Within five years of the commencement of the program in 1997 there were more than 13,000 Green Schools in China.[3]

Most urban Chinese have no sense of "nature" that has not been ordered by humans, and little idea of what a healthy environment might look like.

This program provides a framework for environmental considerations to be made in schools, and schools with Green School status or in the process of acquiring it place significantly more emphasis on environmental education than do schools not associated with the program in any way.[4] However, a number of challenges remain. One of the most significant is the level of support available to schools wishing to make environmental improvements. Even where teachers are willing to undertake training in environmental education, there are few opportunities for them to receive such professional development. There is little to no networking between Green Schools, which means that each school is essentially left to invent the wheel; and there is generally very little contact between schools and educational or environmental authorities.[5] Improvements have been made in many of these areas over the last decade, but they remain factors that limit the achievements of the program.

These limitations of the Green Schools program have meant that a great deal of environmental education has been provided as extra-curricular opportunities, and this has been an area in which a number of non-governmental organizations (NGOs) have been able to operate. NGOs are not common in China, and the state's willingness to allow groups to provide environmental education opportunities indicates that while the state is not in a position to provide it, it recognizes the importance of environmental education.

Hand in Hand, Building an Earth Village

A number of Green Schools participate in the activities of Hand in Hand, a joint initiative of SEPA, the Cultural and Poverty Alleviation Commission and the state-run newspaper *Chinese Children's News*. The newspaper first introduced Hand in Hand in order to engage students in developed regions of China in recycling activities that could raise funds to support schools in poorer regions of China. The success of the activity soon saw it developed into an ongoing project, and within four years the funds raised had built four schools in impoverished regions of China.[6]

On designated days, students in participating schools and classes bring recyclable items from home to school — paper, plastic and metal (glass is deemed potentially dangerous for the young participants). The quantity of each type of material is weighed or measured and recorded. The materials are then sorted and taken to a recycling depot where they are sold. The money is tallied back at the school. These activities take place regularly throughout the year.

Each class that takes part in the program becomes an "Earth Village," and within this village the students each take on a role. There is a "Little Village Leader" who is

responsible for the coordination of the village's activities; a "Little Environmental Expert" who researches answers to questions the village members have about the environment; some "Little Hand in Hand Journalists" who promote the program through newsletters and bulletins; a "Little Recycling Station Manager" who tallies, weighs and records the recyclable materials brought in by each student; and "Little Village Recycling Bank Accountants" who calculate and record the money that is earned each time materials are taken to the recycling depot. These are all elected positions and are supported by an advisory committee made up of the principal, teachers, parents, and members of the community.

The Hand in Hand program operates on the premise of model emulation, which has a long and rich history in China, and is a familiar mode of political participation. It provides participants a safe structure in which to operate but is also flexible enough that each school can adapt the program to their own school culture. It may seem a quaint mode of environmental education to many Western eyes, but the ideas it promotes about social responsibility are quite radical in a Chinese educational context. Central to the program is the idea of helping children to realize the value of the contributions each individual can make to much larger issues. Self-confidence is fostered from an early age by providing participants with opportunities to make decisions about real-life issues. This is manifest in children's learning what items are recyclable, encouraging their family members to choose such items when shopping; and communicating their knowledge about recycling through their community by collecting recyclable materials from neighbors, family, and friends. Hand in Hand achieves just what the tree planting events fail to achieve: a tangible link between individual action and environmental change. Furthermore, the program puts environmental education in the context of the broader issues of sustainability, as the benefits of recycling are used to address issues of poverty and regional disparity.

Friends of Nature Antelope Car

Extra-curricular activities are popular means of implementing environmental education in China. This is a result of a number of factors which include the lack of state-provided formal education resources and training, the interest many schools have in providing environmental education for their students, and the state's acceptance of environmental education as an area in which NGOs can work. Chinese environmental activists can rarely address issues in the head-on way that is common in Western democracies; to achieve meaningful change, they need to work within the avenues to which the state grants them access. Education is one such avenue, and is seen by many activists as an advocacy opportunity, as it is viewed as creating the foundation for all future environmental action.

Friends of Nature, established in 1994, is the oldest environmental NGO in China. One of their projects is the Antelope Car, named for the Tibetan Antelope that has been the focus of another Friends of Nature campaign. This mobile environmental education unit travels to schools and events in Beijing and the surrounding rural areas, providing activities focused on environmental issues. In this way, an environmental ethic is introduced to communities in rural

China's Growing Pains

- China has nine of the world's ten most polluted cities. Many urban children live in an atmosphere described as producing health effects equivalent to smoking two packs of cigarettes a day.
- The main sources of air pollution are coal used for energy and vehicles using low-grade gasoline with high sulfur emissions. Municipal authorities in Beijing estimated that 30,000 vehicles per month were added to the city's streets last year.
- Drinking water everywhere in China is polluted by the emission of untreated wastewater from industry, overuse of chemical fertilizers in agriculture, and large-scale dumping of garbage into waterways.
- The Yellow River regularly runs dry before it reaches the sea, due to the demands of agriculture and industry along its banks. In the northeast, increasing reliance on groundwater has lowered the water table up to three meters per year.
- Between 1970 and 2000, half of the riparian forest along the Yangtze River was destroyed for agriculture or development, resulting in landslides and devastating floods in recent years.
- Since 1949, one-fifth of China's agricultural land has been lost to soil erosion and development.
- China is the world's second-largest consumer of energy (behind the U.S.). Per capita carbon emissions are still only about half the world average, but are rising steadily with economic growth. Moving to cleaner fuels and more fuel-efficient technologies is one of the country's main environmental challenges.
- In 1978, 81% of China's population was rural; by 2005 that figure was down to 62%. The growing inequality of wealth and opportunity between urban and rural populations is causing social unrest and tension: 58,000 major incidents were reported in 2003, six times the number reported ten years earlier.
- Looking ahead 25 years, the Earth Policy Institute estimated that if car ownership in China were to reach U.S. levels, China's fleet would number 1.1 billion automobiles and require as much land for roads and parking lots as is currently planted in rice. Similarly, if oil consumption in China were to reach U.S. levels, China would need 99 million barrels per day in 2031 — 25% more than the current world production.

Sources

Beijing Municipal Vehicle Administration. *The People's Daily*, November 16, 2006, on-line at <http://theory.people.com.cn/GB/49154/49156/5051272.html>.

Brown, Lester B. "Learning From China: Why the Western Economic Model Will not Work for the World." Earth Policy Institute, March 9, 2005, on-line at <www.earth-policy.org/Updates/2005/Update46.htm>.

Hemelryk, Stephanie Donald, and Benewick, Robert. *The State of China Atlas: Mapping the World's Fastest Growing Economy*. University of New South Wales Press: Sydney, 2005.

U.S. CIA. *World Factbook 2006*, on-line at <https://www.cia.gov/cia/publications/factbook/index.html>.

Yan Baohua

Students from Liu Li Qu Primary School in Beijing have a lesson on energy flow, part of an Earthkeepers program to be piloted in China by The Institute for Earth Education in 2007.

areas that may not otherwise have access to such opportunities, and the enthusiasm for environmental issues of many young people in urban areas is supported.

Many of the activities offered would be familiar to Western environmental educators, but in China collaborative learning structures are still generally unfamiliar. Role-play, experimentation, observation, and problem solving are all common themes in the Antelope Car activities. For example, in one activity, each child is assigned a role in an ecosystem: a tree, an insect, water, soil, etc. The children clarify the characteristics of their element and then interact with the others. One element is then taken away, and the remaining children try to interact without it. In this way, they learn about the interconnections within ecosystems. While the Antelope Car drives away within hours of arriving at a school, the lessons it leaves behind linger in the memories of the children who have participated because they tend to be outside the realm of usual experience. This approach of working briefly with a high number of students over a large geographical area is an important complement to other initiatives that seek to embed ongoing programs within schools.

University groups

In a growing number of universities in China, students are organizing their own extra-curricular environmental education activities. Common choices are bird watching excursions, paper and battery recycling programs, and campaigns to discourage the use of disposable chopsticks in university cafeterias. Such activities aim to raise awareness of specific issues and provide students with opportunities to make choices based on criteria other than habit. This is a community-based approach to environmental education.

At the Beijing Forestry University, the Scientific Exploration and Outdoor Life environment group (SENOL) have taken their efforts a step further. During the summer vacation, extended field trips are organized with the aim of providing participants the opportunity to explore an environmental issue in more depth. Trips have focused on tree planting in Inner Mongolia, building an environmental monitoring station in the western province of Qinghai, and providing environmental education opportunities for children in Gansu province, also in the far west of the country. It is common for children in remote areas of Gansu to leave school early because their families are poor and need their children's help in farming. The aim of the SENOL members' trip was to help the children understand their own impact on the environment by making connections between their family's farming practices and the state of the environment in their local area. This provided a tangible link, which is often missing, between classroom learning and real life conditions. An extension of this field trip was that on return to Beijing, SENOL organized an ongoing fundraising activity at their university to provide resources (both financial and material) to help children in Gansu stay in school longer.

World Wildlife Fund

The introduction of student-centered learning strategies in environmental education is also underway in the formal sector, due in large part to a partnership over the last decade between World Wildlife Fund (WWF) and the Ministry of Education. The Environmental Educators' Initiative has involved training and supporting teachers, developing curricula, and developing graduate degrees and diplomas in environmental education. The first group of teachers trained in the program formed the core staff at the environmental education training centers established in teacher training universities in Beijing, Shanghai, and Chongqing. They have developed a training manual for teachers and a series of model lessons for Grades 1-9. They have also worked intensively with teachers in pilot schools to adapt these materials to local conditions.[7]

As an example, the Beijing training center has an overarching focus on water education, reflecting the scarcity of water in northern China. This theme is localized in each school. The Miyun Number One Primary School is located in a town just outside Beijing. The town is adjacent to the Miyun reservoir, one of Beijing's main sources of water. These days the water level in the reservoir is often critically low, threatening its ability to provide water at all. It serves as a focus for much of the school's environmental education. A short documentary was made in 2001 about the ways in which the WWF training had influenced the implementation of water education in the school.[8]

One of the first activities students take part in is designed to stimulate their thinking about watersheds. In small groups students crumple up a piece of paper and use the uneven surface to design a community. They predict how water will flow through the peaks and valleys they have created and discuss where to locate factories, houses, schools, etc., to make best use of the water available. Then they drip water onto their models to see how accurate their predictions of water flow were. This is a style of learning that is completely unfamiliar to the vast majority of Chinese students and takes them a while to get used to.

Other learning activities such as role-plays, observational visits to the reservoir, and meetings with officials in charge of water treatment and protection provide similarly unfamiliar experiences for the students, but ultimately spark their imaginations and make environmental issues real for them. The teachers involved in the WWF training say that creativity is the greatest lesson the children learn through the new forms of education they are exposed to. Before taking part in the water education program, the students are generally quite passive. Through their involvement in the program, however, they become much more active in their own education and come up with their own ideas about issues and act on their own initiative. These results are encouraging the teachers to adapt the new teaching methods to other subject areas beyond the environment.

The passion of environmental educators in China is a source of constant inspiration for me. They face all the same struggles those of us working in Western democracies encounter — funding shortages, time constraints, lack of collegial support, immensity of the challenge ahead — and they do so within a political context that does not always support their efforts. Yet China's environmentalists keep working away, developing the environmental education field in both size and strength. So next time you hear a dire statistic about the state of the environment in China or the impact Chinese resource use will have on the rest of the world, remember that there are lots of educators in China doing their best to address the challenges we all face!

Jane Sayers works in community education for the environment at Environment Victoria, a non-governmental organization in Melbourne, Australia. This article is based on her doctoral research, which was completed in 1994 and is documented in her thesis, "Start with the Little Things: Environmental education as political participation in contemporary China."

Notes

1. John Gittings, "Battling China's deforestation," *Guardian Unlimited* (online), March 21, 2001, <www.guardian.co.uk/paper/story/0,,512442,00.html>, accessed October 30, 2006.

2. Jane Sayers and Eva Sternfeld, "Environmental Education in China," *Berliner China-Hefte*, 2001, 21: 44.

3. China Green Schools, <www.chinaeol.net/greenschools>.

4. Xinjiang Conservation Fund & Environmental Education Network for Our World, Urumqi Environmental Education Survey Report, 2006, <www.eenow.org/en/modules/docus/article.php?articleid=7>, accessed November 1, 2006.

5. Hongying Zeng,. "Quan guo lüse xuexiao fazhan xianzhuang fenxi" ("Analysis of the present status of Green Schools"), *Huanjing Jiaoyu (Environmental Education)*, 2001, 1: 10.

6. "The Story of 'Hand in Hand, Building an Earth Village': An Environmental Project by the Children of China," <www.childrenandearth.org.cn> and <www.dqc.org.cn>, accessed October 30, 2006.

7. Beijing Shifan Daxue Huanjing Jiaoyu Zhongxin (Beijing Normal University Environmental Education Centre) (compiler). *Zhongguo zhong xiaoxue l se jiaoyu xingdong: zhongqi bufen chengguo xuanbian, 1997.11 - 1999.11. di 1 bian. (Environmental Educator s Initiative for China: Selected Mid-phase Achievements 1997.11-1999.11. Volume 1)*, 1999b: 1-2.

8. Zhang Wei, *Baohu yi pen jing shui / Protecting a Basin of Clean Water*, WWF Education Programme, Bejing, January 2001.

Last Child in the Woods?

Treating nature-deficit disorder at a high school winter camp

A high school winter camp in Canada's far north provides a realistic, full-immersion experience with the elements and has a positive resonance with both students and the wider community

All photography by Claude Doucette and Peggy Ransom

Left: Final gear checks before leaving the school. Each student pulls a sleigh and is responsible for tying it down and checking it along the way. Right: Hanging caribou meat for smoking and drying. The students spent the evening before slicing the meat into thin strips, and then soaked it in brine overnight.

by **Claude Doucette**, **David Kowalewski** and **Peggy Ransom**

AT NO TIME IN OUR species' evolution have the young been so separated from nature. Obsessed with protecting children from any possible mishap, hovering "helicopter" teachers and guardians have not only alienated children from the natural world, but unknowingly taught them to fear it. This idea is spelled out eloquently in the recent book *Last Child in the Woods* by environmental writer Richard Louv.[1] Citing a number of indicators, Louv demonstrates how separated from the elements the young have become. For example, the radius of the area where children play around their homes has shrunk dramatically in recent years. Indeed the very notion of playing outside — of romping in meadows and building tree houses — has almost disappeared in favor of scheduled activities like soccer practice and piano lessons. Too, "virtual reality" has distanced youngsters from nature, offering mediated rather than direct experience. In schools, outdoor recess has been drastically reduced in favor of more time spent in classrooms. Even life science courses are increasingly taught in stuffy laboratories and other indoor facilities.

Environmental teachers in particular have been called to account by those wishing to narrow the human-nature separation. "Prima-donna conservationists," to use the term of one critic, have alienated the young from the wonders of the wild.[2] Continual admonishments of "Don't walk on the grass" and micromanagement of students' behavior outdoors have effectively sent students the message "You're here, nature's there, and never the twain shall meet."

The costs of this "nature-deficit disorder," as Louv puts it, are many. He links the alienation to a number of physical and psychosocial maladies, including obesity, asthma, and attention-deficit disorder. As a result, he and others have called for a classroom liberation movement, freeing children from their bureaucratic prisons and leading them into the wild. His thesis is supported by numerous studies showing the positive effects of "wilderness therapy" on disorders in the young.[3]

Beyond outdoor education as we know it

Yet even typical "nature experiences" during so-called "outdoor education" at summer camps and other venues have serious limitations. Whereas they provide an *exposure* to the wild, they fail almost completely in offering a full *experience* of its power, fury, and nurturance. Indeed, the more modern that outdoor education has become (electricity from the grid, store-bought marshmallows), the more the participants have been separated from the elements. The experience of greatest exposure to nature for many children — summer camp — is in too many cases simply a place where beleaguered parents can leave their offspring for a well-deserved break from parental responsibility. As such, it fails to address a number of nature deficits.

First, for most children camp consists of only five or six days spent in a wooded area just a few kilometers from a bustling urban or suburban center. The short distance

between home and camp minimizes the experience of being far from a civilized support system and at the mercy of nature's elements. Exposure is one thing; immersion quite another. Taking a foreign-language course, we know, is hardly the same as living with a family in a foreign country. Only an extended period of time, far from any civilized support, can give the young an authentic experience of nature in its wild form.

Second, the utility of much of outdoor education in teaching survival skills has to be questioned. Rarely do participants pack their own equipment, provide for their own transportation, secure their own water, and so on. Usually camps are in places where it is not possible to glean from the land necessities such as firewood, as one would do in a real wilderness. Instead, prepackaged foods, leather-crafting kits, and other factory products make the camp seem more like a strip-mall lost in the woods than a primitive encampment in the wild. Are the young ever seriously challenged with the question "What if you found yourself out here all alone in the wilderness — could you survive?" We doubt it.

Third, the typical camp experience is far removed from the aboriginal practices of the place. Ancient hunter-gatherers were able not only to survive in wild locales, but even to thrive, while still preserving these places for future generations. Unfortunately, their descendents are rarely tapped for their practical wisdom about the supportive nature of the land and their deep understanding of the connections among all its creatures. A Mohawk medicine woman, when asked the best time to pick a certain herb, replied "Right after the fireflies come out." Instead of relating natural events to a human construct — a calendar — her answer reflects a perception that natural events are related to other natural events, and that everything in nature is broadcasting information to anyone aware enough to listen. These are two very different ways of perceiving. Without such teachers, the young lack the opportunity to view the nurturance of the land, first-hand, through aboriginal lenses.

Fourth, summer camps are held at the most benign time of the year, when nature is at its most supportive. Such camps, then, result in a limited — in fact *illusory* — experience of the land's extremes of temperature, wind, snow, and so on. They constitute "outdoor education" only in a partial, narrow sense; the full, year-round range of natural conditions at a place is never intimately felt. Experiencing only benign nature, when a place is passing through its mildest season, may elicit wonder and spark a little curiosity and affection. But only an experience of the elements at their extreme can elicit awe and generate respect. When the young feel the raw power of a landscape — its overwhelming influence over their lives — then they truly understand the nature of nature. They can also learn that, even in extreme conditions, nature can furnish all their needs. Only a full immersion in such extreme conditions can teach them how to survive, and so fully appreciate the nurturing capacity of the land.

Fifth, the camp experience stays isolated within the individual, unconnected to a wider community. Participants may gain something personally from camp, but they give little back to the society from which they came. The question of social utility — "So what?" — remains unanswered. This lack of social linkages perhaps explains why the camp experience usually stays epiphenomenal, just another vacation from the stresses of civilized modernity, and one that — unconnected — fades quickly with time. The experience is not embedded in the local culture, and as such fails to take on a wider meaning. In fact, the full network of social relations from which the participant comes, far from being strengthened, is actually weakened by such escapism.

The most important isolation, however, is the disconnection of camp from formal educational institutions. The modern camp, almost always, is totally separate from the school. What, then, is a student to think? That the school doesn't care about my experiencing nature? That it doesn't care about my ability to survive in the wild? That nature has nothing serious to teach me? That nature's not for learning but just for fun? That school, then, is not for fun but only for learning? At least some youngsters, we believe, would answer "yes" on all counts. So we ask: Is the separation of the school from direct and deep immersion in nature, and its complement — the proliferation of youth camps and other "outdoor education" institutions — a healthy learning scenario? We think not. When school and wilderness separate, both suffer.

The program

To redress these deficiencies, a winter camp of 7–10 days has been held annually since 1995 for students at the P.W. Kaeser High School, an institution of 300 students in Fort Smith in the southeastern region of Great Slave Lake in the Northwest Territories. The site is a mixed old-growth spruce-birch boreal forest with numerous lakes on the Canadian taiga.

The camp, held in February or March during the school year, is designed for learning traditional survival skills, such as fishing and trapping, according to the way of life of the Dene — the Chipewyan, Cree, Dogrib, Slavey, Gwitch'in, Hare, and Mountain peoples who live in five territories of Canada's north. The camp also stresses the learning of Dene customs, oral traditions, names, and route landmarks, and the importance of elders, especially for their teachings and stories.

At the same time, it is designed to integrate aspects of modern science within this cultural matrix. Skills such as orienteering and anatomy are taught, and the students follow the scientific protocols of the GLOBE (Global Learning and Observations to Benefit the Environment) program for measuring various environmental factors. These include using a global positioning system (GPS) and conducting surveys of groundcover, the results of which can be posted on the GLOBE website for scientists to use.

The instructors at the camp include both aboriginal guides and non-aboriginal teachers and university professors. The guides are all of Dene background, possessing ancient skills such as trapping, making snow shelters, reading the ice, making signal fires, and meat jerking and cooking. These teachers are especially well positioned to teach how modernity has affected traditional patterns of nature and ways of life, such as the effect of bush planes on caribou migration. They are also able to impart knowledge unavailable in books or other modern sources. For example, the trapping instructor points out that, if a beaver trap is set some distance from the animals' lodge, then the larger adult animals will be caught instead of the youngsters, who tend to stay closer to home. Good economy (more meat, bigger hide), in a word, is good ecology (ensuring the next generation of animals).

Left: Setting a fish net on Pier's Lake. The ice hole was chiseled out by the students using ice picks and a shovel. Right: After learning how to skin and dress a caribou, older students teach anatomy lessons to the group. Here a student explains the parts and functions of a caribou heart.

The non-aboriginal instructors are high school and university teachers formally trained in such academic fields as biology and ecology. They too bring a variety of wilderness skills, including flat-water canoeing, orienteering, emergency medicine, wildlife tracking, and the harvesting and preparing of wild edible and medicinal plants. Skilled thus in both traditional and modern methods of wilderness living, they are able to offer students a synthesis of both.

Only an experience of the elements at their extreme can elicit awe and generate respect. When the young feel the raw power of a landscape — its overwhelming influence over their lives — then they truly understand the nature of nature.

Students interested in participating in the camp are invited to a meeting three months prior to the trip. They complete an application form and medical history and are told that their participation is dependent on three criteria: their adherence to the school's requirement to attend at least 80 percent of their classes; permission from the teacher of any course they are failing; and written permission from their legal guardians.[4] Typically, interested students number 20-30, of which a low of 5 to a high of 21 (with an average of 10) have ended up participating. Experience has taught that the ideal number is 12, as larger groups pose unwieldy problems of logistics and group dynamics that can compromise both learning and enjoyment. Costs, too, become prohibitive with larger groups, given that the trip includes travel by snowmobile and bush plane flights to caribou herds. Finally, as any teacher who has led "weed walks" or other tours through debris-strewn woodlands knows, a large number can quickly degrade a landscape, compromise communication and therefore learning, slow everything down, and undermine group cohesion.

Student participants are given a list of necessary clothing and equipment for the camp, which includes items such as an Arctic-worthy parka and sleeping bag. The school, for its part, provides food, tents, snowmobiles, sleds, and other supplies and equipment. The collective gear also includes digital cameras, laptop computers, satellite phones, and walkie-talkies for emergency contacts with families and school officials and coordination of schedules with bush plane pilots and media reporters who sometimes visit the camp.

Camp activities

Students and instructors meet at the school the night before departure to pack the snowmobile sleds and service the vehicles. The following morning the entire group leaves on snowmobiles, traveling over 80 kilometers to a large frozen lake where there are two cabins (for instructors), but no electricity except for an emergency generator. The trip, lasting five hours, is over an uninhabited landscape of frozen rivers and lakes, interspersed with "portages" through dense spruce and birch stands, cattail swamps, and willow thickets.

Many of the lakes and streams feature "overflow"—the presence of water on top of the frozen surface, which presents the danger of getting bogged down in the middle of nowhere. The condition is usually concealed beneath a layer of undisturbed snow, which acts as an insulator that keeps the water from freezing, even when the temperature is well below zero. As such, overflow can be impossible to see. Instructors use such occasions to teach how to spot the problem, where it typically occurs, and how to negotiate it. Students thus learn an environmental lesson of great import scarcely before the trip has gotten underway: global warming, which thins the ice and makes overflow more common, can compromise life, property, and the ability to travel safely and quickly on the ice. In 2005, for example, overflow measured 60 centimeters in some spots, necessitating the relocation of the campsite.

Upon arrival at camp, students proceed immediately to set up tents, procure firewood, service snowmobiles, and prepare dinner. The following days are filled with activities designed to teach wilderness survival skills under extreme conditions. Dealing with low temperatures is a constant challenge. Students are trained in the practical skills of thermoregulation, such as preventing frostbite, and are continually reminded of the mantra "Eat before you're hungry, drink before you're thirsty, and move around when you're cold." Students quickly learn the art of fire making with birch bark, and of fire keeping with wood from spruce

trees they have felled and cut themselves. They are also taught how to cut more than one meter into the ice to procure water and set fishing nets. On some days the temperature drops as low as –43°C (–45°F), with occasional gales blowing off the frozen lake making for wind chill temperatures down to –60°C (–75°F). The program is continually adjusted to meet such extreme conditions, and flexibility on everyone's part proves necessary. Students learn that mother nature has her own agenda, and the frequent schedule changes bring home the lesson like no formal lecture could: "We do not control nature — nature controls us."

Since wild plant foods are scarce in the winter, with the exception of Labrador tea and a few other species, procuring animal flesh for food takes top priority next to keeping warm. Immediately upon arrival, therefore, once the caribou herds are located, students are scheduled for flying out to the hunt by bush plane. Likewise, traps for game are set under the tutelage of an aboriginal guide. Finally, fishnets are set under the ice and are checked on a daily basis. Students quickly find all three methods — hunting, trapping, and fishing — successful in securing meat (caribou, martens, beavers) and fish (trout, pickerel, whitefish).

Students skin and fillet the animals themselves for meals. This meat is supplemented with fats and sugars in modern form (peanut butter, cookies) to ensure that body temperatures remain safely high and teenage appetites relatively sated — a regimen guaranteed to make any vegan howl in horror. Students work in the kitchen in shifts of three to prepare and cook all meals for each day. Tasks include procuring water from beneath the ice of the frozen lake, making fire, stocking firewood for the dining cabin, cleaning the cabin and cookware, and keeping cupboards neat. They thus learn how to procure and prepare nutritious meals in the bush over 80 kilometers from nowhere.

Students are exposed to a host of other skills too numerous to describe in detail *(see "Aboriginal and Modern Skills" sidebar)*. For example, they practice orienteering and learn to identify wild plant teas and the tracks and sign of numerous birds (ravens, whiskey jacks and others) and mammals (lynx and wolverines). In teaching all skills, instructors emphasize ways to use the land with minimum impact and no trace.

As might be expected, minor mishaps of all sorts occur on a daily basis, such as colds, wind and sunburn, campfire scalds, and snow blindness. Treatment has included both aboriginal (snow application to frostbite, spruce gum to pull out infections) and modern (antiseptic cream, gauze bandaging) modalities. Other problems have included lost articles, lack of dry wood to start fires, going to bed with damp clothes, and forgetting to carry food and liquids on outings — all good lessons for the young to learn, even if the hard way. If a serious health problem occurs, the participant is airlifted back to town by bush plane.

On the last day of camp, students participate in a sharing circle of some kind (talking stick, tipi fire, thanksgiving ceremony) led by an aboriginal instructor. As such, they are exposed to the indigenous "attitude of gratitude" for nature's blessings, as expressed in a traditional, sacred way.

Aboriginal and Modern Skills Taught at Winter Camp

Aboriginal
Sleigh and toboggan packing
Wilderness camp setup
No-impact camping
Hunting
Mammal and fish anatomy
Mammal skinning and butchering
Meat smoking
Meat jerking
Thermoregulation
Wildlife track and sign
Wild edible plants
Water procurement
Wild medicinal plants
Igloo construction
Quinze hut construction
Wilderness first aid
Toboggan design
Caribou migration patterns
Fish habitats, depths, feeding habits
Hook-and-line ice fishing
Fish filleting
Trapline setting
Personal hygiene
Hide uses
Camp sanitation
Firewood selection
Tree felling
Fire making
Campfire cooking
Snow melting
Reading the ice
Snowshoe travel
Tipi construction
Natural wayfinding
Cordage selection
Knot tying
Emergency signaling
Weather observation
Backpacking supplies and techniques

Modern
Knife and axe sharpening
Chainsaw use and safety
Wood splitting
Woodstove construction from fuel drums
Wood and propane stove cooking
Water quality testing
Snowmobile travel, safety, maintenance
Jiggerboard ice fishing
Caribou gun hunting
Specimen sampling for wildlife health
Animal necropsy
Regional forest fire patterns and effects
Wildlife inventory
Ice pick and ice chisel use
Topographical map reading
Compass use
GPS theory and use
Lantern fueling and lighting
Walkie-talkie use
Satellite phone use
Bush piloting
Snow ecology
Search-and-rescue
Bannock baking
Forest ecology

Students learn how and where to set a 'Conibear' beaver trap. They checked the trap daily, but didn't get a beaver.

Upon return to town, students cut up the remaining meat and fish and go door-to-door distributing the food to widowed elders who are on a list provided by town officials. In this way, they use the camp experience to contribute to the community. In our view, getting hugs from a grateful town elder for food they procured from the wild and prepared themselves does more for young people's self-esteem than a whole bevy of school counselors.

The final rite of passage: a night in an outdoor shelter built by the students. Everyone stayed toasty warm.

In return for sticking out the arduous camp experience, students are given one academic credit in Outdoor Experiences or related coursework. The school also provides a sweatshirt with the inscription "PWK Winter Camp — in some cultures, what I do *would* be considered normal," as well as felt patches with the words "Winter Camp" for wearing on campus. They are also awarded formal hunter-trapper certificates from the Department of Natural Resources.

Measures of success

That the program resonates with both students and the wider community has been shown in many ways. Students express a high level of satisfaction with the experience. Such views are recorded, formally and informally, in many venues, including cabin conversations, sharing-circle statements on the last day of camp, subsequent gossip in school hallways, and e-mails from graduates. Many indicate that they signed up after hearing laudatory reports from past participants.

Students, then, react favorably, but why exactly? While they appreciate learning new skills, the terms they use most often for the camp experience — self-confidence and self-reliance — point to the personal confronting of survival fears. Thus the camp, we believe, succeeds in reversing fear of nature. Female students, especially self-admitted "girly-girls," seem to gain most in this respect. Participants often mention activities geared specifically toward that end: negotiating overflow, navigating in the wild, sleeping in a self-made snow shelter, and conducting a search-and-rescue mission in the middle of a freezing night. Students learn, then, that even in the harshest conditions, mother nature nourishes her children. Nature is not to be feared, they discover, only our own ignorance of it. For example, whereas many modern humans lament the coming of snow and rejoice at its passing, winter-camp students discover that the material is much more boon than bane *(see "16 Uses of Snow" sidebar)*.

Activities led by the aboriginal instructors have a profound impact on the non-aboriginal student. We doubt that such a student will ever in the future assert that traditional peoples are "backward," when they are seen, up close and personal, surviving and thriving in extreme conditions with ease and comfort. The mentoring, the hands-on demonstrations, the storytelling — all these teach the non-aboriginal student a respect for traditional peoples that no textbook could convey.

Students learn too that fulfilling the needs of the wider community from nature's bounty is deeply rewarding. By receiving kudos from instructors for the tasty fish they have not only caught but also filleted and fried, and appreciative smiles from the elders to whom they give the meat of the caribou they themselves have shot and butchered, they perhaps realize that the oft-acclaimed "helper's high" is at least as good as drugs.

Students also learn the aboriginal value of "cooperation," although the more germane term might be "practical tribalism." At a winter camp in the bush, each individual can furnish his or her own firewood for a personal shelter. Or, the group can live in a bigger shelter and work together, thereby reducing significantly the total expenditure of time, calories, and natural resources. In short, aboriginal ways serve the dual purpose of survival and environmentalism. The valuable lesson that good economics is good ecology is earned, first-hand, with sweat equity.

A number of behavioral changes might reasonably be traced to the camp experience. Those high schoolers who are less than thrilled by the whole idea of institutionalized education, namely "at-risk" students, especially seem to benefit. Wilderness, we learned, has a way of leveling the playing field for the most academically challenged students. The prospect of going to camp gives them a powerful incentive to stay in school and attend classes they would otherwise likely have

16 Uses of Snow

Water when melted
Shelter material and insulation
Camouflage for animal traps
Hand and face cleaning
Frostbite treatment
Landing strip for bush planes
Tracking wildlife movements
Moonlight reflector
Food refrigerator
Snowmobile support
Snowshoe support
Body cooling
Hunting lure when thrown in the air
Sponge for gas spilt on snowmobiles
SOS signaling
Sculptor's material and artist's canvass

missed. Apparently, reversing nature-deficit disorder can make kids smarter.

The camp resonates with a wider audience as well, from which students gain a number of bright career prospects. Those with training in GLOBE and other aspects of the camp are highly sought after by Parks Canada, by the Northwest Territories Environment and Natural Resources department, and by the Canadian Interagency Forest Fire Center. These employers not only value the more experienced students, but also are able to make use of the data they gather during the camps.

No child left inside?

The road to nature-deficit disorder is paved with good intentions. Wanting their wards to know nature in the most modern way, teachers and guardians have unwittingly engendered a one-dimensional and shallow scientific perspective, which in the end induces a fearful alienation. The winter camp experience, in contrast, not only helps reverse this separation, but provides an enjoyable and practical set of skills through full immersion in both aboriginal and modern ways of wilderness survival. In our view, when an alienating fear of nature is supplanted by a practical appreciation that connects to the wider community, then and only then will young people feel nurtured by — and protective of — the Earth.

Claude Doucette has led winter camps for 11 years under the tutelage of indigenous guides, and formerly taught information processing at P.W. Kaeser High School in Fort Smith, Northwest Territories. He currently teaches in Smiths Falls, Ontario.

David Kowalewski is Professor Emeritus of Environmental Studies at Alfred University. He has taught several wilderness courses, including Wildlife Tracking, Wild Edible and Medicinal Plants, and Deep Ecology. His publications have appeared in the *Journal of Environmental Education, Green Teacher*, and other journals. He is the author of *Deep Power: The Political Ecology of Wilderness and Civilization* (Nova Science, 2000).

Peggy Ransom teaches biology and chemistry at P.W. Kaeser High School in Fort Smith, Northwest Territories, where she has led winter camps for the past nine years. She holds degrees in science and education, and is certified in wilderness first aid.

An earlier version of this paper was presented at the 2005 Joint Meeting of the Canadian Network for Environmental Education and Communication, Council of Outdoor Educators of Ontario, Ontario Society for Environmental Education, and Environmental Education Ontario, in Huntsville, Ontario.

Notes

1. Richard Louv, *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder*, Chapel Hill, NC: Algonquin, 2005.

2. Matthew Alfs, *Edible and Medicinal Wild Plants of Minnesota and Wisconsin*, New Brighton, MN: Old Theology Book House, 2001. See also Dan Dagget, *Gardeners of Eden: Rediscovering Our Importance to Nature*, New York: Thatcher Charitable Trust, 2005.

3. For a summary, see David Kowalewski, *Deep Power: The Political Ecology of Wilderness and Civilization*, Huntington, NY: Nova Science, 2000.

4. Copies of the forms used for applications and permissions may be obtained from Peggy Ransom at ransom@southslave.learnnet.nt.ca.

Making It Up As We Go Along

The role of pretend games in early environmental education

All photography by Tricia Edgar

Forest animals looking for food under twigs and leaves.

by **Tricia Edgar**

THE CARIBOU ARE RESTLESS. They sniff and shuffle behind me, waiting for the migration to begin. No, we're not in the far north. We're in Vancouver, in the temperate rainforest, and we're about to embark on an imaginary journey — a seasonal caribou migration.

I love to work with preschool and kindergarten classes. This is because I have the mentality of a five-year-old: I love to pretend. Over nearly a decade of working with kids, I've been caught sliding on the ground like a slug and line dancing like a spider building its web. And they pay me to do this.

Why play pretend games when there's a real world out there with worms and bugs and cedars and streams to explore? Environmental educators have two great resources. One is nature. The other is imagination. When we combine the two, magic happens! So, let's explore the imagination side of the equation and look at what pretend games offer in environmental education. They:

- *Encourage exploration.* Put yourself in a centipede's shoes — all of them! Pretend games connect kids with nature in unexpected ways. Pretending to be another creature can encourage even the most reluctant students to get down and dirty in outdoor explorations. After all, it's the centipede shuffling through those leaves — not them. Pretending also encourages kids to explore with all of their senses: as centipedes wiggling their way through the forest, kids notice the textures and smells of the ground.
- *Engage people.* For kids, playing pretend is just plain fun. For teachers, it's an opportunity to create a mood, build energy, or create calm. Focus attention by leading a visualization exercise; inject energy by having students turn into line-dancing spiders; quiet the mood by having them become seeds slowly growing into flowers.
- *Are adaptable.* Pretend games are the ultimate in flexibility. Requiring only the imagination, they can be played anywhere, indoors or out. They are as simple or as complex as you choose to make them. They can be highly structured or they can have time built in for free creative play. Props, if you choose to use them, can be very simple or as wild and complex as your own imagination can create.
- *Communicate complex ideas.* Concepts related to life cycles and seasonal activities, such as migration, can seem complex and abstract to many children. After going through a life cycle themselves — "hatching" from an egg to a chick or "sprouting" from a seed to a plant — children better understand these natural processes. Similarly, students who learn through movement may find that the concept of migration suddenly clicks when they embark on a migration themselves. You can then reinforce this learning by discussing real-life examples.

- *Inspire!* Pretend games follow students home. One child, after "migrating" several times around a forest path, was distraught that the game was ending…until it was suggested that he could play the same game on his own. The next week, his mother reported that he had been migrating around the perimeter of the house.

Planning play

Here are some frameworks for pretend play that I use in different programs, along with some examples.

What does it feel like to be a …?

Put your students in an animal's body or a plant's root system. Becoming an animal or plant helps children empathize with another living thing and feel what its world might be like. Whether your unit focuses on a specific animal or on a plant's life cycle, putting kids into another organism's "shoes" connects them to that animal or plant.

A well-dressed salmon hiding from predators.

After "hatching" from an egg to a chick or "sprouting" from a seed to a plant, children better understand these natural processes.

Animal senses: Have students use kaleidoscopes to become insects with compound eyes. Go for a walk or a crawl in the forest, insect-style. Or have students seek out a flower for its nectar, using their compound eyes.

Movement: How does a slug walk? How does a hummingbird move? How quickly? Divide the class into pairs, and challenge your students to flap their arms as many times as they can in 10 seconds. Have helpers count how many times each child can flap. Can anyone outdo a Rufous hummingbird at 50 times per second?

Daily life: Animals have different ways of communicating, different family structures, and different methods of construction. Read a story or plan a lesson about an animal's daily life, and then have students act out part of it to bring the message home. Build a nest in the classroom with paper grass and moss, cardboard twigs, and feathers. Sit down in the nest to read a story about a bird's early life.

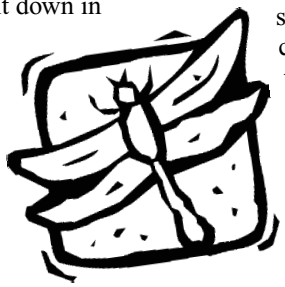
Communication: Honeybees dance to communicate. Learn the various honeybee dances, turn on some bee-utiful music, and buzz around in a line, doing the bee dance. Older students can split into two groups: one group dances to tell the others where the flowers are, and then everyone flies off to search for nectar. To finish the activity, create flowers from wallpaper scraps, place them over cups, and fill the cups with juice. Voilà — nectar for your bees. (The Nova "Tales from the Hive" website has excellent footage of honeybee dances and instructions on how you can do your own dance: see <www.pbs.org/wgbh/nova/bees/>.)

Construction: Put on some dancing music and ask students to form a line. Go over the moves a spider makes when constructing a web, and then have students dance their way through the motions. With young children, it works best to do this together, since spider webs are quite complex. I line the children up and line dance all the way around the edge of the web. Then we form a circle and dance towards the middle. (*Spiderology* by Michael Elsohn Ross provides an introduction to spiders and web building.)

Animal families: How does a baby animal find its mother? Divide the class into mother bats and baby bats, and ask each pair to create their own unique family squeak. Then have the babies close their eyes, listen for their mother's squeak, and navigate toward her using echolocation. How do baby birds eat? Divide the class into parent and baby birds, and have the parents head off to find food. When they return, they "regurgitate" the food by squishing it and handing it to the baby.

We will survive

Predator-prey games: Play predator tag. Create an ocean one side of the gym, and challenge a school of salmon to return from the ocean to their stream (the other side of the gym) to spawn. Designate a few students to be hungry seals or fishing boats. The salmon that are caught become predators too, until all the salmon have been eaten. Or ask the students to become moths, hiding as flat as they can beside trees or behind desks, to camouflage themselves from the teacher, who becomes a hungry bird. For younger students, limit the complexity of the predator-prey interactions, and be sure to provide an opportunity for them to participate even after they have been caught. These activities give students a taste of the challenges



that animals face in the wild. Survival activities are favorites for indoors or out: be prepared to play them again and again, or limit the time by playing them just before recess or lunch.

Searching games: Have students become birds and search for twigs to make into a nest. Or become ladybugs, searching for pompom "aphids" hidden in the classroom. What survival skills do these animals need?

Survival tactics: Create a beach using shells, giant pillowcases for rocks, and boxes for logs. Ask students, Who are the major predators and prey on a sandy beach? *(Birds and invertebrates.)* Have the children become clams and practice getting away from predators by pushing themselves through the sand with a muscular foot. Then, as the leader, become a bird searching the beach for clams. The clams must dig themselves under the rocks and hide so that you don't eat them.

Circles of life

Seasonal cycles: Animals and plants change with the seasons, and these seasonal cycles can be complex. Visualization helps children understand natural cycles. By walking (or slithering) through a plant or an animal's year, they have an opportunity to take part in that cycle for a moment. Have students become leaves sprouting on a tree in the spring, eating sunlight; then have them shake themselves off the tree in an autumn wind and swirl around in the breeze.

Life cycles: Ask students to imagine themselves as slugs, hatching from eggs and licking their way through a mushroom. Or have them become chicks, pecking their way out of their eggs and fluffing their wings. Life-cycle activities are quiet and absorbing ways for children to learn how animals grow. Accompany them with real-life examples — bring butterflies into the classroom or grow salmon from eggs — and you have a recipe for real understanding.

Migration: Nothing burns off some early morning energy like a good migration. Have the students become caribou, using noisemakers to simulate the clacking of their heels as they move through the Arctic. Have them sniff the air for predators, swim across a river, and seek out snow to avoid flies. Finally, have them work as a group to figure out how to get back home again. Did we cross this river before? Did we see this rotten log? Did we smell this skunk cabbage? (Caution: be prepared to migrate more than once!)

Stocking your cupboards

Over the years, my office has become a bit of a mess. I have snowflakes in my filing cabinet, truffles in my cupboards, and giant flowers leaning against the wall. I'm a packrat, and I save the props from each program so that I can use them again and again. Of course, some of the best props are found in the great outdoors — trees to hide behind, or local landmarks that can become signposts during a long migration — but a great many props can be constructed using simple materials. All that's required is a liberal dose of imagination from both teacher and student.

Here are some props to hang your imagination on. There's nothing fancy in the list. Rather, they are made of simple, inexpensive household items; and since none of us has too much time on our hands, they are things that can be used again and again. When you have a personal stash of props like these, you're ready to pretend to be just about anything.

Foam pellets: These are dandies to pick up, but they make great snow. Or place them inside a pretend mountain, reverse a vacuum hose, and watch the volcano erupt.

Long strands of cloth: Hang strands of cloth from the ceiling to make jungle vines and kelp forests, or use them as long strands of grass when you build a nest.

Fabric and wallpaper samples: Multicolored scraps of fabric and wallpaper can become flowers, pollen grains, aphids, or camouflaged invertebrates.

Rope: Rope can become a spider's web or a frog's tongue. Or have students keep together by hanging onto a rope during a group migration or other group movement activity.

Ice cream or margarine containers: Plastic food containers can become the mouths of animals or collection pouches for animals that gather pollen or aphids. A large ice cream container is excellent for storing paper leaves or snowflakes, ready to be tipped onto an unsuspecting group!

Corrugated cardboard: Ah, the cardboard box, long beloved by parents as the best and least expensive child's toy. Roll thin cardboard into tubes to make trees or stumps. Chop it into strips and it becomes twigs for nests and sticks for beaver dams. Large flat pieces make giant flowers and leaves. Huge boxes can become ships, submarines, tunnels, and houses.

Blankets: Blankets make excellent hiding places. Drape them over a box to make a tunnel or a cave. Have students hide under a gray blanket of sand or a blue blanket of water. Place blankets on the floor to make a cozy nest.

Pillowcases: Filled with cloth, pillowcases become giant eggs, or rocks on a beach. Kids who are playing snakes can sit inside one and make it their skin. Smaller children may be able to curl up into a pillowcase and then emerge from their "egg."

Jar lids: Tie jar lids together with string to make a noisemaker, or add a spoon for banging.

Shredded paper: Shredded paper makes great nest material and is good for hiding things.

A few objects are so useful that they are worth paying for. These are:

Kaleidoscopes: When you want students to become insects, kaleidoscopes make fabulous compound eyes.

Tent: Looking for a sturdy cave or undersea experience? Try decorating the inside of a tent and have students crawl into another world.

Masking tape: Masking tape is wonderful for marking out dance steps or building patterns on the floor. And it's easy to remove later.

Finally, you might consider making a few objects. These don't take a lot of work, and they can be used again and again:

Papier-mâché eggs: Cover a balloon or other container with papier-mâché, and it becomes a giant egg or seed. You can cut it down the center so that it "cracks" open.

Laminated leaves: A stash of laminated paper leaves, in both spring and fall colors, can be used and reused for a variety of purposes: students can hide in them, or use them for building animal homes or as "food" for decomposers such as slugs.

Paper snowflakes: Paper snowflakes add atmosphere to winter migrations and they're fun to slide in and to dump on others.

Pretend play with "older" folks

A couple of years ago, I attended a workshop by nature educator Joseph Cornell in which we became trees and he was a nasty tree-boring bug. With no props at all, he had us all giggling hysterically. Pretend games such as these help to drop boundaries. They make it okay to be silly, to make noise, to run around, or to sit in quiet contemplation. Despite the somewhat serious facades of older children, teenagers, and adults, most find pretend play to be fun and engaging. It just takes a little convincing sometimes, especially with those who are uncomfortable in new groups or uneasy with pretend activities. How, then, can we engage older students in pretend play? Here are few guidelines:

- Break the ice first. Initiate pretend activities at a time when everyone is open to them. If you have a group for a few days, wait until the group has gelled and everyone feels comfortable.
- Act when the mood is right. After participants have gotten to know each other a bit, you might introduce an active pretend activity, such as a bee dance. Near the end of the day, when people are feeling more reflective, ask them to become an animal or a plant and to use their senses and imagination to visualize a moment in that organism's life.
- Have an active "out" for anyone who is uncomfortable with the activity. Perhaps the student can be an observer and reporter, or form a perimeter for a chasing game, or act as a guide or guardian for a herd of caribou. Having participated in this way, the student may be inspired to join in next time.

So why not turn into a slug this winter or sprout like a leaf next spring? I wish you many happy hours of pretending, this year and beyond.

Tricia Edgar coordinates education programs at the Lynn Canyon Ecology Centre in North Vancouver, British Columbia.

Resources

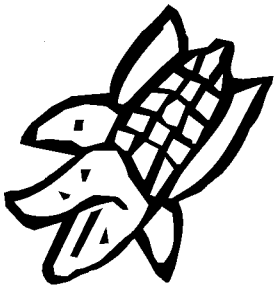
Cornell, Joseph. *Sharing the Joy of Nature*. Dawn Publications, 1989

Cornell, Joseph. *Sharing Nature with Children.* Dawn Publications, 1984.

Petrash, Carol. *Earthways: Simple Environmental Activities for Young Children*. Monarch Books, 2002 (easy guided activities and crafts for the preschool and kindergarten age).

Getting Fresh with Farm-to-School Programs

By making direct connections between growers and schools, farm-to-school programs provide local markets for family farmers and healthier food choices for schoolchildren



Bonnie Hallam

by **Marion Kalb**

THESE DAYS, IT IS ALMOST IMPOSSIBLE to talk about children and food without acknowledging the epidemic of childhood obesity. Unhealthy eating habits — along with lack of exercise — play a major role in this epidemic. Only ten percent of children ages six to eleven eat the recommended five daily servings of fruits and vegetables. During the past 30 years, the percentage of children in the United States who are overweight doubled to 30.3 percent, and the percentage of adolescents who are overweight tripled to 15.5 percent.[1] Statistics are similar in Canada, where the percentage of adolescents who are overweight more than doubled between 1978 and 2004, from 14 percent to 29 percent, while the adolescent obesity rate tripled from 3 percent to 9 percent.[2] Seventy percent of overweight adolescents remain overweight into adulthood, thereby increasing their risk of heart disease, cancer, diabetes, and high blood pressure. For the first time in 200 years, children today are likely to have shorter life spans than their parents.

At the same time that obesity has reached epidemic proportions, family farming is facing its own crisis. Of all occupations in North America, farming is in the greatest decline. In the United States, less than two percent of the population is employed in farming, and the federal Census Bureau has declared the number of family farms "statistically insignificant" and no longer gathers statistics on them. In Canada, only 2.4 percent of the population works in farming,[3] and between 1996 and 2001 the number of farms dropped by 11 percent.[4] The farmers' share of the food dollar declined from 41 cents in 1950 to 20 cents in 1999. The bleak outlook for earning a good living by farming is discouraging to the younger generation: only eight percent of today's farmers are under the age of 35 and nearly half are over 55. With fewer marketing outlets, rising costs for land and water, and the growth of agribusiness, many family farmers find themselves having to sell their land to feed their families.

While a wide range of approaches is needed to address these issues, farm-to-school food programs help to counter these negative trends systemically. By making direct connections between growers and schools, these programs provide local markets for family farmers and healthier food choices for schoolchildren. In California, for example, students line up at salad bars supplied with produce from the local farmers' market. A cooperative of farmers in Florida provides collard greens to over 300,000 children throughout the South. In North Carolina, schools have the option of purchasing produce grown in the state through the Department of Defense's "DoD Fresh" program. These are just a few examples of what's happening in over 400 school districts and 22 states nationwide.

Benefits of farm-to-school programs

Educational and health benefits

A farm-to-school program provides opportunities for integrating food and agriculture topics into science, math, and social studies curricula. Further connections can be made by visiting with farmers, participating in school gardens, composting waste, or cooking in the classroom. Most students have no direct connection to a family farm or opportunity to learn first hand how vegetables, fruits, grains, and animal products are produced. And while nutrition is taught in the classroom, there is generally not a strong relationship between the school curriculum and the school cafeteria. If lessons in nutrition are reinforced by the availability of fresh foods in the cafeteria, and if students are involved in gardening, farming, cooking, and other "real-life" experiences with food, they are more likely to adopt healthy eating as a lifelong practice. As an example, when the Los Angeles Unified School District instituted school salad bars stocked with local produce, students, parents, and teachers participated in farm tours, produce tastings, and nutrition education sessions. As a result, participation in the lunch program increased. Students not only enjoyed the fresh, healthy, and tasty salads, but also reduced their calorie intake by an average of 200 calories a day, and their fat intake by 11 grams a day.

Gill Davidson

A question for "Farmer Jake" during a school field trip to a local farm in Wisconsin

Benefits to farmers

Farmers are always looking for direct markets because their profit margins are higher when they can sell directly to retail outlets and consumers. Selling to schools not only gives them a better return on their land and labor, but also provides greater community exposure. This in turn increases farmers' opportunities to market their products directly in other local outlets, such as grocery stores or community-supported agriculture projects. Selling to schools can also help farmers to increase the total amount of produce that they sell. Many schools and school districts are large-volume customers, and they represent a reliable and steady market that allows farmers to establish better controls on planting and harvesting.

Environmental and community benefits

Farm-to-school programs provide a number of benefits to local communities and economies. By ensuring a steady market for locally grown produce, such programs can help farmers to stay on their farms, and healthy farms provide jobs, pay taxes, and keep working agricultural land open. The retention of farmland has its own community benefits, which include maintaining open space and providing a greater diversity of wildlife habitat, greater food security, and flood control.

The environment also benefits when agricultural products are sold within the region where they are produced. In our present highly inefficient food distribution system, the average food item in North America travels 2,100 kilometers (1,300 miles) before reaching the table. When products are sold within the region, delivery vehicles travel shorter distances, burning less fuel and emitting fewer greenhouse gases. Local sales also mean that less storage and refrigeration are required, and that packaging can be reduced or even eliminated.

Organizing for success

Organizing a farm-to-school program can be a challenging prospect. There is no "correct" way to develop one, yet there are some commonalities among programs. About 75 percent of them are organized by someone other than a farmer or school district personnel: by a nonprofit organization or by a group of concerned parents or community members. Most start small, with one or two schools, and with one product, such as apples. Almost all are collaborative efforts in which a number of people are involved in the program's development and school food service staff play a key role.

Each of the following examples of farm-to-school programs has its own unique characteristics. The New York program began with a push from the state legislature to educate children about New York agriculture. The Philadelphia program targets kindergarteners from low-income families living in an urban environment and combines farm tours and nutrition education. The Madison, Wisconsin, example focuses on a large school district serving about 15,000 meals per day. Their biggest challenge is finding the supply to meet the demand!

New York Harvest for NY Kids

In most people's minds — including New Yorkers' — the state of New York is not usually associated with food production. In 1996, the New York State Assembly Task Force on Farm, Food and Nutrition set out to change that and, at the same time, to help New York farmers, by bringing

state-grown foods into school cafeterias. The Task Force declared the second week in October to be "New York Harvest for New York Kids" week and sent educational materials to schools. There was one small problem, however: no additional funding or support was provided, so that the success of the program depended on local initiative. In response to the educational materials sent to schools, a surprising number of school food service directors developed new programs. In some cases, they partnered with teachers who incorporated lessons on farming and agriculture into their curricula. School cafeteria managers teamed up with teachers, parents, farmers, community groups, the Cooperative Extension service, and the Farm Bureau to teach children about farms and inspire healthy food choices. The program received a boost in 2002 when state legislation mandated that the state departments of education and agriculture work together to promote the purchase of New York farm products by schools, universities, and other educational institutions.

Bonnie Hallam

A kindergartner learns the magic of picking an apple from the tree during a farm visit, part of Kindergarten Initiative's nutrition education program.

Another boost came from NY Farms!, a non-profit organization dedicated to maintaining farms and educating people about agriculture. The organization helped to promote New York Harvest for New York Kids week and encouraged its farming members to visit school cafeterias to see how they could help with this event. They also held a meeting at a farm to which they invited members of the New York State School Food Service Association (NYSSFSA), an association of school food service administrators and managers. According to NYSSFSA member Ray Denniston, Food Service Director for the Johnson City Central School District, the meeting was an "eye-opener" that allowed them to "see what the farmer goes through on a yearly basis.... We developed a lot of respect for the farmer from that visit." The farm visit also helped them see how working directly with farmers could benefit both farms and schools. Says Denniston, "We had been looking to improve our programs by providing kids more wholesome and nutrient-dense foods.... And it just made sense to do what we could to help save the family farms in our own neighborhood. It was win-win — there really wasn't anything not to be excited about."

New York Harvest for New York Kids Week has subsequently led to other promotions throughout the school year. For example, a program called "Give Me Five" highlighted a different state-grown fruit or vegetable each day of the week and included school announcements and informative posters about the health benefits of eating fruits and vegetables. For an upcoming New York Harvest for New York Kids Week, Denniston plans to continue this approach, featuring not only fruits and vegetables but also bagels, milk, cheese and turkey: "We can pretty much fill the whole menu with products that are made in New York state."

Pennsylvania Kindergarten Initiative

A celebrity sighting has just occurred at Robert Blair Pollock School in Philadelphia: a kindergarten student has spotted Chef Harv's truck, filled with farm-fresh snacks for students, on its way to the school. According to Bonnie Hallam, Education Coordinator for the Kindergarten Initiative, "This program has created a buzz around healthy eating. I feel like a star when I visit these schools — I'm known as the Healthy Food Lady."

The Kindergarten Initiative, created by the nonprofit organization Food Trust, began in the fall of 2004 as a pilot program for about 450 students in 15 kindergarten classes in Philadelphia. The goals of the program are to engage young children and their parents in learning about food, farms, and nutrition, to introduce local foods into students' diets, and to integrate nutrition education into the curriculum.

One component of the program is providing students with healthy vegetable and fruit snacks grown by local farmers. Chef Harv, a key player in buying and distributing these snacks, runs an incubator kitchen in West Virginia where farmers can try their hand at processing their farm products. He delivers the farm-fresh snacks in his own truck once a month and uses an overnight delivery service for additional weekly deliveries. Some of the snacks the kids have enjoyed are yellow carrots, sliced apples and pears, roasted corn on the cob, and cubed cantaloupe. During the winter they have tasted strawberry applesauce, apricot muffins, sweet potato biscuits, and peaches in a light sauce. Along with each snack comes a picture of the farmer who grew the product. One vegetable the students didn't much care for was a watermelon radish. However, they were fascinated by its colors: green on the outside and pink on the inside. According to Hallam, there was concern about kids not liking some of the new snacks. "But the really important thing is that they are open to trying new foods. That's the key."

The nutrition education component of the Kindergarten Initiative is ambitious. The activities include cooking demonstrations in the classroom by a local chef, a trip to the supermarket with parents, the introduction of school gardens, and field trips to farms in fall, winter, and spring. The farm visits have been immensely popular with the students. While farm tours in the winter are somewhat unusual, the students thoroughly enjoyed helping farmer Bob Solly with his winter chores. They had the opportunity to rake leaves from

Bonnie Hallam

Parents and children take part in classroom cooking demonstrations in Philadelphia's Kindergarten Initiative program.

under the trees (to discourage mice from building homes), to lay straw on the strawberry plants (to help keep them at a constant temperature), and to plant hothouse broccoli (so that it will be ready for the students to transplant in the spring). And of course there was time for a farm snack of popcorn and an apple cider doughnut.

For the first time in 200 years, children today are likely to have shorter life spans than their parents.

Wisconsin Harvest Festival Meals

A chicken fajita wrap with carrots, cabbage, and spinach, a sweet potato muffin, and a fresh Wisconsin apple were all part of the Harvest Lunch enjoyed by elementary school students of the Madison Metropolitan School District Food Service. "We are thrilled about this meal," said Doug Wubben, coordinator of the Wisconsin Homegrown Lunch program. "It's good for the kids and it's good for local farmers, too."

The Harvest Lunch is part of a Harvest Festival Meals program being piloted at three elementary schools in Madison, Wisconsin. The program provides students with special meals in the fall, winter, and spring that highlight local foods of the seasons. The winter meal is an evening dinner and the whole family is invited to share in the bounty. Sara Tedeschi, co-founder of the program, says, "People often assume that if you're in a northern climate you don't have any local produce during the school year, and this isn't true." Last year's winter dinner, prepared and catered by students in the Culinary Arts Program of the Madison Area Technical College, featured squash bisque, Asian noodle salad, egg rolls, apple cake, and organic ice cream. Wisconsin-grown products included onions, carrots, spinach, winter squash, meat, apples, cream, butter, and maple syrup. The meal also featured an educational event that focused on Wisconsin agriculture and healthy eating.

Although organizers would like to include fresh Wisconsin products in all school meals, the cost of the additional labor required to prepare fresh fruits and vegetables is currently prohibitive for a food service that makes 15,000 meals a day in a centralized kitchen facility. However, one benefit of the small-scale pilot program has been that the food service and the farmers are learning to work with each other. The food service better understands the seasonal availability of produce, and farmers understand the need to supply products that require minimal processing (e.g., broccoli florets instead of broccoli stalks). Tedeschi says they are now working on supplying such products on a more regular basis. This would allow the project to move beyond providing special meals at three pilot schools to incorporating fresh Wisconsin foods into the menu for all 31 elementary schools.

Developing a farm-to-school program

As these examples illustrate, developing a farm-to-school program can provide a number of organizing challenges. Here are a few strategies to address the challenges you may encounter in pursuing this work:

- **Start with the food service director.** The food service director should be the first person consulted when considering a farm-to-school program. What meals are served now? Do they already buy from local farmers? Would they be interested in giving it a try? What products might work with existing menus? If the director is reticent to become involved, it may be because the food service staff is already very busy and the program is regarded as an additional task. This is a very good reason to take a team approach in organizing the program.
- **Collaboration is key.** Take a cooperative approach with partners, including farmers, food service managers, school administrators, teachers, parents, and students. Form a farm-to-school committee that can identify

resources, find additional resources if necessary, and move the program forward.

- **Start small and go slowly.** Begin with one product, such as apples, that have a long shelf life. Working with one product will help define the process, from purchasing the product to delivering it and preparing it in the kitchen. Don't move faster than any project partner is willing to go.
- **Assist the food service in finding farmers.** Food service staff may not know how to make direct contact with local farms, even if they are interested in receiving local, fresh foods. To provide the necessary initial contacts, seek farmers through local farmers' markets, 4-H groups, feed supply stores, roadside stands and pick-your-own farms, community-supported agriculture farms, food cooperatives, commodity boards and commissions, government agencies, and even the Internet.
- **Organize volume and supply.** School food services generally purchase all produce from one broker and are not accustomed to or equipped for dealing with many different vendors. At the same time, successfully marketing products to school food services can be an overwhelming task for a single small producer. Food services and farmers both benefit when farmers are organized to market and sell their products as a group. Look for — or help to organize — a growers' cooperative or informal marketing network by which can farmers organize with other producers in their area. Alternatively, local products may be purchased through farmers' markets or local distributors.
- **Develop a strong educational component.** Education on nutrition and agriculture can help to increase children's acceptance of new foods and menus in the lunchroom. This can include working in a school garden, visiting a farm, taste-testing new products, learning salad bar etiquette, or participating in hands-on nutrition education programs. These linkages help students understand where food comes from and how it is grown.
- **Seasonality — be creative!** The seasonality of produce need not be a barrier to a successful, year-round farm-to-school effort. Fresh fruits and vegetables are only some of the agricultural products available in most regions. Other local products may include dairy products, eggs, grains, beans, meats, or processed items such as honey, maple syrup, and jams. Start small, think creatively, and identify over time what works in your particular agricultural region. Farmers are knowledgeable about product seasonality and can be directly involved in developing seasonal menu ideas or aid the process by providing product availability charts by season. A simple but effective approach is to highlight a different fruit or vegetable each month, both in menu planning and for educational or promotional purposes.

While the barriers to creating a farm-to-school program may appear to be high, certain trends both in farming and in schools are helping to remedy this. First, school food services are slowly moving towards using fresh fruits and vegetables instead of relying on frozen, canned, or processed products. This means that kitchens are becoming better equipped for fresh food preparation, and staff are gaining the skills necessary for working with fresh products. Second,

farmers are realizing the benefits of value-added products. Food service staff prefer to receive broccoli florets instead of broccoli stalks, peeled and chopped potatoes instead of whole ones, etc. Farmers have an incentive to develop processing abilities, not only for schools, but for other institutional and direct markets as well. Third, food service staff and school administrators are beginning to understand what educators already know: if nutrition classes promote the eating of fresh fruits and vegetables, and the school cafeteria serves only processed products, there's a disconnect between what children learn and what they experience day to day. Students need to receive the same message in both the classroom and the cafeteria.

A simple but effective approach is to highlight a different fruit or vegetable each month, both in menu planning and for educational or promotional purposes.

These trends bode well for the future of farm-to-school programs. As fresh produce becomes more of a priority, budgets will be reallocated accordingly. School administrators and food services in the U.S. are finding out that healthy foods can be good for cafeteria revenues as well as kids' waistlines. Studies have shown that farm-to-school programs can increase both students' participation in the federally funded National School Lunch Program and sales of cafeteria meals to staff members, thereby allowing school food services to reach greater economies of scale.

When students have the opportunity to plant a seed, harvest a peach, or visit a farm, they become more connected to the agriculture that feeds them, their families, and their communities. But ultimately farm-to-school programs work because kids discover that fruits and vegetables can taste really good. Such programs can help children adopt healthy eating habits that will last a lifetime, and convince the next generation of consumers to buy from their local farmer.

Marion Kalb is the Director of the National Farm to School Program for the Community Food Security Coalition in Santa Fe, New Mexico.

Parts of this article are excerpted from *Linking Farms with Schools: A Guide to Understanding Farm-to-School Programs for Schools, Farmers and Organizers* by Marion Kalb, Kristen Markley, and Sara Tedeschi, Community Food Security Coalition, 2004, <www.foodsecurity.org>.

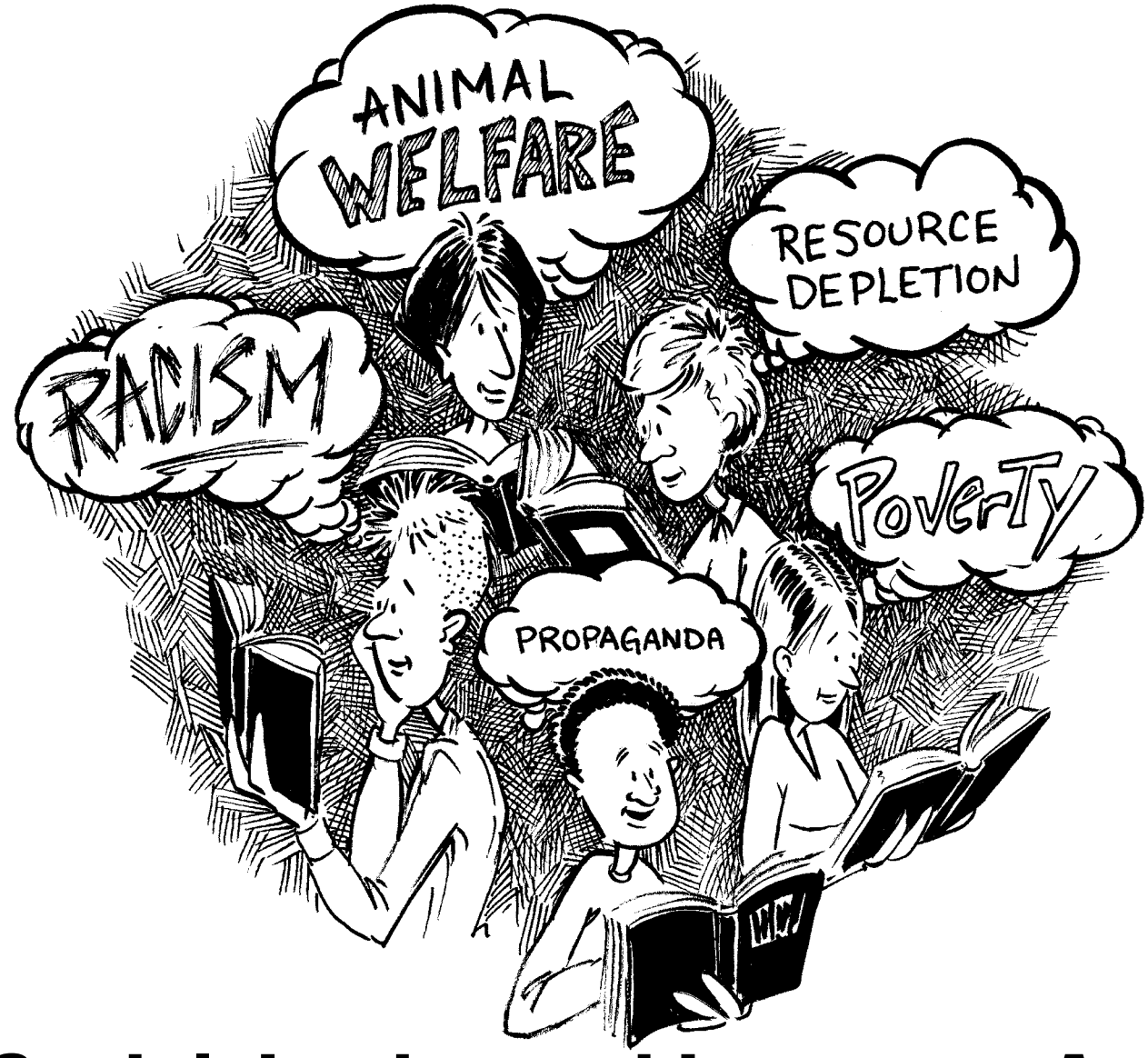
Notes

1. American Obesity Association, "Obesity in Youth," on-line May 30, 2006, <www.obesity.org/subs/fastfacts/obesity_youth.shtml>.

2. Margot Shields, "Measured Obesity: Overweight Children and Adolescents," in *Nutrition: Findings from the Canadian Community Health Survey*, Ottawa: Statistics Canada, July 6, 2005.

3. Statistics Canada, *Canada at a Glance*, Ottawa: Statistics Canada, 2006.

4. CBC, "Agriculture Census, 2005, on-line June 30, 2006, <www.cbc.ca/news/background/agriculture/>.



Illustrations: Timberdoodles

Social Justice and Language Arts

The language arts curriculum offers unlimited opportunities for teachers and students to make connections with current social and global issues

by **Christopher Greenslate**

HIGH SCHOOL CAN BE a time of extreme complexity and anxiety for many of the students who traverse our halls and campuses. It is a time when teens are navigating relationships with friends and family, worrying about appearances and grades, coming to terms with their changing bodies, learning to drive, and in some cases getting that first paying job. However, it is also the time when young people are developing a moral compass, falling in love with new ideas, overtly challenging perceptions, and in many instances shirking the status quo for a new brand of lifestyle and identity. At this point in their lives, teens are truly starting to think for themselves and to expand their radius of inquiry beyond home and school to social and environmental issues in the wider world.

Educators who wish to teach about these larger issues often find themselves on the philosophical and political fringe, and may even ask themselves whether they are taking advantage of students by introducing ideas that in some way validate their own world view. However, clean water and air, human rights, animal protection, and problems of world hunger, racism, sexism, and homophobia are not partisan issues. These are the concerns of our era and will not find resolution unless our youth are educated and empowered toward that end. If we avoid these topics in high school in the belief that our students will be introduced to them in college or later in life, we are being naïve and irresponsible. It's because we aren't teaching our youth about these issues that we continue to see racism, sexism, speciesism, and alarming rates of environmental destruction.

Of the various high school disciplines, it is the language arts curriculum that typically extends itself most readily to these very real and serious subjects, and with good reason. Finding an author's purpose and discovering what comment on life an author is making are at the heart of studying literature, poetry, essays, and speeches. This puts the language arts teacher in an excellent position to help students explore these issues. Whereas math and science teachers find themselves teaching about how things work in an objective environment, English teachers are constantly immersed in exploring the subjective ideas that are central to who we are and what we believe. This article looks at some of the many ways of extending issues of social justice into the language arts curriculum through literature, poetry, expository texts, and writing.

If we avoid these topics in high school in the belief that our students will be introduced to them in college or later in life, we are being naïve and irresponsible.

Fiction and social justice

In most areas, high schools have a set of texts for English classes that are pre-selected and placed in the curriculum by grade level. Whether these are textbooks that include a variety of selections or individual novels and plays, they offer literally an infinite number of possibilities for making connections to larger issues of social justice. While it is best to let students choose the books they'd like to read for class credit, and develop assignments that are flexible enough to accommodate that choice, by and large the majority of English classrooms will have books that all students will read together in a more structured environment. If you teach in a school that works hard at aligning curricula to state or provincial standards, the case can usually be made that the standards or skills are what is most important, not the books used to teach to those standards. So, for those of you who believe in student choice, standards-based education may be a blessing in disguise.

With such works as William Golding's *Lord of the Flies* there are a number of ways to connect to social justice issues. A primary theme, as well as the conflict in this work, is "civilization versus savagery." This theme explores the idea that we live by two competing impulses as human beings: the instinct to live by rules, act peacefully, follow moral commands, and value the good of the group, against the instinct to gratify one's immediate desires, act violently to obtain supremacy over others, and enforce one's will. First and foremost, a theme of this size poses questions: *What does it mean to be civilized? How can we build a society that is fair and just for all? Are humans inherently evil?* The boys on the island are at first peaceful and respectful, doing their very best to work together for a common goal: to survive and to be rescued. In the course of the novel we watch this cooperation, respect, and peace deteriorate to the point of murder. While reading this novel, I assign pre-selected groups (the boys in the novel didn't have choice about who was on the island) of four or five students to work through a number of steps and activities to try to determine whether they would survive outside the confines of civilization. First they get to know each of their group members in depth by sharing answers to reflective questions such as the following.

What are you good at?
What are your weaknesses?
What makes someone a good person?
How do you react when someone is being aggressive?
Do you consider yourself a leader? Why or why not?
What makes you really mad?
How do you react when you have to take orders?
Do you work better by yourself or in groups? Explain.
What does community mean to you?
Do you believe that working together helps a group to survive? Explain.

Next, students decide what tasks and responsibilities must be undertaken on their island and who is going to do what. While I do give suggestions to groups who are struggling, it is a great learning experience for students to have to decide what they will need to do in order to survive. The responsibilities that students commonly come up with include building shelters, finding food, finding fresh water, harvesting coconuts for milk, exploring the island to see what is there, keeping a signal fire going for rescue, writing a large message in the sand that would be visible to planes, making sure that people are working, maintaining community relations, facilitating meetings, and organizing events.

About twice each week during our study of the novel, I give the students a problem that they have to solve in their "survivor" groups. Problems like the following are common.

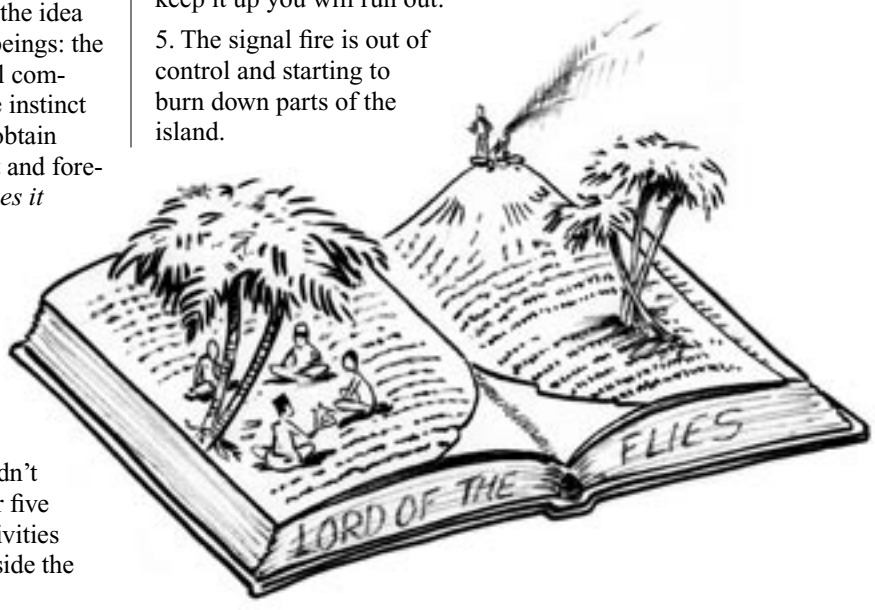
1. It has been raining for two weeks and the storm is destroying your huts.

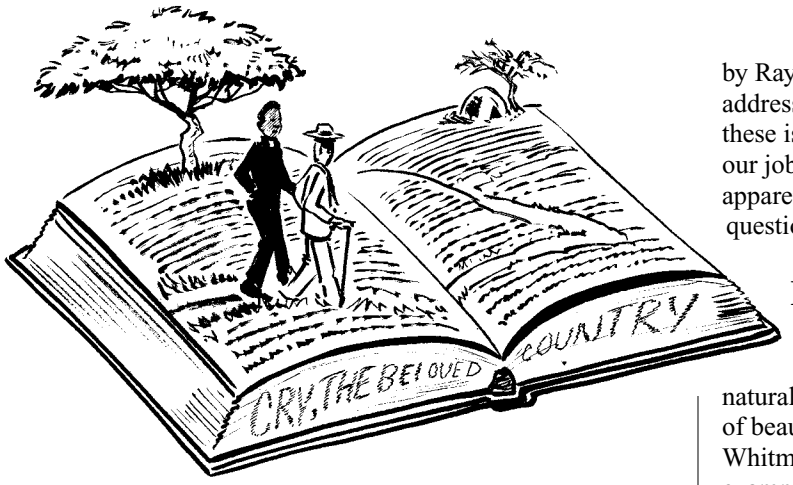
2. Someone in your group is stealing food while the others sleep.

3. The place that you decided would be the restroom is starting to smell and is attracting bugs and other creatures.

4. You're harvesting food faster than it is growing. If you keep it up you will run out.

5. The signal fire is out of control and starting to burn down parts of the island.





6. The water supply that you've been using has made two of you very sick.

7. You started fishing (or hunting) to survive, but you're finding that the animals are fewer in number and harder to find. You haven't found any animals in two days.

8. The weather has become so hot that you've left the beaches and can't come out of the forest without being severely burned or suffering from heat exhaustion.

I then have students use the library or Internet to find out how their problem is similar to current environmental problems or other challenges that humans are facing. Specifically, they have to look for ways in which these problems could be solved or may have been prevented. Groups then give presentations to the class about what they discovered and the solutions they have come up with.

While the foundation is being laid for a fundamental understanding of how communities cohere or dissolve and how human needs are directly connected to the environment, it is also possible to pick up on tangentially related issues. For example, early in the novel, the boys on the island forage for food from plants that grow around them, and it is a time of peace and cooperation. When they start hunting, the boys become violent, going beyond killing a pig for food to abusing it as well. This scene lends itself to discussion of the connection between animal abuse and human violence and to reading and discussing some of the many articles that have been written about this connection.[1]

Exploration of the perceived dichotomy between civilization and tribal life is also explored in such works as *Things Fall Apart* by Chinua Achebe and *Cry, the Beloved Country* by Alan Paton. Like *Lord of the Flies*, these novels present other issues that can be tapped as well, such as racism, poverty, violence, and colonialism. The environment and human anthropocentrism are addressed in *Ishmael* by Daniel Quinn, in which commonly held ideas such as "the world was created for man" are discussed and debunked in favor of the idea that humans are part of nature and are dependent on the Earth in ways that we are aware of, but carelessly continue to ignore. Quinn also debunks the belief by modern "civilized" societies that theirs is the only right way to live and that tribal societies should adhere to the same rules.

In addition to novels, there are many short stories that give voice to concepts and themes that are connected to social justice issues. Such stories as "A Sound of Thunder" by Ray Bradbury and "The Turtle" by John Steinbeck address issues of the environment explicitly. Whether or not these issues are explicit in a work (oftentimes they are not), our job as language arts teachers is to make the connections apparent to our students, or, better yet, ask them guiding questions so that they may find the links on their own.

Poetry and social justice

There is great opportunity and power in poetry. Poetry is the one place where we often see the natural world described in luscious detail and with a level of beauty that competes with the environment itself. Walt Whitman, Pablo Neruda, and Octovio Paz are just a few examples of poets whose works directly illuminate the beauty of the natural world. As with novels and stories, the themes, images, and motifs in poems can be drawn out and connected to larger issues. Poems that express a love of nature and sense of stewardship toward the natural world, such as this one by Emily Dickinson, are great springboards into reflection on one's own feelings concerning the Earth and other species:

If I can stop one heart from breaking,
I shall not live in vain;
If I can ease one life the aching,
Or cool one pain,
Or help one fainting robin
Unto his nest again, I shall not live in vain.

Richard Wright's haikus are also good examples of the way one's life and feelings are connected to and expressed through elements of the natural world:

I am nobody:
A red sinking autumn sun
Took my name away.

In the falling snow
A laughing boy holds out his palms
Until they are white.

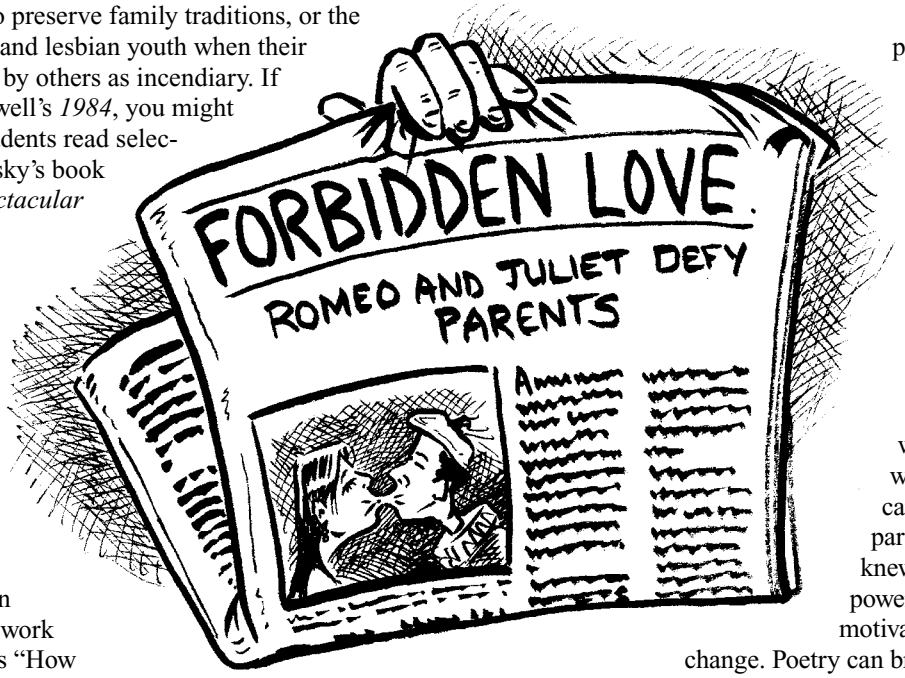
Students can extend their reading and writing of poetry beyond the classroom by publishing a book of their own poems, in which they speak out on issues of social justice or reflect on their personal connections to the natural world. This project could include a class discussion of environmentally friendly ways to reproduce the book: what type of paper to use, what "post-consumer content" is, how many books to print, and so on. Students could sell the books to raise funds for a local community project or nonprofit organization. If your administrators are open to it, they could also use sidewalk chalk to display their poetry across the campus, thereby piquing interest in both poetry and global concerns. In my classroom, each student chooses a poem (or a song with literary quality) to present to the class as a vehicle for teaching us about an issue and about a poetic device such as alliteration, allusion, or onomatopoeia.

Poetry can bring new realities into being, and reading a well-developed research paper can change the way we eat or where we shop.

Expository articles and social justice

Reading expository articles is a great way for students to improve their reading skills as well as prepare for discussions of how issues raised in a work of literature are connected to the real world. For example, if your students are studying *Romeo and Juliet*, you may wish to have them read articles that discuss teen suicide, teen relationships, pressures on young people to preserve family traditions, or the challenges faced by gay and lesbian youth when their relationships are viewed by others as incendiary. If your class is reading Orwell's *1984*, you might consider having your students read selections from Noam Chomsky's book *Media Control: The Spectacular Achievements of Propaganda*. As noted earlier, articles about the link between animal abuse and violence could be used to explore that theme in *Lord of the Flies*.

Students may also select expository articles for sharing with the class. Once a theme or issue has been introduced in a poem or work of literature, ask students "How does this theme connect to our lives or to the world today?" This requires them to think critically and make personal and real-world connections on their own. From there, students can search for articles and use the Socratic seminar method to raise questions and initiate class discussion. In this way, expository articles not only complement the study of literature, but also provide a basis for explicit discussions of things happening in the world today.



Writing and social justice

Encouraging students to explore social justice issues through commonly taught modes of writing, such as research, evaluative, persuasive, autobiographical, and reflective essays, is another way to engage them in deeper thinking about important global concerns. For example, if your class is reading *Frankenstein* by Mary Shelley, students could be assigned a research paper that explores a controversial topic related to scientific and technological "advancements," such as cloning, genetic modification, and stem cell research. Similarly, in a study of Margaret Atwood's *The Handmaid's Tale*, students might research and explore such topics as women's suffrage, gender roles, reproductive health and its connection to women's issues, abortion rights, and repressive governments.

Other modes of written expression, such as speeches and business letters, also afford opportunities to write about themes and issues studied in class. Students could write business letters to elected officials or to the heads of corporations and other organizations to express opinions or ask questions about controversial issues or perceived injustices. While teachers might share with students some examples of letters they've written, they can avoid manipulation by letting students choose what to write about and to whom. If students are struggling, ask them what issue is important to them and who they think could change that.

Literature, poetry, essays, letters, and speeches are means by which humans communicate with each other about life-changing experiences and they help us to see the world anew. A work of literature can validate a part of us we never knew existed, and a powerful speech can motivate us to make change. Poetry can bring new realities into being, and reading a well-developed research paper can change the way we eat or where we shop. Introducing students to these global concerns should not be a peripheral issue or afterthought in education; it should be the core of how and what we teach. If you teach English and choose to stay focused on the surface level of forms, themes, and historical context, you are robbing your students of a chance to make their own education more meaningful. Every poem or work of literature can be connected to present day social

justice issues. Our job as educators is to find these connections, let students explore them, answer questions, and provide support. If you do this, you will be amazed as you watch your students leap to new levels of engagement and meaningful learning.

Christopher Greenslate teaches English, Social Justice, and Journalism at La Costa Canyon High School in Carlsbad, California. Teaching materials for these courses are posted at his website <www.cmgreenslate.com>.

Note

1. See, for example, the resources concerning this connection at the websites of Teach Kind < www.teachkind.org> and the Humane Society of the United States <www.hsus.org>.

Discovering Lake Management: Getting Students' Feet Wet

by **Matthew R. Opdyke**

Heidi Opdyke

A student collecting algae for examining under a microscope.

TEACHING ABOUT lake management is an exciting way of getting students interested in the environment. It offers hands-on opportunities for students of all ages to learn about the biology and chemistry of lakes. This article offers instruction for three field activities that allow students to evaluate the health of a lake and learn the basics of lake management through a classroom debate.

Humans rely on lakes for many reasons, including drinking water, cropland irrigation, and recreation. Additionally, lakes provide habitat for a variety of aquatic life, such as fish, microscopic animals called zooplankton, aquatic plants, and algae. The dependence on lakes of such a diversity of aquatic life, not to mention humans and terrestrial organisms, suggests the need for proper management. In Canada, the Canada Water Act is the most comprehensive legislation governing the quality and use of water resources. In the United States, water quality is preserved by the Clean Water Act, and both countries support the Great Lakes Water Quality Agreement to preserve water quality in the Great Lakes. However, lake management does not begin or end with formal legislation. Managing a lake requires the collaboration of many individuals, from those whose activities directly affect the lake to experts in chemistry, biology, natural resource management, and socio-economics.

The most important concept to grasp when managing a lake is that lake management must begin in the watershed. A watershed is a specific land area that drains water into rivers, lakes, or other bodies of water. A lake is a reflection of its watershed because the nature of the landscape — its topography, geology, vegetation, and use — influences the types of materials that enter it. Whenever possible, watershed sources of pollution are treated before problems within a lake are addressed. Consider a case in which excess nutrients enter a lake via rivers draining an agricultural watershed, resulting in an uncontrolled growth of algae in the lake. It would be poor management to add herbicides to the lake as a way of controlling algae growth, because considerable amounts of herbicide would be required, along with continuous treatments throughout the growing season to prevent a recurrence. A more appropriate action would be to encourage farmers to reduce the amount of fertilizer applied to their fields or to construct wetlands and grass buffer strips along rivers to capture nutrients from surface runoff.

The most pervasive water quality problem in the world is eutrophication, or the presence of excess nutrients such as phosphorus and nitrogen that disturb the balance of aquatic life. Excess nutrients accelerate the growth of aquatic plants, particularly algae, which are faster growing and respond more quickly to changes in nutrients than do larger plants. An overabundance of algae reduces water clarity, and their decomposition by bacteria reduces oxygen levels in the

water. Another common and disruptive response to eutrophication is an increase in the presence of invasive plants. If invasive plants have already been introduced to a lake, an excess of nutrients can stimulate aggressive growth, allowing them to compete with and displace native plants.

The field activities proposed here concentrate on measuring three parameters associated with eutrophication in a lake: habitat resources, water quality, and algae diversity and abundance. In my experience, these activities are best conducted at a small lake, one less than 30 hectares in area, so that the teacher can keep an eye on more adventurous students. If there are enough teachers and assistants, supervision can be made easier by separating students into groups of three to five with an assistant to supervise each group. The activities are suitable for students of all ages, but with elementary and middle school students it is recommended that a teacher or assistant conduct the water quality tests. Some of the chemicals in the recommended test kits should be treated with caution, and the instructions may be difficult for young students.

Investigating Habitat Resources

Time: 1 hour

Materials: aquatic plant identification guide, Habitat Resources Worksheet (see example below)

Background

The presence or absence of lake habitat features largely depends on the condition of the shoreline and whether nutrients are entering the lake by way of a river. If the shoreline is wooded or if rocks have been placed along the bank to prevent erosion, an abundance of submerged wood or rocks could be present. Some aquatic insects attach themselves to the undersides of submerged wood and rocks to escape predatory fish. In shallow waters, the surfaces of wood and rocks that are exposed to sunlight provide substrates for the colonization of algae, which are themselves fed on by several species of fish and aquatic insects.

In areas where nutrients enter the lake by way of a river and sunlight can penetrate to the lake bottom, aquatic plants will often grow in greater abundance than in deeper waters further from the nutrient source. Aquatic plants provide shelter from predators and serve as a food source for a diversity of aquatic life, such as the common carp and aquatic insects. In addition, young fish often find shelter in areas of dense plant growth, making aquatic plants ideal breeding grounds for many species of fish. However, an overabundance of aquatic plants or the presence of invasive plants may be detrimental to aquatic life. Invasive species such as Eurasian watermilfoil *(Myriophyllum spicatum)*, which is found throughout North America, may displace native plants and spread so extensively that fish breeding grounds are lost and food supplies diminished.

The methods frequently used by lake managers to curb the growth of invasive plants include treatment with herbicides, physical removal, and biological controls. A systemic herbicide called fluridone is one option in the control of Eurasian watermilfoil, but it is non-specific and therefore has the tendency to kill native plants as well. More selective controls are physically removing the plants by hand or introducing weevils and beetles that feed specifically on watermilfoil. The success of these methods depends on the extent of watermilfoil growth and the investment in getting rid of the invasives. Physical removal must be done at least annually or watermilfoil will reestablish from seeds buried in lake sediments, whereas biological controls may be self-sustaining once the weevils or beetles are established and reproducing.

Introduction

In this activity, students identify aquatic plants and assess habitat features at three different sites along a lakeshore. This simple observational task is a critical step in identifying potential threats to a lake. The locations of the study sites, as well as the area of shoreline and lake to be observed, largely depend on accessibility and the age of students. Preferably, the study sites should be within walking distance of each other and have features that provide diversity in habitats, such as shoreline development, woodlands, or proximity to river inlets. A shoreline length of 15 meters and a distance out into the lake of 6 meters is sufficient for most sites.

The most challenging part of this activity is identifying the plants. It is essential to have a well-illustrated key to aquatic plants, such as *Through the Looking Glass: A Field Guide to Aquatic Plants* by Susan Borman *et al*. Information on aquatic plants can also be researched on the Internet:

Habitat Resources Worksheet

1. What are the two most abundant plants?
2. Are there any invasive plants? If so, list the names of invasive plants.
3. Do invasive plants outnumber native plants? If so, are invasive plants 25, 50, 75, or 100% more abundant than native plants?
4. Is water clarity impaired by the presence of algae on the water surface?
5. Is there sufficient plant cover to shelter fish from predators, and what type of plant provides the best shelter?
6. Besides plants, are there any other types of shelter for aquatic life along the lakeshore (e.g., large rocks)?

Texas A&M University, for example, has an excellent plant identification guide with pictures and descriptions of the ecology of aquatic plants (see <http://aquaplant.tamu.edu/>). It is also useful for the teacher to visit the lake before the field trip to get an idea of what plants are present. You may wish to construct a field guide specific to your lake by photographing the plants and pasting the photographs on paper adjacent to the plant names. If you have access to waders, students could collect plants, which would make identification easier.

Procedure

1. Upon arriving at the lake, organize students into groups and give a brief introduction to the land use surrounding the lake and the importance of investigating habitat resources, water quality, and algae when considering how best to manage a lake.

2. Provide each group of students with an aquatic plant identification guide and a worksheet for each study site (see Habitat Resources Worksheet).

3. Explain that the groups are to rotate to three different study sites along the lakeshore. At each site, they are to observe the features of the lake habitat and answer the questions on the worksheet.

4. When the groups have completed the habitat study, either collect the completed worksheets for safekeeping or have students keep them until the end of the field trip.

Testing Water Quality

Time: 1 hour

Materials: table or other flat surface, water quality test kits or strips, plastic bottles, boat or waders, one Water Quality Data Sheet for each sampling site (see example)

Background

Excess plant nutrients, particularly phosphorus and nitrogen, can lead to unhealthy growth of aquatic plants and algae in lakes. Several forms of phosphorus (organic phosphorus and phosphate) and nitrogen (organic nitrogen, nitrate, and ammonium) can be found in lakes. The organic forms of these elements are contained in aquatic life and other organic material, such as leaves that are washed into the lake from the surrounding watershed. Of the inorganic forms, ammonium is rarely measured to any significant level in the surface waters, unless there is a source of ammonium pollution entering the lake. Concentrations of phosphate and nitrate are therefore the water quality indicators used to identify eutrophication.

Boone and Crockett Club Foundation

Under healthy conditions, the concentration of phosphate in freshwater lakes is typically lower than that of nitrate. For this reason, phosphate is the better indicator of eutrophication because an increase in phosphate will yield a quicker growth response in algae and aquatic plants than will a similar increase in nitrate. However, high concentrations of nitrate may indicate that nitrogen fertilizers are being washed from croplands into rivers in the watershed upstream of the lake. Generally, concentrations of phosphate and nitrate that exceed 0.1 and 0.5 milligrams per liter, respectively, are high nutrient levels that could result in eutrophication.

Introduction

Phosphate and nitrate concentrations can be measured using nutrient test kits, which are available at many science supply stores. These are portable kits, unique for each nutrient being measured, containing step-by-step directions and all necessary supplies. The directions require the user to add a small packet of chemicals to a water sample, producing a color change. The color of the water is then compared to a color key on a chart indicating nutrient concentrations. Students of high school age or older will find the steps are easy to follow, but younger students may require closer supervision. An alternative to test kits is test strips, which require the user to dip a chemically treated strip into a water sample. Test strips are a better option for younger students and are typically cheaper than test kits. The disadvantage is that they are less accurate than the test kits.

Procedure

1. Identify a central location among the study sites (the same sites used for investigating habitat resources) and set up a water quality testing station consisting of a table, water collection bottles, a test kit or test strips, and a Water Quality Data Sheet.

Water Quality Data Sheet

Sample Location	Time of Sampling	Nitrate Concentration (mg/L)	Phosphate Concentration (mg/L)
river inlet	10:10 AM	1.1	0.3
forested shoreline	10:20 AM	0.4	<0.1
open shoreline for recreation	10:30 AM	0.7	<0.1

Matthew Opdyke

Heidi Opdyke

Left: Students preparing to collect water samples from the center of the lake using a canoe. Right: At a water quality testing station set up in the field, students use chemical test kits to measure nitrate and phosphate concentrations in lake water samples.

2. Have each group of students follow instructions for submerging a water collection bottle beneath the lake surface to collect water samples from each of the three study sites.

3. At the water quality testing station, have each group analyze their water samples and record the phosphate and nitrate readings on the data sheet. This activity is the most demanding of the three because it requires attention to detail when conducting the water tests. If the groups have different results due to errors in analyses, the teacher will need to determine which measurements are the most accurate.

4. As an extension of this activity, students could use a long-handled dipper or similar apparatus to collect water samples at different depths at the center of the lake. In deeper water where sunlight does not penetrate, nutrient concentrations may be greater if algae are consuming the available surface nutrients.

Identifying Algae

Time: 1 hour

Materials: compound microscope and slides, plastic pipettes or straws, plastic water collection bottles, boat or waders, algae identification guide, Algae Identification Worksheets

Background

The purpose of this activity is to introduce students to the lake's microscopic life by having them collect and view algae under a compound microscope. Through this activity, many students will get their first peek at a community of organisms that are a major food source for aquatic life and are the backbone to the survival of many fish.

In lake management, algae are seen as beneficial because they are an important food and energy source for zooplankton and fish. However, too much algae growth could indicate that a lake is eutrophic. An overabundance of algae can clog water treatment facilities; cloud the water, thereby stunting aquatic plant growth; and produce undesirable tastes and odors. Additionally, when excess algae die and settle to the lake bottom, they are decomposed by bacteria, causing a reduction in oxygen concentrations that can suffocate fish and bottom-dwelling organisms. Low oxygen is a common problem in water bodies throughout the world, including Lake Erie in the Great Lakes, the Gulf of Mexico, and the Gulf of St. Lawrence.

On average, lakes have more than 100 species of algae annually, of which 8 to 10 species account for 90 percent of the total algae population. The abundance and diversity of algae fluctuate with temperature, sunlight, nutrients, and flow. In winter, the most common groups are dinoflagellates, small green algae, golden-brown algae, and some diatoms. The fast-growing diatoms dominate in spring; and green algae, dinoflagellates, and cyanobacteria are the most abundant in summer. Cyanobacteria frequently dominate in eutrophic waters when phosphorus exceeds nitrogen concentrations. This is due to cyanobacteria's ability, unique among algae, to convert atmospheric nitrogen to a biologically available form of nitrogen. This process is called nitrogen fixation.

In many cases, algae growth is strongly dependent on nutrient concentrations. In freshwater, phosphate is generally the nutrient that causes excessive algae growth. Phosphate originates from such sources as wastewater treatment plants, fertilizers applied to cropland, and animal waste. When high phosphate concentrations originate from a wastewater treatment plant, management is directed toward reducing concentrations in the effluent. For example, constructing wetlands between the wastewater outflow and the receiving body of water allows aquatic plants to strip the phosphorus from the water. If the situation is more complex, with multiple sources of nutrients throughout the watershed that cannot be treated directly, methods must be found for reducing algae abundance within the lake. Some options are to increase flow through the lake to flush algae out a river outlet, to apply herbicides, and to grow wetland plants along the shoreline that reduce sunlight penetration into the water and absorb phosphorus.

Algae Identification Worksheet		
Sample Location	**Time of Sampling**	**Groups of algae and their abundances per milliliter of water**
river inlet	10:10 AM	green algae - 23
		diatoms - 11
		cyanobacteria - 5

Procedure

1. Have students collect water samples. This can be done in the same manner as for the water quality testing, and simultaneously if time is a concern. If possible, sample from both the open water and along the shoreline, as this may produce different types of algae. For example, diatoms are more tolerant of shade than green algae. The volume of the sample is not critical: only a milliliter or two is needed for examination under a compound microscope.

2. If an electrical outlet is available at the field study site for illuminating samples on slides, students can view the algae in the field. Alternatively, have students observe and identify the algae in the classroom after the field trip. Use a plastic pipette or straw to transfer a drop of water to a microscope slide. One drop of water roughly equals one milliliter, so if students count the number of algae on their slide they can estimate the density of algae, expressed in abundance per milliliter. Examining algal density may prove beneficial if there are observable differences in water quality along the lakeshore (e.g., adjacent to a forest versus a river inlet where the water has a high phosphate concentration).

3. Have students identify the algae in their samples by group (e.g., green algae, cyanobacteria, diatoms). This exercise usually requires the aid of a teacher or assistant who has a basic skill in identifying algae using pictures. The Internet provides abundant resources for learning about algae. For example, Microscopy-UK offers an excellent on-line identification guide for algae groups. For a hard-copy reference, *A Beginner's Guide to Freshwater Algae* by Belcher and Swale is a serviceable identification guide. (See Resources list.)

4. Have each group record the names and density of each type of algae they identify, organized according to where the samples were collected (see Algae Identification Worksheet).

Discussion of results

At the end of the field trip collect all worksheets. Unavoidably, errors in plant and algae identification and water quality measurement and recording will occur. After checking the worksheets for accuracy, choose the most reliable data to use for a classroom discussion. The discussion should be initiated by the teacher, allowing students to interact with comments and questions while the teacher presents the results from the field trip. Once the results have been presented, the discussion can focus on how the results help determine the health of the lake. For example, a general absence of invasive plants, a diversity of algae (more than two groups), and sufficient habitat cover for aquatic life indicate a healthy lake. However, if floating mats of algae persist throughout the lake, and phosphate and nitrate concentrations are greater than 0.1 and 0.5 milligrams per liter, respectively, the lake may be eutrophic.

There are a variety of factors beyond those investigated in these activities that could lead to a lake's being assessed as healthy or unhealthy. The Internet provides many sources of information on how lake health is perceived and what it means for both humans and aquatic life (see Resources list). Additional discussion questions that might lead to interesting conversations include: How are aquatic life or humans affected by poor water quality? What additional tests could be conducted to determine the health of the lake? and How might water quality measurements and algae vary in different seasons?

Lake Management Debate

After discussing the results, separate the class into four or five groups. Assign each group a role to play in a discussion of how their lake should be managed either to maintain or to improve its health. A variety of roles could be assigned, such as a farmer growing crops upriver from the lake, a mayor of a town that is located adjacent to the lakeshore, a fisherman, and a manager of a wastewater facility that discharges into the lake. Provide each group with a brief explanation of their job and ambitions (see below). Then give each group 10 to 15 minutes to prepare a 5- to 10-minute presentation to the class on how the lake should be managed from their point of view. The remaining class period could be spent having the groups decide on a lake management action plan that would either be of most benefit to the lake or satisfy all of the roles included in the discussion.

Role descriptions

The farmer's priority is producing the highest corn yield possible, which requires the application of nitrogen and phosphorus fertilizer on his fields. If the fertilizer is not applied, the crop yield will decline by 50 percent and the farmer will go bankrupt in five years. The lake is located one mile downstream from a river that drains his land and transports any fertilizer washed from the fields during rainstorms into the lake. The farmer wants to do his best to maintain the health of the lake. However, his priority is making a profit in order to support his family, and he cannot cut back on fertilizer.

The mayor serves the public and must make decisions based on the needs of a large population. The lake serves as a water supply and offers recreational opportunities that provide tourism revenue for the nearby town. Therefore, good water quality is imperative. The mayor recognizes that managing the lake is a necessity, but wants to find a way to satisfy everyone in the lake's watershed.

The fisherman does not live within the lake's watershed, but frequently enjoys catching and eating fish from the lake. He supports all efforts at maintaining or improving the health of the lake, particularly since there are few other lakes in the area to fish from.

The manager of the wastewater facility has little incentive to improve the health of the lake. She realizes that nutrients are being discharged into the lake from the wastewater facility, but any efforts to reduce the nutrient discharge would cost her money. All of the waste being treated at the facility originates in the nearby town, and the manager recently spent a large sum of money enlarging the facility to accommodate the growing town.

Management options

There are numerous management options that students might consider. Depending on the flexibility of the group's attitude, the farmer can be stubborn and refuse to take any action or can apply for government grants to grow grass buffer strips along the river. Buffer strips can absorb phosphorus and nitrogen before they enter the river and flow downstream into the lake. An alternative is to grow a crop other than corn, one that is not dependent on fertilizer.

After hearing the farmer's decision, the mayor may respond by passing laws to limit fertilizer applications if the farmer is stubborn. Alternatively, the mayor could choose to address any problems at the lake instead of at the source. In some cases this becomes a necessity, such as when there is a strong coalition of farmers in the watershed capable of blocking any laws that require a reduction in fertilizer applications. Management options for reducing nitrogen and phosphorus in the lake could include diverting some of the inlet flow from the river around the lake or constructing wetlands at the river inlet to absorb nutrients before they enter the lake.

Management options offered by the fisherman may include volunteering his time to physically remove invasive plants or, if there is excessive algae growth, lending his expertise in identifying what species of fish consume large amounts of algae. Unfortunately for the fisherman, he does not live in the watershed. Therefore, the farmer, mayor, and wastewater facility manager may choose to ignore his opinions if improving the health of the lake becomes costly.

Although the manager of the wastewater facility has little interest in the health of the lake, she realizes that others will act and that the management action plan may be detrimental to her business if she does not recommend any alternatives. One alternative may be to increase taxes in the town to pay for constructing wetlands that would remove nutrients from the effluent before it enters the lake. This might be acceptable to the mayor and taxpayers, considering that the manager's facility is treating their waste. The manager could also apply for government grants to improve methods of removing nutrients from the waste effluent or work with the farmer to transport some of the nutrient-laden waste to his fields for fertilizer.

The number of different roles and management options is endless. Discovering them and developing ideas on lake management is an activity that gets students involved in thinking about how communities interact about water issues and the importance of preserving natural resources. Together, the field trip and the classroom debate give students an introduction to the methods and challenges of lake management. The field trip is an excellent opportunity for hands-on learning about physical, chemical, and biological aspects of lakes, while the classroom debate utilizes their results from the field trip to think critically about how we manage our resources and the difficulties in addressing everyone's opinions.

Matthew R. Opdyke is a former visiting assistant instructor at the University of Illinois in Champaign-Urbana, Illinois, and is currently an environmental scientist at Michigan State University in East Lansing, Michigan.

Resources

Aquatic Plant Identification

Belcher, Hilary, and Swale, Erica. Institute of Freshwater Ecology. *A Beginner's Guide to Freshwater Algae*. The Stationery Office Books, 1977.

Borman, S., R. Korth, J. Temte, and C. Watkins. *Through the Looking Glass: A Field Guide to Aquatic Plants*. University of Wisconsin Press, 1997.

Microscopy-UK. *Pond Life ID Kit*, on-line at <www.microscopy-uk.org.uk/> (follow link to algae section of the on-line Pond Life ID Kit).

Texas Cooperative Extension, Department of Wildlife and Fisheries Science, Texas A&M University. *AquaPlant*, on-line plant identification guide with pictures and descriptions of the ecology of aquatic plants, <http://aquaplant.tamu.edu/>.

Lake Management

Aquatic Ecosystems by U.S. Environmental Protection Agency <www.epa.gov/ebtpages/wateaquaticecosystems.html>. Information on aquatic environments and the effects of water pollution.

Great Lakes Information Network (GLIN). Teach.GLIN.Net, <www.great-lakes.net/teach/>. Background on the Great Lakes and lake management issues in the region.

Herbert, P.D.N., Ed. *Canada's Aquatic Environments*, <www.aquatic.uoguelph.ca/>. Educational materials on aquatic life and the environments they frequent.

Washington State Lake Protection Association. *The Washington Lake Book*, <www.ecy.wa.gov/programs/wq/plants/lakes/book_contents.html>. Resource for understanding lakes, indicators for identifying water quality problems, and management options.

All photography by Hilary Inwood

Growing Art in School Gardens

Using the school garden as inspiration, supply cupboard, and exhibition space for students' art

by **Hilary Inwood**

SOMETHING IS GROWING in school gardens in North America, and it's not just the plants. Supporters of schoolyard naturalization have found an unusual way of capturing and sustaining enthusiasm for the garden by having students "plant" art in their school gardens in the form of murals, sculptures, mosaics, and mazes. This innovative approach to naturalization has teachers and students using their schoolyards as sources of natural materials and inspiration for their artworks, as well as exhibition sites. As a teacher educator and parent volunteer involved in the blossoming of an artistic garden at a Toronto elementary school, my aim is inspire you to take a fresh look at your schoolyard and "grow" some art in the garden to cultivate a unique set of benefits for your school and community.

The relationship between art and gardens is not new, as artists have long been involved in designing gardens as well as recording their beauty through drawings, paintings, prints, and photographs. Those who have taken a trip to the gardens of Versailles or to Monet's garden at Giverny have a deep appreciation of the benefits of these artistic interventions in nature. Yet until recently few educators have considered fostering a relationship between student artists and their school gardens. Fortunately, the growing trend toward schoolyard naturalization has planted ideas, as well as trees, in the minds of many educators. For those of us in art education, school gardens are inspiring environments in which to nurture our art programs. By using the garden as a source of images and materials, as well as a site for artistic intervention, we are helping our students develop artistic skills and aesthetic sensibilities, while creating an intriguing space for curriculum integration. Most importantly, we are deepening our students' sense of place, an important step in developing their ecological literacy.

My involvement in schoolyard art was first inspired by an artistic garden in a small park outside my classroom at


Left: Students working on the Hillside Garden Mural at Runnymede Public School. Right: Hillside Garden mural closeup.

the University of Toronto. Situated at a busy intersection in the heart of the city, the park features a nature-inspired installation by local artists Susan Schelle and Mark Gomes. By integrating an existing grove of trees with grassy berms, rock benches, and sculptural elements such as oversized granite dominoes and sculpted metal leaves, these artists have created a peaceful oasis that encourages students and faculty to reflect on the relationship between nature and culture in urban environments. My art classes develop their critical thinking skills by interpreting the installation, and use the garden to study plants for drawings and paintings and to collect natural materials for collage, printmaking, and papermaking. Some have even created their own artworks to place in the garden in response to the permanent installation.

Excited by the multiple uses of the garden, I approached a local public school with a proposal for adding students' art to their naturalized garden. Four years later, the schoolyard of Runnymede Public School boasts five permanent installations of art created by students from kindergarten to Grade 8. The works include a set of six door murals, two pathways made of hand-cast concrete garden stones, a large entrance mural, a 20-foot-long wall mural, and a growing series of fence paintings. These works collectively tell the story of the garden: one shows the garden in the different seasons, another captures its wildlife and student life, and yet another shows the life cycle of the butterfly. Students incorporate these artworks into games at recess; and teachers use them to enhance learning in science, visual arts, and language arts. The student artists involved in their creation proudly show them off to classmates and parents; other students beg to be included in the next art project. Their influence can also be seen inside the school, where two new nature-inspired installations have recently appeared on interior walls.

Other benefits are of a more practical nature. There has been a decrease in graffiti on the doors and walls where the art now resides — even graffiti vandals appear hesitant to tag good art. This has reduced cleanup work for the school caretakers, who are impressed with the way the art has improved the overall appearance of the schoolyard. It has also helped to build a sense of community among parents who have assisted with each project: new friendships have been formed, and the adults feel they have contributed to their children's education. Overall, the benefits are well worth the costs, which are primarily those associated with creating, installing, and maintaining each artwork.

Through these projects I have come to understand that there are three main ways to use a school garden for art: as an image bank, as a source of materials, and as a gallery. What follows is a description of each to inspire you and your students to "grow" some art in your own school garden. Use these as starting points, and remember that in art-making cross-pollination is a sign of a fertile mind, so be creative in mixing ideas and techniques to meet the needs of your students and schoolyard.

School garden as image bank

A school garden is a teacher's best response to the student who says forlornly, "I don't know what to draw." A plethora of images is available in the garden year round to inspire wonder and excitement in even the blankest of minds. Before they make any art, however, have students just look around. Ask them to go on a treasure hunt to search for all of the flowers, insects, plants, or rocks they can find. Have them use a viewfinder made of cardboard to look at long vistas as well as the tiniest of details. Have them search for the basics of visual communication — the elements of design such as lines, colors, shapes, and textures — in plant life as well as in the built components of the garden. Have them talk about what they see, as this will help them to build a language for talking about their own art in future.

Once students have done some careful observation, have them draw what they see: a leaf, a rock, a snail, or an icicle. Keeping a visual journal is a wonderful way to develop skills of observation and drawing, which are important in both science and art. Just as in learning to read or

to play a musical instrument, students should be encouraged to take adequate time to draw and be reminded that their drawing skills will improve only with practice. Provide them with some basic instruction such as how to draw in contour and gesture styles, or how to shade and crosshatch. If you have reluctant artists ("I can't draw," they will protest), place overhead transparencies directly on the ground and have them capture a bit of the garden by tracing what they find. Have students experiment with a variety of materials and tools — draw with pencils, pens, and watercolors; make rubbings of leaves with pastels; draw on a rock with charcoal; create solar drawings on light-sensitive paper. Their journals will quickly grow to inspire and inform the next in-class art project.

...we are helping our students develop artistic skills and aesthetic sensibilities, while creating an intriguing space for curriculum integration.

As students' skills develop, introduce them to examples of professional artists' images of gardens: the history of art has developed by building on the images of others. Move beyond Monet by showing them Albrecht Durer's highly detailed drawings of plants, Georgia O'Keefe's vivid paintings of flowers, Emily Carr's pastels of soaring trees, or Ansel Adams' majestic photographs of nature. Have them talk about what they see, and how the artists used the elements of design to interpret their visions of nature. Ask them to choose their favorites, or to incorporate aspects of these styles in their own work. Build a class library of these images to inspire students to continue looking and creating; after all, a picture is worth a thousand words!

School garden as art store

You need look no further than the school garden to stock your art supply cupboard. With a bit of advance planning, your garden will be a bountiful source of materials to spice up your art program. Leaves are a classic in this regard: with their multitude of shapes, sizes, and colors, they are great for rubbings, paintings, prints, and collages. Along with flower petals and grasses, leaves can also be terrific additives to pulp for papermaking. Scottish artist Andy Goldsworthy shows what a little imagination can do with this natural material: he arranges leaves into glowing color wheels, delicate weavings hung from branches, and exquisite paintings floating on water. Mud, stones, and snowballs become similarly magical in his hands. British artist Richard Long demonstrates a different kind of creativity with natural materials, making patterned rock sculptures to track his journeys and creating mud drawings using nothing but his feet. What could be more fun for children than squishing mud between their toes in the name of art?

Natural materials such as leaves, twigs, feathers, and grasses have tactile qualities that appeal to children and help to broaden their sensory responses to school gardens. Used for sculptures and weavings, these materials bring olfactory and auditory dimensions to artworks and trigger memories of the garden even when displayed indoors, deepening students' experience of and connection to place. Ice, snow, and soil can bring a distinct temperature and moisture level to an artwork, forcing students to think creatively about the use of these materials. In many cases their ephemeral nature will encourage students to revel in the process of art making rather than obsess about the final product. Capturing an ice sculpture in a photo before it melts is usually enough to satisfy any young Michelangelo, especially if the photo gets posted on the school's website.

With some selective planting and scavenging, you can create all-natural pigments for art projects using garden ingredients. Berries, onions, and cabbages can be grown to create a range of colors: boil the plant materials down to concentrate the color or dry and pulverize them. Coffee grounds, tea leaves, spices, and soil can be used in similar ways. Blend the pigments with water, eggs, alcohol, or gel medium (a type of clear acrylic paint) to get the desired effects on paper, fabric, wood, or stones. Or load these pigments into ice cube trays to make frozen markers or into spray bottles for making graffiti art on snow.

School garden as art gallery

Finally, consider transplanting some of that great garden art into the schoolyard permanently. At Runnymede Public School, drawings of the garden by primary students served

Ideas for Growing Art in School Gardens

Handmade concrete paving stone in the garden stones path at Runnymede Public School.

- Plant vegetables and flowers to harvest for materials
- Cast concrete patio stones or mosaic stepping stones
- Make ceramic tiles for mounting on walls, fences, or garden stakes
- Paint murals on walls, doors or windows
- Create asphalt paintings (maps, games, labyrinths)
- Make fence paintings (paintings on wood and wired to a chain link fence)
- Build rammed earth sculptures
- Carve engravings in rocks
- Grow a maze using grasses and stepping stones
- Make chalk and pastel drawings on walls or sidewalks
- Create fence weavings (weaving natural or found materials into fencing)
- Build artistic bat or bird houses
- Engrave or paint large garden stones

as the basis for door murals leading from the yard into their classrooms; every day, proud artists see their drawings writ large for others to admire. Paintings, prints, and photographs can translate equally well into wall or window murals, bench or asphalt paintings, cast-concrete paving stones, and mosaic or clay panels. Individual artworks, such as paintings created on small pieces of fencing or on birdhouses, look impressive if installed as collections in one area. Collaborative large-scale installations, such as murals, mosaics, or concrete stone pathways, develop students' co-operative learning skills by involving them as a group in the work's design and creation. Hiring an experienced artist or art educator to facilitate these types of large-scale installations is of great benefit; such individuals not only bring a wealth of technical expertise, but also provide a unique learning experience for the students who work alongside them.

Considerations of safety and maintenance should play a role in determining the nature of permanent installations. Artworks should be inflammable, and securely attached to a surface to avoid becoming flying or tipping hazards. Unfortunately, little can be done to make them graffiti-proof, although a layer or two of a protective UV-resistant coating can make some graffiti easier to remove. Maintenance related to this also needs careful consideration: for example, if an artwork is vandalized, who will be responsible for cleaning or repairing it?

Not all of the installations in the garden need be permanent, however. Letting nature lend a hand to the transformation of artworks over time can be fascinating to watch; artists such as Andy Goldsworthy, Roy Staab, Chris Drury, and Diana Lynn Thompson have built their careers on this approach. Through the design of plantings in a school garden, it is possible to create wonderful combinations of color, shape, and texture over the course of a year. Using the bounty of materials left in the garden after the summer season (such as dried grasses, twigs, flower petals, and garlic tendrils) to create site-specific temporary artworks is equally satisfying. In the Runnymede garden, a rich harvest of grapevines each autumn provides material for wreaths; this year the vine may form the basis for fence weavings as well.

No matter which approach you take to planting art in your school garden, be sure to follow some of the basic tenets of art education: ensure that the activities and materials are age-appropriate, provide a range of materials and techniques to inspire experimentation, focus on process as well as product, and stimulate students' imaginations by showing examples of others' art. Above all, encourage creativity and individuality; if all of the students' garden art looks the same at the end of a lesson, something has gone amiss! And once you have planted the seeds, stand clear and see what takes root — art will be sprouting in your classroom as well as in the school garden, demonstrating that your students are growing and learning in ways you've never dreamed of!

Hilary Inwood teaches art education in the Initial Teacher Education program at the Ontario Institute of Studies in Education at the University of Toronto. Her research focuses on using art education to develop ecological literacy.

Resources

Gardening Artists

Introduce students to the works of artists such as Andy Goldsworthy, Maya Lin, Richard Long, Ian Hamilton Findlay, Chris Drury, Alan Sonfist, Roy Staab, Isamu Noguchi, Susan Schelle and Mark Gomes, James Pierce, Walter de Maria, and Diana Lynn Thompson. Information about many other artists who have worked in and with gardens and other natural environments can be found on the Green Museum website at <http://greenmuseum.org/>.

Artistic Gardens

Many urban communities are growing or enhancing their own artistic gardens with innovative plantings, pathways, sculpture, or artistic installations. Some are legendary — think of Central Park in New York City or the Tuileries in Paris — while others are quietly waiting for you to find. To stir your imagination, here are a few examples of Toronto parks that take artistic approaches; look for the ones in your community by contacting your local parks department for more information.

The Music Garden <www.city.toronto.on.ca/parks/music_index.htm>
This garden, situated on the shore of Lake Ontario, was designed in conjunction with cellist YoYo Ma and inspired by one of Bach's suites for cello. It is a true integration of art, music, and landscape design.

Spiral Garden <www.bloorviewmacmillan.on.ca/Spiral/>
A wonderful garden that encourages children with special needs to create and exhibit their art in a natural setting.

Yorkville Park <www.crave.com/yorkville/ypark-tour.html>
An urban park that presents native-plant environments in creative ways.

Cloud Forest Conservatory
<www.city.toronto.on.ca/parks/parks_gardens/bayadelaidegdns.htm>
Squeezed into the heart of Toronto's concrete jungle, this lovely oasis features a waterfall, raised pathways, a plant conservatory, and a large-scale relief mural to celebrate the heritage of the area.

Garden Artworks

These websites offer a bounty of ideas for making garden-related art. Some describe projects made by professional artists, while others offer ideas that teachers can replicate with their own students.

<www.communityarts.net/archivefiles/environment/index.php>, Community Arts Network — Arts and the Environment. Articles and news on community eco-art.

<www.ecoartspace.org/introduction.htm>, Ecoart Space. Features the work of international artists creating art that inspires a sustainable relationship between humans and the natural world.

<www.evergreen.ca/en/lg/designideas.html>, Evergreen. Instructions for making murals and mosaics in the school garden. Follow the link to the PDF file "Murals and Mosaics" under "Artistic Elements."

<www.enviro-explorers.com/kidsprojects/decorativestones.htm>, Iowa Department of Transportation Enviro-Explorer's Club. Instructions for making decorative garden stones.

<http://greenmuseum.org/>, Green Museum. Features environmental art and artists.

<www.kidsgardening.com/themes/art1.asp>, Kids' Gardening. "Bringing Art to Life in Schoolyards" includes stories of a variety of schoolyard art projects.

<www.thetreemuseum.ca/>, The Tree Museum. A photo gallery of outdoor art installations.

Readings

Carlson, Laurie. *Ecoart! Earth-Friendly Art and Craft Experiences for 3- To 9-Year-Olds.* Williamson Publishing, 1992.

Diehn, Gwen, *et al. Nature Smart: Awesome Projects to Make with Nature's Help.* Sterling Publishing, 2004.

Kohl, MaryAnn, and Gainer, Cindy. *Good Earth Art: Environmental Art for Kids*. Bright Ring Publishing, 1991.

Luxbacher, Irene. *The Jumbo Book of Outdoor Art*. Kids Can Press, 2005.

Matthews, Clare. *Great Gardens for Kids*. Sterling Publishing, 2002.

Needham, Bobbe. *Ecology Crafts for Kids: 50 Great Ways to Make Friends With Planet Earth*. Sterling Publishing, 1999.

Resources

Reviewers: Debra Bridgman, Alan Crook, Gary Fuhrman, Tim Grant, Judy Halpern, Clifford Knapp, Jennifer Kobylecky, Jessica Kratz, Laura O'Brien

Cultivating Compassion

Cultivating Compassion is a series of three humane education teachers' guides, with activities for Grades 3-5, 6-8, and 9-12, developed by the Farm Sanctuary, a unique farm-animal rescue and protection organization that operates sanctuaries in New York and California. Each guide introduces the Farm Sanctuary and offers five lessons that educate students about the often harsh lives of animals raised in factory farm settings. The activities encourage students to brainstorm ways to make a difference in the lives of these animals, even if it's just by making small changes such as eating meat once or twice a week instead of every day. Accompanying each guide are 14 large photos (8 x 10"), four of conditions in factory farms and ten of rescued farm animals. Also available is a 19-minute film titled *My Friends at the Farm*, suitable for Grades 3-6, which tells compelling stories of rescued livestock, such as Queenie the cow, Bess the chicken, and Hilda the pig. On screen, children share their misconceptions about these animals and learn the real story: that pigs aren't dirty, cows have great memories, and chickens have feelings. These resources will strike a chord in you and your students, making it clear that the humane treatment of farm animals is just as important as the humane treatment of pets or people. – *(JKobylecky)*

Farm Sanctuary, 2001. Curriculum guides US$7 each; film (video/DVD) US$10. Both are free to teachers upon request and the guides are also downloadable at the website. Farm Sanctuary, PO Box 150, Watkins Glen, NY 14891, (607) 583-2225, <www.farmsanctuary.org>, e-mail info@farmsanctuary.org.

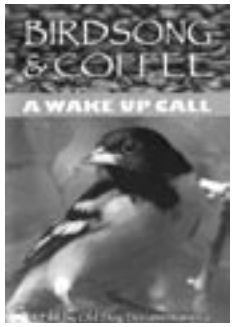
Media Empowerment Kit

Adbusters Media Foundation probably needs no introduction to media literacy teachers who have tried to help adolescents develop critical thinking skills and "break out of the media consumer trance." Their specialty is subverting the advertising industry using its own tools and techniques — for instance, producing slick TV ads urging viewers to turn off the TV. Their *Media Empowerment Kit* challenges classroom teachers to be equally creative and subversive, and provides a variety of materials to assist them. These include some of Adbusters' classic spoof ads in poster and calendar formats, a special media literacy issue of *Adbusters* magazine, and (on DVD) video ads, stills, and a music track. A three-ring binder contains 43 lessons aimed at encouraging students to kick their addictions to TV, cars, alcohol, greasy fast food, and other consumptive fashions. The lessons are grouped under three headings: Explore your Mental Environment, Explore Your Physical Environment (including a calculation of ecological footprint), and Create Your Own Meaning. This last section includes ideas for do-it-yourself activist campaigns, with guidelines for producing tools such as TV ads and "seed bombs" (for greening urban waste spaces). There should be something here for every level of high school. – *(GF)*

Adbusters, 2005, C$125 plus $12 shipping from Adbusters, 1243 West 7th Ave., Vancouver, BC V6H 1B7, (604) 736-9401, <www.adbusters.org>.

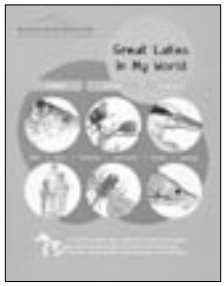
Birdsong and Coffee

The remarkable documentary *Birdsong and Coffee* is a must-see, even for those already familiar with fair trade principles. Highlighting the work of the U.S.-based Community Agroecology Network (CAN), which fosters personal contact (by mail and Internet) between coffee producers in the South and individual consumers



in the North, it demonstrates dramatically the difference that fair trade can make in the lives of small-scale coffee growers. The film's appeal is highly personal, focusing on a few coffee-producing families in Costa Rica, along with local organizers and university students who learn about the link between agribusiness and social justice through CAN placements with producer families. The songbird connection works as an effective hook at the beginning of the film: when coffee farmers (rather than mega-corporations) control growing conditions, they tend to use organic methods that help to preserve or enhance migratory songbird habitat. The film shows that a more fair and sustainable coffee trade can also help to reduce social problems, such as human migration out of rural areas and the trade in illegal drugs, to mention only two. NGOs such as Oxfam and fair trade organizations such as Equal Exchange provide information to fill out the global picture, and a discussion guide is included to help viewers articulate their responses. Audiences from high school up will surely find this film engaging and inspiring. – *(GF)*

Old Dog Documentaries, 2006, 56-minute DVD, US$29.99, (802) 457-9369, <www.olddogdocumentaries.com>.

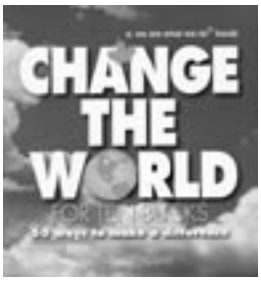


Great Lakes in My World

Great Lakes in My World is a comprehensive interdisciplinary K-8 curriculum made up of six units: Lakes, Sand Dunes, Wetlands, Human Communities, History, and Geology and Water Flow. Each unit focuses on three essential questions and contains a series of 12-18 active, inquiry-based lessons placed in a sequence of *connect* (develop a

personal bond), *explore* (discover key concepts) and *investigate* (investigate local issues and actions taken to address them). Activities are provided for both in-class and outdoor learning as well for service learning (for example, Adopt-A-Beach). Most are intended for a specific age range within the K-8 spectrum (e.g., K-4, 3-6, 4-8, 6-8), and broader-ranged lessons have modifications for younger or older students. To accommodate learning portfolios, all 217 student worksheets are in journal format and can be printed directly from an accompanying CD, which also includes full-color "creature cards," photographs of the Great Lakes, and resource listings. Assessment is primarily through rubrics, although many of the wrap-up discussion questions could also be used to evaluate students. While the design of the guide does not necessarily pull you in, it is clear and functional. Overall, this curriculum is an excellent addition to the growing stock of Great Lakes programming. It offers a good balance of research, observation, discussion, writing, and action; and the issue-based, problem-solving focus provides for authentic learning. – *(AC)*

Alliance for the Great Lakes, 2005, ISBN 0-9770212-0-3, 471 pp. plus cards and CD, US$43.25, (312) 939-0838, 17 N. State St., Suite 1390, Chicago, IL 60602 <www.lakemichigan.org>.



Change the World for Ten Bucks

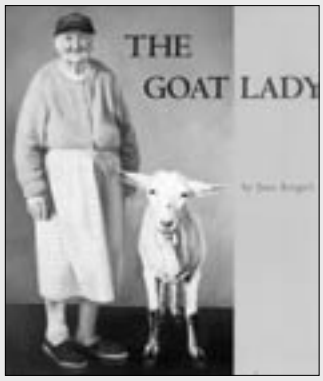
Produced by an international movement called We Are What We Do, this Canadian revision of the UK publication *Change the World for a Fiver* offers a creative response to the common question, What can I do to make the world a better place? It presents 50 ideas for everyday actions, each in a visually entertaining double-page spread with minimal text. Some encourage recycling, conservation of energy or water, using public transportation more and plastic bags less, or planting trees. Others are more socially oriented: "have more meals together, take time to listen, spend time with someone from a different generation, learn to be friendly in another language." Some, such as "shop locally," combine social and environmental concerns; others focus on personal challenges ("seize the moment" and "learn more, do more"). Websites appropriate to each idea are listed at the back of the book. The spirit behind it all is at once committed and whimsical — an open-ended antidote to despair that should inspire individuals or groups of all ages. – *(GF)*

New Society Publishers, 2006, ISBN 1-55092-300-5, 108 pp., C$10 from New Society Publishers, (800) 567-6772, <www.newsociety.com>.

Global Kidz Curriculum

The Global Kidz Curriculum is a cross-disciplinary unit of ten one-hour lessons that aim to help Canadian students in Grades 4 and 5 learn about the lives of their counterparts in other countries. The lessons, supplied in a three-ring binder and available in either English or French, are well designed to encourage global citizenship. Based on the theme of "Building Healthy Communities," they address such topics as food security, sanitation, and income generation; and expectations are listed in each of seven different subject areas, including writing and math. The guidelines and photocopiable pages are well thought out, but the most remarkable feature of this kit

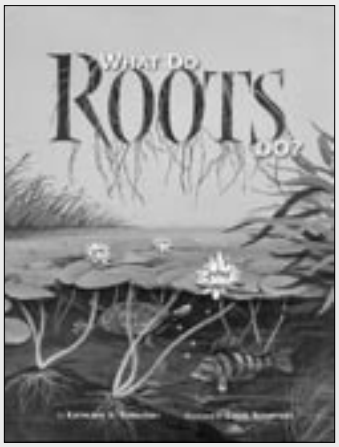
Children's Eco-Stories



The Goat Lady
by Jane Bregoli

This is the true story of Noelie Lemire Houle, an elderly woman who raised goats and lived in an old house with peeling paint in Massachusetts. Shunned by her neighbors because of her ramshackle premises, she is befriended by two children who visit daily to help care for her goats and listen to her stories. When the children's artist mother paints portraits of Noelie and stages an art show, the townspeople come to see the generous old woman in a new light. Bregoli's gentle text and charming paintings make readers of all ages want to know a woman like Noelie. Ages 7-12. – *(JH)*

Tilbury House, 2004, ISBN 0-88448-260-X (hc), 32 pp., US$16.95, (800) 582-1899; in Canada, from Fitzhenry & Whiteside, 2005, ISBN 1-55041-942-0 (pb), 32 pp., C$9.95, (800) 387-9776, <www.fitzhenry.ca>.



What do Roots Do?
by Kathleen Kudlinski, illustrated by David Schuppert

Written in verse, this picture book is packed with information about the importance of plant roots. Simple explanations illuminate the many functions of roots, such as to anchor plants and draw water from the soil. Complementing the text, rich full-color illustrations show both what we see above ground as well as what is normally hidden below. This story would make an excellent introduction to a science lesson on plants. Ages 5-8. – *(JH)*

NorthWord Books, 2005, ISBN 1-55971-896-X (hc), 30 pp., US$15.95 plus s&h from NorthWord, (888) 255-9989. <www.tnkidsbooks.com/northword.asp>; C$21.95 plus s&h from H.B. Fenn and Co., (800) 267-3366 ext 1, <www.hbfenn.ca>.

is its collection of resources for use by teachers, students, or both. Most of these are integrated into the lessons: a children's book called *The Great Kapok Tree*, by Lynne Cherry, in which the whole community of rainforest animals persuades an Amazon logger not to cut down a tree; an inspirational film called *Ryan's Well* (on VHS), about a Canadian first-grader's dedication to bringing potable water to an African school; *The Simple Act of Planting a Tree*, by Andy and Katie Lipkis, a comprehensive 236-page guidebook to inspire urban greening activists of all ages; and *Where on Earth Are We Going?*, in which Maurice Strong (chair of the 1992 Earth Summit in Rio) relates his personal experiences and recommendations for shifting global policies toward a more sustainable future. – *(GF)*

Canadian Physicians for Aid and Relief , 2002, C$90 includes s&h from Canadian Physicians for Aid and Relief, 550 Queen St. E., Suite 335, Toronto, ON M5A 1V2, (800) 263-2727, <www.cpar.ca>.

Life in the Ocean card game

One of Professor Noggin's series of card games on topics ranging from the history of Canada to outer space, *Life in the Ocean* offers lots of fun with facts to students ages 7 and up. Each of the 30 durable cards has on one

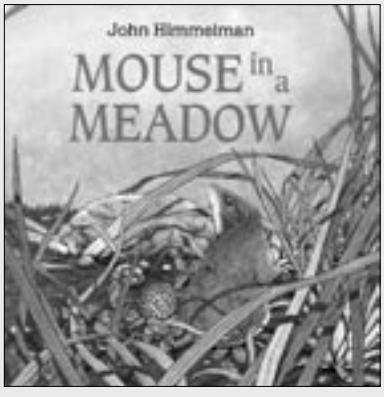
side the name and picture of its subject (Narwhal, Sea Urchin, etc.), and on the other side six questions divided into two groups, "hard" and "easy." The two to eight players decide beforehand on a level of difficulty, while the order of play and choice of question is determined by the roll of a three-numbered die. The player whose turn it is holds up the card while reading the question to the next player, who gets the card if her answer is right. The player who ends up with the most cards after the deck is exhausted wins. The game is of the "trivial pursuit" genre, but most of the facts are well worth knowing (and some will stump even adults the first time through). This game works well with mixed age groups, and after your group has learned all the right answers, you can pass it on to another! Recommended. – *(GF)*

Outset Media, 2003, C$14.99/US$9.99. To find a retailer near you, contact Outset Media, 106 - 4226 Commerce Circle, Victoria BC V8Z 6N6, (250) 592-7374, <www.outsetmedia.com>.

Operation Thistle

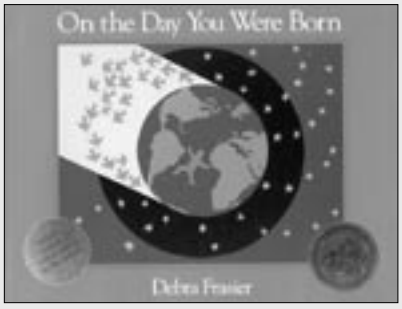
Agent #9, we have a tall order in store for you! Your mission, if you choose to accept it (and I'm sure you will), is to destroy Dr. Thistle's deadly Sicklesurge plants and save Queen Flora. In the process, you will learn about plant growth and development, you will make "plant plastic," design a "survivor seedling," and solve a tree murder mystery. You will also learn how to avoid the pitfalls of procrastination, help create a quilt memory garden, and even start a topiary business venture!

Operation Thistle: Seeds of Despair is designed especially for today's tech-savvy 'tweens and teens. Each one of eight sections in this spiral-bound, sturdy hardcover book is organized around a concept related to plant growth and development, and introduced with an exciting mission brief. Rooted in the saga of Dr. Thistle and branching out into hands-on activities, these eight missions guide students along a journey from plant classification to vegetative propagation. The



Mouse in a Meadow *by John Himmelman*
The North American meadow is a bountiful habitat for the host of creatures that live there. Each two-page spread of this beautifully illustrated storybook is a meadow scene introducing one or more meadow species and hinting at their ecological relationships. The last eight pages serve as a simple field guide, depicting 33 plants, animals, and insects that appear in the book and challenging readers to return to the story — or venture out in a meadow — to find them. Ages 4-8. – *(JH)*

Charlesbridge Publishing, 2005, ISBN 1-57091-520-2 (hc), 30 pp., US$15.95 from Charlesbridge, (800) 225-3214, <www.charlesbridge.com>; C$23.95 plus s&h from Monarch Books, (800) 404-7404, <www.monarchbooks.ca>.



On the Day You Were Born *by Debra Frasier*
Debra Frasier's popular children's book lovingly describes the daily rhythms on the planet in the hours just before and after a child is born. Charming cut-and-paste illustrations highlight the abundance of the Earth's gifts (e.g., moonlight, sunlight, gravity, air, rainfall, trees) and the miracle of birth. This new edition includes an audio CD in which Frasier reads the book, accompanied by the music of Matthew Smith and a song performance by Sara Brown. At the back of the book are scientific explanations of each of the wonders illustrated in the story. – (JH)

Harcourt Children's Books, 2005, ISBN 0-15-205567-3 (hc), 40 pp., US$17.95 plus s&h from Harcourt, (800) 543-1918; C$23.95 plus $5 s&h from Raincoast Books, (800) 663-5714, <www.harcourt.com>.

final section, "Life Skills and Career Exploration," helps students blossom into responsible, confident young adults. Engaging the head, heart, hands, and health of middle schoolers, *Operation Thistle* would be a welcome addition to any science curriculum, after-school program, or home-schooling association. – *(JKratz)*

Texas Cooperative Extension, 2002, ISBN 0-9672990-9-8 (binder), 189 pp., US $35 from the Texas Cooperative Extension Bookstore, (888) 900-2577, <http://tcebookstore.org>.

Dig Your Hands in the Dirt

Using mud as a medium to link communities, cultures, and curriculum can bring out the artist in all of us. In this useful primer for all ages, artist and author Kiko Denzer shows how to find natural clay in any location and to use it to create sculptures, playground structures, buildings, interesting intersections, sundials, labyrinths, birdhouses, and patterned wall murals that reflect the rhythm and design of nature. Supporting the "how-to" sections are numerous case studies, with photos and illustrations, of imaginative school and community projects in the United States, Mexico, and Germany. – *(LO)*

Hand Print Press, 2005, ISBN 0-9679846-6-1 (pb, 4½" x 7"), 132 pp., US$12.95 (s&h is free within the US, $3 to Canada if paid by check or money order in US funds), from Hand Print Press, PO Box 576, Blodgett, OR 97326, (541) 438-4300, <www.handprintpress.com>.

A Mind with Wings

Written for young readers (age 12 and up) *A Mind with Wings: The Story of Henry David Thoreau* by Gerald and Loretta Hausman is a fictionalized biography of Thoreau, beginning with his birth in 1817 in Concord, Massachusetts, and ending in the same place in 1862. The story recounts the key events of his life and the many roles he assumed, including nature explorer, rebellious student, teacher dropout, maker of pencils, hermit, tax resister, lecturer, and author. Thoreau's writings are quoted throughout the book, and the authors include a short poem that he wrote as a young man. Many of Thoreau's character traits were admirable, and this book would therefore be especially useful as an introduction to a unit on environmental heroes. With high school students, the book could serve as a quick and interesting overview of Thoreau's life before delving into *Walden*. Although I have read *Walden* and many meaningful quotations from Thoreau's other writings, reading this short biography made me feel as though I knew him for the first time. – *(CK)*

Shambhala Publications, 2006, ISBN 1-59030-228-1 (hc), 148 pp., US$15.95/C$22.95 from Shambhala, (888) 424-2329, <www.shambhala.com>.

Animal Rescue series

The award-winning Firefly Animal Rescue series seeks to foster in young readers (Grades 4-8) a deep respect for the animal world and an awareness of the many projects and people who are "changing the future for endangered wildlife." Each 64-page book focuses on a different endangered or threatened animal or group, such as chimpanzees, elephants, frogs, pandas, rainforest birds, tigers, turtles, and whales (12 in the series so far). Illustrated with over 50 color photographs, each book provides information about the animal's life cycle, anatomy, and behavior, and explains the threats the animal faces and the actions being taken to protect it. Sections entitled "On the Frontlines" describe innovative conservation solutions being tried in many parts of the world, while "At Work" sections introduce the scientists and conservationists who are involved in these efforts. At the end of each book are a handy "Fast Facts" reference and a "How You Can Help" listing of organizations that young people and adults can contact. With beautiful photography and inspiring examples of individuals passionately devoted to wildlife conservation, these are excellent resources for the classroom or school library. – *(DB)*

Firefly Books, Animal Rescue series, 12-book series, ISBN 1-55407-244-1 (pb), US$89.55/C$104.37; ISBN 1-55407-243-3 (hc), US$143.64/C$167.41. Individual titles (different authors, dates, and ISBNs), $9.95 pb/$19.95 hc from Firefly Books, (800) 387-6192, <www.fireflybooks.com>

Super Size Me DVD

The award-winning documentary *Super Size Me* charts Morgan Spurlock's progress as he subjects himself to a McDonald's-only diet for 30 days straight and confronts many of the health and environmental issues associated with the foods he eats. This "educationally enhanced" version is slightly edited for younger audiences, but the real enhancement comes in the form of witty pop-up factoids that accompany the scenes. Some expand with the simple click of a button to reveal background information from reliable sources such as the National Cancer Institute and the American Heart Association; some define new vocabulary, such as "genetically modified ingredients," and some quiz viewers on facts presented earlier in the film or provide formulas to calculate personal statistics such as body mass index. Also included is a substantive teachers' guide in PDF format with 24 printable lessons for Grades 6-12. It is suggested that the film be watched in segments followed by related curricular lessons, which address a variety of topics from healthy lunchroom choices to fast food marketing techniques. The educational version of the documentary is intended to change the way movies are used in the classroom, and it certainly accomplishes that. – *(JKobylecky)*

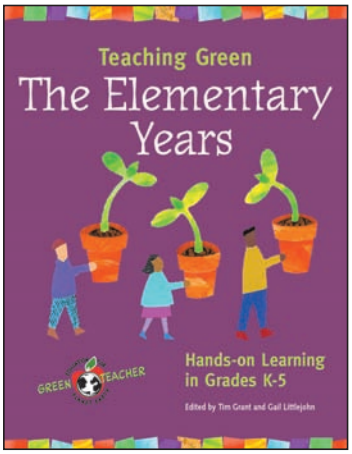
Hart Sharp Video, 2004, 96 minutes (DVD), Educationally enhanced version includes instructional materials and interactive activities, US$39.99 plus $4.95 s&h from Hart Sharp Video, (800) 870-9879, <www.hartsharpvideo.com>.

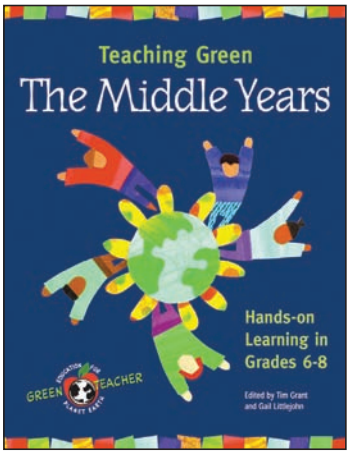
BOOKS from Green Teacher

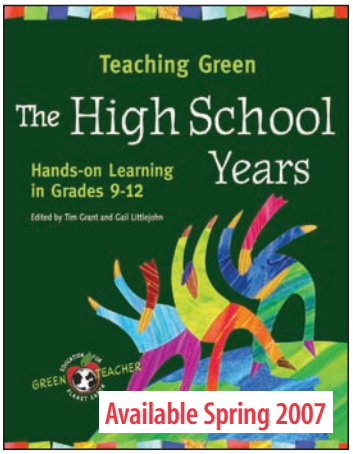
Teaching Green

Hands-on Learning in Grades K–5, 6–8 and 9–12

240 pages, 8 1/2" x 11"





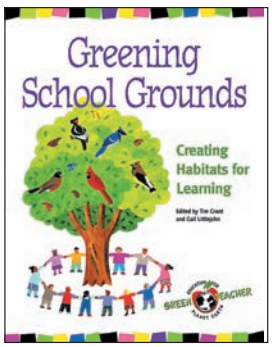


Each of the three ***Teaching Green*** books is a complete "green" teaching resource for anyone working with young people in grades K–5, 6–8 or 9–12, whether inside or outside of schools. Each book contains over 50 of the best teaching strategies and activities contributed to ***Green Teacher*** magazine during the past decade — almost all updated and revised for these special anthologies. Readers will find a wealth of kid-tested ideas from educators across North America, covering a wide spectrum of environmental topics, from biodiversity to resource consumption to green technology. They include practical projects and new learning strategies that will inspire educators seeking to promote interdisciplinary hands-on learning about natural systems and to foster critical thinking about environmental issues, both local and global. Rich illustrations and a curriculum index make each book appealing to a wide range of teachers, educators and parents seeking innovative ideas for incorporating green themes into their programs. **Prices:** *Single copies* US$22.95 CAN$27.95 *2-10 copies* US$16.95 CAN$21.95 *100+ copies* US $10.00 CAN $12.50

Greening School Grounds

Creating Habitats for Learning

2001, 144 pages, 8 1/2" x 11", for grades K–12



Schoolyard "greening" is an excellent way to promote hands-on, inter-disciplinary learning about the environment through projects that benefit schools and increase green space and biodiversity in communities. In this new anthology from ***Green Teacher*** magazine, readers will find step-by-step instructions for numerous schoolyard projects, from tree nurseries to school composting to native-plant gardens, along with a great many suggestions for connnecting these outdoor activities to classroom learning.

Prices: *Single copies* US$16.95 CAN$21.95 *2-10 copies* US$10.95 CAN$13.95 *50+ copies* US $7.95 CAN $10.50

Teaching About Climate Change

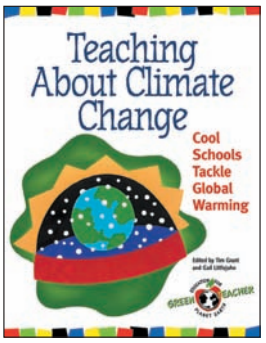
Cool Schools Tackle Global Warming

2001, 80 pages, 8 1/2" x 11", for grades K–12

also available in French as

Des idées fraîches à l'école

Activités et projets pour contrer les changements climatiques



Helping teachers and students to tackle the challenging topic of climate change, this new anthology from ***Green Teacher*** offers a framework for teaching fundamental concepts and a variety of activities that can be undertaken in school, at home and in the community. Teachers will find practical ideas for making the intangibles of climate change more concrete to students, including experiments that demonstrate the greenhouse effect and school energy and waste audits.

Prices: *Single copies* US$12.95 CAN$15.95 *2-10 copies* US$9.75 CAN$11.95 *30+ copies* US $7.95 CAN $9.50

Shipping and handling: Shipping rates vary. Please email us at info@greenteacher.com or call 1-888-804-1486 or (416) 960-1244 for rates. Taxes: Canadians add GST or HST

www.greenteacher.com
Visit our website for tables of contents of books, a listing of all available back issues of *Green Teacher*, and secure online ordering.