INTERACTIONS

The Ontario Journal of Environmental Education

VOLUME 22, NUMBER 1 WWW.OSEE.CA OCTOBER 2009

The mission of OSEE is to support and inspire educators teaching environmental education in Ontario

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Interactions is the journal of the Ontario Society for Environmental Education (OSEE), whose purpose is to foster the growth and development of environmental education in Ontario. OSEE will help spread knowledge, skills, and attitudes supporting an environmentally sound lifestyle through both formal and informal channels. OSEE operates as a nonprofit organization. *Interactions* is published five times annually, in October, December, February, April and June. ISSN 1188-3146

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***Interactions* Then and Now**

CD collection of back issues of OSEE's journal

Interactions Complete Set - 1988 - 2008 CD Contents

Archives: All *Interactions* journals from Vol. 1-1, September, 1988, to September, 2008, Vol;. 21-1, in PDF format.
Contents PDFs: PDF copies of the "Contents" pages of each issue to help find articles of interest.
Ecozoic Curriculum: Integrated lesson activities for secondary schools developed from 1992 – 1993. A curriculum project originally sent to all secondary schools. Use where applicable following your professional judgement to match with current expectations.
Environmental Education Articles by Mike Morris
OSEE Information/History: Conference leaders and presidents
E3 Resources – Energy and Climate Change activity guides
Adobe Reader 8: Free PDF viewing program (March 2007)

Cost: $10, plus $2 shipping, Contact Bill.Thompson–"at"–OSEE.ca

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Editor's Notes

Mike Morris

Have you noticed how crisp the air is right now? That means hockey has started up and baseball is in the World Series stage. Did you enjoy the summer?

In this issue, some of the authors that answer my e-mails with a submission are featured. One of my favorite authors, John Etches, has another article in this issue. Did you know that John is a perfectionist, a very good quality for an author. John's article is how to make use of discarded material to make flying objects? Check out John's article.

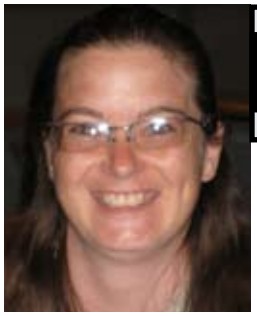
We welcome a couple of new authors to this issue. Holly Groome, a very busy environmentalist, teacher and OSEE board member from Huntsville, sent us her article that was published in the local newspaper about how kids should be spending more time outdoors. My childhood was largely spent at CFB Gagetown in New Brunswick where our black-and-white television received exactly one channel. As a result, I was outdoors a lot. I think that all that time outdoors led to my lifelong love of blueberries and fishing, but that's another story.

On a similar theme, we are also reprinting an article by Roger Belgrave from the *Brampton Guardian* about the initiatives of the Peel District School Board to recognize the importance of kids learning about the environment outdoors and another article by David Suzuki with Faisal Moola on the benefits of outdoor schooling.

Interactions also welcomes another new author. Jennifer Dowker wrote an article about the production and uses of ethanol and another one about how to read radar images. Welcome aboard Jennifer. Ellen Murray, another OSEE board member, reviews some environmental films.

This issue of *Interactions* also welcomes Astrid Steele with her "Interruptions" column which explores Ontario curriculum matters with an environmental slant. This is a very important discussion with the new Ministry of Education policy framework and Astrid gets to the heart of it this issue with STSEs. In another life, Astrid and I were in the same Environmental Science AQ courses at the Frost Centre. Good to have you with *Interactions* Astrid!

Mike Morris is Editorial Chair of *Interactions*



President's Message

Sherri Owen

Hello Everyone,

The conference season has begun. I was privileged to represent OSEE at the Council of Outdoor Educators of Ontario (COEO) conference on September 25, 26. I was happy to be in a beautiful natural environment at RKY camp. Remnants of Oak Savannah remained in the form of large, multiple stem Oaks dotted throughout the site. I was amazed by the tremendous spreading reach tree.

Terrence Dickinson made an accomplished presentation about the night sky. His passion for the subject was evident in his presentation and in his ownership of an observatory complete with sliding roof. Terrence used four ball point pens and two golf balls to eloquently demonstrate the scale of our solar system. If the sun were the size of a golf ball, the earth would be the size of the ball in one of those pens. At that scale, the solar system would extend beyond the walls of a school gymnasium.

After the presentation we were guided to the water front by RKY carrying hurricane lamps. The path was lit by candles. We watched as several of the RKY staff braved the frigid waters to light a floating camp fire. RKY is clearly a place that values tradition and this one was a beautiful ending to a busy day.

I honed my skills as a facilitator and ropes course administrator over the course of the next day. Of greatest interest was a presentation by Kathy Haras about effectively communicating with school administrators about field trips and other activities perceived as risky. From the perspective of most administrators outdoor experiences look like all risk and no reward. She outlined strategies for teachers to make administrators familiar with the benefits of non-classroom experiences and demonstrating the effectiveness of managing risk. I recommend her presentation to any teacher.

After an evening of lively eating, auctioning and dancing I retired to my vinyl camp mattress for a long rest.

Soon, I will be setting up the OSEE display at the Geography teachers' conference (OAGEE) and the Science teachers' conference (STAO) and getting ready for our conference in May. At COEO many of the participants were asking about our conference. The Seneca College King Campus was acknowledged as an excellent site. When I visited the campus with the conference committee earlier I was impressed by the high tech classrooms, woods and lake all within a short walk. Be sure to see the advertisement in this issue and register early to get the discount.

Bill Thompson, our Conference Chair, is currently seeking presenters and invites submissions by all members. Our theme is EcoLinks: Teaching Solutions for your Classes. We want to offer classroom teachers support in meeting new environmental expectations and integrating the environment into all subjects in all grades. I am looking forward to this May and hope all our members can attend.

Sherri Owen is OSEE President

Interruptions

Astrid Steele

STSEs

In case you missed it, there is yet another curriculum mandate that came into effect this September. A good look at the revised Science curriculum for both elementary and secondary students reveals that teaching science could very well be turned on its head by something called STSE. The letters stand for science, technology, society and environment and the acronym suggests that all four components should interconnect within the science curriculum that is taught in public schools in Ontario.

Teaching science used to be relatively straightforward. Take a topic like magnetism ... teaching and learning about magnets consisted of activities with horseshoe and bar magnets and some iron filings or maybe some paperclips. There were notes and diagrams, possibly a video or internet research and probably a little technology in the form of identifying where magnets are used at home or at school.

So how could STSE and the revised curriculum change something simple like a lesson about magnetism? And what does a lesson about magnetism have to do with environmental education? And why fix something that isn't broken? Except that it is...

Most of us got very good at teaching science concepts and facts and even had some fun with our students in the process. But the lessons learned in science class didn't really have an impact on what was happening outside of school; our students are rampant consumers, the earth's resources continue to be depleted, the planet's biodiversity is in peril and the number of world's poor and displaced are still on the increase. It seems that science and technology lessons concentrated a lot on the wonderful ways that science and technology have enriched our lives and made them easier, but not on their hidden risks and costs. The marvels of science and technology that we learned about and later taught to others have left us, at best, a public barraged and confused by multiple and often conflicting messages from the media about everything from medicine to pollution to global warming. We struggle with our scientific literacy with grave consequences.

Enter STSE. Essentially the message of STSE is that learning science in school has to consist of more than facts, laws and theories; it has to give our students (and ourselves) an understanding of not only the benefits, but also the costs, of science and technology. Science lessons need to teach students about their impacts, as global citizens, on their local and global societies and their ability to create positive change in their environments. Science and technology lessons should not ignore the contributions of other cultures and other histories.

The primary goal of the revised Science and Technology, Gr. 1-8 curriculum is "to relate science and technology to society and the environment"[1]. Learning skills of scientific inquiry and understanding basic concepts are listed second and third, respectively. That's right, basic concepts, facts, laws, theories are supposed to take a back seat to STSE. Environmental education should be infused and embedded into every science lesson that we teach, because everything that humans do, every discovery, every interaction, every manufacture and purchase takes place within, and has repercussions for, the environment. Rather than teaching science by way of facts, laws, or cookbook recipe labs, the requirement is for an issues-based approach.

Sound simple? It shouldn't...for a number of reasons. First of all, changing how we teach something, especially a subject with as rich a tradition as science, always seems to present difficulties. There is teacher loyalty to the subject, the relinquishing of control of knowledge, there are classroom management issues, adequate time to cover the entire curriculum, lack of teacher training[2], does this sound familiar? Secondly, the STSE approach requires that we start thinking about the study and subject of science and technology differently. We have to recognize that science is just one version of how the world works, and it has not always served us well. Our science and technology are not politically neutral and nor are they infallible, yet they have allowed the First World to attain a remarkable standard of living. But not without a cost to cultures and to the environment. That is the science that our students need to learn about.

(Continued on page 9)

Environmental Education FYI

Andrew Boughen

Conferences Conferences Conferences

September is a good time to renew memberships in professional organizations such as the Science Teachers Association of Ontario (STAO). Membership which costs $50, includes 5 issues of the Crucible – STAO's professional journal, full access to the association's virtual library, and reduced fees for the conference, workshops and selected resources. STAO's 2009 fall conference "Spotlight on the New Curriculum – Inquiry to Innovation", is being held November 12-14 in Toronto. It is an excellent conference, offering a great variety of interesting professional development opportunities. Get further information and register for their conference at www.stao.ca/

It is also a good time to consider membership with The Council of Outdoor Educators of Ontario (COEO). Their Fall Conference has already taken place, but membership in this organization operates on a school year calendar, and includes a quarterly professional journal and reduced rates at their conferences and regional workshops. Further information can be found at their website www.coeo.org.

O.A.G.E.E. the Ontario Association of Geographic and Environmental Education, is running its fall conference on October 30, and 31 in Peterborough Ontario. The conference will offer a number of sessions dealing with environmental issues and environmental education, and several covering various geotechnology skills. This is another organization which has an annual membership fee that includes a journal that is published quarterly. Further information about both the organization and conference is available at www.oagee.org.

Oct 7-10 is the date that the North American Environmental Education Annual Conference will take place in Portland Oregon. Although this is a conference that many of us may not be able to attend, it is an important organization to be aware of, and this year there is an online webcast that will feature a plenary session entitled "The Future of EE in North America". Three leading government officials including Elizabeth Kilvert an advisor for Environment Canada, will speak on the future of the EE profession in Canada. The live webcast will happen at 11:45-1:15p.m. Oregon time. You may wish to mark next year's conference Sept 28- Oct. 2, 2010 on your calendars as it is closer to home in Buffalo-Niagara, New York.

A special online conference is being offered by the Smithsonian Institution. One can register online at www.SmithsonianEducation.org/Climate, for the conference which takes place September 29- Oct. 1. The conference is aimed at allowing students, teachers, and the general public have free access to the Smithsonian's research and collections related to the evidence, impact, and response to climate change. There will be sessions that examine the issue of climate change from the perspective of science history, and art. All sessions will be recorded and archived, so that you can review them at anytime, and there is also the opportunity to join conference blogs, and twitter and facebook connections related to the conference theme. There are many interesting links that can be explored from the Smithsonian Education website at www. smithsonianeducation.org.

With the approach of the United Nations Climate Change Conference (COP 15) scheduled to take place in Copenhagen in December, teachers can engage their students in a youth forum that will write a communiqué to be presented at the Conference. The Children's Climate Forum will involve 160 youth selected from around the world to meet in Copenhagen, but in addition, through the Unite for Climate website at www.unite4climate.org, youth from around the world will be able to share ideas, experiences, and resources about climate change. An existing program that will be developing a specific focus on the conference is the eCards program operated by Pembina through the greenlearning.ca website. Students will be able to research about climate change and send one of the digital eCards to the youth delegates at the conference. Linking to the www.greenlearning.ca/ website will allow you to access the eCards site, and get information about the eCards-to-Copenhagen program. From the unite4climate website youth will also be able to find information about youth action programs from around the world, and in particular information about the International Day of Climate

Action scheduled for October 24th. It is hoped that on this date people around the world will gather to raise awareness that urgent action must be taken on climate change.

The A.D. Latornell Conservation Symposium is scheduled for November 18-20 in Alliston. This year's theme is The Currency of Ecology, and is to highlight the role that a healthy environment plays in sustaining a healthy economy. There is usually a wide variety of experts presenting on all aspects of healthy watersheds themes and the conference even has a strand that will highlight First Nations perspectives. It is also a good chance to meet with a large number of environmental organizations that exhibit at the conference. Check out their registration information and prelimary program at www.latornell.ca.

Resources

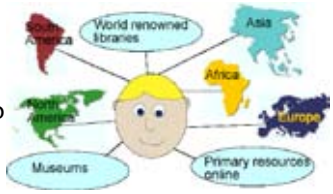
As we see more bears in southern Ontario teachers may be interested in using the Black bear ecology education guides prepared by the Ontario MNR. There are three guides aimed at grades 2, 4 and 7, and each guide has lesson plans with accompanying background material, readings and resources. The guides can be downloaded at www.mnr.gov.on.ca/en/Business/Bearwise/index.html.

National Forest Week runs Sept 20-2, and this year's theme is "Strong Roots, Green Shoots", which highlights research and innovation in Canada's Forest Sector. Teachers can order the poster for their class through the website http://cfs.nrcan.gc.ca/subsite/nationalforestweek/2009-poster.

Teachers of Grades 4-6 may be interested in engaging their students in the Ontario Forestry Association's (OFA) Annual Tree Bee Competition. The competition usually occurs in November, and throughout the fall teachers can coach their students in the skills of tree identification. The participants must also display some knowledge of conservation and environmental awareness. All participants receive prizes. For further information about registration contact the Ontario Forestry Association at www.oforest.on.ca. It is also through this site that one can link to the Focus on Forests Education site at www.focusonforests.on.ca. This Education Resource has all of its resources available for download, and the OFA has recently updated their curriculum links page to show links between all the Focus on Forest activities and the new curriculum for grades 1-12.

Icewatch is one of the Citizen Scientist programs in the Nature Watch suite of programs that include Frogwatch, and Plantwatch. Now is a good time to remind observers about the Icewatch program which encourages citizens to report their observations of "ice on" and "ice off" dates for water bodies. It is hoped that long term observations will assist in informing scientists about how freeze-thaw cycles are changing throughout the country. Visit the website www.naturewatch.ca/english/icewatch/ to obtain more information and a reporting form.

Another citizen science program that begins again this fall is the Bird Studies Canada Project Feederwatch Program. It involves watching and recording species and abundance of birds that visit your feeders over the period from mid November to April. Data from this program help scientists understand such things as changes in winter ranges, the spread of disease through bird populations, and the kinds of habitats and foods that attract birds. Get more information and register for the program through the website www.bsc-eoc.org/national/pfw.html. The website also has information to assist teachers involving their classes in the program.



The Canadian Wildlife Federation is partnering with a group of artists to offer a program whereby students can interact over the web with the artists as they travel for five weeks along the George River in Northern Labrador. Through the interactive CanAfloat in the Forest: Boreal Expedition 2009 website, students can track the progress of the expedition, study the area's geography and native wildlife, and submit questions to the artists who will respond daily via a satellite link. Students can also enter a draw for a live presentation about the Expedition at their school. Visit the website at www.cwf-fcf.org/en/educate/interact/wreaf

Environmental Cinema

For those that enjoy environmental films check out the Planet in Focus environmental film festival in Toronto Oct. 21-25. It's the 10th anniversary of this festival which features 85 environmental films and videos produced in Canada and internationally. One Canadian offering is Finding Farley, which follows a family that retraces some of the literary landscapes in Farley Mowat's books. Further information about all the films can be seen at www.planetinfocus.org.

You can help fight climate change by planting a tree!

Visit Ontario's Lend A Hand: Plant A Tree website to find out more: www.ontario.ca/plantatree

The Ministry of Natural Resources has developed an online tree atlas that will be helpful for students in identifying some of the common native trees in Ontario. It also shows the importance of planting trees to help fight climate change.

Andrew Boughen is an environmental educator living in Newmarket, Ontario

Nature Story

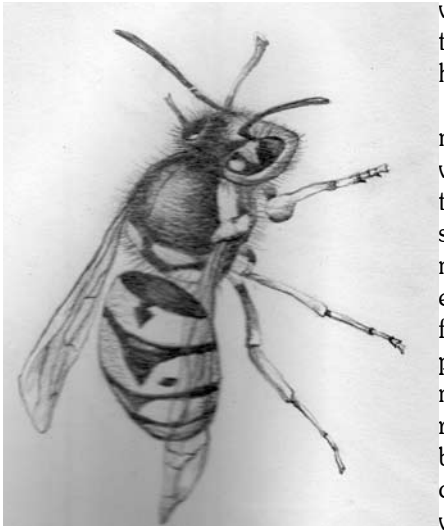
Allan Foster

Scarred for Life

This fall I was invited to facilitate a teacher workshop about combining fiction with lots of natural history facts. The workshop was to coincide with the Toronto District School Board initiative to teach more non-fiction. The workshop ended in an activity that required the teachers to quickly create a story by combining a story format with information from a prepared fact sheet.

As my reward, I received three magnificent new nature stories spilling over with facts. The following is the timeliest example:

Once upon a time there was a great queen of the wasp clan named Velma. She was very successful with over a thousand members in her family. She was the wasp empress who invented the wasp nest—a bag-like sack that hung from a high tree branch.



Drawing by Leslie Foster

There was one feature of her wasp nest of which she and all her family were very proud. At the very top of the bag, there was a large opening serving as the only entrance. This meant that the worker wasps could easily dump their loads of collected food directly into the sack without pausing their flight. This feature saved much time and was one of the main reasons that Velma and her tribe had become so successful—they had become the biggest and most successful wasp colony ever.

The workers collected big mouthfuls of meat such as chunks of flesh ripped from caterpillars and peanut butter and jam stolen from picnic sandwiches. Then they would simply fly over the large gateway to their castle and, without slowing their flight, drop their load directly into the sack. Other workers would wait inside the sack and catch the food as it dropped. Then the food would quickly be distributed to the many baby wasps hungrily waiting here and there inside the sack.

The worker wasps were able to collect and deliver so much food this way that the sack would stretch bigger and bigger until it bulged with food and baby wasps. The wasps became greedy and sometimes delivered too much food. The food dropping through the entrance came so fast that the wasps inside could not keep up. On these occasions babies would become smeared with food and it became quite a mess. But never mind, Velma didn't care about how neat and tidy her nest was. She just kept sending her workers out to collect more food.

At the end of the summer, Velma laid a few special eggs. One of these eggs developed into a shiny new princess wasp named Vespa. Vespa was different from all the other wasps. She was fastidious. She wasn't particularly happy growing up inside this messy nest. She found it chaotic there with bits of sandwich, pools of soda pop, chunks of caterpillar meat all mixed up inside the straining sack. She liked to keep clean and didn't like the feel of food smeared all over the place. Although she complained to her sisters, no one else agreed with her and the nest just got messier and messier.

Then one day, a terrible thing happened. A violent autumn thunderstorm shook their home. The wind tore at their sack and ripped the ties where it was attached to the tree. Several ties broke and the nest began to swing perilously by one single strand. The rain gushed down from the top of the tree and poured right into the entrance to the sack. The water swirled angrily throughout the nest mixing with the food that lay higgledy-piggledy everywhere inside. The resulting sticky mess made it impossible for the wasps to swim. Sadly, they all drowned right there inside the sack. So Queen Velma and all her family were dead when the weight of the sack finally ripped the last attachment away from the branch and the nest smashed to the ground where it exploded like a paper bag filled with water.

All the wasps perished except for Vespa. Lucky for her she had been caught outside by the storm and hid protected under some bark on the tree. When the storm was over, she crawled down to the ground and witnessed the tragic event that had befallen the rest of the wasps. Although she was heartbroken, she managed to find a hidden place at the base of the tree where she was protected from the chill of the weather.

She remained alone in that hidden place for the duration of the winter and had ample time to think about what had happened to the foolish wasps.

When the spring finally came, Vespa started to construct a new nest. She began by building several cells that she made with fibers she stripped from a dead branch. She chewed the fibers until it was a little like paper. She laid some eggs in those first few cells and, in a very short while the eggs turned into new worker wasps that immediately began to help Vespa with her plan. They constructed more cells and soon had several flat tiers of cells filled with baby wasps. Then Vespa organized a building party to build a waterproof bag around the cells and, remembering the fate of her family home, she directed the workers to build the entrance of their nest at the bottom. As more and more wasps were born, Vespa was able to spend all of her time laying eggs and directing the work within the nest. She insisted on organization and neatness. She scolded her children whenever they left food or drink lying around. Whenever the colony needed more space, the builders simply replaced the waterproof walls with new bigger walls. The nest was always being carefully rebuilt and the entrance always remained at the bottom.

Vespa was very proud of the new design and organization of her city, so one day in the middle of the summer, she held a big ceremony where she presented each member of her family with a bright yellow jacket that they would wear proudly ever since.

Queen wasps only live for one year. Vespa was no different. When the time came for her to die, she whispered her secret to a number of special babies who then quietly left the nest and found a hidden place nearby to spend the winter. In the following spring, they all remembered what Vespa told them and they each began to build a highly organized waterproof nest with the entrance hole at the bottom.

Allan Foster is a long time educator at the Kortright Centre for Conservation. To read more of Allan's nature stories, visit his website at www.kortright.org and click on AllanFoster's Stories.

(Continued from page 5)

So what would an STSE infused magnetism lesson look like? The Grade 9 Applied Biology curriculum unit states:

> *Analyse, on the basis of research, medical imaging technologies (e.g., ultrasound, X-rays,computerized axial tomography [CT or CAT] scan, magnetic resonance imaging [MRI], microscopy, biophotonics) used in Canada to explore, diagnose, or treat the human body, and communicate their findings.*
>
> *Sample issue: The diagnostic use of nuclear isotopes has saved lives by providing more reliable diagnoses of certain diseases. However, in the longer term, nuclear medicine could have harmful effects on the human body. (p. 86)*

As a science teacher, my first response to that description of an issues-based approach a science topic was, "Wow, how am I supposed to make that happen?" And that is a very fair question. The answer, like the rest of STSE, is not simple. STSE is a work of collaboration, not isolation, with colleagues, community partners, students…it is the purview of professional learning communities. Issues-based STSE will continue to be a work in progress for a very long time. But I think it will be worth it.

1. Ministry of Education of Ontario. (2008). *Science: The Ontario curriculum grade 9 and 10 revised*. Toronto, Ontario: Queen's Printer for Ontario.
2. Pedretti, E. G., Bencze, L., Hewitt, J., Romkey, L., & Jivraj, A. (2008). Promoting Issues-based STSE perspectives in science teacher education: Problems of identity and Ideology. *Science and Education*, 17, 941-960

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Outdoor Schooling Has Many Benefits

David Suzuki with Faisal Moola

As our children and grandchildren head back to school it's important to consider not just what we are teaching them but how we are teaching them. After all, the world is facing some incredible challenges, and today's young people will be left to deal with many of them.

So, do we fill their heads with facts and figures so that we can evaluate their progress through standardized testing? Or do we give them tools so they can think for themselves?

Back in 1956, when I was in college, Rachel Carson, a biologist, writer, and ecologist who had a tremendous influence on me, wrote an essay for Woman's Home Companion magazine, titled *Help Your Child to Wonder*, which she later expanded into her book The Sense of Wonder. In the article, she wrote, "It is more important to pave the way for the child to want to know than to put him on a diet of facts he is not ready to assimilate."

Ms. Carson believed, as I do, that we humans are just one part of nature, but that our ability to alter natural systems is what sets us apart. And we often alter natural systems in detrimental ways because we do not understand or appreciate nature. Ms. Carson argued that instilling in young people a sense of wonder about the earth and its marvels and mysteries will make them care more about nature and the environment. And she also thought that it would help them lead fuller lives.

"Those who dwell, as scientists or laymen, among the beauties and mysteries of the earth are never alone or weary of life," she wrote in the article.

More fulfilled people in a healthier world – it sounds ideal. But how do we accomplish that? Ms. Carson described the value of just getting kids into nature to explore. Doing so will even make the inevitable – and useful – facts and figures that will follow more relevant. "If facts are the seeds that later produce knowledge and wisdom, then the emotions and the impressions of the senses are the fertile soil in which the seeds must grow," she wrote.

But in this age of computer games and text messaging, of standardized testing and declining education budgets, kids are spending less time outdoors than ever before. Of course, parents have a responsibility to get their children outside, but our schools and teachers must play a role as well.

How can we expect our children to become fulfilled and healthy if we neglect to teach them or inspire them to become interested in their place in the natural world? Sure, we can include the natural sciences in curricula and teach it from books and computers alongside reading, writing, and arithmetic – but most children learn and retain information better through direct experience. Recent scientific studies have also shown that humans have an innate affinity with nature and that spending time in nature has immense psychological benefits.

In fact, moving the learning environment outdoors as much as possible will not only give young people an appreciation for nature and the planet that sustains us, but it will also help with other learning. Studies have shown that spending time in natural environments helps with recall and memory, problem-solving, and creativity. Children (and adults) who spend more time outside are also physically healthier.

The possibilities are endless. Think of how much more interesting and valuable math would be if it were made less abstract by relating it to natural phenomena, such as calculating the height of a tree. Reading the work of someone like Rachel Carson makes you realize as well how inspiring nature can be for any kind of writing, from poetry to scientific analysis. It goes without saying that subjects such as biology and geography would be more relevant if taught outdoors. That doesn't mean all schooling should be moved outside, but we must try at least to increase the amount of time learning takes place in nature.

Instilling a sense of wonder and joy about nature at an early age ensures that "biophilia" (a love of and affinity with nature) rather than "biophobia" (a fear or discomfort with nature) becomes the predominant trait as people grow. Given the deteriorating state of our natural world, this is a compelling reason for moving the classroom outside.

David Suzuki Foundation

The following two stories on page 11 illustrate how two areas of the province are jumping in making use of these benefits. (Ed.)

Kids Need To Spend Time Outside

Holly Groome

Reprinted from the *Huntsville Forester*, Oct. 7, 2009

You may have seen people around Huntsville sporting t-shirts with the slogan "Ask your Teacher to take you Outside" written across the front. These words could not come at a more significant time.

The need to understand our natural environment and the environmental issues that relate to our everyday life become more important — and more urgent — each day. And yet, much of the current research indicates that we know startlingly little about the environment, about how nature works, and even less about our personal connection to nature and the world around us. Without knowledge and understanding, deciding what to do to take appropriate action and change our behaviours seems rather overwhelming — even fruitless. In order to make the changes necessary to save our species and sustain our way of life on earth, we must incorporate environmental learning into our lives — at home, at work, at school, and in our wider community.

Teaching children to connect with nature is in our collective self-interest. Many scientists have shown, through research, that just as children need exercise, a healthy diet, and adequate sleep, they need to connect with nature. A healthy connection with their natural world improves a child's physical, emotional and mental well being. Teaching our children environmental education places a strong emphasis on the skills that educators deem most valuable — critical thinking, cooperative learning, and hands-on, real world application.

The benefits of such learning and of using the natural environment as a context for learning in the "basics", including math, geography, history, science, language and the arts are huge. Environmental education, creatively taught, can give our children the ability to work productively in a team setting, listen to and appreciate diverse opinions, promote change for the greater good, connect with members of their community in a meaningful way, solve real life problems and become advocates and activists to help protect what they hold sacred, nature.

Children who are less successful in a traditional school setting often thrive when they are given the opportunity to learn in a natural outdoor class room.

Just as the research now shows us that we must get our kids back into nature, we know that the payoff can be huge, with better academic achievement, better social interactions and stronger civic responsibility.

So this school year "Ask your Teacher to take you Outside!"

Classroom Environment Moving Outdoors

Roger Belgrave

Reprinted from *Brampton Guardian*, Sept. 29, 2009

A growing list of public schools are taking their classrooms outdoors to make the environment a part of lesson plans.

The Peel District School Board currently has nine elementary and three high schools offering students a "Classroom Without Walls" program. The initiative, supported by the board's outdoor education centres and staff, is designed to entrench environmental education in the delivery of everyday curriculum.

A group of staff, students and parents at Brampton's Massey Street Public School recently gathered on a patch of green space adjacent to school grounds. The ceremonial get-together formally designated the area as the school's outdoor classroom.

Teachers began using the spot last year, according to Principal Greg Purmal. Classes would move outside to the edge of the Massey Forest and use the surroundings as subject matter for art lessons in drawing or sketching, Purmal said.

However, Classroom Without Walls is designed to make environmental education possible in all parts of the curriculum. The Massey Forest is home to one of the most extraordinary concentrations of Shagbark Hickory trees in the province, Purmal pointed out. The vibrant woodlot and pathway create an interactive backdrop for teaching everything from art to math.

Landscape features could make for some interesting geography lessons, while the vegetation and wildlife hold a bounty of surprising nuggets for science classes.

The possibilities are exciting and endless for educators always searching for ways to engage students and make learning more relevant for young minds. Environmental education has also become a Ministry of Education mandate in Ontario schools.

Ontario school boards, including Peel board, are working with Ontario EcoSchools to help teachers plan environmentally focused classroom programs and with schools to reduce their environmental impact.

Premier Dalton McGuinty and the Liberal government have made teaching students about the importance of environmental stewardship a priority in public schools. Schools were scheduled to begin implementing a new policy framework this fall.

Last April, Peel board created an Environmental Policy that included a "commitment to delivering effective environmental education."

Rob Ridley, the board's field centres coordinator, said the Peel board program began three years ago at Fallingbrook Middle School in Mississauga. Teachers wanted to make the environment part of the regular curriculum, he explained.

"It grew after that," he remarked.

A ministry grant last year enabled the board to expand the program to the 12 schools in Brampton and Mississauga this year. Schools received about $750 to seed their version of Classroom Without Walls.

"They each have they're own different take on the program," according to Ridley.

Board administration and outdoor education personnel provide coordination and professional development resources. Teachers are taught how to blend the environment in to regular lesson plans.

Ridley recalls meeting with a teacher who wasn't sure how to incorporate the natural elements of the outdoors in to a math class. Ridley suggested students might use Pythagoras' theorem to calculate the height of a tree.

The initiative is based on the simple idea that everything taught in the classroom is environmental, Ridley said. Other schools, in addition to the 12 funded ones, have started to adapt curriculum to bring their classrooms and the environment closer together.

A group of staff, students and parents at Brampton's Massey Street Public School recently gathered on a patch of green space adjacent to school grounds to formally designate it the school's outdoor classroom. A growing list of public schools are taking their classrooms outdoors to make the environment a part of lesson plans. The Peel District School Board currently has nine elementary and three high schools offering students a "Classroom Without Walls" program.

Feature

TANSTAAFL: Ethanol in 2009

Jennifer Dowker

This article addresses expectations in the Grade 11/12 Science curriculum: the pros and cons of ethanol sources.

TANSTAAFL: There Ain't No Such Thing As A Free Lunch popularized by Robert Heinlein in *The Moon is a Harsh Mistress* (pub. 1966).

Ethanol, a type of alcohol, is currently in the news as both an alternative to gasoline and as an additive. Ethanol is produced in various ways from many sources, most of them now renewable sources (biofuels). The sources of ethanol, its production and its effects on machinery and the environment earn both praise and scorn. This article explores some the reasons that ethanol as a topic is viewed through such multi-hued lenses.

Biofuel sources and production can be defined in two generations. First generation biofuels come from plants used as food, such as corn, sugar cane and wheat. Second generation biofuels come from plant sources that are not used as food. Second generation sources hold challenges: although the sources are as diverse as the coarse stems of native grasses, the waste material from saw mills and (eventually) algae, more complicated processes are required to break down the cellulose in fibrous sources in order to make ethanol. The ultimate goal is to produce ethanol with less energy going in to its production than energy yielded.

Whether ethanol comes from food grains or from cellulose, a polysaccharide, the material must be fermented and distilled in order to provide useable alcohol. Cellulosic materials, such as wheat straw, must undergo additional processing to break down the cellulose into sugars (glucose) that can be fermented. Acids or special enzymes are used as catalysts in these complex hydrolysis (decomposition) reactions. Some producers use the lignin separated from the cellulose in this stage as a fuel for steam turbines, co-generating electricity with fewer toxic emissions than fossil fuels such as coal, while others are creating other products from it.

The American federal government first passed a Clean Air Act in 1963. The version of the act that was then passed in 1970 coincided with the establishment of the Environmental Protection Agency. Major amendments in 1990 were made to that version of the Act. These amendments included provisions for adding "oxygenates" to gasoline, first to improve performance and then to enhance the efficiency of gasoline combustion. Products of incomplete combustion, such as volatile organic compounds (VOCs), particulate matter (PM) and nitrogen oxides (NOx) are some of the principal contributors to photochemical smog – sunlight acts on these compounds, particularly when the weather is warm and sunny, to form this particular type of bad air. The Ontario Air Quality Index, or AQI, reports the conditions in many cities in Ontario, all year round. You can look these up daily online.

www.airqualityontario.com/reports/aqi_site_map.cfm)

In Canada, the Canadian Environmental Protection Act (CEPA) covers air pollution as well as other environmental concerns. In Ontario, Regulation 419/05, the Drive Clean program and the AQI specifically target air pollution.

Two common oxygenating additives have been used in gasoline, especially since 1990. These are MTBE (methyl tertiary butyl ether) and ethanol. Both are intended to reduce emission of various nasty air pollution compounds by enhancing combustion. Recently, people have been discovering that the highly soluble MTBE has contaminated wells and ground water in a number of locations in North America. Ethanol, also very soluble, is being touted as the less frightening alternative. At the moment, there is no clear information on the cumulative toxic properties of MTBE.

Alcohol has been used for many years to provide lighting and to power engines. The first Model T cars were intended to run on either pure ethanol, gasoline or kerosene (engines differed according to fuel). Methanol, the poisonous non-drinkable cousin to ethanol, has been used for years in certain classes of car and boat racing. For an overview of alcohol use over the last two hundred years, have a look at:

http://en.wikipedia.org/wiki/Timeline_of_alcohol_fuel

Many people have pushed for the mandatory inclusion of ethanol in ordinary gasoline, and some provinces and states have legislated for this. Owners of older cars and boats now have to be aware of the damage that can be caused to both steel and rubber engine components when fuel with ethanol mixed into it has been sitting in the engine and fuel system for some time. Alcohols can act as either acids or bases, with corrosive effects. Ethanol degrades over time, and the by-products of this process can also be damaging. Like MTBE, ethanol is very water soluble. However, ethanol in small amounts probably has much less effect on the water and aquatic life, particularly as it breaks down rather quickly in most spillage circumstances. It breaks down eventually into water and carbon dioxide, the products of most simple combustion reactions. Yes, CO_2 – the greenhouse gas of most concern – is also an issue with ethanol reactions.

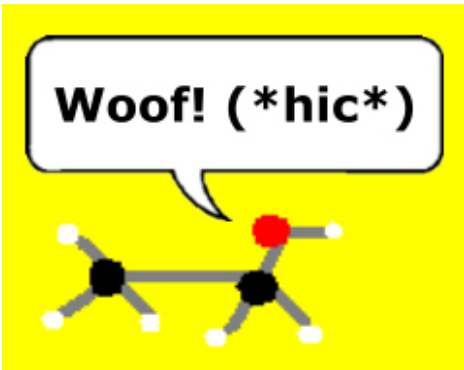
Various studies claim that corn source ethanol requires more energy to produce than the ethanol yields, while others dispute these claims. The

energy yield of ethanol and the energy required to produce it depend on a great number of factors, and supporting claims for ethanol energy yield sometimes don't include as many aspects as the disputing claims. For instance, corn and wheat growing in North America depend on petroleum-based chemicals in fertilizers, herbicides and pesticides in order to produce large crops. With increased demand for ethanol sources, crop lands are pushed even harder, with soil degradation adding to the concerns around the products used on them.

Corn producers benefit from higher prices during years when their land is productive, but people living near the poverty line, in countries around the world, may suddenly find that they cannot afford some of their corn-based staple foods.

Cellulose ethanol (CE) production, with many techniques currently being developed and some already in commercial use, depends for sources on materials that have been termed waste (such as the non-food parts of food plants) or on plants which grow with little or no chemical assistance (such as switchgrass). For this reason, 2nd generation production of ethanol is easier to defend and promote. But all sources must be processed to some extent at their point of origin, then transported to the ethanol-making facility. These additional uses of petroleum, when the machinery is still using traditional gasoline or diesel, is not always factored into efficiency studies. On the other hand, the promotion of grain ethanol has paved the way for keen interest and the funding required to develop cellulose ethanol and other biofuels. Biofuels based on algae sources show promise, although some aspects of production have their own set of environmental challenges.

Federal governments often heavily subsidize energy production – without energy, there is no society to govern. Sometime, the negative aspects of a particular form of energy production are ignored or even attacked. It is up to people using energy, whether commercially or as consumers, to be aware of the principle that Sci Fi author Robert Heinlein made popular – *There Ain't No Such Thing As A Free Lunch*. Any source of energy has some negative consequence – better sources have fewer and less drastic ones.



C2H5OH – Ethanol molecule

Glossary:

Biofuels – "Biofuel is defined as solid, liquid or gaseous fuel obtained from relatively recently lifeless or living biological material and is different from fossil fuels, which are derived from long dead biological material."(en.wikipedia.org/wiki/Biofuel)

Catalyst – substance which increases the efficiency of a reaction

Cellulolysis – cellulase enzymes are used instead of acids as catalysts for hydrolysis. Natural part of your friendly neighbourhood cow's digestive process, currently being developed for industrial applications creating ethanol

Cellulose – part of plant cell wall that makes stems fibrous; long chains of sugar molecules

Combustion – an oxidation reaction where a substance (typically containing carbon) reacts with oxygen to produce water, carbon dioxide and heat

Distillation – liquid is heated until it turns into a vapour, then the vapour is cooled until it condenses, then the condensed substance is collected. This process is used to separate a pure liquid, such as alcohol or water, from other chemical substances.

Enzyme – "organic catalyst", a group of proteins produced by living cells

Ethanol – 2nd simplest form of alcohol, it has different characteristics than methanol (simplest alcohol); it is important to distinguish between these two common substances; methanol is toxic and is more corrosive to engine parts

Fermentation – a chemical change, caused by the zymase enzyme produced by yeast, a one-celled microorganism. Typically this process converts plant sugars to an alcohol and carbon dioxide.

Ground Level Ozone – While ozone (O3, a larger molecule form of oxygen) high in the atmosphere shields us from cosmic short wave radiation such as ultraviolet, direct exposure to it at ground level causes damage to both plants and animals. Other primary components of bad air conditions are SOx (sulphur oxides, especially SO2) and carbon monoxide (CO).

Hydration – combination reaction in which water is added to a compound

Hydrolysis – decomposition reaction in which water is added to split, or decompose, a compound

Lignin – often found combined with cellulose and must be removed before cellulose can be further processed. It can be burned, without toxic byproducts, to generate steam for electrical turbines

Nitrogen Oxide compounds (NOx) – Nitrogen Oxide (NO), Nitrogen Dioxide (NO2). NO and NO2 can convert to nitric acid when combined with atmospheric vapour – this leads to acid fog and acid rain. NO3, or Nitrate, is more often directly associated with water pollution, and can cause severe oxygen uptake problems in babies.

Particulate Matter (PM) – very small particles in air which can carry toxic substances into your respiratory system

Polysaccharides – a complex type of sugar; a large carbohydrate formed from many simpler types of sugar (monosaccharides); includes cellulose and starches

Subsidy – "a grant paid by a government to an enterprise that benefits the public." (http://wordnetweb.princeton.edu/perl/webwn)

Volatile Organic Compound (VOC) – substances based on carbon which volatilize (change quickly into a gaseous state); some examples are liquid gasoline and paint solvents. These are important agents for causing ground level ozone formation.

Web References

http://en.wikipedia.org/wiki/Cellulosic_ethanol
http://en.wikipedia.org/wiki/Ethanol#As_a_fuel and
http://en.wikipedia.org/wiki/Ethanol_fuel
http://en.wikipedia.org/wiki/Panicum_virgatum [switchgrass]
www.ec.gc.ca/ceparegistry/documents/part/MTBE/MTBEReport.cfm
www.ene.gov.on.ca/en/air/ministry/index.php (Ontario Reg. 419 and AQI)
www.epa.gov/air/caa/caa_history.html
www.epa.gov/MTBE/
www.ethanolrfa.org/resource/cellulosic/
www1.eere.energy.gov/biomass/abcs_biofuels.html – U.S. Dept't of Energy page aimed at students, summary of current biofuels

Further Reading on Ethanol and other Biofuels

www.shell.com/home/content/innovation/alternative_energy/biofuels/biofuels.html
www.fireworld.com/ifw_articles/ethanol_07.php – firefighter's take on ethanol and MTBE
www.bgsu.edu/departments/envh/final492paper/ComparisonofEthanolandMTBE.pdf – comparison of ethanol and MTBE as gas additives
www.southcoasttoday.com/apps/pbcs.dll/article?AID=/20080728/NEWS/807280341 – one of many sites warning of problems with ethanol stability and effects on older engine parts
http://en.wikipedia.org/wiki/Alcohol_fuel – good overview of four alcohols (methanol, ethanol, propanol,butanol) and and their use as fuel
www.hort.purdue.edu/newcrop/ncnu02/v5-017.html – A simpler overview of CE production
www.thecesite.com/production_wiki.html – CE site with many many many links
www.theoildrum.com/story/2006/10/22/211321/89 – Article by Robert Rapier, a vocal energy critic.
www.theoildrum.com/ – an energy discussion site and http://i-r-squared.blogspot.com/ is Rapier's personal blog site.
www.biomassmagazine.com/article.jsp?article_id=2928 – Lignin and gasification
www.epa.gov/methane/ — concerns and opportunities in methane production
http://discovermagazine.com/2008/feb/if-life-gives-you-methane-make-methane-energy – natural deposits of methane and their potential recovery as energy sources
www.cbc.ca/technology/story/2008/10/07/f-forbes-naturalgas.html – another review of methane hydrates as potential energy and the dangers of extraction
http://oee.nrcan.gc.ca/transportation/fuels/biodiesel/biodiesel.cfm great brief introduction to biodiesel
www.journeytoforever.org/biodiesel_make.html – one example of many websites showing you how to make your own diesel car fuel from kitchen waste
http://en.wikipedia.org/wiki/Biodiesel – another good introduction to the many types of biodiesel and the different ways of producing them
http://en.wikipedia.org/wiki/Turbocharged_Direct_Injection
The wikipedia article on Volkswagen's highly efficient and cleaner-burning diesel technology (TDI)
www.vw.ca/vwcms/master_public/virtualmaster/en_ca/Inside/innovation__new_/engines/tdi_clean_diesel.html
Volkswagen's Canadian sales site has a brochure which briefly describes Clean Diesel technology

Book References

Hart, H., Craine, L. & Hart,, D. (2003). Organic Chemistry, 11th edition. Boston: Houghton Mifflin Company
Robert Heinlein. (1966). The Moon is a Harsh Mistress. New York: Ace Edition (1987)
Uvarov, A. & Chapman, D. (1971). A Dictionary of Science, 4th edition. Markham: Penguin Books Canada
Wright, R., & Nebel, B. (2002). Environmental Science, 8th edition. New Jersey:Prentice-Hall Inc.
Zimmerman, I. & Zimmerman, H. (1983) Elements of Organic Chemistry, 2nd edition. New York: Macmillan Publishing Co. Inc.

Ethanol Curriculum Connections for further study/extensions

1. Comment on corn ethanol paving the way for other ethanol sources being developed/used.
2. Investigate Shell energy company definitions of biofuel and evolution stages.
3. Investigate biodiesel sources for energy efficiency – eg. Algae as an energy source – energy in compared to energy out.
4. Investigate the history of ethanol use; racing alcohol, flex fuel/E85, Model T, ethanol mix.
5. Science curriculum, Gr. 12 Chemistry, D. Energy Changes and Rates of Reaction, pg. 112 – Sp. Exp. D 1. Relating Science to Technology, Society, and the Environment; D1.1 Sample Question – *What are the advantages and disadvantages, in terms of efficiency and environmental impact, of using corn to produce ethanol fuel?*
6. Science curriculum, Gr. 11 Environmental Science (SVN3M), B. Scientific Solutions to Contemporary Environmental Challenges, pg. 154 – Sp. Exp. Relating Science to Technology, Society, and the Environment; B1.1 Sample Issue – *Greenhouse gas emissions from motor vehicles are a major contributor to global warming. The use of ethanol and other biofuels in motor vehicles reduces these emissions. However, diverting crops from food production to fuel production can increase prices and decrease the supply of food.*
7. Science curriculum, Gr. 11 Environmental Science (SVN3M), F. Conservation of Energy, pg. 162 – Sp. Exp. Relating Science to Technology, Society, and the Environment; F1.1, sample question – *How can the use of ethanol reduce the amount of petroleum needed to run cars?*
8. Readings can be used to investigate for bias.

Jennifer Dowker is a graduate of the Environmental Technology program at Fanshawe College in London, Ontario. She is actively looking for employment in the environmental sector, and has a lifelong interest in education and in writing

Is it Going to Rain Here Soon? Reading the Radar

Jennifer Dowker

Grade Levels:[5-8]

The following article will be useful for the Grade 5 expectation: "analyse the effects of forces from natural phenomena (e.g., tornadoes, hurricanes, earthquakes, tsunamis) on the natural and built environment". It will also be useful for other grade levels, including those that deal with climate change and extreme weather events.

Key Words / Topics: ["Developing investigation and communication skills", "Relate science and technology to science and the environment", "Understanding Earth and space systems", science, media, technology, weather/meteorology]

Introduction:

Have you ever seen the radar image on the weather forecast on TV and wondered what it meant? If you go to the Environment Canada website, you can watch what is happening with the weather all around you. One of the ways you can do this is by keeping an eye on the radar images. To see where precipitation [rain, snow or ice pellets) is happening around London, you can go to a web page where a radar station in Exeter updates the images it sends to the site every 10 minutes:

www.weatheroffice.gc.ca/radar/index_e.html?id=WSO

Over 98% of Canada is covered by weather radar, so look up the radar station closest to where you live so see if you are likely to be swimming, or playing card games, on a summer afternoon.

Information:

How Doppler Weather Radar Works

- The radar emits microwave radiation (wavelengths are several cm long) in narrow beams
- These beams are emitted in pulses (Figure 1)
- Water droplets, ice crystals and hailstones scatter the radiation (bounce it) back to the radar in the time between pulses
- Computer software at the radar station records how intense the signal is: usually, a more intense bounced back signal means more intense precipitation (rain or snow). This information is used to create weather maps
- Precipitation that is closer to the radar will bounce back a signal faster than precipitation that is further away
- The different intensities are colour coded on the radar display, with purple and red being the most intense and blue and green the least intense (Figure 2)
- The radar rotates slowly and tilts up and down, so that a picture of precipitation develops all the way around.
- All these images are stored and examined so that meteorologists can make predictions about precipitation several hours ahead by seeing trends in intensity and movement.

Figures 1 & 2: The radar sends out narrow beams. They bounce back from the rain. The radar station uses the bounced back signals to create an image on a map.

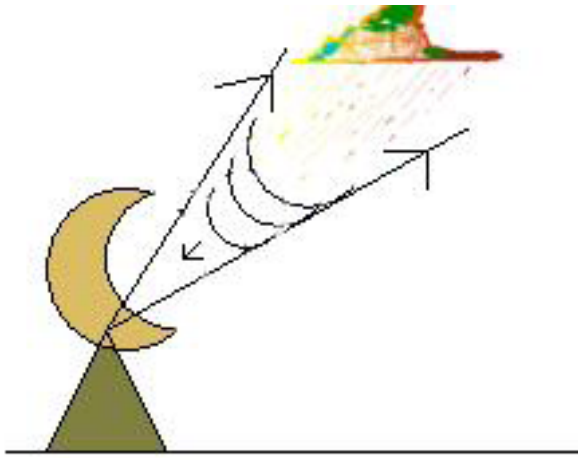


Figure 1

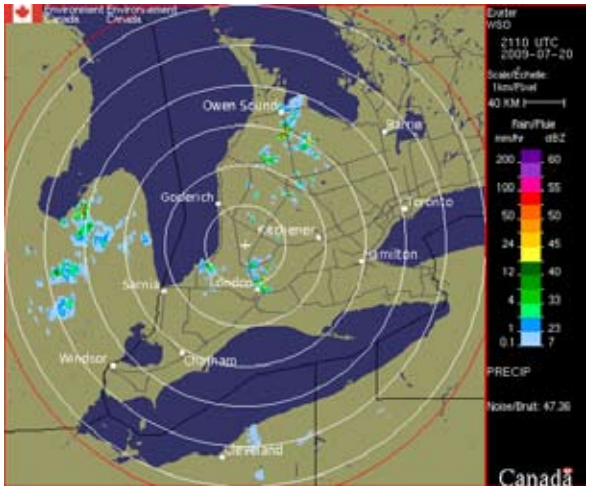
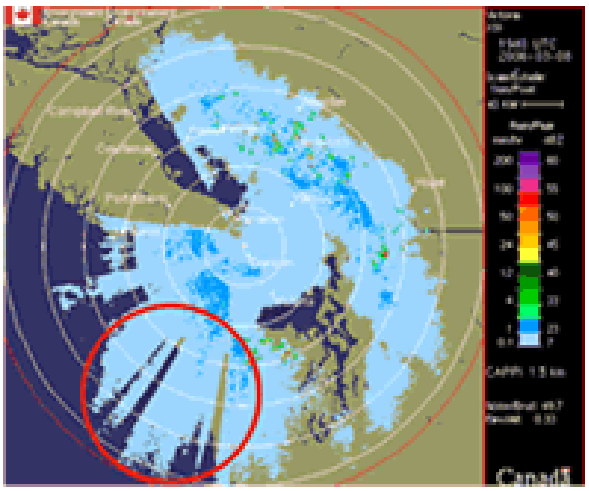


Figure 2

Common Errors in Weather Radar Interpretation

Blocking Beam

- Hills and mountains can block the outgoing microwave beam from reaching the sky
- This looks like long empty streaks in the radar image
- This is common in Newfoundland and near the Rockies

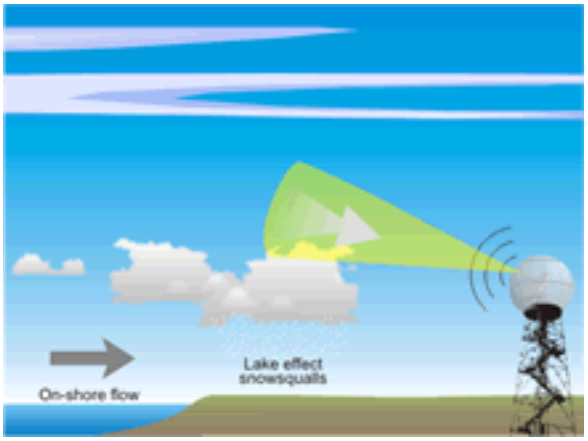


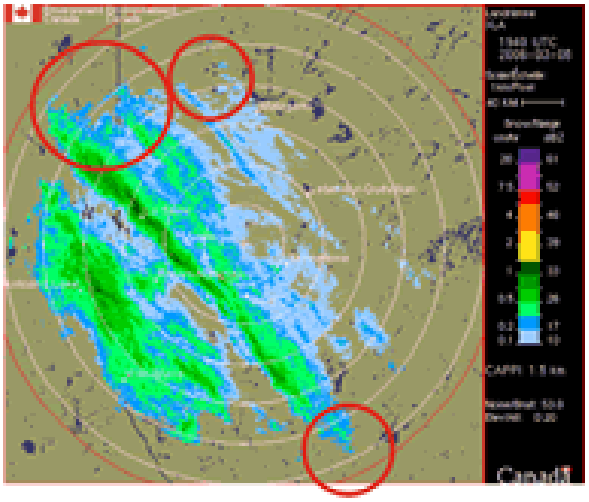
Beam Attenuation

- Storms that are close to the radar absorb most of the microwave energy, so less of the beam reaches past the storm to detect other precipitation

Overshooting Beam

- Some intense precipitation, such as 'lake effect' snowsqualls, comes from clouds very close to the ground, so the radar beam might pass over much of the area
- The image may show little precipitation when very intense precipitation is actually happening

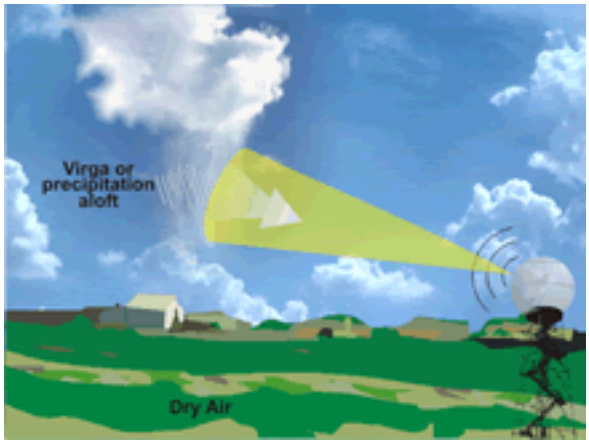


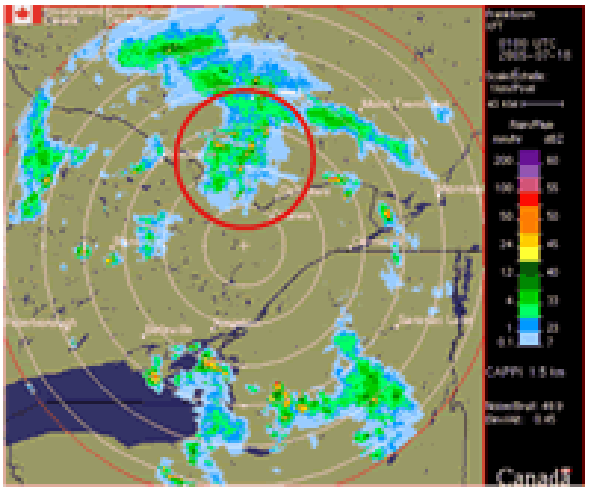


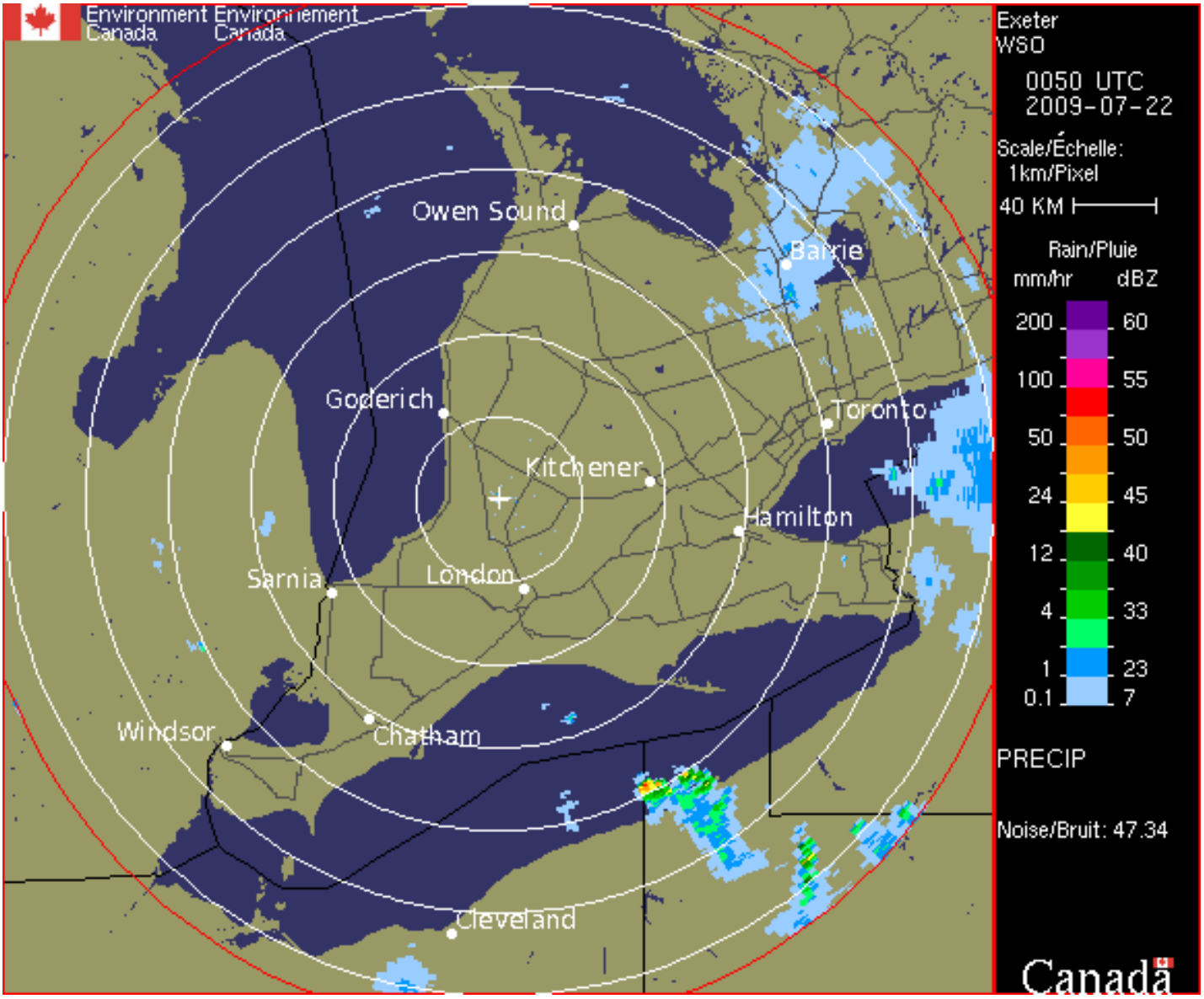
Common Errors in Weather Radar Interpretation (Cont'd)

Virga (vur-gah)

- This is precipitation that happens only in the sky and doesn't reach the ground
- When conditions at ground level are very dry, the dry air absorbs all the moisture from the air before it can reach the ground
- The radar image shows precipitation, even though people on the ground aren't experiencing it







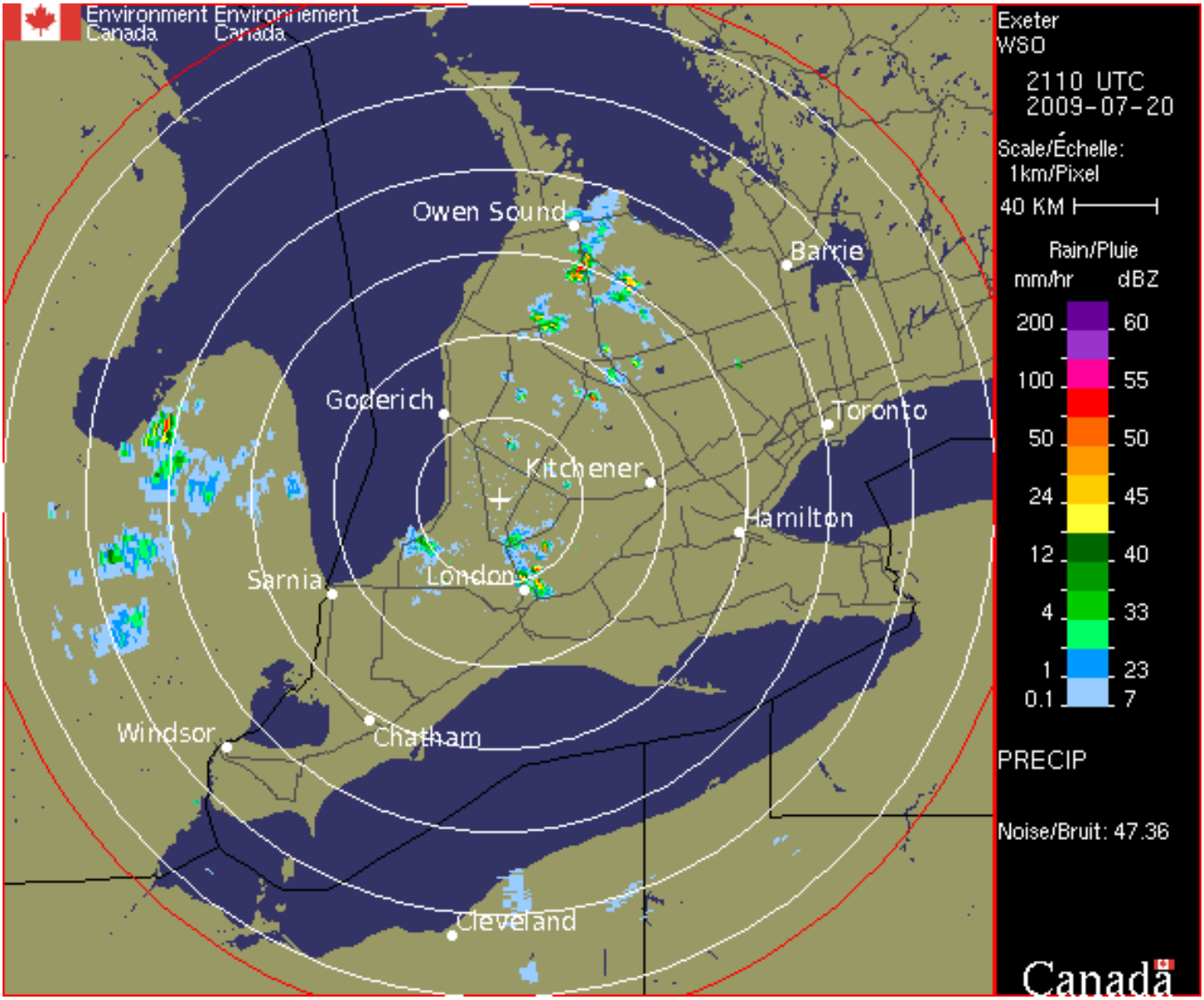
Clear weather around London, Ontario. Do you see the tiny blue dots north of the city, between London and Kitchener? They are caused by ground clutter. Compare this radar image to the large image on pg. 20, showing stormy weather developing later the same day.

Ground Clutter

- This is like beam blocking, only the beam is reflected by tall buildings, trees and hills
- Meteorologists have to learn what the common pattern (the ground clutter signature) is in each area so that they can tell the difference when there is actual precipitation

Anomalous Propagation (AP)

- When there is a layer of warm air over a layer of much cooler air, this is called a temperature inversion. The radar beam can't pass between the layers and bends back towards the ground
- The radar image shows intense precipitation where there isn't any
- This happens most often during the early morning when the weather is clear, and it might take until midday for the inversion to disappear and the false signals to end



Stormy weather developing around London, Ontario, later the same day. Can you see where the more intense rain is happening in the system near the city? (It is shaped a little like a capital letter "E".) Notice that there is still some 'clutter' above it (to the north)

Exercise:

Go to www.weatheroffice.gc.ca/radar/how-to-use_e.html and find the answers to these questions.

1. Where does the word "radar" come from? [Radio Detection and Ranging, used since the 1940's. Relate to tech history/ WW2 studies!]
2. How many different views of radar images are on this website? What are they? [3 – National, Regional, Local. Can students define these more specifically?]
3. How far can the radar beams reach ? [up to 250 km around a station]
4. How is radar used in weather forecasting? (three specific examples) [Early detection of 1. developing precipitation, 2. thunderstorms 3. "high impact" weather. Can students think of examples of #3? How might a thunderstorm look different from light rain? Hint: colour code]

Glossary:

Anomalous	Not usual; abnormal; weird
Attenuation	Less force; thinner; lesser signal
Doppler radar	Measures how fast something is moving away by measuring the Doppler shift – the number of radiation wavelengths in a second change as the object moves towards or away from you. The number of wavelengths passing a point in a second is called the ***frequency****, and uses a unit of measurement called Hertz (Hz).*
Emit	Sends out a signal
Interpretation	Explaining or understanding
Lake Effect	The effect that large lakes have on weather. There is usually more snow on the side of the lake the wind is blowing towards, and the area around a lake has more moderate temperatures (cooler in summer and warmer in winter).
Meteorologist	Person who studies the air and past weather (meteorology) so they can forecast the weather (make a good guess what the weather will be in the near future).
Microwaves	Electromagnetic (EM) wavelengths between 0.1 and 30 cm long; next to infrared on the EM spectrum; a kind of radio wave. These wavelengths are used because they can penetrate clouds and travel a long way. Microwaves are also used to cook food in microwave ovens. Some parts of the food (water, sugar, fats) absorb the microwaves, which makes the molecules move around very quickly, heating the food.
Propagation	Describes how a signal travels (fast or slow, for example)
Pulse	Either a single vibration, or a regular series of vibrations. The signal is sent (emitted) with pauses between each sending (emission).
Radio	Part of the EM spectrum, described in frequency instead of wavelength, from 30 Hertz (30 Hz) to 300 Gigahertz (300 GHz). The big numbers (large frequency) part of the spectrum overlaps the microwave range of wavelengths.

Resources used:

www.msc-smc.ec.gc.ca/cd/factsheets/weather_radar/index_e.cfm Environment Canada, "Common Interpretation Errors", printable for handouts

www.weatheroffice.gc.ca/radar/how-to-use_e.html Environment Canada, "How to use Weather Radar"

http://home.howstuffworks.com/microwave2.htm Straightforward explanation of microwave cooking on "How Stuff Works" site, some spelling errors, good springboard to other device explanations

www.stuffintheair.com/map-radar-weather.html good general 'how it all works' site, intermediate/senior physics

Understanding Weather & Climate, 4th Ed., Eduard Aguado and James E. Burt, Pearson Education Inc., 2007, p.205

Penguin Dictionary of Science, 4th ed., 1977

www.weatheroffice.gc.ca/radar/index_e.html?id=WSO Exeter radar station images (static and "animated" gifs)

Jennifer Dowker is a graduate of the Environmental Technology program at Fanshawe College in London, Ontario. She is actively looking for employment in the environmental sector, and has a lifelong interest in education and in writing

Feature

Garbage That Flies

An Integrated Exercise in Rethinking

John Etches

Educators require lessons that provide positive student motivation, facilitate class focus and fulfill curricular outcomes. Students crave activities that don't make them feel like they are in school. The following lesson accomplishes all of the above. Through this hands-on activity, students become involved in the rethinking of paradigms concerning garbage, consumerism and creativity. The lesson is conceptually palatable for a wide range of grades, the fun factor is high, and the cognitive pay-off is excellent. It also includes an enjoyable outdoor activity.

Figure 1: Small flying discs are made easily from materials that would otherwise go to the dump

This exercise reuses two items that cannot be recycled, CD's (or DVD's), and plastic box strapping. Through the reuse of these materials, students create a toy and ultimately a game. The resulting toy is a small flying disc like a Frisbee™ that flies extremely well, which can then be used to play catch or a bocce/golf-like game. The lesson is easy to set up and conduct successfully with students.

Background

In many cases, small changes in behaviour can make big differences in people's impact on the environment. However big or small those changes might be, they all require one common element. Choosing to refuse, reduce, reuse, repair or recycle all involve rethinking. In this context, rethinking refers to the formulation of new possibilities through the application of new knowledge. Rethinking provides the bridge between wanting to make a change and actually acting on that desire. Without rethinking, the motivation to change a behaviour does not get translated into action.

The conversion of information into new ideas is also the essence of creativity. In this sense, rethinking and creativity are closely linked. By viewing materials in a completely different light, students' minds are opened to fresh opportunities. The rethinking of how to use materials that would otherwise be considered garbage is an expression of real creativity. This lesson guides students through a complete creative and transformative conceptual process.

Garbage > Rethink > Craft Activity > Toy > Game > Fun-Skill-Exercise

Making such an item out of garbage helps students to overcoming an intellectual bottleneck by providing an avenue through which to practice rethinking. Inherently, rethinking also includes the changing of, or at least, the challenging of a previously held perception, belief or behaviour. Hopefully students will take what they learn during this lesson and apply the idea of rethinking to other actions, decisions and situations they are faced with in their lives.

Figure 2: Students think the garbage discs are cool

The hands-on nature of the activity provides students with the satisfaction of making something truly original and fun. The reuse of the materials keeps garbage out of the landfill. By creating a toy with garbage, an additional 'thing' was not bought, which in turn reduces the amount of resources used in manufacturing and packaging while lessening associated pollution.

Neither the plastic strapping nor the CD's are accepted for recycling in most areas. The CD's are a mixed material item made up of plastic, metal and inks. The strapping is not accepted for two reasons. Due to its toughness, the strapping gets tangled in shredding machines and causes breakdowns. Strapping is also often made of recycled materials and may contain a mixture of plastics.

Curriculum Connections

The Ontario Ministry of Education document *Environmental Education: Scope and Sequence of Expectations, The Ontario Curriculum, Grades 1-8, 2008* acknowledges the role that environmental education can play in a number of subjects. The document directly suggests the incorporation of environmentally related content in all elementary grades to assist in the fulfillment of outcomes without being specific about subject matter.

In particular, this lesson could be used to great advantage as a cross-curricular tool in the subjects The Arts, and Health and Physical Education. In this regard, the lower grade limit the author is suggesting for the lesson is Grade 3.

This lesson also satisfies specific outcomes in the following grades, subjects, strands and units in the Ontario curriculum;

Grade 5, Science and Technology (2007), Understanding Earth And Space Systems: Conservation Of Energy and Resources

Grade 6, Science and Technology (2007), Understanding Structures And Mechanisms: Flight

Grade 7, Science and Technology (2007), Understanding Life Systems: Interactions In The Environment; Understanding Matter And Energy: Pure Substances And Mixtures

Grade 11, Environmental Science (2008), Reducing and Managing Waste

There is also an opportunity in Grade 11 and 12 Physics for the analysis and interpretation of observed phenomena. The stability of the discs in flight appears to be optimized by using the 5/16 inch (9 mm) width box strapping. Flying discs made with smaller 3/16 inch strapping or the larger 7/16 inch strapping are less stable. The explanation of this phenomenon in terms of interrelated forces could serve as the basis of an assignment or project.

Time Required: 1.5 hours

If necessary, this lesson could be split into two 45 minute periods.

Equipment and Materials: (Figure 3)

- discarded CD's or DVD's (at least one per student, plus 6 others for instructor practice, demonstration, and game targets)
- discarded 5/16 inch (9 mm) width plastic box strapping (enough for one length per student, 39 cm long each)
- rolls of 1 inch masking tape (green painter's tape works and adds colour)
- scissors
- rulers or metre sticks
- pencils
- assorted stickers, markers
- ~ 6 discarded 50 (or 25) CD bulk cases, bowls or manufactured flying discs for game targets
- at least one manufactured flying disc as an example

Figure 3: Ensure there are enough CD's and lengths of box strapping for all students

Preparation

As part of the rethink/reuse cognitive package, ask students to collect and bring in old CD's or DVD's from home. To ensure you have enough discs to conduct the activity, collect at least one disc per student from computer stores, IT departments of your school or large businesses/agencies, used CD shops, video rental stores, etc. It will be easy to collect enough discs for your class.

The plastic box strapping can be collected from hardware, building supply, or office supply stores. It is important to collect and use the 5/16 inch (9 mm) width strapping. Discs made with smaller 3/16 inch strapping or the larger 7/16 inch strapping do not fly as well.

Practice making a finished disc beforehand so that demonstration with the class goes smoothly. Once materials are assembled, it takes only about

ten minutes to make one finished flying disc. It will take the students a little longer because of the sharing of resources.

Arrange the classroom into group activity stations. Provide masking tape, scissors, rulers, pencils and a quantity of box strapping to share at each station. Each student needs one CD.

Activity Introduction (5 - 10 minutes)

Introduce to the class that they are going to make toys out of garbage and play a game with the toys. Show the students a finished product and how well it flies. Students will think it is cool that it's made out of a CD. This is all the introduction the activity needs. The introduction highlights only the bolded points within the conceptual sequence. The other points are brought forward during the debrief, after the students have completed the activity;

Garbage > Rethink > Craft Activity > **Toy > Game** > Fun-Skill-Exercise

Make The Discs (25 minutes)

Start by gathering students together and demonstrate how to make a disc. Follow with direct student activity. It may be prudent to guide the whole class through the instructions step by step.

1) Provide CD's, masking tape, scissors, box strapping, rulers, and pencils to each activity group.
2) Measure and tear off a length of tape 39 centimetres long. Lay down flat on the desk with the sticky side up.
3) Choose which side of the CD you want showing as the top of the finished disc.
4) Stand your CD on its edge on the tape slightly off the centre line of the tape length. Less of the tape width should be on the side of the CD you want showing as the top, and more of the tape width on the side you want as the bottom. Carefully roll the CD down the tape while maintaining the off centre tape widths until the entire CD has tape stuck around its edge (Figure 4). If necessary, add tape to make sure that the entire CD is ringed with tape.

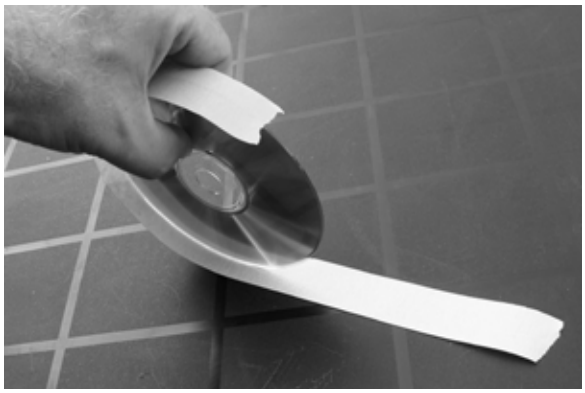


Figure 4: Roll the CD slightly off the centre line of the tape

5) On only the side of the CD that you want to be the top, fold the tape tightly over onto the CD surface. Press tape down firmly with your fingers (Figure 5).

Figure 5: Bend and crimp the narrower side of the tape ring tightly onto the CD first

6) Lay the CD on your desk with the remaining unstuck tape pointing upwards like a ringed wall around the CD.
7) Gather a length of box strapping, scissors, ruler and pencil. Measure and cut the strapping to a length of 39 centimetres.
8) With your fingers, straighten out any bends or crimps in the strapping. These will come out with a bit of finger work.
9) Loosely coil your cut length of strapping and place onto the CD inside the ring of tape. Stand the strapping up on its edge so that it forms a circle inside the ring of tape (Figure 6).

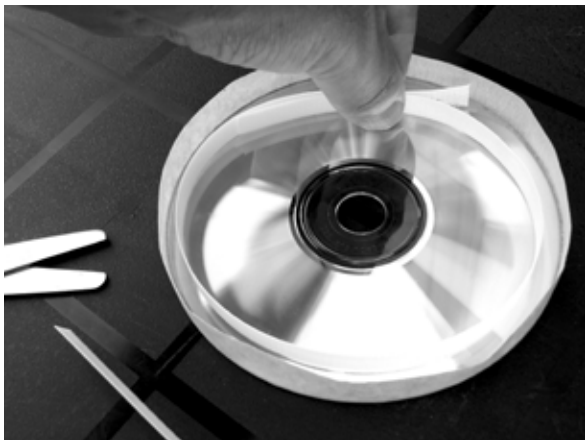


Figure 6: Make sure the strapping is sitting down on the CD before sticking it to the tape

10) Press the strapping against the tape. Work the strapping onto the tape evenly all the way around while making sure that the thin edge of the strapping is sitting down directly on the CD. If the strapping sticks to the tape out of position, just peel it off the tape and reposition. The ends of the strapping will overlap. This is okay; the overlap provides strength to the ring of strapping.

11) Fold the remaining sticky ring of tape over onto the inner surface of the strapping. Work all the way around making sure that the tape has firmly stuck to the inner surface of the strapping (Figure 7).

Figure 7: Tightly fold over the remaining sticky part of the tape onto the strapping

12) Inspect your tape work all around the CD. Make sure the tape is firmly stuck everywhere. Burnish all tape bubbles and wrinkles down with your fingernail (Figure 8).

Figure 8: Use a fingernail to flatten out all the tape wrinkles

13) Decorate your flying disc if time allows, or during another period. Use paint or markers to colour the masking tape and disc. Apply stickers if desired. At least have students write their name or initials somewhere on the disc so it can be identified during game play.
14) Students who make their first disc quickly could make a second disc for use as target discs to play the bocce-golf game. Have a few extra discs on hand for this purpose.

Playing Disc Bocce-Golf (35 minutes)

Take students outside with their discs. Before starting the game, have students split up into pairs and spend about 10 minutes playing catch with the discs to practice throwing and aiming. Ensure students are at least 4 metres apart to start (~6 steps).

The discs are small, light, and are sized perfectly for small hands. They fly very well with a lot of wrist-flick (lots of spin) and without too much arm swing. Move the throwing arm in a backhand swing like in tennis or badminton with a smooth, level motion. Feet and shoulders should be lined up in the direction of the intended target. Demonstrate and provide students with tips on throwing.

Note: depending on the grade and level of students, it may be enough to just play an extended game of catch within the available time. Increase distance between students as throwing skill improves. Give students the challenge of accurately throwing and catching the discs over as great a distance as possible.

Figure 9: Instruct students to throw the discs gently at first until they get the hang of it

To play the bocce-golf, it will be useful to divide the class into play groups of approximately five students.

Begin the game by throwing a target disc a distance out into an open space. An actual Frisbee™ or other manufactured flying disc serves well as a target disc; it can be flipped it over to provide a bowl-like target. Alternatively, a garbage disc could be tossed out to establish the target location, and then replaced with a bowl, box or other vessel. To simplify, the goal for students could be to toss their discs to touch the target disc in any manner.

Start with a short distance and increase as students become more confident with aiming and throwing the discs.

Play the rest of the game like golf. Participants take turns tossing their discs trying to land their discs on or in the target.

If upon the first throw, a participant's disc lands touching the target disc in any way, it is to be considered a "hole in one".

Record the number of throws. The participant sinking their disc in the holes or touching the targets using the fewest throws is the winner. Adjust the number of holes to the available time.

Activity Debrief (20 minutes)

Answers in brackets

1) Ask students if they had fun playing with their discs. Hopefully the answer will be (Yes). Ask students what they think of their flying discs.
2) Highlight that the class started the exercise with a bunch of garbage that would have otherwise gone to the landfill. The exercise reused two items that cannot be recycled; the CD's or DVD's, and the box strapping.
3) Describe the following conceptual sequence. This could be pictured on the blackboard to highlight the key words;

Garbage > Rethink > Craft Activity > Toy > Game > Fun-Skill-Exercise

- As a class, we started with a bunch of *Garbage*.
- By *Rethinking* the value of the garbage, we figured out how to make something fun out of the trash.
- This gave us what we needed for a fun craft *Activity*.
- By the end of the *Activity*, we had all made a *Toy*, and a good toy!
- With our garbage toy, we played a *Game*.
- By playing the game, we all had *Fun*, gained a *Skill* by learning how to throw (and make) the discs, and got some great outdoor *Exercise*.

We had fun with garbage.

4) After making the flying discs, are the original materials still considered to be 'garbage'? (No)
5) When does something become garbage? (When someone decides that an item is of no further value)
6) Who decides whether or not something is garbage? (Individuals.... it is an individual choice)
7) May one person think of an item as garbage, and another person may not? (Yes)
8) How much did our new toys cost? (Other than the shared cost of tape, scissors, etc., there was no cost involved)
9) Is garbage always useful? (There is no one answer to this question; sometimes yes, sometimes no)
10) Does playing with garbage mean a person is poor (No), or is it just a matter of being creative and smart?? (Yes)
11) What takes more energy and resources to manufacture; a new item made of brand new materials, or an item made out of reused or recycled materials? (New items and materials)

In conclusion, garbage can be fun. Garbage can be useful. Garbage isn't a dead end. Garbage sometimes represents possibilities instead of just ending up as trash. By rethinking, reusing, repairing, and recycling, we keep materials from being dumped in the landfill and are less wasteful. We use resources and energy more wisely by reusing instead of always making new materials and items. Using fewer resources also creates less pollution.

The same rethinking applies to all the other R's, that is:

- Refuse
- Reduce
- Reuse
- Repair
- Recycle

Rethinking makes all environmentally responsible behaviours possible.

A note on repairing the discs: through use, the outer edge of the tape will eventually get worn and the box strapping rim will separate from the CD, especially if playing on hard pavement. As soon as the rim of strapping starts to separate, add more masking tape and the flying disc will be as good as new! This could expand the lesson into a full discussion about the value of repair.

Extensions and Resources

- Ask each student to rethink other garbage items and come up with alternative uses.
- Watch the excellent 20 minute on-line video "The Story of Stuff" concerning the social, environmental and economic impacts of consumerism: www.storyofstuff.com. Website includes other useful resources.

Flying disc physics:

- www.mansfieldct.org/schools/MMS/staff/hand/Flightfrisbee.htm
- www.mta.ca/faculty/science/physics/eJournal-Mechanics/Frisbee.pdf
- www.csa.mtu.edu/courses/presentations/isaac.ppt

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L'Institut Jane Goodall Institute

Incredible Opportunity to Participate in an Environmental Education Program for Primary School Teachers in Uganda

We are looking for several highly motivated teachers to work with the Jane Goodall Institute to participate in a teacher training programs in Uganda. There will be two opportunities to be part of this program in 2010: the first is over March Break 2010; the second is a for a period of three weeks, dates to be determined, in July. The program will focus on the use of learner-centred teaching methods as well as the integration of Environmental Education into the Uganda Primary School Curriculum (UPSC).

These workshops are organized by the Jane Goodall Institute of Uganda, with support from the Jane Goodall Institute of Canada.

The Jane Goodall Institute is a global non-profit organization that supports wildlife research, conservation and education, with the primary goal of ensuring the survival of great ape populations through community-centred conservation activities in Africa. The Institute also promotes sustainable livelihoods and nurtures new generations of committed, active citizens around the world. The Institute has a well-established program in Uganda, running wildlife protection, conservation and environmental education programs from its head office in Entebbe. Workshops for teachers in rural districts are a key component of the environmental education program, and the Institute has already successfully delivered several workshops.

The Program in Uganda:

The first week would be an orientation for the teachers to familiarize themselves with Uganda and the Jane Goodall Institute' s educational programs at the JGI office in Entebbe. This will include classroom visits and meeting with primary school teachers in Entebbe in order to gain a better understanding of the classroom setting in Uganda.

The workshops will be run on the second week in Masindi District and will run from Monday to Thursday with a field visit in between. Return to Entebbe on Friday.

The workshops will be held in rural parts of Uganda, and will cover the material laid out in teacher's guides produced by JGI as well as the fundamentals of cooperative learning techniques.

The July program will follow a similar format.

Qualifications Required:

- A relevant Teaching Certificate and exposure to environmental education.
- Hands on experience with delivering workshops and/or training programs.

Inspirational Films for Environmental Science

Ellen Murray

As an environmental science teacher finding ways to integrate social, political and economic issues into the curriculum is a challenge. This column reviews two films that educate and inspire students, educators and environmentalists to work for a more sustainable future.

1. Taking Root: The Vision of Wangari Maathai

I saw the documentary *Taking Root: The Vision of Wangari Maathai* at Vancouver's Projecting Change: Sustainable Environmental Film Festival in 2008. This uplifting narration follows Wangari from her childhood in a Kenyan village to a life of many firsts. She was the first East African woman to earn a PhD, the first to serve as chairperson of a university department, and in 2004 Wangari became the first African woman to earn a Nobel Peace Prize for "her contribution to sustainable development, democracy and peace."

She was the moving force behind the Green Belt Movement which encouraged women to gather seeds, grow seedlings and plant trees. As a biologist Wangari understood that planting trees would combat desertification, deforestation, water crises, and rural hunger. In addition to direct environmental action Wangari was also teaching people how to organize and stand up for their human rights. She was repeatedly targeted by President arap Moi for her work to free imprisoned activists, to protect commonly held land resources and for opposing development of Nairobi's only major park.

This inspirational DVD is 80 minutes long and can be ordered from Mongrel Media, www.mongrelmedia.com via Indigo for $30 Canadian. I have used this documentary with SVN3M students to kick start discussions about resource ownership and use, the role of politics in setting environmental standards, the importance of economic factors in deciding how natural capital resources are managed and the power of people to effect social change.

This film also leads to exploration of the parallels with Canadian colonial history and resource use and the situation in Kenya. Some students' misconceptions about developing countries are challenged as the Kenyans struggle to solve their own problems without aid money. I highly recommend the addition of this DVD title to any school library for use in World Issues classes as well as Environmental Science classes.

2. The Story of Stuff

This densely fact filled video should be required watching for everyone teaching science, business or geography. The website, www.storyofstuff.com, summary of this video states:

> *From its extraction through sale, use and disposal, all the stuff in our lives affects communities at home and abroad, yet most of this is hidden from view. The Story of Stuff is a 20-minute, fast-paced, fact-filled look at the underside of our production and consumption patterns. The Story of Stuff exposes the connections between a huge number of environmental and social issues, and calls us together to create a more sustainable and just world. It'll teach you something, it'll make you laugh, and it just may change the way you look at all the stuff in your life forever.*

The focus for my SVN 3M course is on sustainability and how to combat the three major threats to sustainability; overconsumption, overpopulation and poverty. I have used this free 20 minute streaming flash video to introduce the SVN3M course and the concepts of sustainability and ecological footprints. It is a great introduction to the waste unit too. This film challenges students who lead a consumer focussed lifestyle to consider the consequences of buying a lot of stuff, using it once or twice and then throwing stuff "out".

The teaching materials available free on the website are high quality. The annotated script is essential for follow-up discussion since the film packs too much content into 20 minutes. I have divided the annotated script into the six film topics of extraction, production, distribution, consumption, disposal and another way, asking each group to make a concept map linking their topic to health, energy use, waste and natural capital resource use.

In another class we analysed the script by looking for opinions and supporting facts. Students were then asked to research alternate points of view. The website has an extensive list of websites, non-government organizations and books that can be used for further research. While these lists are far reaching there is a strong bias towards a less consumer oriented lifestyle.

Annie Leonard's research is incredibly detailed but I am not always comfortable with her use of sensationalist examples to make her point. As well, students need to be prepared for the American

viewpoint behind this film. There are strong political messages about governments, corporations and individuals rights and responsibilities. However, the ending is positive with a focus on actions that students can take.

This film can also be streamed with French subtitles for senior French immersion students. The Story of Stuff is not appropriate for use in a class with a large number of ESL students due to the fast paced delivery and the vocabulary level of the film. I look forward to reading the *Story of Stuff* book due out in March of 2010.

If you do not have access to streaming video in your class you can order the DVD on the website. You can make a $10 U.S. donation to the *Story of Stuff Project* and receive the DVD as a thank you gift for your donation. So some evening, when you should be marking, preparing your next class, or going out for a walk, instead go online and watch the Story of Stuff. This is a highly instructive film that all teachers should watch.

Ellen Murray is OSEE Central Region Director

Eco-Action Funding Available

Opportunity: Funding for Environmental Projects in Canada
Deadline: November 1, 2009
Organization: EcoAction Community Funding Program
Website: www.ec.gc.ca/ecoaction/what_is_e.html
Location: across Canada

Since 1995, Environment Canada's EcoAction Community Funding Program has provided financial support to community groups for projects that have measurable, positive impacts on the environment. Funding support can be requested for projects that have an action focus, a community capacity building focus, or a combination of both objectives.

EcoAction encourages project submissions that will protect, rehabilitate or enhance the natural environment, and build the capacity of communities to sustain these activities into the future. Projects require matching funds or in-kind support from other sponsors.

Non-profit groups are eligible to apply to the program. This includes, but is not limited to: community groups, environmental groups, aboriginal groups and First Nations councils, service clubs, associations, and youth and seniors' organizations. Private sector organizations, educational institutions, and municipal, provincial/territorial and federal governments are not eligible applicants, but are encouraged to partner with non-profit organizations.

In keeping with major Environment Canada and Government of Canada environmental priorities, EcoAction supports projects that address the following themes:

- Climate Change - projects focusing on reducing greenhouse gas (GHG) emissions that contribute to climate change
- Clean Water - projects focusing on the diversion and reduction of substances that negatively affect water quality (e.g., pesticides, fertilizers, household hazardous wastes, etc.) and on the conservation of water resources;
- Nature - projects focusing on protecting wildlife and plants, and protecting and improving the habitat where they live (e.g., grasslands, rivers, forests, etc.); and,
- Clean Air - projects focusing on reducing air emissions that contribute to smog and issues with air toxins.

Submission deadline is November 1st annually. The maximum amount available per project is $100,000. Applicants must ensure that at least 50 percent of the total value of their project comes from sources other than the federal government.

To obtain more information on applying to the EcoAction Community Funding Program, link to the Your Project: Start to Finish page. For more information on developing a project and on other funding sources, go to the Before You Begin page.

Should you have any comments or questions about this website or EcoAction, please contact us.

Curriculum Review Process Returns to Teacher Secondments

News from the Ministry of Education by way of the Ontario Teachers Federation tells us that the review process has gone from the present leave of absence approach, back to the process of seconding teachers from boards. This makes things much easier (and better) for the CR process because teachers who want to be involved in Curriculum Review do not have to give up seniority, pay into the pension themselves or any of those requirements that were in place last year under a Leave of Absence.

Curriculum review starting this September is Social Studies, Geography and History, Grades 1-8; Canadian and World Studies, Grades 9-12 (Geography and History).

Cyndie Jacobs, Ontario Teachers Federation, 416-966-3424 ext 315, cyndie.jacobs@otffeo.on.ca

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The Name is the Financial Game

I heard a story on the radio recently about a Beluga giving birth at the Vancouver zoo. The final line in the story was that the young Beluga had not been named yet. The implication was that "naming" a young wild animal is a vital step in the birth process.

I'm here to challenge that philosophy of "naming" zoo animals.

For example, at the Santa Barbara Zoo, in California, their web site says:

> *Imagine if you were able to name a monkey, penguin, or other animal at the Zoo, and tell all your friends and family that you named it? Everyone- the Zoo staff, visitors, even the media, would refer to the animal by the name you chose. Well, at the Santa Barbara Zoo that is entirely possible!*

Many of the Santa Barbara Zoo's animals have been named by generous donors; for example, Docha the lion, Pee-Gloo the penguin, and Raylee the meerkat. These are just some of the animals that have been given names by donors. But there are many more animals that have yet to be named including two new Goeldi's monkeys and four Humboldt penguins!

"A donation of $10,000 is required to name an animal. A brass plaque will be mounted at the animal's exhibit, which displays both the animal's name and your name. You also become a Premier Foster Feeder: benefits include a Foster Feeder certificate, lunch with your animal's keeper, and a behind the-scenes tour of the Zoo. The name you give your animal is permanent, and you may renew your Foster Feeder sponsorship annually for a donation of $5,000 to retain the plaque at the exhibit site."

How about the Greater Los Angeles Zoo Association which, according to their web site, is "proud to offer groups and individuals an opportunity to name a Zoo resident". Of course, a sizeable donation is required to make that happen.

"A program of imperial distinction, the animal naming program provides groups and individuals an opportunity to develop a deeper connection with a Zoo resident while supporting the Zoo's animal acquisition fund, which promotes vital wildlife preservation and breeding projects here and around the world."

"Express your commitment to the Zoo's important conservation programs, enhance your next Zoo visit, consider naming an animal to honor a loved one, or commemorate an important occasion when you name an L. A. Zoo resident."

Many animals are available for naming with donations commensurate with the animal species chosen (www.lazoo.org/animals/index.html). Donors with L.A. Zoo "namesakes" receive the following privileges:

- Opportunity to name your "wild child"
- Recognition in Zooscape, the Zoo's monthly newsletter
- Recognition in Zoo publications when your animal is featured
- Official certificate and photograph
- Commemorative plaque presentation ceremony and VIP tour, with a visit from your animal's care staff

If you think that no one will opt to "name" wild animals, check out these animals that have been "named":

- Dauna Borska: A flamingo, named in honor of her life love, her aunts, uncles, and cousins
- Barry & Linda: Two flamingos named in honor of Barry Shapiro & Linda Gill; a gift from NHHS Zoo Magnet Class of 1991
- Bosco Orangina Berani: An orangutan named by Angela Janklow and Family
- Tom and Gerry: Snow leopards named by Gail and Gerald Oppenheimer
- Wiley Heran & Alyce Ratu: Sumatran tigers named by Gail and Gerald Oppenheimer
- Mel: A Masai giraffe named by Melan Hall
- Glenda: A Western lowland gorilla named by Ann & Jerry Moss
- Yoda: A radiated tortoise named in honor of Lynne Richter
- Harriet: A Masai giraffe named in honor of Harriet Bookstein

I understand how difficult it is for zoos to compete for tourist and support dollars during a recession. But when zoos use "naming opportunities" as a blatant cash grab, then I have a problem with that approach. I can understand that humans name family pets and I can draw the distinction between domestic animals and wild animals. Zoos play an important role in educating us about wild animals and many zoos are involved in captive breeding of rare species. However, when we, as a society, trivialize wild animals by giving them human "names" for whatever reasons, then we do them and ourselves a great disservice.

Mike Morris is Chair, Editorial Board, *Interactions: The Ontario Journal of Environmental Education*

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