ECOS
Ecologists, Educators, and Schools: Partners in GK-12 Education

Newsletter

Summer

ECOS (406) 243-6016 www.bioed.org/ecos **August** 2006

No Child Left Indoors!

ECOS is a partnership program for enhancing science education in K-12 schools in western Montana by using the schoolyard and adjacent open areas as outdoor laboratories for learning about the environment.

Inside:

Important Dates:

August 14-20: Institute 2

September 22: 2006-2007 demonstration projects proposals due!

The ECOS program is sponsored by the University of Montana's Division of Biological Sciences & the College of Forestry and Conservation.

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Aquarium Antics

By Carol Reeves, Lewis and Clark Elementary

As part of our ECOS studies, we have set up aquariums in both Julie Greil's and my classroom. Allison's frogs are definitely a hit. Fifth Graders enjoy observing the frogs, the fish, the plants and other "questionable" things floating in this aquarium. I know that the motto for ECOS is "No Child Left Indoors" but when these children are indoors, they do the next best thing...watch every biotic and abiotic thing in the aquarium, especially at inappropriate times. They definitely know the meanings of biotic and abiotic which is a good thing, but I've noticed this year that many more students seem to need a drink just to take a quick peek or wander by when sharpening a pencil. I think you get the message!

Anyway, right in the middle of class after someone has just "happened" by the aquarium, the entire class is interrupted by a student who is extremely upset because he or she has just observed a dead frog, a dead and slimy cricket or one of the fish is missing! You can imagine what erupts when someone says this in an EXCITED VOICE. Twenty-four other students are up and out of their seats clamoring around the aquarium to see what is going on. They can't wait and, furthermore, this beats spelling, reading or math. Is this the food chain in action or a chain reaction?

I usually have an aquarium set up in the classroom every year but after the first week or so, the newness wears off. The frogs add an indescribable element to the aquarium which is fascinating to most students. They never tire of looking at every minute detail. Everyday someone thinks that one of the frogs has died (because they can hide under the water or under a rock pasted to the side of the glass), escaped or has been squished by a rock. It is an endless source of investigation. In my class we are doing science every second, minute and hour!

Director's Column

Excerpt from Brewer, C. 2006. Translating Data into Meaning, *Conservation Biology*. 20:689-691.

The environmentally literate person understands how ecological knowledge is constructed, how values influence this process, and how to safeguard against bias; understands how society, politics and economics can influence the theories and practice of environmental science; is able to apply or support the application of ecological understanding to social needs and problems; and has an ethical stance concerning responsibility to use their environmental literacy (Berkowitz *et al.* 2005). The specific approaches to cultivate environmental literacy and create opportunities for learning about science and the environment are varied (and many have been reported in Conservation Biology), but all have the same foundation – we learn best through experience, meaningful collaborations, and partnerships. This happens not only in formal school courses, but also at museums, parks, nature centers, and during play and leisure experiences. Conservation biologists must allocate time to reaching out and promoting environmental literacy – even if it means a few less data points or manuscript pages.

Dinking and Thinking: Fellows and Teachers build teams

The Target Range team

"Ecological research begins by getting outside and dinking around" said Carol Brewer to the new cohort of ECOS fellows and teachers on the first day of the Institute in June. After one week of thinking, planning and teambuilding, most teachers and fellows couldn't wait to start the school year!

Teams of 2 graduate students and 2 teachers have been assigned to 5 schools, with 2 additional fellows who will bring the ECOS Nature Guide to the local schools. By the end of the first week of the Institute these teams became true partnerships, in which teachers bring expert knowledge of how to teach effectively and graduate fellows bring the scientific tools and thinking.

Teachers are diving into a new opportunity to bring authentic science to their schools, while graduate students are improving their abilities to communicate their science jargon-free!

Special Projects Fellow Jen Marangelo has a close look at aphids

"The way a child discovers the world constantly replicates the way science began. You start to notice what's around you, and you get very curious about how things work. How things interrelate. It's as simple as seeing a bug that intrigues you. You want to know where it goes at night; who its friends are; what it eats".
David Cronenberg

Reflections on the 2005-2006 School Year

Fellows working together

As an ECOS fellow, my perception of teamwork has been drastically changed... for the better! Throughout my academic career, I have always cringed when given a group assignment or group project. I much preferred to work alone, when I could have sole control of the final product, and have it done "my way". I believed that working in a group was inefficient, and that the final product was of diluted quality. Wow-my perception has changed! I feel very fortunate to be a member of an excellent team at Target Range School. Our group projects, including our lessons, inquiries, and demonstration project, are all of superior quality to anything I could have produced myself (and in a fraction of the time!). It feels like a truly synergistic interaction; that is, each of us contributes and expounds upon each other's ideas until we have an amazing new product, like a fantastic inquiry. The same holds true in the classroom and schoolyard; each of us contributes to the discussion in our own complimentary way, and the students have a more comprehensive experience. To me, this is one of the most valuable things I have learned during my ECOS fellowship. Not only is teamwork enjoyable and rewarding, it can produce an outcome far exceeding that of any individual contribution. My new appreciation of group collaboration is something that will benefit me throughout my career.

Brooke McBride, December

Corissa Crowder helps Brooke McBride and Debbie Caron in a soil inquiry

Fellows working with teachers

Julie Greil and her 1st grade class clean up the Outdoor Classroom on Earth Day

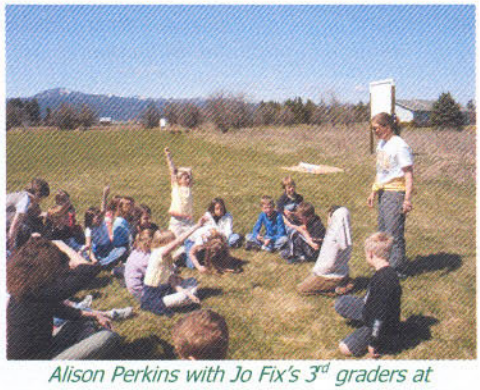
Carol Reeves (5th grade) and Julie Greil (1st and 2nd grade) are wonderful teachers. When I look at the work they put in each week, the word dedication comes to my mind. They truly care about and are involved with their students' progress. Their personalities and the approaches they use to reach students are different, but the underlying commitment is similar. Carol has brought about a change in her student's attitudes and discipline during the four months we've been working at Lewis and Clark. She has a very professional air about her and does a good job preparing the students for our inquiries that we bring into the classroom each week. Julie's enthusiasm is boundless and she knows how to get her kids fired up for an activity. Her tenderness and devotion towards her students is apparent from the moment you walk into her classroom. It's a joy working with both of these teachers. They allow us the freedom to implement our inquiries as we see fit, and offer positive criticism and direction each week.

Bruce Threlkeld, January

Fellows working with students: Peat pellets and 3rd graders

I'm not sure what went in and what stayed in. After scouring the schoolyard for seeds (anything that looked like a seed, buds on trees and bushes, and cool rocks), we took a pallet of peat pellets over to the 5th grade *(yippee!!!)* water fountain to add water and let them expand. Poking, prodding, pressing. *What's going to happen? Why is it taking so long? Should we take the mesh off? Can we add more water?* Ok, back to the classroom. Let's talk about experiments. *Look how big they are! Why are there hard places in the peat? Will the mesh fall off? This one and this one are mine!* Let's talk about experiments. *Should we add more water? Do we put the seed in this hole?* Ok. Focus. We talk about what's important to help seeds grow, and what can we change. In what seems like minutes, they lay out a common garden experiment using 2 seed types, and 3 treatments, and of course they each want to have a peat pellet in each experiment, so we end up with 5 replications - the scientist in me is happy! Done. *Can I water? Will they get hard again? We should label each one! Shouldn't we water them? How will the roots get out?* For me, I just hope they sprout at all!

Alison Perkins, March



Alison Perkins with Jo Fix's 3rd graders at Hellgate Elementary

From the schoolyard to the backyard

Learning science and about the world we live in does not have to be limited to lessons that happen in the formal school setting. Brooke McBride relates a story about taking science from the schoolyard to the backyard.

"One little girl came up to me and told me that everything we do in ECOS, she and her family do at home. She said that her father set up a tracking plate in the backyard, and they got a skunk print! She also drew a little diagram of the birdfeeder in her journal, so she could instruct her family in making birdfeeders. She said "Now we can do environmental things in our backyard."

Schoolyard Demonstration Projects are Complete!

Hellgate K-8 School: ECO-Diversity Learning Centers

The Hellgate team has successfully constructed four outdoor learning centers, providing students and teachers an opportunity to observe and learn about the variety of ecological systems in their schoolyard. These centers offer specific settings for inquiries that include microbial ecology, plant form and function, biological control of noxious weeds, and geologic effects on macro-ecosystems. The ECOS fellows developed the centers according to their research specialties, and also ensured that they were aligned with the school curriculum and national science standards. In a nutshell, the learning centers are:

Native American Medicinal Plant Garden – A 30 foot long garden consisting of native medicinal plants used by Native Americans.

Insectories – Built during Earth Week with the help of the Missoula County Weed District, they house the knapweed root boring weevil.

Behavioral Ecology Center – this corner of the schoolyard explores the ample evidence for ground squirrel activity, birds, and insects.

Rock Walk – Built during Earth Week, this 0.25 km long sidewalk is divided into a geologic time scale with local rock samples that are 2.7 billion to 75 million years old.

Before

Planting the Native Plant Garden

The Rock Walk: before and after

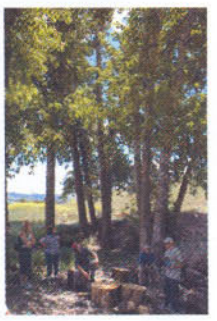
Target Range: A degraded cottonwood grove becomes an outdoor classroom

At Target Range School, the ECOS team and students transformed a neglected and unsafe cottonwood grove at the edge of the schoolyard into an outdoor classroom and nature observatory to be enjoyed by the entire school. Local companies, parents, and the Montana College of Technology generously volunteered their time, products, and labor to the project. Currently, the major excavation and landscaping work is complete, with minor aesthetic details remaining. Inquiries completed in the outdoor classroom include tracking studies and tree sampling.

Before

During

And After!



Lewis and Clark Elementary School: Enhancing the Outdoor Discovery Core

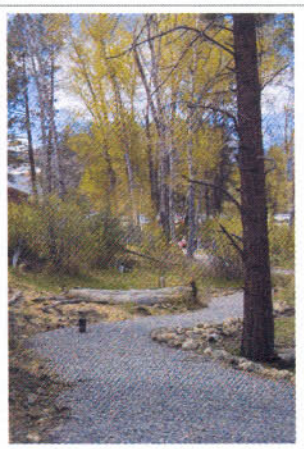
To promote hands-on science education in schoolyards and adjacent open areas in western Montana, the ECOS team enhanced the native garden, called the Outdoor Discovery Core, at Lewis and Clark Elementary School. This garden became an outdoor laboratory to teach a variety of ecological topics, including plant identification, observation and using a nature field guide. A comprehensive nature guide identifying all of the plants in the Outdoor Discovery Core allows the whole school to benefit from this team's project. Also, 100 plant ID plaques are in place and detailed natural history information was compiled for 12 common species in the garden that were originally identified by Lewis and Clark. Each of the 12 featured plants has a small description taken from the journal of Meriwether Lewis.

Florence Carlton School: Ecology for the whole school in an improved, accessible outdoor classroom

The Florence Carlton School has continued last years' improvement of the outdoor classroom, while helping teachers incorporate many ecological aspects of the classroom into their teaching across the K-12 curriculum. The ECOS team wanted all ecological aspects of the OC to be put to use.

After removing abandoned cement slabs, old bed frames, garbage, fencing, and some of the population of knapweed, the team helped the school find a contractor who successfully created a wheelchair-accessible trail through the outdoor classroom. Once the trail was built, an entrance kiosk was installed, over 150 native plants were planted, and plant ID plaques put in place.

The team also put together an ecology-based Discovery Booklet that will help teachers organize inquiries and start discussions involving ecological topics that will capture student interest. To go along with the Discovery Booklet, an Inquiry Binder is now available, providing teachers with investigations for the outdoor classroom.



Fellows and teachers 2006-2007

Go to www.bioed.org/ecos/teams.htm to read about the new ECOS members!

Hellgate Elementary School
Colleen Cooper & Kathy Meyers
Mike Machura
Mary Bricker

Arlee Elementary School
Bonnie Barger & Ronda Howlett
Matt Corsi
Flo Gardipee

Target Range K-8 School
Randee Stephens & Tara Barba
Jeff Piotrowski
Rebecca Wahl

Clinton School
Amanda McGill & Kathy Kaiser
Johnny MacLean
Joss McKinnon

Lewis and Clark Elementary School
Betsy Sharkey & Christy Meurer
Alison Perkins
Nate Gordon

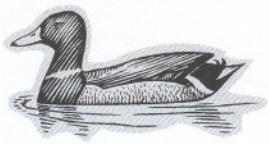
Special Project Fellows
Jen Marangelo
Sarah Bisbing

ECOS Staff

Carol Brewer, PhD. Director
Carol has a PhD in Botany and directs research programs in both plant ecology and ecological education. She serves on many national ecology research boards and is an Associate Editor for the journal *Conservation Biology* (Education).

Paul Alaback, PhD. Co-Director
Paul has a PhD in Forest Ecology. His research centers on disturbance ecology and plant biodiversity patterns. His skills have allowed ECOS to develop a fantastic local plant guide.

Dave Oberbillig, Co-Director
Dave is in his 9th year teaching high school science. He serves on the Ecological Society of America's education advisory board. Dave leads the Conservation Education seminar for all ECOS fellows, while mentoring teams in many aspects of science education and teamwork.



Josh Burnham, Webmaster
Josh is responsible for the design, management, and maintenance of the ECOS website. He also provides much appreciated technology support to ECOS staff, fellows, and teachers.

Kim Notin, Program Assistant
Kim is responsible for all the odds and ends of the ECOS project. She is completing her Masters this Fall in Resource Conservation.

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