



Hot Air from EEOP – A Newsletter

Environmental Education Outreach Program (EEOP)
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The Newsletter

This newsletter is a service of the Institute for Tribal Environmental Professionals (ITEP) Environmental Education Outreach Program (EEOP). We've created this newsletter specifically for K-16 students, educators, and tribal professionals that are interested in learning more about environmental issues with a focus on air quality. The newsletter will also contain information about EEOP programs and activities.

Indoor Air Quality – Short Internship Program (SIP)

The EEOP staff is planning several sessions to work with tribal professionals and students on Indoor Air Quality (IAQ) during the summer. We plan to combine a short workshop for students and tribal professionals with an internship for the students. During the workshop the students and tribal professionals will learn about indoor air. The workshop participants will learn protocols for measuring indoor air such as carbon dioxide, carbon monoxide, relative humidity, etc. They will also learn about the USEPA Tools for Schools program and complete activities from the Oregon State IAQ Hydroville curriculum. Following the workshop, the students will be awarded internships in order to complete IAQ Building Assessments in their own communities.

Teaching and Learning – A Series of Articles

The EEOP staff seeks to understand good teaching and learning. Furthermore, the staff seeks to influence teachers to incorporate exemplary teaching and learning practices into their teaching. In the following articles the EEOP staff will present some ideas about teaching and learning. We believe there are multiple excellent approaches to good teaching and learning. However, while there are many good techniques, there are even more poor attempts at teaching. For example, one term frequently used is “coverage”. Teachers will often say, “I covered that topic, why don't the students know it?” Coverage alone does not equal either teaching or learning. In fact, we would argue that in order to say that there is teaching, there must also be learning. Furthermore learning should not be restricted to just the students, and teaching should not be restricted to the teachers; good teachers learn from their students.

Teaching and Learning – Wildlife Education by Matthew Zierenberg

On April 7th 2007, 35 students and 5 teachers gathered at the edge of a typical high walled sandstone canyon of the southwest, near the Navajo National Monument in Northern AZ.

Standing with them here I am amazed by these students silently searching the sky with binoculars nearly glued to their faces, as they search the canyon winds for a conservation icon, the Peregrine Falcon (*Falco peregrinus*). They do this without prodding or coxing, without threats of disciplinary action for assumed misbehavior, they are engaged in the moment and the

task at hand. Teachers stand spellbound as they witness their students in what must be some strange state of hypnosis.

The silence is broken with a question, “What in the world was that?” We all turn to the student that spoke, with wide eyed expressions of “Well, what was it?” The only description the student is able to give is, “It was FAST!! and gray (*pause*) or blue?” With renewed effort we train our binoculars to the area where “it” was last seen. Within minutes we are enjoying a rare glimpse into the life of a wild bird of prey as it dives, glides, hovers and soars on the canyon breezes. We have found what we came to find and the excitement of the moment is bubbling over in huddled conversations around field guides. With comments such as, “Look for its black mask”, “Did you see its pointed wings?” “Look, it says it can fly up to 200mph”, floating on the wind.

We have just witnessed, a far too rare, moment of true learning, where, subject, student, and excitement meet to create a reference point that lasts a lifetime. In this instant I muse as to whether this experience could be recreated in a classroom setting. Was this simply a moment entirely dependant upon the cosmos, this bird and these students aligning in this wild place to create a supernova of learning? What if these students had not chosen to wake early and peer over the guardrails of the civilized world into the wilderness beyond? Would we have ever been able to give them this sort of experience within four walls and a ceiling?

As I sit with my thoughts flow through me like the winds through the canyon below. I realize that this experience had it’s beginnings in the classroom. In the classroom these students grappled with concepts of conservation, manipulated binoculars to focus on flash cards of common Arizona birds, flipped through field guides to “out-identify” their peers, and laughed with strangled pronunciations of strange scientific names.

What we have really experienced this day is education applied. With the application of education, have come understanding, excitement, passion, and respect. This has not been rote memorization of fact and figures, or forced regurgitation in the form of standardized tests. This has been the manifestation of efforts in education revealed through real life, real time, and real people. This has been learning at its finest, learning from a source of knowledge, learning from the wildlife, and the wild places.

The Wildlife in Native Schools Program (WINS) was developed by the EEOP staff to help tribal students in Arizona observe, explore, and explain our relations with the natural world. Students observe wildlife, learn about conservation efforts, and develop knowledge of wildlife careers.

Teaching and Learning - Service Learning

Recently the Navajo-Hopi Observer reported that students from the STAR School were recognized by the Arizona Governor for their service to elders in their community. The students were involved in the STAR School Learn and Serve project. Their teacher, Tom Tomas, believes that service learning makes a valuable contribution to academic achievement. The EEOP staff also believes that service learning can contribute to excellent teaching and learning.

Service learning is a teaching and learning approach that integrates community service with academic study to enrich learning, teach civic responsibility, and strengthen communities. So how is service learning different than community service? If students remove trash from a streambed, they are providing a valuable service to the community as volunteers, however, service learning would include much more. In service learning the students still remove trash

from a streambed, however, they will also analyze what they found, share the results and offer suggestions for the neighborhood to reduce pollution, and then reflect on their experience. The reflections may include group discussions and personal written reflections.

National studies suggest that students in effective service learning programs improve academic grades; increase attendance in school; and develop personal and social responsibility. Service learning combines service objectives with learning objectives with the intent that the activity change both the recipient and the provider of the service. This is accomplished by combining service tasks with structured opportunities that link the task to self-reflection, self-discovery, and the acquisition and comprehension of values, skills, and knowledge content.

The EEOP staff is interested in incorporating service learning into all aspects of environmental education. For example, after teaching students about indoor air quality, the EEOP staff likes to arrange for the students to apply their learning by taking air quality measurements throughout the school. The students report the results of these measurements in order to encourage improvements in the indoor air quality of the school. The students are able to apply their learning in meaningful, significant ways to situations and problems that really matter. Students are motivated by real applications of their learning, not by some standardized test measuring factoids.

Teaching and Learning - Science in the 21st Century

Nancy Moreno is associate professor in the Department of Family and Community Medicine and associate director of the Center for Educational Outreach at Baylor college of Medicine, Houston. In a recent National Science Teachers Association (NSTA) article Dr Moreno suggests that there are five crucial themes that should be incorporated into any science curriculum.

Science does not proceed in a linear fashion. Many teachers teach the “scientific method” as a straight-line progression of steps. In reality science is conducted in a much more open-ended and creative way than most students are taught. In the science as inquiry standard in the *National Science Education Standards* we find the following statement, “This standard should not be interpreted as advocating a ‘scientific method’. The conceptual and procedural abilities suggest a logical progression, but do not imply a rigid approach to scientific inquiry.”

Science is based on questions. Many teachers have the misconception that the work of scientists involves stating a hypothesis and designing an experiment to examine that hypothesis. However, most scientists think of their work in terms of questions. Possible explanation or hypotheses can change frequently. Great questions – not an inflexible “scientific method” drive great science.

Not all science involved controlled experiments. Geologists and astronomers, clearly scientists, don’t conduct controlled experiments. Instead, they rely on detailed observations of nature. The various branches of science differ in their methodologies; no single process moves all “science” forward. Comparative and observational methodologies are just as important as experimental ones to advance scientific knowledge.

Science knowledge is tentative. Scientific knowledge is being modified continuously. Questioning established ideas is critical to the advancement of scientific understanding. There are many examples demonstrate how accepted views have been challenged and reformed by new evidence. For the general public this can be one of the most confusing aspects of science.

Some teaching strategies promote deep understanding of how science works. Look for science teaching materials that use different experimental approaches or that allow students to develop their own testable questions. Expose students to controlled experiments, as well as observation and comparison. Conduct class discussions about alternative explanations of observations and outcomes of investigations. Instead of just seeking the “right” answer, emphasize the need for students to justify their conclusions based on evidence. Use examples from print and broadcast media to introduce competing scientific viewpoints, and allow students to compare and contrast those views.

The EEOP staff is interested in incorporating all five themes into their educational programs and projects. The staff uses programs like Global Learning and Observations to Benefit the Environment (GLOBE), which allows students and teachers to experience real science.

Teaching and Learning – Native Learners

Author and educator Dr Gregory Cajete outlines many considerations for teaching science to native learners in his book, *“Igniting the Sparkle”*. The curriculum presented by Dr Cajete integrates Native American traditional values, teaching principles, and concepts of nature with those of modern Western science. Every Indigenous culture has an orientation to learning that is metaphorically represented in its art forms, its way of community, its language, and its way of understanding itself in relationship to its natural environment. Native Americans and other Indigenous peoples have historically applied the thought process of creative science within cultural contexts, which are holistic. In most schools, science is taught from a Western cultural perspective that is preoccupied with specifics to the exclusion of making context within the whole. Thus there is a mismatch between cultural perspectives that results in many young Native Americans and other Indigenous students becoming alienated from science.

The EEOP staff is interested in working with educators and students to identify ways to connect native students to science in meaningful ways, without promoting assimilation into the dominant society. One way to achieve this goal is to connect scientific principles with issues and problems within the student’s community.

Future Issues

We are also interested in publishing articles from you. We are interested in articles sharing stories from students, teachers, or tribal professionals influenced by ITEP or EEOP activities.

Credits and Contacts

The US Environmental Protection Agency (USEPA) Office of Air and Radiation provides part of the funding to make this newsletter possible. The newsletter is disseminated on various list serves, however, if you would like to join the newsletter list serve, contact mansel.nelson@nau.edu.

Our staff looks forward to providing new services and developing new programs, as well as continuing existing programs. We especially look forward to hearing from you. So please visit our website at <http://www.nau.edu/eeop> or contact us via telephone or email.

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