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Nebraska Earth Systems Education Network
Newsletter Spring 2006

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SNR E-Commerce Website Changes Web Address

by Charles Flowerday

The School of Natural Resources, e-commerce, or shopping cart, Web site has a new address: **http://nebraskamaps.unl.edu**. It was previously **http://snr.unl.edu/products/.** The old web address, or universal resource locator (URL), will remain an alias for a year or so.

"We took advantage of the efforts of a group of graduate students in business. As part of their master's project in marketing, they looked at our map and publications store to enhance its marketability. And they recommended a web address that's more descriptive than the old one," explained SNR web content editor Charles Flowerday, who met with the group. "We're the no. 1 outlet for maps on all kinds of natural and human geographical features in Nebraska, so it's designed to capture that."

The team of grad students considered the store's main competitive edge to be its association with the University of Nebraska-Lincoln's reputation. As an extension of a Research I, land grant institution, its brand name vouches for the quality of the store's products, added Duane Mohlman, SNR web administrator.

University of Nebraska Lincoln

Teachers Find Laboratory Earth Course Valuable

by Monica Sanford

As the first online course of Laboratory Earth: Concepts and Applications draws to a close, feedback from educators around the state has been positive. Seventeen educators participated in the class, taught by Dr. Dave Gosselin of the School of Natural Resources and Dr. Ron Bonnstetter of the College of Education and Human Sciences. They were assisted by Susan Kelly, an educational consultant, Dr. Tim Slater, a professor of astronomy with the University of Arizona, and Terry Workman, an instructional design technical specialist.

Teachers found the availability and quick response time of the faculty to be one of the main advantages of the course. One of the greatest challenges was the learning curve associated with the technology necessary for an online course. Of constant use were the discussion boards, which provided students with the opportunity to interact with each other and the instructors at any time. The individual learning modules, activities, and expectations were discussed here, as well as in the "The Coffee Bean," the course's online cyber-café where students could discuss just about anything.

There was also a separate "How Did It Go?" section for anonymous feedback regarding what went well, what could have gone better, and what could be improved about each module. Below are the specific learning objectives of modules 1, 2, and 3, and some feedback from students. Module 4 will be completed later this week.

Module 1 Learning Objectives:

•to learn about the participants in the class;
•to describe the general characteristics of the hydrosphere, geosphere, atmosphere, and biosphere;
•to acknowledge that different perspectives regarding Earth systems and issues exist;
•to acquire basic data from online data archives, plot a graph, and import the graph into presentation software;
•and to use a variety of science process skills.

What the participants said:

"I feel like one of my students! I want you to give me the information and then I can go through it and try to relate it to the activity. I feel this is a mind set we all need to change (me included!!!), where we don't just feed the information to the students; they have to discover it themselves."

"I feel that the communication between the classmates and instructors is wonderful. I really appreciate the quickness of responses to questions or concerns! Because this is a web site class, I feel that this close and fast communication is very important to our success."

"The first week could have gone better. At first, it was hard to follow assignments and figure out due dates. Also, I had to adjust to how this course was run. It is my first online course, so this was more of a 'me' issue than anything else."

"What is going well is that you are making me think! and not just spitting back information to you. What could have gone better? Me not being so computer illiterate!!! I really need to be more up on Excel and other programs that will help organize data."

"Improvements: I feel that the directions have been clear and help is always near, so that is

Lab Earth continued...

good. It just seemed that the first week was so overwhelming because of all the requirements I kept finding in different locations on the web site. I felt rushed and probably would have done a better job on my homepage, as well as responding to the discussion board. Could the first week/10 days be broken down into smaller segments with deadlines, so it wasn't all due at once."

Module 2 Learning Objectives:

•Distinguish between the different types of matter
•Describe the physical (volume, mass, and density) characteristics of matter
•Describe three methods of heat energy transfer
•Identify and describe the major sources of energy for the Earth system
•Recognize the importance of energy and matter interaction as it relates to the Earth system
•Distinguish between mass and weight
•Use the concept change in a system = change in input – change in output

What the participants said:

"Do you know how I know when something is going well? It seeps into my lesson plans at school. For instance, we practiced the scientific method using an activity I developed on density. As I read and perform the exercises you have given us, it opens up new discussions with my fifth graders. I am going to set up the aquarium, thermometers, and incense when we study the water cycle. When one teaches this to others, you really cement the learning."

"We have been going at a pretty stiff pace as far as assignments go—at least in my opinion. But most of the assignments have us processing and turning around a lot of information quickly. I don't feel like I have a lot of time to give the concepts complete attention and thought… I also don't think the discussion board assignments are effective if there is no instructor guidance or feedback. And by feedback I mean active participation, not just a summary at the end. It's helpful to write down our thoughts, but how are we supposed to know if we're on the right track or not?"

"I was rushing to complete things so I wouldn't miss a due date only to find out the due date was different on the calendar and the assignment. Thanks for clarifying this at the beginning of the week. It really helped to have consistent dates!"

"I really enjoyed this module. I liked the experiment, the graphing, and the research. I can't think of anything I'd change. The PowerPoints were very informative."

Module 3 Learning Objectives:

•The learner will be able to describe and explain the relationship between Earth and its neighbors in the Solar System

What the participants said:

"I really enjoyed the astronomy activities. I also liked the fact that we were given all our assignments at once, and they were all due by April 16. That way, we could plan ahead and do the activities at our own pace. Thank you also for the assignment templates. They were very helpful!"

"In this module, I have viewed some fantastic web sites! (Web sites in the other modules were awesome too!) The web site where the moon revolves around the Earth, showing the phases of the moon, was just so USEFUL!! It does it right before the

Lab Earth continued...

students' eyes! It is so much more effective when they can see it - plus the explanation on the side - rather than try to figure it out when reading about it, or trying to understand it while it is explained to them! I showed it to my class in school."

"Once again, there are so many facets to the assignments, it is hard to keep track of what you did and what you've done. Instead of trying to download 3 separate assignments per lesson, can it be consolidated onto one page?"

"I was totally lost in lesson 2 about the sun, azimuth, sundials, etc. I really needed someone to walk me through that one. I became very frustrated and decided to just skip it and come back; I'm glad I did because the last lessons were great!"

"I really do wish this class was over a longer period of time and not quite so much so fast. I really find the activities interesting and challenging, and I like reading the comments on the discussion board."

"All in all, because my previous knowledge/interest was extremely low, I did learn a great deal and I will be a little more interested in learning about such in the future. I have a newfound interest in the universe that I never had before!"

With the feedback from the student educators, the next Laboratory Earth course will be better, clearer, and smoother. The next course runs from June 5 to July 30, 2006. A course brochure is available on the NESEN website, **http://nesen.unl.edu**. Scholarships are still available for this course. For more information about the next Laboratory Earth course, contact Dr. Dave Gosselin at dgosslin2@unl.edu or 402-472-8919.

GEON Summer 2006 Workshops See High Enrollment Levels

Geographic Educators of Nebraska (GEON) will be offering three major workshops and institutes and several smaller lectures during the summer of 2006. The Sandhills Journey and Mapping Technology for K-12 Teachers are already full. The primary objective of GEON is to help students realize the importance of geography in an increasingly interconnected and interdependent world. The following workshops still have space:

Middle East Virtual Institute (MEVI)- June 23rd through July 15th in Omaha. Most work done by computer at participants' homes; June 23rd and then July 14 and 15 in Omaha. Field trip on the 14th in Omaha to visit ethnic restaurants, Muslim Religious Center, and Jewish Community Center. $300 for approved lesson plan.

Contact Chuck Gildersleeve at UNO for further details, cgildersleeve@mail.unomaha.edu.

Susan Frack Named Sigma Xi Teacher of the Year

by Monica Sanford

The University of Nebraska-Lincoln's chapter of Sigma Xi recently honored Ms. Susan Frack, a science teacher at Lincoln's North Star High School with their Teacher of the Year Award. Sigma Xi is an international research society whose programs and activities promote the health of the scientific enterprise and honor scientific achievement since 1897 in Nebraska. Susan teaches 9th grade geosciences in the Opportunity Center at North Star, a freshman academy for students thought to be "at risk of failure" due to previous academic, behavior, or home life issues.

Acording to NESEN Director, Dr. Dave Gosselin, Susan wants her students to be excited about science and have access to the latest technology and scientific data. She works hard to make connections between her student's lessons and day to day lives. Susan has been continuously involved with the Nebraska Earth Systems Education Network (NESEN) and has recently worked with the Sand Hills Biocomplexity Project.

Susan served on the teacher advisory board that was integral in establishing NESEN, and she has participated in many workshops and contributed lesson plans to the NESEN website. Last summer, NESEN helped pair Susan with the Sand Hills Biocomplexity Project, which allowed her to carry out scientific research in conjunction with UNL scientists. Susan is continuing with her own research this summer, following in the footsteps of last year's work. She hopes to use this research to continue to develop curriculum for her students and show them how Earth science is having an impact in Nebraska. She is committed to learning and growing in order to become a better teacher. Congratulations to Susan on her being named Sigma Xi Teacher of the Year.

Susan Frack doing research at Barta Brother Ranch as part of the Sand Hills Biocomplexity Project, Summer 2005. (Photo courtesy of Dr. Dave Wedin.)

Tern & Plover Job Shadowing Program Looks For Students with Science Interest

by Charles Flowerday

The Tern and Plover Conservation Partnership will soon begin looking for volunteers for the second year of its job shadowing program for older high school and younger college students. The program is open to anyone who has an interest and some background in science. Another requirement is that students need to have transportation to get them to the University of Nebraska-Lincoln. Program staff will provide transportation from the university to job sites outside Lincoln.

"We send out the information in March to southeastern Nebraska high schools for a program that starts in June," Thody said.

Expected to run at least three to five years, the program gives science- and conservation-minded youth a look at a proactive conservation program that protects endangered least terns and threatened piping plovers along the Platte River, Chris Thody explained. Thody is the volunteer coordinator for the partnership, which is sponsored by the School of Natural Resources at the University of Nebraska-Lincoln and a number of other organizations. The partnership includes a volunteer program called "Adopt-a-Colony," and the students work with that program.

Two students were accepted this year and the program hopes to be able to accommodate up to 10 students, 16 years or older, as it ramps up in future years. Jacob Blacketer of LaVista High School and Molly Staley of Lincoln Northeast High School were chosen this year. They will work as volunteers for a minimum of two days a week, one in the partnership's office at the SNR and one in the field with technicians performing a variety of duties. These range from setting up signs and fences protecting tern and plover colonies to mylar flags designed to deter birds and attempt to keep them away from active mining areas used by sand-and-gravel companies.

"It's a really good program. It gives you an idea of what fieldwork is like," said Staley. "I liked getting out with a technician and having the hands-on experience."

Blacketer said, "It's a good program with lots of hands-on activities. I learned a lot from it."

Students interested in the program should talk to their high school guidance counselors and career planners about the applications or contact Chris Thody at: 313 Biochemistry Hall, Lincoln, NE 68583-0759; phone: (402) 472-8741; fax: (402) 472-8390; e-mail: cthody2@unl.edu. Applications are accepted through May, Thody said.

Other Tern and Plover Conservation partners include: Nebraska Game and Parks Commission (NGPC), University of Nebraska Cooperative Extension (UNL), Lyman-Richey Corporation, Western Sand and Gravel, Arps Gravel and Concrete, Overland Sand and Gravel, Mallard Sand and Gravel, Girl Scouts - Great Plains Council, the Nebraska Environmental Trust, U.S. Fish and Wildlife Service, and the National Fish and Wildlife Foundation. The program is funded by the Nebraska Environmental Trust, the U.S. Fish and Wildlife Service and the National Fish and Wildlife Foundation.

Science Behind the Acronyms: NASA Contributes to Water Management

by Monica Sanford

NASA has fourteen satellites dedicated to studying the dynamic Earth. Six of these satellites, Terra, Aqua, GRACE, Landsat 7, EO-1, and TRMM, contribute directly to water science, and soon two new satellites, GPM and LDCM, will join them. These satellites use their AMSR-E, MODIS, and CERES instruments to gather data.

So what do all these acronyms mean? Terra and Aqua mean earth and water. They were launched in 1999 and 2002, respectively. GRACE stands for Gravity Recover and Climate Experiment and is actually a pair of satellites launched in 2002. EO-1 is the Earth Observatory 1, launched in 2000. TRMM is the Tropical Rainfall Measuring Mission launched in 1997. The new satellites are the Global Precipitation Measurement satellite scheduled to be launched in 2007 and the Landsat Data Continuity Mission, a joint effort of NASA and the U.S. Geological Survey beginning in this year. These satellites use instruments such as the Moderate Resolution Imaging Spectroradiometer (MODIS), Clouds and the Earth's Radiant Energy System (CERES) to gather data about evaporation from Earth's surface, and Advanced Microwave Scanning Radiometer for EOS (AMSR-E) to measure changes in soil moisture to allow for the creation of atmospheric circulation models.

But what does all that mean? It means that NASA is using technology to contribute to the vital societal need for better water management. These satellites use their instruments to help better understand evaporation, soil moisture, tropical and subtropical precipitation patterns, changes in water quality, and aquifer storage. Only a small amount of water on our "blue marble" is freshwater available for use by plants, animals, and humans. This supply includes surface water in ice caps, glaciers, lakes, reservoirs, and streams and ground water stored below the Earth's surface. It is important to determine where this freshwater is located, in what quantity, and of what quality. It is also important to understand how it got there and where it is going, to ensure that enough is available for the ever-growing human population. NASA is also helping ensure the freshwater we have is potable, or fit for human consumption. They help locate and identify the sources of toxins that pollute our water supply, allowing scientists to develop remediation plans.

NASA does all this by using its satellites and by partnering with the Environmental Protection Agency, National Oceanic and Atmospheric Admistration, U.S. Department of the Interior, Department of Agriculture, and Geological Survey, as well as institutions such as the University of Nebraska-Lincoln.

Natural Resources Graduate Credits Valuable Experience in SNR; Now Manages Groundwater-Monitoring Program for Natural Resources District

by Steve Ress

It's rare that a single decision answers many of life's questions, but once in a while, as Yogi Berra said, when you come to a fork in the road, you take it. Valentine native Tylr Naprstek took such turn in his quest to make a love of natural resources and wildlife into a meaningful career path, while, just to up the ante, playing tenor sax in a marching band.

He answered these questions with a single decision – to pursue a degree in natural resources at the University of Nebraska-Lincoln.

"UNL had always been my number one choice when I started to look for colleges, and once I had looked closely at natural resources at UNL and was accepted as a tenor saxophonist in the marching band, the decision was final," the 2003 School of Natural Resources graduate said.

Naprstek is currently pursuing a life-long love of the outdoors and natural resources as water resources manager for the Upper Elkhorn Natural Resources District in O'Neill. There he manages the NRD's groundwater-monitoring program, reviews and approves new well applications, does computer mapping and more. He firmly credits UNL's School of Natural Resources for nurturing his interests and helping get him on a career path he enjoys in which he shows promise.

"My experiences in the School were a strong foundation for career achievement. Because of its ties to related agencies, and the opportunities to expand on work experience, the university really cultivated my field experience and interests. And it did this while expanding my knowledge about current natural resources issues," Naprstek said. Before coming to Lincoln, the 25-year-old knew he wanted a career in natural resources, but wasn't sure if it would lie in fisheries, wildlife, forestry or water.

"I needed a broad education to make myself marketable."

He visited other colleges and universities looking for the answers to these and other questions, but didn't find them until he came home to UNL.

"I enjoyed each visit to the campus, and the faculty made my transition into becoming a UNL student very smooth. A key person in that regard was Dr. Ron Case, the first faculty member I met," he said. Case, recently retired from the School, serves on the board of directors for the Lower Platte South NRD in Lincoln.

Case helped guide Naprstek through his degree program and helped the Valentine Rural High School graduate build on experiences working with state 4-H programs at Halsey and with the Youth Conservation Corps at the Ft. Niobrara National Wildlife Refuge near Valentine.

In his first two summers of college, Naprstek found an opportunity to work as a range technician for the U.S. Fish and Wildlife Service, where he helped fight fires in Nebraska, Colorado and Wyoming, conducted avian studies and worked at helping control purple loosestrife infestations on the Niobrara River.

The next two years he worked part-time for the

Naprstek continued...

Nebraska Game and Parks Commission's Fisheries Division.

"The field work was rigorous, since I assisted with projects such as shad survey or catfish creel, which often required long hours." While working with the Fisheries Division, Naprstek completed a report on using black crappie aging methods. He credits the assistance he had on the project with "great guidance from my adviser, Dr. Ed Peters, along with Keith Hurley of the Nebraska Game and Parks Commission."

"The practical experience gained while getting my degree has been as valuable as the degree itself. I think it helped a lot that when I was fresh out of college, I had some significant and varied work experience," he said. With a combination of work experience and an education, Naprstek secured a job in the natural resource field within two months of graduating from the university.

"The degree I earned and the experiences I had at UNL have been very well-respected in the job field, and there were a lot of contacts and personal interactions in the School that stay with me even today," Naprstek said. "My experiences in the School were a strong foundation for career achievement. Because of its ties to related agencies, and the opportunities to expand on work experience, the university really cultivated my field experience and interests."

Tylr Naprstek shows off a largemouth bass that was collected towards sunset. (Photo courtesy of the UNL Wildlife Club.)

Astronomy Day 2006
Hosted by Mueller Planetarium and University of Nebraska State Museum
May 6, 2006

by Jack Dunn - Mueller Planetarium

Make a connection with the cosmos on Saturday May 6th. National Astronomy Day was first celebrated more than 25 years ago as a celebration of amateur and professional astronomy sponsored by the Astronomical League. In Lincoln, the Prairie Astronomy Club brought Astronomy Day to Morrill Hall over 15 years ago. Organized through Mueller Planetarium, the event has grown over the years to encompass aeronautics, aerospace, space exploration and robotics.

This year's featured speaker is Bryan White of Denver, Colorado, who brings his unique full-color 3D photography of auroras, comets and planets in a 35-minute presentation (presented at 10:30 a.m., 1:30 and 2:30 p.m. in Elephant Hall). There'll be planetarium shows all day and displays of telescopes big and small. Members of the Prairie Astronomy Club will tell you how to use them (or give advice about using your own telescope at home).

There'll be updates on the latest from Mars with the Mars Rovers and the Mars Reconnaissance Orbiter (seen in visualization software from JPL). Kids can build and launch rockets with the UNL Air Force ROTC.

Co-sponsors Astronomy Magazine and Meade Telescopes, have provided plenty of free handouts on astronomy, and some lucky visitor will win a Meade ETX-90EC computerized telescope (and field tripod), valued at over $700. There are complete details at our website at:
http://www.spacelaser.com/asday2006.html

University of Nebraska Lincoln

SNR Researchers to Develop Ecological Index for Organic Farming Research

$750,000 Grant to Integrate Organic Farming Into IANR Teaching, Research, Extension

by Charles Flowerday and Vicki Miller

School of Natural Resources (SNR) researchers are developing an index to better understand the ecosystem benefits and ecological health of organic farms. It will be developed as part of a $750,000 grant that will help the University of Nebraska-Lincoln expand organic farming research and education. The grant is also intended to enhance collaborations with growers and develop science-based information for organic food production.

Other goals include establishing the university's first certified organic research plots, launching focused research and incorporating organic farming concepts into UNL Extension and classroom education.

The project – Improving Organic Farming Systems across Nebraska Agroecoregions – represents a major commitment to the fastest growing part of the food production sector. It brings together researchers from the School of Natural Resources, Agronomy and Horticulture and the extension and research centers and aims to lay the foundation for long-term organic farming efforts at UNL. The Institute of Agriculture and Natural Resources team received the four-year grant from the USDA's Cooperative State Research, Education and Extension Service.

"We hope the infrastructure we are creating will spawn a whole range of other projects that could involve many others and help build organic farming as a standard component of what we do at the university," said Jim Brandle, an SNR windbreak ecologist and project co-leader.

SNR wildlife researchers will focus on bird populations and other conditions to develop a Healthy Farm Index, a tool for landowners to measure their farm's ecological health, said SNR wildlife biologist Ron Johnson, a project co-leader. After identifying birds, insects and soil factors associated with different farming scenarios, researchers will devise a preliminary index that relates different land covers to biodiversity as a way to measure farm health and sustainability.

"For many people, a healthy farm would include a variety of birds and other biological diversity on the land and in the soil and water. There would be clean water and a working landscape with checks and balances against pests and resilience against disturbances," Johnson said. "The index isn't intended to call a farm good or bad," he said. "We want to find a way to measure the balance so that someone can live on the land and make a living but have a sustainable farm that protects the natural resources."

The grant also covers work at four research stations across the state. Each will develop initiatives for production problems for that ecosystem, and an agro-ecological research and education network will integrate production and environmental needs.

"Healthy land and food are difficult terms to quantify or define precisely, but they encompass positive values reflected in measures of environmental qualities in farming areas," Johnson added. "How many bird or other species should a farm have for a balance between land for production and habitat for wild species? Or how do tillage or other management strategies affect

Organic Farming continued...

land health?"

Birds and other wildlife and invertebrates function to suppress pest insects in agro-ecosystems, but conventional management strategies, particularly the use of pesticides with large monocultures, interfere directly or indirectly with these functions, Johnson said. Organic farms, however, operate without these constraints, and offer an excellent system in which to study biological pest suppression.

At the research centers and on cooperating farms across Nebraska's agro-ecozones, SNR researchers will analyze data on birds and related ecosystem components at field, farm, and landscape scales, Brandle explained. They want to include measures of soil, vegetation, invertebrates, and other wildlife.

"These and other data will allow us to establish a preliminary baseline for farmland health, based on environmental qualities that society has said it values," Brandle said.

Each of the project leaders has a long-standing interest in sustainable agriculture. They hope their combined expertise leads to more comprehensive organic research and education efforts.

"In essence, this is a grant to integrate an organic farming component into our teaching, research and extension mission at IANR," said Charles Shapiro, soil scientist at the university's Northeast Research and Extension Center and one of seven project co-leaders. The research will be conducted with IANR's Agricultural Research Division and then extend to other aspects of the land grant mission.

"This is going to allow us to provide better information to producers across the state on workable organic systems for their region," said David Baltensperger, alternative crops breeder at the Panhandle Research and Extension Center and a project co-leader.

Establishing certified research plots at university farms near Concord, Mead, Clay Center and Sidney is a major component. Each site will focus on different aspects of organic production while the network will enable collection of statewide information.

"Establishing this land base will allow us to study organic methods under Nebraska farming conditions from east to west. I don't know of any other state in the region that has 120 acres devoted to organic research statewide," Shapiro said.

Organic certification takes three years, and researchers will use each site's transition as a learning experience. Documenting issues that arise during the conversion to organic farming should provide information for farmers looking to make the change.

"It's one thing to say we know what it's like to farm organically; it's another to do it. We'll be doing it," Shapiro said.

Collaboration with organic farmers is essential. Organic growers supported the grant, and local and state organic producer advisory committees will help guide research. Scientists also will conduct studies on cooperating certified organic farms. "We're building partnerships to work together to ensure success and make sure we are addressing the practical concerns facing organic farmers," Shapiro said.

Organic Farming continued...

That close working relationship between researchers and organic farmers is an exciting aspect of this project, said Stephanie Newman, executive director of the Organic Crop Improvement Association Research and Education Inc. (OCIA).

OCIA International and OCIA Research and Education are allied international organizations with world headquarters in Lincoln. They provide organic research, education, certification and inspection to farmers, processors and brokers/traders worldwide. OCIA will work with UNL to organize farmer advisory groups and will certify university plots.

Integrating organic agriculture into UNL teaching, extension and research is another goal. Charles Francis, professor of agronomy, will head up the teaching efforts, incorporating many of the findings into his Organic Agriculture class. A UNL Extension educator will be hired to help coordinate the outreach aspects of the project and plan how best to share findings and organic concepts with farmers and UNL students.

The team will also collaborate with the Nebraska Indian Community College's Santee site to incorporate Native American wisdom about land use. Other co-leaders are entomologist Bob Wright, leading the effort at Clay Center, and weed scientist Stevan Knezevic at the Northeast Research and Extension Center.

"Organic farmers, landowners, scientists, and others across Nebraska have agreed to participate with us. We're now developing advisory groups to help guide us. Our integrated and multi-disciplinary approach is critical to effectively address goals for both the environment and economically viable food production," Johnson said.