

MINNESOTA STATE UNIVERSITY MOORHEAD
College of Social and Natural Sciences

Presents



**Free Workshops on Topics in the Social Sciences,
Natural Sciences, and Mathematics**

Monday, October 26, 2009

Comstock Memorial Union

Minnesota State University Moorhead

The Workshops Offer:

- Demonstrations and Hands-on Activities for the Classroom
- Insights into Topics in the Social Sciences, Natural Sciences and Mathematics
- Fresh Approaches to Teaching these Subjects
- Networking with MSUM Faculty and other Area Teachers



Registration begins at 8:15 A.M.
Continental Breakfast: 8:15 – 9:20 A.M.
Welcome: 9:10 A.M

Workshop Session I: 9:30 – 11:30 A.M.: Choose One Workshop

Luncheon, Networking and Keynote Address
11:45 A.M. -1:20 P.M.
Comstock Memorial Union Ballroom

Luncheon address to begin around 12:30 P.M.

Workshop Session II: 1:30-3:30 P.M. Choose One Workshop

Closing, Evaluations, Receipt of Clock Hour Certificates: 3:40-4:00 P.M. (CMU Ballroom)

For more information visit: <http://www.mnstate.edu/csnsoutreach>

Luncheon Keynote Address by Dr. Alison Wallace

12:30 P.M. – Comstock Memorial Union

What does it mean to be green?

Helping our students to become more ecologically literate.

Some people say we have moved from the Industrial Age to the Information Age, but that the next age to come is the Ecological Age. Since our growing human population may have already overshoot our planet's current biocapacity, there will be plenty of ecological challenges facing our students throughout their lives. What is it that they need to know as citizens in order to face individual and societal environmental dilemmas, and to make decisions on how to resolve these dilemmas? What is the role of the science classroom in this educational process? Ecology educators are just beginning to have these debates about what it means to be 'ecologically literate'. An overview of the current research in this area will be provided, in addition to a description of a specific research project involving the role of guided writing in the development of ecological literacy.

After obtaining a B.A. in Biology with distinction from St. Olaf in 1989, Alison went to graduate school at Stony Brook University on Long Island, New York in the Department of Ecology and Evolution. There she obtained funding for her research on the effects of elevated carbon dioxide on nitrogen-fixing plants with a NASA "Mission to Planet Earth" Global Change Fellowship. Alison received her Ph. D in Ecology and Evolution in 1997 and then moved to Minnesota to teach science at Shattuck-St. Mary's School. She then became an Education Specialist for a U.S. Technology Innovation Challenge Grant in Grand Forks, ND, where she developed online curriculum for K-12 students and teachers. After completing this project she came to the Biosciences Department at Minnesota State University Moorhead, where she teaches courses for majors and non-majors, and advises the secondary life science education majors. Her research projects vary from projects on local prairie plants to education research projects with organizations such as the Minnesota Teacher Research Network on the practices of beginning math and science teachers. Recently, she was awarded a National Science Foundation grant to research the effectiveness of using guided writing to increase ecological literacy in undergraduates; she is working in collaboration with Dr. Meena Balgopal of Colorado State University. Alison also serves as the higher education representative on the board of the Minnesota Science Teacher Association.

These talks are supported by the Minnesota State University Moorhead Comstock Fund and the College of Social and Natural Sciences Outreach Program

Workshop Descriptions:

Morning Workshops: 9:30 – 11:30 A.M.

A. Energize and Energy-Wise Your Students! (Steve Lindaas, Physics and Astronomy). Design and analyze a net-zero house as you explore a variety of energy technologies. We will examine energy use from peak oil to global warming. *Morning Workshop.*

B. Mind Games: An Active Approach to Teaching about Learning and Memory (Christine Malone, Psychology). Psychologists use the scientific method to study behavior and experience. More specifically, cognitive psychology is the scientific study of thinking, which includes learning and remembering things. The workshop will present several activities regarding basic learning and memory phenomena, such as short-term memory capacity, levels of processing theory, and forming false memories. Suggestions for discussing practical applications will also be discussed. For example, How might students use levels of processing theory or imagery to reduce the overall amount of time they need to study for a test? Participants will receive step-by-step instructions for implementing the activities in their classrooms. Activities should be suitable for grades 7-12. *Morning Workshop.*

C. Reasons for the Seasons (Dave Weinrich, Regional Science Center). Research has shown that many students do not understand why we have the four seasons. We will use the planetarium to investigate the subject and learn some simple classroom activities that you can use to help your students understand these important concepts. *Morning Workshop*

D. Urban Ecology Observations: A Walk Around the School Turns Academic (Tony Bormann, Regional Science Center) As school field trip budgets tighten, consider the ecological laboratory that lies within walking distance of your classroom. Your school grounds, parking lot and neighborhood boulevards are bursting with observations of ecology. This workshop session will help you utilize urban ecology as a complement or supplement to a trip on the “magic school bus” to your favorite natural site. Participants will spend about 20-30 minutes indoors and the balance of the session outside exploring the campus and neighborhood grounds fulfilling their “Urban Ecology Explorer badge”. Dress for the weather and be prepared to discover the wilderness in your backyard. *Morning Workshop*

E. Concrete Examples for Variable Expressions (Kris Montis, Mathematics). Too often in algebra variables and variable expressions are perceived by students as disembodied letters and numbers – a symbol soup with no real meaning. In this workshop we will look at several ways to introduce the concepts of variable, constant, and variable expression using concrete examples so that these concepts are developed as meaningful representations of physical situations. Representations will include polygon trains, tiling patterns, and story situations. The purpose is to show students that variable expressions can be used to describe and predict real-world situations. This workshop is designed for middle school teachers and anyone teaching introductory or developmental levels of pre-algebra. *Morning Workshop*

F. Using Mathematics to Think about Ecology and Evolution (Daniel McEwen, Biosciences). An introduction to the use of STELLA software for teaching basic principles of ecology and evolution. STELLA is a conceptually-based software package for mathematical modeling of dynamic phenomena. The software is used in K-12 for teaching and by researchers who use mathematics to model nature. As a demonstration of the software and how it can be used in a classroom, we will use a model to represent life history characteristics of yellow perch to think about how different strategies of energy allocation to body tissue, reproductive tissue, and metabolism may evolve in the face of environmental stress. *Morning Workshop*

Afternoon Workshops (1:30 – 3:30 P.M.)

G. Energize and Energy-Wise Your Students! (Linda Winkler, Physics and Astronomy) Design and analyze a net-zero house as you explore a variety of energy technologies. We will examine energy use from peak oil to global warming. *Afternoon Workshop.*

H. Scientific Thinking: How to separate science from pseudoscience (Magdalene H. Chalikia, Psychology) The scientific method will be introduced as a way of evaluating information. The workshop will present various claims, such as ESP or dowsing, and discuss the steps necessary to evaluate such claims. Concepts such as “control” “double-blind procedure”, and “placebo effects” will be discussed. Practical applications will also be discussed. For example, how could students use the steps involved in scientific thinking to develop procedures necessary to evaluate claims or phenomena. *Afternoon Workshop*

I. Using video capture and Logger Pro to spice up motion or algebra topics (Richard Lahti, Chemistry, Physics and Astronomy). Participants will learn how to capture and import digital video into the Logger Pro software and use Logger Pro to measure distance. From these distances, Logger Pro calculates velocities, accelerations, etc. Suggestions for use in study the following standards will be given:

- Mn Academic Standards in Science 9.2.2.2.2 (Newton's Second Law), 9P.2.2.1.1 (2D motion), 5.2.2.1.2 (speed, force, direction), and especially 6.2.2.1.2 (graphing motion)
- Mn Academic Standards in Mathematics including 8.4.1 (all three benchmarks, lines of best fit) 9.4.1.3-4 (lines of best fit), as well as 7.2 and 8.2 (entire algebra strands, moving from graphs to equations to verbal descriptions of linear equations of real world phenomena). *Afternoon Workshop*

J. Incorporating Astrobiology into Your Curriculum (Adriane Cooper, Moorhead High School). This workshop will give you an overview of the areas of study in Astrobiology. Much of the workshop will focus on a specific inquiry-based curriculum developed by NASA and SETI that is available for purchase from www.voyagethroughtime.org. (The instructor will have the entire curriculum available to view.) Participants will have time to view and modify sample lessons for their classroom and/or modify their own lessons to incorporate astrobiology and inquiry! This workshop would be appropriate for middle and high school teachers in biology, earth science, chemistry, physics, anatomy and physiology, or environmental science. *Afternoon Workshop*

K. Venn Diagrams in Problem Solving (Timothy Peil, Mathematics). Venn Diagrams are useful in analyzing many problems in statistics and probability. We will discuss several different types of problems that Venn Diagrams may be used to solve. Also, we will consider several interesting general mathematics challenge problems that may be given to students as questions for Problem of the Day or Problem of the Week. *Afternoon Workshop*

APPLY EARLY; workshops fill quickly

No registration fees

***Reimbursement for sub pay will be available to support the first 65-70 teachers .
Free workshops, banquet and teaching materials***

3 clock-hours for those completing the morning conferences; an additional 3 clock hours for those completing the afternoon workshops and educational activities.

There are no limits as to numbers of participants from a single school.

World of Change: October 26, 2009

Application Deadline: October 16, 2009 or until workshops are full. Later applications will be accepted if space and additional supplies are available. Applications must be submitted by **email or fax only** – the dates and times received will be used to reserve spots in workshops.

Name: _____

Department/Classes You Teach: _____

School: _____

Address: _____

Email: _____

Telephone: _____ FAX: _____

PLEASE! Indicate a **First, Second and Third** Workshop Choice for Each Session. Most sessions are limited to 10-15 teachers. Place 1, 2 or 3 in the blanks preceding workshop title. Workshops will be consolidated and/or cancelled if there is low enrollment – 2nd and 3rd choices may need to be used.

Session I (9:30-11:30)

- _____ A. Energize and Energy-Wise Your Students! (Physics and Astronomy)
- _____ B. Mind Games: An Active Approach to Teaching about Learning and Memory (Psychology)
- _____ C. Reasons for the Seasons (Regional Science Center-Planetarium)
- _____ D. Urban Ecology Observations: A Walk Around the School Turns Academic (Regional Science Center)
- _____ E. Concrete Examples for Variable Expressions (Mathematics)
- _____ F. Using Mathematics to Think about Ecology and Evolution (Biosciences)

Session II (1:30-3:30)

- _____ G. Energize and Energy-Wise Your Students! (Physics and Astronomy)
- _____ H. Scientific Thinking: How to separate science from pseudoscience (Psychology)
- _____ I. Using video capture and Logger Pro to spice up motion or algebra topics (Chemistry, Physics and Astronomy)
- _____ J. Incorporating Astrobiology into Your Curriculum (Moorhead High School)
- _____ K. Venn Diagrams in Problem Solving (Mathematics).

Will you be needing sub pay reimbursement _____ If so, what is the cost? _____

Do you have dietary restrictions? If so, what? _____

To Apply:

Send this form or information as an **email attachment** or **fax** to:

Dr. Shawn G. Ellingboe, Chemistry Professor and Outreach Coordinator
College of Social and Natural Sciences,
csnsoutreach@mnstate.edu or Fax: 218-477-4372

For questions email csnsoutreach@mnstate.edu or telephone 218-477-5836.

Workshops are filled based on time of receipt of email or faxed message. They must be sent electronically!