



THIRTEENTH ANNUAL SYMPOSIUM
in
SCIENCE EDUCATION

Master of Science
in
Science Education

June 27-July 2, 2011
Reid Hall, Rooms 101 and 102

Intercollege Programs for Science Education

INTERCOLLEGE PROGRAMS FOR SCIENCE EDUCATION

Director
Associate Director
Assistant Program Coordinator
Lead Program Faculty

Peggy Taylor
Diana Paterson
Laurie Rugemer
John Graves

MSSE FACULTY STEERING COMMITTEE

Elisabeth Swanson, Chair
Robyn Arnold
Maurice Burke
Steve Custer
Carl Fox
Steve Holmgren
Kim Obbink
Barry Pyle
Amy Washtak
Walt Woolbaugh

Science Education
Bozeman School District
Mathematics Education
Earth Science
Graduate Education
Chemistry/Biochemistry
Extended University
Microbiology
Bozeman HS, MSSE Graduate
Science Education

SUPPORTING COLLEGES AND DIVISIONS

College of Agriculture
College of Engineering
College of Health & Human Development
College of Letters & Science
Extended University
The Graduate School

Jeffrey Jacobsen
Robert Marley
Larry Baker
Paula Lutz
Kim Obbink
Carl Fox

COLLABORATING DEPARTMENTS

Burns Technology Center
Cell Biology and Neuroscience
Chemistry/Biochemistry
Civil Engineering
Earth Sciences
Ecology
Education
Electrical Engineering
Health & Human Development
Land Resources & Environmental Sciences
Microbiology
Physics
Plant Sciences & Plant Pathology

Kim Obbink
Thomas Hughes
David Singel
Brett Gunnink
Steve Custer
David Roberts
Jane Downey
Robert Maher
Mark Nelson
Tracy Sterling
Mark Jutila
Richard Smith
John Sherwood

SYMPOSIUM IN SCIENCE EDUCATION

<u>Presenter</u>	<u>Day</u>	<u>Time</u>	<u>Room</u>	<u>Presenter</u>	<u>Day</u>	<u>Time</u>	<u>Room</u>
Melanie Acker	Sat	10 am	Reid 101	Jacob Lame	Fri	9 am	Reid 102
Patti Bartlett	Fri	12 pm	Reid 102	Karen Lund	Tues	8 am	Reid 102
Jennifer Bernstein	Fri	4 pm	Reid 101	Kathryn Madden	Thurs	4 pm	Reid 101
Lindsey Bowser	Wed	12 pm	Reid 101	Margaret Magonigle	Wed	10 am	Reid 101
Brennan Brockbank	Tues	4 pm	Reid 101	Danny Mattern	Thurs	2 pm	Reid 101
Deborah Brown*	Wed	2 pm	Redi 102	Emily McKenna	Mon	2 pm	Reid 102
Nancy Bryant	Sat	9 am	Reid 102	Christian Mills	Tues	12 pm	Reid 102
David Buck	Thurs	1 pm	Reid 102	Amiee Modic	Wed	10 am	Reid 102
Joel Burgener	Mon	12 pm	Reid 101	Christopher Monsour	Fri	2 pm	Reid 101
Sandra Climenhaga	Sat	2 pm	Reid 101	Richard Montoya	Wed	5 pm	Reid 102
Sarah Conner	Thurs	2 pm	Reid 102	Erik Nickerson	Tues	2 pm	Reid 102
Joann Dayton	Fri	8 am	Reid 102	Cameron Novak	Thurs	12 pm	Reid 101
Joseph DeLuca	Mon	8 am	Reid 101	Aaron Olmanson	Sat	12 pm	Reid 102
Joyce Dooley	Mon	9 am	Reid 101	Bradley Pederson	Tues	4 pm	Reid 102
Katherine Echazarreta	Sat	8 am	Reid 102	Timothy Percoski	Mon	1 pm	Reid 101
Kendra Eneroth	Thurs	9 am	Reid 101	Janet Perry	Wed	8 am	Reid 102
Jonathan Ernst	Tues	10 am	Reid 102	Alanna Piccillo	Sat	10 am	Reid 102
Eric Esby	Tues	6 pm	Reid 102	Paul Pierre	Tues	9 am	Reid 101
Lane Fischman	Fri	1 pm	Reid 101	Erin Quintia	Thurs	8 am	Reid 102
Brandon Fritz	Wed	1 pm	Reid 102	Mary Ritter	Fri	8 am	Reid 101
Jeremy Fuller	Thurs	11 am	Reid 102	Seth Robertson	Thurs	8 am	Reid 101
Sheri Gates	Tues	10 am	Reid 101	Peter Rust	Fri	10 am	Reid 101
Ashley Gillespie	Sat	9 am	Reid 101	Robin Scardino	Tues	1 pm	Reid 101
Tanya Gordon	Wed	4 pm	Reid 101	Jessica Schultz	Tues	11 am	Reid 102
Amy Gramling	Mon	10 am	Reid 101	Ralph Spraker	Tues	12 pm	Reid 101
Heather Grant	Mon	2 pm	Reid 101	Marcie Steen	Wed	4 pm	Reid 102
Shannon Greco*	Mon	4 pm	Reid 101	Joyce Striclyn	Sat	2 pm	Reid 102
Christopher Green	Mon	6 pm	Reid 101	Nancy Talley	Sat	12 pm	Reid 101
Christopher Gunderson	Mon	1 pm	Reid 102	Shaun Terry	Wed	9 am	Reid 101
Hadley Hentschel	Sat	8 am	Reid 101	Katherine Theobald	Wed	11 am	Reid 102
Susanne Hokkanen	Wed	8 am	Reid 101	Rob Tillman*	Fri	9 am	Reid 101
Daryl Holst	Thurs	10 am	Reid 101	Marta Toran	Thurs	9 am	Reid 102
Megan Hopkins	Fri	10 am	Reid 102	Jeanne Torske	Thurs	12 pm	Reid 102
Jasper Howell	Mon	10 am	Reid 102	Audrey Urista	Thurs	12 pm	Reid 102
Cheryl Hudson	Sat	1 pm	Reid 102	Shari Ward	Mon	8 am	Reid 102
An'juli Johnston	Mon	12 pm	Reid 102	Thomas Wellnitz	Wed	12 pm	Reid 102
Darren Kellerby	Fri	1 pm	Reid 102	Matt Wigglesworth	Wed	1 pm	Reid 101
Marty King	Thurs	1 pm	Reid 101	Jennifer Williams	Sat	1 pm	Reid 101
Shannon Knodel	Thurs	10am	Reid 102	Beth Workman*	Mon	4 pm	Reid 102
JoDean Knutson-Person	Tues	8 am	Reid 101	Andrea Gissing Yordán	Mon	9 am	Reid 102

*Will present Summer 2011, but graduate at a later date.



Intercollege Programs for Science Education

*401 Linfield Hall
Montana State University-Bozeman
Bozeman, MT 59717-2805*

www.montana.edu/msse

HISTORY OF THE MASTER OF SCIENCE IN SCIENCE EDUCATION PROGRAM

In May 1996, the Montana Board of Regents of Higher Education approved a new degree, the **Master of Science in Science Education (MSSE)**, designed for science educators interested in graduate study while remaining employed. It is unusual in two important ways. First, it is an intercollege, interdisciplinary effort. Four colleges, the Division of Graduate Education, and fourteen departments collaborate to offer this innovative degree. Second, about 80% of the courses and credits needed to complete the degree are offered by distance learning in structured interactive courses using asynchronous computer mediated instruction. The National Teacher Enhancement Network (NTEN) project, a National Science Foundation grant project, funded since 1992, developed and offers many of the distance learning courses for this degree program. The Burns Telecommunication Center, Extended University, provides technical and logistical support. In addition to completing core courses in education, those seeking the degree develop interdisciplinary combinations of science courses from offerings in biology, chemistry, earth science, ecology, microbiology, physics, plant science and other science content areas. All graduates complete a science education capstone project in their final year.

Norm Reed, Coordinator 1996 to 1998, artfully handled admissions for the first two cohorts, oversaw design and development of core classes, and overall implementation of the program. In 1997, 30 teachers enrolled in six classes offered in the first campus summer session. In comparison, this summer, close to 400 teachers are enrolled in approximately 45 campus and distance courses.

Carol Thoresen, Coordinator 1999 to 2007, grew the program from 25 to about 60 admissions per year. Larger enrollment allowed for a wider variety of science course offerings. Carol worked with top campus instructors and researchers to develop over 25 new program courses, some with very innovative modes of delivery.

Peggy Taylor is the current Director of MSSE. She assumed her position in January of 2008. As a graduate of the program's first cohort, she brings a unique perspective to its administration. Her contributions include expansion of the program's targeted populations, strengthening the program's framework through continuous evaluation processes, and growing program admissions to over 100 per year.

Diana Paterson, Associate Director, joined the program in 2002. She provides critical recruiting and advising support to these off-campus graduate students. Close to 400 educators are continuously enrolled in the degree program. Teachers have entered from all 50 states and at least 17 foreign countries. By the end of the summer, close to 600 degrees will have been awarded.

John Graves, Lead Program Faculty, has been a core MSSE instructor since 2003. He assumed his duties as Lead Program Faculty in 2009. In addition to his instructional responsibilities, John provides guidance and mentoring for MSSE faculty, participates in various outreach activities, and serves as a liaison between the MSSE office and MSSE instructors.

Laurie Rugemer, Assistant Program Coordinator, joined the program in 2009 as a program graduate. She works closely with students throughout the application and admissions process, facilitates the online capstone preparation forum required of all graduate candidates, provides expertise regarding capstone organization and formatting, and serves in an instructional support role for various MSSE courses.

MSSE CAPSTONE PROJECT

Each Master of Science in Science Education (MSSE) student, with the cooperation of her or his graduate committee, identifies and completes a science education capstone project. Each project is designed to provide experience and information that aids our understanding of science teaching-learning or science curriculum. The capstone project topic is generally identified during the first year of the student's graduate program. A student begins the project, which relates to science education in the MSSE student's educational setting, in the fall of the final year by submitting a proposal to his/her advisor. The results of each student's project are summarized in a written, professional paper completed and presented in the student's final summer session.

The MSSE Steering Committee, faculty, and staff congratulate these deserving graduate students for their persistence to pursue a graduate degree, while continuing full-time employment as science educators.

2011 Capstone Project Advisors

Jeff Adams, Physics

John Amend, Chemistry

Chris Bahn, Chemistry

Ritchie Boyd, Teach/Learn Tech. Specialist

Joseph Bradshaw, Biology

Monica Brelsford, Thermal Biology Institute

Lisa Brown, Extended University

Eric Brunsell, Science Education

Greg Francis, Physics

Pati Glee, Microbiology

Irene Grimberg, Physics, Science Math Resource Center

John Graves, Science Education

Steve Holmgren, Chemistry

Jerry Johnson, Political Science & Biology

Susan Kelly, Big Sky Institute

Billie Kerans, Ecology

Robyn Klein, Plant Sciences

Bill McLaughlin, Chemistry

Elinor Pulcini, Microbiology

Barry Pyle, Microbiology

Jewel Reuter, Science Education

Angie Sower, Chemistry

Patti Steinmuller, Health & Human Development

David Willey, Ecology

Walt Woolbaugh, Science Education

Off-Campus Advisors

Donna Governor, Astronomy
Liberty Middle School
Forsyth County, Georgia

Irina Irvine, Restoration Ecologist
Santa Monica Mountains National Recreation Center
Thousand Oaks, CA

Gerald Nelson, Department of Geography and Geology
Casper College
Casper, WY

Gregory Reinemer, Physics
Highline Community College
DesMoines, WA

Suzanna Soileau, Outreach Coordinator
USGS Northern Rocky Mountain Science Center
Bozeman, MT

Daniel Steinberg, Princeton Center for Complex Materials
Princeton University
Princeton, NJ

Shannon Walden, Biology
MSU Great Falls
Great Falls, MT

Jeffrey Warren, Wildlife Biologist
Red Rocks Lake NWR
Lima, MT

DEGREE CANDIDATES 2011

Melanie S. Acker Ulysses, PA	Jeremy Fuller Wolfeboro NH	Jacob L. Lame Colorado Springs, CO	Mary Seabrook Ritter Bethlehem, PA
Patti Rae Bartlett Seeley Lake, MT	Sheri Gates Nagykovacs, Hungary	Karen L. Lund Huntingdon, England	Seth Robertson Renton, WA
Jennifer Moore Bernstein Portland, OR	Ashley Gillespie East Helena, Montana	Kathryn Madden Beaufort, SC	Peter Rust Wilmington, DE
Lindsey Paige Bowser Middleburg, VA	Tanya Gordon Boise, Idaho	Margaret K. Magonigle Hana, Hawaii	Robin Scardino Hong Kong, Hong Kong
Brennan Brockbank Fairfax, CA	Amy M. Gramling Hillsdale, Michigan	Danny Mattern El Dorado, Kansas	Jessica F. Schultz Culdesac, Idaho
Nancy Lee Bryant Burlington, NC	Heather M. Grant Ojai, CA	Emily McKenna Belding, Michigan	Ralph E. Spraker, Jr. Columbia, SC
David Buck Dixfield, ME	Christopher Green Painesville, Ohio	Christian R. Mills Rawlins, Wyoming	Marcie Steen Mount Vernon, Ohio
Joel Burgener Lima, MT	Christopher Gunderson Absarokee, MT	Amiee L. Modic Katy, Texas	Joyce Striclyn Terre Haute, IN
Sandra J. Climenhaga Albion, NY	Hadley Hentschel Carbondale, CO	Christopher G. Monsour Tiffin, OH	Nancy Hoggard Talley Tarboro, NC
Sarah Marie Conner KalisPELL, MT	Susanne L. Hokkanen Matteson, IL	Richard Montoya Eureka, MT	Shaun Terry Lovelock, Nevada
Joann C. Dayton-Wolf Kingston, NY	Megan Hopkins Naperville, Illinois	Erik Nickerson Boulder, CO	Katherine Theobald Alexandria, VA
Joe DeLuca Almere, The Netherlands	Daryl Allan Holst Bangkok, Thailand	Cameron Novak Fredericksburg, VA	Marta Toran Boone, NC
Joyce Dooley Bentonville, Arkansas	Jasper Howell Afton, WY	Aaron Olmanson Golden Valley, MN	Jeanne Torske Broadus, MT
Katherine Echazarreta Vienna, VA	Cheryl A. Hudson Tifton, GA	Bradley Pederson Belle Plaine, MN	Audrey Urista Winston, Oregon
Kendra Eneroth Spokane, WA	An'juli Johnston Billings, MT	Timothy D. Percoski Bloomfield, CT	Shari F. Ward Ashland, Maine
Jonathan R. Ernst Wentzville, Missouri	Darren Kellerby Anchorage, AK	Janet E. Perry Ashland, Maine	Tom Wellnitz Johns Creek, Georgia
Eric Esby West Hills, CA	Marty King Legrand, Iowa	Alanna Piccillo Palisade, CO	Matthew Wigglesworth Boise, Idaho
Lane A. Fischman Antioch, IL	Shannon Knodel Belgrade, MT	Paul Pierre Nassau, Bahamas	Jennifer Williams Honolulu, HI
Brandon Fritz Williamsburg, Iowa	JoDe Knutson-Person Bismarck, ND	Erin Quintia Columbia Falls, MT	Andrea Gissing Yordan Philadelphia, PA

Monday, June 27, 2011

8 am **Joe DeLuca** **Reid 101**
Almere, The Netherlands
International School Almere
Facilitator: Katherine Theobald

The Effect of Science Notebooks on Student Achievement

In this project I introduced science notebooks to grades seven through ten at an international school in Almere, The Netherlands. The purpose was to determine if this form of organization improved student achievement. The notebooks were used as the central resource to collect data, take notes, and ask questions. Evidence showed that students achieved higher when they used science notebooks than when they did not.

8 am **Shari F. Ward** **Reid 102**
Ashland, Maine
Ashland District School
Facilitator: Janet E. Perry

The Impact of Guest Speakers in the Science Classroom

Guest speakers were implemented into 9th, 11th, and 12th grade science classes to determine if, in hearing real-world success stories from individuals other than their everyday teacher, there would be impact to student interest in the content area, attention to class work requirements, motivation, and future career plans. Results show that, while most students enjoyed having guest speakers, specific results to target areas of interest vary by age group.

9 am **Joyce Dooley** **Reid 101**
Bentonville, Arkansas
Spring Hill Middle School
Facilitator: Jonathan R. Ernst

The Effects of Using Literature Circles on Understanding of Middle School Earth Science Concepts

The effects of literature circles on students' of understanding earth science concepts was investigated using a variety of data collection tools. The data indicated that student collaboration with a diversity of reading activities increased student understanding and long-term memory. Data also showed students' motivation for using complex comprehension strategies is increased when students are afforded opportunities to share their questions about interesting text, and teacher attitudes and motivation improved as literature circles were used.

9 am **Andrea Gissing Yordán** **Reid 102**
Philadelphia, PA
Philadelphia Zoo
Facilitator: Susanne L. Hokkanen

Setting Them Up For Success: Investigating the Efficacy of the Philadelphia Zoo's Outreach Educator Training Program, an Informal Science Education Project

Educators need to receive proper training before they can truly be effective teachers. Using a combination of surveys and interviews of staff, managers and animal keepers, this study examined the areas the Zoo On Wheels outreach staff need to be trained in: animal handling, knowledge acquisition, and teaching and presentation skills. The results indicated that areas with defined training protocols had the highest levels of educator confidence and efficacy.

Monday, June 27, 2011

10 am **Amy M. Gramling** **Reid 101**
Hillsdale, Michigan
Hillsdale High School
Facilitator: Deborah Brown

The Effect of Two Intervention Strategies on Science Homework Completion

The purpose of this study was to determine the effects of two intervention strategies on homework completion. In the first intervention strategy, students were required to keep an academic planner that recorded assignments and due dates. The second intervention strategy was to provide students with a weekly reminder of missing work. Surveys and interviews, along with collected homework completion data were used to determine the effectiveness of the implemented strategies.

10 am **Jasper Howell** **Reid 102**
Afton, WY
Star Valley High School
Facilitator: Marta Toran

The Effects of Using Lab Report Blogs to Improve the Laboratory Experience in High School Chemistry Class

The use of internet technology can be used in the science classroom much like it is used in other areas of education. In this study students use web blogs to publish and share results, observations, and opinions based on laboratory experiments. This study looked at the effectiveness of just such a strategy in a high school chemistry classroom, to improve various areas of learning and science skills.

12 pm **Joel Burgener** **Reid 101**
Lima, MT
Red Rock Lakes National Wildlife Refuge
Facilitator: Tanya Gordon

Predation on Meadow Voles: The Effects of Predator Exclusion on Vole Population in a Wet Meadow

This project was designed to investigate the response of vole populations to a treatment that restricted access by medium-sized mammalian predators in a wet meadow habitat at Red Rock Lakes National Wildlife Refuge, Lima, Montana. This project included predator monitoring by visual surveys and remote sensing with camera traps. Research procedures, analysis and results will be presented with a discussion of the implications of the results.

12 pm **An'juli Johnston** **Reid 102**
Billings, MT
Castle Rock Middle School
Facilitator: Danny Mattern

Implementing an After School Intervention Program at Castle Rock Middle School in Seventh Grade Science and Other Core Classes

The study implemented an after school intervention program for students who struggled to complete the daily work assigned in core classes including science. Results suggest students were more organized and were always aware of what assignments they needed to complete each week. A specific group of students who had struggled throughout the year showed moderate growth in overall grade point averages, organization, and time on task in the classroom.

Monday, June 27, 2011

1 pm Timothy D. Percoski Reid 101
Bloomfield, CT
Metropolitan Learning Center Interdistrict Magnet School
Facilitator: Daryl Allan Holst

The Use of Higher Order Cognitive Strategies to Improve Student Understanding of High School Chemistry Concepts

This study investigated the effects of Higher Order Cognitive Strategies, which utilizes the upper levels of Bloom's taxonomy, on students' understanding of high school chemistry concepts, answering higher order questions, maximizing long-term memory, and effects on students' perceptions of chemistry. The teacher's attitudes toward the planning and implementation of chemistry units as well as perceptions of teaching chemistry were also investigated. Data showed mixed results for all areas of the study.

1 pm Christopher Gunderson Reid 102
Absarokee, MT
Absarokee School District
Facilitator: Audrey Urista

Mastery of Problem Solving Strategy for Improving High School Chemistry Student Achievement

This investigation determined the correlation between problem-solving strategies and student achievement. Problem solving is an important part of real-world application and many students have not acquired the essential skills to work through complex problems that they may encounter everywhere. Student interviews, teacher and student surveys, prelab and postlab assessments, and journal writings were analyzed to determine an improvement of student understanding through the implementation of the DRUFAS problem-solving strategy. Although there was a slight decrease in overall student achievement, the investigator was able to add more challenging material to the curriculum.

2 pm Heather M. Grant Reid 101
Ojai, CA
The Thacher School
Facilitator: Brennan Brockbank

The Student Experience in Traditional and Inquiry-Based Chemistry Labs

This project introduced two inquiry-based labs to an existing sequence of traditional labs in a sophomore chemistry class. The student experience in both types of lab instruction was examined through surveys, interviews, misconception probes, pre- and post-lab content quizzes, and student-teacher communication logs. It was found that both types of lab instruction had strengths and potential weakness, which indicate areas that require particular attention when using each instructional method.

2 pm Emily McKenna Reid 102
Belding, Michigan
Belding Middle School
Facilitator: Lindsey Paige Bowser

Student Use of Formative Assessments and Progress Charts of Formative Assessments in a Seventh Grade Science Class

In this investigation formative assessments and a progress chart of formative assessments were implemented with the purpose of improving student engagement and learning. Formative assessments were taken the day after material was presented. Student progress was self-monitored by using the progress charts. Student scores on summative assessments improved by 3% and students were overwhelmingly positive about using the formative assessments and the progress charts to monitor their learning.

Monday, June 27, 2011

4 pm **Shannon L. Greco** **Reid 101**
Princeton, NJ
Princeton University
Facilitator: Eric Esby

The Impact of Scientists' and Engineers' Involvement in a One-Day Program for Middle School Students at Princeton University

More than 450 middle school students participated in Making Stuff at Princeton, two one-day materials science programs conducted by the Princeton Center for Complex Materials. Scientists and engineers interacted with middle school students through activity tables, auditorium shows and lab tours. This mixed method evaluation of the program showed that one-day of direct interaction with research scientists and engineers has a positive impact on students' attitudes towards science and scientists.

4 pm **Beth Workman** **Reid 102**
Bainbridge, Ohio
Paint Valley Middle School
Facilitator: Jeremy Fuller

Reading the Middle School Science Textbook

My project examined the use of the science textbook in my middle school science classroom. During my first five years as a middle school science teacher, the students and I read and discussed our textbook orally. But in trying to have more classroom time for hands-on learning, I collected data to determine if reading orally was necessary: my study shows that it is not.

6 pm **Christopher Green** **Reid 101**
Painesville, Ohio
Thomas W. Harvey High School, Painesville City Schools
Facilitator: Matthew Wigglesworth

The Effects of Formative Assessments on Performance and Attitudes of Ninth-Grade Science Students

The importance of formative assessments has been in the forefront of current pedagogy. In this study, ninth-grade urban science classes were taught using clear "I can statements", given meaningful feedback on their assignments, and provided with multiple attempts to successfully reach the learning goals. While the overall performance of students showed marginal improvement, the data indicates that their attitudes towards science and learning seemed to become more positive.

Tuesday, June 28, 2011

8 am **JoDe Knutson-Person** **Reid 101**
Bismarck, ND
Bismarck State College and Jeanette Myhre Elementary
Facilitator: Amiee L. Modic

Increasing Science Awareness of Elementary Students Through a Service Learning Outreach Project Using College Students

Two-year college students participated in a service learning outreach project with two classes at a local elementary school with a high underrepresented population. The project was designed to increase the content knowledge of all the students involved, empower the elementary students, and fulfill some needs of the college awareness program within the elementary school. Analysis was completed using results from questionnaires and journals.

Tuesday, June 28, 2011

8 am **Karen L. Lund** **Reid 102**
Huntingdon, England
Alconbury Middle High School
Facilitator: An'juli Johnston

Utilizing a Comprehensive Webpage to Improve Science Classroom Performance

The purpose of this study was to improve student classroom performance through the use of a detailed chemistry webpage. Students utilized a monthly assignment calendar with links to all classroom materials. Links to additional chemistry resources for review and reinforcement were also available to assist both present as well as absent students in their learning. Results indicate that the treatment increased assessment scores and improved student learning behaviors.

9 am **Paul Pierre** **Reid 101**
Nassau, Bahamas
St. Augustine's College
Facilitator: Heather M. Grant

Using Rubric-Based Formative Assessments with High School Chemistry Instruction

This study investigated the effects of closing the feedback loop of understanding by utilizing rubric-base formative assessment on students' understanding of chemistry concepts and motivation in the classroom. The data from various collection tools indicate no significant improvement in student understanding following the treatment; however, there was an improvement in students' long-term memory, attitude, and motivation and in the teacher's attitude and motivation towards teaching.

10 am **Sheri Gates** **Reid 101**
Nagykovacsi, Hungary
American International School of Budapest
Facilitator: Seth Robertson

The Effects of Using the Conceptual Change Model to Dispel Scientific Misconceptions in Elementary Children

The purpose of this project was to pre-assess and identify student misconceptions and to provide experimental opportunities for students to explore their ideas. Students were then able to invalidate or validate their previous ideas based on the data they gathered and the observations they made in these experiments. The results of the study indicate that the Conceptual Change Model is an effective strategy for helping students to develop a conceptual schema that dispels student misconceptions.

10 am **Jonathan R. Ernst** **Reid 102**
Wentzville, Missouri
Wentzville Holt High School
Facilitator: Jennifer Moore Bernstein

Implementing Frequent Assessments to Increase Student Performance Levels in a High School Chemistry Course

The project's purpose was to help students understand that successfully completing homework assignments translates into an increase in their overall performance in a high school chemistry course. Frequent assessments were implemented after each homework assignment and progress was monitored and tracked through summative assessments. Results suggest an increase in homework completion and performance levels on summative assessments. Students' attitudes towards completing their homework and their confidence levels showed minor improvements.

Tuesday, June 28, 2011

11 am **Jessica F. Schultz** **Reid 102**
Culdesac, Idaho
Culdesac Joint School District # 342
Facilitator: Emily McKenna

The Effects of Intergrating Engineering Strategies in the Science Classroom on Critical Thinking Skills Among Students in 7th to 12th Grade

In my investigation I wanted to find out if implementing engineering strategies in my classes would improve critical thinking skills among my students. The grades of my students ranged from the 7th grade to the 12th grade. The results of this investigation showed that there was an increase in student critical thinking and involvement in their learning process.

12 pm **Ralph E. Spraker, Jr.** **Reid 101**
Columbia, SC
South University
Facilitator: Joel Burgener

How Does “Just-In-Time” Scaffolding of Descriptive and Inferential Statistics within an Existing, Quarter-Long, Group Poster Presentation of Survey Data Impact Undergraduate Statistics Students’ Ability to Apply Their Learning?

Project was based on American Statistical Association’s (ASA) *GAISE* recommendations on how students learn statistics best. Student-designed survey-to-poster projects provided opportunities to construct knowledge through active involvement, modeled content, technology, and practice. Statistical thinking in open-ended investigations as groups, consistent feedback on performance from peers and judges helped students learn statistics. Technology helped conceptual understanding as students analyzed their data.

12 pm **Christian R. Mills** **Reid 102**
Rawlins, Wyoming
Rawlins High School
Facilitator: Cameron Novak

Online & Virtual Education: Its Effectiveness and Impact on Secondary Mathematics & Science Students

This paper describes effects of online instruction on secondary mathematics students. It was designed to determine if students enrolled in online mathematics courses receive a level of instruction comparable to students in traditional classrooms. It was determined that students enrolled in online mathematics courses made progress but fell short of that of traditional students. Hybrid courses may be more effective for accomplishing desired goals for students with exceptional circumstances.

1 pm **Robin Scardino** **Reid 101**
Hong Kong, Hong Kong
Hong Kong International School
Facilitator: Margaret K. Magonigle

The Effects of Using Differentiated Instruction on Understanding Middle School Science Concepts

This study investigated the effects of differentiated instruction on middle school students’ understanding of science concepts. A variety of data collection tools were used to isolate students’ cognitive level of understanding, the understanding of students of various achievement levels, and teacher attitudes and motivation. The data indicate minor improvement in students’ basic understanding and understanding at various cognitive levels. Teacher attitude and motivation yielded mixed results.

Tuesday, June 28, 2011

2 pm Erik Nickerson Reid 102
Colorado Springs and Boulder, Colorado
Fountain Valley School of Colorado and Flatirons Elementary
Facilitator: Kendra Eneroth

Video Games in the Science Classroom

Can video games make a significant impact in the classroom? Most educational video games imitate classroom activities (such as answering multiple choice questions or memorizing flash cards) instead of using the computer's superior simulation capabilities to create a unique learning experience. Would a different type of game be more useful? Students played several different styles of educational video games to evaluate the effect of video games in the classroom. Each different type of game helped students learn, though the games with more words created a stronger impression that learning actually happened.

4 pm Brennan Brockbank Reid 101
Fairfax, CA
White Hill Middle School
Facilitator: Christopher Gunderson

From the Dino's Perspective: Speculative Fiction in the Science Classroom

This research project sought to address a concern that middle school students do not read enough to develop scientific literacy. The speculative fiction novel, Raptor Red, was woven into existing life science curriculum and was used to highlight both aspects of literature and of science. The self-reported interest in science and in reading was measured and compared before and after the treatment.

4 pm Bradley Pederson Reid 102
Belle Plaine, MN
Belle Plaine High School
Facilitator: Brandon Fritz

Different Classes, Different Students? A Comparative Study of Different Chemistry Classes

This study looks at how the students' experiences influence their outcomes in different chemistry classes. In Belle Plaine, MN there are two choices of Chemistry offered, traditional versus context-based. Each of these classes provides the student with a different experience in how they learn chemistry. The outcomes can be compared to what the state of Minnesota suggests that all students in Chemistry should know upon completion.

6 pm Eric Esby Reid 102
West Hills, CA
Santa Monica Mountains National Recreation Area
Chaminade College Preparatory High School
Facilitator: Shannon L. Greco

Edge Effects: Native and Non-Native Plant Distribution Along Single Use and Multi-Use Trails in the Santa Monica Mountains National Recreation Area, California

This project is the culmination of research designed to investigate the potential edge effects of varying recreational usage on two vegetation communities along trails within the Santa Monica Mountains National Recreation Area in Thousand Oaks, California. Research procedures, results, and analysis will be presented with a summary of how being a teacher/researcher has impacted teacher professional development. Additionally the involvement of high school students as volunteer research assistants will be discussed.

Wednesday, June 29, 2011

8am **Susanne L. Hokkanen** **Reid 101**
Matteson, IL
Colin Powell Middle School
Facilitator: Sandra J. Climenhaga

Improving Student Achievement, Interest and Confidence in Science through the Implementation of the 5E Learning Cycle in the Middle Grades

For this project, I used the 5E model to improve student academic achievement and self-expressed interest and confidence in science. Data was collected from pre and post tests and student surveys to determine growth in student academics and attitudes towards science. Data was also collected and compared between a traditional science classroom and a 5E model classroom. Data demonstrated a modest success in the use of the 5E model in teaching.

8 am **Janet E. Perry** **Reid 102**
Ashland, Maine
Ashland District School
Facilitator: Shari F.Ward

Envirothon Teaching Methods- How Do They Impact Learning in the Traditional Biology Classroom?

In the Envirothon, a national environmental contest, teams of students work together outdoors, solving site-based natural resource questions and problems in aquatics, forestry, soils, and wildlife. In this Action Research Project, I incorporated the same teaching methods commonly used to prepare teams for this competition into my high school Biology course. When used within a traditional classroom setting, Envirothon teaching methods had positive impacts on students' comprehension of environmental topics.

9 am **Shaun Terry** **Reid 101**
Lovelock, Nevada
Pershing County High School
Facilitator: Timothy D. Percoski

The Effects of Concept Maps on Student Knowledge of Earth Science

The goal of this project was to study the effects of including concept mapping to associate and correlate concepts from a variety of instructional methods with lessons on Earth Science curriculum in a 9th grade Integrated Science classroom. The data included multiple-choice questions, open-response answers, student interviews, and journal entries. The results indicated an increase in student knowledge of vocabulary while student improvement in test performance was mixed.

10am **Margaret K. Magonigle** **Reid 101**
Hana, Hawaii
Hana School
Facilitator: Jasper Howell

The Effects of Using an Inquiry-Approach Through the 5E Lesson Format on Middle School Earth and Space Science Students

In this investigation the 5E inquiry-based instructional approach was implemented with the purpose of improving students' learning in science, improving students' ability to understand and apply inquiry, and improving teacher's instruction. The results of this 5E Learning Cycle project on eighth grade Earth and Space Science students indicated that learning increased, ability to understand and apply inquiry increased, and that the teacher's instruction improved.

Wednesday, June 29, 2011

10 am **Amiee L. Modic** **Reid 102**
Katy, Texas
Katy High School
Facilitator: Paul Pierre

Student Misconceptions- Identifying and Reformulating What They Bring to the Chemistry Table

Methods of identifying student misconceptions and related treatments were investigated in four PreAP chemistry classes. Misconceptions were identified through existing and teacher created tools, while methods of treatment included laboratory, modeling and animations. An improvement in the understanding of molecular size and conductivity of solutions at a conceptual level was noted, while student understanding of phase changes did not improve as much.

11 am **Katherine Theobald** **Reid 102**
Alexandria, VA
Commonwealth Academy
Facilitator: Joyce Dooley

The Impact of Social Networking in the Secondary Science Classroom

The purpose of this study was to observe the effects of incorporating a social networking platform particularly on discussions, community, and understanding. Results showed the network built a sense of community within the class and provided a comfortable place for students to interact. Student responses to discussion prompts improved in their ability to spark further discussion but remained the same in overall quality.

12 pm **Lindsey Paige Bowser** **Reid 101**
Middleburg, VA
The Foxcroft School
Facilitator: Erik Nickerson

The Effects of Direct Mathematics Instruction on Attitudes and Success in General Chemistry

This project involved the development of a multi-part assignment in cooperation with the math department. Changes in student attitudes about mathematics and chemistry and competencies in terms of mathematical understanding required for success in chemistry were measured before and after students received instruction in both math and chemistry classes and completed the joint assignment. The results indicated gains in math and chemistry skills and in confidence.

12 pm **Tom Wellnitz** **Reid 102**
Johns Creek, Georgia
Northview High School
Facilitator: Beth Workman

Measuring the Effectiveness of Alternative Methods of Lab Work Analysis in an AP Environmental Science Class

Four classes used different methods – preview materials, small group whiteboard presentations, class discussion, and no treatment – to process the same lab experience rather than doing lab reports. Scores on a quiz over the lab ideas were compared to determine from which treatment students better understood the associated concepts. Students in the class using the whiteboards regularly earned the highest quiz score.

Wednesday, June 29, 2011

1 pm **Matthew Wigglesworth** **Reid 101**
Boise, Idaho
Centennial High School
Facilitator: Robin Scardino

The Effects of Teacher Collaboration on Students' Understanding of Earth Science Concepts

The purpose of this study was to examine the effects of collaboration of Earth science teachers on student understanding, student motivation, and teacher motivation. Data were collected using a variety of instruments to evaluate how collaboration on labs and scientific report writing impacts students and teachers in the Grade 9 Earth Science classroom. Results indicated that student understanding and teacher motivation increased, while the results on student motivation were mixed.

1 pm **Brandon Fritz** **Reid 102**
Williamsburg, Iowa
Williamsburg High School
Facilitator: Joann C. Dayton-Wolf

Improving Higher Order Thinking Skills through Blogs and Wiki-based Collaboration

Weekly group discussions online through the use of wikispaces were implemented to see if students' higher order thinking skills were improved. Weekly blogs posting new discoveries or environmental problems initiated problem solving discussions online through the use of wikispaces. Analyzing students' conversations revealed that students conversing online has a positive effect on improving students' development of higher order thinking skills.

2 pm **Deborah Brown** **Reid 102**
Nyssa, OR
Nyssa High School
Facilitator: Joe DeLuca

What Did I Learn? Helping Students Learn Through Inquiry

This study increased the use of inquiry activities in the biology classroom. Student performance was monitored to see if inquiry would make a positive impact on scores and enjoyment of biology. Following each activity, students also have to answer "What did you do? What did you see? What did you learn?" The results indicate that while test scores did not necessarily improve, student enjoyment of science and labs increased.

4 pm **Tanya Gordon** **Reid 101**
Boise, Idaho
Hillside Junior High School
Facilitator: Ralph E. Spraker, Jr.

Assessing and Improving Middle School Teaming from a Science Teacher's Perspective

The focus of this project was to advance the teaming concept at my school by examining both the successes and challenges experienced and to propose methods for improvement influenced by research based strategies. Nine teachers who teach various subjects in grades 7-9 participated in a teaming training workshop and learned new skills to implement throughout the school year. Their experiences, opinions and suggestions for future improvements are documented within this project.

Wednesday, June 29, 2011

4 pm **Marcie Steen** **Reid 102**
Mount Vernon, Ohio
Mount Vernon High School
Facilitator: JoDe Knutson-Person

Investigating the Impact of a Laboratory Skills Checklist on Student Engagement in Biology

How will a lab skills checklist impact student engagement during labs? Results showed that students scored higher in posttreatment performance assessment than nontreatment assessment. Additionally, students of various achievement levels reported benefits from tracking their accomplishments. While communication between students and teacher improved, not as much improvement occurred as pretreatment data predicted.

5 pm **Richard Montoya** **Reid 102**
Eureka, MT
Eureka Middle School
Facilitator: Hadley Hentschel

Collaboration Facilitated Through Technology: Part of a Comprehensive Inquiry-Based Teaching and Learning Strategy

A comparative analysis was conducted between two independent but academically similar science classes to measure academic and motivational effects on student learning as students shifted from face-to-face collaboration to technology-based collaboration. Academically, high level achievers benefited most from technology interventions and low academic performers benefited least. Over time, technology burden caused decreases in student motivation. However, technical challenges resulted in increased problem solving and critical thinking performance for all participants.

Thursday, June 30, 2011

8 am **Seth Robertson** **Reid 101**
Renton, WA
McKnight Middle School
Facilitator: Melanie S. Acker

Using the Primacy Effect to Increase Student Achievement in Science

This project focused on two groups of students who were given scientific method instruction at different times during lessons: The first group received instruction at the beginning of class whereas the second was instructed at other times. The results of this study show an increase in scores for the first group compared to the second.

8 am **Erin Quintia** **Reid 102**
Columbia Falls, MT
Columbia Falls High School Columbia Falls, Montana
Facilitator: Aaron Olmanson

Impacting Environmental Awareness and Personal Environmental Behaviors of High School Biology Students through Action Projects

This research project examined personal environmental behaviors of high school freshman biology students who were exposed to environmental topics in class and participated in environmental action projects. The effectiveness of classroom lessons and action projects on student's environmental behaviors was evaluated. The student's environmental awareness and voluntary environmental behaviors were monitored throughout the year to determine if any changes occurred.

Thursday, June 30, 2011

9 am **Kendra Eneroth** **Reid 101**
Spokane, WA
Ferris High School
Facilitator: Jacob L. Lame

The Effects of Problem-Solving Case Studies on Understanding High School Biology

The purpose of this project was to study the effects of problem-solving scenarios in biology as a teaching strategy on student understanding of concepts. Students were exposed to a variety of problem-solving scenario activities including video, written, and hands-on activities that related biology content to real-world applications. The data showed improvement of student understanding and motivation, especially when a combination of problem-solving case studies included hands-on scenarios activities.

9 am **Marta Toran** **Reid 102**
Boone, NC
Facilitator: Karen L. Lund

A Study into the Transition from High School to College Biology

The aim of this study was to gain a better understanding into the gap that exists between high school and college biology. Over 2600 students taking their first biology class in 42 universities across the US participated. In addition, perspectives of biology educators (high school and college) regarding student readiness for college biology were gathered. The results highlight inadequate student preparation and misalignment between high school and college life science.

10 am **Daryl Allan Holst** **Reid 101**
Bangkok, Thailand
International Community School
Facilitator: Christopher Green

Inquiring into Measurement Error in the Science Laboratory

High school students often struggle with accurate data collection in the science laboratory. This study examined the effects of inquiry-based laboratory learning experiences on student ability to recognize the limited precision of measurements, ability to see error, manipulative ability in using laboratory instruments and commitment to accuracy. Results indicate increased student ability to see and correct error as well as improved understanding of error.

10 am **Shannon Knodel** **Reid 102**
Belgrade, MT
Belgrade Middle School
Facilitator: Andrea Gissing Yordán

The Effectiveness of a Classroom Response System as a Method of Formative Assessment in a Middle School Science Classroom

The purpose of this study was to investigate the effectiveness of a Classroom Response System (CRS) in determining student understanding about particular science concepts. Correct and incorrect responses were discussed after each question so misconceptions could be cleared up immediately. Survey and interview results indicated the CRS was the preferred method of formative assessment, but post-test scores did not show a significant improvement.

Thursday, June 30, 2011

11 am **Jeremy Fuller** **Reid 102**
Wolfeboro, NH
Kingswood Regional High School
Facilitator: Ashley Gillespie

Clickers in the Science Classroom

The purpose of this study was to see if the use of student electronic response systems could help students increase their understanding and retention of the biology curriculum. An electronic student response system, “clickers” as they are also known, was used over the course of a semester. Exam scores, student interviews, and surveys were used to evaluate their effectiveness. A comparison of exam scores did not show a statistically significant difference. Student and teacher opinions were very positive as a large majority of student respondents said that clickers help to engage them in the learning process.

12pm **Cameron Novak** **Reid 101**
Fredericksburg, VA
Post Oak Middle School
Facilitator: Jessica F. Schultz

The Effects of Using Musical Songs as a Supplement to a Traditional Life Science Curriculum

It seems that many students at all levels of education struggle with retaining taught information in classes. This study involves the application of musical curriculum based songs in addition to traditional teaching methods. The results of the study indicated that students exposed to the musical songs did in fact earn higher scores on assessments over the treatment time period.

12 pm **Jeanne Torske** **Reid 102**
Broadus, MT
Powder River County District High School
Facilitator: Joyce Striclyn

Differentiating Instruction with Regards to Gender and Learning Style in a Biology Class

In this investigation, lessons were differentiated with regard to both gender and learning style preference to determine the effect on student in-class performance and classroom dynamics. Overall this investigation revealed little difference between the genders, however there was a large sub-population of males with a preference for the kinesthetic learning style that were being underserved in this particular class. Classroom dynamics were improved as a result of the differentiation.

1 pm **Marty King** **Reid 101**
Legrand, Iowa
East Marshall High School
Facilitator: Alanna Piccillo

The Effects of Using Interactive Lessons on Students' Understanding of Anatomy

This project examines the integration of various interactive and visual activities to a traditional lecture-based high school anatomy class. The supplements included podcasts, multiple pictures, and short videos imbedded in the PowerPoint lectures, games used with iTouches, Webquests on the computer, and full length videos. The data indicate mixed results as to long-term retention of concepts but there was a more comfortable learning environment regarding the students' and the instructor's attitudes. There was an increase in the students' understanding of concepts between the treatment and nontreatment units.

Thursday, June 30, 2011

1 pm **David Buck** **Reid 102**
Dixfield, ME
T.W. Kelly Dirigo Middle School
Facilitator: Tom Wellnitz

Using Specific Questioning Strategies to Promote Better Understanding of Key Scientific Concepts

Middle school students are a curious lot, but their questions can be unfocused, or even unproductive from a scientific standpoint. This action research looks at the effects of teaching students to use the cognitive domain of Bloom's Taxonomy and Cothron's Four-Question Strategy in developing scientific questions. Both measures appeared to improve students' understanding of key scientific concepts and in helping them focus on valuable scientific questions.

2 pm **Danny Mattern** **Reid 101**
El Dorado, Kansas
Butler Community College
Facilitator: Amy M. Gramling

The Effects of Physics Ranking Tasks On Student Understanding Of Conceptual Physics Concepts

Physics ranking tasks were introduced to see if they could increase students' conceptual knowledge in general and calculus based physics courses. Ranking tasks help students think in terms of physics concepts rather than rely on mathematical equations to solve problems. Assessments were given both pre/post in order to calculate the percent gain. Analysis of the percent gain showed remarkable increase in the conceptual concepts due to the ranking tasks.

2 pm **Sarah Marie Conner** **Reid 102**
Kalispell, MT
Glacier High School
Facilitator: Katherine Echazarreta

What Impact Do Student-Led Demonstration Versus Teacher-Led Demonstration Have on the Retention Rate of AP Biology Students?

Strategies were implemented with the purpose of improving engagement and learning in the biology classroom. The investigation included student-led demonstrations versus teacher-led demonstrations and the impact on the retention rate of twelve AP biology students. A progressive Bloom's Taxonomy technique was used in accordance with student-led demonstrations. Engaged students reached higher levels of Bloom's Taxonomy, became self-sustained critical thinkers, and attained long-term memory recognition, supporting their higher level thinking.

4 pm **Kathryn Madden** **Reid 101**
Beaufort, SC
McCracken School
Facilitator: Christian R. Mills

The Use of Inquiry Based Instruction to Increase Motivation and Academic Success in a High School Biology Classroom

A variety of inquiry based lessons and non inquiry based lessons were used to motivate and increase academic success with a freshman biology honors students. Student self surveys, biology journals, and lab skills were indicators of motivation. Scores on standardized tests and other assessments were used to monitor students' academic success. Trends indicated an increase in student motivation to do science while testing scores were varied.

Thursday, June 30, 2011

4 pm **Audrey Urista** **Reid 102**
Winston, Oregon
Douglas High School
Facilitator: Richard Montoya

Modified Lecture Approaches and Their Impact in Improving Student Understanding and Performance in Science

What causes students to stay engaged, be interactive and learn during a lecture? How do we create lectures for various learning styles? This project is a study to measure the difference between two modified lecture approaches and their impact in improving student understanding and performance in science. Which lecture approach, traditional or the modified approach, using modality strategies and timed breaks, creates a better learning environment for the student?

Friday, July 1, 2011

8 am **Mary Seabrook Ritter** **Reid 101**
Bethlehem, PA
Lehigh Valley Charter High School for the Performing Arts
Facilitator: Bradley Pederson

The Effects of Interactive Engagement on Motivation, Participation, and Conceptual Understanding in High School Physics

The purpose of this study was to determine if there was a correlation between student motivation and participation in the understanding of physics concepts. Participation of students did increase with the introduction of interactive engagement. Cooperative group work (one type of interactive engagement) did not show any higher increase in learning of the material as compared with lecture format, although students reported experiencing more motivation during interactive engagement.

8 am **Joann C. Dayton-Wolf** **Reid 102**
Kingston, NY
Kingston High School
Facilitator: Shaun Terry

The Impact of Service Learning on "At Risk" High School Biology Students

Students who may not graduate with their peer cohort are deemed "at risk." This investigation studies the effect of service learning on attendance, attitude, and achievement of at risk high school biology students. Students participated in two community service learning projects: raising trout for release into local streams and/or implementing a vegetable garden on high school property. The results are inconclusive and indicate a longer term study is warranted.

9 am **Rob Tillman** **Reid 101**
Cranbrook, Canada
College of the Rockies
Facilitator: Sheri Gates

The Effects of Using Dichotomous Keys with Analogies on College Students' Understanding of Biology Concepts

This study investigated the effects of dichotomous keys with analogies on students' understanding of concepts. A variety of data collection tools were used to isolate long-term memory and higher-order thinking skills, as well as student attitudes and motivation. The data indicate no significant improvement in understanding and higher-order thinking skills following the treatment, but concept retention skills improved. Both lower-order thinking skills, and student attitudes and motivation, yielded mixed results.

Friday, July 1, 2011

10 am Peter Rust Reid 101
Wilmington, DE
Tower Hill School
Facilitator: Nancy Hoggard Talley

The Effects of Inquiry Instruction on Problem Solving and Conceptual Knowledge in Ninth Grade Physics Class

This project documents the impact of inquiry instruction on two ninth grade physics classes. Problem solving skills, conceptual knowledge, and students' reactions to the teaching style were assessed while students studied rotational motion and energy. The results were mixed: problem solving was not affected by inquiry; however, slight gains in conceptual knowledge were seen. Students generally preferred the traditional, non inquiry style lessons.

10 am Megan Hopkins Reid 102
Naperville, Illinois
Naperville Central High School
Facilitator: Jeanne Torske

Comparing the Effects of Traditional Learning (Lecture) vs. Independent Online Learning on Student Understanding in Weather and Geology

This study examined the effects of lecture compared to individual online learning on student understanding in an upperclassman Weather and Geology class. Students experienced alternating units of lecture and online learning followed by three units in which they chose which method of note-taking they preferred. Results suggest that factors such as gender, academic ability, and ability to focus must be considered when determining the effect each method had on student understanding.

12 pm Patti Rae Bartlett Reid 102
Seeley Lake, MT
Seeley Lake Elementary
Facilitator: Cheryl A. Hudson

Morrell Creek Riparian Classroom: Introducing Students to Outdoor Education through the Creation, Use and Maintenance of an Outdoor Classroom

Although I teach in a small rural school, my students do not seem to have a strong connection to the land. This project focused on building an outdoor classroom and using it to compare traditional classroom learning to that in an outdoor/experiential setting. My hope was to have them develop a connection to it, and raise their level of concern to become good stewards of the land.

Friday, July 1, 2011

1 pm **Lane A. Fischman** **Reid 101**
Antioch, IL
Antioch Community High School
Facilitator: Nancy Lee Bryant

Using Gardner's Multiple Intelligence Theory to Differentiate High School Physics Instruction

The purpose of this project was to examine the effects of differentiated instruction on students' understanding of high school physics based on Gardner's multiple intelligence theory. The original premise was that some students are strong in some intelligences and weak in others. Each student started by learning the content in the areas they were strong in, and then using that knowledge to help them overcome the more challenging concepts. The results indicate that this approach has its merits but will need refinement to be implemented into the entire curriculum.

1 pm **Darren Kellerby** **Reid 102**
Anchorage, Alaska
Highland Tech Charter School
Facilitator: Marcie Steen

Effective Use of Humor in a Secondary Science Classroom

Students and administrators have often commented positively about my ability to bring humor into the classroom, but I had never made a direct correlation between this humor and student achievement. The purpose of this study was to try and make that connection by using humorous warm-up activities, assignments, and lectures during two astronomy lessons. Initial results showed improvements in student participation and recall, but over time, the improvements due to humor decreased.

2 pm **Christopher G. Monsour** **Reid 101**
Tiffin, OH
Tiffin Columbian High School
Facilitator: David Buck

The Effects of Literacy Intervention in High School Biology

In this investigation, issues of reading comprehension in high schools students were explored. Reading comprehension interventions such as metacognitive reading logs were administered with the goal of improving student literacy. Trade books, newspapers, and others types of media were used to differentiate instruction as part of intervention strategies. The results indicate that when students are given the opportunity to read outside of class, their ability to comprehend scientific information increases.

4 pm **Jennifer Moore Bernstein** **Reid 101**
Portland, OR
Lewis and Clark College
Facilitator: Jennifer Williams

Concept Mapping and Student Success in a College-Level Environmental Studies Course

Concept mapping is a visually-oriented educational tool used to facilitate student comprehension. This project looked at the effect of employing concept mapping as a reflective and constructive exercise in an environmental analysis course. We found that students who felt more challenged by the mapping exercises received higher course grades. This indicates that for engaged students, concept mapping can engender an optimal level of intellectual discomfort that ultimately fosters deep learning.

Saturday July 2, 2011

8 am **Hadley Hentschel** **Reid 101**
Carbondale, CO
Roaring Fork High School
Facilitator: Kathryn Madden

The Effects of Shared Common Experiences on Learning in the English Language Learner Science Classroom

In this investigation, background knowledge was created in struggling English language learners through shared common experiences outside of the classroom. Students were taken on a camping trip and biweekly trips to local rivers in order to give them hands-on experiences in which they could use while learning physical science content. These experiences proved to increase the breadth of student knowledge, but had little effect on the depth of student knowledge.

8 am **Katherine Echazarreta** **Reid 102**
Vienna, VA
Fairfax County Public School District
Facilitator: Rob Tillman

What is the Effect of Having a Substitute Teacher in a Science Class or Math Class: Is it a Productive Class?

In this study I was looking at the effects of substitute teaching in science and math classes. There several different points of view of substitute teaching; the substitute teacher themselves, the students, the contracted teacher, and the administration. I looked at the substitutes, the students, and the teachers' point of view on the effectiveness of substitute teaching. The perception of having a substitute is having a cake day, but that shouldn't be the case. I wanted to see if there is an effective way to have the students work as if I were the contracted teacher.

9 am **Ashley Gillespie** **Reid 101**
East Helena, Montana
East Valley Middle School
Facilitator: Peter Rust

The Effects of Using Classroom Performance Systems with Metacognitive and Conceptual Feedback Strategies on Students' Understanding of Eighth Grade Physical Science Concepts

This study investigated the effects of a classroom performance system with metacognitive and conceptual feedback strategies on students' understanding of concepts. Data collection tools were used to isolate long-term memory and varying levels of cognitive questioning, as well as student attitudes and motivation. The data indicate slight improvement in understanding, student attitudes, and higher-levels of cognitive questions following the treatment, but long-term memory and student and teacher motivation showed mixed results.

9 am **Nancy Lee Bryant** **Reid 102**
Burlington, NC
Burlington Christian Academy
Facilitator: Megan Hopkins

What's Up in Your World? Using a Wiki to Discuss Current Environmental Topics and its Effect on Student Success

This investigation explored the relationship between online discussion of current environmental topics and the students' integration of environmental knowledge into their daily lives. Over a two month time period, AP Environmental Science students discussed current events online through a classroom wiki. Through surveys, reflections, and interviews, students indicated that there was increased incorporation of environmental topics both in their thought processes and during interactions with their peers.

Saturday July 2, 2011

10 am **Melanie S. Acker** **Reid 101**
Ulysses, PA
Northern Potter High School
Facilitator: Marty King

Does Peer Review Improve Lab Report Quality In High School Science Students?

The purpose of this study was to determine if students construct better lab reports while performing peer reviews than when they do not. While understanding the components that generate a well written lab protocol is essential, students often neglect components such as grammar, spelling, and formatting. The goal of this study was to advance students' science writing skills over time through exposure to the repetition of writing, peer reviewing, and re-writing lab reports.

10 am **Alanna Piccillo** **Reid 102**
Palisade, CO
Palisade High School
Facilitator: Erin Quintia

Effects of Making Connections Between Science Concepts and the Outdoors on Student Comprehension

This investigation takes students into the natural world to test higher-level thinking skills. Research was conducted with students in block classes and students in shorter class periods and divided into high, medium, and low-achieving groups. While students in block classes mostly benefited from this instruction over students in shorter classes, data suggests that all students can benefit from this instruction with practice and preparation.

12 pm **Nancy Hoggard Talley** **Reid 101**
Tarboro, North Carolina
Roberson Center for Academic Excellent
Facilitator: Christopher G. Monsour

The Effect of SAS Curriculum Pathways on Student Science Achievement

SAS Curriculum Pathways was used as an enhancement tool to increase student achievement, participation and motivation in physical science. SAS Curriculum Pathways is an on-line model that uses reading, graphing, research, web-searches, simulations, labs, and other media to instruct and enhance physical science. Student achievement scores did not increase, but there was an increase in participation and motivation.

12 pm **Aaron Olmanson** **Reid 102**
Golden Valley, MN
King of Grace Lutheran School
Facilitator: Mary Ritter

How Students Drawing in Their Science Notebooks Affects Their Understanding of Science

In this investigation students' drawings were implemented with the purpose of gathering information after passive lessons in science. Students drew concepts after chapters on vertebrates and chemistry. The students' final test scores closely reflected their drawing scores (within 10%). The drawings were found to be a valuable formative assessment, and the students' attitudes increased 47% in favor of using drawings in science as a way to communicate science knowledge learned.

Saturday July 2, 2011

1 pm **Jennifer Williams** **Reid 101**
Honolulu, Hawaii
Theodore Roosevelt High School
Facilitator: Patti Rae Bartlett

The Effects of Using Socially Constructive Lessons on Students' Understanding of Biology Concepts

This study examines the effects of using social constructivism on high school biology students' understanding of concepts. Long-term memory, conceptual understanding of biology, as well as teaching strategies were analyzed with various data collection methods. The data indicate some improvements in terms of student and teacher attitudes and relationships with each other as well as improvements in retention of biological concepts. Students' understanding showed little improvement except in terms of retention.

1 pm **Cheryl A. Hudson** **Reid 102**
Tifton, GA
Tift County High School
Facilitator: Darren Kellerby

Impact of Biotechnology Labs on High School Biology Students

There is a movement to implement biotechnology lab experiences in secondary biology classes. The purpose of this project was to assess the effect of implementing biotechnology labs on students' understanding of molecular biology concepts and on students' attitude toward science in terms of interest, confidence, and perceived relevance. Results for improved attitude were inconclusive; however gains in conceptual understanding were substantial with the biotechnology labs.

2 pm **Sandra J. Climenhaga** **Reid 101**
Albion, NY
Charles D'Amico High School
Facilitator: Lane A. Fischman

The Effects of Using Guided Notes for At Risk High School Science Students

The Take Flight Program in Albion, NY had 20 students who took the Living Environment science class. This study examined the use of a guided note strategy to replace the traditional science notebook for these students. Over the course of three weeks the effectiveness of the guided note packet was measured with quiz scores, concept map preparation, student attitude and final test scores. Results suggested an improvement in attitude and improved test scores.

2 pm **Joyce Striclyn** **Reid 102**
Terre Haute, IN
Honey Creek Middle School
Facilitator: Sarah Marie Conner

Teaching Sixth Grade Students Using the 5E Method of Inquiry

The 5E method of inquiry – Engage, Explore, Explain, Expand, Evaluate – is familiar to many educators. Sixth grade students who were taught using the 5E method of inquiry became more skilled in designing and conducting a controlled experiment. They improved in their ability to collect and analyze data. The science content scores were lower, but their understanding of how scientists work was impacted in a positive way.

ADDENDUM

Tuesday, June 28, 2011

1 pm

**Robert Clow
Rio Rico, Arizona
Facilitator: Mary Ritter**

Reid 102

Integrating Literature into the Science Classroom Using Cooperative Learning Groups

The focus of this Action Research Project was to incorporate literature into my science classroom. How can integrating literature affect learning of Arizona 5th grade science standards and language arts standards? Specifically can students make measurable progress in learning science standards by reading specific fiction and non-fiction science books in a cooperative learning group environment? In comparing Pre and Post Tests in knowledge acquisition, writing skills, and reading comprehension, the study group showed improvement.

ADMISSIONS GEOGRAPHIC DISTRIBUTION*

State/Country	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Alabama	-	-	-	-	-	-	-	1	1	-	-	1	-	-	1
Alaska	1	-	-	1	1	1	3	2	3	3	1	1	3	1	-
Arizona	-	1	-	-	1	-	1	2	-	-	-	-	3	1	2
Arkansas	-	-	-	-	-	-	1	-	2	-	2	-	2	1	1
California	2	-	2	3	6	4	3	3	4	6	4	5	7	6	10
Colorado	-	1	-	-	1	3	3	5	3	2	3	7	3	2	5
Connecticut	-	-	-	-	-	-	1	-	-	-	-	-	2	-	3
Delaware	-	-	-	-	-	1	-	-	-	-	-	1	1	-	-
DC	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-
Florida	-	-	-	-	-	-	-	-	2	2	-	2	2	3	1
Georgia	-	-	-	-	1	1	-	-	-	1	-	1	2	1	1
Hawaii	-	-	-	-	-	-	-	3	1	-	-	1	-	2	-
Idaho	-	-	-	-	-	-	-	1	-	1	1	1	3	3	3
Illinois	-	-	-	4	2	-	7	2	1	4	2	6	8	4	8
Indiana	-	-	-	1	-	-	-	-	2	-	-	1	-	2	1
Iowa	-	-	-	-	1	-	-	-	-	2	3	1	4	3	3
Kansas	-	-	3	-	-	1	-	-	-	2	-	-	1	2	-
Kentucky	1	1	-	-	-	-	1	-	-	-	-	-	-	-	-
Louisiana	-	-	-	-	-	-	1	1	1	-	1	-	-	-	1
Maine	-	-	-	-	1	1	-	1	-	2	-	1	1	2	1
Maryland	-	-	-	-	-	1	-	-	1	-	-	2	1	-	3
Massachusetts	-	-	2	-	2	3	3	1	-	2	3	2	-	2	2
Michigan	-	-	-	-	1	-	2	2	-	1	2	1	4	1	2
Minnesota	-	-	-	1	-	2	3	2	-	1	1	4	1	-	1
Mississippi	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
Missouri	-	-	-	-	-	1	2	-	-	-	-	-	1	1	1
Montana	17	12	6	9	12	12	3	17	11	8	7	19	35	26	46
Nebraska	-	-	-	-	-	-	1	-	1	-	-	-	2	-	1
New Mexico	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1
Nevada	-	-	-	-	-	3	1	2	-	-	-	1	-	1	1
New Hampshire	-	-	-	-	-	-	-	-	2	-	2	3	1	2	1
New Jersey	-	-	-	-	1	-	-	-	1	2	1	1	7	3	3
New Mexico	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
New York	-	-	-	-	-	-	-	2	-	-	2	1	2	2	-
North Carolina	-	-	1	-	2	-	1	2	2	-	2	3	1	2	3
North Dakota	1	-	-	-	-	-	-	1	-	-	1	3	-	-	-
Ohio	1	2	1	-	3	3	2	3	3	1	1	-	4	4	3
Oklahoma	-	-	-	-	-	1	1	-	-	-	-	-	-	1	-
Oregon	-	-	1	3	1	-	1	2	2	1	-	1	1	1	-
Pennsylvania	1	-	-	2	2	2	3	-	2	2	2	5	3	7	4
South Carolina	-	-	-	-	-	-	-	-	1	1	-	1	1	-	-
South Dakota	2	-	-	1	-	1	2	1	1	2	2	1	-	-	-
Tennessee	-	1	-	-	-	-	1	-	-	2	1	-	2	1	1
Texas	2	-	-	-	4	2	-	2	-	2	2	2	7	3	4
Utah	2	-	2	1	-	2	2	-	3	-	1	4	1	-	1
Vermont	-	-	-	-	1	1	-	-	-	-	-	-	1	3	1
Virginia	-	-	-	1	-	-	-	-	1	2	2	3	2	4	1
Washington	-	1	-	1	3	1	-	3	4	4	4	1	4	3	6
West Virginia	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
Wisconsin	-	-	1	-	2	1	3	-	1	4	2	3	1	3	5
Wyoming	-	1	-	-	1	-	1	1	3	1	1	2	1	3	-
Bahamas	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
Bermuda	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
Brazil	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
Canada	-	1	1	-	-	-	-	2	1	-	-	2	3	5	2
China	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
Columbia	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
Germany	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Guam	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
India	-	-	-	-	-	-	-	-	1	-	-	-	-	-	3
Japan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Kenya	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Malaysia	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Netherlands	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
Norway	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Pakistan	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Saudia Arabia	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-
South Africa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Sweden	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
Thailand	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
UAE	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
West Indies	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Total	30	22	21	28	50	50	56	66	61	61	59	99	130	114	141
Grand Total: 988	<i>*residency listed on application</i>														

GRADUATE GEOGRAPHIC DISTRIBUTION*

State/Country	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Alabama	-	-	-	-	-	-	-	2	-	-	-	1	-
Alaska	-	1	1	-	-	2	-	3	2	2	3	-	1
Arizona	-	-	-	-	-	-	1	1	2	-	-	2	1
Arkansas	-	-	-	-	-	-	-	1	1	-	-	-	1
California	2	-	1	3	3	2	3	2	4	3	5	6	4
Colorado	1	1	-	-	-	3	3	3	2	3	1	4	3
Connecticut	-	-	-	-	-	-	-	1	1	-	-	-	1
Delaware	-	-	-	-	-	-	-	-	-	-	-	2	1
Florida	-	-	-	-	-	-	-	-	4	-	1	1	1
Georgia	-	-	-	-	2	-	-	-	-	1	-	-	2
Hawaii	-	-	-	-	-	-	1	-	-	-	2	-	2
Idaho	-	-	-	-	-	-	-	-	1	-	1	-	4
Illinois	-	1	-	-	2	2	1	5	1	1	3	7	6
Indiana	-	-	-	-	-	-	-	-	-	-	-	1	1
Iowa	-	-	-	-	1	-	-	1	1	2	2	3	2
Kansas	-	-	3	-	-	1	-	-	1	1	-	1	1
Kentucky	1	1	-	-	-	-	1	-	-	-	-	-	-
Louisiana	-	-	-	-	-	-	2	-	-	-	-	-	-
Maine	-	-	-	-	-	1	1	-	-	-	-	1	4
Maryland	-	-	-	-	-	1	-	-	-	-	1	-	0
Massachusetts	-	-	-	1	-	2	2	2	-	2	2	2	0
Michigan	-	-	1	-	1	-	1	1	-	2	1	-	2
Minnesota	-	-	1	-	-	2	2	-	1	1	2	-	2
Mississippi	-	-	-	-	-	-	-	-	-	-	-	1	0
Missouri	-	-	-	-	-	-	1	-	2	-	-	-	1
Montana	14	7	8	5	8	5	9	11	9	7	13	36	10
Nebraska	-	-	-	-	-	-	-	-	1	-	1	-	-
Nevada	-	-	-	-	-	2	2	1	-	-	-	-	1
New Hampshire	-	-	-	-	-	-	-	-	2	-	2	2	1
New Jersey	-	-	-	-	-	-	-	-	1	-	1	1	1
New York	-	-	-	-	1	-	1	1	1	2	1	1	2
North Carolina	-	-	-	1	-	2	-	1	2	-	2	2	2
North Dakota	-	-	-	-	-	-	-	-	1	-	1	-	1
Oklahoma	-	-	-	-	1	-	-	-	-	-	-	-	-
Ohio	-	2	-	2	1	2	3	4	2	-	-	-	2
Oregon	-	-	-	3	-	-	2	-	1	1	1	1	1
Pennsylvania	-	-	-	-	-	3	1	-	1	2	1	5	2
South Carolina	-	-	-	-	-	-	-	-	-	-	-	-	2
South Dakota	-	2	-	-	1	-	1	2	1	2	1	1	-
Tennessee	-	-	-	-	-	-	1	-	-	1	2	1	2
Texas	-	1	1	-	-	2	1	-	1	2	1	2	1
Utah	-	-	2	-	-	3	1	2	-	-	1	3	-
Vermont	-	-	-	-	2	-	-	-	1	-	-	-	1
Virginia	-	-	-	1	-	-	-	-	2	-	1	3	3
Washington	-	-	-	2	2	1	3	3	2	2	2	2	3
Wisconsin	-	-	1	-	-	1	1	1	-	4	2	2	-
Wyoming	-	1	-	-	1	2	-	-	1	-	1	-	1
Argentina	-	-	-	-	-	-	-	-	-	-	1	-	-
Bahamas	-	-	-	-	-	-	-	-	-	-	-	-	1
Bermuda	-	-	-	-	-	-	-	-	-	-	1	-	-
Brazil	-	-	-	-	-	-	-	-	-	-	1	-	-
Canada	-	1	1	-	-	-	-	1	-	1	-	4	-
China	-	-	-	-	-	-	1	-	-	-	-	1	-
Columbia	-	-	-	-	-	-	1	-	-	-	-	-	-
Estonia	-	-	-	-	-	-	-	-	-	-	1	-	-
Germany	-	-	-	-	-	1	-	-	-	-	1	-	-
Guam	-	-	-	-	-	-	-	-	-	-	1	-	-
Hungary	-	-	-	-	-	-	-	-	-	-	-	-	1
India	-	-	-	-	-	-	-	1	-	-	-	-	-
Japan	-	-	-	-	-	-	-	1	-	-	-	-	-
Kenya	-	-	-	1	-	-	-	-	-	-	-	1	-
Malaysia	-	-	-	-	-	-	-	1	-	-	-	-	-
Netherlands	-	-	-	-	-	-	-	-	-	-	-	-	1
Norway	-	1	-	-	-	-	-	-	-	-	-	-	-
South Korea	-	-	-	-	-	-	-	-	-	1	-	-	-
Thailand	-	-	-	-	-	-	-	-	-	-	-	-	1
West Indies	-	-	-	-	-	-	1	-	-	-	-	-	-
Total	23	16	21	19	37	34	55	48	56	40	64	100	79

Grand Total: 592

*residence at graduation

1999 Graduates

Paul Andersen, Bozeman, MT
Edward Barry, Sacramento, CA
Richard Dees, Billings, MT
Maureen Driscoll, Butte, MT
Janet Erickson, Helena, MT
Beth Farrar, Rapid City, SD
Kerry Friend, Cayucos, CA
Jonathan Hanson, Big Fork, MT
Melissa Henthorn, Turah, MT
Kevin Klawonn, Lennox, SD
Nancy Males, Mansfield, TX
Wayne Mangold, Plevna, MT
David McDonald, Sidney, MT
Joy-Lyn McDonald, Sidney, MT
Josy McLean, Great Falls, MT
John Miller, Billings, MT
Randall Mogen, Ketchikan, AK
Kelly Morrow, Kalispell, MT
Marjorie Robbins, Morton, IL
Lisa Rubright, Manhattan, MT
Peggy Taylor, Farmington, NM
Shannon Walden, Fort Benton, MT
Martin Wells, Taylor Mill, KY

2000 Graduates

Randall Carmel, Millersburg, OH
Beverly DeVore, Meeker, CO
Ivanell George, Houston, TX
Jeffrey Greenfield, Shepherd, MT
Mark Halvorson, Sidney, MT
Tom Hennard, Stavanger, Norway
Steven Lockyer, Conrad, MT
Ann Lukey, Alberta, Canada
Lisa Mahony, Bozeman, MT
Craig Messerman, Missoula, MT
Kathleen Napp, Scottsdale, AZ
Sandy Shutey, Butte, MT
Lisa Snyder, Chetenne, WY
James Temple, Glendive, MT
Melanie Vinion, Wooster, OH
Chrystel Wells, Taylor Mill, KS

2001 Graduates

Robert Beese, Gardiner, MT
Rodney Benson, East Helena, MT
Jeffrey Berg, Auburn, MA
Lawrence Bice, Cottonwood, AZ
Penny Long Blue, Ellsworth, KS
Kathy Brown, Taft, CA
Daniel Campbell, Big Timber, MT
John Etgen, Belgrade, MT
Sharon Fox, Great Falls, MT
Ashton Griffin, Goldsboro, NC
Taylor Hansen, Bozeman, MT
Deana Hill, Alberta, Canada
Richard Lahti, Fergus Falls, MN
Sanford MacSparran, Logan, UT
Bradley Piroutek, Belleville, KS
Rebecca Reno, Havre, MT
David Robbins, Nairobi, Kenya
Jack Schoonen, Dillon, MT
Wendy Sink, Burton, MI
Clinton Stephens, Escalante, UT

2002 Graduates

Ronald Abarta, Chehalis, WA
Shannon Bowen, Strasburg, VA
Peter Bregand, Fullerton, CA
Pamela Duncan, Woodstock, IL

Leslie Giffen, Rohnert Park, CA
Mary Jane Goebel, Rapid City, SD
Jody Hurd, Helena, MT
Tom Huston, Vale, OR
Kevin Kapanka, Kenton, OH
Lloyd Magnuson, Butte, MT
Deanna Mazanek, Athena, OR
Todd Morstein, Lakeside, MT
Mellissa Newman, Dutton, MT
Chris Ottey, Bozeman, MT
Robert Pendzick, Canfield, OH
Mary Slack, Wheaton, IL
Michelle Snyder, Athena, OR
Michele Thomas, Bakersfield, CA
Kerby Winters, Vale, OR

2003 Graduates

Cyndie Beale, Fairbanks, AK
John Scott Beaver, Talpa, TX
Amy Berg, Auburn, MA
Eric Berg, Auburn, MA
Nikki Bethune, Sapulpa, OK
Bruce Bourne, Seeley Lake, MT
Kevin Bowman, Jackson, OH
Corbin Brace, Waterville, ME
Kelly Cameron, Ridgefield, WA
Ralph Carlson, Hilmar, CA
Corinne Chavern, Pittsburgh, PA
Susan Choman, E. Wenatchee, WA
Tom Cabbage, Great Falls, MT
Sandra DeYonge, Rye, NY
Sharon Dotger, Raleigh, NC
Phyllis French, Douglasville, GA
Michele Geisler, Rutland, VT
Michael Gregory, Pinedale, WY
Robin Hehn, Roundup, MT
Kathy Howe, Houston, TX
Jack Julian, Cairnbrook, PA
Linae Kendall, Saunemin, IL
David Lee, Taylorsville, NC
Brita Lien, Alberton, MT
Eric Matthews, Bozeman, MT
Diane Mayer, Bozeman, MT
Birgitta Meade, Decorah, IA
Linda Moule, Claremont, CA
Susan Olsen, Brownsville, PA
Ryan Prnka, Skagway, AK
Rob Smith, Marengo, IL
Sonja Steffan-Squires, Lancaster, CA
Jim Striebel, Corvallis, MT
Nicole Trombetta, Duluth, GA
Melody VanderWeide, Grand Rapids, WI
Jeffery Wehr, Inverness, MT
Tim Ziegler, Stowe, VT

2004 Graduates

Kimberly Atkins, Annandale, MN
Christopher Cox, Buffalo, WY
Kelley Davis, Monkton, MD
Kirsten DeHart, Houston, TX
Patricia DiEduardo, Lewiston, ME
Terry Edinger, Trabuco Canyon, CA
Mary Margaret Eraci, Lombard, IL
Randall Farchmin, Menomonee, WI
Dona Furrow, Jackson Center, OH
Larry Gursky, Roy, WA
Emmylou Harmon, Kremmling, CO
Penny Juenemann, Two Harbors, MN
Loren Kane, Natick, MA
Robin Kent, Missoula, MT
Dan Kloster, Longmont, CO
Karen Krieger, Bozeman, MT
Deanna Meyer, West Jordan, UT

Lee Moss, Orangeville, UT
Michael Mulligan, Brazil
Katharine Murphy, Ogden, KS
DeAnn Neal, Midvale, UT
Jeannine Paszek, Reno, NV
Glenn Peterson, Greeley, CO
Kim Popham, Lolo, MT
Mary Porter, Melrose, MA
Gordon Powell, Cortland, OH
Chuck Shepard, Saltsburg, PA
Bernie Smith, Colstrip, MT
Dorothy Smith, Colstrip, MT
Scotty Stalp, Germany
Kim Walker, Johnson, KS
Erika Wells, Jackson, WY
Jeff Youker, Placerville, CA
Brian Zeiszler, Elko, NV

2005 Graduates

Marc Affi, Seaside, CA
Christine Bergholtz, Kenai, AK
Matt Bilen, Elgin, IL
Andy Broyles, Aberdeen, SD
Brendan Casey, La Mesa, CA
Peggy Collins, Dudley, MA
Andrew Conger, New Orleans, LA
Michelle Cullen, Valdez, AK
Richard Davis, Frazier, MT
Eric Dougherty, Newport, NC
Brian Edlund, Benson, MN
Rachel Endelman, Monroe, WA
Monica French, Salt Lake City, UT
Nelson Fuamenya, Hunan, China
Ricarda Hoffman, Ashland, MT
Kelley Hoffman, Beaver Dam, WI
Diane Holloway, Osaka, Japan
Steve Huffman, Honolulu, HI
Cathy James-Springer, West Indies
Roby Johnson, Yuma, CO
Ryan Kapping, Wadena, MN
Nicole Kirschten, Newfield, NY
Anita Linder, Mt. Zion, IL
Brad Loveday, Alamo, NV
Justin Lovrien, Sioux Falls, SD
Leslie McDaniel, Memphis, TN
Carla McFadden, Oroville, WA
Valdine McLean, Lovelock, NV
Chris McNabb, Ganado, AZ
Jomae Mertz, Parker, CO
Eric Miller, Athens, OH
Lelia Mitchell, Brighton, MA
Mark Nevala, Klamath Falls, OR
Kristina Newman, Swanton, OH
Helga Pac, Bozeman, MT
Lori Peterson, Polson, MT
Lander Purvis, Bozeman, MT
Chris Putzler, Kalispell, MT
Margaret Rossignol, Boulder, CO
Matthew Rubin, Saugus, CA
Katherine Saylor, Fall City, WA
Tonya Shepherd, Pineville, LA
Chris Spera, Dixon, IL
Susan Steckel, Winchester, IL
Zachary Stroker, Columbia
Becky Sundin, Baker City, OR
Christine Sundly, Great Falls, MT
Brian Swarthout, Bozeman, MT
Harold Taylor, Bidwell, OH
Neysa Thiele, Mt. Zion, IL
Erin Trame, Ann Arbor, MI
Josh Underwood, Tollesboro, KY
Travis Vandenburg, Independence, MO
Jennifer Werda, Plymouth, NH
LeAnne Yenny, Bozeman, MT

2006 Graduates

Cheryl Abbott, Palmer, AK
Stacie Laducer Blue, Fargo, ND
Larry Boyd, Marysville, WA
Rich Calhoun, Lakeville, CT
Chuck Campbell, Russellville, AR
Dawn Carson, Shepherd, MT
Alicia Cepaitis, Fort Collins, CO
Sue Counterman, Littleton, CO
Randy Daniel, Huntsville, AL
Yvette Deighton, Sparks, NV
Lindsay Forsys, White, PA
Greg Gaffey, Beloit, WI
Amanda Gilbreath, Madison, AL
Tara Hall, Golden, CO
Laura Hauswald, Seattle, WA
Lauren Hinchman, Charlevoix, MI
Laura Holmquist, Bigfork, MT
Joanna Hubbard, Anchorage, AK
Margie Huber, Gahanna, OH
Michael Joyce, Edgartown, MA
Ken Mager, Oak Forest, IL
Michael Magno, Monroe, NC
Steve McCauley, Boulder, MT
Kevin McChesney, Reynoldsburg, OH
Rebecca Mentzer, Columbus, OH
Kathy Meyer, Apple Valley, CA
Sherry Miller, West Coxsackie, NY
Gina Monteverde, Winthrop, WA
Leslie Morehead, Leslie, TX
Lori Ann Muchmore, Lolo, MT
Troy Nordick, South Jordan, UT
Kenny Peavy, Kuala Lumpur, Malaysia
Rhonda Phillips, Saskatchewan
Vasanthha Prasad, Tamilnadu, India
Craig Richards, Calusa, CA
Diane Ripollone, Garner, NC
Brad Shuler, Elk Ridge, UT
Brian Sica, Idaho Falls, ID
Chris Straatman, New Holland, SD
Bonnie Streeter, Whitefish, MT
Brian Sullivan, Great Falls, MT
Michael Telling, Boulder, MT
Paul Tingler, Akron, OH
Genevieve Walsh, Bozeman, MT
Molly Ward, Bozeman, MT
Amy Washtak, Bozeman, MT
Deb Williams, Ames, IA
Rick Wyman, Hardin, MT
Betsy Youngman, Phoenix, AZ

2007 Graduates

Serena Ayers, Springfield, NJ
Jason Barr, Charlotte, FL
Lindsay Bartolone, Chicago, IL
Lesley Chappel Bunch, Palmer, AK
Lisa Carpenter, Shepherd, MT
Mark Calhoun, Tucson, AZ
Jenifer Ceven, Avon, MA
Tonya Chapweske, Miles City, MT
Stacey Dobrosky Cool, Merced, CA
Victor Dalla Betta, Kalispell, MT
Bradley Deacon, Montoursville, PA
Dale Dennler, Cresco, IA
Bruce Dudek, Ashland, MT
Brooke Durham, Reynoldsburg, OH
Jane Fisher, Kingston, NY
James Flora, Pleasant Hope, MO
Jonathan Frostad, Olympia, WA
Kimberley Garner, Anchorage, AK
Jeffrey Gaston, Omaha, NE
Jeff Grom, Belgrade, MT
Angela Haas, Gardiner, MT
Marie Akers Hamaker, Cincinnati, OH

Lisa Hawkins, Taejon, South Korea
Kelly Hayden, Bozeman, MT
Shelia Higgins, Bentonville, AR
Bernard Hoczur, Daytona Beach, FL
Linda Jones, McLaughlin, SD
Julianne Kent, Bradenton, FL
Alexa Knight, Grants Pass, OR
Karla Laubach, Kingston, WA
Catherine Le, San Jose, CA
Rebekah Levine, East Burke, VT
Jean Lewis, Jackson, WY
Cooper Mallozzi, Leadville, CO
Jason Martin, Houston, TX
Jeffery Moll, Haverhill, MA
Michelle Marcil-Spicer, Houston, TX
Stephanie Parker, Tucson, AZ
Jacki Pealaterre, Willits, CA
Stuart Perez, Redfield, KS
Lisa Pingrey, Custer, SD
Cary Rosillo, Jupiter, FL
Patrick Simmons, Chesterfield Cty, VA
Michael Sitter, Polson, MT
Brian Stiff, Billings, MT
Rebecca Tolzman, Bozeman, MT
Nina Tyree, Alexandria, VA
Peggy Van Valkenburgh, Peterborough, NH
Michelle Vitko, Norwich, CT
Brynna Vogt, Craig, CO
Christy Ware, Newtown Square, PA
Sharon Welter, Golden Valley, MN
Jenine Rued Winslow, San Diego, CA
Emily Wrubel, Peterborough, NH

2008 Graduates

Steven Alexander, Canton, NY
Jenelle Bailey, Wenatchee, WA
Marlessa Benson, Appleton, WI
Jennifer Brashear, Brunswick, GA
Matthew Bryant, Memphis, TN
Christopher Carucci, Boston, MA
Jennifer Crow, Mundelein, IL
Deborah Dilloway, Fairway, KS
Tracy Durish, Clarion, PA
Andrew Gelman, Westbrook, ME
John Getty, Bozeman, MT
Molly Godar, Rochester, IL
John Gordon, Weidman, MI
Paul Halfpop, Hardin, MT
Martin Hudson, Hannacroix, NY
Jill Hughes-Koszarek, Hartland, WI
Louise Jones, Naperville, IL
Tim King, Glide, OR
Jeffrey Klipstein, Estes Park, CO
Sara Koffarnus, Westminster, CO
Jonell Prather, Missoula, MT
Charles Reade, Sacramento, CA
Laura Ritter, Royal Oak, MI
Franz Ruiz, El Cajon, CA
Kristina Sappenfield, Eagle, CO
Eric Sawtelle, Whitefish, MT
Donald Selusnik, Delavan, WI
Lisa Skilang, Marion, IA
Linda Smith, Missoula, MT
Kathryn Solberg, Sisseton, SD
Jennifer Swan, Sherman Oaks, CA
Angela Swanson, Rockford, IL
Nathan Whelham, Bothell, WA
Laura Wick, Palmer, AK
Kathleen Woltdvedt, Cut Bank, MT
Jaime Wolfe, Saginaw, MN
Wendy Worrall, Abbotsford, BC
June Wozny, Elkhorn, WI

2009 Graduates

Phillip Ammann, Wilmet, SD
Jenni Vee Andersen, Helena, MT
John Bell, Bozeman, MT
Callan Bentley, Annandale, VA
Carolyn Clark Bielser, Dillon, MT
Terry Carlsen, Walla Walla, WA
Aimee J. Chlebnik, W. Yellowstone, MT
Shelley Chrismon, Yoakum, TX
Christopher Cimino, Citrus Heights, CA
Brett Damerow, Hutchinson, MN
Natalie L. Davis, Livingston, MT
Meg DeAntoni, San Diego, CA
Jenny Derks-Anderson, Eugene, OR
Thelma Devlin, Dededo, Guam
Lilliam Edmon, Kamuela, HI
Richard Fillerup, Driggs, ID
Thom Flinders, Holderness, NH
Elizabeth Fracchia, Glen Falls, NY
Doug Frost, Salem, NJ
Stacie Fry, Buenos Aires, Argentina
Victoria R. Ginsburg, Sandy, UT
Rob Greenberg, Chapel Hill, SC
Jenny S. Heckathorn, Valdez, AK
Patti Jelinek, Memphis, TN
Suzanna Johnson, Auburn, CA
Carlie J. Jonas, Renton, WA
Michael E. Joyce III, Oak Bluffs, MA
Leslie C. Karpiak, Des Plaines, IL
Daniel Kinsey, Harlem, MT
Ron Koczaja, Fairbanks, AK
Lucy C. Karwoski Korpi, Holland, MI
Anton Kortenkamp, Monticello, MN
Thomas Kozikowski, Frostburg, MD
Kelly Kramer, DeForest, WI
Karen Kuchar, Naperville, IL
Jason Laducer, Belcourt, ND
Lon LaGrave, Baumholder, Germany
Am L. Manhart, Jackson, WY
Scott D. Masarik, Brussels, WI
Jean Philip Mathot, Irvine, CA
Rory Newcomb, Tallinn, Estonia
Lacy Noble, Three Forks, MT
Loralyn O'Kief, Valentine, NE
Lua Olsen, Sao Paulo, Brazil
Beth Peterson, Highland Park, IL
Leslie Pierce, Barrow, AK
Mike Plautz, Missoula, MT
Ronald P. Ramsey, Sewanee, TN
Julie Kallio Robison, Deerfield, MA
Laurie K. Rugemer, Bozeman, MT
Bruce Alexander Sinclair, Bermuda
Todd M. Samson, East Helena, MT
Cathy Stierman, Dubuque, IA
Steve Sundberg, Moline, IL
Nathan Talafuse, Billings, MT
Lucinda Fisher Talsma, Sheldon, IA
Howard Tenenbaum, La Jolla, CA
Tana Verzuh, Durango, CO
Joe Le Weaver, Marion, NC
Patricia J. Weaver, Halifax, PA
Lisa M. Weeks, Eagle Lake, FL
Christine West, Haugan, MT
Erin Wilson, Honolulu, HI
Gail Whiteman, Bozeman, MT
Joe Wright, Hollis, NH

2010 Graduates

Aimee Flavin Artigues, Crested Butte, CO
James T. Ausprey, East Machias, ME
Carol Jane Baker, Billings, MT
Cheryl A. Barrientos, Denville, NJ
Susan H. Barton, Big Sky, MT
Robert David Baughman, Moss Point, MS
Randall Jay Berndt, Rosholt, WI
Susan Berrend, Salt Lake City, UT
Allen R. Bone, Pablo, MT
Christy Bone, Missoula, MT
Larene Bowen, Lame Deer, MT
Donna Brayfield, Springfield, IL
Linda Briggeman, Missoula, MT
Kelly P. Broderick, Bradenton, FL
Rebecca B. Burg, Dixon, MT
Katherine Burke, Helena, MT
Kara Ann Burrous, Sugar Land, TX
Anjali Devi Chandran, Napa, CA
Erika Christianson, Bozeman, MT
Jann C. Clouse, Missoula, MT
Stanley B. Covington, Beijing, China
Michelle A. Cregger, Chewelah, WA
Carrie Jo Dagg, Fairfield, IL
Quinn Michael Daily, Carbondale, CO
Bonnie E. Daley, San Francisco, CA
Ann Dannenberg, Newton, MA
Tracy Ann Dickerson, Corvallis, MT
Aaron Eling, Sandy, UT
Stacey M. Ellis, Polson, MT
Dawn Nicole Estrella, Union City, CA
Janet C. Fenker, San Jose, CA
Devon M. Flamm, Hardin, MT
Michael J. Flamm, Hardin, MT
Emily M. Ford, Boyce, VA
Dennis Fulkerson, Lisbon, IA
Joshua Gates, Wilmington, DE
Cherri C. Gerber, Kelowna, British Columbia
Tim Germeraad, Flossmoor, IL
Lisa C. Green, Boyce, VA
Paula J. Groenveld, Harrisburg, SD
Jean Marie Kron Hagler, Savage, MT
Stephanie A. Hall, Rosebud, MT
Lisa Dawn Hart, Crested Butte, CO
Amy L. Haverland, Peosta, IA
Angie Hewitt, Bozeman, MT
Kathy Pickens Hirst, Ashland, MT
Seth A. Hodges, St. Michaels, AZ
Miranda Hollow, Charlo, MT
Katie E. Hubbell, Naperville, IL
Deb L. Hughes, Andalusia, AL
Dora M. Hugs, Pryor, MT
Cheryl Hugs, Pryor, MT
Thomas A. Ippolito, Coatesville, PA
Cathy L. Jamison, Wake Forest, NC
Sara Elizabeth Jay, Bozeman, MT
Pamela S. Kaatz, Sechelt, British Columbia
Margaret Kane, Prescott, AZ
Renee Kelch, Ronan, MT
Bonnie J. Keller, Blacksburg, VA
Rose Kent, South Royalton, VT
Maya A. Lampic, Chicago, IL
Lorna Sue Lange, 29 Palms, CA
Erin Kelly Lynch, Bozeman, MT
Mary L. Maier, Missoula, MT
Patrice Malamis, Rochester, IL
Dan McGee, Belt, MT
Amanda McGill, Clinton, MT
Stuart Miles, Asheville, NC
Tami A. Morrison, Polson, MT
Mary K. Osman, Newark, DE
Gerald Ott, Elverson, PA
April Patricia Peterson, North Bay, Ontario
Alfred T. Poirier Jr., Dover, NH
Sarah S. Poletto, Naperville, IL
Anne Powers, Kingston, Ontario
Page-Marie Price, Lolo, MT
Holly Prull, Bend, OR
Tina L. Raeder van Stürum, Gonzales, CA
Nancy Farrington Reid, Natick, MA
Jonathan C. Reveal, Nashville, TN
Paul E. Robinson, Valhalla, NY
Susan R. Rolke, Rindge, NH
Melinda K. Rothschild, Parker, CO
Jeff Salter, Salt Lake City, UT
Scott Schaefer, Weston, WI
Michael A. Schoenborn, Seattle, WA
Catherine Schuck, Missoula, MT
Debra Lea Schwake, Lodge Grass, MT
Justin L. Smith, Coatesville, PA
Karen M. Smith, Lame Deer, MT
Nichole Spindler, Bradford, PA
Jennifer Stadum, Bozeman, MT
James Stuart, Bozeman, MT
Bryna Thomson, Dallas, TX
Bill Thornburgh, Carmel, IN
Charlotte Waters, Vancouver, WA
Michelle Weber, Dubuque, IA
Nancy Wells, Saltsburg, PA
Heide Westwood, Hardin, MT
Sue White, Derby, KS
Deanna Rose Zerbe, Lodge Grass, MT