16th Annual Symposium in Science Education

Bozeman, MT
June 30th - July 5, 2014
Reid Hall 101 & 102

Master of Science in Science Education
Intercollege Programs for Science Education/ MSSE Program

Director
Associate Director
Lead Program Faculty
Program Officers

Peggy Taylor
Diana Paterson
John Graves
Amanda Lipsey & Holly Thompson

MSSE Faculty Steering Committee

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Todd Kaiser
Dave Lageson
Karlene Hoo
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Angela Weikert
Walt Woolbaugh

Science Education
Chemistry/ Biochemistry
Electrical & Computer Engineering
Earth Sciences
Graduate School
Mathematics
Education
Extended University
Education
Bozeman HS, MSSE Graduate
Museum of the Rockies, MSSE Graduate
Science Education

Supporting Colleges & Divisions

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

Glenn Duff
Bret Gunnink
Lynda Ransdell
Nicol Rea
Kim Obbink
Karlene Hoo

Collaborating Departments

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

Kim Obbink
Frances Lefcort
Mary Cloninger
Jerry Stephens
David Mogk
David Roberts
Jayne Downey
Robert Maher
Sandy Bailey
Peggy Taylor
Tracy Sterling
Matthew Fields
Yves Idzerda
John Sherwood
History

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 Graduate School, 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 programs from 25 to about 60 admissions per year. Larger enrollment allowed for a wider variety of science course offerings. Carol worked with leading 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 close to 100 per year.

Diana Paterson, Associate Director, joined the program in 2002. She provides critical recruiting and advising support to off-campus graduate students. Diana skillfully manages the MSSE office and staff. Students lovingly refer to her as the “glue” that holds them together through challenging times.

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 liaison between the MSSE office and MSSE instructors.
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 generally 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.
2014 Capstone Project Advisors

Chris Bahn, Chemistry/Biochemistry  
Ritchie Boyd, Academic Technology Specialist  
Joseph Bradshaw, Biology  
Lisa Brown, Extended University  
Eric Brunsell, Science Education  
Greg Francis, Physics  
Irene Grimberg, Physics, Cell Biology & Neuroscience  
John Graves, Science Education  
Ron Hellings, Physics  
Steve Holmgren, Chemistry & Biochemistry  
Jerry Johnson, Political Science  
Susan Kelly, Land Resources and Environmental Sciences  
Amber Kirkpatrick, Land Resources & Environmental Sciences  
Robyn Klein, Plant Sciences  
Dave Lageson, Earth Sciences  

Nicholas Lux, Education  
Stephanie McGinnis, Land Resources & Environmental Sciences  
Tom McMahon, Ecology  
Terrill Paterson, Ecology  
Elinor Pulcini, Microbiology  
Jewel Reuter, Science Education  
Jay Rotella, Ecology  
Jim Schmitt, Earth Sciences  
Angie Sower, Chemistry & Biochemistry  
Dave Varricchio, Earth Sciences  
Amy Washtak, Chemistry & Biochemistry  
Angie Weikert, Museum of the Rockies  
John Winnie, Ecology  
Walt Woolbaugh, Science Education  
LeAnn Yenny, Mathematics Education

Off-Campus Advisors

Beth Covitt, University of Montana  
Charles M. Crisafulli, US Forest Service, Pacific Northwest Research Station, Olympia, WA  
Sean Griffin, Earth Sciences, NOAA  
James L. Hayward, Andrews University, Berrien Springs, MI  
Paul S. Hardersen, University of North Dakota  
René Fester Kratz, Everett Community College, Everett, WA  
Gerald Nelson, Casper College, Casper, WY  
Jason Marcks, Aerospace Consultant, WI

Cherie McKeever, Montana State University Great Falls  
Gregory Reinemer, Physics  
Suzanna Soileau, Outreach Coordinator, USGS Northern Rocky Mountain Science Center, Bozeman, MT  
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<th>Name</th>
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<tr>
<td>Joshua Abernethy</td>
<td>Asheboro, North Carolina</td>
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<td>Huntington, Vermont</td>
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Summer 2014 MSSE Science Education Symposium Presentations

Monday, June 30, 2014

9 am  Lynn Powers  Reid 101
Bozeman, Montana
Bozeman High School
Facilitator: Krista Martens
Impact of Authentic Astronomical Research on Astronomy Club Students - The Bozeman High School Astronomy Club was used to look at the impacts of conducting authentic astronomical research through participation in several projects. Students were given opportunities to learn about real world science and develop new skills. Students worked with scientists and principal investigators from different NASA missions through various Citizen Science research projects using varied methods. The results indicated that student interest and participation in Astronomy Club greatly increased.

9 am  Tanya Long  Reid 102
El Cajon, California
Literacy First Charter School
Facilitator: Nicolai Love
Effects of the Claims-Evidence-Reasoning Writing Framework on Teaching and Learning in Eighth Grade Science - Students in an eighth grade science class learned the Claims-Evidence-Reasoning (C-E-R) writing framework to write evidence based scientific explanations. The framework was used with a variety of lesson types in astronomy and chemistry. Students reported using the framework helped them learn science content. The C-E-R framework also improved students’ understanding of the nature of science.

10 am  Irene Catlin  Reid 101
Amboy, Washington
Mount St. Helens National Volcanic Monument
Facilitator: Michael H. Tang
Pond Breeding Amphibian Assemblages of the Pumice Plain at Mount St. Helens - 33 Years Post-Eruption - Thirty-three years post-eruption, the Pumice Plain has evolved from a relatively hostile matrix to an environment that contains a network of patchily distributed habitats suitable for amphibians. Surveys were conducted to obtain base-line data on how amphibian populations respond to natural habitat disturbances. Presence, breeding, larval abundances, richness, and biophysical variables among habitats were analyzed. Species documented during summer surveys of 2013 are Rana cascadae, Pseudacris regilla, Anaxyrus boreas, Ambystoma gracile and Rana aurora.

10 am  Camilla Dusenberry  Reid 102
Helena, Montana
Radley Elementary School
Facilitator: Candace McMullan
The Impact of Visual Representation on Students Learning of, and Attitude towards Science Vocabulary - This action research project was designed to test if strengthening a word’s meaning by increasing exposure time through visual representation would allow for comprehension of the overall concept to follow. It also takes a look at the affects visual representation has on a child’s attitude towards vocabulary. Results of the study indicate there was not significant growth between the treatment unit and the non-treatment unit.

11 am  Jennifer Smith  Reid 101
Colorado Springs, Colorado
The Classical Academy High School
Facilitator: Coreen Dingler
A Classical Approach to Science: Socratic Seminars and Data Analysis and Interpretation - Socratic seminars were implemented in four chemistry classes for the purpose of promoting data analysis and interpretation. Students engaged in four separate seminars using a set of data as their text. Results of the study indicate improved student confidence and frequency and value of scientific communication. However, the results reveal little or no change in achievement with relation to data analysis and interpretation.
The Effectiveness of Conceptual and Quantitative Formative Assessments in the High School Physics Curriculum - This study attempted to determine the effects of formative assessments in a flipped curriculum physics classroom. It also attempted to determine whether the type of formative assessment, conceptual or quantitative, makes a difference in the outcome. The data showed that overall performance on the formative assessments does not correlate well with summative assessment performance. However, the type of formative assessment given, interestingly, does seem to make a difference.

Enhancing the Flipped Physics Classroom Through the use of Preflight Questions - My students appeared to have difficulty connecting the content they learned from my video lectures to their assignments. To address this, I created several “preflights”, which students completed after watching videos. I wanted to determine the impact of preflights on learning and to see which format of preflights were most effective. I found that preflights had a positive effect on learning, and that students preferred a guided tutorial format.

The Effects of Explicitly Teaching Metacognitive Techniques in a College Level Human Biology Class - The success rate for Basic Human Biology at Great Falls College MSU has been declining the last three years. While reflecting on possible reasons for the decline I narrowed it down to the most common reasons for students coming to see me. These included difficulty with note taking, time management and learning from errors. This project evaluated the effect of teaching metacognitive strategies on academic performance, self-efficacy, and ability to select appropriate metacognitive strategies. Students were taught time management and study strategies along with reflection activities. Data collection for this project included surveys, interviews, field notes, and exam scores. The results indicated that note taking, study skills and time management improved. Self-efficacy remained the same while academic performance results were inconclusive. The positive outcomes from this project have encouraged me to continue implementing these strategies.

The Informal Classroom: Evaluating the Effects of a Continuing Medical Education Program on Science Learning and Attitudes in Medical Students, Residents and Physicians - Continuing medical education programs play an important role in disseminating current scientific information to our medical community adult learners. This research study evaluated the effects of our education programs on science learning and attitudes, observed preferred learning environments and adult learning theories, and analyzed our evaluation and assessment process. The data revealed that learning method preference depends on educational content, and successful programs adhere to that preference.
Monday, June 30, 2014

2 pm  Randy Rowland  Reid 101
       Sheridan, Wyoming
       Sheridan High School
Facilitator: Cameron Burns
Effects of Incorporating Selected Next Generation Science Standard Practices on Student Motivation and Understanding of Biology Content - This study investigated how incorporation of selected Next Generation Science Standards practices; developing and using models, using mathematics and computational thinking, and engaging in argument from evidence affected student understanding of concepts and engagement and motivation in studying bacteria, molecular genetics, and Mendelian genetics. The results showed improvement in student conceptual understanding, student motivation and engagement, and also improvement in the instructor’s engagement and motivation.

2 pm  Deanna Bailey  Reid 102
       Barre, Vermont
       Barre Supervisory Union
Facilitator: Logan Mannix
The Effect of Professional Development in Science and Literacy - I co-taught an 11-week professional development course to elementary school teachers to help them weave student talk and notebook writing into science instruction and thereby help their students to reason about the natural phenomena they experience during science inquiry. Research showed that this course helped increase teachers’ knowledge-base and self-efficacy for teaching science using literacy strategies. Teachers’ classroom implementation of best practices for science teaching through inquiry changed dramatically too.

3 pm  Michael Poser  Reid 101
       McCook, Nebraska Hobson, Montana
       McCook High School Hobson Public Schools
Facilitator: Katie Redmond
Challenges of Utilizing Tablet Computers for Instruction in the Middle Level Science Classroom - This project examined impacts of tablet computers in middle level classrooms. It was found that teacher preparation time increased and teachers needed more professional development. Concerns over misuse drove district policy and led to restricted access to the tablets. The staff and students valued the tablets and there will be a re-evaluation of district policy and professional development practices to better suit the needs of the district.

3 pm  Christine Scott  Reid 102
       Snohomish, Washington
       Glacier Peak High School
Facilitator: Chance Duncan
Using Real-World Applications to Enhance Learning in a High School Biology Classroom - In this investigation, real world applications were used to enhance the academic success and motivation of students in a high school biology class. During the process, student surveys, assignments and assessments were used as measuring tools. Teacher motivation was also evaluated throughout the process. In the end, the use of real world applications had encouraging impacts on students’ academic success and both teacher and students noted an increase in motivation.

5 pm  Ahmed Shawli  Reid 101
       Bozeman, Montana
       Montana State University
Facilitator: Marka Latif
The Effect of Using the Weekly Podcasts on Students Learning - In this project, the effect of flipping the classroom by the use of videocasts was studied to measure its effectiveness on student learning outcomes compared to the traditional classroom. Also the effect of increasing the number of videos per week on students’ learning was studied. To accomplish the objectives of the project, the class was divided into three periods: no video period, one video a week period and two videos a week period. The data revealed that students scored higher in the one video period in both teacher made assessments and weekly online quizzes. Also, increasing the number of the videos to two did not show any increase neither in the teacher made assessments nor the online quizzes result. Overall, students reported positive feedback regarding using the flipped classroom approach and the results showed that they preferred it to the no videos period, the traditional approach.
Tuesday, July 1, 2014

7 am  Sherry Otruba  Reid 101
      Roanoke, Virginia
      Roanoke Valley Governor’s School
Facilitator: Ashley McGrath

The Effects of Screen Casting on the Mastery of High School Chemistry Concepts and Differentiation of Instruction - The purpose of this study was to examine the effects of using screen casting of video lessons as homework followed by active learning strategies in class, flipping the traditional high school chemistry classroom. Results of the study did not indicate improvement in the understanding of chemistry concepts, but did provide evidence of improved differentiation of instruction.

8 am  LeAnn Thongvanh  Reid 101
      West Des Moines, Iowa
      Indian Hills Jr. High
Facilitator: Rebecca Dobson

A New Way to Read: Will Implementing Literacy Strategies in the Science Classroom Increase Motivation and Understanding - Wanting to refresh the routine of reading text and filling in worksheets, I developed a process called Question, Read, Connect, Reflect as a way to get seventh grade science students engaged and motivated to understand content. Students worked cooperatively to read sections of the science textbook, constructing concept webs and summaries for each section. While effort and motivation increased, no gains were shown in their writing or summarizing abilities.

8 am  Scott Lilley  Reid 102
      New Canaan, Connecticut
      New Canaan Country School
Facilitator: Pamela Schaefer

Measuring the Effectiveness of Projects and Student Learning Ownership through Differentiated Assessments in Science - The purpose of this study was to measure the effect of choice in assessment style, and to measure the reliability of projects as assessment instruments. Data collection involved a comparison of test and project results, student attitude surveys, a questionnaire, and teacher observations. Results suggest that projects are a reliable assessment instrument; they were preferred by students, and students were more involved in the process of their own learning, demonstrated by reported time spent on task and effectiveness of formative assessment pieces.

9 am  Mary Mingles  Reid 101
      Holbrook, Massachusetts
      Holbrook Junior/Senior High School
Facilitator: Marcia Blome

The Effects of Inquiry Activities in a Ninth Grade Physics Classroom - This study focused on the impact of including guided inquiry activities in ninth grade introductory physics classes. Data showed students preferred the inquiry activities to the previous class structure and their understanding of the physics content increased. Students were more engaged and actually requested to do more inquiry activities. Inquiry activities were found to be more effective when they followed direct instruction rather than being used to introduce a topic.

9 am  Matthew Clay  Reid 102
      Joplin, Missouri
      College Heights Christian School
Facilitator: Joshua Caditz

The Effect of Flipped Classroom Videos Filmed at Field Locations - In this project, videos filmed at field locations were used in place of narrated slideshows in a flipped classroom. The study explored the effect of these videos on student engagement and achievement. Test scores increased after students viewed field location videos but there was no improvement with narrated slideshows. This indicates such videos may not have an effect on student achievement. There was also a significant increase in engagement.
Tuesday, July 1, 2014

10 am  Gary Sumner   Reid 101
    Baldwin, Wisconsin
    Baldwin Christian School
Facilitator: Carol Smith

Using Concept Mapping to Advance the Understanding of High School Physics Concepts - This study investigated students interactively building concept maps during classroom discussion and for study guides at the end of a unit as activities to advance the understanding of physics concepts. Data were collected using targeted assessments, interviews, surveys, and observations to determine the effects of the activities. The results indicated that concept mapping helped students to understand and remember concepts. Also, the attitude for both students and teacher was improved.

10 am  Heather Mitchell   Reid 102
    Houlton, Maine
    Houlton Southside School
Facilitator: Shari Generaux

Using Blogging to Increase Science Content Knowledge and Transfer - This study looked at using blogging in the general science classroom to increase the acquisition of science content knowledge and transfer. Research questions considered blogging as it relates to increased critical thinking skills along with improved acquisition and transfer of content knowledge. Other considerations included improvement of test scores due to blogging and the impacts of blogging on teachers, both positive and negative. The participants of this research project were 40 fifth grade students at a small rural school in Maine. Methods consisted of implementing a classroom blog with strict guidelines in one group of 19 students while not implementing the same for the second group of students. All other methods of teaching, including lecture, discussion, labs, and text readings were the same. Data collection and analysis included classroom observations, student surveys, teacher reflection, student reflection, and classroom assessments.

11 am  Jocelyn Wells   Reid 101
    Saint John, New Brunswick
    St. Malachy’s Memorial High School
Facilitator: Jennifer Heisler

The Effects of Introductory Station Labs in High School Physics - Introductory Station Labs were used to engage students in a variety of short collaborative investigations prior to the beginning of formal instruction with three high school physics classes. The labs helped students to make real-world connections, they provided sources of reflection while problem solving and enriched their experience with the world. A positive shift in student interest levels was noted.

11 am  Terina Konrad   Reid 102
    Rupert, Idaho
    Minico High School
Facilitator: John Henry Davis

The Effects of Project-Based Learning on Student Achievement and Motivation in Remedial High School Algebra - The research examined the effects of project-based learning on student achievement and motivation in a remedial high school algebra classroom. Throughout the research period, 13 projects were included in the algebra curriculum. Projects included card games to reinforce integer operations, order of operations puzzles, equation bingo, and teleconferences with NASA engineers about applications of mathematics. Research showed project-based learning as a good teaching tool to help motivate students to learn.

12 pm  Kal Pokley   Reid 101
    Lima, Montana
    Red Rock Lakes National Wildlife Refuge
Facilitator: Jessica Vasquez

Testing Competing Hypotheses for the Seasonal Variation in Nesting Success of a Late-nesting Waterfowl - Collected data and analyzed results of Lesser Scaup nesting ecology. Nest searching was conducted at Red Rock Lakes National Wildlife Refuge, Lima, Montana. Nests were located during nest searches conducted from May through July until the fate of the nest was determined. Nest age, nest location, vegetation height, distance to water and depth of water was recorded at each nest.
Tuesday, July 1, 2014

12 pm  Dori McCormick  Reid 102
Harrison, Ohio
William Henry Harrison High School
Facilitator: Jacquelyn Haas
Implementing Cooperative Learning Strategies with an Emphasis on Teambuilding in a High School Physics Classroom - At the beginning of the unit on light, students were assigned groups and teambuilding activities were conducted. When completing group assignments, cooperative learning strategies were implemented. The treatment data suggested that students were more willing to work together than the students who were not taught with these strategies. Although data was collected to determine academic improvement and attitude toward lab activities, the timeframe was too short to draw a conclusion.

1 pm  Michael Tang  Reid 101
Walnut, California
Southlands Christian Schools
Facilitator: Carissa Ketchen
The Impact of Science Fiction Media on Student Interest and Learning - The purpose of this research project was to determine if the use of science fiction media in the classroom can impact student learning and interest in science. Students were shown clips from various science fiction films such as "Gattaca" and "Spider-Man" throughout each unit. The class then discussed different aspects of the plot, how the movies used science, and how science concepts played a role in the movies. Student learning was gauged by the assessments in each unit while student interest in science was assessed through the Science Subject Survey and the Post-Treatment Interview.

2 pm  Mariann Bernard  Reid 101
San Marcos, California
San Elijo Middle School
Facilitator: Sara Grothro
Effects of Project-Based Inquiry Lessons Integrated with Technology on Understanding Eighth-Grade Physics Concepts - This study investigated the effects of project-based learning (PBL) lessons with access to technology on student understanding of motion, speed, acceleration, and Newton's Laws, and their motivation. Teacher-centered instruction began the units and progressively transitioned to a student-centered environment with open access to technology. Engagement in the PBL process resulted in improvement in student understanding as well as motivation, especially with low-achieving learners.

3 pm  Mark Meredith  Reid 101
Russellville, Arkansas
Russellville High School
Facilitator: Matthew Haack
Testing the Effectiveness of Different Moodle Assignment Styles on Improving Student Comprehension of Biology Concepts and Attitudes toward Homework Assignments - Moodle is an online virtual learning environment that offers educators a wide variety of tools for promoting learning. The purpose of this study was to see if the level of peer to peer interaction of the different Moodle assignments influenced their effectiveness as learning tools. A second goal of the study was to determine if student preferences for assignments on Moodle were based on the level of peer interaction involved. It was found that student perceptions of Moodle assignment contributions to learning were positive overall with mixed views on the different styles of assignments.

3 pm  Eric Ojala  Reid 102
Missoula, Montana
Hellgate High School
Facilitator: William Iliff
Misconception Based Curriculum Restructuring for Freshmen Earth Science Students via Moon Journal Projects - My project involved curricular redesign focused around the freshman earth science astronomy unit. I reworked my moon journal project with different formatting, requirements, presentation materials, and labs with the goal of better addressing content misconceptions. I evaluated progress using pre/posttests, and compared the astronomy treatment unit to the control meteorology unit. Treatment test growth was greater than that of the control, although moon journal scoring and participation could be improved.
Tuesday, July 1, 2014

5 pm  Casey McHugh  Reid 101
Missoula, Montana
Cold Springs Elementary
Facilitator: Justi Crofutt
The Impact of Guest Speakers and Place-Based Learning in the Science Classroom - In this study, guest speakers and place-based learning were introduced into the fifth grade science class to determine if there would be an increase of student understanding of science content. Three presenters and three placed-based experiences occurred during the study. The findings suggest that there was growth in the students’ knowledge and confidence in the content area after hearing the presenter and experiencing the science.

5 pm  Dean Brown  Reid 102
Medicine Hat, AB (Canada)
Crescent Heights High School
Facilitator: Michael Poser
Effects of Cooperative Pre-activities on student understanding in High School Biology - High school biology students are expected to learn complex outcomes, as well as participate in classroom assignments and activities. Cooperative pre-activities and cooperative learning structures were used to allow students to gain some prior knowledge that would not only enhance cognitive development, but increase self-confidence and motivation to become more engaged in the learning process. In addition, teacher motivation and improved pedagogy also impacted the learning environment in a positive manner.

Wednesday, July 2, 2014

7 am  David Dooling  Reid 101
Alamogordo, New Mexico
New Mexico Museum of Space History
Facilitator: Chris Koper
The Awful Truth about Zero-G - Many people wrongly believe there is no gravity in space. I used the Conceptual Change Model to have students first re-enact the discovery of gravity, then use a mini-drop tower with a camera to demonstrate what happens to objects and different phenomena in free-fall. Surveys with one teacher group and six classes show this to be a valid, engaging approach to correcting a common misperception.

8 am  Stephen Mohr  Reid 102
North Jackson, Ohio
Jackson-Milton High School
Facilitator: Kaylee Shaw
The Effect of Computer Simulations on the Conceptual Understanding in General Chemistry Lab - Computer simulations provide an interactive and visual environment that promote and support conceptual change in chemistry education. It is through the implementation of a series of inquiry based student activities that these simulations will be evaluated for their effectiveness in improving conceptual understanding. The results of this study revealed that traditional instruction supplemented prefaced with computer simulations helped students perform better on short term conceptual assessments.

9 am  Chris Koper  Reid 101
Robesonia, Pennsylvania
Conrad Weiser Area School District
Facilitator: Elaine Gibbs
The Effects of Personal Response Systems on Student Engagement and Performance on Science Tests - A growing number of classrooms are using Personal Response Systems, or clickers, to enhance instruction in the classroom. This paper examines the effects of using clickers on student performance on semester exams as well as student perspectives on using these devices in their classrooms. Thirty-two students were surveyed in two college preparatory physics classes in different semesters over the course of a year. The fall semester course used the clickers while the spring semester classes did not. Both student’s perspectives on using clickers and their academic performance were assessed. It was found that, though student interest and confidence seemed greater with the use of these devices, teacher generated exams did not see much benefit at all. In fact, 33% of students using clickers scored an A or B on semester exams while 43% did so without the use of clickers. This was the case with course grades as well. So, though clickers do not seem to indicate increased academic success in the classroom the devices are popular with students in regards to engagement in the classroom itself.
Wednesday, July 2, 2014

9 am    Analea Hronek    Reid 102
        Belfry, Montana
        Belfry School
Facilitator: Rachel Tinkler

*The Effects of a River Study Program on Students’ Comprehension, Skills, and Attitudes in Science* - This study focused on whether an outdoor river study program increased students’ science comprehension, skills, and changed their attitudes towards science and environment. The data shows that students’ knowledge of science concepts did not increase significantly, students retained the river study concepts more easily compared to indoor classroom science concepts. Students’ attitudes towards science, the environment, and themselves as learners were shown to be more positive post-river study.

10 am   Dawn Mercer Turner    Reid 102
        Huntsville, Alabama
        NASA Marshall Space Flight Center
Facilitator: Irene Catlin

*Engineering and Science Career Development: Self-Reflection and Other Methods Used to Steer Professional Development* - A challenge faced in today’s technical workforce at NASA is to transfer the knowledge from employees who have years of experience to those with less experience. Typically, the method of transferring the information is through hands-on experiences over time. However, this study attempts to determine if using more experienced employees in training opportunities, while incorporating real-world examples, can effectively transfer this knowledge and assist employees in self-reflection and career planning.

11 am   Angie Jenkins    Reid 101
        Waterloo, Iowa
        Waterloo East High School
Facilitator: Heidi Jessen

*The Effects on Individual Grades and Test Scores When Assigning and Grading Homework in a Ninth Grade Physical Science Classroom* - The purpose of this study was to examine the effects of graded versus non-graded homework on proficiency, test scores and course grades in physical science. Two classes were selected and compared on proficiency, test scores and overall grades after each unit. It was determined that students do not need to have graded homework assignments in order to display proficiency on tests and pass the class with an above average grade.

12 pm   Jennifer Heisler    Reid 102
        Helena, Montana
        Jim Darcy Elementary
Facilitator: Ahmed Shawli

*The Impact of Increased Nonfiction Reading on Student Achievement in Science* - As technology progresses, teachers must constantly evaluate what tools are best practice for learning in their classroom. Student created digital media provides an avenue for students to express their learning and engagement in the classroom while practicing 21st century skills. This study looked at the effectiveness of student created digital media projects versus a traditional approach and their effect on learning and motivation. Utilizing qualitative and quantitative methods, this study found very little difference between these two approaches.

1 pm    Jim Bratka    Reid 101
        Nunapitchuk, Alaska & Columbus, Ohio
        Anna Tobeluk Memorial School & Reynoldsburg High School
Facilitator: Matthew Clay

*If Student Curiosity in Familiar Items is Stimulated, Will Their Curiosity in Science Be Stimulated, Resulting in an Increase in Science Grades?* Different items were introduced into several classrooms; students were given a series of questionnaires, interviews and journaling opportunities to document their observations. Class discussions were held to get a general input from the class as a whole as to the level of curiosity. Responses were collected using clicker devices. Data was collected and results indicated a marked improvement in student curiosity levels as well as their interest in science.
Wednesday, July 2, 2014

1 pm  Alecia Jongeward  Reid 102
Bozeman, Montana
The Museum of the Rockies
Facilitator: Terina Konrad
*How are Montana’s Teachers Using the Taylor Planetarium as a Teaching Tool?* - This project evaluated how teachers bringing groups to the Museum of the Rockies used the Taylor Planetarium as a learning tool. Teachers who visited the Museum between October 2013 and March of 2014 were asked to participate by answering questions via online surveys and phone interviews. This project generated evidence that there is a considerable need to increase the communication level between Montana’s teachers and the Museum of the Rockies.

2 pm  Clinton Whitmer  Reid 101
Brockton, Montana
Brockton School District
Facilitator: Jennifer Smith
*The Effects of Cooperative Learning on Native American Students’ Understanding of Environmental Science* - This project investigated the effects of cooperative learning strategies with high school students in environmental science. The students, who were mostly Native American, experienced special group discussions and groups working together to perform lab activities. The results were positive for understanding environmental science, promotion of higher-order thinking skills, and student social interaction and discussion.

2 pm  Melissa Thompson-Krug  Reid 102
Omaha, Nebraska
Zoo Academy, Omaha’s Henry Doorly Zoo & Aquarium
Facilitator: Quincie Lords
*The Effects of Authentic Learning Experiences on Female Students’ Perceptions of Science and Confidence in Attaining a STEM Career* - The purpose of this research project, carried out at Omaha’s Henry Doorly Zoo & Aquarium’s Zoo Academy Program, was to determine whether authentic learning experiences improve female students’ perceptions of STEM (Science, Technology, Engineering & Mathematics) and confidence in attaining a STEM career, with an emphasis on hands-on learning experiences and strategies for engaging female students. Data collection tools indicate students’ perceptions of STEM are improved through these methods.

3 pm  Donna Tully  Reid 101
Honolulu, Hawaii
Kamehameha Schools, Kapalama Campus
Facilitator: Kyle Herdina
*The Effects of a Flipped Learning Model Utilizing Varied Technology Verses the Traditional Learning Model in a High School Biology Classroom* - In an effort to measure the effects of a flipped learning model utilizing varied technologies versus a traditional learning model, freshmen and sophomore students in four high school biology classes were studied over five units during the second semester of the 2013-14 school year. Data indicated the flipped learning model is effective in increasing student interest, motivation, engagement, and homework completion, but did not reveal a reliable increase in student achievement.

3 pm  Krista Martens  Reid 102
Columbia Falls, Montana
Columbia Falls High School
Facilitator: Jocelyn Wells
*Effects of Crib Sheets Compared to Open Notebooks on Summative Assessment in an Introductory High School Earth Science Class* - My research compared the use of crib sheets and open notebooks for student assessment scores. The results did not reveal a noteworthy difference. What I did find significant is students’ perceptions that crib sheets are helpful, and so I will utilize crib sheets next year. I believe increased learning will occur if students are trained in their use and understand this is a valuable way to prepare for an exam.

4 pm  Robert Lynch  Reid 102
Haddon Heights, New Jersey
Haddon Heights High School
Facilitator: Joshua Abernathy
*A Study on the Use of Student Centered, Internet Based Problem Solving Instruction in AP Physics* - The goal of my AR will be to develop alternate methods of going over problems in the form of a series of web posts. This will allow the students to access and work with the solutions to a large percentage of the assigned problems on their own, thereby freeing up classroom time for more in depth coverage of the material including extended discussions, demonstrations, and inquiry based laboratory activities.
**Wednesday, July 2, 2014**

5 pm  Christine Jones  
Battle Ground, Washington  
Tukes Valley Middle School  
Facilitator: Tanya Long  

**Incorporating Language Arts Strategies in the Science Classroom to Improve Student Writing** - The purpose of this project was to help students improve their writing skills by utilizing procedures learned in writing class in the science classroom with the goal of preparing them for the state science assessment. All students improved in writing evidence-based conclusions. Results indicated that evidence-based writing can be used across the curriculum and students benefit from using a general scaffolding for writing.

5 pm  Cameron Burns  
Oakesdale, Washington  
Oakesdale School, Oakesdale School District  
Facilitator: Mark Meredith  

**Shared Learning Targets: Effects on Student Achievement When Learning Targets are Communicated with Students** - A descriptive study that looks at the construction and use of student-shared learning targets for the immediacy of individual lessons and the effects they have on student achievement in the middle school science classroom. Being new to the use of student-shared learning targets, the researcher describes the results between treatment and non-treatment periods, making comparisons between the two periods, and reflects on the process and use of student-shared learning targets.

**Thursday, July 3, 2014**

7 am  Kaylee Shaw  
Kalispell, Montana  
Flathead High School  
Facilitator: Dawn Mercer Turner  

**Use of Computer Simulations in Physics: Comparison of Simulation Implementation as Introductory or Reinforcement Tools** - This study investigated whether the use of online simulations are more effective as introduction activity or concept reinforcement in the high school physics classroom. The effectiveness of simulations based on student preference and performance was analyzed using the topics of Energy, Force, the Law of Gravitation and Thermal Physics. The study showed students preferred and had greater conceptual understanding when computer simulations were used as a reinforcement tool.

7 am  Stephanie Fields  
Woodbine, New Jersey  
Woodbine Elementary School  
Facilitator: LeAnn Thongvanh  

**Using Student Growth Objectives and Inquiry Based Learning to Promote Science Literacy in the 21ST Century Learner** - This study focused on vocabulary and writing skills to promote scientific literacy. The need for a strong vocabulary background was evident for at-risk students where there is little support from home. Students were not scoring well on assessments due to the lack of understanding scientific terminology and poor study habits. Throughout the study my eighth grade students used a variety of exercises improving science context and showing growth.

8 am  Carol Smith  
Van Alstyne, Texas  
Van Alstyne High School  
Facilitator: Heather Mitchell  

**ChemQuest1: Do Gaming Strategies Affect Student Engagement and Motivation in the Chemistry Classroom?** - In my project, I investigated the effects of a particular set of gaming strategies on student motivation and engagement in learning chemistry. I designed ChemQuest1 to use game elements such as leaderboards, experience points, guilds, tasks, battles and boss fights to engage students in learning chemistry. Part of the impetus of this design was to reduce students’ fear of failure by allowing them multiple tries to be successful without incurring a penalty.
Thursday, July 3, 2014

8 am  Coreen Dingler  Reid 102
Diboll, Texas
H. G. Temple Intermediate, Diboll ISD
Facilitator: Kal Pokley

*How is Student Achievement on Assessments Impacted by the Use of Computer Based Tests?* - In this investigation assessments using classroom technology were implemented with the purpose of looking for the effect that computer based testing had on student achievement. This study involved a comparison between the use of pencil-paper tests and computer based tests. The data was used to analyze whether or not the use of computer based tests had an effect on student achievement in a fifth grade science classroom.

9 am  Justi Crofutt  Reid 101
Big Piney, Wyoming
Big Piney High School
Facilitator: Christina Scott

*The Effect of Case-Based Learning in a High School Anatomy and Physiology Class on Student Motivation, Higher-Order Thinking Skills, and College Readiness* - This study considers the effectiveness of case-based learning (CBL) on motivation, higher-order thinking skills, and college preparedness in a high school anatomy and physiology classroom. Data was collected over four units of study using different CBL methods. Surveys, interviews, and pre-/posttests were all used as means to collect data. They compared the engagement levels, the skills developed for career and college readiness, and critical thinking skills using traditional methods versus CBL. From the data collected, there was no conclusive evidence to support an improvement in college preparedness. Student motivation and engagement increased slightly for CBL and there was a definite improvement in higher-order thinking skills after the use of any CBL throughout these units.

9 am  Rebecca Dobson  Reid 102
Bristolville, Ohio
Bristol High School
Facilitator: Garold Sumner

*The Effect of Scientific Explanation Instruction on Extended Response Performance by Eighth Grade Science Students* - This project sought to discover if direct instruction of scientific explanation will improve student performance on extended response style questions. Students were taught scientific explanation using Katherine McNeill’s Claim-Evidence-Reason Framework. Activities were scaffolded for increasing difficulty and culminated in an inquiry project requiring them to write a scientific explanation from data they collected. Eight of nine students in the research group showed improvement in scientific explanation writing skills.

10 am  Matthew Haack  Reid 101
North East, Maryland
North East High School
Facilitator: Sherry Otruba

*The Effects of Cooperative-Learning Strategies on Students’ Understanding of High School Biology* - This study investigated how the use of cooperative-learning strategies affected student understanding, long-term memory, attitudes, and engagement. Understanding was compared with and without cooperative learning. The results showed a definitive improvement in student understanding for the high-achieving students and improvement in long-term memory, and a modest increase in attitudes and engagement for all students and teacher’s attitude.

10 am  Katie Redmond  Reid 102
Chicago, Illinois
Herzl School of Excellence
Facilitator: Lynn Powers

*The Effects of Problem-Based Learning on Student Achievement in a Fourth Grade Classroom* - In this action research, project-based learning was implemented with the purpose of improving student achievement and student engagement within the science classroom. Students participated in project-based learning activities in addition to their traditional instruction. Students’ achievement in science and attitudes toward science and school were measured throughout the action research through assessments, observations, attitude surveys, and daily tasks. Academic growth was seen in students who typically perform below grade level, in addition student engagement and attitudes were positively impacted.
Thursday, July 3, 2014

11 am  Shari Generaux  Reid 101
         Oakland, California
         Montana State University
Facilitator: Deanna Bailey

*The Effects of the 5E Learning Cycle on Student Integration of Science Vocabulary* - The purpose of this study was to determine the effects of inquiry based instruction on students' ability to access, synthesis and use vocabulary on written assignments, assessments and in discourse. The results of this study show students perform better on classroom assessment and writing assignments when the 5E Learning Cycle was used prior to the introduction of vocabulary. The most growth was identified among female African American students.

11 am  Kara Coates  Reid 102
         Elko, Nevada
         Great Basin College
Facilitator: Eric Ojala

*Will The Use Of Conceptual Lab Reports and Prelab Quizzes Improve Overall Student Grades?* - The purpose of study was to determine if overall student success increases by adding a prequiz and assigning conceptual lab reports in a college freshman level introductory biology lab class. Combined lecture and lab grades were analyzed between two groups of students. The study was based on the premise that writing promotes learning thereby increasing students overall success in biology. No strong positive objective outcome was observed although writing skills improved.

12 am  Chance Duncan  Reid 102
         Atkins, Arkansas
         Atkins High School
Facilitator: Mariann Bernard

*Determining the Impact of the Atkins School District's Technology Initiative on the Student's Ability to Learn, the Teacher's Ability to Teach* - This project was designed to determine the educational impact of the technology initiative the Atkins School District began in 2013. The research included data from both students and teachers and discovered that technology has an overall positive, if only slightly, impact on the quality of education but must be properly supported for the most successful results.

1 pm  Logan Mannix  Reid 102
         Helena, Montana
         Capital High School
Facilitator: Randy Rowland

*What Are the Effects of Standards-Based Grading on Student Learning and Behavior in the Secondary Science Classroom?* - Traditional points-based grades can be inconsistent, and their meaning can be watered down by non-academic factors. In addition they may lead students and parents to focus more on earning points by turning in assignments and extra credit than on learning in order to game the system. Can switching to a standards-based grading system help change students' focus, improve learning outcomes, and change the conversation between teachers and their students?

1 pm  Candace McMullan  Reid 102
         Fishers, Indiana
         Holy Cross Lutheran School
Facilitator: Casey McHugh

*The Effects of Open Inquiry versus Guided Inquiry on Student Achievement and Enthusiasm For Science* - In order to identify the benefits of inquiry education on student enthusiasm and success, sixteen seventh graders were analyzed over the effectiveness of open inquiry versus guided inquiry. Students conducted open and guided inquiry labs, and were analyzed through surveys, interviews, discussions, assessments, and lab reports. Data showed positive correlations with all forms of inquiry, but there were greater connections to learning, motivation, and enthusiasm with the guided inquiry format.
Thursday, July 3, 2014

2 pm  Lisa Lundgren  Reid 102  Gainesville, Florida  Florida Museum of Natural History, University of Florida  Facilitator: Mary Mingles  
Exploring How Children Use Science Process Skills in a Museum Setting - In the Florida Museum of Natural History’s Discovery Room, children explore scientific concepts. The usage of science process skills (SPS) such as observation, communication, inference, and prediction had not been studied. I conducted observational research into how children used SPS. Data analysis showed that children used SPS more frequently at “dynamic” stations, which should be included in the new Discovery Room that will be built in 2015.

3 pm  Christina Wallace  Reid 101  Gainesville Missouri  Gainesville R5 School District  Facilitator: Daniel DuBrow  
The Effect of Engaging Assignments on Students Performance in the Science Classroom - The purpose of this study was to improve student performance by changing assignment types given in the science classroom. It was accomplished by giving teacher created resources and CATs as described by Anglo and Cross. The students engaged in writing assessments and other activities. Intervention strategies, including Response to Intervention Program (RTI), were used for the students who still did not complete the tasks assigned on time.

3 pm  Matthew McClellan  Reid 102  Lake Charles, Louisiana  Calcasieu Parish 4-H  Facilitator: Dean Brown  
Informal Youth Educational Programming and its Effect on Environmental Stewardship and Formal Science Classroom Performance
In this investigation, 4-H Outdoor Skills Programming was used to determine its effect on participants’ formal science classroom performance, development of life skills, leisure activity choices, and whether this type of adventure programming can increase a participants’ level of environmental awareness. Parent and participant surveys, interviews, and direct observation techniques were used to gather data during intervention sessions with two 4-H project clubs in Calcasieu Parish, Louisiana. Results indicated that these programs do accomplish life skill development and improvement in environmental awareness, but no correlation was found to indicate improvement in the formal classroom or in a decrease in reliance on electronic devices for entertainment.

4 pm  Ashley McGrath  Reid 101  Cascade, Montana  Montana State University, Bozeman  Facilitator: Alicia Jongeward  
Taphonomy of the Modern Tree-Based Nesting of Great Blue Herons - This research supports the growing number of modern bird taphonomic studies and furthers our understanding of the taphonomy of birds and non-avian dinosaurs. The purpose was to determine if Great Blue Herons (A. herodias) are acceptable proxies for dinosaur nesting localities through the taphonomy of the biological material found below the tree-based nests. This study recognized a variety of signatures specific to arboreal nesters, including eggshell orientation characteristics and skeletal representation biases.

5 pm  Joshua Caditz  Reid 101  Carpinteria, California  Cate School  Facilitator: Jeffrey Noblejas  
The Effects of Differentiated Homework on Student Performance, Interest, and Diligence in a High School Biology Course - The use of differentiated homework structures and vodcasts were investigated to determine if they improved student interest, diligence, and understanding of high school biology content and concepts. The project results support the notion that the use of vodcasts increase student interest and provide a useful alternative homework tool. The results do not support the use of a differentiated homework structure for the acquisition of biology content or mastery of concepts.
The Effects of Documented Problem Solutions on Problem Solving Skills for Introductory College Physics Courses - My students struggle to solve physics word problems when the solution is not explicitly given to them. They can understand abstract concepts and repeat a problem that is solved correctly for them, but cannot solve word problems that are new. The ability to solve problems should be a skill that a student acquires or improves as a result of taking a college physics course. Over the past several years of teaching I have noticed that despite my best efforts, I have not observed any measurable improvements in my students' abilities to solve physics problems. As a physics teacher, I needed to find some way to help my students become more comfortable and learn to enjoy solving physics problems. This capstone project investigates the effect of formative assessments on improving student's ability to solve physics problems.

The Effects of Compacted Science Units on Student Retention of Science Concepts the Effect of Class Websites on Student Engagement in Middle School Science - From a descriptive study in which middle school science students were observed over a period of a little over four months during which class websites were used in a variety of capacities; it was determined that class websites increase students' sense of autonomy, but do not change students' attitude towards homework. It could not be determined if student engagement is affected, but was found that teacher practices were positively impacted.

Effect of Reflection on Student Achievement and Self-Confidence in the Science Classroom - This project focused on the use of guided reflection in the middle school science classroom. Students reflected using various strategies both at the beginning and end of each class period. The goal of the project was to see how this daily reflection would affect student achievement and self-confidence for the learning goals of a unit. Students' achievement and self-confidence was evaluated by several methods. The results showed positive increases in both achievement and self-confidence.

Infusing Science into Native American Studies: A Project-Based Unit for Fourth Grade - In this study a project-based learning unit was implemented in order to determine how student learning and engagement would be affected in a fourth grade classroom. The unit required individual or group research, creation of a project artifact, and a public presentation component. Compared to a traditionally designed unit on the same topic, participants in the project-based learning group showed modest gains in student learning and periods of increased engagement.

The Effects of Differentiated Instruction Based on Multiple Intelligences with AP Chemistry Students - This study investigated the design and utilization of differentiated instructional activities and lessons based on student’s profile of multiple intelligences. Students were grouped in homogeneous sets based on their highest intelligence for an introductory lesson and for subsequent lessons students worked collaboratively in integrated heterogeneous groups. The results were positive for the low-achievement group’s understanding of concepts, engagement of the entire class, and teacher self-perception.
**Saturday, July 5, 2014**

**10 am**  
Marcia Blome  
Omaha, Nebraska  
Westside Middle School  
Facilitator: Donna Tully  

*Technology Immersion in the Eighth Grade Science Classroom* - In this action research project, technology immersion was integrated at various levels of content instruction with the purpose of measuring student engagement in eighth grade science. Students applied increased levels of technology during the course of introduction of material, exploration and assessment. The data collected points towards an increase of engagement while improving understanding in science.

**11 am**  
William Iliff  
Sacramento, California  
Christian Brothers High School  
Facilitator: Doralee McCormick  

*The Effects on Learning for the High School Biology Student with the Implementation of the Individual iPad Usage in the Classroom*  
This project studied the introduction of the individual iPad from the perspectives of the students, their parents, and science department teachers. The collected data suggested increased homework completion, perceived better test preparation, and reading assignment completion. Distractions due to unauthorized game playing were a significant negative factor for some students. Future gains seem possible with differentiated instruction, student engagement, and further integration of technology into the science laboratory.

**11 am**  
Kyle Herdina  
Welch, Minnesota  
Prairie Island Indian Community  
Facilitator: Christina Wallace  

*Integrating Native American Mdewakantion Sioux Culture with Environmental Science Curriculum* - The need to develop culturally-related educational resources that engage Native American students has driven many educators to develop their own material. In this study, educators spent time researching and developing a cultural plant field guide to use within their environmental education and outreach program on the reservation. This action research process provided educators with culturally relevant science material while increasing their knowledge and confidence to engage Native American students.

**12 pm**  
Jessica Vasquez  
Cedar Rapids, Iowa  
Harding Middle School  
Facilitator: Stephanie Fields  

*Use of Standards-Based Grading to Increase the Teacher’s Overall Understanding of Student’s Learning in the Seventh Grade Science Classroom* - Standards Based Grading in the classroom was examined along with the extent to which it would increase students’ overall understanding of the materials. Specifically, an analysis of authentic reflection by the student on their learning and the quality of the reflection was compared to their overall understanding of the materials. Students who demonstrated a quality reflection were much more likely to be proficient on the summative assessment.

**1 pm**  
Nicolai Love  
Jackson, Missouri  
Saxony Lutheran High School  
Facilitator: Lisa Lundgren  

*The Effects of Teaching the Nature of Science on Higher Order Thinking Skills* - The study focused on how teaching a unit specifically about the Nature of Science influenced the students’ capabilities to analyze, evaluate, and synthesize scientific information. The Next Generation Science Standards, released in April of 2013, were the benchmarks used for designing the curriculum. The results indicated that the largest improvements in student ability and confidence were in evaluating scientific information.

**1 pm**  
Pamela Schaefer  
New Jersey  
Vernon Township High School  
Facilitator: Clinton Whitmer  

*Writing a Scientific Research Question for Independent Investigation in the High School Laboratory* - The focus of this project was on teaching and guiding a small group of high school seniors in writing testable scientific questions, ultimately for their own independent research. Using a series of teaching modules, group discussion, online data sets and rubric-scored tasks, students practiced and refined the skills needed to become proficient in formulating quality scientific questions.
Comparison of Tillage Practices on Soil Health in the Lower Colorado River Basin Region of the Sonoran Desert - When you think of leafy vegetables does the word desert come to mind? For this project I studied the impact tillage has on soil composition. Three adjacent fields in the Lower Colorado River Basin in Arizona were used in this comparative study. Soil health indicators were tested by laboratory and fieldwork. Among the outcomes, soil organic matter and soil bacteria had positive correlation increasing as tillage levels increased.

The Effects of Scientific Practices in Ninth Grade Religious Education Lessons - Scientific and engineering practices were integrated into newly designed ninth grade religious education lessons to improve faith knowledge and student engagement. The 20-lesson treatment included opportunities for students to engage in argument with evidence, use and develop models, and communicate with peers. Results indicated that 92% of ninth grade students believed that incorporating scientific practices in religious education lessons had a positive impact on their faith learning.

Teaching Science with Science Fiction - The focus of this project was to determine how the incorporation of science fiction reading material impacts student learning. Four specific areas were measured; student engagement, concept reinforcement, interest in science related careers, and science literacy. Data collection and analysis reveal a marked improvement in all areas of the measured areas indicating that utilizing science fiction reading material is a useful strategy for teaching science content.

Effects of Online Prelab Activities on Success in Laboratory Exercises in the Science Classroom - Laboratory exercises have always been an integral component of science education. Although laboratory work can provide students with opportunities to see science in action, practice inquiry skills and analyze real time data, it is not always clear that laboratory exercises are an effective means of supporting content learning in science. Through the use pre-lab activities, facilitated by student iPad use, the goal of this project is to provide students with reflective and preparatory experiences that assist in connecting laboratory outcomes with the science content of study.
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
Josey McLean, Great Falls, MT
John Miller, Billings, MT
Randall Morgan, Ketchikan, AK
Kelly Morrow, Kalispell, MT
Randall Carmel, Millersburg, OH
Ivanell George, Houston, TX
Jeffrey Greenfield, Shepherd, MT
Mark Halvorson, Sidney, MT
Tom Hennard, Stavanger, Norway
Steven Lockyer, Conrad, MT
Ann Lueky, Alberta, Canada
Lisa Mahony, Bozeman, MT
Craig Messerman, Missoula, MT
Kathleen Napp, Scottsdale, AZ
Sandy Shutey, Butte, MT
Lisa Snyder, Chetenne, WY
James Temple, Glendale, MT
Melanie Vinion, Wooster, OH
Chrystel Wells, Taylor Mills, KS

2000 Graduates
Randall Carmel, Millersburg, OH
Beverly DeVore, Meeker, CO
Ivanell George, Houston, TX
Jeffery Greenfield, Shepherd, MT
Mark Halvorson, Sidney, MT
Tom Hennard, Stavanger, Norway
Steven Lockyer, Conrad, MT
Ann Lueky, Alberta, Canada
Lisa Mahony, Bozeman, MT
Craig Messerman, Missoula, MT
Kathleen Napp, Scottsdale, AZ
Sandy Shutey, Butte, MT
Lisa Snyder, Chetenne, WY
James Temple, Glendale, MT
Melanie Vinion, Wooster, OH
Chrystel Wells, Taylor Mills, KS

2001 Graduates
Robert Beece, 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
Deanna Hill, Alberta, Canada
Richard Lahti, Fergus Falls, MN
Sanford MacSparren, Logan, UT
Bradley Piroutek, Belleville, KS
Rebecca Reno, Havre, MT
David Robbins, Nairobi, Kenya
Jack Schoonen, Dillon, MT

2002 Graduates
Ronald Abarta, Chehalis, WA
Shannon Bowen, Strasburg, VA
Peter Bregard, Fullerton, CA
Pamela Duncan, Woodstock, IL
Leslie Griffen, 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
Melissa Newman, Dutton, MT
Chris Ottey, Bozeman, MT
Robert Pendergast, Canfield, OH
Mary Slack, Wheaton, IL
Michelle Snyder, Athena, OR
Michele Thomas, Bakersfield, CA
Kerby Winters, Vale, OR

2003 Graduates
Cynthia Beales, Fairbanks, AK
John Scott Beaver, Talpa, TX
Amy Berg, Auburn, MA
Eric Berg, Auburn, MA
Nikki Bethune, Oklahoma, OK
Bruce Bourne, Seeley Lake, MT
Kevin Bowman, Jackson, OH
Corbin Bracy, Waterville, ME
Kelly Cameron, Ridgefield, WA
Ralph Carlson, Hilmar, CA
Corinne Chavenn, Pittsburgh, PA
Susan Choman, E. Wenatchee, WA
Tom Cuffbage, Great Falls, MT
Sandra DeYonge, Rye, NY
Sharon Dotker, Raleigh, NC
Phyllis French, Douglasville, GA
Michele Geisler, Rutland, VT
Michael Gregory, Pinedale, WY
Robin Hearn, Roundup, MT
Kathy Howe, Houston, TX
Jack Julian, Casterbrook, PA
Linard Kendall, Saumon, IL
David Lee, Taylortowne, 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 Stefan-Squires, Lancaster, CA
Jim Striebel, Corvallis, MT
Nicole Trombeta, Duluth, GA
Melody VanderWeide, Grand Rapids, WI
Jeffery Wehr, Inverness, MT
Tim Ziegler, Stowe, VT

2004 Graduates
Kimberly Atkins, Amandale, MN
Christopher Cox, Buffalo, WY
Kelley Davis, Monkton, MD
Kirsten Dehart, Houston, TX
Patricia DiEdwardo, Lewiston, ME
Terry Edinger, Trabooco Canyon, CA
Mary Margaret Ercal, Lombard, IL
Randall Farchmin, Menomonie, WI
Dona Furrrow, Jackson Center, OH
Larry Gursky, Roy, WA
Emmylou Harmon, Kremmling, CO
Penny Juennemann, 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
Jeannie 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
Ericka Wells, Jackson, WY
Jeff Youker, Placerville, CA
Brian Zeissler, Elko, NV

2005 Graduates
Marc Afifi, Seacliff, CA
Christine Bergholtz, Kenai, AK
Matt Bilin, 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 Endeman, Monroe, WA
Monica French, Salt Lake City, UT
Nelson Fuamenya, Hunan, China
Nicole Tscherske, Ashland, MT
Kellel 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
Nicolé Kirschken, Newfield, NY
Anita Linder, MT, Zion, IL
Brad Lovedy, Alamo NV
Justin Lovrien, Sioux Falls, SD
Leslie McDaniel, Memphis, TN
Carla McFadden, Orovillo, WA
2005 Graduates (Continued)

LeAnne Yenny, Bozeman, MT
Jennifer Werda, Plymouth, NH
Josh Underwood, Tollesboro, KY
Katherine Saylor, Fall City, WA
Travis Vandenburgh, Independence, MO
Erin Trame, Ann Arbor, MI
Neysa Thiele, MT. Zion, IL
Christine Sundly, Great Falls, MT
Margaret Rossignol, Boulder, CO
Brian Swarthout, Bozeman, MT
Becky Sundin, Baker City, OR
Susan Steckel, Winchester, IL
Zachary Stroker, Columbus
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 Vandenburgh, Independence, MO
Jennifer Wenda, 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
Alisia Cepaitis, Fort Collins, CO
Janine Gardner, Littleton, CO
Randy Daniel, Hunstville, AL
Yvette Deighton, Sparks, NV
Lindsay Forsys, White, PA
Greg Gaffey, Beloit, WI
Amanda Gilbreath, Madison, AL
Tara Hall, Golden, CO
Laura Hauswold, Seattle, WA
Lauren Hinchman, Charlevaux, MI
Laura Holmoquist, Bigfork, MT
Joanna Hubbard, Anchorage, AK
Margie Huber, Gahanna, OH
Ken Mager, Oak Forest, IL
Michael Magno, Monroe, NT
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
Vasantha Prasad, Tamilnadua, India
Craig Richards, Calusa, CA
Brad Shuler, Elk Ridge, UT
Carla McFadden, Orovino, WA
Brad Shuler, Elk Ridge, UT
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 Tinger, Akron, OH
Geneviee Walsh, Bozeman, MT
Molly Ward, Bozeman, MT
Amy Washtak, Bozeman, MT
Deb Williams, Ames, IA
Rick Wyman, Hardin, MT
Besty Youngman, Phoenix, AZ

2007 Graduates

Serena Ayers, Springfield, NJ
Jason Barr, Charlotte, FL
Lindsay Bartolone, Chicago, IL
Lesley Chappell Bunch, Palmer, AK
Lisa Carpenter, Shepherd, MT
Mark Calhoun, Tucson, AZ
Jennifer Ceven, Avon, MA
Tonya Chapweske, Cities, MT
Stacey Dobrosky Cool, Merced, CA
Victor Dalla Betta, Kalsispell, MT
Bradley Deacon, Montoursville, PA
Dale Dennier, 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, Anchorage, AK
Kelly R. Gorski, Kelly, WI
Jeff Grom, Belgrade, MT
Angela Haas, Gardiner, MT
Marie Akers Hamaker, Cincinnati, OH
Lisa Hawkins, Taehon, South Korea
Kelly Hayden, Bozeman, MT
Shelia Higgins, Bentonville, AR
Bernard Hocour, 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
Kolbeh 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, Tuscon, AZ
Jacki Pealatere, Willits, CA
Stuart Perez, Redfield, KS
Lisa Pingrey, Custer, SD
Cary Rosillo, Jupiter, FL
Patrick Simmons, Chesterfield City, VA
Michael Sitter, Polson, MT
Ben Stiff, Billings, MT
Rebecca Tolzman, Bozeman, MT
Nina Tyree, Alexandria, VA
Peggy Van Valkenburgh, Peterborough, NH
Michelle Vitko, Norwich, CT
Bryanna 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, Watacheke, WA
Marlessa Benson, Appleton, WI
Jennifer Brathear, 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 Halplop, Hardin, MT
Martin Hudson, Hancock, WI
Jill Hughes-Koszarek, Hartland, WI
Louise Jones, Naperville, IL
Tim King, Glide, OR
Jeffrey Klibstein, Estes Park, CO
Sara Koifarnus, Westminster, CO
Jonell Prather, Missoula, MT
Charles Reade, Sacramento, CA
Laura Ritter, Royal Oak, MI
Franz Ruiz, El Cajon, CA
Kristina Sappfen, Eagle, CO
Eric Sawettle, 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 Welham, Bothell, WA
Lara Wick, Palmer, AK
Kathleen Woltvedt, Cut Bank, MT
Jaimie Wolfe, Saginaw, MN
Wendy Worral, Abbotsford, BC
June Wozny, Ellsworth, WI

2009 Graduates

Phillip Ammann, Wilmot, 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
Terry Carlsen, Walla Walla, WA
Miranda Cimino, Citrus Heights, CA
Brett Damrow, Hutchinson, MN
Natalie L. Davis, Livingston, MT
Meg DeAntoni, San Diego, CA
Jenny Derks-Anderson, Eugene, OR
2009 Graduates (Continued)

Leslie C. Karpiak, Des Plaines, IL
Ron Koczaja, Fairbanks, AK
Michael E. Joyce III, Oak Bluffs, MA
Larene Bowen, Lame Deer, MT
Christy Bone, Missoula, MT
Susan Berrend, Salt Lake City, UT
Anton Kortenkamp, Monticello, MN
Lucy C. Karwoski Korpi, Holland, MI
Carlie J. Jones, Renton, WA
Suzanna Johnson, Auburn, CA
Patti Jelinek, Memphis, TN
Allen R. Bone, Pablo, MT
Randall Jay Berndt, Rosholt, WI
Carol Jane Baker, Billings, MT
James T. Ausprey, East Machias, ME
Thomas Kozikowski, Frostburg, MD
Robert David Baughman, Moss Point, MS
Susan H. Barton, Big Sky, MT
Cheryl A. Barrientos, Denville, NJ
Laurie K. Rugemer, Bozeman, MT
Julie Kallio Estrella, Union City, CA
Janet C. Fenker, San Jose, CA
Devon M. Flamm, Hardin, MT
Emily M. Ford, Boyce, VA
Dennis Fullerson, Lisbon, IA
Joshua Gates, Wilmington, DE
Cheri C. Gerber, Kelowna, British Columbia
Tim Gerneraad, 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, Poesta, 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, Coatsville, PA
Cathy L. Jamison, Wake Forest, NC
Sara Elizabeth Jay, Bozeman, MT
Pamela S. Kaatz, Sechelt, British Columbia
Margaret Kane, Prescott, AZ
Renée Kelch, Ronan, MT
Bonnie J. Keller, Blacksburg, VA
Rose Kent, South Royalton, VT
Lorna Sue Langle, 29 Palms, CA
Erin Kelly Lynch, Bozeman, 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
Beth Peterson, Highland Park, IL
Alfred T. Potier Jr., Dover, NH
Sarah S. Poletto, Bozeman, MT
Anne Powers, Kingston, Ontario
Page-Marie Price, Lolo, MT
Holly Prull, Bend, OR
Tina L. Raeder van Strum, Gonzales, CA
Nancy Farrington Reid, Natick, MA
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. Closse, Missoula, MT
Stanley B. Covington, Beijing, China
Michelle A. Cregger, Cheyefelah, WA
Carrie Jo Dagg, Fairfield, IL
Quinn Michael Daly, carbondale, CO
Bonnie E. Daley, San Francisco, CA
Ann Dannenberg, Newtown, 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
Michael J. Flamm, Hardin, MT
Emily M. Ford, Boyce, VA
Dennis Fullerson, Lisbon, IA
Joshua Gates, Wilmington, DE
Cheri C. Gerber, Kelowna, British Columbia
Tim Gerneraad, 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, Poesta, 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, Coatsville, PA
Cathy L. Jamison, Wake Forest, NC
Sara Elizabeth Jay, Bozeman, MT
Pamela S. Kaatz, Sechelt, British Columbia
Margaret Kane, Prescott, AZ
Renée Kelch, Ronan, MT
Bonnie J. Keller, Blacksburg, VA
Rose Kent, South Royalton, VT
Lorna Sue Langle, 29 Palms, CA
Erin Kelly Lynch, Bozeman, 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
Beth Peterson, Highland Park, IL
Alfred T. Potier Jr., Dover, NH
Sarah S. Poletto, Bozeman, MT
Anne Powers, Kingston, Ontario
Page-Marie Price, Lolo, MT
Holly Prull, Bend, OR
Tina L. Raeder van Strum, Gonzales, CA
Nancy Farrington Reid, Natick, MA
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. Closse, Missoula, MT
Stanley B. Covington, Beijing, China
Michelle A. Cregger, Cheyefelah, WA
Carrie Jo Dagg, Fairfield, IL
Quinn Michael Daly, carbondale, CO
Bonnie E. Daley, San Francisco, CA
Ann Dannenberg, Newtown, 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
Michael J. Flamm, Hardin, MT
Emily M. Ford, Boyce, VA
Dennis Fullerson, Lisbon, IA
Joshua Gates, Wilmington, DE
Cheri C. Gerber, Kelowna, British Columbia
Tim Gerneraad, 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, Poesta, 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, Coatsville, PA
Cathy L. Jamison, Wake Forest, NC
Sara Elizabeth Jay, Bozeman, MT
Pamela S. Kaatz, Sechelt, British Columbia
Margaret Kane, Prescott, AZ
Renée Kelch, Ronan, MT
Bonnie J. Keller, Blacksburg, VA
Rose Kent, South Royalton, VT
Lorna Sue Langle, 29 Palms, CA
Erin Kelly Lynch, Bozeman, 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
Beth Peterson, Highland Park, IL
Alfred T. Potier Jr., Dover, NH
Sarah S. Poletto, Bozeman, MT
Anne Powers, Kingston, Ontario
Page-Marie Price, Lolo, MT
Holly Prull, Bend, OR
Tina L. Raeder van Strum, Gonzales, CA
Nancy Farrington Reid, Natick, MA
Paul E. Robinson, Valhalla, NY
Susan R. Rolke, Rindge, NH
Melinda K. Rothschild, Parker, CO
Jeff Salter, Salt Lake City, UT
Scott Schafer, Weston, WI
Michael A. Schoenborn, Seattle, WA
Catherine Schuck, Missoula, MT
Debra Lea Schwake, Lodge Grass, MT
Justin L. Smith, Coatsville, PA
Karen M. Smith, Lame Deer, MT
Nichole Spindler, Bradford, PA
Jennifer Stadum, Bozeman, MT
James Sturt, 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
Gail Whiteman, Bozeman, MT
Deanna Rose Zerbe, Lodge Grass, MT

2011 Graduates

Melanie S. Acker, Ulysses, PA
Patti Rae Bartlett, Seeley Lake, MT
Jennifer Moore Bernstein, Portland, OR
Lindsay Paige Bower, Middleburg, VA
Brennan Brockbank, Fairfax, CA
Deborah Brown, Nyssa, OR
Nancy Lee Bryant, Burlington, NC
David Buck, Oxted, ME
Joel Burgener, Lima, MT
Sandra J. Cilmenhaga, Albion, MY
Sarah Marie Connor, Kalispell, MT
Joann C. Dayton-Wolf, Kingston, NY
Joe DeLuca, Almere, The Netherlands
Joyce Dooley, Bentonville, AR
Katherine Echazarreta, Vienna, VA
Kendra Eneroth, Spokane, WA
Jonathan R. Ern, Wentzville, MO
Eric Esby, West Hills, CA
Lanie A. Fischman, Antioch, IL
Brandon Fritz, Williamsburg, IA
Jeremy Fuller, Wolfeboro, NH
Sheri Gates, Nagykovacs, Hungary
Ashley Gillespie, East Helena, MT
Tanya Gordon, Boise, ID
Amy M. Gramling, Hillsdale, MT
Heather M. Grant, Ojai, CA
Christopher Green, Painesville, OH
Christopher Gunderson, Absarokee, MT
Hadley Hentschel, Carbondale, CO
Susanne L. Hokkanen, Matteson, IL
Megan Hopkins, Naperville, IL
Daryl Allan Holst, Bangkok, Thailand
Jasper Howell, AFton, WY
Cheryl A. Hudson, Tifton, GA
An’juli Johnson, Billings, MT
Darren Kellerby, Anchorage, AK
Marty King, Legrand, IA
Heather M. Grant, Ojai, CA
Christopher Green, Painesville, OH
Christopher Gunderson, Absarokee, MT
Hadley Hentschel, Carbondale, CO
Susanne L. Hokkanen, Matteson, IL
Megan Hopkins, Naperville, IL
Daryl Allan Holst, Bangkok, Thailand
Jasper Howell, AFton, WY
Cheryl A. Hudson, Tifton, GA
An’juli Johnson, Billings, MT
Darren Kellerby, Anchorage, AK
Marty King, Legrand, IA
Heather M. Grant, Ojai, CA
2011 Graduates (Continued)

Kathryn Madden, Beaufort, SC
Margaret K. Magonigle, Hanna, HI
Danny Mattern, El Dorado, KS
Emily McKenna, Belding, MI
Christian R. Mills, Rawlins, WY
Annie L. Modic, Katy, Texas
Christopher G. Monsour, Tiffin, OH
Richard Montoya, Eureka, MT
Erik Nickerson, Boulder, CO
Cameron Novak, Frederickburg, VA
Aaron Olmanson, Golden Valley, MN
Bradley Pederson, Belle Plaine, MN
Timothy D. Percoski, Bloomfield, CT
Janet E. Perry, Ashland, ME
Alanna Piccillo, Palisade, CO
Janet E. Perry, Ashland, ME
Timothy D. Percoski, Bloomfield, CT
Charlotte Hagerman, Fagar, AZ
Shawna Halsey, Billings, MT
Angela J. Hamman, Dillon, MT
Michelle Hammond, Lake Worth, FL
Jeremy Harder, Big Sky, MT
Yvette Strandell Hart, Hastings, NE
Annie Hesterman, Westminster, CO
Brian Holtzhafer, Orefield, PA
Brandon Honzua, Missoula, MT
Angie Hopwood, Superior, MT
Laura Hovland, Bozeman, MT
Jessica Hughes, Arlee, MT
Douglas Martin Janecko, Goshen, NY
Jennifer Jones, Ogalla, NE
Alan Kalf, Lexington, MA
Mark Kellogg, Camdenton, MO
Batya Kinsberg, Eaglewood, NJ
Leah M. Knickerbocker, Bozeman, MT
Karyn Ann Kretscher, Genoa City, WI
Charla Lake, Ronan, MT
Mary Larson, Polson, MT
Ann Leach, Leavenworth, WA
Candice M. Lommen, Mapple Valley, WA
Hilary M. Lozar, Roman, MT
Hermes Lynn, Livingston, MT
Jill D. Mahoney, Fairfax, VA
Sibley A. Malee-Ligas, Arlee, MT
Kasey Marks, Missoula, MT
Cara Marlowe, Dubai, United Arab Emirates
Joy Mayer, Green Bay, WI
Colleen Marie McDaniel, Houston, TX
Miles McGeethan, Manhattan, MT
Randi Metzer, Oriwigsburg, PA
Robert Moysey, Birstol, PA
Susannah Spradlin Murphy, Frenchtown, MT
Jennifer Narimatsu, Bremerton, WA
Kimberley Orr, Lethbridge, AB, Canada
Alisha Pablo, Hot Springs, MT
April Peterson, North Bay, Ontario, Canada
Sadie Peterson, Silver Springs, MD
Melinda Reed, Florence, MT
Marcie Reuer, Grande Cache, AB, Canada
Joe M. Ruffatto, Great Falls, MT
Marco Santarelli, New Fairfield, CT
Michele Schaub, Crow Agency, MT
Anne Farley Schoefller, Hudson, OH
Rachel Scenar, Bozeman, MT
Matthew J. Shargel, Walnut Creek, CA
Jennifer Sherburn, Hesperia, MI
Aaron Shotts, Mechanicsburg, PA
Carolyn Slagle, East Helena, MT
LaCee Small, Ashland, MT
Dale Spady, Westlake Village, CA
Stephanie Statema, Park Ridge, IL
Lauren Stephon, Norfolk, VA
Lisa Russell Stevens, Crow Agency, MT
Heather G. S. Deitz, Regina, Canada
Kaye Ebelt, Missoula, MT
Nathan R. Fairchild, Redding, CA
Jessica Felchel, Billings, MT
Amy Flintz, Roseville, CA
Ryan Foley, Great Falls, MT
Rebecca Beacham Fulk, Steamboat Springs, CO
Jason Getz, Woodbury Forest, VA
Kellina Gilbreth, Colorado Springs, CO
Vanessa Nashee Green, Lawrenceburg, TN
Lori Hacck, Kremmling, CO
Molly Russell Underwood, Redwood City, CA
Jay Wallis, British Columbia, Canada
Tylene M. Walters, Manhattan, MT
Paula Wang, Poplar Island, MD
Lee Weldon, Missoula, MT
Rachel M. White, Belgrade, MT
Wendy D. Whittner, Spokane, WA
Beth Workman, Bainbridge, OH
Rachel Lee Zupke, Seattle, WA

2012 Graduates

Jessica Anderson, Deer Lodge, MT
Tanya M. Anderson, Hardin, MT
Tom Anderson, Twin Valley, MN
Donald James Asbury, Lame Deer, MT
Kathy Aune, Frenchtown, MT
Kristian Basaraba, Sherwood Park, AB, Canada
Nancy Hoggard Talley, Tarboro, NC
Shaun Terry, Lovelock, NV
Katherine Theobald, Alexandria, VA
Marta Toran, Boone, NC
Jeanne Torske, Broadus, MT
Audrey Urista, Winston, OR
Shari F. Ward, Ashland, ME
Tom Wellnitz, Johnstown, PA
Matthew Wigglesworth, Honolulu, HI
Jennifer Williams, Honolulu, HI
Andrea Gissig Yordan, Philadelphia, PA

2013 Graduates

Georgia Alvarez, Vancouver, WA
Kelly Arnold, Clarksville, TN
Suzanna Barnhart, La Crosse, WI
David Bates, San Francisco, CA
Charles Benson, Bellevue, NE
John Bishel, Port Allegany, PA
Dana Blomquist, Helena MT
Andrew Bright, Gabrills, MD
Tina Brothers-Tilling, Helena, MT
Jennifer Bruns, Juliaetta, ID
Joe Clark, Carson City, NV
Carrrie Clement, Helena, MT
Judith Coats, Eldorado del Mar, CA
Crystal Cornwell, Ronan, MT
Brooklyne Coulter, Strasburg, CO
Joe Crider, Helena, MT
Emily Currier, Helena, MT
Janeen Curtis, Darby, MT
Jennifer Curtis, Rockport, ME
James Davies, Ridgefield, WA
Caleb Dorse, Loyalton, CA
Pamela Dresher, Culver City, CA
Amy Dushane, Yuba City, CA
Lori Egan, Thornton, CO
Holly Fanis, Hamilton, MT
Laura Feldkamp, Wichita, KS
Tyler Ferebee, Pawnee City, NE
Jason George, Notus, ID
Lance Gerow, Riyadh, Saudi Arabia
Dale Glass, Potezoc, MD
James Glynn, Chicago, IL
Rachel Grey, Winnisooko, LA
Taylor Green, Red Lion, PA
Michael Greenhoe, Kander, Germany
Courtney Harrell, Payto, CO
Michael Helseth, Yakima, WA
Robin Hendricks, Mc Cook, NE
Benjamin Heyde, British Columbia, Canada
Alice Hinck, Broadus, MT
Jennifer Hood, Dayton, TN
Jeanna Jasperson, Montrose, CO
Beverly Jaworski, Burtonsville, MD
Tamarra Jendro, Helena, MT
Susan Johnson, Southbury, CT
Shari Juroszek, Bozeman, MT
Kevin Keneally, Nevada, IA
Kendra Koch, Elk Grove Village, IL
Amanda Kozak, Ashland, OH
Scott Lannen, Phoenix, AZ
2013 Graduates (Continued)
Robert Lee, Shelby, MT
Brett Lehner, APO, CA
Heather Leiberg, Helena, MT
Martha Lord, Hamilton, MT
Doug Lymer, Houston, TX
Dalton McCurdy, Fairfield, CT
Julie McDonnell, Oak Park IL
Heather McWhorter, Las Vegas, NV
Murry Metge, Great Falls, MT
Ashley Milbrandt, Helena, MT
Julie Morris, Peotone, IL
John Nilsen, Dhahran, Saudi Arabia
Laura Patch, Brevard, NC
Brian Phillips, Rabun, GA
Dorcella Plain Bull, Crow Agency, MT
Mary Ragusa, Bloomingdale, IL
Jayanthi Ramakrishna, Chennai, India

Chris Reidburn, Watertown, SD
Stacey Rhodes, Waynesville, MO
Andrea Robbins, Buhl, IN
Christopher Rocheleau, Southington, CT
Pablo Rojo, Brooksville, FL
Sally Sanders, Tallahassee, FL
Josie Shern, Bozeman, MT
Charles Shields, Greencastle, ID
Judith Silva, Franklin, ME
Michelle Slaughter, Lincoln, CA
Matthew Sloan, Glenview, IL
Adam Smith, Sioux Falls, SD
Charles Strobino, APO, Germany
Angela Swank, Livermore, CA
Chris Swiden, Watertown, SD
Sarah Tabor, Bozeman, MT
Kenneth Taylor, Bozeman, MT
Carol Teintze, Bozeman, MT
Zachary Thomas, Mountainburg, AR

2014 Spring Graduate
Shannon Greco, Princeton, NJ

Jacob Thompson-Krug, Omaha, NE
Kristina Troge, Doral, FL
Dina Tucker, Austin, TX
Jennifer Vaughn, Houston, TX
Carrie Wager, Medina, OH
Cindy Watson Pottebaum, Winterset, IA
Mary Ann Watt, Concord, NH
Irene Wilcox, Clearwater, MN
Danielle Wilczak, Clearwater, MN
Suzanne Wilson, Olympia, WA
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*Will present Summer 2014 but graduate at a later date
**Scheduled to present outside of Capstone Week: Katie Koessler