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2012-2013 Newsletter

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STEM Ed

From the Director

MORTON STERNHEIM

Go West!

STEM Ed has been following this ancient advice of late. Our staff has been traveling further and more frequently this past year than in previous years. Some presentations were in familiar venues where we present more or less regularly. These included:

- Massachusetts Environmental Education Society, Worcester, MA, March 14, 2012. Air Quality: STEM DIGITAL Project for Measuring Ozone. Presented by grad student Debbie Carlisle.
- The National Science Teachers Association (NSTA) 2012 annual meeting in Indianapolis in March. A nanotechnology short course and a STEM DIGITAL presentation. Rob Snyder (STEM Ed staff) and myself.
- The Massachusetts Association of Science Teachers, Marlborough, MA, in November, on the same subjects.
- The American Association of Physics Teachers, Williamstown, NY, November, nanotechnology. Mark Tuominen (Physics and the Center for Hierarchical Manufacturing), Rob Snyder.

We've also gone west to our neighbors in New York State. This started in January when Rob Snyder accepted an invitation to do a nanotechnology presentation at the Hudson Valley Community College in Albany as part of an NSF funded Northeast Advanced Technological Education Center (NEATEC) workshop. This led to an invitation for STEM Ed to conduct a three day institute in July for NEATEC at Rennssalaer Polytechnic in Troy. Staff for this very successful program included Mark Tuominen, Jennifer Welborn (Amherst Regional Middle School), Rob, and me. The response from the participating teachers was highly positive.

Utica is just a bit further west of Albany. Over the past few years, several teachers from Utica have attended our Science and Engineering Saturday Seminars. Their enthusiasm for these events encouraged their professional development coordinator to ask us to hold similar sessions in Utica, which we did on two Saturdays this fall. Each day there were two morning workshops, one for elementary and one for secondary teachers, and two afternoon workshops. The evaluations were very enthusiastic.

Next year we will repeat some of these events. Rob will again present for NEATEC in January, and we will return to NSTA in San Antonio in April with a nanotechnology short course plus presentations on STEM DIGITAL and on the STEM Solar Laboratories. Two new venues are planned:

- The Association for Science Teacher Education, January 2013, Charleston, SC. Debbie Carlisle will present on STEM DIGITAL
- Family Days, American Association for the Advancement of Science, February 16, 2013. We will share a UMass booth with hands on materials for children and their parents.

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UMass Amherst Facilitates Team Based Learning

By Richard Yuretich

UMass-Amherst has recently become a nexus for promoting team-based learning (TBL), which is a highly structured development of cooperative learning. At UMass, the Center for Teaching and Faculty Development started a cadre of TBL Fellows selected from the faculty to explore the application of this technique in their classrooms. . TBL is centered on the establishment of permanent teams that work together through most or all of the semester, and the key ingredient is that these teams collaborate only during class time. There is no need for the students to find time to meet after class, which is an almost impossible task given the different schedules of each student. The technique was originally developed at the University of Oklahoma in its business school and has since been applied widely to other disciplines, especially science courses (Michaelson et al, 2004). The ideal team is relatively large, six or seven members, and this allows the team to function even if not all members are present. These teams are formed by the instructor with the goal of picking heterogeneous groups with a variety of different skills. The idea is that students who possess superior knowledge in one area can assist those with less preparation in learning the subject, and there can be a more robust exchange of ideas when discussing a particular topic.

A major component of TBL is the "Readiness Assurance Process." In general, students in TBL classes must take responsibility for their own learning; lecturing is kept to a minimum. Accordingly, students must read and comprehend basic concepts on their own in preparation for team-based investigations or projects. At the beginning of each topic or course module, the students take a "Readiness Assurance Test "(RAT) that focuses on the core concepts of the unit. This is done in two stages. First, they take the test individually as a regular test. These are collected, and then they take the test a second time with their teams. The scores for the two tests are weighted to stimulate the collaboration among team members. These tests are usually multiple choice and they can be graded in real time with an optical scanner in the classroom or by using an interactive classroom communication system. The third component of the RAT is the challenge, whereby students can propose other correct answers to the questions based upon their reference to the material they have read.

The centerpiece of TBL is the team collaboration that takes place during the bulk of the instructional unit or module. Each class session consists largely of teams working on the same or similar problems and then reporting on the results. The latter is best accomplished if the reports can be displayed simultaneously to stimulate a collective class discussion of the findings. The final piece of the structure is peer evaluation, which allows for the proper allocation of individual responsibility for the team efforts.

Beginning with the 2011-12 academic year, two experimental classrooms were built at UMass-Amherst in DuBois Library and Goodell to test-drive TBL, which is facilitated by a large array of technological support. These classrooms are designed around circular tables which seat nine students apiece. The smaller room in Goodell has six tables and the DuBois Library room has ten. Each table has three laptops that can be connected to a large video screen, a whiteboard for displaying results or posting information, and a camera that allows the whiteboard to be shown to the rest of the class. The instructor has a console that selects among the various display options for the numerous video screens around the classroom.

I used the TBL approach initially in Geosciences 103 "Introductory Oceanography", which took place in the large TBL classroom (90 students). The course was divided into five modules that correspond to sections in the text book. The first class of each module was a "concept preview," which highlighted the major ideas to focus on in the assigned reading. I had the teams themselves answer questions concerning the topic, and then we reviewed the answers in a whole-class discussion. The Readiness Assurance Test in the following class was based on these concept questions. For each of the remaining classes in the module, five or six class sessions of 50 minutes apiece, the teams worked on investigations that developed the principal concepts. For example, on the topic of coastal erosion, the teams explored the questions: "*Are there effective measures against coastal erosion? What can be done to address the problem?*" When teams had come up with a consensus, they their answers on their whiteboards, and then we had whole-class discussion of the alternatives presented. In this case, I also showed a short video that presented some additional information that was included in our analysis.

In addition to the RATs, the assessment of student learning had three other components. The team investigations were all collected, read, and graded. The team efforts were adjusted for individual members through peer evaluation, in this case through the use of "I-peer" software, which allows each team member to apportion points to each of the other students in the team. Each module also included an assignment or quiz that had to be completed through the course on-line learning management system (SPARK or Moodle). These consisted of approximately 20 questions that explored the information of the module in a more detailed way through problem solving, graphical interpretation and short-answer questions. These assignments were completed individually away from class, graded automatically, and reinforced the individual accountability aspect of the course.

Lastly, the class was given a traditional final exam that was cumulative in its content. Students also had the option of completing the exam a second time on-line, and they were allowed to collaborate with their teams or use other sources in this second effort. The final exam grade was a blend of the solo and on-line components, similar to the scoring of the RATs.
Student evaluation of the course in the TBL classroom was generally positive, with an incremental improvement over the more traditional version of the course (Fig. 2). The largest and most significant increases came in answers to the questions "I received useful feedback on my performance on tests, papers etc." and "The instructor stimulated student participation in the class." The increases for both these questions were significant at the 99% level. Of greater interest is the evidence that student learning in the course improved. The final grade distribution was skewed heavily to the high end of the scale, although some of this resulted from liberal scoring of the team investigations. However, the content of the final exam did not differ significantly from those administered in the earlier versions of the course. The mean grade on the solo round of the final exam was 10 points higher than for the comparison class from previous years, indicating that the ability of the students in the TBL class to use information and concepts from the earlier parts of the course is much greater.

Overall, TBL is a more sophisticated and effective application of the methods of collaborative learning. The team approach makes large classes seem smaller; I felt that the 90-student oceanography course had the atmosphere of a class about one-third its size. To use TBL effectively, the course has to be heavily front-end loaded, with the class schedule, team composition, and team projects all planned out before the semester begins. The high-technology classrooms were a real help in implementing the TBL approach, but I was interested to see how it could be accomplished in more traditional settings. I subsequently tried TBL in a class of 20 (Introduction to Geochemistry) and in a lecture-hall with 300 students (Introductory Oceanography). Although I have not yet analyzed the results of these latter efforts completely, I felt that TBL had a significant positive effect on the smaller class, but the physical surroundings hindered the overall learning in the auditorium class. The problems in the latter class were primarily related to an inability to interact with all the teams (there were 52) and selective reporting of the team investigations, i.e. not all teams could share their results in the time available. However, in all cases, students in the courses attended regularly and participated actively compared to more traditional courses or those using generic cooperative-learning techniques. In addition, reading the team investigations after each class session is an opportunity for formative evaluation of the class' grasp of major concepts, and can be used to develop "Just-In-Time" teaching directions for the subsequent class meeting.

Reference:

Michaelson, L.K., Knight, A.B., Fink, L.D. (editors). 2004. Team-Based Learning: A Transformative Use of Small Groups in College Teaching. Stylus Publishing, Sterling, VA, 304 p.

Participant in the 2012 STEM DIGITAL Workshop

STEM DIGITAL: Lessons Learned

Based on what we learned from the 2011 Summer Institute, we made some major changes in the agenda for the NSF funded Digital Images in Geoscience Investigations: Teaching Analysis with Light (STEM DIGITAL) 2012 institute.

1. We stressed that the Analyzing Digital Images (ADI) program, like Microsoft Word, has many features, but you do not have to learn all of them before you can do something useful. We wanted to dispel the idea that students needed to have an in-depth introduction to color theory in order to use the program at all. Accordingly, instead of starting with the basics of color, pixels, etc., as we had last year, we began the first day with some useful measurements you can make very easily with ADI: lengths, areas, angles, and intensities. The validity of this approach was demonstrated later in the summer when we used ADI in two different nanotechnology workshops. The teachers in these programs immediately grasped how to measure lengths in digital photos that they had taken in an experiment and were eager to learn more about ADI. They felt that their students could make similar measurements.

"It was a great week overall and as a chemistry teacher, I believe that this was probably the most relevant summer institute of the three that I have participated in."

"It was obvious that the professors and assistants were passionate about what they were doing and passed this on to us during the presentations and activities."

STEM DIGITAL continued

2. STEM DIGITAL staff member Jennifer Welborn, a middle school science teacher, shared several ways she had learned to circumvent technology limitations. For example, in one activity, she had one work station set up with a digital camera. Each group of students took a turn photographing the materials they were working on. Then, during a whole class discussion, the images were analyzed on a single computer connected to a projector.

3. Each day we had the teachers meet in peer groups – chemistry teachers, middle school teachers, etc. – to brainstorm ways they could use ADI in their curricula and how they could manage the logistics. Their ideas were then shared with the whole group. This was very effective in building teacher confidence and helping them to understand how ADI could enhance their students' experiences.

4. Last year we asked the teachers to construct lesson plans around one of the three environmental themes – air quality, arsenic contamination, and water quality – and post them on Moodle, our e-learning platform, in the fall. However, not all of them could use these applications effectively in their classes. This year we asked teachers instead to create lesson plans on any ADI application that they could use in their classes and post them by the end of the summer on Moodle. They would then have the opportunity in the fall to report on and discuss their results on Moodle, as well as an option in the spring to create a full curriculum unit for additional graduate credits or "professional development points" needed for continued certification. The lesson plans posted on Moodle this summer show a great deal of creativity and are applied to a wide range of subject areas.

We will be holding our third and final summer institute June 24-28, 2013. An NSF funded online version will be offered in the fall 2013 semester. The online course will be offered in subsequent years as part of the UMass Science Education Online (SEO) graduate program through Continuing and Professional Education. Summer institute information, curriculum materials, and free ADI software are online at www.umassk12.net/digital.

2012 DIGITAL Participants

ALLEN, Anne, West Winfield, NY
BERLSTEIN, James, Sheffield, MA
CONROY,Jill, Natick, MA
COPEN, Joshua, Springfield, MA
CORNWELL, Daniel, Central Bridge, NY
CRAMER, Vanessa, Holyoke, MA
CROFT, Jocelyn, Greenfield, MA
DALZELL, Alyce, Peyton, CO
DALZELL-WAGERS, Elizabeth, Colorado Springs, CO
DIBBERN, James, Springfield, MA
FOURNIER-REA, Julia, Granby, MA
FURKEY, Tara, Chicopee, MA
GABLE, Teresa, Seneca Falls, NY
GORRILL, David, Centerville, MA
HAVERSTICK, Susan, Natick, MA
KARPE, Bruce, Philadelphia, PA
KLAIBER, James, Montague, MA
KOZIOL, Stevens, Wilbraham, MA
LANGER-SMITH, Elyse, Easthampton, MA
LAUZON, Sally, Sharon Springs, NY
McDONALD, Sharon, Amherst, MA
MORENO, Allyson, Hopatcong, NJ
PASCALE, Stefana, Washington, NJ
PIAZZA, Theresa, Methuen, MA
PRASOL, Daniel, Greenfield, MA
RADWILOWICZ, Elizabeth, Belchertown, MA
STRAZZERE, Karen, Wilmington, MA
SUNDERMIER, Geraldine, Melville, NY
SUNDERMIER, Joseph, Melville, NY
THERIAULT, Susanne, Little Compton, CT
TULLY, Susan, Charlestown, MA

Science and Engineering Saturday Seminars—Spring 2013

January 26. ***Air Pressure, Clouds and the Weather***. *Laura Schofield, Ipswich schools*. Predict the weather by understanding air pressure and clouds. Participants will be presented with content to strengthen their own understandings as well as student friendly materials from the National Weather Service and NOAA. Topics covered will include Clouds, Air Pressure and Weather Systems. The presentation will include tutorials, hands-on analysis of current weather data using online resources and materials that support nonfiction reading and writing skills which address ELA Common Core Standards.

February 2. ***Everyday Particle Physics***. *Andrea Pocar, Physics.* Elementary particles are often viewed by the general public as remote concepts. The recent discovery of the Higgs boson has required one of the most complex machines ever built, but many pioneering discoveries have been made with much simpler detectors. This workshop will present an overview of elementary particles and techniques at a level presentable to high school students and show how particle physics is all around us and can be used to introduce quantum and relativity concepts to students. Using easily-available components, we'll build a cloud chamber, a particle detector in which particles leave distinct tracks that can be seen by eye. Bring a digital camera, laptop, laser pointers and a bright white light (like the ones for bicycles) if you can.

February 9. ***Pollen Biology***. *Alice Y. Cheung, Hen-ming Wu, Qiaohong Duan and Yanjiao Zou, Biochemistry and Molecular Biology.* Pollen is a specialized cell type in plants whose function is to deliver sperm to the female for fertilization. Therefore pollen is important for seed formation and essential for agriculture, ecology as well as the economy. It is also an excellent system for studying many fundamental biological processes, including genetics, cell-cell communication and cell growth. Pollen grains and pollen tube growth are also visually fascinating to observe. Much of the methodology is readily transferable from the research laboratory to the teaching laboratory at all levels. In this workshop, we shall introduce pollen biology in a short lecture and have experimental set-ups for participants to explore during the session. In addition, we will provide a protocol packet and some essential experimental materials for participants to facilitate their adopting some of the experiments to their classrooms.

March 2. ***How much arsenic do we eat?*** *Julian Tyson, Chemistry.* A workshop starting with an overview of some topics that could form the basis of activities for your students, both in and out of class. The contamination of apple juice and rice with potentially harmful arsenic compounds has been highlighted in the news recently. This comes on top of the drinking-water contamination issues that many countries, including the US, are facing. Relevant agencies have recently revised guidelines for human consumption of "arsenic", and there are discussions concerning possible regulations for the arsenic content of foods. Answering the question "is it safe" is complicated and involves (a) making decisions about what level of risk are we prepared to accept, and (b) a knowledge of what is reasonable to expect in terms of information about chemical composition—all rich topics for discussion. Members of my research group (including K-12 students and their teachers, undergraduates and graduates) have been working on the development of a procedure for the measurement of the relevant arsenic compounds in rice that can be performed in a kitchen at home (or, of course, in a school lab). We'll work through the analysis of water and of rice extracts by a colorimetric metric that involves the examination of the image, produced by a digital camera, with powerful, free software, AnalyzingDigitalImages. Bring a digital camera and a laptop if you can.

March 9. ***Patterns Around Us.*** *Benjamin Davidovitch, Physics; Jennifer Welborn, Amherst Regional; Wayne Kermenski, Mohawk Regional.* "Science may be described as the attempt to give good accounts of the patterns in nature. The result of scientific investigation is an understanding of natural processes.... Overall, the key criterion of science is that it provides a clear, rational, and succinct account of a pattern in nature...." Massachusetts State Frameworks for Science and Technology. We will explore the process of pattern recognition, analysis, and prediction (RAP) through a variety of activities which align with the Frameworks. Professor Davidovitch will present his current research on the quantitative analysis of wrinkling patterns. We will then investigate wrinkling patterns through hands-on activities which culminate in a real-life design challenge.

April 6. Weather Makeup if needed.

April 27. Recall for those registered for graduate credits. Hasbrouck Lab.

Graduate credit option: There is a charge of $300 for 3 graduate credits plus a $45 registration fee; register for Nat Sci 697A (Cont ed) or 697 F (University). This is in addition to the $120 STEM Education Institute fee. Teachers may obtain credit for the seminar as many terms as they wish, but only 3 credits may be applied to UMass Amherst degrees. A lesson plan and a book report will be required for those enrolled for graduate credit. We will have Continuing Education registration forms at the first seminar.

Questions: Mort Sternheim, mort@umassk12.net, 413-545-1908, www.umassk12.net/sess

Online seminar registration and payment: www.umassk12.net/sess/register.html. Required for everyone whether or not they are registering for graduate credit.

NANOTECH IS BIG

"Thank you for bringing the subject matter down to a level that we could understand and then pass on to our students. I feel like I learned a lot and I have many ideas to share with my students. "

Of course nanotechnology refers to very small things. It is "big" these days in terms of the level of interest in the subject on the part of teachers and the general public. This is demonstrated by the large numbers of applications to our nanotech summer institute and other programs.

Past STEM Ed programs for teachers usually have had grant funding from NSF or NASA for three summer institutes. By the third summer the pool of applicants generally had shrunk considerably, although we never have had open slots.

The nanotech summer institute is funded as an educational component of the large research grant to the UMass Center for Hierarchical Manufacturing. The initial five year grant was followed by a second five year award. As a consequence, we will be able to offer summer programs for a total of nine years.

We have seen a steady increase in the number of applicants for the summer institute despite the fact that we cannot provide travel funds. (We do, however, offer a $375 stipend which covers most travel expenses.) Last summer was our sixth; we had over 50 well qualified applications for our 27 slots by our April 1 cutoff date. These came from 15 states plus the District of Columbia.

In the front page article we listed several other venues in which we had introduced nanotechnology curriculum materials. Most noteworthy is the huge National Science Teachers Association annual meeting which features just eight 3 or 4 hour short courses. We have been selected to offer a nanotech course for several years, and will present one again in April at their meeting in San Antonio. This course requires advance registration and a fee, and it generally sells out. The enthusiastic evaluations have led NSTA to have us back each year.

2012 Nanotech participants hard at work

Why is nanotech so big? Part of the answer is the fact that the government and industry are spending large sums on basic and applied research in this field. The applications range from faster computer chips to better sunscreens. Nanotech related Jobs at all levels are predicted to grow rapidly. Also, our programs provide teachers with the resources they can use to incorporate exciting, contemporary materials into a variety of middle and high school classes.

2012 NANOTECH PARTICIPANTS

COCHRAN, Laura, Shinglehouse, PA
CUDDEBACK, Rachel, Boston, MA
DEMPSEY-MARCHESE, Leslie, Morristown, NJ
DONAHOE, Helen Cox, Holyoke, MA
DUNN, Ruth Ann, W. Townshend, VT
DWYER, Kathleen, O'Fallon, IL
FLICK, Judith, Baldwinsville, NY
FOLEY, Darcy, Sturbridge, MA
HORNE, Douglas, Essex Junction, VT
HOWE, Gail, Agawam, MA
KAPLAN, Daniel, Springfield, NJ
KARPE, Bruce, Philadelphia, PA
KARPUK, Scott, Northborough, MA
KLAIBER, James, Montague, MA
KURKOSKI, Kenneth, West Warwick, RI
LABOWSKY, Hsuan Lillian, Wayne, NJ
LAURION, Wes, Ilion, NY
LIGHTLE, Abby, Anna, OH
MALONEY, Deborah, Wilton, NH
MULLANEY, Daniel, Norwood, MA
PADULA, Wanda, Pennellville, NY
PRAIRIE, Sharron, Northfield, VT
SABIA, Mary, Hyde Park, NY
SANCHEZ, Jessica, Seekonk, MA
SCHMITMEYER, Laura, Fort Loramie, OH
VOSBURGH, George, Canajoharie, NY

Gateway Project to Hold Institute in Western Mass

At the Massachusetts STEM Summit this past October, the Governor's STEM Advisory Council endorsed the Gateway Project as one of seven projects recognized as a best practice in STEM education in the state of Massachusetts. The National Center for Technological Literacy(r) (NCTL(r)) founded by the Museum of Science, Boston established the Gateway Project in 2004, to assist Massachusetts school districts in deplans to implement the Massachusetts Science and Technology/ Engineering Curriculum Framework K-12. As of July 2012, the Gateway Project has reached over 425 educational leaders in 85 school districts and impacted 45% of all Massachusetts K-12 students." The Gateway Project will be holding two Summer Institutes at the Museum of Science, Boston on July 9-11, 2013 and July 23-25, 2013 and Aug. 13-15, 2013 at Westfield State University. If you would like more information on the Gateway Project or to attend one of the Gateway Institutes please call (617) 589-3100 or send an email to gateway@mos.org<mailto: gateway@mos.org> Also visit our website at http:// legacy.mos.org/nctl/ k12_gateway.php

2012 NEATEC Nanotechnology Workshop Participants **(see Director's Letter)**

Rick Jason, New Lebanon
James Brown, Shaker Rd Elem
Jody Beebie, Algonquin MS
Karren Harris, Castleton Elem
Deborah Boyce, Guilderland HS
Brook Bourgeois, Lisha Kill MS
Vaclav Sotola, Canajoharie HS
Barbara Barker, Fonda-Fultonville CSAlbert Wooten, Al, Cranston West HS, Rhode Island
Charles Nagel, S. Colonie CSD
Jason Brechko, Glens Falls MS
Kelsey Norberg, New Lebanon
CheriLyn Dempsey, S. Glens Falls
Sean Higgins, Cairo-Durham CS
Kaitlin McGann, Maple Hill HS
Thomas Vartuli, Hudson Falls HS
Tomas Krueger, Penfield HS
Tom McGreevy, Farnsworth MS
William Eipp, Broadalbin-Perth HS
Nathan Ellis, Catholic Central HS
Gwen Peterson, Catholic Central HS
Gary Gazaille, Newcomb CS

I am delighted with the experience at the Nanotechnology Institute. Today's work added more in the way of lessons that I can bring into my classroom.

Spring 2013 STEM Tuesday Seminars

STEM seminars are held at 4PM on the first and third Tuesdays of each month in Hasbrouck 138. All are welcome; no reservations are needed, and there is no charge. Parking is available in the Campus Center Garage.

February 5

Dr. Brian Lukoff

Postdoctoral Fellow, School of Engineering and Applied Sciences, Harvard University

"Using Learning Catalytics to Create an Interactive Classroom"

Peer instruction and other interactive teaching methods have been shown to dramatically improve conceptual understanding. While no technology is necessary to take advantage of these teaching methods, technology can enable the instructor to better understand student understanding, prompt students to engage in deeper thinking, and facilitate more productive student discussions in the classroom. In this talk, I will introduce Learning Catalytics, a cloud-based platform for interactive teaching that allows students to use web-enabled devices -- laptops, smartphones, and tablets -- to engage in rich, authentic tasks in class. With Learning Catalytics, instructors can go beyond clickers and other response systems to create a rich interactive environment that integrates assessment with learning.

February 19

Justin Fermann

Professor, Chemistry, UMass

"The Science of Craft"

Learning scientific principles and skills needed to understand and master the crafts of blacksmithing, ceramics, brewing, and glassblowing." I'd like to talk about what motivated the development of a GenEd curriculum that was such a radical departure from what is traditionally offered in Chemistry, the design work we did leading up to the first offering of the class, the challenges we faced in running it, and some ideas from either successes or failures that we can take away.

March 5

Richard Brady

Founder and Director of Minding Your Life; Mindfulness in Teaching and Learning

"Learning to Stop, Stopping to Learn: Discovering the Contemplative Dimension in Education"

Contemplative pedagogy is a young and growing approach in American education. It invites new possibilities for the emergence of creativity and promotes depth of understanding and a more personal relationship with course content. The path to contemplative learning is different for each educator who travels it. I will relate experiences that led me to develop a personal contemplative practice and describe how, over time, my practice affected my teaching. I will focus especially on contemplative methods I used in teaching a tenth grade mathematics course. In the process I will discuss the dimensions of centering, questioning, awareness, and community that were central to the contemplative element of the course.

April 2

Linda Slakey

Former Dean, Commonwealth College, National Science Foundation Division Director

"Improving STEM Undergraduate Education"

April 23

Wayne Kermenski

Science Teacher, Mohawk Trail Regional School District

"Project Based Learning, the Fifth Academic Class"

A few years back, Mohawk Trail Regional Middle School created a course entitled, Project Based Learning or PBL. It became one of five academic classes for middle school students. The goals for this course included inquiry-based projects that enforced skills students learned in their other courses. In addition, the course was responsible for implementing social curriculum, math and reading literacy remediation, and authentic learning opportunities. The benefits from this course included an increase in student attendance, a well-rounded education for our students, and a letter of acknowledgement from the Governor for our achievement in our MCAS math scores. Come find out about this dynamic course and learn what has been successful for us.

STEM DIGITAL Professional Development Institute

•Monday to Friday, June 24-29 at UMass Amherst
•Funded by the National Science Foundation; sponsored by the STEM Education Institute
•Middle and High School Science, Math, and Technology Teachers; teams encourages
•Participants MUST bring a digital camera, and are encouraged to bring a laptop computer
•Stipends ($375 summer, $300 school year follow-up), materials, parking, some meals
•Housing for those outside the commuting radius
•3 to 6 graduate credits available at reduced cost; free PDP's (Professional Development Points)

website: www.umassk12.net/digital

Nanotechnology Professional Development Institute

Monday to Friday, July 9 - July 13, 2012 at UMass Amherst
• Funded by the National Science Foundation
• Sponsored by the STEM Education Institute and the Center for Hierarchical Manufacturing
• Middle and High School Science, Math, and Technology Teachers
• $75/day stipends ($375 total), materials, parking, some meals
• Housing (new air conditioned dorms) for those outside the commuting radius
• 3 graduate credits available at reduced cost; free PDP's (Professional Development Points)
Website: www.umassk12.net/nano