Photo: Garden of the Gods and Pikes Peak compliments of Dr. Pat McGuire

School Science and Mathematics Association
Colorado Springs, Colorado
November 10-12, 2011

Welcome to the 110th Annual Convention of the School Science and Mathematics Association (SSMA)!

On behalf of the Board of Directors of School Science and Mathematics Association, I welcome you to the 2011 Annual Convention. We are an international organization that continues to nurture new researchers and practitioners through our meetings. We continue to have participation from outside North America.

The activities of SSMA are defined by four goals:

1. To build and sustain a community of educators and researchers in STEM fields.

2. To advance knowledge through research in science and mathematics education, and in their integration and application in the real world.

3. To inform practice through the dissemination of scholarly works in science and mathematics, in our journal, *School Science and Mathematics*.

4. To influence policy in science and mathematics education at all levels of government.

As you involve yourself in the convention, please show professional courtesy to our presenters and to other members by attending sessions, muting phones, and being supportive.

In celebrating 110 years of existence, please extend invitations to your new and experienced science and mathematics colleagues to join us.

Enjoy your time in Colorado Springs as you network with friends and new acquaintances in your field.

Don S. Balka
SSMA President

Welcome from the University of Colorado Colorado Springs
UCCS Teach Program

One Degree, Two Careers: The UCCS Teach four-year program enables students to complete a full math, physics, biology, or chemistry major, and earn a teaching license at the same time.

The UCCS Teach Program is a replication of the UTeach Institute's UTeach Program at the University of Texas Austin. There are currently 27 replication programs across the United States, two of which are in Colorado. The hallmark of the program is to steep math and science majors in real-world experiences from the outset.

Two initial courses (whose tuition is reimbursable upon successful completion) introduce UCCS Teach participants to effective math and science teaching approaches. These courses are taught under the auspices of the College of Education by experienced Master Teachers who know, firsthand, the challenges of teaching STEM subjects in public schools. In these courses, students integrate into local elementary and middle school settings, where they observe and lead inquiry-based lessons. Three later courses (taught by College of Letters, Arts and Sciences faculty) help UCCS Teach participants refine their math and science pedagogy—incorporating themes such as technology, equity, and assessment, with an exploratory lesson plan approach that goes beyond rote memorization and predetermined lab results.

Even as freshmen, UCCS Teach participants are already in the field exploring, experiencing, and teaching. This early immersion into the excitement and challenges of teaching helps students see whether the profession is a good fit for them.

Catherine A. Kelly, Ph.D.
UCCS Teach Co-Director

A Special Thank You to….

Conference Keynotes, Sponsors, and Special Events

Dr. Neil Heffernan, Associate Professor, Computer Science, Worcester Polytechnic Institute
Dr. Paul Kuerbis, Professor, Science Education, Colorado College
Dr. Ron Furstenau, Professor, Physical Chemistry, US Air Force Academy
Dr. Paul Grogger, Retired Professor, Geography, University of Colorado Colorado Springs

Dr. Mary Snyder, Dean, College of Education

The University of Colorado Colorado Springs **College of Education**
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Individual Volunteers

Ms. Victoria Skubic, MBA Intern for the UCCS Teach Program

Local Planning Committee Members

Dr. Catherine Kelly, SSMA Program Chair, Chair, Curriculum & Instruction, University of Colorado Colorado Springs
Dr. Patrick McGuire, Assistant Professor, Curriculum & Instruction, University of Colorado Colorado
Ms. Melissa Schecter, Student Services Manager, College of Education, University of Colorado Colorado Springs
Mr. David Khaliqi, Director, Center for STEM Education, University of Colorado Colorado Springs
Dr. Mary Gromko, Retired Colorado Springs D11 Science Coordinator, Retired Colorado Department of Education Science Content Specialist, Past National Science Teachers Association Board Member

Convention Overview: Thursday-Saturday

Thursday November 10	
7:30 AM – 5:00 PM	Registration Desk Open
7:30 AM – 12:15 PM	Breakout Sessions
11:45 AM -1:00 PM	Lunch Buffet is Available in the Resort Dining Room
1:00 PM – 1:40 PM	Keynote Speaker – Dr. Neil Heffernan
1:45 PM – 4:05 PM	Breakout Sessions
4:15 PM – 4:45 PM	SSMA Committee Meetings List Committees and Spaces
5:00 PM – 5:50 PM	Keynote Speaker – Dr. Ron Furstenau
6:00 PM – 7:30 PM	Welcome Reception Sponsored by the University of Colorado Colorado Springs College of Education and Wiley-Blackwell Wiley New Editor Reception

Friday November 11	
7:30 AM – 8:00 AM	SSMA Business Meeting (Grand Rivers Ballroom)
7:30 AM – 5:00 PM	Registration Desk Open
8:00 AM – 8:45 AM	Keynote Speaker – Dr. Paul Kuerbis
8:55 AM – 11:45 AM	Breakout Sessions & Workshops
Saturday November 12	
7:30 AM – 9:00 AM	Registration Desk Open
8:00 AM – 11:45 AM	Breakout Sessions & Symposiums
10:30 AM – 6:00 PM	Air Force Football Game (Optional)
12:00 PM – 1:00 PM	Lunch on Your Own
1:00 PM – 5:00 PM	Garden of the Gods Geology Tour with Dr. Paul Grogger (advance registration required)

Thursday Sessions

Sessions	
1	Location: Shoshoni 7:30-7:55AM
Title:	Supporting Cognitively Guided Formative Assessment Techniques in Elementary Mathematics
Presenter(s):	Patrick McGuire, University of Colorado Colorado Springs John Weathers, University of Colorado Colorado Springs
Description:	In this presentation, we demonstrate how a cognitively guided instruction professional development model was leveraged to support over 100 first and second grade teachers serving at-risk student populations. More specifically, we describe how this type of professional development workshop model was used to improve teachers' pedagogical content knowledge and support their ability to address and remediate students' misconceptions in key mathematical areas (e.g., addition and subtraction). Finally, we introduce and describe a new observational rubric designed to measure elementary teachers' ability to develop cognitively guided lesson plans and conduct formative assessments in mathematics.
2	Location: Arapahoe 7:30-7:55AM
Title:	Integrating Elementary Level DNA Lessons with All Content Areas
Presenter(s):	Johanna Mitchell, Hartwick College
Description:	Participants will engage with highly motivating elementary-level lesson ideas centered on the concepts and mysteries of DNA. Materials provided to participants include integrated lesson ideas in physiology and forensics, history, mathematics, reading and language arts, drama, and art. Employing children's books as a springboard, these exciting DNA lessons address national standards in several different content areas.

Sessions	
3	Location: Comanche 7:30-7:55AM
Title:	Making Math Fractals Comprehensible Through Art, Science and Literacy
Presenter(s):	Catherine Kelly, University of Colorado Colorado Springs Linda Button, University of Colorado Colorado Springs Greg Button, University of Colorado Colorado Springs
Description:	This inquiry learning based workshop will explore the concepts relating to mathematical fractals using examples found in nature, and how they can be understood using recursive and self-similarity patterns, as well as computer software. Participants will have the opportunity to construct fractals using various art media and then express the concepts through discussion, quick writes, and an inquiry summary.
4	Location: Manitou 7:30 – 7:55 AM
Title:	Recent Developments in Neuroscience and Psychology and their Implications for Teaching Science & Mathematics
Presenter(s):	Mark Malone, University of Colorado Colorado Springs
Description:	This session will summarize overlapping brain research findings from the fields of neuroscience, psychology, physics, and medicine. This growing literature is improving our understanding of how the brain works and to some extent supports the importance of inquiry and other strategies in science & mathematics education.

Sessions	
5	Location: Gunnison 7:30-7:55AM
Title:	Implementation of an introductory-level, inquiry-based laboratory using a yeast genetic screen.
Presenter(s):	Lisa Hines, University of Colorado Colorado Springs Tom Wolkow, University of Colorado Colorado Springs
Description:	Recent research emphasizes the need to incorporate active learning and inquiry-based instructional methods into the standard curriculum as a means to enhance science education. We have developed an introductory-level, inquiry-based laboratory that employs mutation and genetic screening in fission yeast (S. Pombe). This laboratory was piloted in both the UCCS Teach program and an Introductory Biology section during spring 2011. It included the development of three laboratory sessions, detailed laboratory protocols for students and teachers, student worksheets, and assessment materials. During this presentation, we will describe the laboratory sessions, instructional materials and assessment results.
6	Location: Arapahoe 8:00 – 8:25 AM
Title:	When Good Intentions and Reality Meet: Large Scale Reform of Science Teaching in Urban Schools with Predominantly Hispanic ELL Students
Presenter(s):	Carla Johnson, University of Cincinnati Virginia Jennings Bolshakova, Utah State University
Description:	This session will present an overview of the factors that work against scale-up of educational reform within a large, low-performing school district with primarily Hispanic ELLs. Specifically, this presentation will discuss the impact of mandated assessments on student learning.

Sessions	
7	Location: Comanche 8:00 – 8:25 AM
Title:	Achievement Gap: Differences in the Practices of High Schools and Science Teachers
Presenter(s):	Carol Stuessy, Texas A&M University Dane Bozeman, Texas A&M University Tori Hollas, Texas A&M University Toni Ivey, Texas A&M University Sara Spikes, Texas A&M University Ra'Sheedah Richardson, Texas A&M University Laura Ruebush, Texas A&M University
Description:	We present a model for high school science achievement and college readiness that emphasizes the intertwined roles of schools and teachers in assuring teachers' professional growth, job satisfaction, and retention. The model includes three school practices (recruitment, induction, professional development); and three teacher variables (professional activity, job satisfaction, retention). Our 5-year, state-wide, field-based study revealed differences in school characteristics important for policymakers to consider. Extreme differences existed in the co-occurrences of school- and teacher-related variables in high- and low-achieving schools in terms of (1) the size of the school; (2) and the minority student enrollment proportion of the school.
8	Location: Arapahoe 8:00 – 8:25 AM
Title:	The Benefits of Authentic Science Experiences in Professional Development
Presenter(s):	Nikki Hanegan, The University of Texas at Dallas Mary Urquhart, The University of Texas at Dallas
Description:	Science teachers often speak about the need for specialized professional development (PD) based on their educational goals and attainment. Funders however ask for grant proposals based on whole group needs assessment based on economic and efficiency drivers, resulting in a one size fits all. For the past six years, we have utilized authentic science experiences which promote individual teacher improvement and satisfy funder requirements. Our professional development research study finds that teachers receive both content and pedagogical knowledge gains resulting from authentic science experiences.

Sessions	
9	Location: Manitou 8:00 – 8:25 AM
Title:	Developing Student Academic Literacy Through a Community-Based Integrated Science and Mathematics Curriculum
Presenter(s):	Sanghee Choi, University of Memphis Angiline Powell, University of Memphis Andrea Reeder, University of Memphis
Description:	This study is aligned with reform efforts in science and mathematics education, which is to develop student academic literacy, through a community-based integrated curriculum. This curriculum combines the community's environmental issues with state standards in science and mathematics. The goals of this study are to improve student understanding of environmental science concept using lab activities and relationships between environmental, mathematical, and scientific concepts. Surveys and a case study were administered to approximately 120 students and two teachers in 7th grade from an urban charter school before and after completing the year-long project.
10	Location: Arkansas 8:00 – 8:50 AM
Title:	What Can Autobiographies Tell Us About Elementary Preservice Teachers' Experiences With Science?
Presenter(s):	Sarah Ramsey, Southern Oklahoma State University Kate Popejoy, University of North Carolina Charlotte
Description:	Narrative inquiry is helpful in understanding the meaning preservice teachers attach to their science experiences. With this in mind, we asked our preservice elementary teachers to write science autobiographies to help them understand how their experiences with science affect their attitudes toward science, interest in science, and confidence in their ability to teach science. We will present an analysis of these students' stories revealing common experiences and their associated consequences related to science teaching and learning. It is important to consider these stories; they inform the primary discourse students bring to the university and influence their experiences in our classes.

Sessions	
11	Location: Platte 8:00 – 8:50 AM
Title:	Using Venn Diagrams in STEM: Lessons from Literacy
Presenter(s):	Jeremy Winters, Middle Tennessee State University Dovie Kimmins, Middle Tennessee State University
Description:	Participants in this session will experience various ways Venn Diagrams are used in STEM and literacy. These activities can be implemented immediately into the classroom. Participants will also compare and contrast the use of Venn Diagrams in STEM and Literacy.
12	Location: Rio Grande 8:00 – 8:50 AM
Title:	Using Probeware to Analyze Classic Demonstrations
Presenter(s):	John Park, North Carolina State University
Description:	Probeware allows for the measurement of phenomena that was difficult to do before its inception. This session will use the technology to investigate the science of classic demonstrations, such as the candle under a jar, egg in the milk bottle, and air pressure in a long drinking straw. The session will include the study of the data using synchronized video of the event.

13	Location: Gunnison 8:00 – 8:50 AM
Title:	Using NAEP Items to Extend Teachers' Knowledge of Proportional Reasoning
Presenter(s):	Victor Cifarelli, University of North Carolina Charlotte Shelby Morge, University of North Carolina Charlotte Tracy Goodson-Espy, University of North Carolina Charlotte David Pugalee, University of North Carolina Charlotte
Description:	The session will describe the activities of a current NSF project that developed and implemented a set of National Assessment of Educational Progress (NAEP) learning modules for pre-service Middle Grades mathematics teachers. The goals were to help participants: Develop the necessary content knowledge to solve proportional reasoning problems; Understand students' mathematical thinking by analyzing their work on NAEP tasks; and Promote understanding of how NAEP tasks can be used to assess students' understanding of proportionality. The presentation will include: an overview of the modules; summary of the results; discussion of student; and, summary of the lessons learned from this implementation.

Sessions		
14	Location: Comanche	8:25 – 8:50 AM
Title:	Messy Mix of Math Competence and Confidence: Preservice Elementary Teachers' Attitudes and Skills	
Presenter(s):	Johanna Mitchell, Hartwick College	
Description:	Preservice elementary teachers' mathematics skills and attitudes have received substantial attention in recent journals. Many teachers enter the field unprepared to teach even the simplest sixth grade mathematics concepts. The purpose of this study was to document the relatively poor mathematics content knowledge and attitudes of preservice elementary teachers at a small liberal arts college where students receive a degree in a content area (usually sociology, history, or psychology) and take a limited number of education courses. Documenting the messy mix of competence and confidence was intended to make a case for adding an extra elementary-level math course.	
15	Location: Manitou	8:25 – 8:50 AM
Title:	Introducing Engineering into Texas State Math and Science Curricula	
Presenter(s):	Abby Perkins, Texas A&M University Carol Stuessy, Texas A&M University	
Description:	Recently, Texas educators have emphasized STEM education. Engineering is part of STEM but is rarely addressed. Earthquake engineering simulations can be used to introduce engineering into secondary level curricula. During this presentation we will discuss the results of a summer workshop, which brought teachers and engineers together. During the workshop they developed a series of instructions and examples highlighting engineering situations in math and science classrooms, varying in length and depth of material covered for each subject.	

Sessions		
16	Location: Shoshoni	8:25 – 8:50 AM
Title:	Critical Thinking Skills in Science vs. Non-Science Majors	
Presenter(s):	Cindy Adams, Lehigh University	
Description: **Session Canceled**	Anecdotal evidence suggests that science majors have better critical thinking skills than non-science majors, but is this really true? Some would argue that critical thinking is also necessary in business and many other non-science fields. Students are commonly asked to analyze primary scientific research papers even when they are non-science majors taking a science course as an elective to help meet core education requirements. This study uses a unique rubric to help determine the differences in critical thinking skills between science and non-science majors as demonstrated in their resulting scientific paper critiques.	
17	Location: Gunnison	9:00 – 9:50 AM
Title:	Teaching Science and Mathematics through Community and Culture: A Place-Based Model	
Presenter(s):	Donna Berlin, The Ohio State University	
Description:	Science and mathematics are a part of student's personal life, community, and cultural heritage. Using a community and/or cultural context as the catalyst to design integrated science and mathematics experiences may make teaching and learning more accessible, relevant, and meaningful to students. Aligned with science and mathematics curricular standards, examples of integrated science and mathematical experiences that were designed for use with Hispanic/Latino students will be described as place-based models that can be generalized to different areas of the world and diverse populations. Current and future research related to this model will be discussed.	

18	Location: Comanche	9:00 – 9:50 AM
Title:	Talking About When and Why, Not Just What and How	
Presenter(s):	Kansas Pope, Tarleton State University	
Description:	While a goal of mathematics education is to promote thinking and reasoning skills, mathematics teachers often discuss what to do and how to do it, but rarely help students determine when and why they should apply particular thoughts and strategies. This session will share findings from a study that looked at how a mathematics instructor promoted metacognitive development in her mathematics content course designed for pre-service elementary teachers, while also discussing the potential impact this metacognitive development could have on the future students of these pre-service teachers.	

Sessions	
19	Location: Shoshoni 9:00 – 9:50 AM
Title:	Summer Fun! The Design and Impact of a Summer Math/Science Teacher Academy
Presenter(s):	Suzanne Nesmith, Baylor University Sandi Cooper, Baylor University
Description:	Recognizing that many elementary teachers struggle with perceived or actual mathematics and science content and pedagogical limitations led us to design and share a summer academy. The academy was aimed at assisting teacher participants in confronting and addressing their possible alternative math/science conceptions as well as their varied perceptions towards the same. By sharing and modeling these activities in an inquiry oriented manner, our goal was to simultaneously address content, pedagogy, and perceptions while also allowing for immediate transfer to the elementary classroom. The design of the academy as well as participants' reflections will be shared.
20	Location: Comanche 9:00 – 10:15 AM
Title:	The Impact of STEM PBL on Women's Scores, Retention, and Course Choice.
Presenter(s):	Rayya Younes, Texas A & M University Robert M. Capraro, Texas A & M University
Description:	Women are underrepresented in STEM fields and their attrition from the STEM pipeline begins in high school. A four-year longitudinal study was conducted in a school where STEM Project Based Learning was introduced. Data from high-stakes test scores, course taking patterns, and retention were examined. The results indicated that these women's scores improved in mathematics and science and more women opted to take physics than men. Moreover, women's attrition was lower than men's and decreased markedly after the introduction of STEM PBL to the classrooms. STEM PBL looks promising for improving women's participation in STEM.

Sessions	
21	Location: Arkansas 9:00 – 10:15 AM
Title:	Bringing Best Practices into the Science Classroom
Presenter(s):	Joanne Smith, Educational Consultant and Author Sharon Johnson, Educational Consultant and Author
Description:	Our presentation models the integration of best practices of science instruction; inquiry based learning, literacy integration, and embedded assessments, into science lessons. In this model, students become active participants in the learning process. As students read, write, calculate and communicate in the context of science, they not only deepen their conceptual understanding but also improve their literacy and math skills. An example from a new middle school physical science curriculum will be shared.
22	Location: Platte 9:00 – 10:15 AM
Title:	Teaching and Learning with Concrete and Virtual Manipulatives (GeoGebra ™)
Presenter(s):	Erol Uzan, Indiana University Shelly Sheats Harkness, University of Cincinnati
Description:	The significance of using concrete manipulatives for some mathematics problems cannot be overstated. Using concrete materials is helpful for understanding abstract concepts (McNeil & Jarvin, 2007; Vinson, 2001). Although the National Council of Teachers of Mathematics recommends their use at all grade levels, manipulatives are frequently used by students in grades K-8 but not in high school courses (Hartshorn & Boren, 1990). Participants will explore a problem posed in a high school classroom. We will discuss the implications of using both concrete and virtual manipulatives (using GeoGebra ™) with students.

Sessions	
23	Location: Rio Grande 9:00 – 10:15 AM
Title:	Students Saving The World - Using Scenario Based Learning to Deepen Student Engagement
Presenter(s):	David Khaliqi, University of Colorado Colorado Springs
Description:	It is well documented that interest in STEM subjects drops as students progress through high school. The Center for STEM Education, through the Jumpstart-STEM summer workshop attempts to address this decline in student interest by developing several immersive, scenario based learning workshops using open inquiry strategies. Data is collected analyzing changes in student science motivation, confidence, knowledge, and social niche. In addition, gender differences in problem solving strategies are observed. Data, strategies, and lessons learned from two iterations of Jumpstart will be shared in this workshop about scenario-based learning.
24	Location: Manitou 9:10 – 9:35 AM
Title:	Function-Based Algebra Effects on Student's Conceptual Understanding of Function
Presenter(s):	Bowen Brawner, Tarleton State University
Description:	This research investigated the effect of a function-based approach to algebra on the achievement and understanding of academically disadvantaged students. The study followed an action research model and included both quantitative and qualitative components. The subjects were students in a large suburban high school that had been identified as at-risk for failing Algebra I. The qualitative data consisted of interviews with selected students in the treatment and control group. From the interview evidence, the results to the question "What is a function?" will be shared to gain insight into the treatments effects on students' understanding of the function concept.

Sessions	
25	Location: Arapahoe 9:10 – 9:35 AM
Title:	Critical Classroom Discourse Analysis of Single-Sex Mathematics and Science Classrooms
Presenter(s):	Megan Che, Clemson University Elaine Wiegert, University of South Carolina Upstate
Description:	In this session we present findings from a critical classroom discourse analysis of single-sex mathematics and science middle grades classrooms at a charter school in the southeast. One mathematics teacher and one science teacher participated in this case study, which sought to uncover ways in which discourse in single-sex mathematics and science classrooms acts to constrain, to privilege, and to marginalize. In this session, we share transcript excerpts and details of our analysis processes.
26	Location: Comanche 9:50 – 10:15 AM
Title:	Effect of Computer Assisted Instruction on Preservice Teachers' Algebra Misconceptions
Presenter(s):	Cheng-Yao Lin, Southern Illinois University Carbondale
Description:	This study was to investigate the effectiveness of computer assisted and traditional instruction on preservice teachers' algebra misconceptions. Students' knowledge of algebra was measured using an Algebra Misconception Test. One of the classes was randomly assigned as the experimental group (n = 21) instruction was based on computer-assisted instruction and the other class was assigned as a control group (n = 20) instruction was based on traditional instruction. The analysis of results showed a statistically significant difference between the experimental and control groups' posttest mean scores in favor of the experimental group.

Sessions		
27	Location: Manitou	9:50 – 10:15 AM
Title:	Anxiety Towards Teaching Mathematics and Science: Correlation, Prevalence, and Intensity	
Presenter(s):	Fuchang Liu, Wichita State University	
Description:	This study investigated the correlation, prevalence, and intensity of preservice elementary teachers' anxiety towards teaching mathematics (ATTM) and anxiety towards teaching science (ATTS). It was found that those who are anxious about teaching mathematics are also anxious about teaching science and that their anxieties are prevalent and intense. It is suspected that their ATTM and ATTS are just manifestations of a common form of anxiety. It suggests that if elementary education majors get to choose what they will teach, they will likely choose the subject area that they are the most comfortable with and feel the least anxious about.	

28	Location: Arapahoe	9:50 – 10:15 AM
Title:	Exploring In-Service Teachers' Perceptions of Student Attributions in Mathematics	
Presenter(s):	Melanie Shores, The University of Alabama Birmingham Tommy G. Smith, The University of Alabama at Birmingham Jeremy Zelkowski, The University of Alabama John Dantzler, The University of Alabama at Birmingham	
Description:	In-service teachers were selected from universities in southern Alabama who were majoring in mathematics education, currently enrolled in a mathematics methods course, and, were currently teaching in a K-12 school. Participants completed a Mathematics Attribution Scale, which asked them to consider the relation that certain factors have relative to students' success and failure in mathematics. In order to examine in-service teachers' perceptions of students' attributions each attribution factor will be examined and frequencies will be calculated. Open-ended responses will be categorized into common themes and then percentages will be calculated for each occurring them.	

Sessions	
29	Location: Shoshoni 10:20 – 10:45 AM
Title:	A Latent Growth Model: Longitudinal Investigation of Student Achievement in Mathematics and Science
Presenter(s):	Sevket Ceyhun Cetin, Texas A&M University Mehmet Sencer Corlu, Texas A&M University Mary Margaret Capraro, Texas A&M University Robert M. Capraro, Texas A&M University
Description:	The relationship between mathematics and science is generally validated by common sense. There is a need to empirically show how student growth is affected during students' transition to high school when the role of mathematics in science courses increases considerably. The purpose of this study is to investigate the causal relationship between mathematics and science objectives that are tested in state-wide student achievement exams in Texas, USA and how this relationship changes over the high school years.

30	Location: Manitou 10:20 – 10:45 AM
Title:	A Comparative Study of the Effects of Combinations of Hands-On and Computer-Based Instructional Strategies on Elementary Students' Understanding of the States of Matter
Presenter(s):	Tzu-Ling Wang, National Hsinchu University of Education Yi-Hui Li, National Hsinchu University of Education Wei-Hsin Chan, National Hsinchu University of Education James A. Shymansky, University of Missouri St. Louis
Description:	This study will compare the effectiveness of three teaching methodologies: a hands-on activities method, a computer-based activities method, and a combined hands-on activities and computer-based activities method on students' understanding of changes in the three states of matter (specifically, water). One teacher will be trained in the three instructional methods after which he/she will implement the different methods to a group of 105 third grade students for 8 weeks: ~35 of whom will study the states of matter via the hands-on method; ~35 of whom will study via the computer-based method; and ~35 of whom will learn via the combined hands-on/computer-based method. Students' understanding of the changes in the states of water will be assessed from students' pre- and post-test responses to items on a concept test consisting of multiple-choice and constructed-response items and a follow-up interview focused on the constructed-response items. Pre and post-test written responses to the constructed- response items and video recordings of the follow-up interviews will be assigned an identification code to facilitate blind-scoring of the student.

Sessions	
31	Location: Rio Grande 10:20 – 10:45 AM
Title:	Elementary Teachers' Definitions and Characterizations of "Good" Mathematics Teaching
Presenter(s):	Heidi Higgins, University of North Carolina Wilmington Shelby P. Morge, University of North Carolina Wilmington Ginger Rhodes, University of North Carolina Wilmington
Description:	Pre-service elementary teachers often describe what "good" mathematics teachers do by stating they engage children in activities that are fun and use hands-on materials. This study investigated whether these perceptions of "good" teaching related to their beliefs about mathematics as a discipline and what it means to be proficient at mathematics. Data consisted of surveys from students enrolled in an elementary mathematics pedagogy course. These results indicated an association between their definitions of mathematics and perceptions of "good" mathematics teaching. We will share our findings and offer suggestions for mathematics and teacher education courses.
32	Location: Arkansas 10:20 – 10:45 AM
Title:	Effects of Standardized Testing on Science in the Elementary Classroom
Presenter(s):	Mary Sowder, Utah Valley University Stan Harward, Utah Valley University Elaine Tuft, Utah Valley University
Description:	Elementary teachers often receive inconsistent messages from national and local officials about the value of science instruction relative to the value of teaching subjects emphasized on standardized tests. This study looks at practices of elementary science teaching as sampled in the classrooms of 179 K-6 teachers across ten U.S. school districts in the Intermountain West. Results of this investigation confirm earlier studies about the inconsistent amounts of time and resources devoted to science instruction in elementary classroom, and call into question elementary teachers' notions about the effect of devoting class time to science teaching on measures of annual yearly progress.

Sessions	
33	Location: Platte 10:20 – 10:45 AM
Title:	Effective lessons: Comparing teacher definitions and lesson descriptions
Presenter(s):	Gil Naizer, Texas A&M Commerce Becky Sinclair, Texas A&M Commerce Mark Reid, Texas A&M Commerce
Description:	Teachers in a professional development program were asked to give characteristics of an effective lesson. Additionally, they were asked to describe a lesson they had taught that they thought was effective. This study will present a comparison of the teacher definitions of effective lessons and the lesson descriptions they provided. Qualitative data analysis indicated a mismatch between the definitions and descriptions of effective lessons.
34	Location: Gunnison 10:20 – 10:45 AM
Title:	Does Teacher Professional Development Make a Difference? Assessing Online Inquiry and Discourse
Presenter(s):	Cheryl Ann Peterson, Texas A&M University Carol L. Stuessy, Texas A&M University
Description:	Web 2.0 technologies supported students' authentic inquiry experiences in an online-mentored inquiry platform developed by a scientific society. The platform enabled students to engage and interact with others, including scientist mentors, in authentic scientific practices. The Online Elements of Inquiry Checklist was used to evaluate online interactions of students. While some students' teachers had professional development opportunities to prepare them to use the platform, other students' teachers signed up online without professional development support. Data from the online interactions of students from the two types of teachers were compared to assess the value of the immersive workshop experience for teachers.

Sessions		
35	Location: Arapahoe	10:20 – 10:45 AM
Title:	Supporting Secondary Math and Science Instruction with Intelligent Tutoring Software	
Presenter(s):	Patrick McGuire, University of Colorado, Colorado Springs	
Description:	This presentation demonstrates how a free, university-based, online intelligent tutoring system, ASSISTments (www.assistments.org), can be leveraged to support secondary math and science classrooms. We model how teachers can use the system to create their own content, modify existing content, and assess their students' progress using real-time, data-driven instruction reports. We also demonstrate how the system supports students' learning by providing detailed scaffolding and hint messages for each sub-step of a given problem. Anyone with an interest in middle/secondary math or science, educational technology, or data-driven instruction is encouraged to attend this presentation.	
36	Location: Arkansas	10:55 – 11:45 AM
Title:	Shadows That Enlighten	
Presenter(s):	Darlinda Cassel, University of Central Oklahoma Dan Vincent, University of Central Oklahoma	
Description:	This presentation is about fifth grade students' exploration of shadow lengths and using i-Touches. They were given the task of measuring and recording their shadow lengths throughout the school year. The change in shadow lengths prompted many questions, which lead to several discussions about measurement, data collection, and seasons. The researchers brought in i-Touches to help the fifth graders figure out why the shadow measurements changed. The students used the Planet App to see the sun' shadow cast on the earth on the dates that they took measurements. The researchers will discuss the task, and the students' explorations.	

Sessions		
37	Location: Platte	10:55 – 11:45 AM
Title:	Safety First!	
Presenter(s):	Janet B. Williams, Youngstown State University Dana R. Vlock, Youngstown State University	
Description:	Attention to safety standards and the safety of individuals, groups of students, and live animals in the classroom are critical to high-quality science instruction. An online module, entitled Safety in the Science Classroom, will be presented that includes pedagogical and professional knowledge, skills and dispositions science educators need when addressing legal, safety, and ethical issues in their classrooms. Safety in the Science Classroom is designed for pre- and in-service science educators to meet NSTA's current standards on safety and school science instruction. The module, including assignment descriptions and assessment instruments, will be available for all session participants.	
38	Location: Rio Grande	10:55 – 11:45 AM
Title:	Reflective Dialogue as a Tool for Navigating Pre-service Elementary Teachers' Identity Development	
Presenter(s):	Sarah Quebec, Texas Christian University Mark Bloom, Texas Christian University	
Description:	This presentation explores struggles pre-service teachers face when negotiating their dual roles of student and teacher while simultaneously reevaluating their views of these roles. In a science course for elementary teachers, the students' and instructor's contradictory views of work quality exposed pre-service teachers' lack of understanding about knowledge and skills necessary to teach children and their inability to discern instructor expectations. Reflective dialoguing helped pre-service teachers recognize how their work presented content knowledge of a typical K-12 student and failed to demonstrate necessary teacher knowledge. This experience provides insight for teacher educators about helping pre-service teachers navigate this identity development.	

Sessions		
39	Location: Arapahoe	10:55 – 11:45 AM
Title:	Model Inquiry Design	
Presenter(s):	Mehmet Ayar, Texas A&M University Niyazi Erdogan, Texas A&M University Baki Cavlazoglu, Texas A&M University	
Description:	Our main purpose is to introduce an innovative instructional model. Our framework is first shaped by our personal reflections on scientific investigations. Then we propose a model for science teachers along with 21th century skills. Our model has two dimensions. One is to offer professional development workshops for science teachers who will be immersed in a scientific investigation process. They will be encouraged to read, articulate, and discuss the relevant articles about open inquiry. Two exemplars provided will be a means for them to design their own model. At the second dimension, they will implement their model in their regular classroom instruction. Thus, participating teachers and we will further understand that their model is alternative to differentiate science instruction.	
40	Location: Gunnison	10:55 – 11:45 AM
Title:	Professional Development of High School Teachers: A Georgia US DOE MSP Project	
Presenter(s):	Gregory Chamblee, Georgia Southern University Sharon Taylor, Georgia Southern University	
Description:	This session will discuss content knowledge, curriculum, and assessment changes of high school mathematics teachers as they implemented the new Georgia Performance Standards courses in their classrooms. Relationship to Common Core Standards implementation in GA also will be noted.	

Sessions	
41	Location: Comanche 10:55 – 11:20 AM
Title:	Assessment of a Summer Statistics Course
Presenter(s):	Judy Beauford, University of the Incarnate Word
Description:	This is a description and analysis of a course in Correlational Research offered in a summer term format. A student survey and instructor give some insight into the effective strategies for using this elective to increase graduate and doctoral abilities in quantitative analysis and presentation.
42	Location: Manitou 10:55 – 11:20 AM
Title:	P-12 Robotics Competitions: Building More than Just Robots
Presenter(s):	Anita Welch, North Dakota State University Douglas Huffman, University of Kansas
Description:	This presentation will begin with a vignette of a typical robotics build process and competition in high schools. Following the vignette, we will review the key components of the design, build, and competition process. The robotics competitions discussed in this presentation are designed to build awareness and interest in science and engineering in middle and high school students by providing challenging and engaging learning opportunities in a setting that inspires students to pursue careers in science and technology in the same way professional sports inspires young people to pursue careers as professional athletes. We will look closely at how the competitions engage students in the engineering design process and in the application of mechanical and electrical engineering skills. In addition, we will also examine how the competitions encourage the use of computer programming, social media applications, and entrepreneurship and marketing techniques. The presentation will also explore the role of technical mentors, both before during and after competitions.

Sessions	
43	Location: Shoshoni 10:55 – 11:20 AM
Title:	An Innovative Approach in Providing Authentic Inquiry-Teaching Experiences for Pre-service Science Teachers
Presenter(s):	Julie Angle, Oklahoma State University Donald French, Oklahoma State University
Description:	Pre-service science teachers are often unaware of how to create or conduct quality, inquiry-based lessons. To increase this skill among pre-service science teachers, the biology department and the secondary science education department collaborated on providing pre-service science teachers with experiences in teaching through inquiry. While enrolled in a science methods course, students spend three hours a week facilitating a freshmen biology lab that is taught through an inquiry lens. Each week while biology students are confronted with a lesson that is organized around a scenario, pre-service teachers facilitate students in the learning process while they themselves learn inquiry-teaching strategies as they mirror the graduate-student lab instructors.
44	Location: Comanche 11:20 – 11:45 AM
Title:	Pre- Service Science Teachers' Inquiry Implementation: Mixed Methods Design Applying Demographics and Beliefs.
Presenter(s):	Patricia O'Donnell, Lehigh University Lynn Columba, Lehigh University
Description:	The presentation will discuss the final mixed method statistical analysis of a dissertation investigation to differentiate between inquiry teaching and learning of two types of pre-service teachers including their pre-conceived beliefs' affects on the capacity and propensity to teach inquiry-based science. Through collaborative partnerships research examined which pre-service teachers were most likely to utilize inquiry-based instruction. Findings assist in development and insight into advancing teacher preparation programs, while keeping teacher demographics in mind. Inquiry-based teaching is imperative to enhance science literacy and the science workforce. Statistical analysis facilitates increased comprehension about shortfalls in today's science inquiry teaching.

Sessions	
45	Location: Manitou 11:20 – 11:45 AM
Title:	K9 – Just Dog-gone Mental Math Fun!
Presenter(s):	Peggy Moch, Valdosta State University
Description:	The rule of nines or the casting out of nines has provided mathematicians and bright students with hours of recreational as well as investigational mathematical fun over the years. A colleague's daughter discovered a delightful connection to the patterns associated with the multiplication facts for nine expanded to include factors using 19 during a casual father-daughter walk outside one evening. We expanded this observation to show that any two digit number ending in nine follows a generalized pattern providing for an almost trivial mental calculation.

LUNCH	11:45-1:00 PM (Available in the Resort Dining Room)

Grand Rivers Ballroom 1:00-1:40 PM

KEYNOTE

ASSISTments: A TestBed for Conducting Web-Based Research on What Works to Help Students Learn

Dr. Neil Heffernan, Worcester Polytechnic Institute

Associate Professor of Computer Science and Co-Director of the Learning Science and Technologies PhD Program

BA, Amherst College, Computer Science & History *Summa cum laude* (1993)
MS, Carnegie Mellon University, Computer Science (1997)
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After graduating from Amherst College, Dr. Neil Heffernan joined Teach for America and taught middle school in inner-city Baltimore. Two years later, he pursued a PhD in computer science at Carnegie Mellon University building intelligent tutoring systems. Neil works with teams of researchers, graduate students, and teachers to build and use the ASSISTments web-based question answering platform, currently used by over 10,000 students a year, as part of their normal math class. You may learn more about ASSISTments at:

http://teacherwiki.assistment.org/

Sessions		
46	Location: Gunnison	1:45 – 2:10 PM
Title:	Tale of Two Cities: Complementary or Differing Views of the Students and Teachers	
Presenter(s):	S. Asli Ozgun-Koca, Wayne State University Thomas Edwards, Wayne State University	
Description:	The main goal was to analyze mathematics teachers' and students' initial opinions of TI-Nspire. We asked 19 preservice teachers, 26 inservice teachers, and 56 middle school students to reflect on the novel capabilities of TI-Nspire. Our main data collection methods include a survey with open-ended questions for teachers and surveys with Likert type and open-ended questions for students. Both students and teachers saw the advantages for students' learning of graph manipulation and linked representations. Students were more likely than teachers to discuss the learning curve involved, but they were also more likely to discuss being able to enhance students' understanding.	
47	Location: Arapahoe	1:45 – 2:10 PM
Title:	The Standards for (Student) Mathematical Practice Support Science Education	
Presenter(s):	Suzanne Mitchell, National Council of Supervisors of Mathematics	
Description:	The Standards for Mathematical Practice in the Common Core Mathematics Standards describe varieties of expertise that mathematics and science educators should seek to develop collaboratively in their students. These practices spring from processes and proficiencies that support problem solving, communication, competence, conceptual understanding, procedural fluency, modeling, precision, and habitual inclinations to see mathematics as sensible and useful in the science and mathematics world. This interactive session will explore the eight mathematical practices as applied to the classroom and will help science and mathematics teachers see the importance of applying these to produce mathematically proficient students.	

Sessions	
48	Location: Comanche 1:45 – 2:10 PM
Title:	The Professional Development STEM Teachers Using Classroom Based Research
Presenter(s):	Arthur White, The Ohio State University Donna F. Berlin, The Ohio State University
Description:	Individual teachers, as professionals, can facilitate systemic change. We propose a professional development program focused upon professionalization of teachers through practical research related to the teaching and learning in their own classrooms with collaborative support of partners from higher education. Teachers can be agents of educational change when provided with the opportunities and resources needed. Schools should support continued teacher development and their need to obtain and practice the skills of reflection and inquiry. This session will report on the implementation of action research in the preservice teacher preparation in mathematics, science, and technology education. Preservice teacher attitudes and perceptions related to educational research were explored. These preservice teachers valued educational research at the onset and completion of the program. There was a significant change in preservice teacher attitudes and perceptions related to efficiency and difficulty in doing educational research. Preservice teachers generally perceived classroom-based inquiry as requiring a great deal of time and effort. They realized that the planning and implementation of classroom-based inquiry was more difficult than expected. These perceptions comprise a more realistic view of what is required for classroom-based inquiry. As the teachers became more involved in action research they became more aware of their values and expectations for their students. This awareness and the association of the teaching strategies and materials used should help them develop a deeper understanding of learning.
49	Location: Manitou 1:45 – 2:10 PM
Title:	Program (Size) Does Matter: Replicating a Large-Scale Program at a Small University
Presenter(s):	Catherine Kelly, University of Colorado Colorado Springs Patrick McGuire, University of Colorado Colorado Springs Pam Peszek, University of Colorado Colorado Springs Tom Fritz, University of Colorado Colorado Springs
Description:	The purpose of this presentation is to demonstrate how a considerably smaller institution with fewer resources can create a successful replication of the UTeach model. Specific highlights will include initial set up, hiring of staff and master teachers, course development, establishing a presence on campus, and overall recruitment and marketing.

Sessions		
50	Location: Arkansas	2:15 – 2:40 PM
Title:	Learning to Integrate Math and Science: An Assignment for Elementary Preservice Teachers	
Presenter(s):	Sandi Cooper, Baylor University Suzanne Nesmith, Baylor University	
Description:	With the goal of providing an experience teaching an integrated lesson during field experiences, two methods instructors crafted an assignment that required the integration of mathematics and science. Preservice teachers were asked to develop a 4-day lesson plan, using the 5E model, focused on a science concept designed for their age group and integrating mathematics concepts that were appropriate. After two semesters of requiring this assignment, the instructors have great insight to share about the lesson plans, observations of actual lessons taught, working with classroom teachers, and the impact on preservice teachers.	

51	Location: Rio Grande	2:15 – 2:40 PM
Title:	Supporting the Development of Mathematical Habits of Mind Through Mathematical Immersion	
Presenter(s):	Trena Wilkerson, Baylor University	
Description:	Engaging mathematics teachers and aspiring researchers in relevant mathematical explorations that support the development of habits of mind and provide opportunities to "discover" significant concepts as mathematicians is an aspect of graduate education that has found recent interest. The purpose of this session will be to share an example of such an experience and the impact on student mathematical thinking and practice as mathematics educators. During the course students explored mathematical investigations, submitted on-line and weekly project journals, and completed mathematical research projects. Findings will be shared relative to the development of mathematical habits of mind along with sample problems/projects.	
52	Location: Gunnison	2:15 – 2:40 PM
Title:	E-Learning and Interdisciplinary Principles for Grades K-8	
Presenter(s):	Uzma Nooreen Maherally, University of Cincinnati	
Description: **Session Canceled**	Educators are introduced to a free website with exciting ways to engage students in learning centering on facts and concepts that are consistent with the standards endorsed by the National Science Teachers Association as well as the American Association for the advancement of science STEM Benchmarks. Educators are informed about how this non-profit tool engages "edu"-tainment principles to enhance the classroom, home, or after school setting with games, standards-based curriculum, lesson plans, a blog for teachers, skill/drill area, home activities and a career section. Opportunities for student success reports as well as professional development certificates are available.	

Sessions	
53	Location: Arapahoe 2:15 – 2:40 PM
Title:	Writing for Understanding in Mathematics
Presenter(s):	Bob Drake, University of Cincinnati
Description:	Writing can be used to develop understanding of troublesome mathematics concepts. This session will discuss useful types of writing, and provide samples of student work that reveals how understanding develops – both for the teacher and for students -- via the use of writing.
54	Location: Comanche 2:15 – 2:40 PM
Title:	Using Comedy to Facilitate Conceptual Understanding
Presenter(s):	Kenneth Miller, Montana State University Georgia Cobbs, University of Montana Edith Gummer, Education Northwest
Description:	Scientifically based cartoons offer a wonderful way to introduce concepts that are commonly found in secondary curricula. Our presentation will be a fun-filled, engaging presentation involving many laughable moments that we will tie into the teaching of the specific concept in science.

55	Location: Manitou 2:15 – 2:40 PM
Title:	Mixed Up: Confusing Language in Science and Mathematics
Presenter(s):	Sandra S. West, Texas State University San Marcos Sandra T. Browning, Texas State University San Marcos
Description:	English is one of the more difficult languages to learn partly because it is replete with homonyms and homophones. While preparing a new professional development model, *Correlated Science and Math*, the problem of confusing language with synonyms and homonyms arose as teams of science and mathematics instructors planned correlated lessons. The first confusing word that caught our attention was "motion" when the physics instructor observed that, while planning the motion lesson, the mathematics instructor used the word differently. When quizzed, the mathematics instructor provided a different definition from the way science uses the term "motion." Subsequently, participating teachers and instructors have discovered additional confusing words during instruction and classroom observations. For example, the homonym "constant" in science means a variable that is kept the same throughout an investigation that can be comparative or experimental design. In math, a constant is a value that does not change, but can be represented by a letter. Through rich conversations between science and mathematics instructors and teachers, confusing language can be identified and clarified for everyone, including students. We are continuing to identify confusing words and are compiling a dictionary, *Mixed Up Words: Confusing Language in Science and Mathematics*.

Sessions	
56	Location: Arkansas 2:45 – 3:10 PM
Title:	Undergraduate Research in Chemistry: Authentic and Original
Presenter(s):	Molly Weinburgh, Texas Christian University
Description: **Session Canceled**	Each year, thousands of undergraduate science students participate in research activities; many of these are funded through NSF. Faculty and administrators assert undergraduate research as a powerful form of educational experience, yet Seymour, et al (2004) claim that there is little evidence to support these beliefs. The purpose of this phenomenological study was to understand the authentic research experience in chemistry of six sophomore students. Pre/post interviews, a mid-term focus group, and researcher observations served as data. From transcripts significant statements (Moustakas, 1994) were mined and meaning units/themes were created. Results and conclusions will be reported.
57	Location: Platte 2:45 – 3:10 PM
Title:	The Effects of Multiple Linked Representations: An Analysis of Clinical Interviews
Presenter(s):	Thomas Edwards, Wayne State University S. Asli Ozgun-Koca, Wayne State University
Description:	The main goal was to gain a better understanding of students' learning processes when TI-Nspire is used to support a lesson. To do so, we conducted clinical interviews in which pairs of students worked through the three activities aimed at understanding the individual effects of the coefficients a, b, and c in the quadratic function. Student pairs completed the activities under the guidance of one of the researchers. The clinical interviews were videotaped, and the videos were transcribed. Analysis of the videotapes and their transcriptions revealed that students' use of multiple representations that are dynamically linked strengthened their learning.
58	Location: Platte 2:45 – 3:10 PM
Title:	The Primacy – Recency Effect: How the Brain Learns Mathematics
Presenter(s):	Catherine Kelly, University of Colorado Colorado Springs Patrick McGuire, University of Colorado Colorado Springs
Description:	The focus of this interactive presentation is to highlight the primacy-recency effect in learning in mathematics and science at all levels. Memory compatible lessons, writing, cognitive closure, appropriate homework practices, multiple intelligences, and differentiation will be interactively presented.

Sessions		
59	Location: Comanche	2:45 – 3:10 PM
Title:	A Coordinated, Multi-Dimensional K-12 STEM Outreach for Southern Colorado	
Presenter(s):	Tracey Tomme, Challenger Learning Center of Colorado Billy Crisler, United States Air Force Academy	
Description:	Colorado has a wealth of formal and informal STEM education opportunities. Under our Coordinated Outreach effort, USAFA and Challenger have come together to support and promote quality STEM programs to school and after-school groups. We will present the variety of community partners, programs, and audiences we work with as well as the data to date that we have collected.	
60	Location: Manitou	2:45 – 3:10 PM
Title:	CSI Paleontology: Using Trace Fossils to Incorporate Mathematics into Mesozoic	
Presenter(s):	Renee Clary, Mississippi State University James H. Wandersee, Louisiana State University	
Description:	Although body fossils reveal organisms' morphologies, trace fossils or ichnofossils (e.g. tracks, burrows) supply details about movement, speed, and environment. Trace fossils also provide opportunities to integrate mathematics into science classrooms. Using human constructivism principles, we designed an ichnofossil investigation that required students to 1) calculate their preferred and maximal gait speed; 2) determine relative mass from footprint size; 3) use formulas to estimate dinosaurs' speeds/masses through tracks, and 4) construct accurate campus trackway displays. Mathematical formulas were adjusted according to grade and student skill levels. Students successfully completed tasks, demonstrated learning gains, and exhibited creativity in trackway solutions.	

Sessions		
61	Location: Shoshoni	2:45 – 3:10 PM
Title:	Cooperative Learning Strategies to Improve College Geometry Instruction	
Presenter(s):	Dixie Metheny, Montana State University	
Description:	The presentation concerns a study of the use of cooperative learning and differentiated instruction in teaching geometry to prospective secondary teachers of mathematics. More specifically, the focus of the study was to determine which grouping strategies contribute most effectively to college geometry instruction. Both heterogeneous and homogeneous cooperative groups were used successfully; the type of group being determined by the material being taught. The results have implications for college geometry instruction, as well as for other college math courses.	
62	Location: Arkansas	3:15 – 4:05 PM
Title:	Engaging Parents to Increase Student Achievement	
Presenter(s):	Mark Montgomery, Baylor University	
Description:	Parental involvement tends to drop off once students reach middle schools. This session will explore research conducted by the presenter in relation to the perceptions of parents regarding their own involvement in mathematics instruction.	

Sessions	
63	Location: Platte 3:15 – 4:05 PM
Title:	Mathematics of the Mesa – Shape, Color, and Design
Presenter(s):	Patricia Jordan, Oklahoma State University
Description:	This paper presents a discussion of the geometry of the mesa dwellings from the dimensions of the kivas, to the arrangements of the living spaces, to an exploration of archeological discoveries, to a discussion of the painted pottery designs that are specific to a variety of Native American cultures. Patterns existing in the woven rugs and bead-work designs will also be explored through a mathematical lens. Suggestions for activities to utilize the concepts with middle and high school students will also be included in the presentation.
64	Location: Rio Grande 3:15 – 4:05 PM
Title:	Preparing Secondary Students for College Readiness in Mathematics
Presenter(s):	Robert Thomas, Eastern Kentucky University Cheryll Crowe, Eastern Kentucky University Nancy Blue Williams, Eastern Kentucky University
Description:	New state legislation enacted in 2009 mandates college and career readiness for all secondary students in the commonwealth of Kentucky. In late summer 2009, the mathematics education team from Eastern Kentucky University met with teachers and administrators at a regional school district to develop and implement pilot "transition to college" mathematics courses. The pilot program centered on a framework of content and concepts roughly aligned with the developmental courses at the university that were adapted to the specific needs and conditions of the high schools. In its second year, the College Readiness Initiative has expanded to over 40 school districts in Kentucky serving more than 120,000 high school students. This presentation will trace the origins of this highly successful initiative and highlight the unique components that led the project to be named "A Best Practice in Kentucky Schools" by the Kentucky Commissioner of Education.

Sessions		
65	Location: Gunnison	3:15 – 4:05 PM
Title:	SLLC-The Science Living and Learning Community at St. Mary's University	
Presenter(s):	Mary Wagner-Krankel, St. Mary's University	
Description:	The Science Living and Learning Community (SLLC) at St. Mary's University in San Antonio is a special residential learning community where STEM majors, freshman through seniors, are housed in a single dorm. Entrance requirements for the dorm, special programs developed for the dorm, and emerging outreach activities associated with the dorm will be discussed. Positive results of the SLLC on recruitment and retention will also be addressed.	
66	Location: Arapahoe	3:15 – 4:05 PM
Title:	Creating Interactive PowerPoint Presentations	
Presenter(s):	Chuck Emenaker, University of Cincinnati - RWC	
Description:	Are you a K – 16 teacher and use or want to use PowerPoint in your classes? Are your presentations linear progressions, moving from one slide to the next with no flexibility to allow for side branches when students present questions? Learn some ideas for creating PowerPoint presentations that allow the flexibility to flow in different directions based on your students' responses. We will also look at how PowerPoint presentations can be used for assessment and other classroom applications. Online Power Point instructions and examples will be made available to all participants.	

Sessions	
67	Location: Comanche 3:15 – 4:05 PM
Title:	Better Together: Why it Matters That You Are Here
Presenter(s):	Carolyn Riley, Northern Illinois University Linda Figgins, Judson University
Description:	This session will focus on the practices in our courses that have helped pre-service candidates become effective teachers. In this session, we will explore how working together has strengthened our programs. We will identify the role of SSMA as one of these important influences. We will discuss how working together as a team influenced the pre-service courses we teach and show how current research on pre-service programs supports the implementation of those practices. We will end by asking you to reflect on the things that have strengthened your courses and how you can work with colleagues to continue to grow.
68	Location: Manitou 3:15 – 4:05 PM
Title:	Impacting At-Risk Students with an Innovative Interdisciplinary Algebra I/ Biology I Course
Presenter(s):	Tiffany Neill, University of Oklahoma Timothy Laubach, University of Oklahoma Levi Patrick, University of Oklahoma
Description:	We will share our experiences in piloting an interdisciplinary Algebra I/Biology I course for minority, at-risk students, at a turnaround high school in a large city in the South Central United States. Participants were randomly selected from a pool of students who failed the state's 8th grade Criterion Reference Test in mathematics and science. The course incorporated teacher-developed, authentic guided inquiry lessons that followed the 5E model of instruction. We will share student assessment results and teacher reflections, present some of the lessons, and connect participants to a free website where they can download the lessons.

Sessions	
69	Location: Shoshoni 3:15 – 4:05 PM
Title:	How Policy Has Influenced Teacher Professional Development in Curriculum, Instruction, and Assessment
Presenter(s):	Mary Gromko, University of Colorado Colorado Springs Nancy Kellogg
Description:	With the greater emphasis on STEM education policies, this presentation will share strategies that were implemented by two large Colorado science education grants---the NSF funded Center for Learning and Teaching in the West (CLT West) at Colorado State University and the Partnership in Innovation for Educators and Students (PIPES) at the University of Colorado at Colorado Springs. Both grants incorporated science content and process centered around the most current research on how students learn. The participants will be actively engaged with several of these strategies that incorporate inquiry based models and the use of formative assessments in the learning process.

Sessions
Committee Meetings 4:15 – 4:45
• **Awards and Endowments - Arapahoe** • **Membership – Arapahoe** • **Conventions – Manitou** • **Finance – Comanche** • **Nominations & Elections - Shoshoni** • **Policy – Shoshoni** • **Publications – Kiowa**

Conference Welcome, Keynote, and Wiley New Editor Reception - Grand Rivers Ballroom	5:00 – 5:10 PM
Opening Remarks Dr. Don Balka, President, School Science and Mathematics Association	
Welcome from University of Colorado Colorado Springs Dr. Mary Snyder, Dean, College of Education	

Grand Rivers Ballroom 5:10-5:50 PM

KEYNOTE

The Magic of Chemistry

Dr. Ron Fursenau, The United States Air Force Academy

Professor of Chemistry

BS, US Air Force Academy, Chemistry
MS, University of Nebraska, Physical Chemistry
Ph.D. Montana State University, Physical Chemistry

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"The Magic of Chemistry" is presented to local schools, children's organizations, and community gatherings by the United States Air Force Academy's (USAFA) Department of Chemistry. The purpose of "The Magic of Chemistry" is to get kids excited about the wonders of chemistry. The presentation consists of a series of chemical demonstrations that are used in the classrooms at USAFA. The Department of Chemistry presents the "Magic of Chemistry" about 70 times per year as part of the USAFA community outreach efforts.

As an Air Force chemist, Ron was involved in rocket design projects for satellite systems and won the Air Force Rocket Propulsion Laboratory's Scientist/Engineer Excellence Award for his efforts. He was also awarded the USAF Academy's Outstanding Educator Award and Montana State University's Outstanding Doctoral Dissertation Award. Ron has taught at the USAF Academy since 1984, including courses in general, physical, environmental, analytical, and space chemistry, as well as courses in rocket propulsion design. He has given well over 400 science presentations to local area schools and civic groups. He was actively involved in the Colorado Springs Children's Museum for 10 years, serving on several committees and the board of directors. He has been with Cool Science since its inception. Ron is very dedicated towards children seeing the wonders of science.

Friday Sessions

Business Meetings: 7:30 AM – 8:00 AM (Grand Rivers Ballroom)

Grand Rivers Ballroom 8:00-8:45 AM

KEYNOTE

Tracing the Links From Professional Development to Teaching Classroom Instruction to High Stakes Student Achievement in K-5 Science, Mathematics, and Literacy (STEP-uP)

Dr. Paul Kuerbis, The Colorado College

Chair & Professor of Education and Director of the Crown Faculty Center and Colket Student Learning Center

BA, St. Mary's College (California), Biology
MA, University of California, Los Angeles, Zoology
Ph.D. University of California, Berkeley, Science Education

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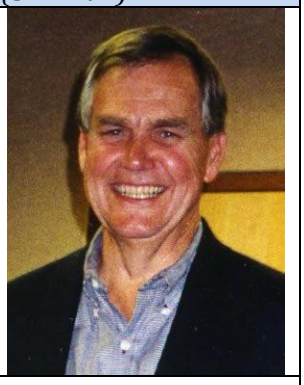

While a graduate student in biology, I became hooked on teaching through a teaching assistantship and intrigued with the complexity of human learning. Biology experiments seemed easy by comparison to educational ones! I moved into classroom teaching at an independent school and taught middle level and high school science for several years before completing a doctorate in science education at Cal Berkeley. I have been at CC since 1973. Over the years I have received several multi-million dollar National Science Foundation grants including one to develop the Master of Arts in Teaching Integrated Natural Sciences degree program for K-12 teachers, and more recently a six year grant to support K-6 teachers implementing inquiry science in the Pikes Peak region. I was one of the contributing authors of the National Science Education Standards (1996) and co-authored several other books and reports from the National Academy of Science, including Educating Teachers of Science, Mathematics and Technology (2001). In 1999, the Dean of the College invited me to try a stint directing a fairly new faculty center for learning and teaching, the Crown Faculty Center. I no longer actively teach in the Education Department (except in the MAT INS program for experienced teachers), instead devoting my energies to providing direction and coordination for the Learning Commons at Tutt Library, which my planning team opened in fall 2004. Come to Tutt Library and say hello!

Sessions		
70	Location: Arkansas	8:55 – 9:45 AM
Title:	Automaticity and High School Readiness in Mathematics	
Presenter(s):	Cheryll Crowe, Eastern Kentucky University Nancy Blue Williams, Eastern Kentucky University Robert Thomas, Eastern Kentucky University	
Description:	The initiative combines a comprehensive basic skills initiative centered on automaticity, numeracy, and mathematics fluency with a comprehensive testing and remediation program. The program includes three phases: initial diagnosis of automaticity, automaticity remediation review sheets, and individualized student remediation, reinforcement, and enrichment. Throughout each phase, university professors work closely with K-9 teachers to provide resources and direction to foster computational fluency. In its second year, the project has expanded to more than 45 school districts, serving students across Kentucky. This presentation will describe the components of this successful program and outline the process for automaticity diagnosis and remediation.	

Sessions		
71	Location: Platte	8:55 – 9:45 AM
Title:	An Open Discussion About Mathematical Reasoning in the Elementary School	
Presenter(s):	William Speer, University of Nevada Las Vegas Ron Zambo, Arizona State University	
Description:	To develop mathematical reasoning in their students, teachers must help their students develop the logical thinking that enables them to determine if and why their answers to questions makes sense. Mathematical reasoning is at the heart of mathematics instruction, but in the era of state standards that tend to focus on skills and facts, it may not get the attention it deserves. The purpose of this session is to provide the opportunity for a discussion about mathematical reasoning, how to assist students in developing it, and how to best assess it from both a formative and summative base.	
72	Location: Rio Grande	8:55 – 9:45 AM
Title:	STEM Pathways for School Science and Mathematics Collaborations	
Presenter(s):	Eric Packenham, Utah State University	
Description:	This presentation focuses on policies used in university communities to promote Science, Technology, Engineering, and Mathematics (STEM) development. The presentation showcases how STEM can be expanded to engage colleges and universities with school students and faculty. Emphasis is placed on proven practices that engage and sustain educators and students in STEM experiences. Most needed to facilitate STEM efforts is a strong commitment from institutional leadership and clear measures to scale-up efforts. Successful STEM efforts attract multiple partners who collective share in the risks and rewards of the STEM efforts.	

Sessions		
73	Location: Gunnison	8:55 – 9:45 AM
Title:	How Reading Can Support Scientific Understanding	
Presenter(s):	Susan Cooper, Florida Gulf Coast University	
Description:	Participants will learn how to promote student inquiry through reading about science in print and electronic formats. I will demonstrate how to structure engaging reading assignments to promote scientific understanding through inquiry. The instructional approaches have been shown to promote conceptual change in readers of all ability levels from upper elementary school through college. The strategies presented will help students evaluate the science underlying claims in a variety of formats. The goal is to produce scientifically literate readers with metacognitive and reflective habits of mind.	
74	Location: Arapahoe	8:55 – 9:45 AM
Title:	Grappling with Group Work to Develop Students Math and Life Skills	
Presenter(s):	Natalia Darling, University of Cincinnati	
Description:	An important aspect of teaching mathematics includes incorporating strategies that target student improvement in problem solving skills. Oftentimes, group work is used to enable students to actively engage to determine solutions and improve their math skills. Cooperative learning strategies can begin as early as preschool (Tarim, 2009), where students build on innate reasoning. However, through all school levels, there are concerns regarding supporting equitable interactions that assist both novice and expert students (Esmonde, 2009). This presentation focuses on assessing collaboration and correctness; discussion will cover guiding student roles and interaction, minimizing tensions, and supporting written and oral skills development.	

Sessions		
75	Location: Comanche	8:55 – 9:45 AM
Title:	Does Chapter 1 Describe Anything Close to Real Science?	
Presenter(s):	Leslie Sandra Jones, Valdosta State University	
Description:	After years of codifying everything into a sequence of activities known as "The Scientific Method," textbooks are finally beginning to loosen the mantra. However, instead of memorizing a linear sequence, students still are faced with obligatory, opening/methods chapters that do little to convey an accurate epistemological representation. Bring (or use the provided) photocopies of introductory chapters for discussion of better ways to portray the nature of science. How can we help teachers better demonstrate the inextricable combination of inductive and deductive reasoning? What are the most important methodological understandings students should take away from their science classes?	
76	Location: Manitou	9:20 – 9:45 AM
Title:	The Impact of Online Mathematics Mentoring with Preservice Teachers on Rural Campuses	
Presenter(s):	Amy Bingham Brown, Utah State University K. Ann Renninger, Swarthmore College	
Description:	Studies of virtual fieldwork as a method for supporting preservice teachers to engage mathematics has been systematically undertaken in different implementations across varying populations of preservice students. Findings from this study suggest that the online environment that involves the preservice teacher to mentor elementary pupils online supports the preservice teachers to seriously engage mathematics, even when they have little interest for mathematics and weak skills. A follow-up study examined the relation between learner interest, developments in mathematical communication and mathematical thinking. Implications for using virtual fieldwork as a support in work with preservice teachers in rural settings will be discussed.	

Sessions	
77	Location: Arapahoe 9:50- 10:15 AM
Title:	Mathematics Teachers' Self-efficacy and Professional Development
Presenter(s):	James Telese, University of Texas Brownsville
Description:	This session will discuss the role that mathematics teachers' self-efficacy plays in the teaching of mathematics, especially for elementary teachers. The current study examined the impact of a professional development program on the participants' self-efficacy for teaching mathematics. The implications for the study will also be presented.
78	Location: Comanche 9:50- 10:15 AM
Title:	Prospective Elementary Teachers' Conceptual Understanding of Operations with Integers
Presenter(s):	Stacy Reeder, University of Oklahoma
Description:	Why does a negative time equal a positive? The purpose of this study was to examine prospective elementary teachers' conceptual understanding of operations with integers. It further explored the participants' willingness to accept, without questioning, mathematics "rules" that do not make sense to them as a natural part of what it means to learn mathematics. The results indicated that the unquestioning acceptance of "rules" leads to a limited or non-existent conceptual understanding of operations with integers.

Sessions	
79	Location: Manitou 9:50- 10:15 AM
Title:	The Importance of Undergraduate Research in a Predominantly Undergraduate Public Four-Year University
Presenter(s):	Kathy Smith, Tarleton State University Bryant Wyatt, Tarleton State University
Description:	As the interest and funding of undergraduate research grows in the fields of mathematics and science, how does an undergraduate research program affect a predominantly undergraduate public four-year university, the faculty, and the students involved. Does a shift in content pedagogy and/or research focus occur for faculty? How do students view the experience - immediate impact and future impact? Presenters will share a review of the assessment of the program and results from interviews of faculty and undergraduate students.
80	Location: Shoshoni 9:50 – 10:15 AM
Title:	Preservice Teachers' Understanding of Variables
Presenter(s):	Sue Brown, University of Houston Clear Lake Judy Bergman, University of Houston Clear Lake
Description:	This presentation will report on a study that examined preservice teachers understanding of variables. Seventy-three preservice teachers seeking early childhood through grade 6 certification responded to four questions related to variables. These same four questions have been used with middle school students. The percentage of the preservice teachers who obtained the correct answer varied from 52 to 81%. The questions as well as teacher responses and errors will be discussed.

Sessions		
81	Location: Arkansas	9:50 – 10:45 AM
Title:	More Than a Mountain of Factoids: The Organization of Everything in Science	
Presenter(s):	Leslie Sandra Jones, Valdosta State University	
Description:	Our failure to present a coherent, unifying, conceptual framework for the natural sciences is the reason science never makes sense to most people. Screams of the agony of memorizing a hodgepodge of terminology are a clue that we fail to demonstrate how it all fits together. We have to help teachers understand how to articulate the logical interdependence of scientific knowledge. Mathematics is the clue. Our understanding of the natural world can be organized hierarchically into levels that range from the holistic totality of the universe down to the reductionist representations of quarks or even string theory.	

82	Location: Rio Grande	9:50- 10:45 AM
Title:	Instructional Models for Inquiry	
Presenter(s):	Diane Schmidt, Florida Gulf Coast University Patricia Cunningham, Florida Gulf Coast University	
Description:	Presenters will demonstrate several instructional models that are not well-known, but have excellent applications for science and mathematics. Among these are the Concept Attainment Model, the Conceptual Change Model, and Mental Model Building. In addition to the brief demonstrations, participants will engage in discussion about the general characteristics of inquiry-based models, their connections to the Essential Features of inquiry defined by the National Research Council, and the overall benefits as compared to more traditional models.	
83	Location: Gunnison	9:50- 10:45 AM
Title:	Rocky Mountain Math Teachers' Circle - Demonstration Session	
Presenter(s):	Diana White, University of Colorado Denver	
Description:	We run a sample session of the Rocky Mountain Math Teachers' Circle Program, a problem-solving focused professional development program for middle-level teachers. Developed by a team consisting of a mathematician, statistician, secondary math coordinator, high school math teacher, and middle school math teacher, this program began in Summer 2010 with a weeklong mathematical problem solving workshop in Longmont, CO. We currently run monthly Saturday morning sessions in downtown Denver, and hold an annual one week summer workshop.	

Sessions	
84	Location: Arapahoe 10:20- 10:45 AM
Title:	Pre-Service Teachers Notions about Repeating Decimals- A Qualitative Study
Presenter(s):	Marnie Phipps, North Georgia College & State University
Description:	Pre-service elementary and middle school teachers confront and develop their conceptions about repeating decimals in a mathematical content course. Come to this session and discover what they really think about repeating decimals and how they explain this phenomenon. You will hear their voices in explaining why 1/3 is equal to point three repeating and why point nine repeating is NOT equal to 1.

85	Location: Manitou 10:20 – 10:45 AM
Title:	Narrative Analysis of Chinese Students' Struggling Experiences in Learning Mathematics and Science
Presenter(s):	An Song, Texas A&M University Junjun Wang, Southeast University (China)
Description:	The study analyzed Chinese students' narratives about their personal experiences of anxiety toward learning mathematics and science. Thematic analysis was used to identify and interpret the storylines contained within the narratives. Six themes were identified from the three storylines in the narratives told by the participants from their struggling experiences. The study, from learner's perspectives, pointed out several weaknesses in Chinese mathematics and science education systems. The narratives of Chinese students' struggling experience demonstrated their demanding of an anxiety-free environment and their desire to be a successful learner in mathematics and science.
86	Location: Shoshoni 10:20 – 10:45 AM
Title:	Observations of STEM PBL Teachers and Their Student Scores
Presenter(s):	Mary Margaret Capraro, Texas A & M University Robert M. Capraro, Texas A & M University Tuba Oner, Texas A & M University
Description:	To improve the quality of Science Technology, Engineering, and Mathematics (STEM) education classes designed to encourage interdisciplinary conceptual development through implementing Project-Based Learning Activities, teachers need support and feedback. There is evidence suggesting how teachers employ instructional strategies significantly affects how their students learn. The Aggie STEM observation instrument was used to observe Algebra I teachers over three years in one socio-economically disadvantaged high school. This session will trace teacher development of PBLs over three years of sustained professional development. We will qualitatively analyze the justifications of each instrument indicator. Additionally, scores on the high-stakes ninth-grade math test will be quantitatively analyzed.

Sessions		
87	Location: Arkansas	10:50 – 11:15 AM
Title:	Influence of Parental Involvement by Gender on Student Outcomes in STEM	
Presenter(s):	Peter Marle, University of Colorado Colorado Springs	
Description:	The level of parent involvement in children's education is paramount to the development of their child's interest in STEM. However, differences exist when factoring in the parent's and child's gender with parent involvement upon children's self-efficacy, interest, and attitudes towards STEM education. Results illustrate the need for STEM educational programs to involve fathers with their children, especially their daughters. Special attention should not only be given to these three factors when measuring children's STEM attitudes, but also other influential variables (e.g., parent education, parent expectations of child's education level, SES, race & ethnicity, etc.).	
88	Location: Rio Grande	10:50 – 11:15 AM
Title:	Impact of an Informal Science Program on Students' Science Interest and Knowledge	
Presenter(s):	Anne Zandstra, Baylor University	
Description:	This research session will report the findings of a study that examines the impact of an informal science learning program on high school students' knowledge and interest in science. The GEAR UP (Gaining Early Awareness and Readiness for Undergraduate Programs) program has been following a cohort of students through middle school and high school. Students participated in informal (out-of-school) activities in a museum, at a university, and in a nature park. Science test scores, science interest questionnaires, and focus group interviews are being used to explore how the program impacted students' science knowledge and interest.	

Sessions		
89	Location: Arapahoe	10:50 – 11:15 AM
Title:	Linked in to Chemistry: Bridging High School and College Chemistry using Vodcasts	
Presenter(s):	Kimberly Bilica, University of Texas at San Antonio Lydia Martinez-Rivera, University of Texas at San Antonio	
Description:	Chemistry is a challenging course for students in high school and college (Uce, 2009). In recent years, technology has become a focus in chemistry education (Su, 2006, 2008). Vodcasts, in particular, gained popularity as instructional tools. This presentation will showcase how our local research team systematically identified some of the most challenging chemistry topics common to high school and college classrooms and then designed vodcasts to address the topics. The team included pre-service science teachers, high school chemistry teachers, and college chemistry professors. As part of this presentation, we will show portions of the vodcasts and share on the value of inter-developmental teams of pre-service, high school, and college instructors.	
90	Location: Comanche	10:50 – 11:15 AM
Title:	Scaffolding for Inquiring in Mathematics	
Presenter(s):	Mark Daniels, University of Texas at Austin Efraim Armendariz, University of Texas at Austin	
Description:	Marshall and Horton [SSMA Journal, Vol. 111, No.3, March 2011] have demonstrated that scaffolding learning leads to higher level thinking by mathematics students. The session authors will use specific examples to emphasize the importance of scaffolding inquiry based mathematics lessons for preservice and inservice mathematics teachers.	
91	Location: Manitou	10:50 – 11:15 AM
Title:	Math Class can be Visual, Dynamic, and Engaging	
Presenter(s):	Tom Hibbs, Texas Instruments	
Description:	Take a quick look at the new color handhelds combined with a classroom management and response system that is the cadillac of student interactivity. The TI-Nspire CX features pedagogically oriented color making math teaching more modern and more engaging. The Navigator connects the class through the teacher's computer. The TI-Nspire program includes a calculator, dynamic graphing, interactive geometry, an integrated spreadsheet, a special stat and data display package, fabulous science and data collection, and an exceptional instant response system. This is a hands-on presentation.	

Sessions		
92	Location: Shoshoni	10:50 – 11:15 AM
Title:	Integrating Authentic Teaching Experiences into Secondary Mathematics Methods	
Presenter(s):	Paula Stickles, Millikin University	
Description:	Many methods courses include peer teaching, however, many pre-service teachers find it difficult to teach their peers as there are no discipline issues and little mathematical discourse as the "students" know the content. A recent change in structure to our secondary mathematics methods course allows pre-service teachers to teach in developmental classes, videotape lessons, and analyze and reflect on the experience. The structure of the experience, lessons learned, and feedback will be shared, as well as, the impact on pre-service teachers' teaching.	
93	Location: Platte	11:20 – 11:45 AM
Title:	A Snapshot of Advanced High School Students' Understanding of Continuity	
Presenter(s):	James Epperson, University of Texas at Arlington	
Description:	We report on a study of high school calculus and precalculus students' concept image and concept definition of continuity after one-trimester of instruction. The researchers developed a questionnaire based upon the work of Tall and Vinner (1981) to determine if calculus students had developed a more sophisticated concept image and concept definition of continuity than students in pre-calculus after a typical treatment in both courses. Preliminary data analysis indicates that weak concept image or concept definition of continuity reflects practices in precalculus instruction.	

Sessions	
94	Location: Rio Grande 11:20 – 11:45 AM
Title:	A Meta-Analysis of the Effects of Virtual Manipulatives on Mathematics Learning and Student Achievement.
Presenter(s):	Patricia Moyer Packenham, Utah State University
Description:	For the past two decades, researchers have documented effects of virtual manipulatives for school mathematics instruction. This session reports on the first research meta-analysis conducted, to date, to determine the overall effects of virtual manipulatives on student achievement. The meta-analysis was used to compare the effects of virtual manipulatives with other instructional treatments for mathematics instruction. The findings will be reported to reveal overall effects for the virtual manipulatives, as well as effects when virtual manipulatives were compared with physical manipulatives, and when virtual manipulatives were used for different mathematical topics, grade levels, and study durations.
95	Location: Gunnison 11:20 – 11:45 AM
Title:	The Personal Side of Science: Helping Early Childhood Pre-Service Teachers
Presenter(s):	John Mascazine, Ohio Dominican University
Description:	This presentation will discuss previous work with early childhood science methods students. Using personal narratives and "behind the scenes" historically accurate stories of the lives / work of scientists, we explore strategies making science more approachable. We consider the usefulness of student science autobiographies and human interest stories behind major scientific ideas / scientists. Books and resources will be provided that illuminate science as a creative, interesting, and human endeavor. We consider the personal side of scientists, including Mary Anning, Gregor Mendel, Nicholas Steno, Tycho Brahe, and others. Using historical and autobiographical information can increase student interest, provide opportunities for interdisciplinary science instruction, and overcome early childhood teachers' fears of teaching science.

Sessions	
96	Location: Arapahoe 11:20 – 11:45 AM
Title:	Increasing Mathematics Achievement Through Discourse Embedded in Stories
Presenter(s):	Lynn Columba, Lehigh University
Description:	Shared storybook reading offers a unique opportunity for increasing "math talk" in a way that is consistent with the natural routines typically found in preschool classrooms. Research suggests that teacher use of "math talk" in the classroom has an effect on children's mathematical skills and knowledge (Klibanoff, Levine, Huttnelocher, Vasilyeva & Hedges, 2006). The purpose of this session is to present a study investigating if mathematical storybook reading that encourages "math talk" can have a demonstrated effect on children's early mathematical skills and knowledge. Pre- and post-test data analysis of this study will be discussed.
97	Location: Comanche 11:20 - 11:45 AM
Title:	Dynamic Geometry and Mathematics Teacher Professional Development
Presenter(s):	Zhonghong Jiang, Texas State University San Marcos
Description:	This presentation will use the dynamic geometry technology as an example to illustrate that mathematics teacher professional development focused on technology should move from learning and practicing the basic skills of the particular tool to a deeper look into the mathematical and pedagogical opportunities afforded by the technology. The theme is how to effectively help teachers to develop their knowledge of mathematics, pedagogy, and technology and related abilities/skills as an organic integral. The participants will be encouraged to interact with the presenter, ask questions, provide feedback and recommendations, discuss related issues, and suggest possible future collaborations.

98	Location: Shoshoni 11:20 – 11:45 AM
Title:	Engendering Algebraic Readiness through H.E.A.T.
Presenter(s):	Peter Sheppard, University of Louisiana at Lafayette
Description:	The Hands-On Exposure to Algebraic Topics (HEAT) project provides sustained extra-curricular instruction to students enrolled in six high needs middle schools. The culminating activity for the project is an interscholastic mathematics competition designed to: 1) assess student algebraic proficiency and 2) generate student interest and excitement about algebra. Preliminary results show the totality of the project activities accelerated the use of conceptually based algebraic pedagogical strategies and yielded immediate positive impacts on students' algebra readiness and proficiency. Ultimately, the paper seeks to contribute to uncovering demonstrable factors that lead to students' firm command of algebra.

LUNCH	Available in Resort Dining Room from 11:45 – 1:00PM

Sessions	
99	Location: Gunnison 1:00 – 1:50 PM
Title:	Integrating Mathematics and Science: Creating Critical Connections for Middle School Teachers
Presenter(s):	Timothy A. Laubach, University of Oklahoma Stacy Reeder, University of Oklahoma
Description:	We will share our experiences in facilitating the pedagogy component of a 3-year Mathematics and Science Partnership grant. This project employed an innovative approach to integrating mathematics and science using engineering, life science and earth science. Each year, nearly fifty middle school mathematics and science teachers participated in a ten-day summer institute and in four follow-up sessions during the subsequent school year. The summer institute consisted of two components: investigations in research laboratories with engineers and scientists and pedagogy experiences in classrooms with mathematics and science educators. We will also highlight several authentic, guided inquiry lessons implemented throughout the project.

100	Location: Arapahoe 1:00 – 1:50 PM
Title:	An Examination of Teaching Models: Exploring Elementary Students' Fractional Understanding
Presenter(s):	Dittika Gupta, Baylor University Susan Cooper, University of Wisconsin-Green Bay Trena Wilkerson, Baylor University
Description:	This study considers the effect of varying models has on student understanding of fractions in grade two during a six week intervention at a professional development school. A mixed-methods approach involving a pre/post assessment, classroom observation and video notes, and daily written instructional reflections were analyzed for a peek into the student understanding in relation to part-whole partitioning, fair share, unitizing, and equivalence. Discussion related to the study and methodology will focus on implementation in the PDS setting. Audiences will engage in the analysis of select problems from pre/post assessment and discuss findings related to student understanding. Audiences will also be engaged in findings and issues with the coding structure focusing especially on the role of discrete and continuous models.

Sessions	
101	Location: Comanche 1:00 – 1:50 PM
Title:	Dynamic Approaches to Increasing Student Success and Retention: Learning Communities, Linked Courses
Presenter(s):	Edith Cranor-Buck, Western State College of Colorado
Description:	The participants will explore structures and benefits of learning communities with linked courses as a means to increase student success, student satisfaction, and student retention. Participants will consider The Freshman Cadre, a pilot program at Western State College of Colorado which links mathematics in unique and interesting combinations of curricula. Participants will gather concrete criteria to determine if their students and institutions can benefit from such a program. The nuts and bolts of selecting and recruiting students to a specific learning community with linked courses will be discussed.

102	Location: Shoshoni 1:00 – 1:50 PM
Title:	STEM in the Classroom - How Could It Happen?
Presenter(s):	David Young, Fayetteville Public Schools Michael Odell, University of Texas at Tyler
Description: **Session Canceled**	Science, Technology, Engineering, and Mathematics are taught, for the most part, as separate events in school. Come see several long-term TI-Nspire based investigations that make a worthy STEM event in the classroom. These investigations were developed with the help of Texas Instruments and the University of Texas at Tyler under the direction of Michael Odell. Take these investigations home to try with your students.
103	Location: Arkansas 1:25- 1:50 PM
Title:	Student Research Groups: Teacher Induction
Presenter(s):	Bryan Nankervis, Texas State University San Marcos Selena Mireles, Texas State University San Marcos
Description:	This presentation will report on research groups, which are part of a Mathematics, Science, and Technology Teacher Preparation Academy at Texas State University-San Marcos. These groups, consisting of graduates (inservice and preservice teachers) and undergraduates (preservice teachers), conducted surveys with current teachers and investigations of state and national induction efforts and programs. This presentation, by their mentor, will report the groups' findings. Deliverables will include a list of most desirable practices for certification programs that produce teachers and the districts that employ them, a suggested induction program format, and a sample induction program schedule.

Sessions		
104	Location: Platte	1:25 – 1:50 PM
Title:	Enhancing your Sense of SMELL: Science and Mathematics for English Language Learners	
Presenter(s):	Bill Jasper, Sam Houston State University Andrea Foster, Sam Houston State University Tiffany Forester, Sam Houston State University	
Description:	This session will provide practical examples of lesson plans that are designed to enhance English language acquisition for grades 6-12 science and mathematics classrooms. Presenters will incorporate the four language domains (speaking, writing, reading, and listening) into exciting science and mathematics activities. By incorporating these language domains into classroom lessons, English Language Learners will experience success in learning mathematics and science content. The Texas English Language Proficiency standards will be shared and used as a framework for curriculum design.	

105	Location: Rio Grande	1:25 – 1:50 PM
Title:	Instructional Change That Lasts Longer than the Workshop	
Presenter(s):	Bob Drake, University of Cincinnati	
Description:	Workshops don't change a school's instructional approach. When teachers focus on procedural knowledge in mathematics classes, what does it take to change their emphasis for more than a single class period? A study with positive results for improving math instruction will be discussed, and a strategy to encourage long term changes in instructional emphases to support mathematical understanding and problem solving is described.	

106	Location: Arkansas	2:00 – 2:50 PM
Title:	Teachers as Connectors: Providing Access to Math and Science	
Presenter(s):	Lyn Swackhamer, University of Colorado Denver	
Description:	Given the changing nature of technology and the world today, teachers not only need content and pedagogical knowledge they need "connected knowledge". This presentation introduces the notion of connected knowledge as part of a teacher professional learning model, introduces an ecological approach to thinking about the connections that need to be made for students, and reports the results of a study examining a professional learning program designed to capitalize on enhancing the connected knowledge of teachers at the secondary school level.	
107	Location: Platte	2:00 – 2:50 PM
Title:	School Mathematics Research on Virtual Manipulatives: A Collaborative Team Approach	
Presenter(s):	Patricia Moyer-Packenham, Utah State University Kerry Jordan, Utah State University Dicky Ng, Utah State University Katie Anderson, Utah State University Joe Baker, Utah State University Kati Rodzon, Utah State University Jessica Shumway, Utah State University Arla Westenskow, Utah State University	
Description:	This session focuses on the collaborative work of the Virtual Manipulatives Research Group to conduct school-based research on virtual manipulatives for mathematics learning. During this panel presentation, team members will share findings based on their role in the group research project, including 1) developing and validating instruments for school-based research, 2) developing and testing instructional materials for treatment groups, 3) analyzing data from classroom observations, and 4) interpreting pre-test, post-test, and delayed post-test results by classroom and individual student demographics. Strategies for conducting collaborative research work, as well as the findings of our research will be shared.	

Sessions	
108	Location: Rio Grande 2:00 – 2:50 PM
Title:	Evaluating Mathematics and Science Teacher Leadership through a Graduate Program
Presenter(s):	Pat Jordan, Oklahoma State University Julie Angle, Oklahoma State University Toni Ivey, Oklahoma State University Adrienne Redmond, Oklahoma State University Julie Thomas, Oklahoma State University Juliana Utley, Oklahoma State University
Description:	Many reports (empirical and otherwise) make claims that Master's programs do little to promote teacher quality in the classroom. Some school districts are switching to merit pay scales as opposed to compensating teachers for furthering their education. The panel will share their experiences of a cohort of mathematics and science teachers seeking a master's degree. We want to elicit conversations about: How graduate programs can benefit teachers? How teacher educators can collectively provide evidence of the worth of teachers completing advanced degrees? What are ways that you are evaluating your graduate programs?
109	Location: Gunnison 2:00 – 2:50 PM
Title:	Using Probeware to Determine College and Elementary Students' Understandings of Heat Transfer
Presenter(s):	Tim Laubach, University of Oklahoma
Description:	A structured inquiry lesson integrating mini-PCs and temperature probes was taught in elementary science methods classes and in elementary school science classes to determine conceptual change in understanding heat transfer. Pre-post-post data were collected for both student groups. Experiences of facilitating this lesson to both groups will be shared while leading session attendees through the lesson. Conceptual understandings data for both student groups will be reviewed and the implications for elementary teacher education will be discussed.

Sessions	
110	Location: Rio Grande 2:20 – 2:45 PM
Title:	Meet the SSMJ Editor and Staff: Publishing in the SSMJ Journal
Presenter(s):	Carla Johnson, University of Cincinnati Shelly Harkness, University of Cincinnati Andrea Milner, Adrian College
Description:	Come to this session and meet the School Science and Mathematics Journal (SSMJ) editors and staff and learn strategies for publishing, future themes, and more.

111	Location: Arapahoe 2:20 – 2:45 PM
Title:	Measuring STEM Teachers' Strategic Knowledge with a Scenario-Based Instrument
Presenter(s):	Robert (Bud) Talbot, University of Colorado Denver
Description:	As we strive to develop STEM teacher education programs capable of preparing "highly qualified" teachers, we must be able to evaluate the effectiveness of these programs. Defining and measuring STEM teacher "qualification" are challenging endeavors. The measures must be both valid and reliable in order to make sound inferences about program quality. In this study, I discuss the validity of a scenario-based survey of STEM teachers' Strategic Knowledge (SK). SK consists of how a teacher conceives of student engagement in the learning process, and what teaching strategies they apply in various teaching scenarios. I also present implications for related efforts.
112	Location: Comanche 2:20 – 2:45 PM
Title:	Mathematics and Teaching Self-Efficacy of Early Childhood and Elementary Education Preservice Teachers
Presenter(s):	Alan Bates, Illinois State University Nancy Latham, Illinois State University Jin-ah Kim, Roosevelt University
Description:	This study examined early childhood pre-service teachers' and elementary pre-service teachers' mathematics self-efficacy and mathematics teaching efficacy at a Midwestern university. Instruments included the Mathematics Self- Efficacy Scale (MSES), Mathematics Teaching Efficacy Beliefs Instrument (MTEBI) and the Illinois Certification Testing System (ICTS) Basic Skills Test. The results indicate that early childhood and elementary pre-service teachers' mathematics self-efficacy and mathematics teaching efficacy differ. Elementary pre-service teachers are more confident of their mathematical abilities, however early childhood pre-service teachers are more confident of their mathematics teaching abilities.

Sessions		
113	Location: Manitou	2:20 – 2:45 PM
Title:	Predicting and Improving Success in Engineering Calculus	
Presenter(s):	Sandra Nite, Texas A&M University	
Description:	There are many factors involved in college success in mathematics. Data over five years shows a correlation between the grade in the first college level mathematics course at Texas A&M University and success through retention in the engineering program. Analysis of the data and implications for further research are considered.	
114	Location: Shoshoni	2:20 – 2:45 PM
Title:	Mathematical Habits of Mind as a Framework for Elementary PSTs Learning and Teaching Division of Fractions	
Presenter(s):	Hsing-Wen Hu, University of Alaska Anchorage	
Description:	The very nature of the Mathematical Habits of Mind focuses on the processes and strategies that learners' minds need to engage with for effective mathematics learning to occur. This study investigates the difference between the learners' performing model and the standard model of Mathematical Habits of Mind in learning division of fractions. This comparison provides mathematics educators deeper and broader visions for elementary pre-service teachers' intelligent minds and behaviors toward learning and teaching this content area.	

Sessions	
115	Location: Arkansas 3:00 – 3:25 PM
Title:	Research Experiences for Teachers in Math and Science
Presenter(s):	Lyn Swackhamer, University of Colorado Denver Doris Kimbrough, University of Colorado Denver Michael Jacobson, University of Colorado Denver
Description:	Research experiences for teachers (RETs) have become a popular way to engage teachers in research settings. In this presentation we will look at the results from teachers who have participated in these experiences in both mathematics and science. Results examined changes in practice in the areas of content pedagogy, general pedagogy, the nature of math/science, process, tools, technology, and content.
116	Location: Platte 3:00 – 3:25 PM
Title:	Impact of Repeated Exposure to Inquiry-Based STEM Educational Workshops on K-12 Students
Presenter(s):	Lisa Decker, University of Colorado Colorado Springs
Description:	The Center for STEM Education at the University of Colorado, Colorado Springs is dedicated to researching and developing programs that help students retain STEM interest. Students, grades 6-12, take part in our PIPES inquiry-based workshops and camps aimed at igniting interest in STEM careers. We hypothesize students will be more likely to commit themselves to studying STEM fields beyond high school due to repeated exposure to STEM paradigms. Resultantly, students manifest increased math and science self-efficacy, demonstrate higher achievement, and greater interest in STEM fields compared to current trends, highlighting the imperative for continued examination of innovations in STEM education.

Sessions		
117	Location: Gunnison	3:00 – 3:25 PM
Title:	I'm Writing to Whom? Examining Mathematical Writing and Audience	
Presenter(s):	Byung-In Seo, Chicago State University	
Description:	Student writing is affected when given a mathematical topic for in-class writing assignments in both math and English/language arts (ELA) classes. In this study, 7th grade junior-high school students, in two teachers' math classes and 2 teachers' ELA classes, were asked to solve math problems, and to write an explanation and rationale for their answers. Findings showed that students attended to audience, using ELA writing conventions in the ELA class, and using mathematical conventions in the math class. Also, the majority of the students stated that there was benefit in writing mathematically in both math and ELA classes.	
118	Location: Arapahoe	3:00 – 3:25 PM
Title:	A Discussion with Past SSMA Presidents	
Presenter(s):	Alan Zollman, Northern Illinois University	
Description:	This session is for past presidents to discuss current status and future directions of the Association.	

Sessions		
119	Location: Comanche	3:00 – 3:25 PM
Title:	Improving Teacher and Student Understanding of Science Concepts with Inquiry-based Science Kits	
Presenter(s):	Sarah Brasiel, Edvance Research, Inc. Eric Rolfhus, Edvance Research, Inc.	
Description:	Based on a regional need to improve student achievement in science, this project focused on using inquiry-based science kit instruction to increase the achievement in science of high-need students, close achievement gaps for English learners, and improve literacy over time. This project was informed by a science reform model of the National Science Resources Center (NSRC). Teachers in participating schools in five districts were provided with five days of professional development (PD) in kit based inquiry instruction accompanied by support from classroom coaches. One kit was implemented in the fall of 2010 and another in the spring of 2011.	
120	Location: Manitou	3:00 – 3:25 PM
Title:	Using Concepts and Items from PISA to Promote STEM Education in the Classroom	
Presenter(s):	Zhonghe Wu, National University	
Description:	This presentation addresses how to use math and science item selected from Program for International Student Assessment (PISA) to promote student STEM thinking. Participants will learn how to use released item from the PISA to connect technology and engineering in the classroom.	

4:00-9:30 - Dinner at the Flying W Ranch Please be on the bus no later than 4:00pm!	

Saturday Sessions

Sessions	
121	Location: Arkansas 8:00- 8:50 AM
Title:	Learning for STEM Literacy: STEM Literacy for Learning
Presenter(s):	Alan Zollman, Northern Illinois University
Description:	This may be the STEM Generation whose comprehensive purpose is to resolve societal, economic, and personal needs to become a productive, knowledgeable citizen. There is a general consensus that everyone needs to be STEM Literate. However, there is not an agreement of the particulars in education, in standards, by professional organizations, or in legislation that define STEM Literacy. This presentation gives a quick background of literacy definitions in the four strands, presents a working definition of STEM Literacy based upon cognitive/affective/psychomotor domains from education foundations, and lastly discusses ideas to develop, support and apply STEM Literacy to the classroom.
122	Location: Platte 8:00- 8:50 AM
Title:	The Implementation of Music-Math Integrated Lessons in Elementary School Classes
Presenter(s):	An Song, Texas A&M University Min Young Kim, California State University Long Beach
Description:	Teaching mathematics integrated with music not only can improve students' attitude toward learning mathematics but also can increase students' mathematics achievement. On the one hand, music could be used as a motivator to engage students in learning mathematics in an enjoyable but sense making way; on the other hand, music could be used as a resource for teachers to present and design mathematical problems in non-routine ways. The workshop will present a sequence of classroom activities that connected music with NCTM standards in a music-math project, sample lessons will be detailed introduced by the project participate teachers.

Sessions		
123	Location: Rio Grande	8:00- 8:50 AM
Title:	Addressing the Problem of Basic Computational Abilities in a Teacher Education Program	
Presenter(s):	Jerry Becker, Southern Illinois University	
Description:	In this session we will look at the weaknesses of pre-service elementary teachers in computational skills and understandings and how we are addressing them.	
124	Location: Gunnison	8:00- 8:50 AM
Title:	Archimedes' Box	
Presenter(s):	Don Balka, Saint Mary's College	
Description:	Over 2000 years ago, Archimedes created the Stomachion or "stomach turner," a puzzle consisting of 14 polygons that can be arranged in a 12 x 12 square such that all the vertices are integer points. Rather than creating bellyaches, teachers can use it to present and explore topics to increase geometric understanding.	

Sessions		
125	Location: Arapahoe	8:00- 8:50 AM
Title:	Cosmic Chemistry – Giving Students the Tools and Confidence to Succeed	
Presenter(s):	Sandra Weeks, Mid-Continent Research Education and Learning John Ristvey, Mid-Continent Research Education and Learning	
Description:	Summer school = remediation? Not always, *Cosmic Chemistry* is a summer science program, designed using best practices in out-of-school-time learning and connections to real world science from the NASA Genesis Mission to support students in their pursuit of chemistry. Chemistry is a gatekeeper course. Students who take it tend to go on to college and have greater success in life. But many students (and adults) are intimidated by just the word "chemistry." The goal of Cosmic Chemistry is to give students the tools and confidence they need to succeed in a high school chemistry course and in life.	
126	Location: Comanche	8:00- 8:50 AM
Title:	Learning by Teaching Elementary Mathematics Methods Course in Different Settings	
Presenter(s):	Lida Uribe-Florez, New Mexico State University CathyKinzer, New Mexico State University Janice Bradley, New Mexico State University	
Description:	The purpose of this study was to learn the differences and similarities of teaching mathematics methods course for elementary preservice teachers. In the university, we had three different sessions for the course and each one in different settings and instructor. Instructors meet weekly to plan and discuss the content and resources to be used for each lesson. Instructors will discuss their experiences and the learning from this study. In addition, results from data on students' beliefs and attitudes toward teaching mathematics in elementary school will be shared and discussed.	

Sessions		
127	Location: Manitou	8:00- 8:50 AM
Title:	Enhancing the Science Content Understanding of Elementary Science Teachers	
Presenter(s):	David Davison, Montana State University- Billings Ken Miller, Montana State University-Billings Mike Scarlett, Montana State University- Billings	
Description:	The Partnership to Reform Inquiry Science in Montana (PRISM) was designed to prepare rural elementary teachers to improve student science achievement in Montana schools by focusing on increasing their science content knowledge and science inquiry skills. This three-year project worked with 52 teachers from rural schools in southeastern Montana. Teachers completed pre- and post-tests of two SciPacks, and their Scoop notebooks showed how teachers successfully implemented inquiry methods. Cohort teachers showed very significant gains in test scores, while comparison teachers' scores were not significantly different. This presentation will address the project, the strategies used, Scoop Notebook examples and project successes.	

Sessions	
128	Location: Arkansas 9:00- 9:25 AM
Title:	Challenges of Transitioning Engineering Research to Middle Schools
Presenter(s):	Julie Angle, Oklahoma State University Juliana Utley, Oklahoma State University
Description:	Despite research on the benefits of engineering research experiences on teacher learning, little research has explored the transfer of laboratory engineering research practices into middle school classroom practices. Transitioning Engineering Research to Middle Schools (TERMS) is an NSF Research Experience for Teachers (RET) sponsored project that has the goal of developing effective techniques for translating research experiences to simple and affordable lesson that crate student awareness of engineering careers. This session will focus on the challenges that teachers face in transitioning engineering research experiences into middle school mathematics and science classrooms.
129	Location: Platte 9:00- 9:25 AM
Title:	Authentic Geoscience Experiences for Teachers: Integrating the Earth Sciences into the High School Classroom
Presenter(s):	Toni Ivey, Oklahoma State University Jim Puckette, Oklahoma State University Julie Thomas, Oklahoma State University
Description:	The Earth Sciences are the most underrepresented area of all STEM areas. G.E.T. (Geoscience Experiences for Teachers) in the Field is a National Science Foundation research study that provided high school science teachers with laboratory- and field-based geoscience experiences. Using these experiences, the teachers developed curriculum that infused the geosciences into their biology, chemistry, or physics classrooms. This presentation reports on findings from this teacher experience.

Sessions		
130	Location: Gunnison	9:00- 9:25 AM
Title:	Case Study of two Beginning Science Teachers in High Needs Schools	
Presenter(s):	Michael Wavering, University of Arkansas Felicia Lincoln, University of Arkansas	
Description:	The purpose of this study is to delineate experiences of two beginning science teachers in high needs secondary schools. The researchers describe recurring phenomena that these teachers encounter in challenging settings. The subjects are graduates of a Master of Arts in Teaching Program, who are in their beginning years of teaching science in secondary schools. One of the novice teachers teaches in a school for at risk students in southwest Missouri. The other teacher is in rural central Arkansas. Face-to-face and telephone interviews combined with observations and site documents are used to document the issues of these teachers.	
131	Location: Arapahoe	9:00- 9:25 AM
Title:	Confirmatory Factor Analysis of Knowledge of Algebra for Teaching (KAT)	
Presenter(s):	Nazli Uygun, Michigan State University	
Description:	In this research, structural equation modeling was used to examine the factor structure of one of the survey forms of the KAT project. The sample was composed of 1107 pre-service mathematics teachers, and the data included 15 manifest variables that were proposed to explain the relationships among 9 factors with specific definitions provided by the KAT framework. Based on preliminary analyses, a multidimensional approach to confirmatory factor analysis is presented. Although revision of the items and the framework would be valuable, according to the estimates and goodness of fit statistics, the research model has a very close fit and the defined constructs are mostly measured by the intended items.	

Sessions	
132	Location: Comanche 9:00- 9:25 AM
Title:	An Investigation of the Paradox of Learning about the Environment in a Virtual Classroom
Presenter(s):	Christine Moseley, University of Texas at San Antonio
Description:	There is an inherent paradox in the tenets of environmental education (EE) and the constructs of virtual classrooms. Does learning about EE in an online environment contradict the basic principles of EE? This presentation discusses a collaborative inquiry research study conducted with three teachers enrolled in an online environmental education course. The presenter examined the extent to which the online course adhered to the cognitive model of learning by investigating participants' individual learning in the virtual environment. This study illustrated the importance of collaborative communication between participants and instructor and the learning strategies used by the participants.
133	Location: Shoshoni 9:00- 9:25 AM
Title:	A Comparison of Two Alternative Pathway Programs in Secondary Mathematics Teacher Certification.
Presenter(s):	Brian Evans, Pace University
Description:	The purpose of this study was to compare the mathematics content knowledge, attitudes, and efficacy held by teachers in two alternative pathways to mathematics teacher certification: New York City Teaching Fellows and Teach for America (TFA). Differences were not found in content, attitudes, and efficacy, but learning and teaching journals revealed several differences between Teaching Fellows and TFA teachers. Particularly, social justice in the classroom, was mentioned more often by TFA teachers, and Teaching Fellows found classroom management to not be as much an issue as had been expected.

Sessions		
134	Location: Platte	9:00- 10:20 AM
Title:	Beyond Content Knowledge Important Skills for Mathematics Teachers and Those Who Teach Them	
Presenter(s):	Cassandra Etgeton, University of North Florida	
Description:	This session will present suggestions for mathematics education programs as we prepare teachers for reaching learners that have traditionally been left behind because of their learning style. Manipulatives on all levels, lessons that include visual learners, and models that give all students a chance to learn mathematics conceptually are modeled and explained.	
135	Location: Arkansas	9:35- 10:20 AM
Title:	Why do you need to know "this"? Because NASA's scientists use it!	
Presenter(s):	Sandra Weeks, Mid-continent Research for Education and Learning John Ristvey, Mid-continent Research for Education and Learning	
Description:	Help your high-school students connect their learning to the "real" world, by learning about some out-of-this world applications! NASA's Dawn Mission has some great lessons to help you! In this session, you'll learn how ions (and their attractive and repulsive forces) are used to propel the fastest spacecraft engine in space – and (more importantly) how to help your students do the same! Then, "see the light" as we use potatoes to understand how astronomers can determine the shape of asteroids. Come see STEM education in action!	

Sessions	
136	Location: Gunnison 9:35- 10:20 AM
Title:	Incorporating Geospatial Technology with Science and Math
Presenter(s):	Rebecca Theobald, University of Colorado Colorado Springs
Description:	Over 100 members of a county's staff have access to mapping software and are expected to update and use data that provide spatial analysis on everything from property values to crime trends. To prepare students for employment requiring mathematical, scientific, and spatial analysis skills, integration must occur throughout the schooling process. This session provides an overview of developments in geospatial sciences, reviews issues including climate change and sustainability in relation to geography, and shares lessons in geomath. It highlights geospatial technology as an inquiry-driven, problem-solving, standards-based set of tasks incorporating fieldwork that helps students use real data and think critically.

Sessions	
137	Location: Comanche 9:35- 10:20 AM
Title:	The Study of Science Concepts and Science Attitude for Science Camps in Taipei Elementary School
Presenter(s):	I-shin Chen, Taipei Municipal University of Education
Description:	The purpose of the study is to probe the science concepts and science attitude of science camp in Taipei elementary school. The study was conducted by a quasi-experimental designed research. Two groups are selected from same elementary school. One is experiment group (total 31, male 16, female 15) and another one is control group (total 30, male 15, female 15). The experiment group was conducted in a three-unit hands-on activity science camp. The other one is only taught by traditional teaching method in one week with an 8 hour-activity per day. Before and after the activities, a 24-question science concept-test and a 34-question science attitude questionnaire were set. There are two statistical significant differences, one is between pre- and post test, $F=8.147$, $p< .01$ on science concepts, another one is between male and female students $F=4.765$, $p< .05$ on science concepts. But there is no statistical significant difference in science attitude between pre- and post test. The results can share to science education scholars and elementary school teachers in science education.
138	Location: Manitou 9:35- 10:20 AM
Title:	Using ASSISTments to Assess Middle School Math Students' HW Understanding.
Presenter(s):	Kelsy Kroeshcen, University of Colorado Colorado Springs Patrick McGuire, University of Colorado Colorado Springs
Description:	This presentation describes an experimental pilot study conducted with 99 seventh grade mathematics students using an online intelligent tutor, ASSISTments. Students were randomly assigned into two conditions and completed the same homework problems using: traditional paper-and-pencil vs. web-based homework with immediate feedback provided by the tutor. Our results suggest that students in the web-based group learned significantly more than the traditional group. In addition to discussing the design and results of this pilot study, we demonstrate how secondary math teachers can modify existing ASSISTments content, create their own homework content, and utilize data-driven reports to assess student growth and understanding.

Sessions	
139	Location: Shoshoni 9:35- 10:20 AM
Title:	College Faculty Learning from the Differentiated Instruction Model used in P-12 Classrooms
Presenter(s):	Julie Saam, Indiana State University-Kokomo Amber Reed, Indiana State University-Kokomo
Description:	Due to budget constraints and low enrollments, faculty has found him/herself teaching varying groups of students within one course. Our university has had to cross-list courses with undergraduates and graduates; with science education and mathematics education students, and with cohorts at different developmental levels. After interviews, observations, and syllabi analyses, we have discovered what parts of the Differentiated Instruction Model used in P-12 classrooms can be transferred successfully to the college classroom. We will share in our presentation how we use syllabi organization, differentiated rubrics, and technology to meet the needs of all students in our courses.
140	Location: Platte 10:45 – 11:10 AM
Title:	Altitude and Atmospheric Pressure: Discover How They Are Connected
Presenter(s):	Kathleen Mittag, University of Texas at San Antonio Sharon Taylor, Georgia Southern University
Description:	Participants will determine atmospheric pressure using non-standard units and measuring devices. They will then discover the relationship between atmospheric pressure and altitude as well as solving problems using gas laws.

Sessions		
141	Location: Rio Grande	10:45 – 11:10 AM
Title:	Upward Bound STEM Students Lead with Mercury Education and Reduction	
Presenter(s):	Carol Fortino, Pueblo County Mercury	
Description:	Join our STEM students from Colorado State University-Pueblo Upward Bound who assist with the Pueblo County Mercury Education and Reduction grant-funded program. They will demonstrate their leadership skills while explaining the science facts and performing an experiment to demonstrate the concept of parts per million of mercury pollution. The students have attended special sessions to learn about the dangers of mercury pollution, distribute the information locally, and attend community meetings where they practice their leadership skills by working with small groups of adults. Learn how your community may be eligible for state Supplemental Environmental Penalty (SEP) funding using STEM initiatives.	
142	Location: Comanche	10:45 – 11:10 AM
Title:	Elementary Teachers' Mathematical Knowledge, Efficacy, and Problem Solving Abilities in Alternative Certification.	
Presenter(s):	Brian Evans, Pace University	
Description:	The purpose of this study was to understand teachers' mathematical content knowledge, efficacy, problem solving abilities, and teacher beliefs in an elementary education mathematics methods course for special education teachers in alternative certification programs. Findings revealed a significant increase in mathematical content knowledge and teacher self-efficacy. Additionally, teachers were found to have high self-efficacy at the end of the semester and strong problem solving abilities. Further, teachers generally found that helping students with disabilities learn mathematics was the biggest issue in their teaching, and that the use of technology and manipulatives were the most important topics addressed in their learning.	

Sessions	
143	Location: Shoshoni 10:45 – 11:10 AM
Title:	Are These the Standards You Want?
Presenter(s):	Sue Brown, University of Houston Clear Lake
Description:	NCTM is currently revising the standards for mathematics teacher education programs. These standards will be used as part of the NCATE program review process, as well as other in venues. Come hear about the draft standards and help shape the final revisions through your feedback.
144	Location: Manitou 10:45 – 11:10 AM
Title:	Pedagogical Content Knowledge and the integration of Science & Mathematics: Inciting Innovation in a Virtual Environment
Presenter(s):	Rebecca Ortiz, Texas Tech University David Camp, Texas Tech University Zenaida Aguirre-Munoz, Texas Tech University
Description:	Despite the impetus from professional organizations for integration, few teacher training programs provide opportunities for teachers to develop the knowledge and skills in effective integration of math and science content. This presentation reports on the process evaluation of a technologically-enhanced training model for in-service mathematics and science middle school teachers. Quantitative results suggest the program was effective in increasing teacher implementation of integrated lessons. However, increased pedagogical content knowledge appears to be necessary to enhance the goals for student learning in both math and science content. Implications for teacher education will be discussed.

145	Location: Comanche	10:45 – 11:45 AM
Title:	GEARS: Working Math into Science	
Presenter(s):	Georgia Cobbs, University of Montana Edith Cranor-Buck, Western State College, Gunnison, CO	
Description:	Participants will build a compound gear train to meet the "challenge" of the AWIM (A World in Motion) curriculum for middle school students. These materials teach both scientific and mathematical concepts via hands-on real world applications. Participants will experience how to be problem solvers building specific gear ratios and to work in teams to get the toy train to move. All of this while having fun!	
146	Location: Arapahoe	11:20 – 11:45 AM
Title:	Learning Science through Children's Literature	
Presenter(s):	Barbara Frye, University of Colorado Colorado Springs Helen Vogt, Colorado Springs District 11	
Description:	Children's literature is an effective way to not only integrate reading with science, but to invite students to experience enjoyment while learning. Teaching with literature also helps change students' perceptions about science as a difficult subject filled with abstract concepts, to seeing its connection to their lives. This session will introduce participants to literature for students in the upper elementary grades through middle school, which invites them to learn about the world through a scientific lens.	

Sessions		
147	Location: Comanche	11:20 – 11:45 AM
Title:	Math Teachers' Circles - Impacting Teachers' Mathematical Knowledge for Teaching	
Presenter(s):	Diana White, University of Colorado Denver	
Description: **Session Canceled**	The Math Teachers' Circle (MTC) program, developed at the American Institute of Mathematics (AIM), aims to establish the foundation for a culture of problem solving among middle school math teachers in the U.S. In this talk, we focus on a small preliminary study that investigated the summer immersion workshop portion of this program at multiple sites throughout the country. In particular, we focus on how the summer immersion workshops impacted teachers' mathematical knowledge for teaching.	

148	Location: Shoshoni 11:20 – 11:45 AM
Title:	Student Outcomes of Inquiry-Based Learning in College Mathematics Courses
Presenter(s):	Sandra Laursen, University of Colorado Boulder
Description:	I will share recent research findings from a large, mixed-methods study of inquiry-based learning (IBL) in undergraduate mathematics. IBL methods were implemented in a variety of college courses for math majors and pre-service K-12 teachers at four campuses. As students developed and tested mathematical claims for themselves they learned concepts deeply and came to see mathematics as a means of constructing verifiable knowledge, not just a set of procedures. In combination, deep engagement and collaboration fostered learning, strengthened communication, skills, and made class fun. Women and lower-achieving students benefited particularly as IBL provided both support and challenge for all students.

10:30-6:00 PM AIR FORCE GAME (OPTIONAL)

1:00 – 5:00PM – Garden of the Gods Geology Tour With Dr. Paul Grogger
Please bring water, snack, jacket, hiking shoes/boots, and prepare for a walking tour.
*__The bus will leave at 12:30 sharp!__

12:00 PM LUNCH ON YOUR OWN

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Late Cancelations are in PINK

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