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| **SSMA 2014 Annual Convention: Jacksonville, Florida***Bridging Connections between Mathematics and Science* |
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| **2014 Conference Program Chairs** | **2014 Local Arrangements** |
| Melanie Shores, University of Alabama BirminghamTommy Smith, University of Alabama Birmingham  | Gregory Chamblee, Georgia Southern UniversityAdele Hanlon, Jacksonville University |
| **SSMA Leadership** |
| **President, 2012-2014**John Park, Baylor University | **Co-Executive Directors, 2014-2019**Melanie Shores, University of Alabama BirminghamTommy Smith, University of Alabama Birmingham |
| **President-Elect, 2013-2014**Gilbert Naizer, Texas A&M University-Commerce | **Journal Editor and Office, 2011-2021**Carla Johnson, Purdue UniversityShelly Harkness, University of Cincinnati |
| **Directors-at-Large, 2011-2014**Lynn Columba, Lehigh UniversitySuzanne Nesmith, Baylor University | **Newsletter Editor, 2013-2016**Georgia Cobb, University of Montana |
| **Directors-at-Large, 2012-2015**Stacy Reeder, University of OklahomaMargaret Mohr-Schroeder, University of Kentucky |  |
| **Directors-at-Large, 2013-2016**Timothy Laubach, University of OklahomaRon Zambo, Arizona State University |  |
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| **Special thanks to** |
| **Felicia Forbes, Georgia Southern University, for all of her hard work on the program** |
| Lara Gunnells, University of Alabama Birmingham, for assistance with registration |
| Veronique Zimmerman-Brown,University of Alabama Birmingham, SSMA Office Director |

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**Conference Overview**

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| **Thursday** | **Friday** | **Saturday** |
| **8:00-9:00** Continental Breakfast  | **8:00-9:00**Full Breakfast Buffet **Awards and Business Meeting** | **7:30-8:30** Continental Breakfast  |
| **9:10–9:35** Breakouts | **9:10–9:35** Breakouts | **8:30–8:55** Breakouts |
| **9:45–10:10** Breakouts | **9:45–10:10** Breakouts | **9:10–10:00** Breakouts |
| **10:20–10:45** Breakouts | **10:20–10:45** Breakouts | **10:10–11:00** Breakouts |
| **10:55–11:20** Breakouts | **10:55–11:20** Breakouts | **11:10–12:00** Breakouts |
|  | **11:30–11:55** Breakouts |  |
| **11:20-1:00** Lunch on your own | **12:30-1:50** **Luncheon** **and****General Session*****Manatees, Math and Mackerel: Building Bridges*** **Dr. Quinton White** | **12:00** **Box Lunch**  |
| **1:00–1:50** Breakouts | **12:00–?** Explore Jacksonville! |
| **2:00–2:50** Breakouts | **2:00–2:50** Breakouts |  |
| **3:00–3:50** Breakouts | **3:00–3:50** Breakouts |  |
|  | **4:00–4:50** Breakouts |  |
| **4:00–6:00** **General Session and Reception*****The St. Johns Riverkeeper*** **Lisa Rinaman** | **5:00–6:00** **Committees meet**  |  |
|  | **6:00** Dinner on your own |  |
| Explore Jacksonville! | Explore Jacksonville! | *Safe travels!* |

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| **Thursday Morning – Continental Breakfast 8:00-9:00 (Omni Ballroom)** |
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| **Thursday Morning Sessions** | **9:10–9:35** |
| **#1 Naples**Pre-Service Teachers Use of 3D Printing as an Instructional Tool Gil Naizer, Mienie DeKock, Deborah DavisPre-service teachers were assigned the task of designing and creating a hands-on manipulative that does not currently exist. The availability of a 3-D printer allowed them to ‘print’ their manipulative and modify it to best model the concept. Their reflections on the process and the results of their designs will be shared.  | **#2 Pensacola A**Elementary Mathematics Teacher BeliefsBrian Evans The purpose of this study was to measure teacher beliefs about teaching mathematics over the course of an elementary mathematics teaching methods course. The participants came from three groups of in-service and preservice teachers in master’s degrees programs at a university in New York: New York City Teaching Fellows, Teacher Education Assessment and Management program, and traditional preservice teachers. Findings revealed an increase in positive beliefs about teaching mathematics over the semester, but there were no differences in participants’ beliefs between the three programs.  |
| **#3 Pensacola B**Qualitative Policy Discourse Analysis: A Reproducible Research ApproachS. Enrico P. Indiogine, Gerald KulmReproducible Research methodologies have become popular in the analysis of quantitative data. However, these methodologies are not much used in the field of qualitative data analysis. Recent advances in analysis software offer social science researchers computing tools for the processing and analysis of this type of data. These resources enable us to implement reproducible research protocols for qualitative data. As an additional benefit, we are able to analyze large amounts of textual data by restricting our reading to procedurally preselected portions of the texts. We present our adaptation of these tools to the qualitative analysis of STEM education policy. | **#4 Pensacola C**Factors that influence the final decisions of women in STEM: Phase IIMelanie Shores, Veronique Zimmerman-Brown, Rose McNeeseThis research examines why and how females who are currently in STEM careers made it where they are today. An electronic survey was administered in order to dig deeper into the understanding of females and their career choices. Phone interviews will also be conducted to gain rich qualitative data from the participants. Participation will be solicited from professional organizations related to STEM and those that target women. This will help understand why women choose STEM careers, factors that influence the decision, and help continue to promote girls in STEM education. |

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| **Thursday Morning Sessions** | **9:10–9:35** |
| **#5 Jacksonville** Engaging Rural Elementary Educators and Students in Engineering EducationJulie Thomas, Toni Ivey, Nicole Colston, Juliana UtleyResearchers worked with a rural education cooperative to deliver engineering education professional development to 38 elementary teachers. Teachers received training in EiE and Family Engineering curriculum and then implemented those lessons with their 2nd-5th grade students. Researchers administered pre- and post- measures to gauge changes on teachers’ and students’ knowledge and perceptions regarding engineering. We further measured changes in teachers’ self-efficacy of teaching engineering and students’ attitudes about science and engineering. This session discusses the value of elementary engineering education in rural communities. | **#6 St. Augustine**The effects of using LEGO blocks in helping blind students learn mathematicsQi Zhou, Houbin Fang, Anna Wan This study was designed to examine the effectiveness of the use of LEGO blocks in helping blind students learn mathematics. Approximately 70 sighted students in a southeastern university participated in the study. The students were instructed to use LEGO blocks to learn multiplication, fraction, and geometry in in a series of sessions while being blind folded. At the end, students completed a questionnaire containing open ended questions evaluating their understanding of the concepts covered in the session. The study is currently in the phase of data analysis. It is expected the LEGO blocks can effectively help blind students learn mathematics. |
| **#7 Miami**Addressing Elementary Teachers’ Misconceptions Related to Gravity Using a Conceptual Change ProcessErin Dixon, Suzanne Nesmith Much emphasis has been placed on providing students with learning opportunities that address their scientific misconceptions through a conceptual change process. Many elementary teachers hold misconceptions similar to those of their students; unfortunately, the same emphasis has not been placed on providing them with similar opportunities to address their misconceptions. This presentation will describe a professional development program designed to address teachers’ misconceptions about gravity through the use of a conceptual change framework. Research about the impact of this program on teachers’ understanding of weight, mass, gravity, and factors impacting gravity will also be shared. |  |

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| **Thursday Morning Sessions** | **9:45-10:10** |
| **#8 Naples**Beyond engagement: Inductive evaluation of a 21st century educational board gameAbigail Perkins, Carol StuessyA collaborative educational board game about earthquake engineering was inductively evaluated. Aligned with 21st century learning, the game provides players opportunities to practice critical thinking, argumentation, and metacognitive skills while constructing earthquake engineering knowledge. Evidence supporting learning outcomes resulted from constant comparison of interviews from six secondary students who played the game twice. Video analysis of student game-play was compared via a rubric to assess cognitive gains between games. The rubric was developed to measure changes in higher-order thinking and engineering knowledge between game-plays. Findings indicate students practiced more higher-order thinking during the second game and gained engineering knowledge. | **#9 Pensacola A**The Impact of a STEM Camp on Gifted Students’ Understandings About Scientific InquiryStephen Bartos, Allison Antink Meyers, Norman G. Lederman, Judith S. LedermanThe purpose of this study was to measure teacher beliefs about teaching mathematics over the course of an elementary mathematics teaching methods course. The participants came from three groups of in-service and preservice teachers in master’s degrees programs at a university in New York: New York City Teaching Fellows, Teacher Education Assessment and Management program, and traditional preservice teachers. Findings revealed an increase in positive beliefs about teaching mathematics over the semester, but there were no differences in participants’ beliefs between the three programs.  |
| **#10 Pensacola B**Write Reactions: Part I -Science WritingCindy Chesworth Adams, Lynn ColumbaThe 21st Century Skills Framework includes the ability to critically read and analyze new scientific information. This session will explore the applications of a rubric specifically designed for measuring critical analysis skills in scientific analysis papers written by first-year college students. | **#11 Pensacola C**Preservice Mathematics Teachers’ Effectiveness in Addressing Misconceptions in AlgebraAyse Tugba Oner, S. Enrico Indiogine, Gerald Kulm, Haiping Hao, G. Donald Allen  The purpose of this study was to examine to what extent two groups of preservice mathematics teachers (PSTs) were engaged addressing middle grade students’ misconceptions in algebra. The engagement of the PSTs was defined as an effective answer that could assist students to correct existing misconceptions. On a posttest, four open-ended problems were presented to 32 (treatment) and 27(comparison) PSTs, requesting them to assist middle grade students with a misconception. There was no statistically significant difference between the treatment and comparison groups. However, the proportion of engaged PSTs in the treatment group was two to four times greater than the comparison group. |

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| **Thursday Morning Sessions** | **9:45-10:10** |
| **#12 Jacksonville** Enhancing elementary preservice teachers’ mathematical task knowledgeKristen ApraizThis session presents findings of a study investigating elementary preservice teachers’ beliefs about mathematics instruction by focusing on aspects of mathematical task knowledge. The intervention for the study focused on learning about features of mathematical tasks that hold the potential for eliciting low and high levels of cognitive demand and participating in a letter writing exchange with third grade students. Results from the study indicate ways to improve the elementary preservice teachers’ learning in the elementary mathematics methods course. | **#13**  **St. Augustine**Exploring Elementary Preservice Teachers' Conceptions of Carbon Cycling in TreesRebecca Krall, Vera Soules-MabsonPrevious research has highlighted conceptual difficulties elementary students and adults have with concepts relating to energy flow through an ecosystem. These studies have reported conceptual difficulties related to energy sources, photosynthesis, respiration, and energy transfer. The current study uses scenarios to explore preservice elementary teachers understanding about energy sources for plants and trees in all seasons. A scenario showing trees in far northern environments where sunlight is absent 40 days a year posed the greatest challenge. Results from the study will be presented including the notion that trees access different energy sources when light levels are low or absent.  |
|  | **9:45-10:45** |
| **#14 Miami**Science Fair Participation and Students Views of Nature of Science: Bridging ConnectionsJulie AngleResearch suggests that students who participate in science research develop scientific practice skills and in-depth content knowledge as warranted by the expectations of the Framework and NGSS. However, little research on NOS has been conducted with students who have taken their research to a competitive level. To determine the extent to which participating in science research and fair competitions have on students’ views of NOS, a pilot study was conducted to compare NOS views between students who conduct research to students, of equal academic ability, but do not conduct research but are taught under the guidance of the same science teacher.  | **#15 Omni Ballroom A**Practicing the Common Core Standards for Mathematical PracticeSusie HakanssonPresident, TODOSParticipants will become familiar with the *Common Core*Standards for Mathematics Practice (SMP) through the introduction of this online course that supports teachers becoming proficient in the SMP through engaging discussions, videos, and problems. Grade level specific examples will be provided as well as strategies for English learners to access the SMP. One of the purposes is to support students, particularly English learners, to develop the habits of mind necessary to become proficient mathematical thinkers. Connections will be made to the Science and Engineering Practices of the *Next Generation Science Standards*. |

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| **Thursday Morning Sessions** | **10:20-10:45** |
| **#16 Naples**Active Participation Through Partnership Enhancement Projects: Science and Mathematics Education ReformMerryn Cole, Jennifer WilhelmPartnership enhancement projects (PEP) in Kentucky were examined to identify challenges and benefits of this model for education reform. Twelve school districts partnered with higher education to design and implement professional development to address local needs. Three patterns emerged in this qualitative study: a gap exists between activities teachers thought were important and actual ones in practice; nearly all participants believed professional connections made were important; teachers took an active role in planning and presenting professional development. Using a PEP to bring about education reform is unique, as it allows teachers and administrators to become active participants in the process.  | **#17 Pensacola A**The use of hands-on activities to explore directly and inversely proportional relationships Muhammet AricanIn mathematics education literature, preservice teachers’ reasoning about and comprehension of proportional and inversely proportional relationships is not well-explored. In this explanatory multiple-case study, hands-on and real-world problems were used to investigate the reasoning of four middle and secondary grades teachers’ when determining whether two quantities are in a directly or inversely proportional relationship. This study makes use of the coordination classes construct to analyze teachers’ responses. Although teachers considered proportionality to explain relationships, they determined directly and inversely proportional relationships by comparing given quantities qualitatively and had trouble in recognizing the reciprocal multiplicative relationships between those quantities.​ |
| **#18 Pensacola B**Communication: An Equity Pedagogy in the Mathematics ClassroomMichael DornooThis research was to investigate the impact of communication in the mathematics classroom. The investigation was in a form of a game after which participants were provided with open-ended questions. Participants’ written open-ended responses were analyzed. The results show that participants felt helpless, challenged, lost, defeated, frustrated, and extremely confused when they were not allowed to communicate. However, they felt encouraged, engaged, entitled, emancipated, and empowered when they were allowed to collaborate and play as a team. The results make a very strong case for the use of effective communication as tool for equity pedagogy in the mathematics classroom. | **#19 Pensacola C**Elementary Pre-Service Teachers' Self-Efficacy to Teach Mathematics Shelby GilbertRecent reports indicate that U.S. students continually rank lower than their peers in many comparable nations. Beginning as early as pre-kindergarten, the NCTM advocates that teachers help students foster a positive disposition toward mathematics through a deep understanding of the mathematics they teach. Studies have shown, however, that elementary pre-service teachers in the United States often lack sufficient mathematical content knowledge and confidence to effectively teach mathematics. Using data from the IEA Teacher Education and Development Study in Mathematics (TEDS-M, 2008), this paper will compare pre-service teachers’ mathematics experiences in the U.S. and select top performing countries. |

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| **Thursday Morning Sessions** | **10:20-10:45** |
| **#20 Jacksonville** The Impact of Collaborative Teaching on Graduate Students Steven Foti, Catherine Case, Douglas Whitaker, and Tim JacobbeThis session describes a collaborative teaching effort between the College of Education at the University of Florida and its affiliated developmental research school. Three graduate students with content-area expertise in statistics, but without prior K-12 experience, worked with a high school classroom teacher to teach the school’s first offering of AP Statistics. This novel teaching arrangement benefited all parties involved and can serve as a model for other collaborations, not just in the content area of statistics. Benefits and challenges, including selections of research findings and unique teaching strategies arising from this co-teaching experience, are presented. | **#21**  **St. Augustine**Examining Teachers’ Conceptions of their Subject Matter and Their Classroom Practiceaker(s):Stephen Bartos, Norman G. LedermanShulman’s conception of pedagogical content knowledge includes the conjecture that how teachers conceptualize their subject matter should impact related instruction. This study examined the knowledge structures and related classroom practices of eight teacher in two different contexts - common physics content and regarding nature of science (NOS) and scientific inquiry (SI). While teachers’ conceptions of physics content varied regarding connectedness and coherence, they were typically congruent with those communicated through practice. This congruence, though, was not evident for NOS and SI, as the connections between concepts were typically absent from practice. Results have implication for teaching and teacher preparation. |
| **#22 Miami**The transition from STEM expert to teacher: A longitudinal studyJeff Connor, Allyson Hallman-Thrasher, Aaron SickelThis presentation describes how a STEM background contributes to (1) the ways teacher candidates think about their preparation for work as teachers and (2) how this thinking changes during their internship and first year of teaching. We interviewed one cohort of teacher candidates enrolled in an intensive one-year masters program for STEM content experts. Conclusions were based on three interviews with each candidate one with their mentors over a two-year span. We found that, initially, candidates’ understandings of STEM and integration were less sophisticated than anticipated, and candidates focused on developing a general, rather than STEM-specific, professional teaching identity.  |  |

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| **Thursday Morning Sessions** | **10:55-11:20** |
| **#23 Naples**Pre-Service Secondary Teachers' Operationalization of Interdisciplinary Mathematics and Science Content KnowledgeJames Willingham, Jeffery BonnerWith the lack of consensus language present in the field of Interdisciplinary Mathematics and Science Education (IMSE), the working definitions and characterizations that teachers use to operationalize their content knowledge for teaching are significant indicators of their understanding of IMSE. This study examines the correlation of pre-service secondary mathematics and science teachers' content knowledge with their ability to define and distinguish IMSE constructs. This ability to operationally define and distinguish IMSE characteristics is viewed as a key prerequisite to the design and delivery of IMSE lessons, and this study acts as a pilot for future considerations of this nature. | **#24 Pensacola A**A Noyce Scholarship program: Implications for STEM teacher perceptions, recruitment, and retentionAbigail Perkins, Timothy ScottIn this presentation, a Noyce Scholarship program is explored to capture features of STEM teacher candidates and elements of the program associated with teachers’ desired beliefs, persistence in the profession, and achievement of K12 students in mathematics and science. Each Noyce scholar (n=23) who graduated the program was surveyed to gather associated data. Findings suggest Noyce scholars regarded teaching as an honorable professional and found the program helpful in preparing them for teaching in high-need schools. Study implications may inform stakeholders of pre-service teacher characteristics associated with high retention in the field to improve teacher recruitment and preparation. |
| **#25 Pensacola B**A Foucauldian analysis of recent U.S. STEM education reform.Salvatore Indiogine, Gerald KulmWe used the Foucauldian principles of governmentality to analyze recent STEM education reform at the federal level. We obtained relevant Congressional Hearings and Presidential Speeches from the Federal data repository and performed qualitative analysis. Relevant paragraphs were labeled using codes derived from the research criteria. Complex queries were created according to the three definitions (dimensions) of Foucault's governmentality. The results of these queries were woven into narratives that addressed the three governmentality definitions. These narratives, among others, describe the federalization of education control and the creation of processes and tactics that function as a proxy of a free-market system. | **#26 Pensacola C**Examining Students’ Algebra, Geometry, and Statistics Objectives Scores in both STEM and non-STEM Schools.Bilgin Navruz, Ali Bicer, Robert M. Capraro, & Mary M. CapraroAn essential goal of STEM schools is to increase K-12 students’ mathematics scores on both national and international exams. The reason why mathematics has been emphasized is because mathematics has been considered as a gatekeeper for students’ future academic achievement. In the present study, a structural equation modeling (SEM) was used to explore if 11th grade students performed differently on algebra, geometry, and statistics objectives in STEM and non-STEM high schools. In this study, the data were obtained from Texas Education Agency for 11th grade students from STEM schools and non-STEM high schools located in the state of Texas.  |

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| **Thursday Morning Sessions** | **10:55-11:20** |
| **#27 Jacksonville** Write Reactions: Part 2 – Enhancing Student Critical Analysis Skills:Cindy Chesworth Adams, Lynn ColumbaThis session will explore online resources for enhancing critical analysis skills among early-year college students. | **#28**  **St. Augustine**A Qualitative Study on the Multidimentionality of Intermediate Algebra Students’ Mathematical IdentitiesMarilupe HrenThis session will present the theories, methods, analysis and conclusions of a qualitative study that examines how Intermediate Algebra students’ mathematical identities are developed and negotiated within their multiple experiences. Starting with the premise that students’ mathematical identities are mainly constructed through their everyday life experiences (Gutstein, 2006), I conducted three individual interviews with each undergraduate student. I conducted these interviews to present an inquiry of students’ stories, to reveal common experiences towards learning mathematics, to focus on how each student identifies him/herself as a mathematical doer and knower (Nasir, 2002), and to understand the development of their mathematical identities. |
| **#29 Miami**Engineering is Everywhere: Engaging Engineers in Elementary Preservice Teacher TrainingToni Ivey, Julie Thomas, Nicole Colston, Tyler Ley, Juliana UtleyResearchers worked with an engineer to develop and test a video-based curriculum aimed at exposing teachers to the real-life work of engineers. Two different treatments (Virtual and Expert-Visit) were delivered during elementary science methods courses, each with 20 preservice teacher participants. All participants were trained in the curriculum; however the engineer visited with the Expert-Visit group and taught the first of three lessons. Researchers administered pre- and post- measures to gauge changes on preservice teachers’: (1) knowledge and perceptions regarding engineering, and (2) self-efficacy of teaching engineering. This session discusses the development of the curriculum and findings indicating success. |  |

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| **Thursday Afternoon Sessions** | **1:00-1:50** |
| **#30 Naples**Capturing Your Students’ AttentionChuck EmenakerChallenging students with a variety of mathematical teasers is a valuable way to capture student interest and motivate students to spend more time on mathematics. This session will focus on methods of infusing these teasers into the class as well as assessment techniques. Participants will be provided a collection of problems that are ready for classroom use and categorized by mathematical topic.  | **#31 Pensacola A**Procedural vs Conceptual KnowledgeLaura Tapp, Heidi EisenreichAll teachers want to help their students be successful. Many teachers fell that students with procedural knowledge have a greater understanding of mathematics. With the Common Core State Standards being implemented in most states, teachers need to help their students to conceptually and procedurally understand mathematics. This workshop will help teachers understand the importance of students gaining conceptual knowledge not just procedural knowledge. |
| **#32 Pensacola B**History of Mathematics in the Classroom: A Focus on CulturesBrian EvansThis presentation gives a brief overview of the history of mathematics through the contributions from various cultures. It provides ideas for using mathematics history to motivate students. The presentation will be interactive and have teachers solve historical problems and we will discuss how mathematics history can be used in the classroom. Topics will briefly include mathematics in ancient Egypt, ancient Mesopotamia, ancient Greece, China, India, the Islamic World, the Pre-Columbian Americas, Europe, and the United States. The development of mathematics from ancient times, the Middle Ages, and throughout the 17th to 21st Centuries will be briefly examined. | **#33 Pensacola C**The Use of Mathematical Modeling to Enhance Teachers’ Understanding of Sustainable DevelopmentMark Bloom, Sarah Quebec Fuentes, Kelly FeilleAbstract:This presentation describes a long-term professional development for science teachers that focused on the relative sustainability of various energy sources. Teachers were introduced to the process of mathematical modeling as a strategy to identify the multitude of variables that must be considered when making informed decisions. Teachers were then exposed to conflicting views of each energy source via on-site field trips, expert lectures, and documentary films. Through the integration of the modeling process and the science content, data revealed that the teachers’ conceptions regarding energy sustainability became more informed and complex over the course of the professional development. |

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| **Thursday Afternoon Sessions** | **1:00-1:50** |
| **#34 Jacksonville** A New Views through the STEM Lens: Place-Based Integrated STEMLouis NadelsonThe various lenses through which we look at STEM shapes our vision of STEM. In schools, many times the visions of STEM is to prepare students for learning more STEM, while outside of school STEM is viewed as an intellectual toolbox for solving complex problems. The STEM intellectual toolbox requires an integrated STEM approach that is accessed to explain phenomenon and find solutions. Further, the view of integrated STEM can be profoundly influence by place. In this presentation I will share my research on K-12 teacher engagement in teaching integrated place-based STEM, following their participation in intensive integrated place-based STEM professional development.  | **#35**  **St. Augustine**Science, Mathematics, and RigorDon BalkaThe Next Generation Science Standards Framework identifies eight science and engineering practices that have a strong relationship to the Common Core Standards for Mathematical Practice.  Both documents stress rigor.  Integrating the practices is critical for developing rigor in STEM fields.  How do leaders and teachers monitor implementation of both sets of practices? |
| **#36 Miami**Supporting preservice teachers with lesson planning: Connecting the 5 Es and mathematical process standards Elaine Cerrato FisherThe purpose of this presentation is to share ways in which a Mathematics Content Coach provided support for elementary preservice teachers in their struggle to structure math and science lesson plans. Together they explored the similarities among the process standards in the Principles and Standards for School Mathematics (NCTM, 2000) and the 5 Es of the National Science Education Standards (NRC, 1995) to gain a better understanding of sequencing lessons.  | **#37 Omni Ballroom A**To Integrate or Not to Integrate: A Question of FidelityMindy Kalchman, Richard KozollMethods for teaching early childhood mathematics and science are often addressed in a single methods course. One approach to teaching these dual-subject, or “blended” courses is to integrate the content and the pedagogy. An alternative to integrating the material is keeping the subject areas distinct. We argue for the latter, which allows pre-service teachers to first construct pedagogical content knowledge within each subject area, only after which is a fidelity of integration is possible. In our session we will facilitate a discussion based on the topic of integration and share our approach to teaching such a dual-content methods course. |

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| **Thursday Afternoon Sessions** | **2:00-2:50** |
| **#38 Naples**Understanding Fractions: Area and Linear ModelsHeidi Eisenreich, Laura TappWith the Common Core State Standards being implemented in most states, teachers are expected to introduce fractions in a way that aligns with these standards. This workshop will discuss two different types of models – area and linear. Participants will create different models, and be shown how to use them in their classroom.  | **#39 Pensacola A**Context-Dependency between Mathematics and Science by Using Students’ Response Patterns Masato KosakaThe objective of this study is to examine the types of questions that cause context-dependency between mathematics and science by using students’ response patterns in the tests and identify the factors that caused context-dependency. One hundred and sixty-five students in Grade 12 at highs school in Zambia were chosen for this study. The research was conducted by using the same two types of tests about function providing different context between mathematics and science. The result showed that the five questions out of twelve caused context dependency. Based upon the analysis, three factors were identified as the cause of context-dependency. |
| **#40 Pensacola B**Questioning elementary students in an interdisciplinary lesson in Science and MathematicsAnnie Savard, Ghislain SamsonIntegrative approaches and creating connections between science, technology, engineering and mathematics (STEM) seem to be still an issue. Whole class discussion might be a way to bridge them. In this session, we want to explore the questions two elementary school teachers asked while they orchestrated a whole class discussion during an interdisciplinary lesson. More specifically, we want to know what kinds of questions were asked to students in term of cognitive demand and find out if the questions lead to convergent or divergent answers. We are also interested to know what kind of knowledge and processes students were asked for.  | **#41 Pensacola C**Examining the Journey of Preservice Teachers Creating Culturally Responsive Mathematics LessonsRhonda WilliamsThis qualitative study explores the journey of preservice elementary teachers creating culturally responsive mathematics lessons for intermediate grades. It focuses on meaning and understanding that is obtained from the preservice teachers about the process of creating those lessons. The researcher investigated the process using lesson plans, student reflections, critical feedback from peers, and peer evaluation of the lessons. Findings provide understandings that will assist teacher educators that seek to promote creating culturally responsive mathematics lessons. |

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| **Thursday Afternoon Sessions** | **2:00-2:50** |
| **#42 Jacksonville** Challenges of Assessment in Inquiry Based Mathematics Courses for TeachersTommy SmithIn this presentation, the author will share examples of problems and tasks used in inquiry based mathematics courses for middle and elementary school teachers. Examples of assessment tasks, portfolios, and associated rubrics will be shown. The author will share some of the challenges associated with assigning course grades in classes that promote inquiry and aspire to promote students’ competence and confidence in doing mathematics. | **#43**  **St. Augustine**Creating a Model of Acceptance: Math and Science Family Learning EventsCherie McCollough, Olga RamirezThis research describes a culturally relevant mathematics and science content program for pre-service teachers (PSTs) at Family Math/Science Learning Events (FM/SLEs) conducted through two different university programs. These required course activities help PSTs interact with Latino families’ culture and language in after school settings. Results show that PSTs perceptions of Latino parents and culture can be changed through these events. Implications include providing PSTs with opportunities to participate in FM/SLEs that incorporate planning and teaching of culturally relevant math and science activities, requiring PSTS to identify and deconstruct misconceptions and negative perceptions of parents, especially Latino parents of ELLs. |
| **#44 Miami**“My Mathematics Classroom”: Validating the Draw-A-Mathematics-Teacher-Test ChecklistJuliana Utley, Stacy Reeder, Adrienne Redmond-SanogoGiven the potential of the Draw a Science Teacher Test – Checklist (Thomas, Pederson, & Finson, 2001) for launching reflection on and discussion about science teaching, the purpose of this research is to examine how preservice elementary teachers envision their mathematics classrooms and to determine the reliability and validity of the Draw a Mathematics Teacher Test-Checklist (DAMTT-C) to measure preservice teachers’ images of their future mathematics classrooms. The DAMTT-C will be shared along with samples of preservice teachers’ drawings.  | **#45 Omni Ballroom A**Promoting Pre-service Teachers' Use of Mathematical Discourse in the ClassroomHeidi Higgins, Tracy HargroveClassroom discussions play a significant role in deepening students' mathematical understanding and learning. This session will focus on increasing classroom discourse to develop children's number sense and problem solving. We will share teaching practices that promote an environment rich in communication and findings from a study designed to measure pre-service teachers' progress toward implementing mathematical discourse in their classrooms. A rubric and videos used for assessing their success with implementing mathematical discourse and whether this discourse improves students' mathematical understanding will be shared. |

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| **Thursday Afternoon Sessions** | **3:00-3:50** |
| **#46 Naples**STEM Writing: What It Is and How to Teach ItByung-In SeoCCSS, NCTM, and NSTA all say that students need to be able to communicate STEM knowledge. Secondary-level STEM teachers feel that they have the responsibility to teach their students content-specific writing, but feel they don't have the tools to do this work. Drawing from the findings of my research with secondary-level mathematics students and from my experiences as a secondary-level English/math/science teacher, I will give tools so that STEM teachers can do this work. Also, participants will try their hand at exercises from English/language arts class on STEM topics.  | **#47 Pensacola A**Are all lines straight?Jeremy Winters, Dovie Kimmins, Mary Martin, Teresa SchmidtWhat is a line? Do you have to qualify a line as straight or not? In the Common Core Math Standards both straight line and line are used. To answer these questions, our research looked at the current uses and understandings of the term "line." Participants of the study ranged from PK-12 preservice teachers to math majors. Findings and implications from this study will be shared. |
| **#48 Pensacola B**LOCUS Assessments: Implications for and Uses in Research and TeachingDouglas Whitaker, Steven Foti, Catherine Case, Tim JacobbeThe NSF-funded LOCUS project (DRL-1118168) has developed assessments to measure conceptual understanding in statistics, different from the procedural knowledge commonly assessed. This session provides a brief description of the development of the assessments, which are aligned with the GAISE framework and CCSS-M, and a number of representative sample items. Since statistics is a tool utilized in scientific exploration, LOCUS has implications for research and teaching of mathematics and science. This session will also highlight how sample items can be used in professional development with teachers.  |  |

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| **Thursday Afternoon Sessions** | **3:00-3:50** |
| **#49 Jacksonville** Unpacking Standards to Support Mathematical Learning of Students who Struggle with MathematicsElizabeth Jakubowski, Onder Koklu, Jiajing Huang, Tayfun Servi Cognitive and performance characteristics of general subtypes of mathematical disability were used to unpack mathematics standards at the middle grades level. Three subtypes of mathematical disability, semantic memory, procedural and visio-spatial, were used to analyze student cognitive and performance expectations in the Florida State Standards. The results of the application of a relative measurement method, analytic hierarchy process (AHP), yielded information for teachers and test developers regarding the structure of the standards in terms of mathematical disability characteristics. Specific examples aligned with the sub-types will be used to show the structure of the standards. | **#50**  **St. Augustine**STEM Road Map: A K-12 Integrated STEM Curriculum ProjectCarla Johnson, Erin Peters Burton, Toni SondergeldThe STEM Road Map is a national integrated STEM project that has produced an effective tool for teaching integrated STEM in grades K-12. Come and learn more about the new publication (due out 2015) and how it will help you transform the teaching of STEM |
| **Keynote Speaker Omni Ballroom A/B (4:00-5:00)** |
| **Reception in Atrium (5:00-6:00)** |

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| **Friday Morning – Full Breakfast 8:00-9:00 (Omni Ballroom)** **Awards and Business Meeting** |
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| **Friday Morning Sessions** | **9:10–9:35** |
| **#51 Naples**Classroom Environment Influence on Student Self-Efficacy in MathematicsGil Naizer, Hillary Croissant This study examined the characteristics of public school math classrooms and how they influence mathematics self-efficacy of 4th – 12th grade students. Students completed a classroom environment survey, followed by a self-efficacy survey. A multiple regression was used to determine which dimensions under classroom environment could predict a high or low self-efficacy. Data analysis was unable to generalize low self-efficacy in mathematics and classroom environment correlation due to a small effect size. High self-efficacy in mathematics was found to increase as cohesion and satisfaction would increase and high self-efficacy in mathematics would increase as friction and difficulty would decrease. | **#52 Pensacola A**The Effects of Problem- and Project-based Learning on Student Interests in STEMAlfred Hall, Angiline Powell, Matthew DavisParticipants will distinguish between problem and project based learning strategies via design and implementation activities based on water quality and conversation. Participants will learn how PBL strategies support the tenets of the CCSS for mathematics and the NGSS. PBLs can help enhance student awareness of the larger world, help them ask significant and relevant questions, and support them as they wrestle with big ideas. PBLs also support and encourage adolescents to think rationally and critically. This project was implemented in an urban middle school, and the results will indicate any effect these classroom strategies have on student interest in STEM.  |
| **#53 Pensacola B**Enhancing Engineering Education in the Elementary SchoolToni Ivey, Juliana Utley, Rebekah Hammack, Karen HighThe Next Generation Science Standards emphasize the incorporation of engineering practices in grades k-12. Therefore, it is important that elementary educators are knowledgeable about engineering and engineering careers so that they can expose their students to engineering. This session reports on a Math/Science Partnership that trained elementary teachers in engineering education curriculum. Teachers received training on two Engineering is Elementary kits and the Family Engineering curriculum. Researchers administered pre- and post- measures to gauge changes on teachers’: (1) knowledge and perceptions regarding engineering, and (2) self-efficacy of teaching engineering. This session discusses the findings of the program. |  |

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| **Friday Morning Sessions** | **9:10-9:35** |
| **#54 Jacksonville** Exploring how teachers differentiate mathematics instruction while using a standards-based curriculumCarolyn Mitten, Tim Jacobbe This session presents findings of a study investigating elementary preservice teachers’ beliefs about mathematics instruction by focusing on aspects of mathematical task knowledge. The intervention for the study focused on learning about features of mathematical tasks that hold the potential for eliciting low and high levels of cognitive demand and participating in a letter writing exchange with third grade students. Results from the study indicate ways to improve the elementary preservice teachers’ learning in the elementary mathematics methods course. | **#55 St. Augustine**Pre-Service Science Teachers: Shifting Views of Nature of Science Julie AngleTo strengthen pre-service science teachers’ understanding of nature of science an additional science methods course, “Teaching Nature of Science through an Inquiry Approach” was added to the degree program of students pursuing a degree in secondary science education. During this course NOS was taught through an explicit approach. Students enrolled in the course conducted engaging lessons that addressed tenants of nature of science, and engaged in group discussions facilitating reflective NOS practices. This session focuses on the outline of the course, pre/post assessments, and student leadership opportunities. |
| **9:10-10:10** |
| **Miami**Past President’s Meeting |

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| **Friday Morning Sessions** | **9:45-10:10** |
| **#56 Naples**Motivating and Inspiring Middle Level Students’ Interest in STEM via STEM Camp Craig Schroeder, Christa Jackson, Margaret Mohr-Schroeder, Kayla Blyman, Maranda Miller, Maureen Cavalcanti, & Thomas RobertsBefore many students enter the 8th grade, they conclude many of the STEM subjects are too challenging, boring, and/or uninteresting (PCAST, 2010). It is at this key juncture in students’ educational career that their interest in STEM must be roused. Research has shown that more exposure to a variety of STEM opportunities will have a long-term effect on individuals and the overall STEM education community (Wai, Lubinski, Benbow, & Steiger, 2010). In this session, we discuss the extent middle level students’ perceptions and interest in STEM change after participating in a week long STEM Camp. | **#57 Pensacola A**Teaching and Learning STEM Subjects through a Robotics Program for Elementary Students Elaine TuftThis session will be a description of a partnership between a university school of education, a robotics learning business, and a school district to offer enrichment robotics classes to 5th and 6th graders. After being trained in using and teaching Lego Mindstorm Robotics, elementary education majors taught the classes to the elementary students. The first round of the project provided robotics classes to over 540 students in 20 classes at 15 elementary schools taught by 11 university students. Outcomes of this effort, including effects of this program on the elementary students’ and university students’ knowledge and attitudes will be reported.  |
| **#58 Pensacola B**Assistive Technology Applications for Mathematics and Science LearnersPatricia O'DonnellHow can teachers utilize student's own technology devices to discover applications that work for many different learning styles? Teachers and students can examine the usage of technology through inquiry lessons in mathematics and Science. The students gain novel techniques while researching new apps for their assignments from free app stores and other sites for iPads, adnroid tablets and cell phones. Students and teachers will gain knowledge of the latest applications for their devices while experimenting. Expanations and examples of different learner's success with particular apps will be examined to identify how to find application downloads for different devices. | **#59 Pensacola C**Prospective teachers’ considerations during the lesson planning processJessica de la CruzThis session will examine prospective teachers’ considerations when selecting proportional reasoning tasks for a lesson, with fifth graders, involving comparing ratios. We will discuss the extent to which prospective elementary school teachers considered (a) the numerical structure of the ratios within the chosen comparison, (b) the likely strategies that such a comparison would elicit from fifth graders, (c) the link between numerical structure and student thinking , and (d) the goal of the lesson. Implications of this research for teacher education will be shared.  |

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| **Friday Morning Sessions** | **9:45-10:10** |
| **#60 Jacksonville** Correlating Teachers’ Implementation of a Moon Phase Lesson to Student Learning Outcomes Jennifer Wilhelm, Mary Lamar, Merryn ColeThis study explores the correlation between teachers’ implementation of an inquiry-based moon phase lesson to student learning outcomes as measured on a lunar assessment. This lesson was part of a 5 week long implementation of the Realistic Explorations in Astronomical Learning (REAL) Curriculum, which focuses on teaching Moon phases and related mathematics and science concepts. Students kept daily moon observation journals for 5 weeks prior to this lesson. Videotapes of the moon phase lesson were scored using the PSOP (Practice of Science Observation Protocol). Findings indicate a link between teachers’ effective implementation of this lesson and student learning gains.  | **#61 St. Augustine**ASSURE Model: Enhancing Pre-service Teachers’ TPACK Capacity for Mathematic instructionHsing Wen Hu, Wei Ying HsiaoMathematics Teacher TPACK Development model has been successful in helping pre-service teachers by identifying them as teachers of mathematics instead of learners of mathematics, but there are few evidences about what the better approaches are for enhancing pre-service teachers’ TPACK capacity in designing and implementing mathematics lessons. The ASSURE Model (a model that leads educators to plan systematically for effective use of technology and media) is recommended as an effective approach to enhance pre-service teachers’ instructional strategies for TPACK integration. From this presentation, participants will not only be able to perceive the interactions between the Mathematics Teacher TPACK Development Model and ASSURE model but also debrief what is the best practice for integrating technology into math teaching.  |

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| **Friday Morning Sessions** | **10:20-10:45** |
| **#62 Naples**Impact of Student Motivation on Learning Mathematics in an Informal SettingWilliam Bean, Mr. Jeffrey R. Peake, Jennifer Wilhelm, Christa JacksonIn this session, we discuss student motivation for learning STEM concepts in an informal, after-school setting. Students participated in a 13 week program that emphasized developing their mathematics and science content knowledge via a lunar-related curriculum. This qualitative study utilized Padilla’s Local Student Success Model to determine in what ways students’ motivation affected their mathematical development while being instructed with an integrated curriculum. Data were triangulated for trustworthiness. Findings suggest student motivation influenced the effectiveness of an integrated curriculum to develop students' mathematical knowledge. Informal settings are opportunities for students to learn STEM concepts and student motivation has a role. | **#63 Pensacola A**Meeting pre-service teachers 21st century needs for technology integrationAbigail Perkins, Timothy ScottA STEM teacher preparation program was evaluated for technological, pedagogical, and content knowledge (TPACK) implications. A TPACK survey was administered to pre-service teachers in the program and in a separate control group. Findings indicate scholars reported statistically higher self-efficacies relating to technological knowledge and technological pedagogical knowledge, with higher averaged survey responses to all TPACK categories. Potentially influential program features are discussed, such as multi-modal use of varying technologies and entry into a discursive community of learners. By situating technology within a broader conceptualization of professional knowledge, programs may better prepare teachers to integrate technology into teaching practices. |
| **#64 Pensacola B**Preschoolers Exposure to Scientists in the Sid the Science Kid TV ShowDonna Farland-Smith, Xuemei ZhaoIn an effort to understand aspects of scientists preschoolers were exposed to during one thirty minute episode researchers evaluated and analyzed 51 episodes of Sid the Science Kid. Overall study findings about the use of process skills suggest preschoolers are exposed to observation and predicting most often while watching the television show, and are exposed to an average of fifteen questions per episode. The explicit and implicit use of the word scientist (an average of five times per episode) might actually help young children visualize themselves as scientists.  | **#65 Pensacola C**The Relationship between Mathematics Teachers' PCK and Their Professional BackgroundJames Telese, Zhidong ZhangThis session will present the results from a regression analysis and a path analysis. In this study, elementary teachers were administered two measures of mathematics knowledge for teaching, the Elementary Geometry and the Patterns, Functions and Algebra LMT. Their scores were regressed with their various background variables such as self-efficacy, years of experience, amount of professional development and coursework in mathematics and mathematics education. The results showed that PCK was statistically significant in predicting self-efficacy. In addition, a discuss will be presented based on a path analysis for professional background and PCK factors and frequency of classroom activities that foster deeper understanding of mathematics. |

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| **Friday Morning Sessions** | **10:20-10:45** |
| **#66 Jacksonville** Publishing in the SSM JournalCarla Johnson, Shelly Harkness, Andrea MilnerThis session will provide an overview of the requirements for publishing in the SSM Journal. |
| **Friday Morning Sessions** | **10:20-11:20** |
| **#67 Omni Ballroom A**But It Can't Be True! Well, Maybe.William SpeerJoin in the exploration of the nature and benefits of activities designed to invite reasoning and discourse about scientific and mathematical ideas to help us all better understand ways that ideas interconnect and build on one another to produce a coherent knowledge base. Being good at science/mathematics is not evidenced by how many answers you know. Instead, it best evidenced by what you do when you don't know the answers. We must help students construct and own "new" knowledge in a manner that enables them to apply new knowledge in ways different from the situation in which it was learned. |

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| **Friday Morning Sessions** | **10:55-11:20** |
| **#68 Naples**Fifth Graders Discuss Mathematics and Science in and out of the ClassroomCynthia OronaThe qualitative portion of a three year NSF study collected data via children focus groups (7 girl groups, 4 boy groups) to determine the types of mathematics and science 5th grade students were currently receiving and the types they would like to receive. There were a total of 49 participants (32 girls, 17 boys) in 11 of 23 schools involved in the study in northeastern Oklahoma. In addition, data was analyzed to look for trends in how students connected mathematics and science to their worlds outside of the classroom.  | **#69 Pensacola A**Cognitively Guided Instruction in a Second Grade ClassroomRon Zambo, Amy SpildeThis presentation will highlight an action research study regarding the effects of guided practice problem solving in a second grade classroom. Over a 12-week period students were involved with problem solving with a focus on progressing solution strategy complexity through incremental steps. Students’ problem solving abilities increased dramatically from participating in daily CGI-style word problem solving; students worked more independently on problems as their problem solving abilities increased; and students checked the accuracy of their work more frequently as a result of participation in this innovation.  |
| **#70 Pensacola B**Is there a Disconnect between Students and Instructors?Paul McCombsAs part of my research on student understanding of series and series convergence, students who participated in the study were asked demographic information. Some of the information asked of the students concerned where they went for assistance when their mathematics course became difficult. In addition, instructors were asked their opinion as to where students should go for assistance. In this talk I will reveal what was observed from the data collected and provide some possible ways to bridge the possible gap. | **#71 Pensacola C**Emerging bilingual students’ developing conceptual understanding and academic languageMolly Weinburgh, Cecilia Silva, Kathy SmithOur research focuses on helping emerging bilingual students acquire and modify knowledge and language needed to be successful in science in U.S. schools. Forty-five students, recent immigrants with various levels of English language proficiency and prior schooling, participated in the study. We examined the change in science content knowledge and academic vocabulary as emerging bilingual students engaged in inquiry-based science experience. A team of researchers coded the transcribed pre/post interview. Results, explanations and implications will be discussed. |

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| **Friday Morning Sessions** | **10:55-11:20** |
| **#72 Jacksonville** Elaborating teachers’ choice and use of examples: Improving mathematics teachingOguz Koklu, Fatma Aslan-TutakThe study aims at emphasizing the critical role of examples employed in classroom teaching. Based on our larger project, we will be focusing on in-class mathematical examples used by six middle school mathematics teachers in teaching the concept of slope. We will address types of examples included as well as various ways they were used to teach essential ideas of slope concept. The audience will observe the ones that are more effective, and the ones that have the potential to produce misconceptions, hence, interactively deduce some basic features of good examples for teaching the slope concept.  | **#73 St. Augustine**Preparing Prospective Teachers to Work with Students who Struggle in Mathematics Christa Jackson, Margaret Mohr-Schroeder, Craig Schroeder, Thomas Roberts, Maureen Cavalcanti, Kayla Blyman, and Maranda MillerAccording to the Teaching Principle from the Principles and Standards of School Mathematics, “effective mathematics teaching requires understanding what students know and need to learn and then challenging and supporting them to learn it well” (NCTM, 2000, p. 17). Traditionally, teacher education programs have placed little emphasis on preparing mathematics teachers to work with struggling learners (Allsopp, Kyger, & Lovin, 2007). The purpose of this session is to discuss how a course situated in an informal learning environment affects the preparation of secondary mathematics prospective teachers to work with students who struggle in mathematics. |
| **#74 Miami**Exploring Preservice Teachers’ Understanding of Science Instruction Through an International Research ExperienceSuzanne Nesmith, Betty Ruth BakerSignificant documentation exists to demonstrate that in order to develop and improve teaching, educators must regularly reflect on what they do. For preservice teachers, reflective teaching often takes the form of role-playing, discussions, written journals, and observational reports. Another means of improving reflectivity is through classroom research, yet preservice teachers are often reluctant to engage in experiences of this type. This presentation will describe a U.S./Australia experience designed to involve preservice teachers in science pedagogy research. Findings related to the impact of the experience on preservice teachers’ understanding of the similarities and differences between science practices in these countries will also be shared. |  |

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| **Friday Morning Sessions** | **11:30-11:55** |
| **#75 Naples**Examining REU Fellows’ Research Expectations as They Begin a Research-Intensive STEM ProgramMolly Fisher, Jennifer WilhelmWe describe what REU (Research Experiences for Undergraduates) Fellows reported regarding their expected learning experiences within a nine-month research-intensive program in STEM Education. We examined Fellows’ research expectations, familiarity with research literature, and ability to conduct statistical analyses through a survey modified from Kardash (2000). Our findings showed Fellows enter the program with confidence in analyzing literature, but still need improvement in the areas of designing their own research projects and performing statistical analysis of their research data. Despite their initial confidence, Fellows believe this program can greatly increase their abilities to conduct research and write manuscripts for publication. | **#76 Pensacola A**A Longitudinal Study: Comparing STEM Schools to non-STEM Schools in terms of High School Students’ Mathematics Achievement Ali Bicer, Bilgin Navruz, Robert M. Capraro, Mary M. CapraroA central aim of STEM schools is to increase K-12 students’ mathematics and science scores on both national and international exams. In the present study, a hierarchical linear model (HLM) was used to investigate whether STEM schools are promising math achievement comparing to non-STEM high schools. A longitudinal data for three years (2009-2011) were obtained from Texas Education Agency from STEM and non-STEM high schools located in the state of Texas. Students’ mathematics score from 2009 and 2011 were followed to investigate the differences between STEM schools and non-STEM schools students’ mathematics score growth rate.  |
| **#77 Pensacola B**Exploring Students’ Understanding of Polynomial FunctionsVictor Cifarelli, Volkan SevimThis paper reports results from a study of College Algebra students that examined their understanding of polynomial functions. Our research questions were: 1.What is the essence of the students’ understanding of polynomial function? and 2. How do they use their understanding of polynomial functions to solve problems? Unlike traditional studies of understanding that rely primarily on quantitative assessments, the study included interviews with students as they completed mathematical tasks, enabling a focus on the students’ on-going cognitive actions. The results provide a comprehensive account of the mathematical knowledge developed by the students as they solved polynomial function problems.  | **#78 Pensacola C**Graphing Calculator Quandary: When should graphing calculators be used when graphing quadratics?Elayne Weger Bowman, Kansas ConradyHigh stakes testing is driving the decision for when and where teachers use technology in the mathematics classroom. This study examined two sequences for using graphing calculators to teach quadratic functions in two classes of Honors Algebra 2 (n=43) in a large Midwestern high school. While each class received both types of instruction, initial instruction for one class incorporated the graphing calculator, while the other class used pencil and paper. Data from pre, mid, and post-tests suggest that students can learn to graph quadratics by either sequence, but indicate that students who initially use pencil and paper are advantaged. |

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| **Friday Morning Sessions** | **11:30-11:55** |
| **#79 Jacksonville** Reviewing for the SSM JournalShelly Harkness, Carla C. Johnson, Andrea MilnerThis session will provide an orientation for how to complete peer reviews for the SSM Journal. | **#80 St. Augustine**Impact of a non-majors biology course on student’s knowledge and perceptions of the general education curriculum Michael Rutledge, Sandra Lampley, Jeff BonnerThe objective of this work was to determine the impact of a non-majors biology course that features active-learning strategies on student perceptions of the role of the General Education Program (GEP). Courses that seek to make content relevant while emphasizing the goals of the GEP may help engage students in their own learning and increase the perceived value of courses that are not in a student's major. In this presentation we will show the analysis of data that was collected on the first and last day of class utilizing an existing instrument.  |
| **#81 Miami**Is Doing Knowing? Elementary Student Views About Scientific InquiryJennifer Parrish, Stephen Bartos, Kim Sadler The purpose of the current study was to examine changes in 5th grade students’ views about scientific inquiry after completing an open-ended inquiry investigation with explicit instruction on scientific inquiry. The study examined the following question: Does explicit inquiry instruction combined with doing inquiry inform student views about the practice of science? An abridged version of the Views About Science Inquiry instrument (VASI) developed by Lederman et al. (2014) was administered in a pre- and post-survey design. The unit culminated with an open-ended inquiry investigation where groups of 3 – 5 students worked cooperatively to answer an original, student-generated testable question. Preliminary results showed few changes in students’ views about scientific inquiry. Implications from this preliminary study support the idea that students may need more teacher guidance and classroom discourse to understand the practices of science. |
| **LUNCH and KEYNOTE SPEAKER Florida Ballroom Salon C (12:15-1:50)**  |

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| **Friday Afternoon Sessions** | **2:00-2:50** |
| **#82 Naples**Using Collaboration to Increase STEM Engagement for GirlsKaren Peterson, Brenda BritschIn this interactive, dynamic session, learn about the proven model, tools and resources developed by the National Girls Collaborative Project to strengthen practitioner efforts to engage and support girls in STEM programs. Participants will leave this session with information about the research related to engaging and supporting girls in STEM; professional development tools and opportunities for staff members; ready-to-implement strategies and curricula integrating inquiry-based science instruction with a commitment to gender equity, based on the PBS television series, SciGirlsTM; and access to free materials for hands-on, video-enhanced activities that put a creative twist on teaching STEM.  | **#83 Pensacola A**No Student Teacher Left Behind: Lessons Learned from a Physically Handicapped Science Student Teacher Catherine KoehlerStudent teaching is the rite of passage for all future teachers. The experience can be exhilarating, exhausting, exciting and rewarding for the student teacher, but just imagine going through this experience with a physical handicap. This qualitative case study explores the student teaching experience of Andrew, a 25-year old secondary science preservice teacher who is inflicted with Duchenne muscular dystrophy (DMD). This study followed Andrew for one academic year from secondary science methods course through student teaching. The lessons learned from this experience is a story that needs to be shared with all parties involved in teacher education preparation. |
| **#84 Pensacola B**Sparking Teacher Candidate's Interest in STEMDarlinda Cassel, Daniel Vincent, Jennifer Shields, Wendy Mounger With the growing emphasis on developing STEM experiences both at the K-12 level and at the university teacher-preparation level, faculty need to begin sharing ideas on how to engage teacher candidates in STEM experiences. This session will focus on how university level methods courses promoted positive attitudes towards STEM learning and thinking by providing opportunities for undergraduates to work with K-12 students on STEM experiences. The presenters, which include undergraduate teacher candidates, will discuss course organization, field experience opportunities and tasks that help motivate teacher candidates to include STEM activities in their future classroom. |  |

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| **Friday Afternoon Sessions** | **2:00-2:50** |
| **#85 Jacksonville** Starting from Scratch: Designing an Integrated Degree for Middle School CertificationAlan ZollmanThe State of Illinois begins tri-level certification, requiring a new middle level education certification degree program of each higher education institution. This presentation will be an open discussion of the stages of development an integrated, cross-disciplinary degree – including the political, social, and academic challenges and achievements. The program for mathematics and science has several unique aspects including assisting students through notorious university “gateway” courses and the blending STEM Education into methods courses. | **#86 St. Augustine**Using Free Online Tutor Khan Academy to Blend or Flip Math InstructionLori Cargile, Shelly Sheats HarknessKhan Academy (KA) is a free online tutorial program that is currently used by more than 10 million users worldwide.  This session focuses on using KA to blend or flip mathematics instruction but is also applicable to science instruction and other commercially available online tutorial programs.  Participants in the hands-on session will view examples from the KA website and will learn (a) how some schools are already using KA; (b) blending/flipping tips from field experts; (c) using KA as a formative assessment tool; and (d) relevant research.   The participants will also engage with a mathematics mini project.​ |

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| **Friday Afternoon Sessions** | **3:00-3:50** |
| **#87 Naples**Building Bridges with MenusCarolyn Riley, Linda FigginsMenus allow teachers to take advantage of mathematics as a tool for building science concepts. They can include problem solving experiences, game situations, and scientific investigations that allow students to make choices and help differentiate instruction in order to meet the needs of a diverse group of learners. In this interactive session participants will learn how a menu of activities can be used to strengthen mathematical thinking and support scientific inquiry. As participants work through various menus they will learn how menus fit into an instructional sequence. The interactive menus support the natural connections between mathematics and science. | **#88 Pensacola A**A Look at the Interplay between the Common Core and the NGSS PracticesKen Miller, Georgia CobbsBoth the Next Generation Science Standards (NGSS) and Common Core Mathematics Standards (CCMS) approach teaching so that students develop fluency, mathematical and scientific mindsets, conceptual understanding, and see applications in the world around them. Both CCMS and NGSS encourage teachers to use practices related to their respective content areas. These practices have too often been under emphasized in K-12 science and mathematics education. This presentation will discuss the interplay between the NGSS and CCMS Practices. Participants will be involved in an activity to prepare model lessons “Integrating the Practices in Math and Science.” |
| **#89 Pensacola B**Changing Course: Construction of Scientific and Mathematical ThinkingJane Metty, Clemmie WhatleyThis session provides an overview of a pre-service teacher course designed to develop the habits of mind consistent with the practices of mathematics and science. The rationale for this course and the decision to make this a mandatory course for all elementary pre-service teachers will be discussed. The session encourages robust debate and discussion about the need for this type of course, the substance of the course and lessons learned about delivery of a course devoted to “the construction of scientific and mathematical thinking”.  | **#90 Pensacola C**Outcomes of an iPad Assignment in an Intermediate Grades Pedagogy CourseKansas ConradyStudents in an intermediate grades mathematics pedagogy course completed a multi-phase technology activity consisting of textbook readings, an iPad app Scavengar Hunt, develop an activity that uses an iPad app, an in-depth in-class analysis of approximately 6 apps and the technology activities, and a reflection on the overall activity about what they learned and issues of implementation. Qualitative content analysis of this data suggests that preservice elementary teachers value iPad integration, but still struggle to modify or redesign tasks to allow for tasks that could not be completed without technology. |

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| **Friday Afternoon Sessions** | **3:00-3:50** |
| **#91 Jacksonville** STEM Principals: What They Want and What They NeedSandra West, Sandra BrowningSchool administrators have an intrinsic incentive to create a culture of teacher collaboration to positively affect student learning (Burkhouser, Gates, Hamilton & Ikemoto, 2012; Lunenburg, 2010). Principals rate deficiencies in content and pedagogical knowledge as the primary factor in teacher ineffectiveness (Torff & Sessions, 2009). This presentation delineates the findings from a multi-year study in which teams of grades 5-8 principals and their science and mathematics teachers participated in a series of professional development (PD) using the Correlated Science and Math (CSM) PD model (Author, 2006) that focuses on the integration of science and mathematics to increase student performance.  | **#92 St. Augustine**Situated Cognition Enhances Mathematical Approaches to Natural/Artificial SelectionLeslie Sandra Jones, Joy W. Darley The words evolution and statistics can both evoke negative reactions from students and impede their likelihood of understanding these important subjects. We have developed a number of collaborative, integrated activities that combine both topics in familiar contexts. Instead of the often outdated, classic textbook examples, these ideas are more relevant to current students. Manipulatives reduce the degree of abstraction and make measures of central tendency & variation that are used to explain directional, stabilizing, & disruptive selection more evident. Lessons can be modified to differentiate instruction or meet different grade-level standards in both mathematics and science. |

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| **Friday Afternoon Sessions** | **4:00-4:50** |
| **#93 Naples**Getting Pre-Service Elementary Teachers to Buy in to Problem Based Learning for Math and Science Through ModelingVanessa WyssPre-service elementary teachers sometimes struggle with implementing true problem based learning. It takes confidence in self, and confidence in students. This interactive/hands on workshop will give examples of problem based learning that can be easily implemented in the classroom. The purpose of the examples demonstrated in this session is to have pre-service teachers experience problem based learning, however the examples could be used in the pre-k classroom as well. Authors note that problem based learning has multiple definitions, this presentation is derived from the definition as exemplified in Van De Walle, Karp, and Bay-Williams, 2013. | **#94 Pensacola A**K-12 STEM Summer Institute for TeachersSusan CooperThis presentation will describe the implementation of two week-long K-12 STEM Summer Institutes for K-12 teachers through partnering the university, local informal educators, and businesses. With a limited budget, the institutes emphasized evidence-based inquiry techniques using the lens of environmental issues. Teachers participated in inquiry-based activities, including some that integrated iPads with Vernier probes, as they learned more about conducting scientific investigations. The teachers used what they learned to develop and publish inquiry lesson plans for K-12 classrooms. The planning process, inquiry activities, and outcomes of the institutes will be shared with participants. |
| **#95 Pensacola B**Improving Learning of Chemical Equilibrium with TechnologyBharath Kumar, Rebecca KrallChemistry concepts are abstract and difficult to learn, particularly at the microscopic level. Chemical equilibrium is a topic that presents many conceptual difficulties for students. Effective use of technology can make abstract concepts accessible and apparent to students, and can support explorations of natural phenomena. This paper will present a review of the research on common conceptual difficulties secondary students and teachers experience with chemical equilibrium, and review current instructional tools and technologies for teaching chemical equilibrium. The paper will conclude with a discussion on partnering visual simulations with low-tech instructional methods to improve student learning of chemical equilibrium. | **#96 Pensacola C**High School Mathematics Coaches and Models of InfluenceSue Brown, Scott Harrell, Sandra BrowningThis study examined the impact of mathematics coaching on the quality of instructional practices of Algebra I teachers in three high schools. This mixed methods case study included data collected in classroom observations, individual interviews with instructional coaches, focus groups with Algebra I teams, and coaching logs. This study provides insight into the factors influencing the implementation of the coaching initiative at each site including the assets an instructional coach brought to the position and the challenges unique to each school. These factors governed the approach the instructional coach took to influence instructional practices.  |

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| **Friday Afternoon Sessions** | **4:00-4:50** |
| **#97 Jacksonville** Elementary Teachers Engaged in Authentic Math and Science (ETEAMS)Tonya Jeffery, Cherie McCollough, Kim MooreETEAMS (Elementary Teachers Engaged in Authentic Math and Science) is a NSF funded initiative that provides a transformative pathway for elementary generalist pre-service teachers (PSTs) to seek additional 4-8 teaching certification(s) in science and/or mathematics. The project is collaborative involving a major university and local school district partnering to engage PSTs and inservice teachers in field research that focuses on the unique regional coastal environments, increasing content knowledge in STEM fields. The project plans to increase self-efficacy and content knowledge in science and mathematics for PSTs, classroom teachers, and grades 4-8 students. Project design and preliminary findings will be discussed. | **#98 St. Augustine**Engineering is Everywhere Nicole Colston, Tyler Ley, Julie Thomas, Toni Ivey, Juliana UtleyThree video lectures and super cool microscopes encourage students to explore how real-life engineers use math and science to improve their designs. This unique curriculum pathway and accompanying activity trunk offer hands-on opportunities for students to explore how micro-structures are important to structural and material engineers. Tested in 5th grade classrooms and with preservice elementary educators, this Curriculum exposes the learner to engineering careers and engineers’ use of mathematics and science. Come play with us and help guide the future development of this curriculum! |
| **#99 Miami**Nature of Mathematical KnowledgeIbrahim Burak Olmez, Oguz KokluStudents and teachers need deeper understanding about where mathematical knowledge comes from to understand more about mathematics. At this point, nature of mathematical knowledge presents awareness. Regarding “Nature of Mathematical Knowledge” as values and assumptions located in mathematical knowledge and its development, there is close relationship between nature of scientific and mathematical knowledge in terms of being tentative, being empirically based, and being cumulative. The aim of this paper is to emphasize these similarities, and the role of history of mathematics in understanding nature of mathematical knowledge. | **#100 Omni Ballroom A**Examination of Problem Solving Lessons Presented in Virtual Classroom in Second LifeTrina Davis, Enrico Indiogine, Tugba Oner, Glenn Phillips, Gerald KulmThe research team will present findings from examining classroom observation data from problem solving lessons delivered in a virtual algebra classroom in Second Life across multiple semesters of a 5-year NSF-funded design experiment. The Knowledge for Algebra Teaching for Equity (KATE) Project employed various strategies to enhance middle grades preservice teachers’ knowledge for teaching algebra problem solving for equity. Results from using the Virtual Classroom Observation Instrument (VCOI) to examine the algebra problem solving lessons will be presented. Discussions of the overall effectiveness of using Second Life classrooms simulations to engage preservice teachers in practice teaching sessions will be highlighted. |

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| **Friday Afternoon** |
| **SSMA Committee Meetings (5:00 – 6:00)**  |
| **Awards and Endowments****Membership****Conventions****Finance****Nominations and Elections****Policy****Publications** | **Naples****Pensacola A****Pensacola B****Pensacola C****Jacksonville** **St. Augustine****Miami** |

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| **Saturday Morning – Continental Breakfast 7:30-8:30 (Florida Salon D)** |
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| **Saturday Morning Sessions** | **8:30-8:55** |
| **#101 Naples**Developing Spatial Skills in K-6Adele Hanlon, Colleen WilsonHelp your students increase their spatial prowess with these hands-on activities that can be integrated into your daily rituals and routines. | **#102 Pensacola A**Process Oriented Guided Inquiry Learning and Alternative Conceptions in Secondary Chemistry Scott Watson, Michelle BarthlowThis study investigated the effect of process oriented guided inquiry learning (POGIL) in high school chemistry to reduce alternate conceptions related to the particulate nature of matter versus traditional lecture pedagogy. A nonequivalent control group design was utilized. Data were collected from chemistry students in four large high schools and analyzed using ANCOVA. The results show that POGIL pedagogy, as opposed to traditional lecture pedagogy, resulted in fewer alternate conceptions related to the particulate nature of matter. Male and female students in the POGIL group posted better posttest scores than their traditional group peers. |
| **#103 Pensacola B**Using Hands-on Activities into Teaching Activities for Natural Science and Life Technology I-shin ChenThe purpose of the study was to design hands-on activities to teach Natural Science and Life Technology.  All hands-on activities covered General Physics, Mechanics, Heat, Light, etc.  There are four activities as belowing: 1) Celt; 2) Water Rocket; 3) “Manneken Pis” heat effect; 4) CD (Compact Disc) diffraction grating phenomena and others.  The study will provide another kind of teaching method also it provides teaching materials for 5th graders in elementary school teachers and a new research branch for science educators. | **#104 Pensacola C**Using K-5 Science as a Framework for Addressing Common Core State Standards Nancy Romance, Michael VitaleTwo decades of NAEP reports indicate that science learning and content-area reading comprehension are persistent problems across grades K-5. With the challenges associated with the addition of Common Core State Standards (CCSS-LA), teachers would benefit from exemplary instructional models of how best to blend the CCSS with the Next Generation Science Standards (NGSS) across K-5 classrooms. Presented is a description of the K-5 integrated model, the effectiveness of the model on accelerating student literacy growth through science, and, an analysis of how schools can address CCSS standards in both reading and writing by integrating them within NGSS-focused science instruction.  |

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| **Saturday Morning Sessions** | **8:30-8:55** |
| **#105 Jacksonville** Changes in Content Knowledge of Grades 6 – 8 Mathematics Teachers Through Professional DevelopmentGregory ChambleeThis presentation will discuss content knowledge changes in Grades 6 - 8 mathematics teachers who participated in a two-year US DOE MSP grant.  | **#106 St. Augustine**"Reading, Writing, and Arithmetic: Incorporating Literacy in the Mathematics Classroom"Stephanie Dillard-McClain, Susan Seay, Tommy SmithThis presentation will share results of a research study that investigated secondary mathematics teachers’ perceptions regarding the implementation process of Common Core literacy standards in mathematics classrooms in public schools in the state of Alabama. Likewise, this study sought to identify ways in which secondary teachers were implementing the Common Core literacy standards and determine the resources needed to do so efficiently and effectively. Results and implications for classroom teachers and administrators will be discussed. |
| **#107 Miami**Multiyear Analysis of Strategies Modeling and Reading Together ThroughAndrea Milner, Vanessa MorrisonThis presentation will report on the results of a multiyear analysis of "Strategies Modeling and Reading Together Through Integrating Science" (SMARTTIS). SMARTTIS is a collaborative project between a small liberal arts college in the Midwest and a local public school system focusing on summer school enrichment programs. This research centers around the integration of science and reading, teacher beliefs, student content knowledge, and student attitudes. |

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| **Saturday Morning Sessions** | **9:10-10:00** |
| **#108 Naples**Next Generation Science Standards + Common Core Promotes Plant LiteracyLloyd BarrowThis workshop will provide experiences of using Next Generation and Common Core in designing a plant unit.Also student misconceptions will be highlighted. Plants are an essential part of the environment and provides us with sources of food, beauty, and resources. The unit starts with attributes of seeds. The science notebook provides a place for students to record their observations. | **#109 Pensacola A**Predictors for Success in a STEM Degree at a large Midwestern Land Grant University Adrienne Redmond-Sanogo, Julie Angle, Robert Evan Davis, Sean SimmonsThis study explored both high school and college predictors for successfully graduating with a STEM major at a large Midwestern Land Grant University. Students who had declared a STEM major between the Fall of 2006 and the Spring of 2008 were chosen as participants in this study with a final sample of 893 students. Both high school and university academic performance measures in the form of course grades, ACT/SAT scores, and GPA were collected and analyzed. Researchers found successfully completing Calculus in high school was a predictor of graduating with a STEM degree. Additional results and implications will be discussed. |
| **#110 Pensacola B**Guiding versus Telling: Engaging Elementary Mathematics Students in Doing MathematicsRebecca Gault, Katie HarshmanAs teachers, we want to help. We believe we have valuable knowledge that, if we can give it to our students, will help them. Teachers are, by our very nature, eager to help and highly empathetic to any discomfort our students feel. This can result in a teacher accomplishing exactly the opposite of what is intended: The student comes to believe that the teacher is the only source of strategies to solve problems. What if we don’t “tell” our students a process? What if we do something more valuable, truly guide, instead? What does that look like? | **#111 Pensacola C**Do Vampires Exist? Exploring biological populations with indirect proofVidal Olivares, Jenny HartEngage your biology, ecology or mathematics students in the study of exponential and logistic population growth with this hands-on proof of the age-old question: do vampires exist? This adaptable activity gives students a first look at indirect proof, extends the students’ critical thinking skills, and leads naturally into rich conversations about literature and history. Additional concepts which can be addressed with this task include: predator/prey relationships, carrying capacity, limiting factors, probability, graphing exponential function, and finding lines of regression. Finally, the presenters will demonstrate how this task can be adjusted for teacher educators to use with pre-service middle grades teachers.  |

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| **Saturday Morning Sessions** | **9:10-10:00** |
| **#112 Jacksonville** Dealing with the Magnitude of Fractions Effectively: Using Benchmark NumbersFuchang LiuThe magnitude of a fraction is difficult for beginners in that it's not visible from the fraction's numerator or denominator, as 0.2 in 1/5 is not shown by either the 1 or 5. This study investigated using common benchmark numbers to facilitate the perception of a fraction's magnitude. Seven benchmark numbers were chosen: 0, 1/4, 1/3, 1/2, 2/3, 3/4, and 1. Then 127 uncommon factions were formed. Four rules were derived on how to "round" an uncommon fraction to one of such benchmark numbers. Results suggest that using benchmark numbers is very beneficial in perceiving the magnitude of uncommon fractions.  | **#113 St. Augustine**Use a Science Writing Heuristic to support the CCSS and NGSS while Improving Student's Science Self-EfficacyNancy Caukin A science writing heuristic (SWH) is a tool used by educators to engage students in guided-inquiry laboratory experiences where students design their own labs based on their own questions and science standards. They make claims based on the evidence they collect; compare results and analyze group data; and reflect deeply on their work. I have engaged in action research using SWH with my chemistry students and will share their insights on how using a SWH affected their attitudes about science as well as how this writing-to-learn instructional strategy supports the Common Core State Standards and the Next Generation Science Standards. |
| **#114 Miami**Common Sense Common Core for Classroom Teachers Clara Gill, Susan GotwalsWhile often presented as a new trend in education, Common Core is a recognition of the connections that existed in the curriculum all along. Doctor Gill and Mrs. Gotwals are classroom teachers who work together to create lessons that take advantage of the connections that naturally exist between Math and Science in middle school curriculum. Over the years, they have presented their ideas at local and state conferences. They developed a common sense process that makes planning Common Core lessons engaging for both teachers and students. |

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| **Saturday Morning Sessions** | **9:10-10:00** |
| **#115 Syllabus Share Omni B** *A High School Chemistry Incorporating Best Practices* James LaughnerHigh school teachers often need a detailed curriculum to overcome entrenched hindrances to good methodology. This first-year, modeling based advanced chemistry curriculum covers all topics on the SAT II test. It uses a modeling approach and an atoms-first order, a free text, student-performed demonstrations to replace ineffective teacher demonstrations, less complex lab activities to leave time for discussion, etc. Most importantly, the mental models are explicitly presented and often linked to hands-on manipulatives. The entire curriculum is available for no cost. It has been used successfully (student SATII score average >650) and can be modified easily by the individual teacher. *Meeting Their Needs-Science Content Courses for Elementary Preservice Teachers* Madelon McCall, John Park, Suzanne NesmithPresenters will share syllabi of two proposed integrated science courses designed to specifically address science content deficiencies often found in EC-6 teacher preparation programs. Attendees are invited to share syllabi from similar courses offered at colleges and universities across the nation and/or offer advice and experience that will contribute to further development of the courses shared by the presenters and to improvement of all science content courses discussed during the session.*Foundations of Teaching Geometry, Data and Measurement (K-6)*Heidi HigginsThis session will focus on the syllabus and course activities for an undergraduate methods course on geometry, data and measurement. This course includes the following primary activities: 1) Data project - Students conduct a statistical investigation and learn how to implement similar activities with elementary students, 2) Case Study Analysis – Students analyze interactions between students and teacher, and 3) Video Analysis – Students videotape themselves teaching content from the course and reflect on classroom discourse, and 4) WebQuest – Students research a famous mathematician and create an online interactive artifact.*Foundations of Teaching Number and Algebraic Reasoning (K-6)*Tracy HargroveThis session will focus on the syllabus and course activities for an undergraduate methods course on number and algebraic reasoning. This course includes the following primary activities: 1) Comprehensive Mathematics Inventory – Students complete a series of assessments before tutoring an elementary student in mathematics, 2) Math Trail – Students create a resource designed to explore mathematics in the community while addressing the Common Core Standards 3) Case Study Responses - Students analyze interactions between students and teacher, and 4) Textbook Review – Students complete a critique of an elementary mathematics textbook. |

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| **Saturday Morning Sessions** | **10:10-11:00** |
| **#116 Naples**Understanding caloric balance, food groups and plate portions, and serving size portions Patricia HernandezSuper-sized food portions appear in packaged foods and restaurants. Very young children regulate food intake by internal cues, older children use external cues (portion size). Lessons for second graders were created to understand caloric balance, food groups and their plate portions, and serving size portions. Caloric balance is explained using primary balance pans representing energy input (food intake) and energy output (exercise), and by using a sock puppet (enlarges as it eats, gets smaller as it exercises). Using myplate.gov, fractional sections of the plate and the appropriate food groups are taught. Common objects are used to teach appropriate serving size portions. | **#117 Pensacola A**Math/Science: Gestures and Motion Adrian MendozaThis presentation will include fun ways of learning Math/Science vocabulary words through movement and gestures. Gestures and Motion is a new way of learning where students make connections while moving and having fun. ELL students will benefit from this program. I want to show that more than 120 Math/Science vocabulary words and mostly all Math/Science lessons can be introduced, learned, and practiced with gestures and movement. We learn by doing things, so in this session I will have the audience practicing movements of vocabulary words, games, and activities than will engage students in their classrooms. |
| **#118 Pensacola B**A Web-Based Support Tool for Addressing Issues in Preparing Students for edTPAMichael Whillingham, Jamin Carson, Hakan Aras, Jeffery BonnerDespite potential as a measure of teaching effectiveness, the edTPA task faced by teacher education candidates in developing a 3-5 lesson/hour learning sequence is daunting. While the edTPA Manual provides rubrics used to evaluate teaching performance, these are insufficient for providing the detailed guidance necessary for candidate design and development of instructionally sound lessons. The web-based tool introduced in this presentation incorporates a structured format based on interdisciplinary research for guiding students through the edTPA development process while providing faculty with an interactive tool for supporting candidate practice applications in advance of the development of their actual edTPA lesson sequence. | **#119 Pensacola C**Geometric Patterns: Exploring Modular Arithmetic and Fractal DesignsPeggy MochLending an artistic flare to exploring modular arithmetic makes the subject more palatable and interesting to both the math and non-math wired student. Making observations, drawing and shading patterns obtained from residual sets can range from simple to complex. Adding fractal explorations connected to the familiar Pascal’s Triangle to make models of Sierpinski’s Triangle by use of different modulo just increases the fun! |

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| **Saturday Morning Sessions** | **10:10-11:00** |
| **#120 Jacksonville** Understanding of Equal Sign: Developing Algebraic Reasoning in Elementary School Nesrin SahinThe CCSSM require students to think algebraically as early as first grade. Developing algebraic reasoning in early years is important for students and understanding of equal sign is a foundation for this development. So, how should we teach the concept of equality to young children? In this session, teachers will gain an understanding of how children understand equality, what their misconceptions are and will see examples of how to integrate Algebra in teaching Arithmetic.  | **#121 St. Augustine**Mathematics and Science in Feature Film: Investigating Impulse ImpossibilitiesJohn ParkFeature film provides a method to engage students in topics related to science and mathematics in an entertaining way. However, some of the physics and mathematics involved in the action-adventure genre are not scientifically valid. This presentation will investigate problems of force, acceleration, impulse and change of momentum using measurements from action films. Sample activities will be available to all participants. |
| **#122 Miami**In motion: Learning mathematics and science with motion detectors!Deborah Roberts-Harris, Carlos Lopez Leiva, Elizabeth von TollTwo university faculty, a sixth grade teacher, and her students are implementing a unit integrating math and science with technology. Together, we are learning at three levels. First of all, we are learning about how our ideas for integrating math and science play out in terms of student learning. Secondly, how our interactions and collaboration with this 6th grade class are enriching our understanding about the integration of mathematics science and technology and student learning. Last, how and what the students are learning in math, science and technology with motion detectors, through an experiential approach. | **#123 Omni Ballroom A**Flip and Blend Math Instruction like a ProLori Cargile, Shelly Sheats HarknessElementary, middle, and high school mathematics teachers have recently begun to flip and blend their classrooms by using computer based technology as a replacement or supplement for traditional lecture either as homework (flipping) or at school (blending). Session participants will learn a variety of flipping and blending strategies for integrating instructional video, project-based-learning (PBL), and mastery learning as envisioned by leading field experts. Resources for accessing existing online instructional videos and creating personalized instructional videos will be provided. Participants will also receive a resource list of engaging mathematics projects.  |

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| **Saturday Morning Sessions** | **10:10-11:00** |
| **#124 Roundtable Discussions Omni B**  *Using Multi-Decision Scenarios to Facilitate Teacher Knowledge for Mathematical Questioning*Karl KoskoA novel method for both examining and improving preservice teachers’ knowledge for facilitating student questioning in mathematics is presented. The online platform LessonSketch was used to create comic-based representations of mathematics teaching that included multiple variations depending on user (preservice teacher) question choice. Each scenario includes three decision points in which question types are available as options for the user, allowing for 39 potential storylines generated from user choice. Preliminary data from preservice teachers is presented, along with example scenarios, to support discussion for implementation in teacher education, with the examples provided focusing particularly on elementary mathematics. *A Typology of Mathematical Teachable Moments in Kindergarten Classrooms: Preliminary Findings* Elizabeth Petit CunninghamIn this session, a preliminary typology, or classification, of mathematical teachable moments will be presented. A mathematical teachable moment is a moment when a teacher has an opportunity that, if seized by the teacher, provides an opportunity to enrich, teach, connect, or extend, a part of the broader mathematics curriculum and the teacher’s mathematical goals for his or her students. This session will explore the instructional choices and reasons for the choices kindergarten teachers make when they use a mathematical teachable moment. Implications for teacher professional development and classroom practice will be discussed.*Science, Mathematics, Culture, & Community: Writing A Curriculum that Binds*Kimberly Bilica What tools do engineers use to build aqueducts? How do farmers sustain crops through droughts? How do communities provide for residents and maintain trade? All of these are questions that children might ask today, but they are also questions that may have been asked by children who lived in the Spanish Colonial Missions of South Texas in the 1700s. This presentation will showcase the conceptualization and production of an interdisciplinary science, mathematics, and engineering curriculum for Mission San Juan Capistrano, a Spanish Colonial Mission in San Antonio, Texas. The curriculum designed for Mission San Juan draws from contemporary and historical science, engineering, and mathematics knowledge and techniques. Topics include sustainability (science), dimensional analysis (mathematics), and aqueduct design (engineering). Presentation highlights will include: Examining STEM through historical situatedness. Recognizing the pervasive power of culture to define curriculum (and the experiences of curriculum writers).  |

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| **Saturday Morning Sessions** | **11:10-12:00** |
| **#125 Naples**Squishy Circuits: Next Generation Science Standards, Modeling, and InquiryCarol Stuessy, Luke Lyons,Jennifer LeBlancParticipants use Squishy Circuits to explore connections between inquiry learning and the NGSS process of modeling. With scientific inquiry as the framework, participants experience a typical inquiry cycle to solve Consequential Tasks dealing with circuits. Innovative in context, materials include colored Play-Dough made of different substances to develop predictions about various configurations of circuits. A modeling practice lens applied during the inquiry demonstrates linkages between inquiry learning and modeling practice. Lesson plans, sources for Squishy Circuit materials, and examples of consequential tasks are distributed on CDs to the first 30 people coming to participate in the session.  | **#126 Pensacola A**Playing video games = doing mathLana Koch, Darlinda CasselVideo games children play for fun are often just that--fun. However, studies have supported the idea that games can train the brain by contributing to cognitive development, such as spatial reasoning, visual scanning, hand-eye coordination, and problem solving skills. Spatial reasoning is an important skill needed for certain math concepts, and it is therefore the focus of this research. Since video games are only getting more popular with young children, a positive approach on video game playing is imperative to provide parents and teachers with information about the potential positive impact of video games on their children's development.  |
| **#127 Pensacola B**Active-Engagement Instructional Strategies to Support Student Learning in University-Level STEM CoursesTimothy SurretteA large body of research indicates that undergraduate university students are able to learn more effectively in courses that embrace active-engagement instructional strategies. The target audience for this interactive workshop is university faculty that teaches undergraduate level STEM courses and is interested in learning about instructional strategies to enhance active learning. This hands-on workshop will: (a) highlight differences among instructional strategies that encourage active learning versus passive learning in university classrooms, (b) engage its participants in a variety of active learning strategies, and (c) introduce its participants to web-based educational tools capable of supporting active learning in classroom settings. | **#128 Pensacola C**Mixed Up Words: Confusing Language in Science and Mathematics Sandra West, Sandra BrowningEnglish is one of the more difficult languages to learn partly because it is replete with homonyms and homophones. While preparing a professional development model, Correlated Science and Math, the problem of confusing language arose as teams of science and mathematics instructors planned correlated lessons. Participating teachers and instructors have discovered many confusing words during instruction and classroom observations. Through rich conversations between science and mathematics instructors and teachers, confusing language can be identified and clarified for everyone, including students. We continue to identify confusing words and are compiling a dictionary, Mixed Up Words: Confusing Language in Science and Mathematics.  |

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| **Saturday Morning Sessions** | **11:10-12:00** |
| **#129 Jacksonville** Multiple Representations with Math of Tomorrow- A Digital Learning Environment for K-2Lynn Columba, Barbara Dougherty Helping children who struggle--Math of Tomorrow (MOTO) is a Response to Intervention (RtI) (tiers 1 and 2) digital series (iPads and tablets) for kindergarten through second grade. MOTO encourages active learning through interactive games, songs, tasks, videos, and stories to construct multiple representations. K-2 students work along with the MOTO family of characters to learn mathematics by doing. The digital books support the Common Core State Standards for Mathematics. In a digital environment, four math friends--Addison, Mina, Split, and Multiplex—lead explorations so students acquire essential skills such as counting, telling time, adding and subtracting, and sorting data.  | **#130 St. Augustine**Common Core Standards for Mathematical Practice: Made Easy! Katie Harshman, Rebecca GaultThis workshop is geared toward teachers, students, and parents as a quick, hands-on overview of the Common Core Standards for Mathematical Practice. Join us in this interactive experience as we break down the 8 Mathematical Practices making them easy to understand, and easy to remember. There will be plenty of examples! This presentation may be used for math parent nights, department meetings, faculty meetings, etc.  |
| **#131 Omni Ballroom A****Innovation Showcase** Ron ZamboThis session will consist of a guided discussion regarding the teaching of multiplication and division in the intermediate grades. The progression of objectives in the Common Core State Standards for Mathematics related to the algorithms and representations of those two operations will be presented and discussed in a problem solving context. Examples include: computing products of multi-digit numbers using the matrix model, and representing and computing quotients utilizing a rectangular region for which the area and one dimension are known. |
| **Box Lunch 12:00 (Florida Salon D)** |

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