



PRESENTATION SAMPLING: GRADES 9–12

The NCTM 2011 Annual Meeting offers more than 650 presentations focused on mathematics education. The following is a small sampling of Annual Meeting sessions and gallery workshops targeted to educators who work with students in grades nine through twelve. For a complete listing of presentations or search the program by speakers, grade level, or topic, visit the Online Conference Planner at www.nctm.org/indy.

Experiencing the Euler Line and More!

In 1765, Euler proved that the centroid of a triangle trisects the line segment joining its circumcenter to its orthocenter. Students respond, “Show me.” This presentation will investigate a wide variety of ways to explore this important finding, including a student's project that can help solidify mastering many concepts normally studied in Algebra 2.

Close Encounters of the Third Dimension: Learning through Investigation

Experience a student-centered, whole-school research project involving the design and testing of a game intended to teach the 3-D coordinate system. Participants will learn about the project's development through a short video and examine the game prototype. A number of students involved in the project will present the results and analysis.

Technology as a Lever for Reasoning and Sense Making in Mathematics

Technology—useful computational workhorse or black box that obscures the mathematics? Neither view captures technology's real potential as a powerful lever for students' reasoning and sense making that provides settings for good questions from teachers. The speakers will draw on several examples from the new NCTM reasoning-and-sense-making volume on technology to illustrate.

Find the Area of the Convention Center Using Determinants

Students can use Google maps to find the footprint of any building. Connecting geometry and algebra, areas of quadrilaterals and triangles can be calculated using two-by-two determinants. This presentation will develop and prove these relationships and then apply the determinants to find the area of the Indianapolis Convention Center.

Different Types of Interactive Geometry Problems to Foster Mathematical Discussion

The speaker will introduce a variety of interactive geometry problems that can foster mathematical discussion. Examples include problems that relate geometric definitions to dynamic constructions or involve generating conjectures by searching for a conclusion or premise to use in an “if ... then” statement.

Geometry Software Showdown: The Geometer's Sketchpad® versus GeoGebra

This presentation will compare and contrast two geometry programs, The Geometer's Sketchpad and GeoGebra, and demonstrate their effectiveness in teaching various aspects of a high school geometry curriculum. Discussed topics will include conic section construction, circle properties, triangle properties, coordinate geometry, and more.

Get Girls Excited about Diverse Math-Based Careers

Be an advocate for your female students by sparking their interest in math-related careers. Participants will learn about research-based messages, images, and methods that excite and engage girls with engineering and technology, and they will receive strategies for integrating these resources into math curricula.

Mindmapping in Mathematics

One teaching strategy equals four applications. Learn how to pretest without the test, allow students to personalize their learning, review units, and assess students' knowledge in a fun, creative, personal way! Creating mindmaps helps all learners construct relationships among mathematical concepts. Sample mindmaps for algebra through calculus will be available.

Bringing Mathematics to Life through Dance

A group of precalculus students at the Toledo School for the Arts have connected mathematics and dance. A video production will share students insights and their performance of a mathematics puzzle published in Mathematics Teacher in 2006.

Using Your Graphing Calculator to Explore Translations, Rotations, and Reflections

The "list" and "stat plot" features on the TI-84 are used to graph objects. By experimenting with changes in the x and y values, participants will discover and develop rules to create translations, reflections, and rotations.

Infinity in Focus with The Geometer's Sketchpad®

Come experience an interactive, visual tour of infinity that spans the entire mathematics curriculum. From geometric series to conic sections to calculus to circle inversion, this talk will leave you with a nearly infinite number of classroom ideas.

What's the Probability I Can Draw That?

Have fun conceptualizing probability and geometry by visualizing sample spaces. Simple and compound probability problems can be easily represented and solved using drawings and diagrams. These representations help students describe probability as fractions and percentages leading to a more intuitive understanding of probability.

Math and Science @ Work from Launch to Landing

Teachers will be introduced to real application problems developed by the National Aeronautics and Space Administration to help calculus students develop and reinforce knowledge and skills necessary as they prepare for college-level work. These skills will also help students enter an increasingly competitive technological workforce.

Reasoning and Sense Making in Algebra: It's about Good Problems!

This presentation's goal is developing reasoning and sense making in the context of important content. The speakers will examine rich problems that connect to common algebra lessons (slope, solutions to equations, functions transformation) and show classroom videos and students' work.

Polyhedra You've Never Met, But Will Absolutely Want to Use!

Twenty years ago, who knew about Johnson solids, Catalan solids, and dipyramids? Now we have great activities accessible to average students using 3D software, manipulatives, and Sketchpad, in which we can build, analyze, and gather data on these marvelous figures. Come find out about what these are and bring them back to your geometry classes!

An Evaluation of a Hybrid Online Program for Algebra 1

This presentation will report on a multiyear, randomized-control trial of an Algebra 1 intervention that used online content with face-to-face instruction for teachers' professional development and students' learning. Participants will see videos of classroom practices and hear students' and teachers' reactions to the program.

Improving Assessment and Inquiry with Technology: TI-Nspire™ Navigator and SMART™

Experience hands-on activities with the latest interactive, handheld learning tool. Hear about inquiry learning resources from NASA, Texas Instruments, and publishers who focus on improving the instruction of high school math topics. See how to use the TI-Nspire Navigator with interactive whiteboards for formative assessment or review and preparation for high-stakes tests.

Becoming a PRIME Teacher for Assessment!

Assessment plays an indispensable role in teachers' daily work. Used with skill, assessment can motivate the unmotivated, restore the desire to learn, and encourage students to keep learning. And, it can create, not simply measure, increased achievement. This highly motivational presentation will explore how to write high-quality exams and use those exams to help students learn from their mistakes.

Using Screen-Capture Movies to Assess Quadrilateral Constructions in Sketchpad

Students' sketches of quadrilateral constructions convey much information about the students' understanding of quadrilateral properties and how those properties drive sound constructions. But how do you document the decisions, missteps, and self-corrections that are lost in the final sketch? Make screen-capture movies of the construction process!

How Graphing Technology Changes Teachers' Questioning

The TI-Nspire provides teachers with a technology tool that can foster mathematical discourse through exploration. In order to promote conversation, the teacher's questions aim for eliciting students' thinking. Several questioning types will be shared for sample algebra and geometry classroom activities.

Learn How to Create Your Own Wii Interactive Whiteboard

Need modern technology for your classroom? Discouraged by the high-priced interactive whiteboard hardware and software programs that are available? Here is a great new way to move your classroom into the twenty-first century without spending a lot of money. Learn how you can create your own interactive whiteboard system using a Wii remote.

Communicating about Geometry in a Web 2.0 World

Facebook and other Web 2.0 tools give students and teachers a new, exciting way to communicate about geometry. Learn how the speaker uses Facebook groups to get students sharing ideas about quadrilaterals, right triangles, circles, surface area, and volume. She will also share creative projects using free Web 2.0 tools.

Play-Doh® in Calculus?

Yes! Come see how using Play-Doh can lay the foundation for the disk, washer and shell methods for volumes of revolution. You, too, will find your students saying, “Volumes of revolution are easy!”

And We Have Liftoff! Exploring Space through Algebra 1

Students blast off to a better understanding of linear and quadratic functions with problems from Exploring Space through Math: Applications in Algebra 1. Math educators collaborated with scientists and engineers on these problems, which will inspire your students with the opportunity to analyze real data from the launch of the space shuttle.

A Day in the Life of a Fractal

Fractal geometry is a beautiful, captivating motivator that engages students in mathematical learning. This presentation will introduce participants to fractal geometry and its connections to algebra, geometry, precalculus, and the real world. Teachers will learn how to create their own fractals and teach this topic to their students.

Classroom-Level Assessment That Determines and Meets Individual Students' Needs

Learn how to create and collect material for a classroom-level assessment program that determines individual students' needs and how to meet them for any lesson. Discuss how to use the collected data to set up your lesson, determine your instructional mode, determine strategic student groups, and create differentiated questioning and worksheets.

Build a Digital Thermometer: The Math-and-Science Connection

Come build a digital thermometer to make connections between science and mathematics. Acquire data to create a mathematical model for calibration of voltage into Celsius. Examine the results of using this activity in high school classrooms. Participants will receive classroom-ready materials.

3-D Modeling with Google™ SketchUp™

Do your students confuse prisms with pyramids? Do they mix up slant height with the height of the shape, or know where to put all those right triangles? Transform your classroom as you engage students with three-dimensional geometry. The speakers will share classroom activities that reinforce vocabulary, measurement, and visualization skills.

Using Open-Ended Questions to “Teach to the Test”

High-stakes exams have a large influence on teachers' practice. Attendees will look at sample end-of-year algebra questions and design their own open-ended, conceptual questions that address the same topics and could be used in the classroom. Sample rubrics for grading open-ended questions will be shared.

Alternative Assessment Strategies in High School Geometry: Project-Based Measures

The prevailing atmosphere of high-stakes testing frenzy constantly challenges classroom teachers to come up with ways to inspire their students to experience mathematics beyond the paper-and-pencil, worksheet drills and thrills. The speakers will share their effort to broaden the assessment of geometry skills and concepts.

Taking Advantage of Technology and Connections to Construct Multiple Proofs

By investigating the Three Altitudes of a Triangle problem and exploring how it connects to a variety of other ideas, this presentation will discuss an appropriate use of dynamic geometry software – stimulating students' conjecturing spirit and proof insights, and focus on taking advantage of connections in order to construct multiple proofs to the same problem.

America's Next Top Modelers: How to Excite Students about STEM

Do you want activities that increase students' problem solving skills, communication skills, and mathematical understanding? Modeling-eliciting activities (MEAs) are a way to integrate science, technology, engineering, and mathematics (STEM) concepts. MEAs are realistic, interdisciplinary, team-based problems. Participants will receive MEAs and ideas on how to implement them in their curriculum.