

The Whiteboard

Official Newsletter of The American Modeling Teachers Association

“Great teachable moments rarely occur by chance, but instead most often occur when a culture of curiosity and exploration has been laboriously crafted.”

Jeff Hengesbach, Executive Officer



Page 1



Teachable Moments

Great teachable moments rarely occur by chance, but instead most often occur when a culture of curiosity and exploration has been laboriously crafted. The creation of an inquisitive classroom culture undoubtedly requires a concerted effort, but my experience suggests that the payoff is absolutely worthwhile. I advance that Modeling Instruction™ provides an ideal framework for building highly effective class learning cultures, because it uniquely supports the creation of the environment which requires the reflective thinking that inevitably results in a dynamic classroom environment. **When learners are challenged through Modeling’s pedagogy and curricular elements to consider the questions of “how” and “why” instead of just “what”, the outcome for students is inevitably positive.** Modeling’s foundation of student discourse over teacher pontification builds these much needed thinking practices even as communication skills and confidence are refined. However, this construction is not a haphazard or easy undertaking. On the contrary, evidence suggests that it takes dedicated effort for an extended time-period to achieve noteworthy results. I have become convinced that purposeful practice is the key to the sustained acquisition of expertise. In his paper on expertise development, K. Anders Ericsson contends that a primary factor influencing the creation of expertise is “deliberate practice.”

Continued on Page 4

Contents

- 2 Biennial retreat review
- 3 Working Together...A word from the XO
- 5 AMTA Launches New Monthly Webinars
- 6 Middle School Modeling and Chem II Distance Learning Workshop
- 7 Articles to check out!

“Modeling has led me to the scientific practice of science education. It helps me focus on what helps my students learn.” – Jim Deane, Modeler from Kansas

@jim_deane



Second National AMTA Retreat

For three days at the end of June, 78 members from across the country gathered at Fermilab in Batavia, Illinois, outside of Chicago, for the second national AMTA meeting. As a renowned particle physics laboratory, Fermilab provided a wonderful setting for discussing many aspects of Modeling.

The meetings kicked off with an informal Friday evening dinner, where we got to reconnect with many of our colleagues and meet new members. On Saturday morning, our host, Spencer Pasero, from Fermilab's Education Department, welcomed us in an opening session that was then led by our outgoing executive officer, Colleen Megowan-Romanowicz and our newly appointed executive officer, Jeff Hengesbach. Both reported on the robust state of the AMTA (our membership has grown to nearly 3,000) and on future plans involving the expansion of national workshop offerings, partnerships with STEM organizations, workshop leader training, and many other initiatives designed to improve and expand the scope of the AMTA.

Participants then chose from twelve different breakout sessions that ran during the day on Saturday and Sunday, as well as several "unconference" sessions about topics of interest that attendees suggested. These sessions included such topics as Innovative Uses of Classroom Technology, Standards-Based Grading, Engineering Practices in Modeling Instruction™, Energy as a Cross-cutting Concept in Modeling Instruction™, Connecting Modeling Instruction™ to NGSS, Online Collaborating and Learning, and many more. Fermilab catered lunch both days, and a delicious Saturday evening dinner. Our meeting closed on Sunday with a featured talk by our plenary speaker, Rocky Kolb, Dean of the Physical Sciences at the University of Chicago, and former head of astrophysics at Fermilab. Rocky's talk was entitled "Dark Matter", and in a wonderfully humorous way, gave us insights into a topic in cosmology that basically says we don't know much at all about what makes up the universe, since 95% of the mass of the universe can't be identified.

Our time together ended with the first presentation of the AMTA awards, and a tour of Fermilab's facilities. Thanks to all who attended and made for a most rewarding weekend.

Information about our next national meeting will be coming soon!

Jim Stankevitz

Wheaton Warrenville South High School
Jimstanke@comcast.net





Working Together

A message from the XO

“...now is financially an excellent time to become a lifetime member!”

Since its inception, the AMTA has been organized around the principle that we can accomplish more working together toward the common purpose of advancing Modeling Instruction™ than we can by working separately, and that Modeling’s advancement is worthy of our energies. From the initial summer workshop in 1992, where thirteen curious educators gathered to learn physics teaching through “Modeling” from Malcom Wells, Greg Swackhammer, and David Hestenes, the number of workshops and participants in a range of course disciplines have expanded greatly. This past summer there were 78 workshops offered to nearly 1200 participants in 10 different disciplines. With almost 10,000 teachers having participated in Modeling Workshops™ over the many years, and with nearly 2800 active AMTA members, our community has grown impressively. It now supports a leadership development program, where aspiring Modeling leaders come together to refine their understanding and skills as educational leaders, as well as a number of partnerships with organizations and agencies to advance our mission. In addition to a monthly series of webinar conversations hosted by expert Modelers advancing various topics, this spring semester AMTA will be offering two distance learning courses for graduate credit. These courses, Chemistry II and Middle School Modeling II, are for members who have previously taken a face-to-face workshop. Future semester courses offerings will be advanced in response to membership requests. There are also a number of research and curricular development initiatives underway (K-5 Modeling Workshops™, Earth Sciences, reviews/updates to existing materials, alignment to NGSS, etc.) that will begin when financially supported.

AMTA programs are funded primarily through site licensing fees, membership dues and member contributions. In recent months our Executive Board has recognized the importance of seeking additional revenue sources and have advocated for increase corporate and donor support. The greatest advertisement AMTA enjoys comes from the daily impact excellent Modeling Instruction™ has on communities. If you have contact with potential school

and business partners who recognize Modeling’s value and want to be a part of advancing the work, help us to begin building those partnerships. After careful deliberation the board also recognized that AMTA Life Membership is undervalued, and have authorized a price increase to \$400 beginning January 1st, 2017. So, if you had been considering AMTA Life Membership, now is financially an excellent time to make that commitment, though many consider that even with this increase this membership remains a bargain.

The AMTA community exists to support its member’s ability to continue teaching brilliantly and inspire others toward similar ends! Passionately sharing your Modeling success stories with administration, colleagues, parents and business leaders is key for our continuation. Please seek opportunities to engage with policy makers, and to advocate for model-centered classroom student experiences. Supporting quality STEM education is an important need and together we are equipped to offer leadership toward positive change.

Jeff Hengesbach

Executive Officer

American Modeling Teachers Association

amtaexec@modelinginstruction.org

Shop Amazon Smile and Support AMTA

With the holiday season quickly approaching, please take the time to visit our Amazon Smile page! Shop Amazon using this link:

[Smile.amazon.com/ch/54-2179316](https://smile.amazon.com/ch/54-2179316)

A portion of your total purchase will be donated to AMTA – share with your family and friends!

amazonsmile
You shop. Amazon gives.

Continued from page 1

He defines this as “the examination of our own performance and asking how it can be improved,” and then taking the steps to make things better (Ericsson, Krampe, & Tesch-Rbmer, 1993). I remember well when Dr. Hestenes first shared this research with me during an early Modeling Workshop™. It remains relevant and offers hope for today’s educators by suggesting that given sufficient time those with the fortitude to pursue focused hard work may achieve excellence in their craft. Modeling classroom cultures advance student learning through shared and expertly guided experience. It is an environment that prompts teachers and students to work together building a coherent framework of skills and understanding. Its culture promotes both teacher and student expertise development through deliberate, reflective practice.

I imagine that this is not news to most who have already gathered ample evidence of Modeling’s effectiveness, but let’s not lose sight of a key element contributing to that success. In Modeling we have the advantage of strongly networked membership pooling its creativities, efforts, and skills toward a common purpose. Like many, I have enjoyed significant benefit from my participation in this community. As a preservice teacher taking a Modeling Workshop™ I was encouraged by both the experienced leaders and veteran participants to join their efforts to improve our teaching practices. Their example and encouragement helped set my professional trajectory. Those relationships, and the many I have made through Modeling since, have continued to affirm my resolve to improve my skills and understanding. I am confident that my story is typical of many Modelers experiences and it is likely the key element contributing to our communities continued growth of numbers and impact. With nearly 3,000 members around the world, we can now offer workshops across a number of disciplines and reach students from sixth grade up through early college. I would encourage us to continue to build on our strengths by investing in each other even as we welcome others to join us in the “deliberate practice” that we pursue to gain expertise in our practice.

Ericsson, K. A., Krampe, R. Th., & Tesch-Rbmer, C. (1993). The role of deliberate practice in the acquisition of expert performance. *Psychological Review*, 100, 363-406.

Jeff Hengesbach
Executive Officer, AMTA
jeff@modelinginstruction.org



Modeling workshops reach teachers across the country!



What’s the fastest way to connect with experienced Modelers?

Follow us on twitter
@AMTATEACHERS and tweet with the hashtags

#modphys

#modchem

#modbio

#modsci

Start a conversation today!



AMTA Launches Monthly Webinar Series

This fall AMTA announced the topics for the new monthly webinar series. The webinars are free to members, but spots are limited so watch website, listserv, and social media for registration announcements. If the session fills before you can register, no need to worry – we are recording each session and posting them on our member-only page so you can watch them at your convenience.

Date	Presenter	Topic
December 14, 2016 7 pm EDT	Kathy Malone & Anita Schuchardt	Redevelopments in Biology Modeling
January 17, 2017 7 pm EDT	Rex Rice and Jim Stankevitz	Lab Practica and Inexpensive Alternatives for Equipment in Physics
February 14, 2017 7 pm EDT	Kathy Malone	Engineering in Modeling
March 14, 2017 7 pm EDT	Colleen Megowan-Romanowicz	Coding in Physics First Modeling
April 11, 2017 7 pm EDT	Erica Posthuma-Adams	Standards-Based Learning in the Modeling Classroom
May 9, 2017 7 pm EDT	Anita Schuchardt	Role of Computational Thinking in Modeling

First Webinars Aim at Educating and Connecting Members

Tuesday September 20th, Larry Dukerich and I kicked off AMTA's members' monthly webinar series with a conversation about energy across the disciplines.

Energy—"the non-stuff that helps stuff do stuff"—is both a Disciplinary Core Idea and a Crosscutting Concept for NGSS and it has been a growing emphasis for Modeling Instruction in the last 15 years, not just in physics, where an "energy first" approach was proposed over a decade ago, but chemistry, biology and middle school science as well. The newly released "beta" Physics First course is energy-themed from end to end. Progress notwithstanding, the consensus was that we could do better.

Conversation during the webinar, intended to be an interactive exchange of ideas between participants on the call, ranged from to what we know about how energy is taught in disciplines besides our own (not much) and how well coordinated the treatment of energy is across the sciences in our high schools (not very) to what representations are in common use across disciplines and grade levels.

There was interest in how we define and categorize (motional and positional) energy storage modes (or accounts) and energy transfers and the metaphors we use to help our students think and reason about these things.

There was a great deal of curiosity and interest in how energy storage and transfer should be treated in biological systems—particularly with respect to cellular respiration. This is a point at which we find that even textbooks implant the misconception that energy is "stored" in chemical bonds. Ray Howanski, Larry Dukerich and Ingrid Waldron have written a nice student handout accompanied by detailed Teacher's Notes that we reviewed and discussed.

The concept of a field as a place where energy is stored was deemed an important element of our model of energy storage across all disciplines—both EM and gravitational.

In the end we barely scratched the surface of a concept that is central to all scientific disciplines. I am sure the conversation will continue, and if there is interest, I am willing to host regular (or irregular!) energy chats over the coming months.

Colleen Megowan-Romanowicz
AMTA
colleen@modelinginstruction.org

Middle School Modeling Returned to NYC!

Middle School Modeling returned to NYC this summer. STEMteachersNYC hosted their 2nd middle school workshop with a new wonderful group of intelligent, dedicated middle school teachers. Workshop leaders and participants quickly formed a caring, close community as they delved into learning how to build the three overarching middle school models: matter (describing and classifying its structure), energy (as an agent of *change* in any system), matter and energy interactions (system interactions) Participants jumped right into student mode to explore several units from the student point of view, and then discussed logistics and best practices for how to incorporate these NGSS aligned units in teacher-mode. Participants are quoted as saying: "I've learned more in the 1st week of the workshop than in all of my other PD combined", "Hooked from day one!", and "I am so excited to apply what I have learned from this workshop in my classroom this fall."

Fellow Modelers spread the word and get your middle schools involved with Modeling Instruction.

Erin Conrardy
AMTA
erinconrardy@gmail.com

New Distance Learning Courses Offered

AMTA will be hosting a distance learning **Chemistry 2** course that will run 15 weeks from January 19th -April 27 (with a pre-workshop session on January 12). It will be led by expert chemistry Modeling leaders Larry Dukerich and Brenda Royce. The course develops an evidence-based approach to the internal structure of the atom, periodicity and covalent bonding, intermolecular forces, equilibrium and acids and bases. It will also build teacher's skill and confidence implementing Modeling Instruction™ in their classes. Participants will frequently perform all the laboratory investigations and problem solving as their students would as well as consider common preconceptions and misconceptions students hold. Additionally, teachers will practice student discourse management strategies, employ Socratic dialogue and inquiry-based classroom techniques as leaders within the classroom.

Limited seats are available so follow this link for information and to register for **Chemistry 2**:

<http://tinyurl.com/Chem2DL>

Middle School 2 will run 15 weeks from January 16 - April 24 (with a pre-workshop session on January 9). It will be led by expert Modeling leaders Erin Conrardy and Christi Mendoza. It will focus on further skill development in all aspects of the Modeling method and improving teacher confidence with its implementation. This workshop will center around three fundamental models: 1) Matter - describing and classifying its structure, 2) Energy - as an agent of change in any system, 3) Matter and Energy Interactions which unify all science content areas. Participants will reflect on the Modeling cycle and develop familiarity with the materials necessary for full classroom implementation. They will also be asked to reflect on their practice, and how they might apply the techniques they have learned in the course; as well as how to modify activities, improve current unit activities, and "modelize" their own activities for use in their classes.

Limited seats are available so follow this link for more information and to sign-up for **Middle School 2**.

<http://tinyurl.com/MiddleSchoolIDL>

AMTA Web Re-design Underway!

We are thrilled to announce our website will soon have a new updated look and mobile responsive design. Kelli Gamez-Warble is creating a sleek new look for our website. Watch our Facebook and Twitter accounts for updates!

Check Out These Articles Recommended by AMTA!

Whiteboarding Strategies

<http://tinyurl.com/hhbbs8v>

Socratic Questioning

<http://tinyurl.com/j8vbu3>

What We Call Misconceptions...

<http://tinyurl.com/zjxyr5l>

Have an article you want to share? Tweet us the link @AMTATeachers

Your AMTA Leadership Team

Jeff Hengesbach, Executive Officer

Wendy Hehemann, National Workshop Coordinator

Kathy Malone, Past President

Rex Rice, President

Jim Stankevitz, President Elect

Laura Slocum, Vice President

Erica Posthuma-Adams, Secretary

Lee Trampleasure, Treasurer

Erin Conrardy, Member-at-Large

David Weaver, Member-at-Large

Anita Schuchardt, Member-at-Large



American Modeling Teachers Association