

THE DIALOG



The Newsletter of the Southern Ohio Section of the American Association of Physics Teachers

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Have you missed something?

Have you missed a meeting or two? Wondering what's been happening? Are you wondering about other opportunities to connect with other physics teachers? Want to contribute or advertise your physics events? We have the place for you! The SOS/AAPT has a website. There you will find links to past programs, past Dialogs, registration for coming meetings, and so much more. Please check out it out at:

<http://sosaapt.weebly.com/index.html>



President's Corner

Hi! My name is Sandy Doty and I serve as the 2012-13 President of the SOS-AAPT. As fall turns to winter and the new year approaches, I find myself reflecting on where we have been and planning for the future. Over the past few years, due to exemplary leadership, the SOS-AAPT has actively worked to engage today's physics teacher. Kevin McChesney has done a remarkable job in updating our website. Kathy Harper has kept us in touch with the "moving and shaking" at the national level. The Fall and Spring meetings have been designed to reflect trending areas in physics and physics education. It is my sincere hope that over the next year we can continue these endeavors and, with input from our membership, address specific areas of need or interest. Toward that end I encourage you to:

1. Contact us with your ideas, wishes, and hopes for the organization. While we can't do everything, we want this organization to respond to your needs.
2. Consider running for one of the 3 offices open for election at the spring meeting: President Elect, VP for Univ / 4 Yr Colleges!

Together we can make good things happen! SLD

SOS/AAPT SPRING 2013 MEETING

Hosted by Dublin Jerome High School
8300 County Highway 2, Dublin, OH

SAVE THE DATE!!!

- **Saturday, March 9, 2013**
- Come meet with your colleagues from Southern and Central Ohio!
- Pick up a few new ideas for your classroom and share a few of your own good ideas!
- Present a contributed paper or a "How I do it" demo!
- Define the future of SOS-AAPT. Elections will be held for: President-Elect, VP-Univ./4 YR College, and Treasurer.

PLAN TO COME!

**ON-LINE REGISTRATION AVAILABLE SHORTLY
AT THE SECTION WEBSITE.**

SOS/AAPT FALL 2012 MEETING ABSTRACTS

Oak Hills High School
3200 Ebenezer Rd
Cincinnati, OH 452480
Saturday, October 13, 2012
8:45 am – 2:30 pm

WORKSHOPS 9:30 am – NOON:

Choose ONE of two morning workshops led by experts in modeling *Aaron Debbink, Sara Lavelle, Michele Taylor; Oak Hills High School*

- **Introduction to Modeling** – This workshop is designed for those new to MI to expose them to the modeling methodology and how it is implemented in the classroom. Participants will work through one complete modeling lesson cycle and will be provided with MI resources to take back to their own classrooms.
- **Advanced Modeling** – This workshop is designed for those who have previously used modeling in their classrooms and wish additional exposure to 2nd semester topics and the use of PhET Simulations (<http://phet.colorado.edu/>) in modeling instruction.

CONTRIBUTED TALKS 1:00 pm – 2:15 pm:

The importance of statistics - the importance of care

David Groh, Department of Physics, University of Cincinnati, grohdd@ucmail.uc.edu

Statistics are fundamental to a science - through experimentation we distinguish between alternative hypotheses. As a consultant with Pearson Evaluation, I was dismayed by how poorly physics graduates understand the role of experimentation in science. I will discuss the role of statistics in science, some really bad statistics, and some suggestions for teaching science to physics students.

Convincing Middle & High School Teachers of the Value of (formal) Formative Assessment*

Gordon Aubrecht, Professor of Physics, OSU at Marion, aubrecht@mps.ohio-state.edu

Formative assessments can allow teachers to understand what is and is not working in their classrooms for the purpose of changing how they teach various content. Many school administrators do not understand the difference between summative and formative assessment and actively prevent true formative assessment to occur. The teachers then proceed to “give them what they want” with no useful effect. This study presents a model, as well as its application, for the development of formative assessments in the classroom in a rurally located, city high-needs district in the state of Ohio. Results indicate changes not only in the way teachers view their pedagogical approaches but also in their ability to “listen” to students’ voices.

*Research supported in part by grants from the Ohio Department of Education C1457-OSCI-09-49 (2008-2009), C1667-MSP-10-410 (2009-2010), EDU01-0000006141 (2010-2011), EDU01-0000007902 (2011-2012) and GRT00029161 (2012-2013).

Circular reflections and 3-D movie glasses

Terry Toepker, Department of Physics, Xavier University, toepker@xavier.edu

Concepts of polarization (linear and circular) and the 3-D movie glasses will be presented by a person who still remembers the blue-red glasses. Part of this paper will be published in *The Physics Teacher*.

Air Resistance Beyond Terminal Velocity without Calculus

Lenore Horner, Seven Hills, lenore.horner@7hills.org

I will demonstrate two methods of using GeoGebra to numerically calculate and graphically display the effects of air resistance on dropped and thrown objects. Practically, this is an exercise my students find very accessible and fun and the software is free and can be used without tech support via webstart.

Pedagogically, this lessons enables students to investigate the accuracy of the no-air-resistance model, to experience incremental modeling of the real world, and to gain experience with very elementary numerical techniques.

A Laboratory Based Physical Science Course

James F. Sullivan, Department of Physics, University of Cincinnati, james.sullivan@uc.edu

Amber Pleiman, Department of Chemistry, University of Cincinnati, pleimaan@ucmail.uc.edu

During the summer of 2012 the authors co-taught a course designed to acquaint current and future teachers with various aspects of Physics and Chemistry. The course was woven around the basic concept of energy and emphasized laboratory work in groups.

“How I Do It” Presentations

Modeling using white boards with Freshman - Cijy Elizabeth Sunny

Real-Time Spectral Analysis - Lenore Horner

Tire pressure, science and politics - Terry Toepker



*Workshop fun at the Fall 2012
SOS-AAPT Meeting in
Cincinnati!*



SOS/AAPT SPRING 2012 MEETING ABSTRACTS

Ohio University – Lancaster Regional Campus

1570 Granville Pike

Lancaster, OH 43130

Saturday, April 28, 2012

9 am – 3 pm

INVITED TALKS AND WORKSHOPS 9:20 am – 1:00 pm

9:20 am Invited Talk: *Problem Solving and Conceptual Understanding* PRESENTER: Dave Maloney

An oft repeated goal for introductory physics courses is to develop the problem solving skills of students. But what does that mean, and what, if anything, does it imply about the development of students' conceptual understanding of the physics? The physics education research has shown that answering this question involves a number of complex inter-related issues. This talk will give an overview of our current understanding of how conceptual understanding and problem solving relate.

10:15 am Invited Talk: *Teaching Physics using Children's Literature* PRESENTER: Bill Reitz

11:10 am Workshop I: *Developing Tasks to Promote Sense Making in General Physics*

PRESENTER: Dave Maloney

This workshop will introduce several task formats that help students make sense of basic concepts, principles and relations in introductory physics classes. These materials will be samples from a collection of tasks known as TIPERs (Tasks Inspired by Physics Education Research). The workshop will explore the idea, structure, and use of these tasks, as well as some advantages and disadvantages of using them.

12: 50 p.m. Workshop II: *Make and Take Teaching Physics using Children's Literature*

PRESENTER: Bill Reitz

CONTRIBUTED TALKS 1:35 pm – 3:00 pm

1: 35 p.m. *What is new about the "new" International System of Units?*

Gordon Aubrecht, *Ohio State University - Marion*

The International System of Unites (SI) is getting ready to replace the "explicit unit" definition that all practicing scientists have grown up with by the "explicit-constant formulation," in which there is less contact with physical objects, but the definitions depend on the fixing of values of certain physical constants (h, e, c, etc.). This talk will discuss the reasons for the proposed change and what, if anything, it might mean for physics teachers.

1: 50 p.m. *Helping Middle & High School Teachers be Informed in their Pedagogical Approaches to Teaching Scientific Content*

Gordon Aubrecht, Bill Schmitt, and Jenny Esswein, *Ohio State University - Marion*

Formative assessments can allow teachers to understand what is and is not working in their classrooms for the purpose of changing how they teach various content. Many school administrators do not understand the difference between summative and formative assessment and actively prevent true formative assessment to occur. The teachers then proceed to "give them what they want" with no useful effect. This study presents a model, as well as its application, for the development of formative assessments in the classroom in a rurally located, city high-needs district in the state of Ohio. Results indicate changes not only in the way teachers view their pedagogical approaches, but also in how teachers consider student personal epistemologies.

2: 05 p.m. POOLkits: Applying Object Oriented Principles from Software Engineering to Physics Object Oriented Learning – Preliminary Ideas

Tom Kassebaum, *Byrd Polar Research Center, Ohio State University*

Object-oriented development depends upon the creation of generic pieces that can be built into more complex parts. In physics, we begin teaching basic principles and then develop more complex systems, a fertile environment to develop learning objects. Each learning object consists of observable quantities, such as the physical properties of an item, and operators that act on it, such as force. Additionally, each object can include an assessment operator that evaluates the impact of the learning object on student comprehension.

The physics object-oriented learning kits (POOLkits) will be developed to enhance student understanding of physics concepts, as well as, build a framework for developing a software object based on the physics concept. As with software objects, POOLkits can be extended as physics knowledge expands. POOLkits may also enhance the object-oriented programming capabilities of physics students

2: 20 p.m. Conducting Large Recitation Sections in College Physics

James F. Sullivan, Ryan A. Grosso, Leigh M. Smith, *University of Cincinnati*

Historically, the College Physics lectures at the University of Cincinnati have consisted of a maximum of 125 students. These sections were broken up (once per week) into smaller recitations sections each with a maximum of 25 students. During this academic year various things have mandated that the lectures be increased to a maximum of 135 students and the recitations be once a week with the entire group of 135 students in one sitting. In these large groups both a Professor and a Teaching Assistance are present and the major goal is still to encourage students to individually work word problems. Several techniques have been developed that assist us in this and these will be shared in this paper.

2: 35 p.m. Kinematics: A Dynamic Launch into Useful Physics

Fred Thomas, *Math Learning Machines*

Too often, kinematics intimidates and frightens those physics students who have been struggling with mathematics, and many of these students see no answer to the question, “When will I ever use this?” The NSF-funded project, “Math Machines and Algebraic Thinking,” has developed hardware and software which empowers students to create, test, compare and modify free-form mathematical functions that CONTROL motion, rather than simply describing it. Based on a hobby servo motor with 0.1 degree precision, the system lets students control the motion of a laser dot across the front of a classroom whiteboard or a small laboratory screen, the motion of a block of wood as it creates scale-model earthquakes, the motion of gears as they drive other objects, and more. The system’s role in motivation, pedagogy and assessment will be discussed along with opportunities for collaboration. Supported in part by NSF’s Advanced Technological Education Program through grant # DUE-1003381.

“How I Do It!” Presentations

- **Book promotion. An Application of the Culture of Science.** Byron Hall
- **Newsletter promotion: Newsletter for H.S. physics teachers.** Folden Stumpf

SOS/AAPT Business Meeting Minutes – DRAFT - 12 October 2012

Oak Hills High School - Cincinnati, OH

Meeting called to order by President Doty at 2:15 pm.

I. Thanks to Oak Hills High School hosts, Aaron Debbink, Michele Taylor, Sara Lavelle, and Kathy Koenig for organizing the meeting.

II. Introduced SOS/AAPT board:

President: Sandy Doty

Past-President: Eric Towers

President-Elect: Lenore Horner

VP for 4 yr Colleges: Mark Fisher

VP for Two Year Colleges: Darwin Church

VP for High Schools & Webmaster: Kevin McChesney

Secretary: Krista Wood

Treasurer: Bill Kuhlman

Member-at-Large & Science Day Coordinator: Gordon Aubrecht

Section Rep to AAPT: Kathy Harper

Associate Secretary & Treasurer: James Sullivan

Dialog Editor: Frank Huss

III. What can SOS/AAPT provide?

- Want demonstrations, instead of just talk.
- 10 minutes not enough. Longer contributed talks.
- General support-especially for new teachers. A network for questions, discussion board, blog on SOS AAPT website?
- In 1990s, Ta-Ta at Tristate Physics Teachers (TPT) Teachers Anxiety Hotline (Terry Toepker phone). For questions. Local source is preferred. Identify specialty areas.
- Need carpool site on SOS AAPT webpage

IV. Future SOS/AAPT meeting dates and locations will be emailed to members

- Spring 2013-Date and location TBD
- Fall 2013 at UC date TBD

V. Spring elections will include President-Elect, VP of 4 yr Colleges, and Treasurer

VI. SOS/AAPT Section Representative to AAPT, Kathy Harper, report

- AAPT National wants to know what they can do to support physics teaching.
- Summer 2012 Philadelphia well attended. Wonderful to get together with so many people excited about teaching physics & learn so many cool things about all areas.
- Future National AAPT meetings
 - Winter 2013 New Orleans
 - Summer 2013 Portland (same hotel and Portland State)
 - Winter 2014 Orlando (1st or 2nd week in January)

- You are encouraged to consider writing your great ideas for Physics Teacher.
- Potential for Cincinnati to host a summer National AAPT meeting in 2016 or 2017
- If Cincinnati hosts, will need locals to volunteer.
- HS teachers who volunteer may get free registration.
- Encourage you to join National AAPT for resources and meetings and networking.
- Give any suggestions to Kathy Harper.

VII. Door prizes given away.

VIII. Announcements: State Science Day May 5th, 2013. Need people to judge.

Meeting adjourned at 2:41 pm. *DRAFT MINUTES TO BE APPROVED AT THE SPRING MEETING.*

OFFICERS**SECTION REPRESENTATIVE**

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Suggestions?
Questions?
Got an idea on how to
improve the section or ideas
on how we can help you?

**PLEASE CONTACT ANY
ONE OF THE SECTION
OFFICERS!**