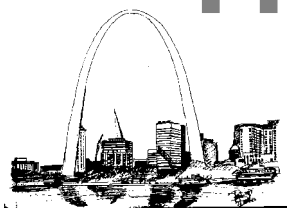
PHYSICS Tempo



The Newsletter of the Saint Louis Area Physics Teachers
an affiliate organization of the American Association of Physics Teachers

Volume 13, No. 1 Fall, 2002

2002/2003 SLAPT Officers

Co-Presidents ..... Valerie Michael
..... Joe Bartin
Secretary-Treasurer ..... Joe Bartin
Newsletter ..... Rex Rice
Web Site ..... Mark Schober

Tentative Schedule for 2002/2003

SLAPT Workshop:
Amusement Park Physics
When: October 12, 2002
8:00 a.m. - 2:30 p.m.
Where: Six Flags St. Louis
Host: Six Flags St. Louis
Cost: Free Admission to Park plus free lunch.
Details: Reservation required, See article on this page

PTRA Wokshop:
Vernier Interfacing Workshop
When: November 2, 2002, 7:30 am to 12:30 p.m.
Where: Parkway Central High
Host: Valerie Michael
Cost: $56.00
Details: Reservation required! Limited to first 20 people. See enclosed flyer!

SLAPT/Chemistry Joint Meeting:
Physics and Chemistry Lab Ideas
When: December 7, 2002
Where: Kirkwood High School
Time: 8:30 a.m. to noon
Hosts: Joe Bartin/ Bob Becker
Cost: Free
Details: All physics and chemistry teachers are invited to bring a favorite lab idea to share with others.

SLAPT Workshop:
The Role of Graphical Analysis in Teaching Physics
When: February 8, 2003
8:00 a.m. to 3:00 p.m.
Where: Clayton High School
Host: Rex Rice
Cost: $10.00 including lunch
Details: Advanced registration required by 1/17/03.See enclosed flyer.

SLAPT Meeting in conjuction with SLU High School Physics Competition
When: April 26, 2003, 9:am to 11 am
Where: St. Louis University
Host: Larry Stacey
Details: See article, this issue

See the SLAPT Website at http://www.SLAPT.org

Six Flags St. Louis Hosts Amusement Park Physics Workshop Saturday, October 12, 2002, 8:00 a.m. to 2:30 p.m.

On Saturday, October 12, a free workshop on Amusement Park Physics will be hosted by Six Flags St. Louis. This workshop will be presented by Bill Brinkhorst, Mark Schober, Debbie Rice and Rex Rice. Each participant and a guiest will be given free admission to Six Flags as well as free lunch.

This workshop is intended to introduce participants to the use of low and high-tech data collection instruments for student use at amusement parks. Specifically, participants will get an opportunity to analyze data from the rides at Six Flags St. Louis using 3-axis accelerometers, barometers, and video. This workshop is designed to help participants prepare their students for a successful and enjoyable day doing physics at the annual Physics Day at Six Flags in the spring. Participants will also get to preview some of the items that will be included on the new CD that will be given to teachers whose classes participate in Physics Day this spring.

Registration for this workshop is required, and should be done as soon as you receive this notice! Upon registration, your name will be put on a list, and you and a guest will be admitted by a security guard through the back gate. To get to the back entrance, head north from I-44 on Allenton Road, past the main entrance (bear left) until you see the security guard shack on the right. The security guard will direct you to the appropriate parking lot. Signs will direct you to the meeting location. You and your guest are welcome to stay until the park closes if you wish.

The schedule of activities for this workshop will include:

An orientation to Physics Day at Six Flags

An introduction to the use of accelerometers and barometers,

A backstage tour of one or more rides

Data Analysis activities using accelerometer, barometer, and video data

An opportunity to use accelerometers and barometers on the rides

Free Lunch (Served at 2:00 p.m.)

This workshop is highly recommended for anyone who is considering bringing students to Physics Day at Six Flags, which has evolved significantly over the past few years.

To register for this workshop, contact Rex Rice at rexrice@swbell.net (preferred) or 314-862-2845 ASAP!

SLAPT is going totally electronic! This will be the <u>only</u> mailing for SLAPT this year. All updates and changes will be handled via email and through the SLAPT website at http://www.SLAPT.org

Please send Rex Rice your email address today! (rexrice@swbell.net)

PTRA Workshop: Vernier Interfacing

Presented by: Valerie Michael
Location: Parkway Central High School
Date: Saturday, November 2, 2002
Time: 7:30 a.m. to 12:30 p.m.

Registration in Advance is Required!
Limited to the First 20 People who Register!
To register, contact Valerie Michael via email at vmichael@pkwy.k12.mo.us

What: We will perform a sequence of labs using Vernier interface probes. We will also perform supporting activities such as conceptual questioning, ranking tasks and white board presentations. In one lab we will work with closed and open pipes. We will use the FFT feature of Logger Pro. Via a make-n-take, you will take home the set of pipes to do the lab in class. In another lab, we will look at the temperature in a plastic bottle topped with a Fizz Keeper. Finally, we will investigate the use of the Lab Pro as a remote sensing device.

Cost: The PTRA fee is $36 if your district pays and $18 if you pay. There is an additional materials cost of $20. Thus the total cost will be $56 if your school pays or $38 if you pay.

Why: First, these materials were designed to support the National Teaching Standards on inquiry. We will take the time to discuss how to use and when to use the ideas. Secondly, getting together with other teachers is an excellent opportunity to expand the way you approach teaching and how you interact with kids. Finally, we'll have some fun along the way.

Take Highway 40 west to the Hwy 141 exit. Turn North on 141. After the intersection at Ladue and 141 watch for the school on the west (left) side. Caution, there is a new entrance to the school. Park in the front lot and follow the signs to Room 1006.

PLEASE INDICATE YOUR EXPERIENCE WITH THE PROBES!

SLAPT Workshop
The Role of Graphical Analysis in Teaching Physics

Presented by: Debbie and Rex Rice
Location: Clayton High School, Room 225
Date: Saturday, February 8, 2003
Time: 8:00 a.m. to 3:00 p.m.
Cost: $10.00, Lunch included

Registration in Advance is Required!
Limited to the First 24 People who Register!
Registration Deadline: January 17, 2003

This workshop is intended to introduce participants to a way to structure physics curriculum units in such a way to make them more inquiry based. Participants will learn to redesign experiments so that students are able to develop the mathematical models to be used in a physics unit through methods of graphical analysis. Basic elements of the Modeling Method for Teaching Physics will be introduced.

While the Vernier Software program, Graphical Analysis, will be used in this workshop, the workshop is not intended as a tutorial on the software, but rather as an introduction to how to incorporate the process of graphical analysis into teaching physics. Graphing with other software such as Microsoft Excel will be discussed.

Participants will receive a copy of the workshop manual on a CD. The manual includes the workshop activities, a set of experiment guides for over 50 experiments that incorporate the graphical analysis methods shown in the workshop, a student guide to graphical analysis, a curriculum unit on graphical analysis, and a tutorial on using Microsoft Excel for performing graphical analysis.

To register, fill out the form below and mail it to: Rex Rice
6051 Kingsbury
St. Louis, MO 63112

Enclosed is $10.00 for the Role of Graphical Analysis in Teaching Physics Workshop.

Name _____

School _____

School Address _____

Home Address _____

School Phone _____ Home Phone _____

Email Address _____

Verification of Registration, and directions to Clayton High School will be sent to registrants via email!

Problem-solving: The Interface Between Math and Physics.

Tom Foster
Department of Physics
Southern Illinois University Edwardsville

The introduction of mathematics as the language of physics is what separated physics from natural philosophy. Imagine trying to differentiate between Galileo and Aristotle based entirely on philosophical grounds?

"Not only does Galileo postulate airless projectiles in clear violation of the basic elements, but he writes in Italian. Aristotle, who writes in a language familiar to all educated men, Greek, is obviously correct!"

But with math (and measurement), the debate is moot. The precision and power afforded to physicists by mathematics allows us a level of objectivity which is the envy of all disciplines (not that the creation "scientists" aren't trying to reintroduce a philosophy first mentality). This precision is also what attracts most of us to physics and is what we try to impart to our students.

However our students do not share our appreciation of mathematics. Some students struggle with math and even fear it (Math anxiety is a well documented effect). Other students can do the math, but they never really understand or internalize math. Even our best students will struggle in transferring their skills acquired expertly in their math classes to our physics classes. The trouble is not with their skills; it is with applying it to a new setting.

Cognitive science warns us that transferring skills across contexts is hard. Consider the idea of "sea legs." Those of us familiar with walking on land might naively assume that walking on a boat will be similar – and quickly be proven wrong. Even those of us who have been warned by friends, will struggle even though we "know" what to do. In fact, you could lecture indefinitely on how to walk on a boat, but until your students get the experience of transferring their land-based skills to boats, they will never develop sea legs.

We know as teachers that practice is important in physics problem solving, but there is more you can do. To facilitate transfer of math skills to your physics classroom, let me offer you a few rules to remember:

1) Physics looks like alphabet soup. In physics we use a large variety of symbols in our mathematical expressions. Sometimes these symbols are variables, sometimes they are constants, sometimes they are parameters, and sometimes they are operators. This generalizability is power to us, but confusing to our students. It is hard for students, who think in terms of x or y, to deal with this complexity. Help them see through the thicket of variables. A few ideas to help this are to insert numbers leaving only "x", circle the variable for which you want to solve, be consistent in your nomenclature, and try using novel problems like Jeopardy problems or Ranking Tasks

2) Physics first. In most math classes, the students get plenty of practice with new skills by solving equations already set up for them (drill and practice). They get minimal experience setting up equations with the dreaded word problems. Of course, physics is nothing but word problems. You will need to teach your students how to read a physics word problem so that they understand what is happening in the problem statement. The students will also need to learn how to parse the valuable information out of the word problem and how to record this information on the page (by assigning variables and drawing diagrams). Then teach them how to identify which of the many physics concepts they have learned will be most useful. In short, physics begins before you write the first equation.

3) Physics takes time. Many students believe that problems can be solved quickly. In TV shows, most problems are solved in 30 minutes. In some classes, tests frequently have about 10 questions – or 5 minutes per question. Students have been trained that problems which have solutions take about 5 minutes. If it takes more than 5 minutes, the problem is impossible. Real problems take time. The best problems are those which require the students to make decisions and struggle with parsing the information. The students should really have to think about the physics (Context-rich problems are a good place to start. For examples go to: http://www.physics.umn.edu/groups/physed/Research/CRP/crintro.html). But they will get frustrated. As a teacher you will need to support the students during this struggle. Let them work in groups to solve these big problems, give them a chance to redo their work, use the problem-solving strategy in your textbooks, and remind them they can do succeed.

4) Make a plan. We all know two step problems are hard, but part of what makes them difficult is that even if the students know what is going on at first (see rule 2), after completing the first part, they forget there is more. Teach your students to create and record a plan to get through the problem. Do this by doing it yourself. Make it explicit and grade for it. You students will mirror what you teach them to do.

Remember that your student's poor performance on physics problems is probably not due to a lack of math skills (we are preparing to investigate this idea at SIUE) so more math classes may or may not help. Instead, you should teach your students to use their existing math skills following a well-planned path in the context of physics. Transferring math skills to physics is possible. Your best students will eventually figure it out, but you can help all of your students by remembering these rules and explicitly teaching your students how to transfer their skills.

2002/2003 SLAPT Calendar of Events and other Events of Interest to Physics Teachers

Oct 12: Amusement Park Physics Workshop
Host: Six Flags St. Louis
Time: 8:00 a.m. to 2:30 p.m.
Place: Six Flags St. Louis
Details: Advanced registration required by October 8. Free admission for you and a guest. Free Lunch. Contact Rex Rice by email at rexrice@swbell.net or by phone at 862-2845.

Nov 2: PTRA Workshop: Vernier Interfacing
Host: Valerie Michael
Time: 7:30 a.m. to 12:30 p.m.
Place: Parkway Central High School
Details: Participation is limited to the first 20 people who register. The cost is $56 if you school pays (preferred) or $38 if you pay. Contact Valerie Michael at vmichael@pkwy.k12.mo.us

Dec 7: SLAPT/Chemistry Joint Meeting: Physics and Chemistry Lab Ideas
Hosts: Joe Bartin and Bob Becker
Time: 8:30 a.m. to noon
Place: Kirkwood High School
Details: Bring your lab ideas to share with your fellow physics and chemistry teachers.

Jan 11: 126th AAPT National Meeting
2003 Winter Meeting
Place: Austin, TX
Details: Visit the AAPT website at www.aapt.org

Feb 8: SLAPT Workshop: The Role of Graphical Analysis in Teaching Physics
Host: Rex Rice. Presented by Debbie and Rex Rice.
Time: 8:00 a.m. to 3:00 p.m.
Place: Clayton High School
Cost: $10 per participant. Includes lunch.
Details: This workshop will be limited to the first 24 participant registered for the workshop. See the registration form in the flyer enclosed in this issue of Tempo, for registration details or contact Rex Rice at rexrice@swbell.net

Mar 27: National Science Teachers Association 2003 National Convention
Place: Philadelphia, PA
Details: Visit NSTA website for details http://www.nsta.org

Apr 25: Physics Day at Six Flags
Host: Six Flags St. Louis
Time: TBA
Place: Six Flags St. Louis
Details: equipment will be available for free checkout at a predetermined ride. This event gets better each year. Plan to take your classes. Check the SLAPT website for details. http://www.SLAPT.org

Apr 26: SLAPT Meeting, St. Louis University High School Physics Competition
Host: Larry Stacey
Place: St. Louis University
Time: 9:00-11:00 a.m., Awards ceremony at 1:00 p.m.
Details: Larry will send out a mailing giving details for registering students for the competition. If you do not on the mailing list, contact Larry Stacey at stacey@SLU.EDU

Aug 2-6: 127th AAPT National Meeting
2003 Summer Meeting
Place: Madison, WI
Details: Visit AAPT website for details http://www.aapt.org

The Saint Louis Area Physics Teachers is changing its information delivery system to a totally electronic format. It is essential that we have email addresses for all area physics teachers and any other interested parties.

Please send your email address (and that of anyone you think might be interested) as soon as possible to:

rexrice@swbell.net

in order to assure that you will be kept up to date on the activities of SLAPT

PHYSICS Tempo

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an affiliate organization of the American Association of Physics Teachers

Rex Rice, Physics Tempo Editor
6051 Kingsbury
St. Louis, MO 63112
email: rexrice@swbell.net

Stay up to date on the latest news for Physics Teachers in the Greater St. Louis Area.

Please send Rex Rice (rexrice@swbell.net) your email address today!

Volume 13, No. 1 Fall, 2002 **http://www.SLAPT.org**

The Physics Teacher's ROLODEX®

The Saint Louis Area Physics Teachers Have a new Website!

Bookmark this Address today!

http://www.SLAPT.org

Mark Schober, of John Burroughs School has graciously agreed to be the new SLAPT webmaster. All updates to this annual newsletter will be made via this website. Please check it regularly.

In order to host this new website, SLAPT really needs your financial support. Please send Joe Bartin your $10 annual dues and join SLAPT today!

Saint Louis Area Physics Teachers MEMBERSHIP APPLICATION

In order to continue to keep you informed of the activities of the Saint Louis Area Physics Teachers, we mail out one printed copy of the Physics Tempo annually. All updates and corrections to our calendar will be handled via email and through our new website at http://www.SLAPT.org. Please consider helping to support the continuation of our group by joining the Saint Louis Area Physics Teachers.

Annual dues are $10 and should be sent payable to: **Joe Bartin**
8429 Gannon
St. Louis , MO 63132
bartinj@gw.kirkwood.k12.mo.us

In addition to the newsletter, you will receive a buzz book of the members of the Saint Louis Area Physics Teachers.

Membership is open to anyone with an interest in improving the quality of the teaching of physics and physical science. You do not have to be a member of the group to participate in the activities, but membership dues make it possible to continue the activities of our organization. Thanks for your support.

Please help us update our records. Send the following information to via regular mail or email to Rex Rice, 6051 Kingsbury, St. Louis, MO 63112. email: rexrice@swbell.net
If you received this newsletter erroneously, please forward it to a science teacher who might find it useful. In order to keep you current on the activities of SLAPT, it is essential that we have your current email address.

Name _____

Home Address _____ City _____ State _____ Zip _____

Name of School _____

School Address _____ City _____ State _____ Zip _____

Home Phone _____ School Phone _____ email address _____

I would like to receive mailings from SLAPT at: ☐ Home ☐ School