NEWSLETTER

ONTARIO ASSOCIATION OF PHYSICS TEACHERS
(An Affiliate of the American Association of Physics Teachers)
September, 2004

Ontario Association of Physics Teachers News

by: Rolly Meisel

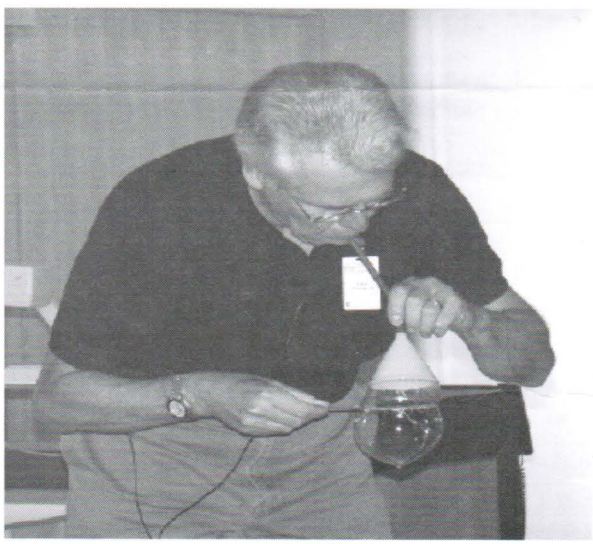
The OAPT annual conference was held at the newly-opened University of Ontario Institute of Technology (UOIT) in Oshawa, Ontario from May 27-29, 2004. The conference opened Thursday evening with a welcome barbecue, followed by workshops on practical applications in the grade 12 College physics course, assessment and evaluation, and Interactive Physics software. A wine & cheese allowed workshop participants to share their experiences. Friday morning featured Dr. Joe Redish of the University of Maryland, speaking on how students learn physics. Follow up workshops were available in the afternoon, as well as tours to the Darlington nuclear station, the Pickering Wind Turbine, and the Canadian Regional Engineering Centre at GM Canada. Friday evening participants enjoyed a banquet, with guest speaker Donald Schmitt, of Diamond and Schmitt Architects, Inc. The topic was the design and construction of UOIT, including some of its unique features, such as a geothermal heating/cooling system. Sessions continued on Saturday, including Canada in Space, rubber band dynamics, soap bubbles and films, software for teaching physics, the new OAPT photography contest, wind as an energy source, the Sudbury Neutrino Observatory, women in science and engineering, and others. Exhibits and demonstrations of apparatus for teaching physics were on display during coffee breaks and lunch.

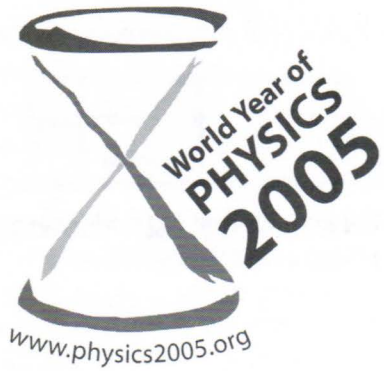
Veteran physics teacher George Vanderkuur (also former chief scientist at the Ontario Science Centre) demonstrates one of the many uses of soap bubbles and films in the teaching of physics.

The next OAPT conference will be held from May 26-28, 2005 at Laurentian University in Sudbury, Ontario, which is also home to Science North and the Sudbury Neutrino Observatory. More information will be posted on the OAPT web site at http://www.physics.uoguelph.ca/OAPT

Several thousand physics students wrote the OAPT grade 11 prize contest in May. The next contest will be written on Tuesday, May 3, 2005. Information on how to enter the contest is posted at the OAPT web site http://www.physics.uoguelph.ca/OAPT. Past exams and solution sets are also available on the site.

About the author: ***Rolly Meisel****, a retired physics teacher, is now the OAPT section rep for AAPT. His email address is: rollym@vaxxine.com.*





2005 World Year of Physics

By: Diana Hall

Next year, the international physics community will be celebrating the World Year of Physics. The year 2005 was selected in recognition of the 100th anniversary of the publication of Einstein's famous three papers on the theory of relativity, quantum theory, and the theory of Brownian motion. Events and celebrations are being organized everywhere and Ontario is no exception.

Apart from festivities recognizing the centennial, this is an opportunity to bring physics to the community and promote the subject within and outside our schools. Let's increase the 'phriendliness phactor' of physics. It's time to start thinking about how to get your school involved.

Here I share with you some ideas that my students and I have come up with and I hope that you will also share your plans.

- We are putting together a web site where teachers and students can go to share plans and report on events that have taken place. Using this venue, we won't have to each reinvent the wheel as we develop activities that might be going on elsewhere as well. When this is up we will link it to the OAPT site, www.physics.uoguelph.ca/OAPT/.

- All physics students in both grade 11 and 12 courses will participate in the NEW OAPT Photo Contests. We have a lot of physics students and so we will hold an in-school competition and select entries to send in for the provincial competition.

- This year our SPH4U's and 4UG's will be working on projects that emphasize a cross-curricular connection. Communication with students in other courses is a big part of this project. Knowing their audience and keeping the physics manageable will be crucial in keeping things positive.

    - Students will present to grade 9 music students concepts related to their musical instruments and similarly for a dance class.
    - Rocket Scientists will design rockets, prepare detailed specifications and pass them on to the construction class for manufacture.
    - Artists will create a mural for the Library reflecting physics concepts and WYP.
    - Exercise Science uses impulse and momentum as well as work and energy concepts so an interactive cross-curricular presentation can be made to this class.
    - I'm hoping the marketing class will participate in promoting the stage production coming to our local theatre.
    - Students will organize a physics day for students of feeder schools.

- OAPT is sponsoring a one-man show called "Einstein: A Stage Portrait", performed by Tom Schuch of New Mexico. It will be performed May 13-14th, 2005 at Centrepointe Theatre in Ottawa. (Any interest in bringing him to your town should be directed to Tom or me). Check his website at www.spoli.com.

- A special effort will be made to encouraged more students to get involved in the OAPT grade 11 physics contest, the CAP and SIN physics contest and the Leonardo DaVinci Engineering Contest.

- Our students will also participate in organizing and promoting events less content based. Such as:
    - Design and sales of school World Year of Physics baseball shirts. We will organize events for the 5th day of the month when all physics students in the school will wear their shirts.
    - Movie Nights
    - Trivia Contests
    - Circus acts

We will be making an effort to let the entire school know what physics students are doing and invite them to participate or watch. Sometimes I forget to do this.

The Canadian Association of Physicists, CAP, is sponsoring events on a local, regional, provincial and national level. Please check their website http://www.cap.ca.

The American Association of Physicists, AAPT, also maintains a web site with ideas and links to other WYP sites. See www.aapt.org.

I believe this is an opportunity that should not be passed by. Let's make sure that everyone knows that 2005 is World Year of Physics and that people in our communities have a chance to experience the joy of physics in some small way. Please also spread the word of OAPT and World Year of Physics to your physics teacher friends in case they are not already members and or are not aware of the significance of 2005. Any photo fanatics will certainly be interested in the one time WYP version of the photo contest for members.

Good Luck everyone and don't forget to share your ideas.

About the Author: ***Diana Hall*** *is a teacher of high school physics at Bell High School. She's been teaching for 14 years.*

Physics Photo Contest

By: Alan Hirsch

A great opportunity has been initiated to allow students (and teachers!) to display their photography skills while illustrating physics principles. To coincide with the World Year of Physics, the OAPT is pleased to announce an OAPT Physics Photo Contest for senior high school physics students and, for 2005 only, a separate contest for OAPT members.

The student contest is open to anyone enrolled in a day school Grade 12 physics course in Ontario in the 2004 – 2005 school year. There are four categories in the contest, one for students enrolled in the university preparation course, SPH4U, one for students enrolled in the college preparation course, SPH4C, and two separate categories for members of the OAPT. The photos will be judged by physics educators at the annual OAPT Conference in May, 2005, in Sudbury.
The specific rules are described in detail on the photo contest website where entry forms are also available. The website, maintained at the University of Guelph, can be found at:

www.physics.uoguelph.ca/~omeara/photocontest

Students in SPH4U will submit two or three photographs of the same subject showing the effects of changing a specific photographic variable. Examples of variables are polarization of light, interference and/or diffraction of light, controlling depth of field, controlling film speed, and controlling special effects. The photos must be accompanied by an explanation of the physics principles involved. Before attempting to take their photographs, students should research how the variables can be controlled. The camera's instruction manual is an obvious place to begin research. Other resources include photography magazines, photography reference books (such as *Digital Landscape Photography*, by Tim Gartside, published by Muska & Lipman Publishing, 2003), science encyclopedias, the Internet, first-year university textbooks (such as *Physics for Scientists and Engineers,* by Raymond A. Serway, published by Saunders College Publishing), and people such as photographers who have both equipment and experience. In order to be sure that they understand how physics principles relate to photography, students should refer to the part of the SPH4U course that involves the wave nature of light. For example, in order to explain why a polarizing filter has to be
oriented a specific way and at a specific angle to minimize the glare off a non-metallic horizontal surface, students should understand such phrases as plane-polarized, polarization by reflection, axis of polarization, polarization angle (or Brewster's angle), and the electric component of an electromagnetic wave. Finally, students should be aware that the best type of camera for

controlling variables is a single-lens reflex camera, now available in digital format.

Students in SPH4C will submit one or two photographs (along with an explanation of the related physics principles) that feature this year's theme, "The Physics of Motion, Forces, and/or Machines." Examples of physics principles in this theme are acceleration, Newton's laws of motion, friction, simple machines, and domestic and industrial machines. (The theme for this category will change each year.) Students can get ideas regarding this theme by referring to the topic of "Mechanical Systems" in their physics course. (In the textbook *Nelson Physics 12, College Preparation*, the topic is covered in Chapter 1, Motion and Forces, and Chapter 2, Machines.) Students will get more out of this photography challenge if they study the camera's instruction manual. For example, if they want to take a photo that shows water moving slowest at the top of a fountain and accelerating toward the bottom of the fountain, students have to understand how to take a photo with a relatively long exposure time, as seen in the accompanying photograph.

Prizes (provided by me) for each student category are:
First prize: $200.00 cash
Second Prize: $100.00 cash
Third Prize: $50.00 cash

The teacher of the First Place student winners will also receive a Computerized Assessment Bank for 4U Preparation or 4C Preparation donated by Nelson Publishing.

The criteria for the photo contest for OAPT members are the same as those for the SPH4U students. However, there will be two sets of three prizes ($200.00, $100.00, and $50.00, provided by Nelson Publishing and me), one for sets of photos illustrating polarization and the other for all other photographic variables.

For more details and sample photographs, please refer to the website mentioned above. Notice that the entries must be submitted between April 4 and May 2, 2005.

I would like to express my gratitude to the following for their contributions: Diana Hall for helping to set up and promote the contest, and coordinating the judging of the entries; Joanne O'Meara for setting up and maintaining the photo contest website; Ernie McFarland for his ideas and support; and Paul Masson from Nelson Publishing for donating two software items and $350.00 cash.

About the Author: ***Alan Hirsh*** *has been an active member of the OAPT since the second of its inception. He has been involved in writing physics and science textbooks for many years, and he retired in 1999 after 31 years of teaching high school physics in Ontario.*

This photo was taken with a telephoto lens on a digital single-lens reflex camera with an exposure time of 1/200th of a second and an aperture setting of f-5.6. The water droplets become more streaked toward the bottom of the fountain as their speed increases.

Attention all Physics Teachers!

The next International Commission on Physics Education (title: World View on Physics Education in 2005: Focusing on Change) will be held in New Delhi, India from August 21 – 26, 2005. The host of this conference, The University of Delhi, is extending an invitation to all physics teachers. Conference details may be found at:
http://education.vsnl.com/pjolly,
http://education.vsnl.com/pjolly.