

DMAPT Today

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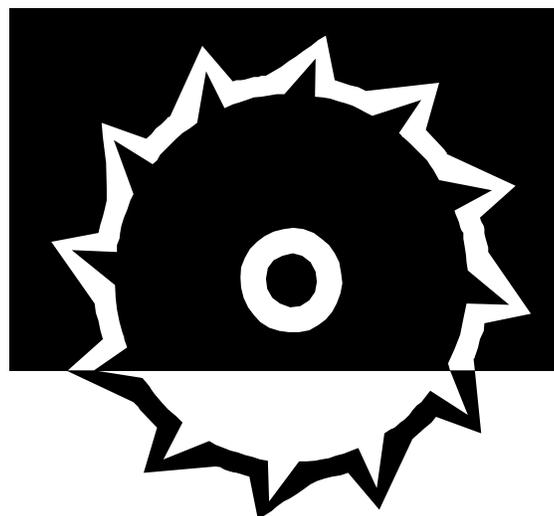
DMAPT Winter Meetings—2004-

*Minutes taken by Laura Clarke—
Dondero H.S., Royal Oak*

*Newsletter by Nicole Murawski—
Kimball H.S., Royal Oak*

Meetings in this Newsletter:

- **January 27, 2005**—Oakland Schools Technical Center Northeast, Pontiac
- **November 9, 2004**—Plymouth High School, Plymouth



DMAPT's First Meeting of 2005, in Pontiac:

Mike McIntyre was the host of our January meeting at the Oakland Schools Technical Center Northeast Campus in Pontiac. The official meeting started at 7:00 PM and lasted until 9:30 PM.

Meeting topics included real-world physics, field trips and the World Year of Physics.

Upcoming Meetings:

Late March/Early April:

Rhonda Diliberti had offered to host the next meeting in Mt. Clemens (L'Anse Creuse High School).

Mark Davids, Don Pata & Rick Forrest also offered to host the meeting in Grosse Pointe to demonstrate the physics of wireless communications. The members decided to move the next meeting from L'Anse Creuse to Grosse Pointe. The tentative date is Wednesday, March 23rd at Grosse Pointe South.

Coming this Fall:

In late September, Wayne State will host a meeting at the Detroit Science Center on a Wednesday or Thursday night.

Announcements:

Rhonda Diliberti, our VP, is working on a website for DMAPT. Check out the website at: www.diliberti.net/DMAPT_HOME.htm

U of M Dearborn will have a speaker on February 1st at 4:35pm in the Castle Building (Arts and Letters Building). Peter Gallison from Harvard, who is the author of several history of physics textbooks as well as other books, will be speaking to the general public.



U of M Dearborn is looking for anyone with a Master's degree who is interested in teaching a "Physics for Elementary Teachers" class. Contact Paul Zitzewitz at U of M-Dearborn.

Chris Deyo mentioned that there is a need for teachers who would be interested in piloting the Active Physics program for 9th graders. Summer workshops are available. Go to the Arizona State website for more information. Search for the modeling workshop.

You might want to look into going to Saturday Morning Physics at U of M - Ann Arbor. Be sure you get there 30-45 minutes early to get a seat.

Mike McIntyre mentioned that the Wall Street Journal printed that there is a backlog for engineers, especially at upper management levels. Engineering is making a comeback.

Mike also mentioned that there was a 5th grade girl had been doing a project on tidal waves. She went to India and stayed with her family at a resort beach. When the girl recognized the signs of a tidal wave, they evacuated the beach before the destructive wave hit. The moral of the story... science saves lives!!!!

The AAPT Physics Bowl is April 7-20, 2005. Applications were handed out.

Nicole Murawski and Mike McIntyre recently participated in a video conference regarding being highly qualified for science. Nicole passed out the latest list of classes that can be taught according to major/minor. Physics majors are qualified to teach physics, astronomy and physical science. There will be a new physical science test that will be designed to allow teachers to become endorsed in physical science. This will make them highly qualified in physics, chemistry and physical science. Nicole is on a test evaluation committee for that. For the latest list of classes you are qualified to teach under the NCLB guidelines, go to:

http://www.michigan.gov/documents/What_can_be_taught_composite_TQ_for_12-22-04__112320_7.doc

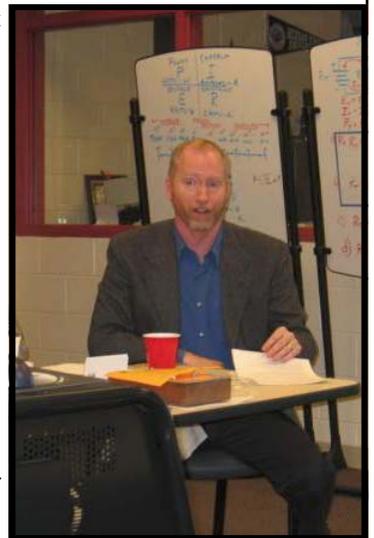
An astronaut who has been on the International Space Station is speaking to Grosse Pointe South in the 1st week of April (week after Easter) in the War Memorial during the day and in the evening. Mark Davids will email soon with details.

Check out www.spaceflight.nasa.gov

Wayne State University will be hosting a series of lectures in the late spring for the World Year of Physics. There will also be open house in the fall at Wayne State University. We may get more information about the open house at the next DMAPT meeting.

There will be a Sigma Psi lecture on February 15, 2005 at 4:00 in room 245 Physics at Wayne State University. The topic of discussion will be the Brain and Mind. The speaker is a psychologist and brain scientist.

The next Robotics Tournament is in March at Wayne State University Fieldhouse on March 17-19th. Go on Saturday to see the elimination matches.

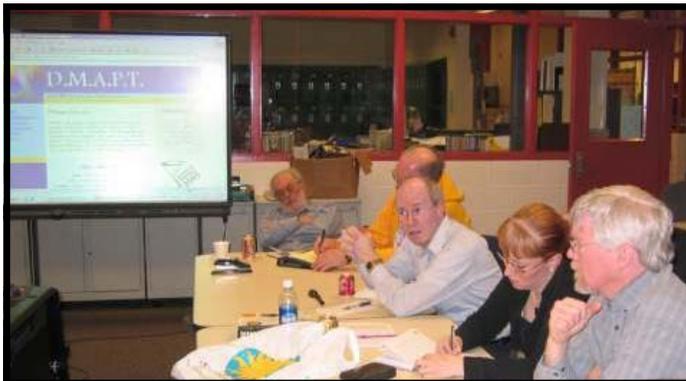


Ideas for Real-World Applications for Physics:

Chris Deyo brought a handout for her physics Olympics event that she does with her classes.

Don Pata talked about how he used the sport of sailing to connect to vectors. He designed a vector racing project. Students build a sail. They use box fans and race wooden block cars both downwind and upwind at a certain angle.

For the remainder of the meeting, there was an open discussion of random physics topics, such as: antenna length and wavelength, LED flashing lights on cars, physics of the eye, vector racing on graph paper, and the physics of bobsleds. You just had to be there...



DMAPT's Final Meeting of 2004, in Plymouth:

Steve Rea was the host of this month's meeting at the new Plymouth High School. The official meeting started at 7:00 PM and lasted until 9:30 PM.

Announcements:

The University of Michigan physics department encourages anyone who is interested to attend "Saturday Morning Physics" at Dennison Hall on the main campus. The current topic is particle physics. Presentations begin at 10:30, but it is recommended to arrive early to secure a good seat! Parking is available on Church Street. The physics department at the University of Michigan also announced their interest hosting a future DMAPT meeting.

The Oakland County Robotics Championship was held November 20, 2004 at Kimball High School in Royal Oak. Robotics is a great motivator for students and this event promises to be an exciting competition.



Master Physics Teacher Chris Chaveriana from metro Chicago was a keynote at the recent MDSTA Conference. A special **thanks to Arbor Scientific** for sponsoring this speaker and also for their longtime support of the DMAPT! Mark Davids thanked the DMAPT for helping to make the MDSTA Conference a success. There were at least 10 presentations from our members!

Mark Davids announced that he has received a grant to fund a project on the physics of cell phones and wireless communications. This project will result in a 2 week long unit of student investigations. GP South, GP North, Rochester HS and 2 other local high schools will pilot the program this school year. Next year the program will be expanded to include about 15 new schools. Contact Mark Davids directly if you want more info about this project. (mark-davids@comcast.net) Mark, Don Pata, and Rick Forrest will hold a workshop on this topic in the spring for DMAPT.

Ernie Berenger from Eastern Michigan University announced that this year's MI-AAPT conference will be April 6, 2005 at Grand Valley State.

The next DMAPT meeting will be on a Thursday at the end of January at the Oakland Tech Center in Pontiac. Potential topics include real-world physics and/or electricity and magnetism.

Energy and Momentum Demos:

Ernie Berenger from EMU showed a quick demonstration to teach rotational inertia. He had two soup cans of equal mass and radius. One can contained beans, the other contained broth. The cans were covered so that the audience could not tell which one was which. He rolled both cans down an inclined plane. One can clearly won the race. Which wins? Why? The can of broth won because more energy goes into rolling the beans.

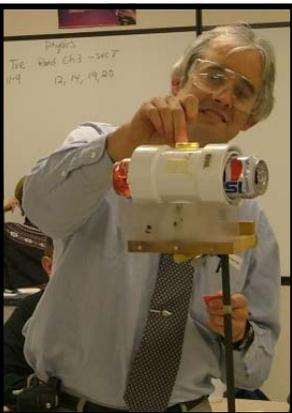
Doug Birchmeier from Divine Child HS demonstrated some of the new features that come with Logger Pro 3.3. Included in the upgraded software is a folder that contains Doane physics videos. With this software one can compare the actual motion in the video to the position on a graph. Logger Pro costs \$150 and is available through Arbor Scientific. If you currently have Logger Pro 3.0 or a later version, you may download a free upgrade. If you have an earlier version of Logger Pro, the upgrade will cost \$50.



Vicki Kramer showed us how she demonstrates energy transfers to her students. She sets up several stations of different types of mechanical toys. Students test the toys and discuss how energy is transferred. Several teachers suggested the classic Rube Goldberg type of competition was great to motivate students and show applications of different types of simple machines.

Paul Cerre from Dearborn HS showed us several demonstrations for circular motion. He set up a rotating system that included motorized propellers at the end of each side of a rotating board. One can use this kind of system to measure linear velocity or rotational velocity. He also uses fan cars to demonstrate velocity. A single fan placed on the car will result in a velocity in one direction. Two fans in opposing directions demonstrate the sum of

the forces depends on the angles. Dick Braun added that teachers could reduce the speed of fan cars. Just replace one of the batteries with a wood dowel covered in aluminum foil. The circuit will be closed, but with only $\frac{1}{2}$ of the voltage!



Rick Forrest from Rochester HS helped us to answer the question: *Is diet soda really "lighter"?* He showed us a momentum demonstration where a small explosion from a firecracker sent two empty pop cans flying through the air. We then compared the sideways distances of the two cans.

Mark Davids showed a gyroscope demonstration of a rotating wheel. He asked if anyone could remember the explanation of precession based on linear momentum. Several college people indicated that the simple explanation was probably in the first book of the *Feynman Lectures*. Although Mark could not find the work in the *Feynman Lectures*, Paul Zitzewitz has figured it out. See Paul Zitzewitz's explanation on page 6!



Steve Rea described various methods for introducing the concept of "work." Al Saperstein from WSU initiated a question about the concept of work? "How do we define work?" and "Why is work = $F \cdot d$?" When do we introduce this topic?" The group had a lively exchange of ideas related to these pedagogical quandaries.

Mike McIntyre of Oakland Schools Technical Center NE demonstrated the relationship between impulse and momentum by throwing a raw egg at a loosely held bed sheet. Mike explained that the change in the momentum for the egg doesn't change. However, the egg was stopped over a large amount of time which reduced the amount of force on the egg so that egg did not break! Mark suggested that there was a second equally important reason for the egg's survival – pressure. When the egg was stopped by the sheet, the force was spread over a large area – about $\frac{1}{2}$ of the surface of the egg so that the pressure ($p = F/A$) is small. If the egg were to be stopped by a non-flexible object such as the wall, then the force would be applied to a small area on the egg and the pressure ($P = F/a$) would be much larger.

Dick Braun demonstrated a simple, but elegant improvement on the old ticker tape timers. He made 2 parallel cuts in a 3 X 5 notecard, then threaded the tape through the cuts and taped the notecard to the table. Dick then attached the ticker tape to the back of a battery powered car. Dick then marked dots on the tape at 1.0 second intervals as it was pulled by the car. This technique produces excellent results! Another suggestion was to tape a long strip of paper to the table and students move with the car and mark the tape at the back of the car every second. The data of position and time can be used to make motion maps, graphs, and etc.



Another suggestion was for plotting a motion diagram of projectile motion on the wall. Line up all students shoulder to shoulder facing the board. Shoot a ping-pong ball gun parallel to the chalkboard and have the students mark the height of the ball on the wall where they see the ball pass in front of them.

Another teacher talked a little about “hallway physics”. He uses a bowling ball not only to demonstrate constant velocity but also to teach about good vs. bad data and best fit lines.

Doug Birchmeier has a stopwatch program for the graphing calculator, “How to turn a \$100 calculator into a \$5 stopwatch!” He later emailed the program to the DMAPT members. If you missed it, and you're interested in receiving the program, email Nicole Murawski at murawskin@royaloakschools.com



AL'S CORNER: Tidbits and goodies from the desk of Al Gibson

Physics/Chemistry Field Test Opportunity 2005-2006:

The Center for Science Education (CSE), one of the nation's premier innovators of science curricula, is now accepting applications from high school teachers interested in field testing a new ninth or tenth grade physics/chemistry curriculum for the 2005-2006 school year.

This curriculum is one semester of physics for the fall of 2005, and one semester of chemistry for the spring of 2006. Classrooms that teach physics and chemistry concepts in grade nine or ten are welcome to participate in this field test. A Teacher Guide, a book for each student, tests, and worksheets are provided. Only equipment and consumables that are generally available in high school are needed.

The curriculum, *Foundation Science*, is being developed by the Center for Science Education (CSE), a part of Education Development Center (EDC), an international, nonprofit organization that conducts research and creates materials and programs to advance learning and promote health. EDC has been working in all areas of education since 1958. Funding for *Foundation Science* is being provided by the National Science Foundation; and the Principal Investigator, Dr. Jacqueline S. Miller, is a scientist who also led the team that produced the *Insights in Biology* curriculum.

For further information about the curriculum, go to <http://cse.edc.org/work/foundationscience>. **To apply to be a field-test teacher, go to <http://cse.edc.org/work/foundationscience/fieldtest.asp>.**

World Year of Physics Challenges:

The Physics Teacher is conducting a WYP 2005 Physics Challenges problem solving contest which is open to faculty, college students and high school students. The winners each month in each category receive a t-shirt and their name is listed in a later issue of The Physics Teacher. Those who submit the most correct solutions during the period January-May will be eligible for an additional prize and recognition. The problems and instructions for entering the contest can be found in The Physics Teacher or online at <http://scitation.aip.org/tpt/>

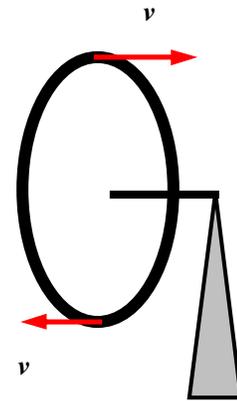
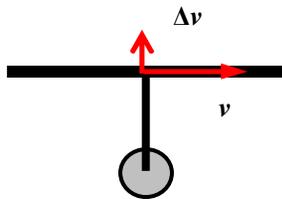
Rotation of a Spinning Bicycle Wheel—Without Angular Momentum

Paul Titzewitz, University of Michigan-Dearborn

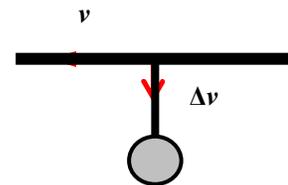
Jeff Prentis (UM-D) first taught me this method.

Consider a spinning wheel supported at one end of its axle:

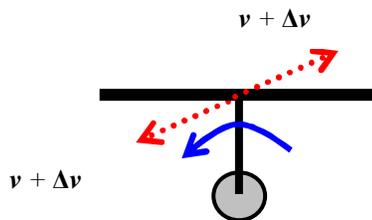
Now look at the top of the wheel. The rim is moving to the right. But, the support of the wheel isn't under its center of mass, so the wheel tries to tip. This gives the top of the wheel a small velocity, Δv , outward, away from the support.



If you consider the bottom of the wheel, the velocity of the rim is in the opposite direction, but so is Δv , which is now inward, toward the support.



If you now add $\Delta v + v$, you obtain the resultant velocity vector. The rim at the top tends to move to the right and outward, the rim at the top to the left and inward. The only way this can be accomplished is for the wheel to rotate (precess) about its pivot point, as shows by the blue arrow.



Special Thanks goes to Cal Hoeksema and Louie Miller for their wonderful photography!

DON'T FORGET: 2005 IS THE YEAR OF PHYSICS!

For information and classroom ideas for celebrating this event, go to: <http://www.physics2005.org/>

Suggestions? If you have any ideas or suggestions for future newsletters, please email them to Nicole Murawski at: murawskin@royaloakschools.com