Ontario Association of Physics Teachers

NEWSLETTER

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AAPT MEETS IN SAN FRANCISCO IN JANUARY, 1989

The winter meeting of the American Association of Physics Teachers will be held in San Francisco from Sunday, January 15 through Thursday, January 19, 1989. The meeting will be joint with the American Physical Society and the American Association for the Advancement of Science. The program includes an open house at the Exploratorium, a visit to the Lawrence Hall of Science in Berkeley and many workshops.

AIP RELEASES MAJOR SURVEY OF HIGH SCHOOL PHYSICS TEACHERS

The first national survey of public, private and parochial high schools in the U.S.- a project conceived and planned by the American Institute of Physics and the American Association of Physics Teacher - has just been completed and published by the AIP. About 2/3 of the schools offer physics every year, and another 17% offer it every second year. 90% of the schools with physics classes have only one physics teacher and four out of five provide only a basic introductory course in physics. Copies of this report are available from AIP, Education and Employment Statistics Division, 335 East 45th Street, New York, NY 10017. The report will be available for viewing at the OAPT Conference in June.

OAPT PHYSICS CONTEST

George Kelly and his committee are presently preparing the 1989 version of the OAPT Physics Contest. The contest will be written on Tuesday, May 9, 1989, which falls in the week after the SIN test. The contest is designed for students presently taking the Grade 12 (or Grade 11) Physics course or who will be taking it during the second semester. The topics tested will be the same as in last year's contest. However, an attempt will be made to include questions based on laboratory work.

NEWSLETTER EDITOR

Malcolm Coutts will be the new editor of the newsletter. Thanks to Alan Hirsch for acting as temporary editor. If you have any materials to contribute or any suggestions for the newsletter, please send them to

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THE DEMONSTRATION CORNER

Falling Faster Than 'g'

by T. Dean Gaily,
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London, Ontario

A simple lecture demonstration to illustrate that some objects do 'fall' with an acceleration greater than 9.8 m/s^2 is constructed from two pieces of 2.5 cm x 15 cm lumber approximately 1 m in length (1" x 6" x 39"), hinged together at one end. A small marble placed in a notch at or near the end of the "falling" board can be made to fall slower than the board and land in the cup strategically placed on the falling board. [See the sketch below.]

Construction is very straightforward, but here are some tips and precautions:

1) Arrange to release the falling board smoothly, using either a support thread that can be burned or an electromagnet and a piece of soft iron on the falling board. Interrupting the current to the magnet causes the board to fall smoothly.

2) Provide some form of sticky substance in the catching cup to prevent the marble from bouncing out when the board reaches the bottom of its fall.

3) Provide a cushion for the falling board, again to keep the marble from bouncing out of the cup. You might use plasticene or 'duxseal' warmed and worked by hand just prior to the performance of the demo.

This demonstration has been the subject of a recent article in the *American Journal of Physics* [August, 1988, pg. 736]. Here is a much simplified (and less accurate) analysis of the demonstration. The falling board is a rigid body and the gravitational torque acting on the center of mass of the board equals its moment of inertia times its angular acceleration.

$$\tau = I\alpha$$

$$(mg)(\frac{\ell}{2})\cos\theta = (\frac{1}{3}m\ell^2)\alpha$$

Hence, the angular acceleration is

$$\alpha = \frac{3g}{2\ell}\cos\theta$$

The tangential acceleration of the end of the board (approximately where the marble is placed) is obtained from the angular acceleration of the board by

$$a_T = \alpha\ell = \frac{3}{2}g\cos\theta$$

The vertical component of this tangential acceleration is then

$$a_v = a_T\cos\theta = \frac{3}{2}g\cos^2\theta$$

When $\cos^2\theta > 2/3$, $a_v > g$ and the end of the board falls with an acceleration greater than g. Thus for angles of release of less than about 35°, the marble will be caught in the cup. You might wish to experiment with other angles of release, especially greater than 35-45°, to see if the acceleration of the board's end is *less* than that of the freely falling marble.

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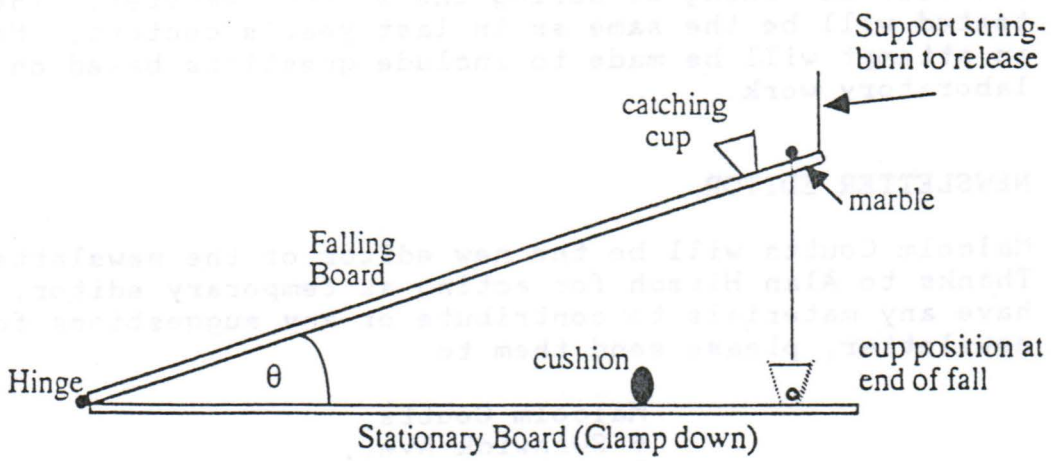
Submissions describing demonstrations will be gladly received by the column editor.



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