NEWSLETTER

ONTARIO ASSOCIATION OF PHYSICS TEACHERS
(an affiliate of the American Association of Physics Teachers)
Volume XXI, Number 3 **Spring 1999**

Response to Secondary Policy Document, Science

Grades 11 and 12 Physics, University Stream (Released Dec. 31, 1998)

by Peter Scovil

On April 24, a group of secondary and university physics teachers got together in Toronto to look over the fourth draft of the physics policy document. It included OAPT and STAO members: Dianne Ness (chair), Bill Konrad, Peter Scovil, John Pitre, Stuart Quick, John Harrison, Doug de la Matter and Stan Kosior. Other people were also consulted.

Our first concern was the amount of material to be covered in the courses, forcing us to take a rote facts and formula approach to teaching. This flies in the face of research in physics education over the past 30 years. We also felt the "one shot at a topic" approach was inadequate, preferring a more sequential approach.

We suggested making the modern physics strands in each year optional. This is not to say they are unimportant. Teachers would be strongly encouraged to cover at least some of the modern physics topics that they feel would stimulate the interest of the students. This would allow more in-depth treatment of the other four strands.

Another suggestion was that for the Specific Expectations, we build in some flexibility. For "developing skills of inquiry and communications" the word "will" would be replaced by "should", recognizing the difficulty some schools may have due to lack of equipment or of training. This still emphasizes the importance of laboratory work. For "relating science to technology, society and the environment" the word "will" would be replaced by "may", allowing teachers to use examples in areas where they have experience, and giving time to deal with a few topics well. This may not fly with the ministry, but if the courses are overloaded, we will be cutting topics whether it is permitted or not. We would like the emphasis to be on the basic concepts.

In specific areas, we recommended coefficient of friction, and Hooke's Law be moved from the grade 11 to the grade 12 course, and that Newton's Third Law be placed back in the grade 11 course. As optics and electricity are previously covered in grades 8 and 9, they needed to be included again at the grade 11 level. Numerous changes were suggested in the order of topics in the grade 12 course to make it flow more logically. For example, we felt gravitation fit better with dynamics and energy than with electric and magnetic fields, and the nature of light was more suitable after electric and magnetic fields. The expression "wave-particle duality" was rejected in favour of "the nature of light and matter".

We recommended quite a few other changes, but this gives you an idea of the main ones. We hope the ministry will listen to our suggestions and give us a more manageable curriculum.

Physics News Update

The A. I. P. Bulletin of Physics News
by Phillip F. Schewe and Ben Stein

MEASURED VALUES FOR THE HUBBLE CONSTANT are converging nicely. At a press conference on May 25, Wendy Freedman of the Carnegie Institution reported a new value of 70 km/sec/megaparsec (with an uncertainty of 10%), down from a value of 80 reported back in 1994. She is one of the leaders of a group that uses the Hubble Space Telescope (HST) to track the light emission of Cepheid variable stars in nearby galaxies.

Another Carnegie astronomer, Allan Sandage, has been a leader of a group that consistently measures a smaller value for the Hubble constant, the latest number being about 59, up from an earlier value of 57. Thus the observed Hubble constant, which is a measure of the overall expansion of the cosmos, is now providing an estimate for the age of the universe about 12 billion years that is no longer in contradiction with the apparent age of the oldest stars.
(NASA press release, 25 May 1999.)

OBITUARY NOTICE

Dr. Robert Sears, the AAPT President Elect, died Wednesday, April 14. Dr. Sears was previously AAPT Treasurer and Chair of the Section Representatives, and would have become the AAPT president next year. He was 57 years old.

OAPT Conference

June 24th, 25th, 26th—1999

Queen's University
Kingston, Ontario

Features Tours To
ALCAN
DuPont
Bombardier

Guest Speaker June 25th
Mr. Terence Dickinson
Editor of Sky News

"The Universe and All That Is In It"

Contacts
Dr. Leslie (613) 545-2713
Dave Gervais (613) 279-2131

OAPT Executive Positions

The OAPT is looking for members interested in serving on the executive. Several positions are opening up this year (including the Newsletter Editor). If you are interested in finding out more information, contact Terry Price (tprice@YorkU.CA).

Anybody Out There?

Don't forget that I'm always interested in hearing your comments, criticisms, etc.

You can reach me—the editor—by e-mail:

pdlaxon@julian.uwo.ca

or, if the mood strikes you, by mailing a letter to:

OAPT Newsletter
c/o Paul Laxon
201 Chestnut St.
St. Thomas, ON
N5R 2B5

OAPT Web Site

Guleph University is host to the OAPT site.

Get info on executive members (including a great picture of me, your humble newsletter editor), the upcoming OAPT Conference, links to other physics web sites, and much, much more!
The URL is:

www.physics.uoguelph.ca/OAPT/index.html

Why wait until it's too late?

The date on your address label is the expiry date for your membership. You may use the coupon below (or a facsimile) to renew it, or to indicate a change of address (or both) by checking the appropriate box. And, hey, what the heck, why not renew it for two (or more!) years; it will save you the hassle of renewing over and over again.

Membership Application

Renewal ❒ **Change of Address ❒**

Name _____

Address _____

_____

$8.00 / year x _____ years = $ _____ , payable to the OAPT

Send to: Ernie McFarland, Dept. of Physics, University of Guelph, Guelph, Ontario N1G 2W1; Email: elm@physics.uoguelph.ca

ONTARIO ASSOCIATION OF PHYSICS TEACHERS

ANNUAL CONFERENCE June 24-26 1999

PROGRAM

Thursday June 24

6:00 - 9:00 p.m. Registration Desk Open in Stirling Hall

7:00 - 9:00 p.m. **Workshops**

Senior Level

Pasco Interfaces	Bill Konrad
Vernier Interfaces	Dianne Ness
Interactive Physics	Kevin Soltes
Grade 9 Astronomy	Chris Burns

Junior Level

Electricity
Heat, and Structural Strength and Stability
Hydraulics

9:00 - 10:30 p.m. Reception

Friday June 25

8:30 a.m. - 12:30 p.m Registration Desk Open in Stirling Hall

9:00 a.m. Opening Remarks and Welcome

9:15 a..m. "Dynamics of Solar Systems", Martin Duncan (Queen's University)

10:00 a..m. "The Transform of Anamorphic Art and the Art of Anamorphic Transforms", James Hunt (University of Guelph)

10:30 a.m. Refreshments and Displays

11:15 a.m. "Using Energy-bar Diagrams in Teaching the Conservation of Energy", Glenn Wagner (Central Wellington District HS)

11:30 a.m. "Physics Software Demonstration", John Berrigan (Oakville Trafalgar High School)

Noon "Diana's Demos", Diana Hall (Bell HS, Nepean)

12:20 p.m. Lunch

1:30 p.m. Board Buses for Industry Tours to ALCAN, Bombardier or DuPont

4:00 p.m. Free Time

6:00 p.m. Pre Banquet Reception in University Club

6:30 p.m. Banquet with after Dinner Talk by Terrence Dickinson - "The Universe and All That Is In It"

Saturday, June 25

9:00 a.m. "The Light Fantastic - Demonstrations in Optics",John B. Johnston (The Faraday Center)

9:45 a.m. "Freshman Physics Lab with Take Home Kits", Tony French (MIT)

10:15 a .m. "Helmholtz Resonance in an Industrial Application", John Earnshaw (Trent University)

10:30 a.m. Refreshments and Displays

11:00 a..m. "An Education Leading to a Career in Industrial Physics", Darcy Poulin (NORTEL)

11:35 a.m. "Medical Applications of Acoustic Imaging", Marc Lukacs (Queen's University)

12:15 p.m. Lunch

1:30 p.m. DEMOS TBA

1:45 p.m. "Fun with Newton's First Law", Roland Meisel (Ridgeway Crystal Beach HS)

1:55 p.m. "A Machine that Differentiates", John Coenraads (Regiopolis Notre-Dame, Kingston)

2: 15 p.m. OAPT Business Meeting

2:30 p.m. "AAPT Summer Meeting 2000", Ernie McFarlane and Jim Hunt (University of Guelph)

2:45 p.m. "Draft Senior Physics Science Guidelines" Tom McCaul (Bayview S.S. Richmond Hill)

3:05 p.m. "The Sudbury Neutrino Observatory - First Observations", George Ewan (Queen's University)

3:50 p.m. Final Remarks and Close.

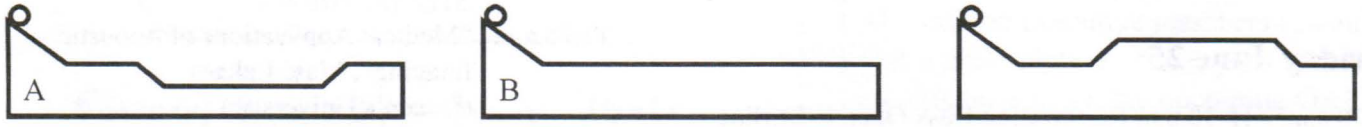
Which Ball Gets to the End of the Ramp First

by

John Childs

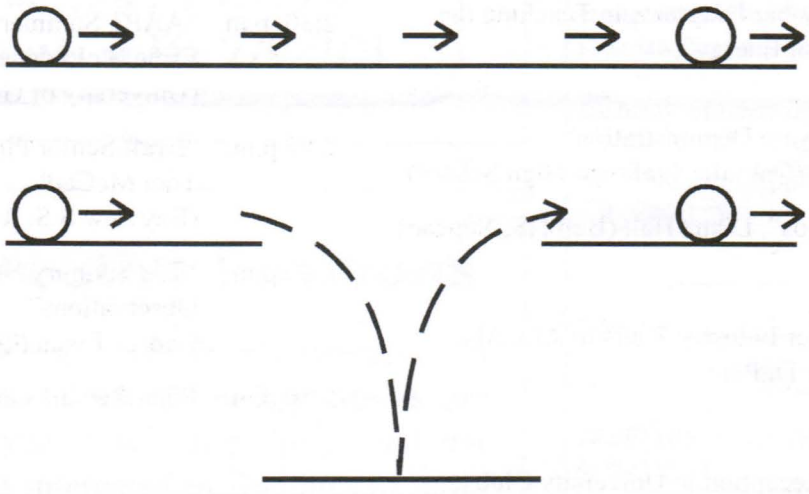
Grenville Christian College, Brockville, ON
e-mail: jchilds@grenvillecc.ca

This is a good exercise to use after you've done kinematics, dynamics and energy. We all talk about the kinetic and potential energy of roller coasters and their speeds, and the demonstration will let your students apply their critical thinking skills to this kind of situation. Be sure to have your students examine the setup and predict the outcome, *before* you run the demo. The question is, "Which ball gets to the end of the ramp first?" I give this demo as a quiz, asking students to predict a result (A, B or C), and write a paragraph defending their choice. I give some points for a correct answer and some more points for a correct, logical argument.



Most students seem to choose B, since it is the shortest distance. Some will choose A, B and C, or that all will get to the end at the same time. This is perhaps a mixup with the concept that they all have the same speed when they arrive at the end, at whatever time. The correct answer, of course, is A, since it travels its "valley" at a higher speed, more than making up for the fact that it has a little farther to go.

You can build these ramps using curtain rods and plywood (email me for plans), or you can simulate the ramps using Interactive Physics. The computer simulation allows some interesting extensions to be added to the demo. Imagine two side-by-side tracks of path B. Place a gap in one track so that the ball free falls to a "perfect" bounce and returns to its original height. As long as the gap-depth ratio is correct, both balls get to the end of their tracks at the same time, no matter how deep a bounce the one ball takes! It is quite striking to watch the computer demo and see the balls actually do what is predicted. If you use interactive Physics, I can email you the simulations.



Column Editor: Ernie McFarland, Physics Dept., University of Guelph, Guelph, Ontario, N1G 2W1
Email: elm@physics.uoguelph.ca

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