

Physics Challenges for Teachers and Students

► A Home Stretch

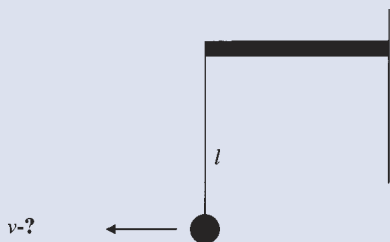
A new car model is tested first along a specially designed track. First, the car is driven along a straight stretch of the track of length r . If the car starts from rest at its maximum (constant) acceleration, it takes the amount of time t to cover distance r . The car is then brought to rest and is accelerated again along a circular loop of the track that has a radius r . Assuming that the car is speeding up at the maximum possible constant rate that allows it to remain on the track, how long would it take to cover that loop?

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► Back on Track

A small ball is hung as shown on a string of length l . What minimum horizontal speed must be given to the ball so that it hits the pivot point?

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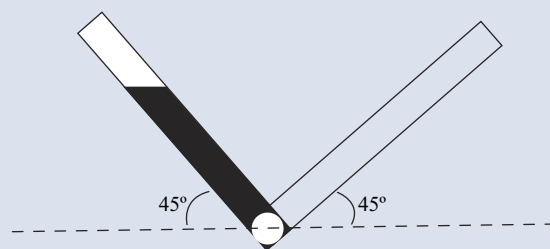


► The Waterworld

A thin V-shaped glass tube is bent through the right angle and is fixed in the vertical plane as shown. Initially, the left part of the tube contains a column of water of length d . A valve at

the bottom of the tube prevents the water from moving. At some point, the valve is quickly opened. Neglecting friction, find the time it takes the water to move completely into the right part of the tube.

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Contributors' Solutions

Many readers sent us the correct solutions to the *Challenges* published in September. It was great to hear from so many new colleagues and students, as well as from the “established” contributors. Below are the names of the readers who were first to submit the correct solutions.

Hubert N. Biezeveld (Zwaag, The Netherlands)

Bartley L. Cardon (MIT Lincoln Laboratory, Wavertertown, MA)

James J. Carr (Webster, NY)

Michael C. Faleski (Delta College, Midland, MI)

Gaston Fischer, retired (Switzerland)

John F. Goehl Jr. (Barry University, Miami Shores, FL)

Bruce Gordon (Kimball Union Academy, Meriden, NH)

Art Hovey (Milford, CT)

David Jones (Miami Palmetto H.S., Miami, FL)

Mark Lenfestey (Elkhart Central H.S., White Pi-

geon, MI)

Jim Mallmann (Milwaukee School of Engineering,
New Berlin, WI)

Carl E. Mungan (U. S. Naval Academy, Annapolis,
MD)

Inge H. A. Pettersen (Univ. of Minnesota, Duluth,
MN)

Kathryn Quoi (Fort Plain H.S., Fort Plain, NY)

Bayani I. Ramirez (San Jacinto College South,
Houston, TX)

Gregory Ruffa (Univ. of Minnesota, Minneapolis,
MN)

Peter Sadowski, student (Archbishop Murphy H.S.,
Everett, WA)

The solutions, as well as the more complete list
of their contributors, can be found on our web-
site: <http://www.aapt.org/tpt>.

And now, a very special announcement:

Celebrate the World Year of Physics in style! Solve some physics puzzles!

As many of you know, 2005 is the World
Year of Physics (WYP). As part of the effort to
commemorate this event, AAPT is proud to
announce a monthly Problem-Solving Contest
open to all physics enthusiasts worldwide.

From January through May 2005, AAPT will
publish a new problem weekly on *The Physics
Teacher* website (<http://www.aapt.org/tpt>) in
conjunction with the *Physics Challenges* column.
You do not have to subscribe to *The Physics
Teacher* to participate. The style and the level of
the problems will be similar to the ones usually
found in the column: tricky and challenging but
not requiring high-level mathematics. Submis-
sion deadlines and guidelines will accompany
each problem.

Each month, a T-shirt and certificate will be

awarded to each contest winner. The names of
all those who submit at least one correct solution
will be recognized on the website. Winning
solutions will be published on the website regu-
larly. We hope to be able to recognize winners in
the following categories: faculty, college student,
and high school student. After the contest ends
in May, a special award in each category will be
given based on cumulative submissions.
Criteria used to determine award recipients may
include, but are not limited to: the total number
of correct solutions presented; most innovative
and elegant solutions, etc. You may only win
one T-shirt, but you are encouraged to enter
each month's contest to compete for the special
awards.

Look for the first Problem of the Week in
early January. We look forward to your participa-
tion!

► **Note to contributors:** As the number
of submissions grows, we request that certain
guidelines be observed, in order to facilitate the
process more efficiently:

- please email the solutions as Word files;
- please name the file “Dec04DVader” if—for
instance—your name is Darth Vader, and
you are sending the solutions to December
2004 *Challenges*;
- please state your name, hometown, and profes-
sional affiliation in the file, not only in the
email message.

Many thanks!

Please send correspondence to:

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