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Fermi Questions, Question 1: Trumpet Spit; Question 2: Tall Buildings

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Question 1: Trumpet spit; Question 2: Tall buildings

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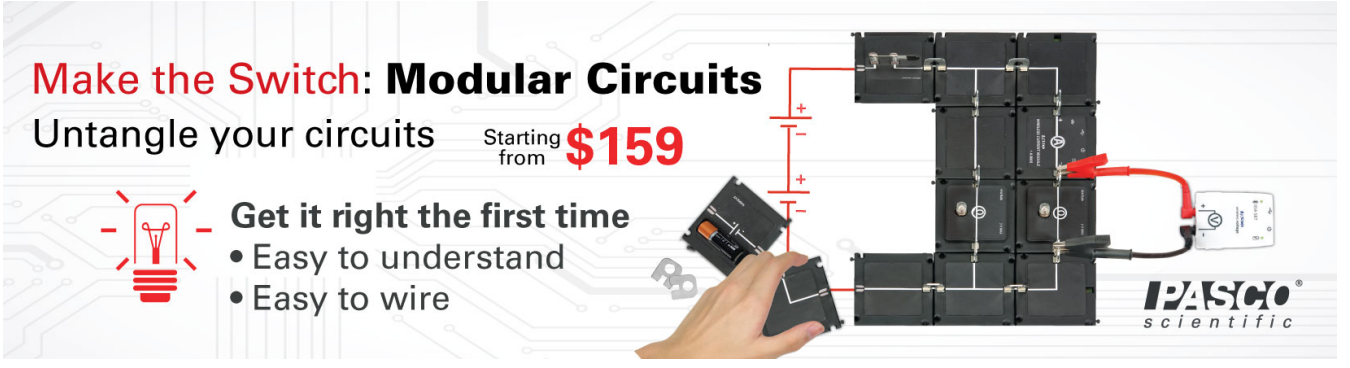

Physics Challenge for Teachers and Students

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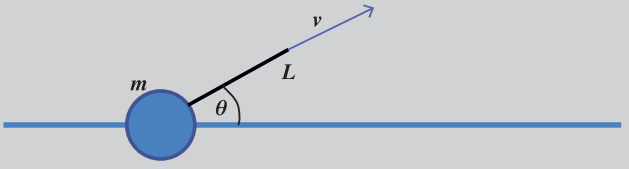
Just pulling through...

A marble of mass m can slide without friction along a horizontal rod. The marble is being continuously pulled by a light string of length L in such a way that the velocity of the "loose" end of the string is always directed along the string and has a constant magnitude v. What is the magnitude of the force applied to the string at the moment it makes angle θ with the rod?



Guidelines for contributors

- We ask that all solutions, preferably in Word format, be submitted to the dedicated email address ***challenges@aapt.org***. Each message will receive an automatic acknowledgment.
- If your name is—for instance—Anthony Scaramucci, please name the file "**Scaramucci17Oct**" (do not include your first initial) when submitting the October 2017 solution.
- The subject line of each message should be the same as the name of the solution file.
- The deadline for submitting the solutions is the last day of the corresponding month.
- Each month, a representative selection of the successful solvers' names will be published in print and on the web.
- If you have a message for the Column Editor, you may contact him at ***korsunbo@post.harvard.edu***; however, please do not send your solutions to this address.

Many thanks to all contributors and we hope to hear from many more of you in the future!

Note: as always, we would very much appreciate reader-contributed original Challenges.

Boris Korsunsky, Column Editor

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Fermi Questions

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Question 1: Trumpet spit

How much saliva did Louis Armstrong empty from his trumpet during his career? (*Thanks to Delaney Wright, Olivia Reel and Halina Garraway of my Oklahoma Scholar-Leadership Enrichment Program (OSLEP) class for suggesting the question.*)

Question 2: Tall buildings

How much do buildings lengthen the day by increasing the Earth's rotational inertia?

Look for the answers online at *tpt.aapt.org*. Question suggestions are always welcome! For more Fermi questions and answers, see *Guesstimation 2.0: Solving Today's Problems on the Back of a Napkin,* by Lawrence Weinstein (Princeton University Press, 2012).

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