

Physics on the Subway

Robert H. Romer

If you ride the buses serving the “Five-College” community here in western Massachusetts, on each bus you will find one or two “physics ads” in addition to the usual “Please don’t eat on the bus” placards. In each one, a number of articulate cats and dogs get into a brief physics discussion, ending with “Let’s Try It!” and “What Do You Think? Visit Our Website: www.amherst.edu/~physicsqanda”. Our initial questions include physics professor favorites such as “Which way does the tricycle go?” and “The helium balloon in a car” and questions of enduring interest to the public such as “Should I turn down the thermostat at night?” (That one seems obvious to *us*; to most ordinary people \neq i.e., nonphysicists \neq it is not obvious at all.) One of our placards, reproduced below, is an old physics puzzler, “Throwing the anchor overboard”. I am now a member of what may be a very select group \neq those who have done the experiment; no matter how solid the theory, I was not going to go public without the experimental test.

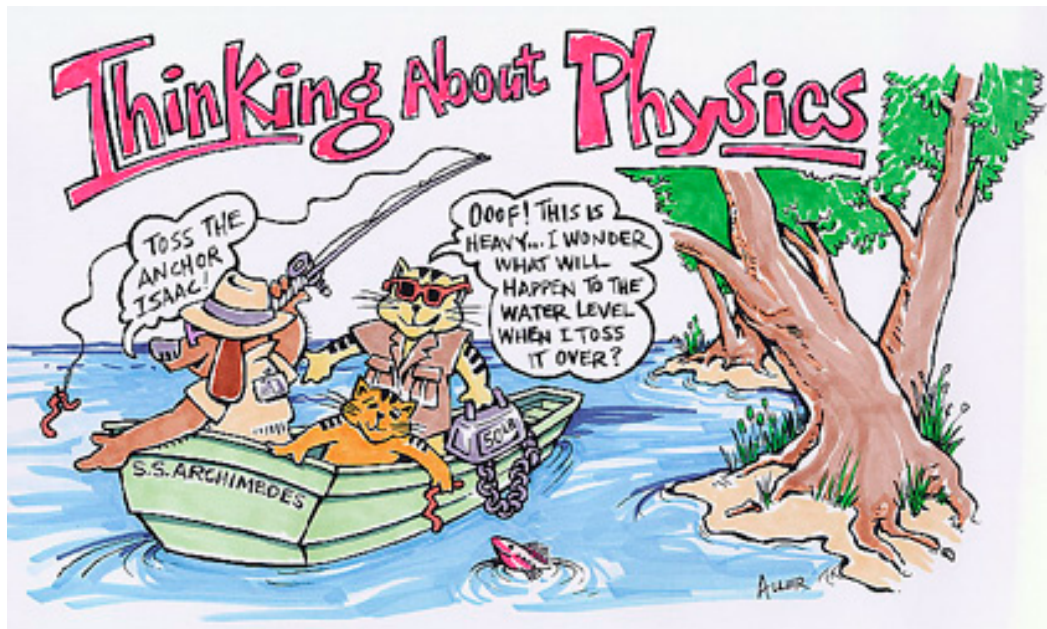
We want to give bus riders (and web surfers) the idea that thinking \neq even (or especially) about physics, with its bad reputation \neq can be fun. Physics deals not only with galaxies and quarks but also with everyday objects and phenomena. Don’t stop with our handful of questions \neq keep your eyes and minds open to the natural world around you.

Although this project is so far “Physics on the Bus” (and our *local* buses at that), we call it “Physics on the Subway (POTS)” to indicate our higher ambitions (for which we will need money beyond that provided so far by Amherst College and by our own pockets). POTS is a small part of a dream that John King and I call “Physics Everywhere” starting in the cradle with an “Age-Zero Physics Kit” for every newborn child. (See King’s Oersted Medal talk “Observation, experiment, and the future of physics”, *Am. J. Phys.* 69 (1), 11-25 (2001) for a full description.) The idea of putting placards on buses and subways is one that we were pleased to borrow from physicists in the U.K. who have done something similar on the London Underground. (Brenda Keogh, Stuart Naylor, and Catherine Wilson, “Concept Cartoons: A new perspective on physics education”, *Phys. Educ.* 33 (4), 219-224 (1998).) Our drawings are by our talented artist and collaborator, Bruce Aller. (See cartoons below and in next file.)

The website has received a great many emails (and I feel guilty about not having answered all of them yet). Some are just nice: “It’s wonderful to have found something entertaining AND intelligent on the internet for a change. I look forward to more Qs&As. Keep up the good work!” Some argue with our answers: “You’re wrong! The trike goes backward. I haven’t tried it, but I don’t need to. Too bad you made a mistake. Interesting, anyhow.” Many have suggested more questions for us or simply asked us to respond to theirs: “This is a little morbid, I admit, but it’s something I have wondered about for years. If you are in an elevator that is falling, will jumping up and down reduce your chance of being killed when it hits \neq assuming, of course, that you are in mid-air when the elevator hits bottom. Thanks!”

We would welcome your comments, suggestions for further questions, and especially for thoughts about other transit systems that might be as cooperative in this project as UMass Transit has been.

Robert H. Romer,
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WHAT DO YOU THINK?

**YOU CAN TRY
THIS ONE AT HOME!**



THE EFFECT IS SMALL AND DIFFICULT TO DETECT WITH A REAL LAKE AND BOAT, BUT USE A PLASTIC BOWL AS YOUR "BOAT" AND A SLIGHTLY LARGER BOWL AS YOUR "LAKE" AND SOME SMALL HEAVY OBJECTS AS YOUR "ANCHOR." DOES THE WATER LEVEL RISE OR FALL WHEN YOU DROP THE ANCHOR OVERBOARD?

HINTS • ANSWERS • DISCUSSION:
VISIT US AT: www.amherst.edu/~physicsqanda