

The Physics of It

Whether he's lying on a bed of nails or illuminating pickles like lightbulbs, Dave Maiullo RC'83 takes hard-to-understand scientific principles and creates ways to make audiences sit up and pay attention. Maiullo, a physics support specialist in the Department of Physics and Astronomy at Rutgers–New Brunswick, uses his large, muscular body in several of his more than 200 physics demonstrations. Maiullo knew from the time he got his first telescope at age 14 and began reading science fiction that teaching physics was in his future. And he has written the book on it, too, coauthoring *A Demo a Day: A Year of Physics Demonstrations* (Flinn Scientific, 2008). These days, Maiullo—who received a Distinguished Service Citation in 2009 from the American Association of Physics Teachers, which recognizes exceptional contributions to the organization and physics teaching—gives instructional seminars at national conferences that often attract more than 500 science teachers at a time, eager to demonstrate the laws of physics through physical illustration.



■ “At a science cabaret on Coney Island, I once went onstage between the performances of a female sword swallower with a beard and mermaids kissing a dolphin.”

■ “I once slipped a magician’s hand, which was made of fake rubber, under a lab coat sleeve and inserted the hand into liquid nitrogen in front of 200 high school science teachers. When I removed the hand after about two minutes, it was frosty cold. I smacked it onto the table, and it exploded into a thousand pieces. A few people in the audience, fooled into thinking it was my real hand, were horrified. I never tried it again: I don’t want to scare people.”

■ “One demonstration involves putting my head against the wall and placing a pendulum bob against my nose and then releasing it. As the pendulum swings across the room and then returns to me, it appears as if it will smash me in the face. But it runs out of energy right before impact.”

■ “Physics teachers who know the science behind the bed of nails always get a kick out of it; some think I’m crazy. The principle is to have enough nails so that not any one nail has enough force to press into your body. You can then unroll your body slowly over the bed. We then place a second bed of nails on top of me. It is even more impressive if you have someone stand on top of you to get your point across. Sorry about the pun.”

■ “I have a demonstration in which I am about to hit my hand with a hammer,

but I put a lead brick over my hand and in the path of the blow. The lead brick absorbs the force of the blow so I don’t feel anything. I sometimes do this demonstration with the brick on my head.”

■ “Teenagers are the toughest audience. To stop them from nodding off or texting, I’ll whack a hammer as hard as I can against a table to illustrate the force of the hammer’s blow, and then whack a sponge, a piece of wood, and a lead brick to illustrate that force equals mass times acceleration.”

■ “With the physicality of the shows, I need to be in good shape. I run two miles or so four to five times per week, and I go to the gym for an hour workout five to six times per week.”

■ “When you keep it simple, it’s easier to understand the scientific principle. For example, take a big gherkin pickle, put it between two leads from a wall outlet, and plug it in. As the current passes through, the pickle glows like a bright yellow bulb. It’s easy to grasp.”

■ “While I was in North Carolina to teach physics teachers how to conduct their own demonstrations, the fog machine set off the smoke alarms, and everyone bolted from the building. At least it was at the end of the show.”

■ “Seniors are a great audience. I’ll be doing my hydrogen balloon routine and someone will raise their hand and say, ‘I witnessed the Hindenburg.’” — Bill Glavin