

putting the cool in school

One young engineer's mission is to turn kids on to science.

by Jeffrey
Winters,
Associate Editor

"You know what's fun?" asked Aurora Lipper, a 30-something mechanical engineer from San Luis Obispo, Calif. "Unwrap a bar of Ivory soap, put it on a plate, and stick it in a microwave for two minutes. It's more fun than blowing up marshmallows."

Indeed, the small bubbles embedded in the bar of soap will heat and expand as the bar itself melts, making for a big foamy mess.

One would think that a young woman whose tastes ran toward potato guns and fighter jets would have been the world's coolest babysitter growing up, but Lipper didn't spend a lot of time around children until recently. "I wasn't a kid person," Lipper said. "I never babysat."



Teachers can demonstrate the basics of electromagnetism by

building a telegraph with parts such as a nail, a paper clip, and a film container.

All of which could make her career a bit hard to explain. Lipper is the founder and main author of a line of educational products aimed at elementary school age children. She runs camps that try to turn kids on to the wonders of science. She is involved with kid-related stuff all day long.

But the connection between Lipper and her work isn't an overt love of children, although as a mother of two she certainly does like them. It's that she carries with her a childlike belief that science is really cool—and that she'd like others to share her sense of wonder.

Indeed, if one were to look at Lipper some 10 or 15 years ago, you would have seen a promising young engineer. On the advice of a high school chemistry teacher, Lipper applied for an internship at NASA's Ames Research Center in California, near where she grew up. She was accepted, and spent the next year there, working with aeronautical researchers.

"I had the best time. I was immersed in what it was really like," Lipper said. "At the end, I wanted to know what they called what I was doing, and the guys there said, 'It's mechanical engineering.' " Lipper attended California Polytechnic State University in San Luis Obispo, where she studied the flow patterns in high-performance jet turbines on her way to a master's degree. She went on to become an instructor at the school, teaching dynamics, engineering systems, and a lab in fluid dynamics.

It had the makings of a great career. But after a college experience interning at NASA facilities and conducting high-level research—Lipper has three patents based on her work—she found herself facing a long slog to get her Ph.D. and realized that's not where her passion was.

"I realized that I didn't want to be a designer or an academic, even though I've had success there. I really wanted to teach people about science."

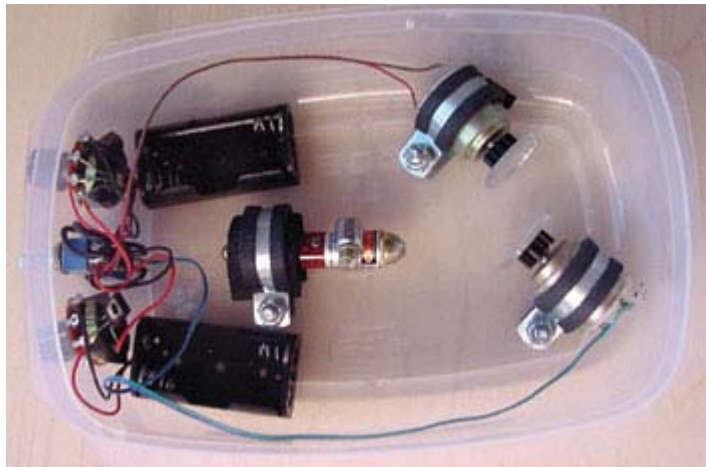
Engaging Experiments

Lipper went back to teaching at the college level, but

while she was a popular instructor, she said that she didn't feel she was making a big enough impact on young people. Her involvement with a robotics camp left her similarly disenchanted. "It didn't seem to make a shift in the kids' lives," she said. Lipper then began to adapt her university-level classes for K-12 students. Lipper said that at first it was difficult to see how you could teach subjects such as hypersonic combustion to elementary school students, but she stuck with it until she saw that the key to reaching those children was in well-designed and engaging experiments.

Such experiments are the heart of Supercharged Science, the company that Lipper started in 2002. The company sells packets of material for teaching physical science to youngsters, and conducts one-day seminars and science classes for teachers, parents, and children.

Although Lipper tours the country talking to professional educators, one of the biggest markets for her material is parents who are home-schooling their children. Although such parents are incredibly motivated, many lack a sure grasp of science fundamentals and, what's more, are intimidated by the prospect of teaching the subject matter. (Lipper said that she focuses exclusively on the physical sciences to avoid the conflict between many religious parents and aspects of modern biology. No matter your faith, she said, "A ball rolls down the hill the same way.")



The founder of Supercharged Science, Aurora Lipper, wants to capture the imagination of children by performing experiments using everyday objects. This demonstration houses a laser display in a plastic food container.

But what parents may lack in training, they more than make up in motivation. Parents of home-schooled

children are invested in providing the best education they can, and are grateful to find a resource that can help them teach science subjects.

Lipper's company also provides materials to traditional schools as well. There, though, the challenges are quite different. "I don't know that the teachers in the school system are supported," Lipper said. "I really don't know the best way to help them." Too often, Lipper said, she has met teachers who supplement their teaching budget out of their own pockets, and many of the best are overworked. "The ones who are in it for the love of teaching are doing the best they can. All the standards and requirements they need to meet take the fun out of teaching. I can see how they get burned out."

A Hundred New Ideas

Many of the teachers Lipper talks to grumble about the recent education initiative from the federal government, which has emphasized teaching toward a series of standardized tests rather than allowing for the kind of creative teaching that can keep children engaged. Some joke that the federal program should be called "Every Child Left Behind."

All of which makes Lipper thankful that her job exists outside the ordinary boundaries of the education system. "I love being a contract teacher, because I can give them 100 new ideas in one class."

Her company also conducts special classes for groups of elementary school children. The emphasis on teaching through fun experiments has given many of these children a renewed desire to learn about science. One class involved making kites from long bamboo poles, and the wind caught one and lifted a wide-eyed child off the ground. "Whenever we teach a class, the kids say, 'This is the best science class ever. This is not what they do in school,'" Lipper said. (Two articles by Lipper describing experiments for kids appear in Mechanical Engineering Online this month.)

"Right now, this is what I want to do," Lipper said. "It's my dream job to help people learn science. I just want to keep doing more of it."

Starting an educational services business from scratch would seem like plenty, but Lipper is a driven woman. (During an internship at an aeronautics lab, she earned a pilot's license.) She said that part of her 10-year plan involved starting a private school that would incorporate her style of science instruction.

"We'll see," Lipper said. "Ten years ago, I would never have imagined I'd be where I am today."



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