



May the Force Be With You

She blows up a balloon, ties it off, and sticks a wooden skewer through one side and out the other. Much to the amazement of the 5th grade class, it doesn't pop.

"If you understand science, you can do that. And each of you will do it by the end of this class," promises Dr. Laura Whitlock, who can transform student apathy towards science into enthusiasm in a single hour. A popular member of Louisiana EPSCoR's Speaking of Science (SoS) program, she exemplifies her contention that "being a scientist is cool."

Sitting in on her SoS presentation to two classes, one fifth grade, the other, sixth, is a stimulating, fun-filled learning experience. Her tools are toys, thus its title, "It's Toys...No, It's Science! Understanding Motion."

Noting that it was Isaac Newton who proved that "to understand motion, you just need to look at all of the forces involved," the LSU-Shreveport assistant professor of physics cited her versions of his three laws of motion with which we can understand how most toys function:

1. All objects want to keep doing whatever they were doing and won't change unless you force them.
2. Forces can change your motion. They can speed you up or slow you down; make you turn left or turn right or even around.
3. If I push on you, you push back on me unless I break you. That push back affects me; only the forces on you affect you.



Just as Dr. Laura Whitlock promised at the beginning of class, these students at Northwestern Middle School in Zachary learned how to stick a wooden skewer through one side of a balloon and out the other without popping it.

Sponsored by the National Science Foundation and the Board of Regents' Louisiana EPSCoR program, SoS features the State's finest university teaching and research talent in the science and engineering disciplines. They tailor their presentations to their respective audiences and are available free of charge to groups of K-16 students, educators and general audiences throughout the State.

"Now, let's play so you can see for yourselves how playing with toys is also studying science," she says.

LET'S PLAY

Paper, Paperclips & Helicopters Dr. Whitlock gives each student a paperclip and strip of paper which, when folded according to her directions, was shaped like a paint brush. Once they clipped the paperclip to the "tail" of the brush handle, she offered her "Congratulations. You have just made your first helicopter. Now stand up and drop it and tell me which way it is moving (counter clockwise). Now

reverse the folds and tell me which way it is moving (clockwise)." Citing Newton's laws, she explains how you know how it is going to move.

The room is full of laughter and awe as students toss their helicopters in the air. Reminding them of Newton's third law, Dr. Whitlock points out that if there were no air to push the wings, they wouldn't spin, and the faster the air pushes them, the faster the helicopter spins.

"But be careful, at some point it can fall so fast that the wings don't have time to spin before it hits the ground," she adds. A fifth grader and several others decide to experiment on their own by attaching their house keys, coins, and anything else they can find.

Tops She introduces the students to a hemispherical top (sometimes called a magic top) made of a hollowed sphere with a stick protruding out the hollowed side. The top, which appears stable while spinning slowly, becomes wobbly as the speed increases.

There is an incredulous group **WOW** when the top suddenly flips over and continues spinning on the end of the stick.

"You may think it's magic; and it is magical, but it's all just science," says Dr. Whitlock. "Remember Newton; if pushed by an unbalanced force, you change your motion in the direction of that force."

Balloons Students are given a balloon to blow up and tie. "Is it the same color as before you blew it up? No? It's darker at the top of the balloon and at the tie?"

SoS Continued on page 2

Introducing Students to the Wonders of Science

Dr. Laura Whitlock and the Speaking of Science (SoS) program share a common aspiration: to spark the interest of students in science and engineering.

"Applying to participate in SoS was actually the first thing I did after joining the LSU-Shreveport faculty," recalls Dr. Whitlock, an assistant professor of physics. "Keeping the interest of science sparked in kids is so important to our country."

"While not everyone needs to grow up to be a scientist, everyone does need to understand and appreciate how science works, to be able to distinguish between good and bad science."



Students at Northwestern Middle School in Zachary listening to Dr. Laura Whitlock's presentation.

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While serving as the Education and Outreach Director for the Laboratory for High Energy Astrophysics at NASA's Goddard Space Flight Center, Dr. Whitlock also recognized the possibilities of the World Wide Web, "which was just starting to get going, as an education tool."

She subsequently created two websites—*Imagine the Universe!* for students up to age 14, and *StarChild* for younger children—both of which garnered her a number of national awards.

"I have always wondered why things work and loved learning how and why they work," she says. "And I am absolutely convinced that I and other SoS speakers can make you wonder why, too."

To find the most current list of SoS topics and/or schedule a presentation, go to <http://laregents.org/sos> or call Ms. Susan Jernigan at (225) 342-4253.



Taking his helicopter out for a spin is a student at Northwestern Middle School in Zachary.

SoS Continued from page 1

That's because not as much air is pushing outward on those areas. And Newton says that if no forces are pushing out on you, you don't want to explode out of the balloon. And that's how you push the skewer through the inflated balloon without popping it."

As they prepare to leave for their next class, a sixth grade boy carefully clips his helicopter in his notebook as others resume tossing theirs in the air. A fifth grade girl announces that she's going to show off her balloon skewering skills at a birthday party.

A sixth grade girl confiding to another says it all: "The next time anyone tells me that science isn't cool, I'm going to tell them they're wrong."

