



**Woodrow Wilson  
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*News Release*

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## **Nanotechnology Can Be Child's Play “Hands-on” Learning Activity for Science Invisible to the Naked Eye**

WASHINGTON—Most educators promote “hands-on” science learning—instead of traditional rote memorization—as the best way to teach and excite youngsters about science. Drawing on the world around them, children handle and manipulate the objects they study—plants, rocks, insects, water, magnetic fields. And students learn by using scientific instruments, measurement and observation devices like rulers, microscopes, telescopes, test tubes, and cameras.

But how do children experience activities-based learning about nanotechnology—a world of atoms and molecules that’s too small to see with the naked eye and that requires sophisticated electron or scanning probe microscopes?

Bethany Maynard, a 6<sup>th</sup> grader at a Fairfax County, Virginia elementary school, shows how young people can observe, test and investigate nanotechnology—sharpening their analytical skills and becoming active science learners—at home or in a classroom without any expensive equipment. All that’s needed is some ketchup, mustard and a tie.

Bethany’s curiosity was sparked by a new silk tie bought by her father at Brooks Brothers® that claims to be treated with Nano-Tex™ fabric protection to repel liquids and stains. Examining the tie, she began to ask critical questions: What is nanotechnology? How does it protect clothing from stains? Does nanotechnology have other potential uses, particularly to help improve or safeguard the environment? Are there risks?

She experimented in her family kitchen, slathering the tie with ketchup, mustard and coffee to test its stain resistant properties. And she posed basic questions about nanotechnology to her father, Andrew Maynard, chief science advisor at the Wilson Center’s Project on Emerging Nanotechnologies. She also interviewed one of the country’s leading experts on “green” nanotechnology, Barbara Karn, who works at the U.S. Environmental Protection Agency and who currently is a visiting scientist at the Project. In addition, Bethany turned to the Internet to find more information about nanotechnology online.

Her Internet search included the Project on Emerging Nanotechnologies’ online inventory of almost 300 manufacturer-identified nanotechnology consumer products currently being sold in department and hardware stores, pharmacies, and sporting goods catalogues. The inventory includes the Brooks Brothers® tie she tested in her kitchen “laboratory”: [www.nanotechproject.org/consumerproducts](http://www.nanotechproject.org/consumerproducts).

Using her family’s video camera and recruiting her younger brother, Alex, as cameraman, Bethany produced a short video (8:25 minutes) that reports her main observations, findings and conclusions. The video is available online at the Project on Emerging Nanotechnologies website: [www.nanotechproject.org](http://www.nanotechproject.org).

“Young people’s ability to compete successfully in a 21<sup>st</sup> century global economy and to secure exciting, self-fulfilling careers is highly dependent on their scientific and mathematical literacy—

particularly their understanding of an emerging area like nanotechnology,” according to Julia A. Moore, deputy director of the Project on Emerging Nanotechnologies. “If nanotechnology results in the new industrial revolution that many foresee, then it is vital for children like Bethany and others to have the opportunity—in schools, science museums, or supervised at home—to discover, experiment, ask questions and draw conclusions about nanotechnology using a hands-on learning approach.”

Nanotechnology is the ability to measure, see, manipulate and manufacture things usually between 1 and 100 nanometers. A nanometer is one billionth of a meter; a human hair is roughly 100,000 nanometers wide. The National Science Foundation predicts that the world market for goods and services using nanotechnologies will grow to \$1 trillion and employ 2 million people by 2015. The U.S. invests approximately \$3 billion annually in nanotechnology research and development, which accounts for approximately one-third of the total public and private sector investments worldwide.

The **Project on Emerging Nanotechnologies** is an initiative launched by the Woodrow Wilson International Center for Scholars and The Pew Charitable Trusts in 2005. It is dedicated to helping business, government and the public anticipate and manage possible health and environmental implications of nanotechnology.

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