About MAKING STUFF

NOVA's exciting four-part documentary series, *Making Stuff*, takes viewers on a thrilling tour of the material world and presents dramatic stories about how the field of materials science has changed history and is shaping the future. Each episode—*Stronger*, *Smaller*, *Cleaner*, and *Smarter*—gives viewers a behind-the-scenes look at scientific innovations that are happening every day on the frontiers of scientific research and ushering in a new generation of materials. *Making Stuff* is hosted by respected journalist, *New York Times* technology columnist, and Emmy Award–winning CBS News correspondent David Pogue. *Making Stuff* premieres on PBS in January 2011 (check your local listings).

Making Stuff: Stronger

The series begins with a quest for the world's strongest stuff. David Pogue helps viewers understand what defines strength by testing the world's strongest materials. He examines everything from mollusks, Kevlar®, and carbon nanotubes to the beak of the toucan and spider silk. He travels to the deck of a U.S. naval aircraft carrier, rides in a crash car in a demolition derby, and visits the country's top research labs to check in with the experts who are looking to nature to create the next generation of strong "stuff."

Making Stuff: Smaller

In the current Information Age, the triumphs of tiny are seen all around us: smaller transistors and microchips used in ever-shrinking laptops and cell phones. Now, David Pogue takes viewers to an even smaller world, examining the latest in high-powered nanocircuits and microrobots that may one day hold the key to saving lives and creating materials from the ground up, atom by atom. He explores the star materials of small applications, including silicon—the stuff of computer chips, and carbon—the element now being manipulated at the atomic level to produce future technology.

Making Stuff: Cleaner

Batteries grown from viruses, tires made from orange peel oil, and solar cells that cook up hydrogen—these are just a few of a new generation of clean materials that could power the devices of the future. In this episode, David Pogue explores the rapidly developing science and business of clean energy and the alternative ways to generate, store, and distribute it. He investigates the latest developments in bio-based fuels and in harnessing solar energy for our cars, homes, and industry in a fascinating exploration of the "stuff" of a sustainable future.

Making Stuff: Smarter

This episode looks into the growing number of materials that can shape themselves—reacting, changing, and even learning. For inspiration and ideas, scientists are turning to nature and biology and producing innovative developments in materials science. The sticky feet of geckos have yielded an adhesive-less tape. David Pogue literally swims with the sharks to understand bacteria-resistant sharkskin, which is being used to develop an antibacterial film. He also visits a scientist who has created a material that can render objects invisible. The episode concludes with the ultimate in "life-like" stuff: programmable matter that could create a duplicate of a human.

Making Stuff **premieres on PBS in January 2011 (check your local listings).**

About the MAKING STUFF Outreach Campaign

WGBH, Boston's public television station and producer of NOVA and NOVA scienceNOW, is teaming up with the Materials Research Society (MRS) to create a national education outreach campaign that will encourage appreciation and better understanding of our material world in the young and old alike.

Working with partners in museums, schools, universities, labs, and businesses across the country, the national outreach campaign will coalesce with a month of *Making Stuff* events. Local and regional outreach coalitions will create opportunities for middle and high school youth, families, educators, and engineers and scientists to access a range of engaging educational activities that explore materials science, so that "viewers" become active "doers" in the process of science and engineering.

Materials Research Society

MRS MATERIALS RESEARCH SOCIETY
Advancing materials. Improving the quality of life.

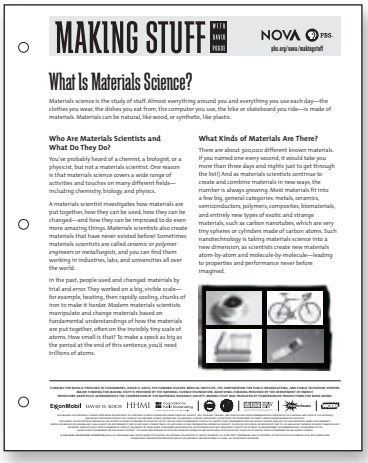
The Materials Research Society (MRS), a professional association of materials researchers from academia, industry, and government, has nearly 16,000 members around the world. As a professional organization for scientists, MRS is experienced at communicating complicated science topics to the public and finding new ways to engage them. To maximize the reach and impact of *Making Stuff*, MRS is drawing on its professional membership and its network of university student chapters and materials science and engineering departments, as well as expertise from the national laboratories and research centers of the National Science Foundation, the Department of Energy, the Nanoscale Informal Science Education Network, and other materials societies members. The goals of this collaboration are to enhance public engagement in and understanding of materials science, including appreciation of its effects on society; to promote sustainable collaboration among educators, scientists, and community-based organizations; and to create effective methods of expanding informal science learning.

About the MAKING STUFF Toolkit

This toolkit contains the information, guidelines, and resources needed to effectively plan and host a variety of community-based *Making Stuff* events. These materials can be adapted, expanded, shared, condensed, used, and reused. The *Making Stuff* toolkit blends print and multimedia educational resources to produce interactive events for all ages. You can use elements from any or all of these resources to customize activities that are suited to your particular audience. The *Making Stuff* toolkit includes:

- A description of the broadcast series (four one-hour documentary programs premiering nationally on PBS in January 2011)

- Guidelines for producing a variety of events, including a short presentation, materials science demonstrations, a large public event, an information table, a screening and panel discussion, a science café, training events, and youth activities, including hands-on activities and an online game
- Information sheet: *What Is Materials Science?*
- Four detailed scripts for materials science demonstrations
- An afterschool Activity Guide containing four episode-related activities
- Training presentations for scientists and educators
- *What's This Stuff? asks David Pogue* online game flyers
- Project logos that can be used to create local promotional, educational, and other collateral materials



MAKING STUFF

NOVA

pbs.org/nova/makingstuff

What Is Materials Science?

Materials science is the study of stuff. Almost everything around you and everything you use each day—the clothes you wear, the dishes you eat from, the computer you use, the bike or skateboard you ride—is made of materials. Materials can be natural, like wood, or synthetic, like plastic.

Who Are Materials Scientists and What Do They Do?

You've probably heard of a chemist, a biologist, or a physicist, but not a materials scientist. One reason is that materials science covers a wide range of activities and touches on many different fields—including chemistry, biology, and physics.

A materials scientist investigates how materials are put together, how they can be used, how they can be changed—and how they can be improved to do even more amazing things. Materials scientists also create materials that have never existed before! Sometimes materials scientists are called *ceramic or polymer engineers* or *metallurgists*, and you can find them working in industries, labs, and universities all over the world.

In the past, people used and changed materials by trial and error. They worked on a big, visible scale—for example, heating, then rapidly cooling, chunks of iron to make it harder. Modern materials scientists manipulate and change materials based on fundamental understandings of how the materials are put together, often on the invisibly tiny scale of atoms. How small is that? To make a speck as big as the period at the end of this sentence, you'd need trillions of atoms.

What Kinds of Materials Are There?

There are about 900,000 different known materials. If you named one every second, it would take you more than three days and nights just to get through the list! And as materials scientists continue to create and combine materials in new ways, the number is always growing. Most materials fit into a few big, general categories: metals, ceramics, semiconductors, polymers, composites, biomaterials, and entirely new types of exotic and strange materials, such as carbon nanotubes, which are very tiny spheres or cylinders made of carbon atoms. Such nanotechnology is taking materials science into a new dimension, as scientists create new materials atom-by-atom and molecule-by-molecule—leading to properties and performance never before imagined.

Resources at a Glance

These information sheets, signs, and other materials will support your efforts to host and promote successful *Making Stuff* events. These resources can be accessed online at pbs.org/nova/education/makingstuff.

Educational Resources

- *Making Stuff* Activity Guide—This guide contains four hands-on materials science activities designed for use in afterschool programs serving students aged 10 to 12.
- *Making Stuff* Demonstrations—Four materials science demonstrations to be presented in a museum setting, or at a public event, for ages 12 and up. *Note: Most materials used in the demonstrations are readily available at hardware, home supply, or grocery stores. See the Demonstrations section for details.*
- General Resources—Reference these books, videos, and Web sites for further information on materials science.

Information Sheets

- *What Is Materials Science?*—A brief description of materials science and materials scientists.
- *What's This Stuff? asks David Pogue* online game flyer—Solve the clues to identify the mystery material and then continue to play the game online.

Promotional Resources

Use this resource to raise awareness about materials science at the community level as well as to promote specific *Making Stuff* events.

- *Making Stuff* customizable press release—Download and insert your own event information.

Event Signage

Use these materials to support your efforts to host successful *Making Stuff* events.

- Demonstration signs.
- *Making Stuff* logo.

Multimedia Resources

Use the following video clips and PowerPoint™ presentations as part of events, screenings, and educational outreach efforts.

- *Making Stuff* overview presentation
- Training Presentation for Scientists
- Training Presentation for Educators
- Screening video clip (a longer segment)
- Promotional video clip (a short series overview)
- Four video clips to accompany the four demonstrations (each segment highlights the materials science concepts related to that demonstration)

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