PBS

Einstein's Big Idea

WGBH International

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Exactly 100 years ago, Albert Einstein considered the implications of his revolutionary special theory of relativity and came to a startling conclusion: mass and energy are one, related by the formula, $E=mc^2$. Despite being just one of several extraordinary breakthroughs that Einstein made in 1905, including his proof that atoms exist and his explanation of the nature of light, $E=mc^2$ has become his most famous idea by far. Yet how many people know what it really means? In a thought-provoking docudrama, NOVA illuminates this formula by unraveling the story of how it came to be.

Based on David Bodanis's bestselling book, *$E=mc^2$*, the program explores the lives of the scientists who helped develop the concepts behind the equation: E for energy; m for mass; c for the speed of light; and ^{2} for "squared," the multiplication of one number by itself. Like a multi-plot novel building to a climactic scene, *Einstein's Big Idea* follows the stories of a fascinating range of characters, including:

Albert Einstein: In 1905 he was a 26-year-old family man stuck in a dead-end job. In his spare time, he single-mindedly pursued an unconventional approach to physics.

Mileva Maric: Einstein's first wife, a struggling scientist as well as a young mother, who paid a heavy price for her husband's obsession.

Michael Faraday: He became one of the giants of nineteenth-century science, studying how different forces could change into each other, which led to the modern scientific concept of energy.

Antoine-Laurent Lavoisier: This French aristocrat and amateur scientist proved that total mass is never lost, no matter what physical transformations a substance undergoes.

James Clerk Maxwell: This young Scot showed that light is an electro-magnetic wave that always travels at the speed of 670 million miles per hour.

Emilie du Châtelet: A mathematical genius and lover to Voltaire, she showed that the velocity of an object must be squared when calculating its total energy.

Lise Meitner: She proved that a uranium atom can be split, converting a tiny amount of mass into a prodigious amount of energy according to the formula $E=mc^2$. This discovery led to the development of the atomic bomb.

Genius by genius, idea by idea, NOVA's *Einstein's Big Idea* shows how Einstein's predecessors provided the intellectual tools for his extraordinary breakthrough—and will help you understand this famous equation as never before.

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CREDITS
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Producer, Director, and Writer: Gary Johnstone
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