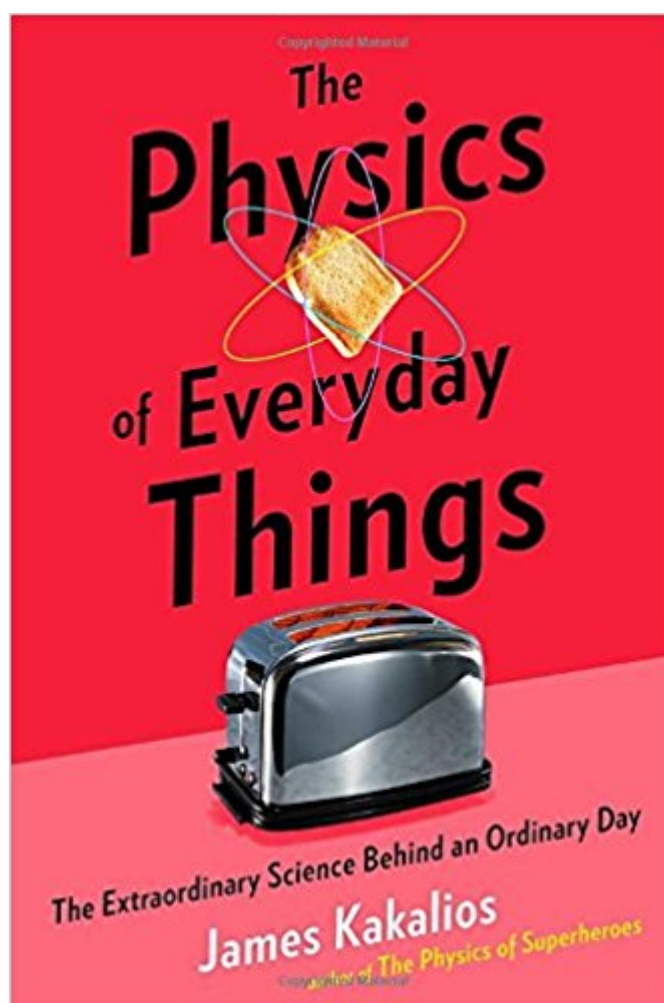


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The Physics Of Everyday Things: The Extraordinary Science Behind An Ordinary Day



Synopsis

Physics professor, bestselling author, and dynamic storyteller James Kakalios reveals the mind-bending science behind the seemingly basic things that keep our daily lives running, from our smart phones and digital "clouds" to x-ray machines and hybrid vehicles. Most of us are clueless when it comes to the physics that makes our modern world so convenient. What's the simple science behind motion sensors, touch screens, and toasters? How do we glide through tolls using an E-Z Pass, or find our way to new places using GPS? In *The Physics of Everyday Things*, James Kakalios takes us on an amazing journey into the subatomic marvels that underlie so much of what we use and take for granted. Breaking down the world of things into a single day, Kakalios engages our curiosity about how our refrigerators keep food cool, how a plane manages to remain airborne, and how our wrist fitness monitors keep track of our steps. Each explanation is coupled with a story revealing the interplay of the astonishing invisible forces that surround us. Through this "narrative physics," *The Physics of Everyday Things* demonstrates that "far from the abstractions conjured by terms like the Higgs Boson, black holes, and gravity waves" sophisticated science is also quite practical. With his signature clarity and inventiveness, Kakalios ignites our imaginations and enthralls us with the principles that make up our lives.

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Customer Reviews

"[A] vivid compendium of digestible science lessons [The pages constantly generate a pleasurable "Aha!" at the connections the author reveals.]" —Wall Street Journal "Forget what people say, learning is cool. And *The Physics of Everyday Things* will have plenty to teach

you... When you're done, you can wow your friends the next time you meet them for drinks with your knowledge of how credit cards work.

• "Stuff.tv" Readers will enjoy lucid explanations of dazzling yet quotidian technology, and those who remember a bit of high school-level science may appreciate them even more.

• "Publishers Weekly" "From start to finish, this is a fun and comprehensive introduction to many of the forces that govern how we interact with each other and the world around us...Once again, Kakalios makes physics relatable, this time demonstrating how profoundly its principles enable our way of life.

• "Kirkus Reviews" "Sure to awaken in readers a new awareness of science operating beneath familiar surfaces, this analysis also opens a historical perspective on the inventions that have reshaped the world—once dependent on little-understood steam engines, now exploiting ingeniously engineered semiconductors. A fascinating inquiry exposing hidden science.

• "Booklist" "Jim Kakalios is recognized as the world's expert on the physics of superheroes, but apparently his talents also extend to the real world. We shouldn't be surprised: physics is at heart a search for basic underlying principles, whether in comic-book universes or our everyday lives. You won't find a better, more enjoyable tour guide to how the laws of physics explain the world all around us.

• "Sean Carroll, physicist at Caltech and author of The Big Picture" "Think how much richer your life would be if you understood how the beloved devices that govern your daily life actually worked. You might be surprised to learn that even the most common ones—like your smartphone and GPS—depend on the wonders of modern physics, such as quantum mechanics and general relativity. A new world awaits you in this accessible and charming volume by James Kakalios, who takes you through an ordinary day that becomes extraordinary through his clear examples.

• "Lawrence M. Krauss, Director of the Origins Project and author of A Universe from Nothing and The Greatest Story Ever Told" "So Far

• JAMES KAKALIOS is the Taylor Distinguished Professor of Physics at the University of Minnesota and the author of the bestselling The Physics of Superheroes.

A very nice presentation that does an excellent job of emphasizing the meaningful applications of physics in everyday life. So if you were asking "What can the Higgs particle do for me?" this book will not answer that question, but it will show you the role of physics in things, such as cars, toasters etc..., the importance of which can hardly be denied. It will show you how toasting a bagel involves a large number of various physical disciplines (thermodynamics, quantum mechanics and electrodynamics, to name the most important). Of course, you may not need to read everything in

sequence, but you will get a good general impression of to what extent physics is involved in everyday life, whether it is the several machines one uses, or simple facts which one knows by experience, but the cause of which may remain obscure (why, for example, does blowing on your coffee cool it down? what happens when the traffic grinds to a halt? The book gives interesting explanations to such doubts). Over all, a very nice book.

A gift to my husband who enjoyed it very much.

This is a short book but also one that was a bit short on educating me. I can't say if this is the fault of the author or a lack in me or some combination. I can only report what I experienced. The setup is clever. A person (you) goes through a busy day involving getting up, making breakfast, going to a doctor's appointment for a bad ankle and then flying on a commercial airliner to make a presentation finishing up your day watching some TV in a hotel. Along the way, the author notes and then explains (or tries to in my case) the technology behind the objects you use. These objects are many and vary from a digital alarm clock to a microwave to an X-Ray machine to airport scanners and much more. I found in each explanation either it was something I knew or something I didn't and only grasped a piece of as I worked my way through the example. The simple stuff reminded me of an annoying illustration I saw when I was 8 years old labeled "How Television Works". The illustration was all in stick figures. There was a TV camera pointed at a personality. Lightning bolts came out of the camera, arced through the air landing on top of a TV. The TV screen showed the personality. See, now knowing that, you can make your own TV, kid! In this book, the author goes on to say things like you get an oscillating current and then this chip does this to it and that chip further does that so in the end, all you get is an oscillating current somehow manages to perform some magic feats. Along the way the author mildly bugged me by some careless side issues. For example, he describes cars as still using carburetors and says to fly you need to have more air molecules pushing up than air molecules pushing down or words to that effect. That is true in the two specifics he uses "airplanes and hot air balloons but you can fly using a Saturn rocket as well which has more air molecules pushing down on it than up. Ditto any ballistic flight I can think of. So this reader anyway put in several hours reading getting little from the investment. Others will likely get more or less. Not bad but not Sagan, Wilson, Dawkins, Asimov, Plait, Wilson or dozens of others I can name either.

Physics is hard. Everybody knows that, and knows that Physics is a subject best avoided unless

you are some sort of rocket scientist or nerd. This is a horrible attitude. Sure, Physics and the mathematical analysis of complicated systems can get very complicated and involved, and is indeed the domain of trained scientists and engineers. But at its basic levels, Physics is the explanation of life. It is the reason your toaster manages to prepare your breakfast without killing you, or why your air conditioner lets you live in the American Southwest. James Kakalios makes a commendable effort at taking the complexity and scariness out of the physical sciences and explain them in everyday, common language.=== The Good Stuff ===* Kakalios goes out of his way to keep the discussion grounded in reality. The format of the book is "a life in the day of", and it traces the interactions during a typical day with our subject and the myriad of technologies that surround us. Along the way we discuss toasters, elevators, automated highway toll systems (EZ-PASS), automobiles and a number of other products. In each case, the author starts with the basic physics behind what is going on, then explains how it is put in practice in everyday life.* The language is, for the most part, high-school level grammar and vocabulary. You find some unusual words (frequency, voltage, oscillator), but for the most part you can infer their meaning and stay focused on the narrative.* The discussions are mostly self-contained. Pretty much everything you need to understand a technology is within the chapter, and the chapters do not build upon one another. While the book will reward you for taking more time to read and understand the details presented, you can also read it somewhat less completely, and still understand the main concepts and ideas.* Even though I already understood nearly all of the technologies discussed, I still enjoyed reading the book. There is always some value in reading alternative explanations for things you already think you understand, and there were a few tidbits that I either never knew or had forgotten somewhere along the way.=== The Not-So-Good Stuff ===* My major concern is the target audience. Kakalios picks a very specific target audience, and as an engineer, I am not a good judge of how appropriate that target is. For example, there is an excellent discussion of how a refrigerator works to pump heat from the interior to the exterior. To compete this discussion, the author introduces and explains some basic principles of thermodynamics. These concepts are a bit counter-intuitive, and you are probably not going to immediately grasp them from a one page discussion. The problem is that the book seems targeted toward a group of people who understand-or can be easily taught- the basics of thermodynamics, but who do not already understand how a refrigerator works.=== Summary ===I enjoyed the book, and believe that most anyone with an interest in how the world works will find it a worthwhile effort. Some of the material seems a bit more complicated that might be appropriate, but it is certainly explained well enough that it can be used either for a rough overview, or to stimulate interest in finding more

information.=== Disclaimer ===I was able to read an advance copy through the courtesy of the publisher and NetGalley.

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