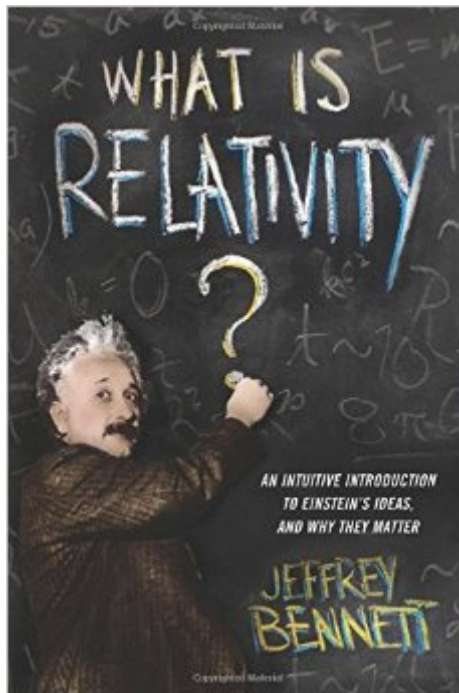


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# What Is Relativity?: An Intuitive Introduction To Einstein's Ideas, And Why They Matter



## Synopsis

It is commonly assumed that if the Sun suddenly turned into a black hole, it would suck Earth and the rest of the planets into oblivion. Yet, as prominent author and astrophysicist Jeffrey Bennett points out, black holes don't suck. With that simple idea in mind, Bennett begins an entertaining introduction to Einstein's theories of relativity, describing the amazing phenomena readers would actually experience if they took a trip to a black hole. The theory of relativity reveals the speed of light as the cosmic speed limit, the mind-bending ideas of time dilation and curvature of spacetime, and what may be the most famous equation in history:  $E = mc^2$ . Indeed, the theory of relativity shapes much of our modern understanding of the universe. It is not "just a theory"—every major prediction of relativity has been tested to exquisite precision, and its practical applications include the Global Positioning System (GPS). Amply illustrated and written in clear, accessible prose, Bennett's book proves anyone can grasp the basics of Einstein's ideas. His intuitive, nonmathematical approach gives a wide audience its first real taste of how relativity works and why it is so important to science and the way we view ourselves as human beings.

## Book Information

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## Customer Reviews

For context, I am a physicist by training, and well versed in relativity theory. And I've been faced with the challenge of explaining relativity, and therefore know it's not as easy as it may sound. Overall, I will say that Bennett has done a good job. He walks through many simple examples, slowly building up the story of what Einstein realized and codified from his student days through the final papers on the general theory. It's a cute but non-obtrusive choice to have many

examples place the reader in a scenario with his or her friend "Al" as the second party. While I don't know of a better choice for the beginning relativist, this book is not quite perfect. I think Bennett draws out some of his scenarios a bit long; most readers will either have gotten the idea or aren't going to. He opens with the idea of someone traveling to a distant star and aging slower, but defers the "twin paradox" this raises until much later in the book, when he is into the general theory and ready to explain it. (This is fine if you believe that your readers won't figure out that there is a "relativity" problem with the story and spend chapters wondering what is going on.) My biggest issue with the book centers on a personal peeve, and maybe most people won't care about it. Bennett employs the rubber bedsheet model, and while he admits it has limitations, to me it misses the point of the general theory. The rubber bedsheet model invokes a mythical gravitational force at the bottom of the page that has nothing to do with relativity. The curvature of spacetime is intrinsic to spacetime, and I find this model to be a distraction. This book also fails to highlight what I consider the most profound aspect of relativity. Einstein began by realizing that light is seen to travel at the same speed in every reference frame. But the special theory teaches us that what we think of as the speed of light is merely a conversion constant between space and time units, which are really the same. Bennett introduces the idea of setting the speed of light as 1, but doesn't really talk about how fundamental a geometric principle that has become in physics. In the general theory we learn that light travels on a null geodesic, which ultimately separates the casual from the noncasual. I realize this may be a little deep for a popular book, but it is, to me, at the heart of relativity theory. The publisher provided me a copy for review.

I generally enjoy science. In college I was a chemistry major and had a mathematics minor. A majority of my career focused on Computer Science in which I had a graduate degree and spent teaching in the college classroom. I enjoyed studying science. My exposure to physics began with a year course during my senior year and then three semesters of physics in college. Sadly, my appreciation for science and my courses in physics left me with a dislike of physics. I wish I could say Jeffrey Bennett's book cured me of my dislike. It did not. However, it did leave me a better appreciation of Einstein's theories and contributions to modern science. As he writes, the author includes a number of milestones where he says, "This is what we now know" and he repeats the basic points covered to that point in the book. Though I occasionally felt overwhelmed as I read, at those points, I could hear myself thinking, "Okay, I know how he came to that point, and that one." I was able, though it was still confusing, to follow the argument from point A to point D. I was learning something about relativity. Though

relativity has its roots in mathematics, What Is Relativity? does not require a great deal of mathematics. I did not say none, but it is not the foundation upon which the book is built. There are occasional sections which authors says are written for the mathematical astute and others should skip them - a very small portion of the book is of this nature. The book would make a good piece of ancillary reading for a high school or college freshman physics course. There were still times I wish there has been an instructor nearby ready to answer questions. There are details that the book discusses that are still being hammered out in physics labs around the world (e.g. Do Black Holes exist? Just this week, Stephen Hawking was very vocal about the non-existence of Black Holes, saying that only grey holes existed.). I would not classify the book as "light" reading - but it certainly understandable and can be appreciated in its own right. For that reason, I would recommend the book for the reader who has an interest in science, but for whom physics was over the top, as it was for me. It made a tough subject understandable. \_\_\_\_\_ This review is based on a free electronic copy provided by the publisher for the purpose of creating this review. The opinions expressed are mine alone.

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