

What Is Relativity Jeffrey Bennett

"It would be hard to imagine a better guide to this difficult subject."--Scientific American In Three Roads to Quantum Gravity, Lee Smolin provides an accessible overview of the attempts to build a final "theory of everything." He explains in simple terms what scientists are talking about when they say the world is made from exotic entities such as loops, strings, and black holes and tells the fascinating stories behind these discoveries: the rivalries, epiphanies, and intrigues he witnessed firsthand. "Provocative, original, and unsettling." -The New York Review of Books "An excellent writer, a creative thinker."-Nature "Startling in scope and bravado." —Janet Maslin, The New York Times "Artfully envisions a breathtakingly better world." —Los Angeles Times "Elaborate, smart and persuasive." —The Boston Globe "A pleasure to read." —The Wall Street Journal One of CBS News's Best Fall Books of 2005 • Among St Louis Post-Dispatch's Best Nonfiction Books of 2005 • One of Amazon.com's Best Science Books of 2005 A radical and optimistic view of the future course of human development from the bestselling author of How to Create a Mind and The Singularity is Nearer who Bill Gates calls "the best person I know at predicting the future of artificial intelligence" For over three decades, Ray Kurzweil has been one of the most respected and provocative advocates of the role of technology in our future. In his classic The Age of Spiritual Machines, he argued that computers would soon rival the full range of human intelligence at its best. Now he examines the next step in this inexorable evolutionary process: the union of human and machine, in which the knowledge and skills embedded in our brains will be combined with the vastly greater capacity, speed, and knowledge-sharing ability of our creations.

This book, suitable for interested post-16 school pupils or undergraduates looking for a supplement to their course text, develops our modern view of space-time and its implications in the theories of gravity and cosmology. While aspects of this topic are inevitably abstract, the book seeks to ground thinking in observational and experimental evidence where possible. In addition, some of Einstein's philosophical thoughts are explored and contrasted with our modern views. Written in an accessible yet rigorous style, Jonathan Allday, a highly accomplished writer, brings his trademark clarity and engagement to these fascinating subjects, which underpin so much of modern physics. Features: Restricted use of advanced mathematics, making the book suitable for post-16 students and undergraduates Contains discussions of key modern developments in quantum gravity, and the latest developments in the field, including results from the Laser Interferometer Gravitational-Wave Observatory (LIGO) Accompanied by appendices on the CRC Press website featuring detailed mathematical arguments for key derivations NAMED ONE OF THE BEST BOOKS OF THE YEAR BY KIRKUS REVIEWS In a memoir of family bonding and cutting-edge physics for readers of Brian Greene's The Hidden Reality and Jim Holt's Why Does the World Exist?, Amanda Geffer tells the story of how she conned her way into a career as a science journalist—and wound up hanging out, talking shop, and butting heads with the world's most brilliant minds. At a Chinese restaurant outside of Philadelphia, a father asks his fifteen-year-old daughter a deceptively simple question: "How would you define nothing?" With that, the girl who once tried to fail geometry as a

conscientious objector starts reading up on general relativity and quantum mechanics, as she and her dad embark on a life-altering quest for the answers to the universe's greatest mysteries. Before Amanda Geffer became an accomplished science writer, she was a twenty-one-year-old magazine assistant willing to sneak her and her father, Warren, into a conference devoted to their physics hero, John Wheeler. Posing as journalists, Amanda and Warren met Wheeler, who offered them cryptic clues to the nature of reality: The universe is a self-excited circuit, he said. And, The boundary of a boundary is zero. Baffled, Amanda and Warren vowed to decode the phrases—and with them, the enigmas of existence. When we solve all that, they agreed, we'll write a book. *Trespassing on Einstein's Lawn* is that book, a memoir of the impassioned hunt that takes Amanda and her father from New York to London to Los Alamos. Along the way, they bump up against quirky science and even quirkier personalities, including Leonard Susskind, the former Bronx plumber who invented string theory; Ed Witten, the soft-spoken genius who coined the enigmatic M-theory; even Stephen Hawking. What they discover is extraordinary: the beginnings of a monumental paradigm shift in cosmology, from a single universe we all share to a splintered reality in which each observer has her own. Reality, the Geffers learn, is radically observer-dependent, far beyond anything of which Einstein or the founders of quantum mechanics ever dreamed—with shattering consequences for our understanding of the universe's origin. And somehow it all ties back to that conversation, to that Chinese restaurant, and to the true meaning of nothing. Throughout their journey, Amanda struggles to make sense of her own life—as her journalism career transforms from illusion to reality, as she searches for her voice as a writer, as she steps from a universe shared with her father to at last carve out one of her own. It's a paradigm shift you might call growing up. By turns hilarious, moving, irreverent, and profound, *Trespassing on Einstein's Lawn* weaves together story and science in remarkable ways. By the end, you will never look at the universe the same way again. Praise for *Trespassing on Einstein's Lawn* “Nothing quite prepared me for this book. Wow. Reading it, I alternated between depression—how could the rest of us science writers ever match this?—and exhilaration.”—*Scientific American* “To Do: Read *Trespassing on Einstein's Lawn*. Reality doesn't have to bite.”—*New York* “A zany superposition of genres . . . It's at once a coming-of-age chronicle and a father-daughter road trip to the far reaches of this universe and 10,500 others.”—*The Philadelphia Inquirer*

This revised and expanded popular media workbook is provided at no extra charge on CD-ROM with *The Cosmic Perspective Media Update, Fifth Edition* and includes a new set of activities based on the library of *Interactive Figures and Photos*(tm), a set of activities using *Voyager: SkyGazer v4.0*, and a set of web projects to use in conjunction with the new RSS feeds offered on *MasteringAstronomy*. These thought-provoking projects are suitable for labs or for homework assignments.

Story Time From Space Official Selection Part of a set of books launched to the International Space Station through NASA's *Story Time from Space* program, read aloud by astronauts for children around the world Written in the first person with the viewpoint of a narrator who represents the human race throughout history, I, Humanity tells the story of what we now know about the universe and how we learned it. It begins with the ancient view of a small, flat Earth, and page-by-page shows how we've gradually learned about our planet, its orbit, and its place in the vast universe. The book is designed to work on three different levels: education,

perspective, and inspiration. The educational aspect comes in the factual content of the story, the perspective element involves enabling children learn to see themselves and our planet in a new light, and the inspirational component comes in helping children dream of how they can help make the world a better place.

Longing to become a wizard so that he can magically fight global warming, young Diego realizes that he does not possess magical powers and considers other environmentally friendly careers, in a story complemented by informative scientific sidebars. By the author of Max Goes to the Moon. \$25,000 ad/promo.

"On the Cosmic Horizon reaches wide across the cosmos to provide lucid explanations for many of the most compelling cosmic questions. Following a Top Ten countdown, the book explores with wit and clarity each mystery and how it may be resolved. Each enigma is made accessible through a story which draws upon history and everyday human experience. Along the way, we learn about our state-of-the-art understanding of the universe, future missions, and the potential impact of unravelling these cosmic conundrums. On the Cosmic Horizon is the perfect book for anyone who wants to understand astronomical headlines and why they are important."--BOOK JACKET. Title Summary field provided by Blackwell North America, Inc. All Rights Reserved

A journey through the otherworldly science behind Christopher Nolan's award-winning film, *Interstellar*, from executive producer and Nobel Prize-winning physicist Kip Thorne. *Interstellar*, from acclaimed filmmaker Christopher Nolan, takes us on a fantastic voyage far beyond our solar system. Yet in *The Science of Interstellar*, Kip Thorne, the Nobel prize-winning physicist who assisted Nolan on the scientific aspects of *Interstellar*, shows us that the movie's jaw-dropping events and stunning, never-before-attempted visuals are grounded in real science. Thorne shares his experiences working as the science adviser on the film and then moves on to the science itself. In chapters on wormholes, black holes, interstellar travel, and much more, Thorne's scientific insights—many of them triggered during the actual scripting and shooting of *Interstellar*—describe the physical laws that govern our universe and the truly astounding phenomena that those laws make possible. *Interstellar* and all related characters and elements are trademarks of and © Warner Bros. Entertainment Inc. (s14).

A beloved introductory physics textbook, now including exercises and an answer key, explains the concepts essential for thorough scientific understanding. In this concise book, R. Shankar, a well-known physicist and contagiously enthusiastic educator, explains the essential concepts of Newtonian mechanics, special relativity, waves, fluids, thermodynamics, and statistical mechanics. Now in an expanded edition—complete with problem sets and answers for course use or self-study—this work provides an ideal introduction for college-level students of physics, chemistry, and engineering; for AP Physics students; and for general readers interested in advances in the sciences. The book begins at the simplest level, develops the basics, and reinforces fundamentals, ensuring a solid foundation in the principles and methods of physics.

For two-semester courses in astronomy. Teaching the Process of Science through Astronomy Building on a long tradition of effective pedagogy and comprehensive coverage, *The Cosmic Perspective*, Eighth Edition provides a thoroughly engaging and up-to-date introduction to astronomy for non-science majors. This text offers a wealth of features that enhance student understanding

of the process of science and actively engage students in the learning process for key concepts. The fully updated Eighth Edition includes the latest scientific discoveries, revises several subjects based on our most current understanding of the cosmos, and now emphasizes deeper understanding of the twists and turns of the process of science and the relevance of concepts to student's lives. This text is also available in two volumes, which can be purchased separately: The Cosmic Perspective: The Solar System, Eighth Edition (includes Chapters 1–13, 14, S1, 24) The Cosmic Perspective: Stars, Galaxies, and Cosmology, Eighth Edition (includes Chapters 1-3, S1, 4–6, S2–S4, 14–24) Also available as a Pearson eText or packaged with Mastering Astronomy Pearson eText is a simple-to-use, mobile-optimized, personalized reading experience that can be adopted on its own as the main course material. It lets students highlight, take notes, and review key vocabulary all in one place, even when offline. Seamlessly integrated videos and other rich media engage students and give them access to the help they need, when they need it. Educators can easily share their own notes with students so they see the connection between their eText and what they learn in class — motivating them to keep reading, and keep learning. Mastering Astronomy is the leading online homework, tutorial, and assessment system, designed to improve results by engaging students before, during, and after class with powerful content. Instructors ensure students arrive ready to learn by assigning educationally effective content before class, and encourage critical thinking and retention with in-class resources. Students can further master concepts after class through homework assignments that provide interactivity, hints and answer-specific feedback. Note: You are purchasing a standalone book; Pearson eText and Mastering Astronomy do not come packaged with this content. Students, ask your instructor for the correct package ISBN and Course ID. Instructors, contact your Pearson representative for more information. If your instructor has assigned Pearson eText as your main course material, search for: • 0135234441 / 9780135234440 Pearson eText The Cosmic Perspective, 8/e -- Access Card OR • 0135234417 / 9780135234419 Pearson eText The Cosmic Perspective, 8/e -- Instant Access If you would like to purchase both the physical text and Mastering Astronomy, search for: 0134058291 / 9780134058290 Cosmic Perspective Plus MasteringAstronomy with eText -- Access Card Package, The Package consists of: 0134059069 / 9780134059068 Cosmic Perspective, The 0134080572 / 9780134080574 MasteringAstronomy with Pearson eText -- ValuePack Access Card -- for The Cosmic Perspective 0321765184 / 9780321765185 SkyGazer 5.0 Student Access Code Card (Integrated component)

The quest for extraterrestrial life doesn't happen only in science fiction. This book describes the startling discoveries being made in the very real science of astrobiology, an intriguing new field that blends astronomy, biology, and geology to explore the possibility of life on other planets. Jeffrey Bennett takes readers beyond UFOs to discuss some of the tantalizing questions astrobiologists grapple with every day: What is life and how does it begin? What makes a planet or moon habitable? Is there life on Mars or elsewhere in the solar system? How can life be recognized on distant worlds? Is it likely to be microbial, more biologically complex--or even intelligent? What would such a discovery mean for life here on Earth? Come along on this scientific adventure and learn the astonishing implications of discoveries made in this field for the future of the human race. Bennett, who believes that "science is a way of helping people come to agreement," explains how the search for extraterrestrial life can help bridge the divide

that sometimes exists between science and religion, defuse public rancor over the teaching of evolution, and quiet the debate over global warming. He likens humanity today to a troubled adolescent teetering on the edge between self-destruction and a future of virtually limitless possibilities. *Beyond UFOs* shows why the very quest to find alien life can help us to grow up as a species and chart a course for the stars. In a new afterword, Bennett shares the most recent developments in extrasolar research, and discusses how they might further our quest to find alien life.

Dr. Greg Zacharias, former Chief Scientist of the United States Air Force (2015-18), explores next steps in autonomous systems (AS) development, fielding, and training. Rapid advances in AS development and artificial intelligence (AI) research will change how we think about machines, whether they are individual vehicle platforms or networked enterprises. The payoff will be considerable, affording the US military significant protection for aviators, greater effectiveness in employment, and unlimited opportunities for novel and disruptive concepts of operations. *Autonomous Horizons: The Way Forward* identifies issues and makes recommendations for the Air Force to take full advantage of this transformational technology.

A text for a nonmajor introductory course, serving as an introduction to astronomy and to science in general. Treatment moves from the solar system to stars to galaxies, with a final chapter on cosmology. Includes margin notes and definitions, review quizzes, discussion questions, calculation exercises, activities, and questions keyed to the publisher's Web site. Optional mathematical exercises are interspersed through the text, with worked examples and answers. Boxed readings discuss topics of interest such as the search for extraterrestrial life, and present personal accounts of astronomers. This second edition includes color photos from the Hubble Space Telescope and incorporates the latest research in the field. There is expanded discussion of the Hubble device, findings from recent missions, and interstellar matter and star formation. This edition has a larger page size, allowing for enlarged color photos and illustrations, and color cues located at the first reference in the text to each figure. Figures are placed on the same page as accompanying material. Annotation copyrighted by Book News, Inc., Portland, OR

A groundbreaking text and reference book on twenty-first-century classical physics and its applications This first-year graduate-level text and reference book covers the fundamental concepts and twenty-first-century applications of six major areas of classical physics that every masters- or PhD-level physicist should be exposed to, but often isn't: statistical physics, optics (waves of all sorts), elastodynamics, fluid mechanics, plasma physics, and special and general relativity and cosmology. Growing out of a full-year course that the eminent researchers Kip Thorne and Roger Blandford taught at Caltech for almost three decades, this book is designed to broaden the training of physicists. Its six main topical sections are also designed so they can be used in separate courses, and the book provides an invaluable reference for researchers. Presents all the major fields of classical physics except three prerequisites: classical mechanics, electromagnetism, and elementary thermodynamics Elucidates the interconnections between diverse fields and explains their shared concepts and tools Focuses on fundamental concepts and modern, real-world applications Takes applications from fundamental, experimental, and applied physics; astrophysics and cosmology; geophysics, oceanography, and meteorology; biophysics and chemical physics; engineering and optical science and technology; and

information science and technology Emphasizes the quantum roots of classical physics and how to use quantum techniques to elucidate classical concepts or simplify classical calculations Features hundreds of color figures, some five hundred exercises, extensive cross-references, and a detailed index An online illustration package is available

In this Second Edition of his investigation into the relative nature of social deviance and how the public perceives it, author John Curra demonstrates that what qualifies as deviance varies from place to place, time to time, and situation to situation. Through thought-provoking examples that include the blue people of Kentucky, a woman who believes she is a vampire, autoerotic asphyxiators, and others, Curra illustrates that deviance cannot be explained in terms of absolutes, nor can it be understood apart from its social setting. This insightful book approaches sex, violence, theft, suicide, drugs, and mental disorders in such a way that definitive or objective judgments become impossible.

Explains the fundamental concepts of Newtonian mechanics, special relativity, waves, fluids, thermodynamics, and statistical mechanics. Provides an introduction for college-level students of physics, chemistry, and engineering, for AP Physics students, and for general readers interested in advances in the sciences. In volume II, Shankar explains essential concepts, including electromagnetism, optics, and quantum mechanics. The book begins at the simplest level, develops the basics, and reinforces fundamentals, ensuring a solid foundation in the principles and methods of physics.

NOTE: You are purchasing a standalone product; MasteringAstronomy does not come packaged with this content. If you would like to purchase both the physical text and MasteringAstronomy search for 0133858642 / 9780133858648 The Cosmic Perspective Fundamentals Plus MasteringAstronomy with eText, Access Card Package: Package consists of: 0133889564 / 9780133889567 Cosmic Perspective Fundamentals, The 0133905306 / 9780133905304 MasteringAstronomy with Pearson eText -- ValuePack Access Card -- for The Cosmic Perspective Fundamentals 0321712951 / 9780321712950 Starry Night College Student Access Code Card 0321765184 / 9780321765185 SkyGazer 5.0 Student Access Code Card (Integrated component) MasteringAstronomy should only be purchased when required by an instructor. For one-semester college courses in Introductory Astronomy. Teaching the Process of Science through Astronomy Inspired by an activities-based classroom approach, The Cosmic Perspective Fundamentals is the briefest introduction to astronomy in the Bennett series. By focusing on the process of science and fundamental concepts of astronomy, The Cosmic Perspective Fundamentals allows time for the use of other instructional tools in the course. Each concisely written chapter is formatted into two main sections followed by a Process of Science section, making learning targeted and expectations clear for students. The Second Edition of The Cosmic Perspective Fundamentals presents recent dramatic advances in astronomy and how they change our understanding of the cosmos. This new edition focuses on essential subjects of astronomy chosen for their importance to the field, interest, and engagement level, using goal-oriented lessons and practical tools to bring astronomy to life. The textbook is now supported in MasteringAstronomy to create an unrivalled learning suite for students and instructors.

Is human-induced global warming a real threat to our future? Most people will express an opinion on this question, but relatively few can back their opinions with solid evidence. Many times we've even heard pundits say "I am not a scientist" to avoid the issue altogether. But the truth is, the basic science is not that difficult. Using a question and answer format, this book will help readers achieve three major goals: To see that anyone can understand the basic science of global warming; To understand the arguments about this issue made by skeptics, so that

readers will be able to decide for themselves what to believe; To understand why, despite the "gloom and doom" that often surrounds this topic, the solutions are ones that will not only protect the world for our children and grandchildren, but that will actually lead us to a stronger economy with energy that is cheaper, cleaner, and more abundant than the energy we use today.

This is the eBook of the printed book and may not include any media, website access codes, or print supplements that may come packaged with the bound book. Statistical Reasoning for Everyday Life, Fourth Edition, provides students with a clear understanding of statistical concepts and ideas so they can become better critical thinkers and decision makers, whether they decide to start a business, plan for their financial future, or just watch the news. The authors bring statistics to life by applying statistical concepts to the real world situations, taken from news sources, the internet, and individual experiences. Note: This is the standalone book If you want the Book/Access Card you can order the ISBN below ALERT: Before you purchase, check with your instructor or review your course syllabus to ensure that you select the correct ISBN. Several versions of Pearson's MyLab & Mastering products exist for each title, including customized versions for individual schools, and registrations are not transferable. In addition, you may need a CourseID, provided by your instructor, to register for and use Pearson's MyLab & Mastering products. NOTE: Make sure to use the dashes shown on the Access Card Code when entering the code. Student can use the URL and phone number below to help answer their questions: <http://247pearsoned.custhelp.com/app/home>
800-677-6337 0321890132 / 9780321890139 Statistical Reasoning for Everyday Life Plus NEW MyStatLab with Pearson eText -- Access Card Package 4/e Package consists of: 0321817621 / 9780321817624 Statistical Reasoning for Everyday Life 0321847997 / 9780321847997 My StatLab Glue-in Access Card 032184839X / 9780321848390 MyStatLab Inside Sticker for Glue-In Packages

Quantum Information Theory and the Foundations of Quantum Mechanics is a conceptual analysis of one the most prominent and exciting new areas of physics, providing the first full-length philosophical treatment of quantum information theory and the questions it raises for our understanding of the quantum world. Beginning from a careful, revisionary, analysis of the concepts of information in the everyday and classical information-theory settings, Christopher G. Timpson argues for an ontologically deflationary account of the nature of quantum information. Against what many have supposed, quantum information can be clearly defined (it is not a primitive or vague notion) but it is not part of the material contents of the world. Timpson's account sheds light on the nature of nonlocality and information flow in the presence of entanglement and, in particular, dissolves puzzles surrounding the remarkable process of quantum teleportation. In addition it permits a clear view of what the ontological and methodological lessons provided by quantum information theory are; lessons which bear on the gripping question of what role a concept like information has to play in fundamental physics. Topics discussed include the slogan 'Information is Physical', the prospects for an informational immaterialism (the view that information rather than matter might fundamentally constitute the world), and the status of the Church-Turing hypothesis in light of quantum computation. With a clear grasp of the concept of information in hand, Timpson turns his attention to the pressing question of whether advances in quantum information theory pave the way for the resolution of the traditional conceptual problems of quantum mechanics: the deep problems which loom over measurement, nonlocality and the general nature of quantum ontology. He marks out a number of common pitfalls to be avoided before analysing in detail some concrete proposals, including the radical quantum Bayesian programme of Caves, Fuchs, and Schack. One central moral which is drawn is that, for all the interest that the quantum information-inspired approaches hold, no cheap resolutions to the traditional problems of quantum mechanics are to be had. NOW A MAJOR SERIES 'GENIUS' ON NATIONAL GEOGRAPHIC, PRODUCED BY RON HOWARD AND STARRING GEOFFREY RUSH Einstein is the great icon of our age: the kindly refugee from oppression whose wild halo of hair, twinkling eyes, engaging humanity and

extraordinary brilliance made his face a symbol and his name a synonym for genius. He was a rebel and nonconformist from boyhood days. His character, creativity and imagination were related, and they drove both his life and his science. In this marvellously clear and accessible narrative, Walter Isaacson explains how his mind worked and the mysteries of the universe that he discovered. Einstein's success came from questioning conventional wisdom and marvelling at mysteries that struck others as mundane. This led him to embrace a worldview based on respect for free spirits and free individuals. All of which helped make Einstein into a rebel but with a reverence for the harmony of nature, one with just the right blend of imagination and wisdom to transform our understanding of the universe. This new biography, the first since all of Einstein's papers have become available, is the fullest picture yet of one of the key figures of the twentieth century. This is the first full biography of Albert Einstein since all of his papers have become available -- a fully realised portrait of this extraordinary human being, and great genius. Praise for EINSTEIN by Walter Isaacson:- 'YOU REALLY MUST READ THIS.' Sunday Times 'As pithy as Einstein himself.' New Scientist '[A] brilliant biography, rich with newly available archival material.' Literary Review 'Beautifully written, it renders the physics understandable.' Sunday Telegraph 'Isaacson is excellent at explaining the science.' Daily Express

The celebrated physicist and author of A Brief History of Time brings together a single-volume compilation of the most important works by Albert Einstein, presenting his papers on the Theory of Relativity, quantum theory, statistical mechanics, the photoelectric effect, and other ground-breaking studies that transformed modern physics. 75,000 first printing.

This open access book examines how the social sciences can be integrated into the praxis of engineering and science, presenting unique perspectives on the interplay between engineering and social science. Motivated by the report by the Commission on Humanities and Social Sciences of the American Association of Arts and Sciences, which emphasizes the importance of social sciences and Humanities in technical fields, the essays and papers collected in this book were presented at the NSF-funded workshop 'Engineering a Better Future: Interplay between Engineering, Social Sciences and Innovation', which brought together a singular collection of people, topics and disciplines. The book is split into three parts: A. Meeting at the Middle: Challenges to educating at the boundaries covers experiments in combining engineering education and the social sciences; B. Engineers Shaping Human Affairs: Investigating the interaction between social sciences and engineering, including the cult of innovation, politics of engineering, engineering design and future of societies; and C. Engineering the Engineers: Investigates thinking about design with papers on the art and science of science and engineering practice.

When scientists peer through a telescope at the distant stars in outer space or use a particle-accelerator to analyze the smallest components of matter, they discover that the same laws of physics govern the whole universe at all times and all places. Physicists call the eternal, ubiquitous constancy of the laws of physics symmetry. Symmetry is the basic underlying principle that defines the laws of nature and hence controls the universe. This all-important insight is one of the great conceptual breakthroughs in modern physics and is the basis of contemporary efforts to discover a grand unified theory to explain all the laws of physics. Nobel Laureate Leon M. Lederman and physicist Christopher T. Hill explain the supremely elegant concept of symmetry and all its profound ramifications to life on Earth and the universe at large in this eloquent, accessible popular science book. They not only clearly describe concepts normally reserved only for physicists and mathematicians, but they also instill an appreciation for the profound beauty of the universe's inherent design. Central to the story of symmetry is an obscure, unpretentious, but extremely gifted German mathematician named Emmy Noether. Though still little known to the world, she impressed no less a scientist than Albert Einstein, who praised her "penetrating mathematical thinking." In some of her earliest work she proved that the law of the conservation of energy was connected to the idea of symmetry and thus laid the mathematical

groundwork for what may be the most important concept of modern physics. Lederman and Hill reveal concepts about the universe, based on Noether's work, that are largely unknown to the public and have wide-reaching implications in connection with the Big Bang, Einstein's theory of relativity, quantum mechanics, and many other areas of physics. Through ingenious analogies and illustrations, they bring these astounding notions to life. This book will open your eyes to a universe you never knew existed.

Taking the first trip to the Moon since the Apollo missions, Max the dog and his friend Tori help set up the first colony on the Moon.

An astrophysicist offers an entertaining introduction to Einstein's theories, explaining how well they have held up to rigorous testing over the years, and even describing the amazing phenomena readers would actually experience if they took a trip through a black hole.

In this fascinating journey to the edge of science, Vidal takes on big philosophical questions: Does our universe have a beginning and an end or is it cyclic? Are we alone in the universe? What is the role of intelligent life, if any, in cosmic evolution? Grounded in science and committed to philosophical rigor, this book presents an evolutionary worldview where the rise of intelligent life is not an accident, but may well be the key to unlocking the universe's deepest mysteries. Vidal shows how the fine-tuning controversy can be advanced with computer simulations. He also explores whether natural or artificial selection could hold on a cosmic scale. In perhaps his boldest hypothesis, he argues that signs of advanced extraterrestrial civilizations are already present in our astrophysical data. His conclusions invite us to see the meaning of life, evolution and intelligence from a novel cosmological framework that should stir debate for years to come.

Life in the Universe By Jeffrey O. Bennett

Discusses the major issues in science, including the structure of particles within the atom, origins of species, and the birth of the universe.

What Is Relativity? An Intuitive Introduction to Einstein's Ideas, and Why They Matter Columbia University Press

"A compelling appeal, at just the right time, for continuing to look up."—Air & Space America's space program is at a turning point. After decades of global primacy, NASA has ended the space-shuttle program, cutting off its access to space. No astronauts will be launched in an American craft, from American soil, until the 2020s, and NASA may soon find itself eclipsed by other countries' space programs. With his signature wit and thought-provoking insights, Neil deGrasse Tyson—one of our foremost thinkers on all things space—illuminates the past, present, and future of space exploration and brilliantly reminds us why NASA matters now as much as ever. As Tyson reveals, exploring the space frontier can profoundly enrich many aspects of our daily lives, from education systems and the economy to national security and morale. For America to maintain its status as a global leader and a technological innovator, he explains, we must regain our enthusiasm and curiosity about what lies beyond our world. Provocative, humorous, and wonderfully readable, Space Chronicles represents the best of Tyson's recent commentary, including a must-read prologue on NASA and partisan politics. Reflecting on topics that range from scientific literacy to space-travel missteps, Tyson gives us an urgent, clear-eyed, and ultimately inspiring vision for the future.

One of the subject's clearest, most entertaining introductions offers lucid explanations of special and general theories of relativity, gravity, and spacetime, models of the universe, and more. 100 illustrations.

An engaging account of our quest for habitable environments, recounting fascinating recent discoveries and providing insight into future space missions.

A renowned astrophysicist's approachable introduction to Albert Einstein's theory of relativity and its application in our daily lives. 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. "Well-written and uniquely readable . . . Bennett carefully avoids bombastic statements and "spectacularization" of the subject." —Alberto Nicolis, Columbia University "I have read lots of introductions to relativity, but none is as clear and compelling as this one." —Seth Shostak, Senior Astronomer, SETI Institute

Newton's Principia introduced conceptions of space and time that launched one of the most famous and sustained debates in the history of physics, a controversy that involves fundamental concerns in the foundations of physics, metaphysics, and scientific epistemology. This book introduces and clarifies the historical and philosophical development of the clash between Newton's absolute conception of space and Leibniz's relational one. It separates the issues and provides new perspectives on absolute relational accounts of motion and relational-substantival accounts of the ontology of space time. Earman's sustained treatment and imaginative insights raise to a new level the debate on these important issues at the boundary of philosophy and physics. He surveys the history of the controversy from Newton to Einstein develops the mathematics and physics needed to pose the issues in sharp form and provides a persuasive assessment of the philosophical problems involved. Most importantly, Earman revitalizes the connection of the debate to contemporary science. He shows, for example, how concerns raised by Leibniz form the core of ongoing debate on the foundations of general theory of relativity, moving the discussion into a new and vital arena and introducing arguments that will be discussed for years to come. John Earman is Professor of History and Philosophy of Science at the University of Pittsburgh. A Bradford Book

Focusing on solutions specific to science and math education both for K–12 and college, this book explores how students learn in general and helps teachers develop successful techniques for the classroom. On Teaching Science is a short, practical guide to key principles and strategies that will help students learn in any subject at any level but with special focus on the STEM (science, technology, engineering, and mathematics) subjects. Though aimed primarily at current and future teachers, the ideas covered will be of interest to anyone involved in education, including parents, school administrators, policymakers, community leaders, and research scientists. The book describes how important it is to instill the notion that learning requires study and effort; presents big picture ideas about teaching; provides general suggestions for successful teaching; and includes pedagogical strategies for success in science teaching. With a combination of personal experience and research-based studies to discuss the current state of education in the United States, the author shows how it can be improved through both individual educators and systemic changes.

Written by a Nobel Prize physicist and his colleague, this compelling book uses familiar objects (trains, rulers, clocks) to illuminate the more subtle aspects of relativity. 23 illustrations. 1959 edition.

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