The Half Life Of Planets

There are many planetary systems other than our own, but it is only through a detailed understanding of the relatively accessible bodies in our solar system that a thorough appreciation of planetary science can be gained. This is particularly pertinent with the recent discovery of extra-solar planets and the desire to understand their formation and the prospect of life on other worlds. Planetary Science: The Science of Planets Around Stars focuses on the structure of planets and the stars they orbit and the interactions between them. The book is written in two parts, making it suitable for students at different levels and approaching planetary science from differing backgrounds. Twelve independent descriptive chapters reveal our solar system and the diverse bodies it contains, including satellites, planetary rings, asteroids, comets, meteorites, and interstellar dust. These chapters are accompanied by 42 detailed topics that discuss specialized subjects in a quantitative manner and will be essential reading for those in higher level courses. Coverage includes mineralogy, stellar formation and evolution, solar system dynamics, atmospheric physics, planetary interiors, thermodynamics, planetary astrophysics, and exobiology. Problems and answers are also included. Planetary Science: The Science of Planets Around Stars presents a complete overview of planetary science for students of physics, astronomy, astrophysics, earth sciences, and geophysics. Assuming no prior knowledge of astrophysics or geophysics, this book is suitable for students studying planetary science for the first time.

Planetary Science is an exciting, fast–moving, interdisciplinary field with courses taught in a wide range of departments, including astronomy, physics, chemistry, earth sciences and biology. Planets and Planetary Systems is a well–written, concise introductory textbook on the science of planets within our own and other solar systems. Keeping mathematics to a minimum, assuming only a rudimentary knowledge of calculus, the book begins with a description of the basic properties of the planets in our solar systems, and then moves on to compare them with what is known about planets in other solar systems. It continues by looking at the surfaces, interiors and atmospheres of the planets and then covers the dynamics and origin of planetary systems. The book closes with a look at the role of life in planetary systems. · An accessible, concise introduction to planets and planetary systems · Uses insights from all the disciplines underlying planetary science · Incorporates results from recent planetary space missions, such as Cassini to Saturn and a number of missions to Mars · Well illustrated throughout, including a colour plate section Planets and Planetary Systems is invaluable to students taking courses in planetary science across a wide range of disciplines and of interest to researchers and many keen amateur astronomers, needing an up–to–date introduction to this exciting subject.

Earth's Oldest Rocks, Second Edition, is the only single reference source for geological research of early Earth. This new edition is an up-to-date collection of scientific articles on all aspects of the early history of the Earth, from planetary accretion at 4.567 billion years ago (Ga), to the onset of modern-style plate tectonics at 3.2 Ga. Since the first edition was published, significant new advances have been made in our understanding of events and processes on early Earth that correspond with new advances in technology. The book includes contributions from over 100 authors, all of whom are experts in their respective fields. The research in this reference concentrates on what is directly gleaned from the existing rock record to understand how our planet formed and evolved during the planetary accretion phase, formation of the first crust, the changing dynamics of the mantle and style of tectonics, life's foothold and early development, and mineral deposits. It is an ideal resource for academics, students and the general public alike. Advances in early Earth research since 2007 based primarily on evidence gleaned directly from the rock record More than 50% of the chapters in this edition are new and the rest of the chapters are revised from the first edition, with more than 700 pages of new material Comprehensive reviews of areas of ancient lithosphere from all over the world, and of crust-forming processes New chapters on early solar system materials, composition of the ancient atmosphere-hydrosphere, and overviews of the oldest evidence of life on Earth, and modeling of early Earth tectonics

"An audacious and concrete proposal…Half-Earth completes the 86-year-old Wilson's valedictory trilogy on the human animal and our place on the planet." —Jedediah Purdy, New Republic In his most urgent book to date, Pulitzer Prize–winning author and world-renowned biologist Edward O. Wilson states that in order to stave off the mass extinction of species, including our own, we must move swiftly to preserve the biodiversity of our planet. In this "visionary blueprint for saving the planet" (Stephen Greenblatt), Half-Earth argues that the situation facing us is too large to be solved piecemeal and proposes a solution commensurate with the magnitude of the problem: dedicate fully half the surface of the Earth to nature. Identifying actual regions of the planet that can still be reclaimed—such as the California redwood forest, the Amazon River basin, and grasslands of the Serengeti, among others—Wilson puts aside the prevailing pessimism of our times and "speaks with a humane eloquence which calls to us all" (Oliver Sacks).

Their Origin, Evolution and Structure

Half-Earth: Our Planet's Fight for Life

An Introduction to Our Dynamic Planet

Origin of the Earth and Moon

Physics, Chemistry and Habitability

The Science of Planets Around Stars

In Origins of Existence astrophysicist Fred Adams takes a radically different approach from the long tradition of biologists and spiritual leaders who have tried to explain how the universe supports the development of life. He argues that life followed naturally from the laws of physics -- which were established as the universe burst into existence at the big bang. Those elegant laws drove the formation of galaxies, stars, and planets -- including some like our Earth. That chain of creation produced all the tiny chemical structures and vast celestial landscapes required for life. Ultimately, physical laws and the complexity they generate define the kind of biospheres that are possible -- from an Amazon rain forest to a frigid ocean beneath an ice sheet on a Jovian moon. Adams suggests that life was not merely some lucky break, but rather a natural outcome of the ascending ladder of complexity supported by our universe. Since our galaxy seems to harbor millions of planets with the same basic elements of habitability as Earth, the emergence of life is probably not a rare event. If life emerges deep inside planets and moons, as new research suggests happened on our planet, the number of viable habitats is truly enormous. Seven chronological chapters take the reader from the laws of physics and birth of the universe to the origins of life on Earth -- showing how energy flowed, exploded, and was repeatedly harnessed in replicating structures and organisms. In his groundbreaking first book, Fred Adams established the five eras of the universe with a focus on its long-term future. It is perhaps not surprising that he now turns his attention to the mystery of our astronomical origins. Here is a stunning new perspective, a book of genesis for our time, revealing how the laws of physics created galaxies, stars, planets, and even life in the universe.

New insights from the science of science Facts change all the time. Smoking has gone from doctor recommended to deadly. We used to think the Earth was the center of the universe and that the brontosaurus was a real dinosaur. In short, what we know about the world is constantly changing. Samuel Arbesman shows us how knowledge in most fields evolves systematically and predictably, and how this evolution unfolds in a fascinating way that can have a powerful impact on our lives. He takes us through a wide variety of fields, including those that change quickly, over the course of a few years, or over the span of centuries.

In this modern twist on the Cyrano story, talented and witty Cyrie Bergerac, a high school senior cursed with an enormous nose, has a secret crush on her popular friend Eddie Roxanninoff. Original.

This book is a welcome introduction and reference for users and innovators in geochronology. It provides modern perspectives on the current state-of-the art in most of the principal areas of geochronology and thermochronology, while recognizing that they are changing at a fast pace. It emphasizes fundamentals and systematics, historical perspective, analytical methods, data interpretation, and some applications chosen from the literature. This book complements existing coverage by expanding on those parts of isotope geochemistry that are concerned with dates and rates and insights into Earth and planetary science that come from temporal perspectives. Geochronology and Thermochronology offers chapters covering: Foundations of Radioisotopic Dating; Analytical Methods; Interpretational Approaches: Making Sense of Data; Diffusion and Thermochronologic Interpretations; Rb-Sr, Sm-Nd, Lu-Hf; Re-Os and Pt-Os; U-Th-Pb Geochronology and Thermochronology; The K-Ar and 40Ar/39Ar Systems; Radiation-damage Methods of Geo- and Thermochronology; The (U-Th)/He System; Uranium-series Geochronology; Cosmogenic Nuclides; and Extinct Radionuclide Chronology. Offers a foundation for understanding each of the methods and for illuminating directions that will be important in the near future Presents the fundamentals, perspectives, and opportunities in modern geochronology in a way that inspires further innovation, creative technique development, and applications Provides references to rapidly evolving topics that will enable readers to pursue future developments Geochronology and Thermochronology is designed for graduate and upper-level undergraduate students with a solid background in mathematics, geochemistry, and geology. Read an interview with the editors to find out more: https://eos.org/editors-vox/the-science-of-dates-and-rates

By Means of Natural Simple Processes

Satellites of the Outer Planets

The Physics of the Planets

Comparative Climatology of Terrestrial Planets

Abstracts of Papers Submitted to the Twenty-seventh Lunar and Planetary Science Conference, March 18-22, 1996

Origins of Life on the Earth and in the Cosmos, Second Edition, suggests answers to the age-old questions of how life arose in the universe and how it might arise elsewhere. This thorough revision of a very successful text describes key events in the evolution of living systems, starting with the creation of an environment suitable for the origins of life. Whereas one may never be able to reconstruct the precise pathway that led to the origin of life on earth, one can certainly make some plausible reconstructions of it. Such discussions have greatly expanded our understanding of the principles of chemical evolution and how they compare and contrast with the principles of biological evolution. The text is strong on biochemistry and its recent applications to origins' research. Provides an excellent review of basic biochemistry an evolution Written in a clear, concise style for scientists, students, and readers interested in a scientific inquiry into the origins of life Written by an authority in the field, and brought fully up-to-date in light of new research Pulls together valuable information not found in a single source Organized and presented in a manner conductive for use in a college course Heavily illustrated to make difficult concepts concrete

An authoritative introduction for graduate students in the physical sciences, this award-winning textbook explains the wide variety of physical, chemical, and geological processes that govern the motions and properties of planets. This updated second edition has been revised and improved while maintaining its existing structure and organization. Many data tables and plots have been updated to account for the latest measurements. A new Appendix focuses on recent discoveries since the second edition was first published. These include results from Cassini, Kepler, MESSENGER, MRO, LRO, Dawn at Vesta, Curiosity, and others, as well as many ground-based observatories. With over 300 exercises to help students apply the concepts covered, this textbook is ideal for graduate courses in astronomy, planetary science and earth science, and well suited as a reference for researchers. Color versions of many figures, movie clips supplementing the text, and other resources are available at www.cambridge.org/depater.

How life originated from the inanimate mixture of organic and inorganic compounds on the priomordial earth remains one of the great unknowns in science. This origin of life, or abiogenesis, continues to be examined in the context of the conditions and materials required for natural life to have begun on Earth both theoretically and experimentally. This book provides a broad but in-depth analysis of the latest discoveries in prebiotic chemsitry from the microscopic to the macroscopic scale; utilising experimental insight to provide a bottom up approach to plausibly explaining how life arose. With contributions from global leaders, this book is an ideal reference for postgraduate students and a single source of comprehensive information on the latest technical and theoretical advancements for researchers in a variety of fields from astrochemistry and astrophysics to organic chemistry and evolution.

Uncover the mysteries, wonders, and history of Mars—as close to an eye-witness perspective of the incredible Red Planet as any reader can get. The history of Mars is drawn not just on its surface, but also down into its broken bedrock and up into its frigid air. Most of all, it stretches back into deep time, where the trackways of the past have been obliterated and there is no discernible trace of where they started from or how they travelled, only where they ended up. From the planet's formation 4.5 billion years ago, through eras that featured cataclysmic meteor strikes, explosive volcanoes and a vast ocean that spanned the entire upper hemisphere, to the long, frozen ages that saw its atmosphere steadily thinning and leaking away into space, planetary geologist Dr. Simon Morden presents a tantalizing vision of our nearest neighbour, its dramatic history, and astonishing present.

Life in the Universe

Planetary Systems

Lives of the Planets

Cosmochemistry

An Introduction to the Solar System

Time in Powers of Ten

A bibliography of lunar and planetary research articles published during 1965 is presented with both subject and author listings. The major subject categories are: astrobiology, comets, meteorite craters and cratering effects, meteors and meteorites, the moon, origin of the solar system, the planets, and tektites. Each article is abstracted. (Author).

Lives of the Planets describes a scientific field in the midst of a revolution. Planetary science has mainly been a descriptive science, but it is becoming increasingly experimental. The space probes that went up between the 1960s and 1990s were primarily generalists-they collected massive amounts of information so that scientists could learn what questions to pursue. But recent missions have become more focused: Scientists know better what information they want and how to collect it. Even now probes are on their way to Mercury, Venus, Mars, and Pluto, with Europa-one of Jupiter's moons-on the agenda. In a sweeping look into the manifold objects inhabiting the depths of space, Lives of the Planets delves into the mythology and the knowledge humanity has built over the ages. Placing our current understanding in historical context, Richard Corfield explores the seismic shifts in planetary astronomy and probes why we must change our perspective of our place in the universe. In our era of extraordinary discovery, this is the first comprehensive survey of this new understanding and the history of how we got here.

With a Foreword writer Steven Weinberg In this richly illustrated book, Nobel Laureate Gerard 't Hooft and Theoretical Physicist Stefan Vandoren describe the enormous diversity of natural phenomena that take place at different time scales. In the tradition of the bestseller Powers of Ten, the authors zoom in and out in time, each step with a factor of ten. Starting from one second, time scales are enlarged until processes are reached that take much longer than the age of the universe. After the largest possible eternities, the reader is treated to the shortest and fastest phenomena known. Then the authors increase with powers of ten, until again the second is reached at the end of the book. At each time scale, interesting natural phenomena occur, spread over all scientific disciplines: orbital and rotation periods of planets and stars, decay times of elementary particles and atoms, biological rhythms and evolution processes, but also the different geological time scales. Contents:Part I:100 Seconds = 1 Second101 Seconds = 10 Seconds102 Seconds = 100 Seconds = 1 Minute, 40 Seconds103 Seconds = 1,000 Seconds = 16 Minutes, 40 Seconds104 Seconds = 10,000 Seconds = 2.78 Hours105 Seconds = 100,000 Seconds = 1.16 Days = 27.78 Hours106 Seconds = 1,000,000 = 1 Million Seconds = 11.57 Days = 1.65 Weeks106.41 Seconds = 2,592,000 Seconds = 30 Days ≈ 1 Month107 Seconds = 10 Million Seconds = 115.74 Days = 3.86 Months108 Seconds = 100 Million Seconds = 3.17 Years109 Seconds = 1 Billion Seconds = 31.7 Years1010 Seconds = 10 Billion Seconds = 317 Years1011 Seconds = 100 Billion Seconds = 3,171 Years1012 Seconds = 1 Trillion Seconds = 31,710 Years1013 Seconds = 10 Trillion Seconds = 317,098 Years1014 Seconds = 100 Trillion Seconds = 3.17 Million Years1015 Seconds = 1 Quadrillion Seconds = 31.7 Million Years1016 Seconds = 10 Quadrillion Seconds = 317 Million Years1017 Seconds = 100 Quadrillion Seconds = 3.17 Billion Years1018 Seconds = 1 Quintillion Seconds = 31.7 Billion years: The Large Timescales1021 seconds = 1 Sextillion Seconds = 3.17 × 1013 Years: The Large Timescales1028 Seconds = 3.17 × 1020 Years: The Large Timescales1032 Seconds: To Infinity and Beyond: The Dark EternitiesPart II:10-44 to 10-26 Seconds: Small Timescales10-25 Seconds10-24 Seconds = 1 Yoctosecond10-23 Seconds = 10 Yoctoseconds10-22 Seconds = 100 Yoctoseconds10-21 Seconds = 1 Zeptosecond10-20 Seconds = 10 Zeptoseconds10-19 Seconds = 100 Zeptoseconds10-18 Seconds = 1 Attosecond10-17 Seconds = 10 Attoseconds10-16 Seconds = 100 Attoseconds10-15 Seconds = 1 Femtosecond10-14 Seconds = 10 Femtoseconds10-13 Seconds = 100 Femtoseconds10-12 Seconds = 1 Picosecond10-11 Seconds = 10 Picoseconds10-10 Seconds = 100 Picoseconds10-9 Seconds = 1 Nanosecond10-8 Seconds = 10 Nanoseconds10-7 Seconds = 100 Nanoseconds10-6 Seconds = 1 Microsecond10-5 Seconds = 10 Microseconds10-4 Seconds = 100 Microseconds = 0.0001 Seconds10-3 Seconds = 1 Millisecond = 0.001 Seconds10-2 Seconds = 10 Milliseconds = 0.01 Seconds10-1 Seconds = 100 Milliseconds = 0.1 Seconds100 Seconds = 1 Second -->Readership: Science enthusiasts and students. Keywords:Time;natural Phenomena;Time Scales;Age of the Universe;Powers of TenReviews: "The somewhat facetious narrating style and the abundance of illustrations are so inviting and rather addictive once you picked up the book." European Mathematical Society "Pleasingly accessible volume that will give pleasure to academics, students, connoisseurs of coffee-table books and even the people who compile questions for Trivial Pursuit … Can be enjoyed as a source of scientific stories and images, as an unusual perspective on history, as a popular account of modern physics, and so on. Underneath them all is a wealth of serious science that will give readers insights into abstract fundamental ideas via concrete realities … Every science teacher would benefit from reading Time in Powers of Ten, but I hope it will have an even wider reach." Times Higher Education "The authors have compiled a refreshing mix of historical anecdotes and examples from music to sport and biology to astronomy to lighten up the heavier taste of particle physics and cosmology… It is both an enjoyable read and very pleasant to browse at leisure… It fully conveys the authors' amazement at — as Feynman put it — our fantastically marvellous universe." Nature Physics "The authors introduce the reader to the diversity of nature in a novel way by describing typical and interesting phenomena that occur or have occurred on many different time scales. The time scales considered differ by powers of ten, as the title of the book says, from the shortest times of which we have knowledge to the longest. I am sure many readers will enjoy the book as I have." Edward Witten, Fields Medalist "Time is an essential dimension of life. Indeed, its remarkable and awesome variation of scale shapes the natural world. This book by Gerard 't Hooft and Stefan Vandoren gives us an exposé of a wide range of natural phenomena and their associated time scales, spanning the very small, the very large, and the life events of our universe. The book is elegantly illustrated and should be an enjoyable read for anyone interested in a deeper understanding of the fourth dimension, time, and how it shapes our lives." Ahmed Zewail, Nobel Laureate in Chemistry "Like the original Powers of Ten, it is a wonderful book for flipping through and thinking about puzzles and is a good introduction to basics like how to tell a quark from a lepton." The Dispatch "The book reveals the extraordinary complexity of our universe — it is a fascinating journey." CERN Courier "This is a fascinating coffee-table book ranging from the unimaginably huge to the unimaginably tiny." Ultramicroscopy "You can read the book in any direction. Delving into the index takes you on a mystery tour of the time domain. Helpfully, all the major phenomena are gathered together on an illustrated time line. This book is definitely one for your reading list." Physics Education

Cosmochemistry is a rapidly evolving field of planetary science and the second edition of this classic text reflects the exciting discoveries made over the past decade from new spacecraft missions. Topics covered include the synthesis of elements in stars, behaviour of elements and isotopes in the early solar nebula and planetary bodies, and compositions of extra-terrestrial materials. Radioisotope chronology of the early Solar System is also discussed, as well as geochemical exploration of planets by spacecraft, and cosmochemical constraints on the formation of solar systems. Thoroughly updated throughout, this new edition features significantly expanded coverage of chemical fractionation and isotopic analyses; focus boxes covering basic definitions and essential background material on mineralogy, organic chemistry and quantitative topics; and a comprehensive glossary. An appendix of analytical techniques and end-of-chapter review questions, with solutions available at www.cambridge.org/cosmochemistry2e, also contribute to making this the ideal teaching resource for courses on the Solar System's composition as well as a valuable reference for early career researchers.

The Half-Life of Facts

Fundamental Planetary Science

On the Origin of Planets

Planets and Planetary Systems

Origins of Life on the Earth and in the Cosmos

An Introduction

Rev. and expanded ed. of: How to build a habitable planet / Wallace S. Broecker. 1985.

The book begins with a historical review of four major theories for the origin of the Solar System in particular, or of planets in general, which highlight the major problems that need to be solved by any plausible theory. In many theories, including that which form the major theme of this book, the formation of planets and stars is intimately linked, so four chapters are devoted to the processes that can be described as the birth, life and death of stars. Recent observations that have revealed the existence of planets around many Sun-like stars are described in detail, followed by a clear exposition of the Capture Theory for the origin of planets. Many aspects of this theory are illustrated with sophisticated computer modelling that convincingly demonstrates the plausibility of the theory. The Capture Theory is in complete accord with all observations, including the estimate it gives for the proportion of Sun-like stars with planets. It is the only theory that sits comfortably with all present observational and theoretical constraints. The general theory of planet formation does not explain the detailed structure of the Solar System. An early postulated collision of two major planets is shown to explain many disparate features of the Solar System the nature of the terrestrial planets, surface features of the Moon and its relationship with Earth, asteroids, comets and dwarf planets, the relationship between Neptune, Triton and Pluto and the characteristics of meteorites, including the isotopic anomalies found in them. The postulate of a planetary collision is given support by a 2009 NASA observation of the residue of such an event around a distant young star.

A quantitative introduction to the Solar System and planetary systems science for advanced undergraduate students, this engaging new textbook explains the wide variety of physical, chemical and geological processes that govern the motions and properties of planets. The authors provide an overview of our current knowledge and discuss some of the unanswered

questions at the forefront of research in planetary science and astrobiology today. They combine knowledge of the Solar System and the properties of extrasolar planets with astrophysical observations of ongoing star and planet formation, offering a comprehensive model for understanding the origin of planetary systems. The book concludes with an introduction to the fundamental properties of living organisms and the relationship that life has to its host planet. With more than 200 exercises to help students learn how to apply the concepts covered, this textbook is ideal for a one-semester or two-quarter course for undergraduate students.

Very Good,No Highlights or Markup,all pages are intact.

Worlds in Their Own Right

Bibliography of Lunar and Planetary Research

Planetary Geosciences--1988

The Story of Earth from the Big Bang to Humankind

Astronomy: A Physical Perspective

The Abundance of Extraterrestrial Civilizations

This book explores the science of extraterrestrial life, with a particular emphasis on the existence of intelligent alien civilizations. It introduces the reader to the basic chemistry associated with life on Earth and describes the planetary and stellar environments that allow us to exist. It also discusses the likelihood of alien life developing at other locations in our galaxy, along with the possibility that we will meet or communicate with them.

This book is suitable for use as a text in an introductory "Life in the Universe" course. REVIEWS: Blog Critics Magazine written by Regis Schilken http://blogcritics.org/archives/2009/03/16/082715.php

The Half-Life of PlanetsOpen Road Media

"A brave expression of hope, a visionary blueprint for saving the planet. Stephen Greenblatt"

“A smart and unusual romance just about right for fans of John Green.” —Booklist Liana’s decided to boycott kissing this summer, hoping to lose her reputation and focus on planetary science. Hank has near-encyclopedic knowledge of music and Asperger’s syndrome. When they meet by chance in a hospital restroom, neither one realizes that their friendship will change everything. If Liana’s experiment goes as planned, she’ll learn to open up, using her mouth for talking instead of kissing. But Hank’s never been kissed and thinks Liana might be the one to show him . . . if he can stop spewing music trivia long enough to let her.

A Very Short Introduction

Planetary Science

Exploration of Halley’s Comet

Prebiotic Chemistry and Life's Origin

Planetary Sciences

Planetary Astrobiology

In particular he shows how tectonic and volcanic processes, driven by heat from within, have shaped the rigid outer layers of these worlds. Rothery also discusses the similarities and differences among them and the ways in which they resemble Earth-like planets."--BOOK JACKET.

"Through the contributions of more than sixty leading experts in the field, Comparative Climatology of Terrestrial Planets sets forth the foundations for this emerging new science and brings the reader to the forefront of our current understanding of atmospheric formation and climate evolution"--Provided by publisher.

The 1985/86 apparition of Halley's Comet turned out to be the most important apparition of a comet ever. It provided a worldwide science community with a wealth of exciting new discoveries, the most remarkable of which was undoubtedly the first image of a cometary nucleus. Halley's Comet is the brightest periodic comet, and the most famous of the 750 known comets. With its 76-year period, its recent appearance was truly a "once-in-a-lifetime" observational opportunity. The 1985/86 apparition was the thirtieth consecutive recorded apparition. Five apparitions ago, the English astronomer Edmond Halley discovered the periodicity of "his" comet and correctly predicted its return in 1758, a triumph for science best appreciated in the context of contemporary views, or rather fears, about comets at that time. The increasingly rapid progress in technological development is very much apparent when one compares the dominant tools for cometary research during Halley's next three apparitions: in 1835 studies were made based on drawings ofthe comet; in 1910 photographic plates were used; while in March 1986 an armada of six spacecraft from four space agencies approached the comet and carried out in situ measurements, 1 AU from the Earth. In 1910, nobody could have dreamed that this was possible, and today it is equally difficult to anticipate what scientists will be able to achieve in 2061.

Published by the American Geophysical Union as part of the Geophysical Monograph Series, Volume 176. With the search for extra-solar planets in full gear, it has become essential to gain a more detailed understanding of the evolution of the other earth-like planets in our own solar system. Space missions to Venus, including the Soviet Veneras, Pioneer Venus, and Magellan, provided a wealth of information about this planet' enigmatic surface and atmosphere, but left many fundamental questions about its origin and evolution unanswered. This book discusses how the study of Venus will aid our understanding of terrestrial and extra-solar planet evolution, with particular reference to surface and interior processes, atmospheric circulation, chemistry, and aeronomy. Incorporating results from the recent European Venus Express mission, Exploring Venus as a Terrestrial Planet examines the open questions and relates them to Earth and other terrestrial planets. The goal is to stimulate thinking about those broader issues as the new Venus data arrive.

The Half-Life of Planets

Bibliography of Lunar and Planetary Research -1965

Our Planet's Fight for Life

Earth's Oldest Rocks

At Face Value

A Natural History of Mars

The American Chemical Society has launched an activities-based, student-centered approach to the general chemistry course, a textbook covering all the traditional general chemistry topics but arranged in a molecular context appropriate for biology, environmental and engineering students. Written by a team of industry chemists and educators and thoroughly class-tested, Chemistry combines cooperative learning strategies and active learning techniques with a powerful media/supplements package to create an effective introductory text.

"This book: Provides extensive grounding in key issues of astrophysics, chemistry, biology and geophysics; over 150 images and illustrations; exercises for each chapter, ranging from straightforward calculation problems to more far-ranging research-oriented exercises; an online component for users that includes new exercises and a continually updated blog of late-breaking scientific news items, fully cross referenced with the book; and extensive bibliographies for each chapter."--BOOK JACKET.

This textbook provides an intuitive yet mathematically rigorous introduction to the thermodynamics and thermal physics of planetary processes. It demonstrates how the workings of planetary bodies can be understood in depth by reducing them to fundamental physics and chemistry. The book is based on two courses taught by the author for many years at the University of Georgia. It includes 'Guided Exercise' boxes; end-of-chapter problems (worked solutions provided online); and software boxes (Maple code provided online). As well as being an ideal textbook on planetary thermodynamics for advanced students in the Earth and planetary sciences, it also provides an innovative and quantitative complement to more traditional courses in geological thermodynamics, petrology, chemical oceanography and planetary science. In addition to its use as a textbook, it is also of great interest to researchers looking for a 'one stop' source of concepts and techniques that they can apply to their research problems.

The age-old question of how our home planet and its satellite originated has in recent times undergone a minor revolution. The emergence of the "giant impact theory" as the most successful model for the origin of the Moon has been difficult to reconcile with some aspects of the Earth, and the development of an integrated model for the origin of the Earth-Moon system has been difficult for this reason. However, recent technical advances in experimental and isotopic work, together with intensified interest in the modeling of planetary dynamics, have produced a wealth of new results requiring a rethinking of models for the origin of the Earth and Moon. This book is intended to serve as a resource for those scientists working closely in this field, while at the same time it provides enough balance and depth to offer an introduction for students or technically minded general readers. Its thirty chapters address isotopic and chemical constraints on accretion, the dynamics of terrestrial planet formation, the impact-triggered formation of the Earth-Moon system, differentiation of the Earth and Moon, the origin of terrestrial volatiles, and conditions on the young Earth and Moon. Covering such subjects as the history and origin of the Moon's orbit, water on the Earth, and the implications of Earth-Moon interactions for terrestrial climate and life, the book constitutes a state-of-the-art overview of the most recent investigations in the field. Although many advances have been made in our ability to evaluate competing models of the formation of the Earth-Moon system, there are still many gaps in our understanding. This book makes great strides toward closing those gaps by highlighting the extensive progress that has been made and pointing toward future research.

Geochronology and Thermochronology

A Natural History of the Solar System

Extrasolar Planets and Astrobiology

Thermodynamics of the Earth and Planets

Origins of Existence

Half-Earth

"Planetary Astrobiology provides an accessible, interdisciplinary gateway to the frontiers of knowledge in astrobiology via results from the exploration of our own solar system and exoplanetary systems"--

A comprehensive introduction to astronomical objects and phenomena, for undergraduate students.

At last, an undergraduate textbook integrating the geophysics, geochemistry, and petrology of the Earth to explain plate tectonics and geodynamics.

For many decades, we were only familiar with our own system of planets, the Solar System, orbiting our Sun. Now we know that it is just one among a vast range of planetary systems around distant stars. This book explores the nature and variety of planetary systems, how they are formed, and how they die.

Chemistry

Planetary Geology

Natural Phenomena and Their Timescales

The Red Planet

How Life Emerged in the Universe

Exploring Venus as a Terrestrial Planet

Planetary Geology provides the student reader and enthusiastic amateur with comprehensive coverage of the solar system viewed through the eyes of Earth scientists. Recent planetary missions by NASA, the European Space Agency and other national agencies have reaffirmed that those geological processes which are familiar from our studies of the Earth operate on many solid planets and satellites. Common threads link the internal structure, thermal evolution and surface character of both rocky and icy worlds; volcanoes, impact craters, ice caps, dunes, rift valleys, rivers and oceans are features of extra-terrestrial worlds as diverse as Mercury and Titan. The new data reveal that many of the supposedly inert planetary bodies were recently subject to earthquakes, landslides and climate change and that some of them display active volcanism. Moreover, our understanding of the very origins of the Solar System depends heavily on the composition of meteorites from Mars reaching the Earth and of rock fragments found on the Moon. Combining extensive use of imagery, the results of laboratory experiments and theoretical modelling, this comprehensively updated second edition of Planetary Geology presents fresh evidence that, to quote the first edition, planetary geology now embraces conventional geology and vice versa.

Updated third edition introduces undergraduates to the Solar System's bodies, the processes upon and within them, and their origins and evolution.

How to Build a Habitable Planet

A Project of the American Chemical Society

Lunar and Planetary Science XXVII

Why Everything We Know Has an Expiration Date