

Nature S Building Blocks An A Z Guide To The Elements

Shortlisted for the 2020 AAAS/Subaru SB&F Prize for Excellence in Science Books

Creating an element is no easy feat. It's the equivalent of firing six trillion bullets a second at a needle in a haystack, hoping the bullet and needle somehow fuse together, then catching it in less than a thousandth of a second – after which it's gone forever.

Welcome to the world of the superheavy elements: a realm where scientists use giant machines and spend years trying to make a single atom of mysterious artefacts that have never existed on Earth. From the first elements past uranium and their role in the atomic bomb to the latest discoveries stretching our chemical world, Superheavy will reveal the hidden stories lurking at the edges of the periodic table. Why did the US Air Force fly planes into mushroom clouds? Who won the transfermium wars? How did an earthquake help give Japan its first element? And what happened when Superman almost spilled nuclear secrets? In a globe-trotting adventure that stretches from the United States to Russia, Sweden to Australia, Superheavy is your guide to the amazing science filling in the missing pieces of the periodic table. By the end you'll not only marvel at how nuclear science has changed our lives – you'll wonder where it's going to take us in the future.

The periodic table of elements is among the most recognizable image in science. It lies at the core of chemistry and embodies the most fundamental principles of science. In

this new edition, Eric Scerri offers readers a complete and updated history and philosophy of the periodic table. Written in a lively style to appeal to experts and interested lay-persons alike, *The Periodic Table: Its Story and Its Significance* begins with an overview of the importance of the periodic table and the manner in which the term "element" has been interpreted by chemists and philosophers across time. The book traces the evolution and development of the periodic table from its early beginnings with the work of the precursors like De Chancourtois, Newlands and Meyer to Mendeleev's 1869 first published table and beyond. Several chapters are devoted to developments in 20th century physics, especially quantum mechanics and the extent to which they explain the periodic table in a more fundamental way. Other chapters examine the formation of the elements, nuclear structure, the discovery of the last seven infra-uranium elements, and the synthesis of trans-uranium elements. Finally, the book considers the many different ways of representing the periodic system and the quest for an optimal arrangement.

The phenomenal Sunday Times bestseller *Periodic Tales* by Hugh Andersey-Williams, packed with fascinating stories and unexpected information about the building blocks of our universe. Everything in the universe is made of them, including you. Like you, the elements have personalities, attitudes, talents, shortcomings, stories rich with meaning. Here you'll meet iron that rains from the heavens and noble gases that light the way to vice. You'll learn how lead can tell your future while zinc may one day line your coffin.

You'll discover what connects the bones in your body with the Whitehouse in Washington, the glow of a streetlamp with the salt on your dinner table. Unlocking their astonishing secrets and colourful pasts, *Periodic Tales* is a voyage of wonder and discovery, showing that their stories are our stories, and their lives are inextricable from our own. 'Science writing at its best. A fascinating and beautiful literary anthology, bringing them to life as personalities. If only chemistry had been like this at school. A rich compilation of delicious tales' *Matt Ridley, Prospect* 'A love letter to the chemical elements. Aldersey-Williams is full of good stories and he knows how to tell them well' *Sunday Telegraph* 'Great fun to read and an endless fund of unlikely and improbable anecdotes' *Financial Times* 'The history, science, art, literature and everyday applications of all the elements from aluminium to zinc' *The Times* Hugh Aldersey-Williams studied natural sciences at Cambridge. He is the author of several books exploring science, design and architecture and has curated exhibitions at the Victoria and Albert Museum and the Wellcome Collection. He lives in Norfolk with his wife and son.

Explores the element of Beryllium and its uses.

Provides information on writing scalable network applications using the JavaScript-based platform.

Presents chemical, physical, nuclear, electron, crystal, biological, and geological data on all the chemical elements.

The formation of galaxies is one of the greatest puzzles in astronomy, the solution is shrouded in the depths of space and time, but has profound implications for the universe we observe today. This book discusses the beginnings of the process from cosmological observations and calculations. It examines the different theories of galaxy formation and shows where each theory either succeeds or fails in explaining what we actually observe. In addition, the book looks ahead to what we may expect to uncover about the epoch of galaxy formation from the new and upcoming generations of telescopes and technology.

Molecules of Murder is about infamous murderers and famous victims; about people like Harold Shipman, Alexander Litvinenko, Adelaide Bartlett, and Georgi Markov. Few books on poisons analyse these crimes from the viewpoint of the poison itself, doing so throws a new light on how the murders or attempted murders were carried out and ultimately how the perpetrators were uncovered and brought to justice. Part I includes molecules which occur naturally and were originally used by doctors before becoming notorious as murder weapons. Part II deals with unnatural molecules, mainly man-made, and they too have been dangerously misused in famous crimes. The book ends with the most famous poisoning case in recent years, that of Alexander Litvinenko and his death from polonium chloride. The first half of each chapter starts by looking at the target molecule itself, its discovery, its history, its chemistry, its use in medicine, its toxicology, and its effects on the human body. The second half then investigates a

famous murder case and reveals the modus operandi of the poisoner and how some were caught, some are still at large, and some literally got away with murder. *Molecules of Murder* will explain how forensic chemists have developed cunning ways to detect minute traces of dangerous substances, and explain why some of these poisons, which appear so life-threatening, are now being researched as possible life-savers. Award winning science writer John Emsley has assembled another group of true crime and chemistry stories to rival those of his highly acclaimed *Elements of Murder*.

In her first novel since *The Quick and the Dead* (a finalist for the Pulitzer Prize), the legendary writer takes us into an uncertain landscape after an environmental apocalypse, a world in which only the man-made has value, but some still wish to salvage the authentic. "She practices ... camouflage, except that instead of adapting to its environment, Williams's imagination, by remaining true to itself, reveals new colorations in the ecology around her." —A.O. Scott, *The New York Times Book Review*

Khristen is a teenager who, her mother believes, was marked by greatness as a baby when she died for a moment and then came back to life. After Khristen's failing boarding school for gifted teens closes its doors, and she finds that her mother has disappeared, she ranges across the dead landscape and washes up at a "resort" on the shores of a mysterious, putrid lake the elderly residents there call "Big Girl." In a rotting honeycomb of

rooms, these old ones plot actions to punish corporations and people they consider culpable in the destruction of the final scraps of nature's beauty. What will Kristen and Jeffrey, the precocious ten-year-old boy she meets there, learn from this "gabby seditious lot, in the worst of health but with kamikaze hearts, an army of the aged and ill, determined to refresh, through crackpot violence, a plundered earth"? Rivetingly strange and beautiful, and delivered with Williams's searing, deadpan wit, Harrow is their intertwined tale of paradise lost and of their reasons—against all reasonableness—to try and recover something of it. To understand why we humans are as we are, it is necessary to look at the essential building blocks that comprise our nature. The foundations of this structure are our evolutionary origins as primates and our social roots. Upon these rest features such as our emotions, language and aesthetic preferences, with our self-perceptions, self-deceptions and thirst for knowledge right at the top. The unifying force holding these blocks together is evolutionary theory. Evolution provides a deeper understanding of human nature and, in particular, of the common roots of these different perspectives. To build a reliable and coherent model of man, leading authors from fields as diverse as primatology, anthropology, neurobiology and philosophy have joined forces to present essays each describing their own expert perspective. Together they provide a convincing

and complete picture of our own human nature.

A fascinating account of the five most toxic elements describes the lethal chemical properties of arsenic, antimony, lead, mercury, and thallium, as well as their use in some of the most famous murder cases in history, with profiles of such deadly poisoners as Mary Ann Cotton, Michael Swango, and Saddam Hussein and a look at modern-day environmental catastrophes.

From New York Times bestselling author Sam Kean comes incredible stories of science, history, finance, mythology, the arts, medicine, and more, as told by the Periodic Table. Why did Gandhi hate iodine (I, 53)? How did radium (Ra, 88) nearly ruin Marie Curie's reputation? And why is gallium (Ga, 31) the go-to element for laboratory pranksters?* The Periodic Table is a crowning scientific achievement, but it's also a treasure trove of adventure, betrayal, and obsession. These fascinating tales follow every element on the table as they play out their parts in human history, and in the lives of the (frequently) mad scientists who discovered them. THE DISAPPEARING SPOON masterfully fuses science with the classic lore of invention, investigation, and discovery--from the Big Bang through the end of time. *Though solid at room temperature, gallium is a moldable metal that melts at 84 degrees Fahrenheit. A classic science prank is to mold gallium spoons, serve them with tea, and watch guests recoil as their

utensils disappear.

The aim of this book is to discuss the fundamental ideas which lie behind the statistical theory of learning and generalization. It considers learning as a general problem of function estimation based on empirical data. Omitting proofs and technical details, the author concentrates on discussing the main results of learning theory and their connections to fundamental problems in statistics. This second edition contains three new chapters devoted to further development of the learning theory and SVM techniques. Written in a readable and concise style, the book is intended for statisticians, mathematicians, physicists, and computer scientists.

From the brilliant mind of Japanese artist Bunpei Yorifuji comes *Wonderful Life with the Elements*, an illustrated guide to the periodic table that gives chemistry a friendly face. In this super periodic table, every element is a unique character whose properties are represented visually: heavy elements are fat, man-made elements are robots, and noble gases sport impressive afros. Every detail is significant, from the length of an element's beard to the clothes on its back. You'll also learn about each element's discovery, its common uses, and other vital stats like whether it floats—or explodes—in water. Why bother trudging through a traditional periodic table? In this periodic paradise, the elements are people too.

And once you've met them, you'll never forget them.

The Elements has become an international sensation, with over one million copies in-print worldwide. The highly-anticipated paperback edition of The Elements is finally available. An eye-opening, original collection of gorgeous, never-before-seen photographic representations of the 118 elements in the periodic table. The elements are what we, and everything around us, are made of. But how many elements has anyone actually seen in pure, uncombined form? The Elements provides this rare opportunity. Based on seven years of research and photography, the pictures in this book make up the most complete, and visually arresting, representation available to the naked eye of every atom in the universe. Organized in order of appearance on the periodic table, each element is represented by a spread that includes a stunning, full-page, full-color photograph that most closely represents it in its purest form. For example, at -183°C , oxygen turns from a colorless gas to a beautiful pale blue liquid. Also included are fascinating facts, figures, and stories of the elements as well as data on the properties of each, including atomic weight, density, melting and boiling point, valence, electronegativity, and the year and location in which it was discovered. Several additional photographs show each element in slightly altered forms or as used in various practical ways. The element's position on the periodic

table is pinpointed on a mini rendering of the table and an illustrated scale of the element's boiling and/or melting points appears on each page along with a density scale that runs along the bottom. Packed with interesting information, this combination of solid science and stunning artistic photographs is the perfect gift book for every sentient creature in the universe. Includes a tear-out poster of Theodore Gray's iconic Photographic Periodic Table!

The incredible "glowing" history of the "Devil's element" phosphorus Discovered by alchemists, prescribed by apothecaries, exploited by ninth-century industrialists, and abused by twentieth-century combatants, the chemical element phosphorus has fascinated us for more than three centuries. It may even be the cause of will-o'-the wisps and spontaneous human combustion! Now John Emsley has written an enthralling account of this eerily luminescent element. Shining with wonderful nuggets—from murders-by-phosphorus to a match factory strike; from the firebombing of Hamburg to the deadly compounds derived from phosphorus today—The 13th Element weaves together a rich tableau of brilliant and oddball characters, social upheavals, and bizarre events.

Shortlisted for the 2021 Booker Prize Longlisted for the 2021 National Book Award for Fiction A heartrending new novel from the Pulitzer Prize-winning and #1 New York Times best-selling author of *The Overstory*. Named one of the Most Anticipated Books of 2021 by Newsweek, Los

Angeles Times, New York Magazine, Chicago Tribune, BuzzFeed, BookPage, Goodreads, Literary Hub, The Millions, New Statesman, and Times of London The astrobiologist Theo Byrne searches for life throughout the cosmos while single-handedly raising his unusual nine-year-old, Robin, following the death of his wife. Robin is a warm, kind boy who spends hours painting elaborate pictures of endangered animals. He's also about to be expelled from third grade for smashing his friend in the face. As his son grows more troubled, Theo hopes to keep him off psychoactive drugs. He learns of an experimental neurofeedback treatment to bolster Robin's emotional control, one that involves training the boy on the recorded patterns of his mother's brain... With its soaring descriptions of the natural world, its tantalizing vision of life beyond, and its account of a father and son's ferocious love, Bewilderment marks Richard Powers's most intimate and moving novel. At its heart lies the question: How can we tell our children the truth about this beautiful, imperiled planet?

Discusses interesting chemicals, such as the smelliest, most lethal, and most versatile, in a non-technical style that covers each chemical's importance without using formulas, equations, or diagrams

John Emsley's *Nature's Building Blocks* was published in paperback in 2003. In this readable, informative, and fascinating guide to the elements are entries on each of the 100-odd chemical elements, arranged alphabetically from actinium to zirconium. Each entry comprises an explanation of where the element's name comes from, followed by Body element (the role it plays in living things), Element of history (how and when it was discovered), Economic element (what it is used for), Environmental element (where it occurs, how much), Chemical element (facts, figures, and narrative), and Element of surprise (an amazing, little-known fact). Since

publication of the first edition there have been a number of developments. Three new chemical elements have been named and validated: darmstadtium, roetgenium, and copernicium and the section on 'transfermium elements' has now been incorporated into the main part of the book. Economic uses of elements have grown, and some quite rare elements such as Scandium are now economically important, along with updates to elements such as gold due to new roles in industry. Fully revised and updated for 2010, this browsable compendium holds a wealth of useful information.

This unique and practical book provides quick and easy access to data on the physical and chemical properties of all classes of materials. The second edition has been much expanded to include whole new families of materials while many of the existing families are broadened and refined with new material and up-to-date information. Particular emphasis is placed on the properties of common industrial materials in each class. Detailed appendices provide additional information, and careful indexing and a tabular format make the data quickly accessible. This book is an essential tool for any practitioner or academic working in materials or in engineering.

Treating such issues as animal sex, species politics, environmental justice, lesbian space and "gay" ghettos, AIDS literatures, and queer nationalities, this lively collection asks important questions at the intersections of sexuality and environmental studies. Contributors from a wide range of disciplines present a focused engagement with the critical, philosophical, and political dimensions of sex and nature. These discussions are particularly relevant to current debates in many disciplines, including environmental studies, queer theory, critical race theory, philosophy, literary criticism, and politics. As a whole, *Queer Ecologies* stands as a powerful

corrective to views that equate "natural" with "straight" while "queer" is held to be against nature.

Explains the characteristics of oxygen, where it is found, how it is used by humans, and its relationship to other elements found in the periodic table.

Describes the physical characteristics and properties of the element Helium.

Describes the structure and mechanics of a wide range of cellular materials in botany, zoology, and medicine.

For a physicist, all the world is information. The Universe and its workings are the ebb and flow of information. We are all transient patterns of information, passing on the recipe for our basic forms to future generations using a four-letter digital code called DNA. In this engaging and mind-stretching account, Vlatko Vedral considers some of the deepest questions about the Universe and considers the implications of interpreting it in terms of information. He explains the nature of information, the idea of entropy, and the roots of this thinking in thermodynamics. He describes the bizarre effects of quantum behaviour — effects such as 'entanglement', which Einstein called 'spooky action at a distance', and explores cutting edge work on harnessing quantum effects in hyperfast quantum computers, and how recent evidence suggests that the weirdness of the quantum world, once thought limited to the tiniest scales, may reach into the macro world. Vedral finishes by considering the answer to the ultimate question: where did all

of the information in the Universe come from? The answers he considers are exhilarating, drawing upon the work of distinguished physicist John Wheeler. The ideas challenge our concept of the nature of particles, of time, of determinism, and of reality itself. This edition includes a new foreword from the author, reflecting on changes in the world of quantum information since first publication. Oxford Landmark Science books are 'must-read' classics of modern science writing which have crystallized big ideas, and shaped the way we think.

An introductory journey through the periodic table explains how every tangible object is comprised of the various elements, while chronicling the history of element discovery and explaining how elemental knowledge can be applied. For over 300 years, the chemical element phosphorus maimed, killed, polluted and burned - yet doctors prescribed it and whole industries were dedicated to its manufacture. This is a history of phosphorus, from its genesis through to its modern-day use in pesticides and household chemicals.

Introduce baby to the beauty in the world around her with Baby Einstein Nesting Blocks. The set of ten stackable blocks features stunning real-life photographs and charming illustrations grouped together by themes, such as day and night, and Spring and Fall. Baby will learn to understand nature as never before while building her motor skills, with this new interactive format. Baby Einstein Books is

an imprint of developmentally appropriate, interactive books designed to introduce children ages 0-3 to classic poetry, art, and foreign languages in a fun and accessible way. A combination of playful images, beautiful photography, and bold illustrations with multilayered text will captivate and stimulate babies and young children. This “humanities for babies” program, based on the award-winning video series, taps into the natural learning potential of young children—and their parents’ aspirations for them.

You know that you need oxygen to breathe, that neon can glow and chrome shines? But did you know that your cell phone contains arsenic, your spectacles contain rhodium and that the tin pest is not a disease? And can you name just three researchers whom we have to thank for all these results? Here, Professor Quadbeck-Seeger, a long-serving member of the board at BASF, goes in search of these and other questions. Based on the periodic table, the key reference source for any natural scientist, he explains the criteria that define an element's position in the table and are responsible for its particular characteristics. In a clear and concise manner, he describes for each element the story behind its discovery, its physical and chemical properties as well as its role in our everyday lives. Enriched by a wealth of interesting details, this beautifully designed book in full color represents not only varied reading, but also a treasure trove of

surprising facts. Ideally combined with the "Historical Periodic Table" poster, this book is aimed at younger audiences and is thus particularly suitable for schools, lectures and other courses.

'The book neatly illuminates a forgotten history of female chemists — and this is not an overstatement. It contains a multitude of names, events and socio-economic interactions in the pursuit of women's education and professional emancipation that are guaranteed to contain stories that readers will not have heard before ... It is easily a dip-in and dip-out type of read, allowing simple navigation to specific areas of Britain, disciplines and professions ... Besides highlighting the women who fought against an inherently male-dominated system and celebrating their supporters, this book also examines the events and the history surrounding their lives and endeavours. It pays particular note to the nations of the British Isles and gives equal contribution to those lost in history as to those names we are all so familiar with. A fantastic resource that has been excellently researched, I am sure it will remain an ageless tribute and reference work.'

Education in Chemistry Historically, British chemistry has been perceived as a solely male endeavour. However, this perception is untrue: the allure of chemistry has attracted British women for centuries past. In this new book, the authors trace the story of women's fascination with chemistry back to the amateur

women chemists of the late 1500s. From the 1880s, pioneering academic girls' schools provided the knowledge base and enthusiasm to enable their graduates to enter chemistry degree programs at university. The ensuing stream of women chemistry graduates made interesting and significant contributions to their fields, yet they have been absent from the historical record. In addition to the broad picture, the authors focus upon the life and contributions of some of the individual women chemists who were determined to survive and flourish in their chosen field. From secondary school to university to industry, some of the women chemists expressed their sentiments and enthusiasm in chemistry verse. Examples of their poetic efforts are sprinkled throughout to give a unifying theme from grade school to university and industrial employment. This book provides a well-researched glimpse into the forgotten world of British women in chemistry up to the 1930s and 1940s.

The Periodic Table: Nature's Building Blocks: An Introduction to the Naturally Occurring Elements, Their Origins and Their Uses addresses how minerals and their elements are used, where the elements come from in nature, and their applications in modern society. The book is structured in a logical way using the periodic table as its outline. It begins with an introduction of the history of the periodic table and a short introduction to mineralogy. Element sections contain

their history, how they were discovered, and a description of the minerals that contain the element. Sections conclude with our current use of each element. Abundant color photos of some of the most characteristic minerals containing the element accompany the discussion. Ideal for students and researchers working in inorganic chemistry, mineralogy and geology, this book provides the foundational knowledge needed for successful study and work in this exciting area. Describes the link between geology, minerals and chemistry to show how chemistry relies on elements from nature Emphasizes the connection between geology, mineralogy and daily life, showing how minerals contribute to the things we use and in our modern economy Contains abundant color photos of each mineral that bring the periodic table to life

Presents the basic concepts of chemistry and explains complex theories before offering a separate article on each of the building blocks that make up the universe.

In the mid-nineteenth century, chemists came to the conclusion that elements should be organized by their atomic weights. However, the atomic weights of various elements were calculated erroneously, and chemists also observed some anomalies in the properties of other elements. Over time, it became clear that the periodic table as currently comprised contained gaps, missing elements that had

yet to be discovered. A rush to discover these missing pieces followed, and a seemingly endless amount of elemental discoveries were proclaimed and brought into laboratories. It wasn't until the discovery of the atomic number in 1913 that chemists were able to begin making sense of what did and what did not belong on the periodic table, but even then, the discovery of radioactivity convoluted the definition of an element further. Throughout its formation, the periodic table has seen false entries, good-faith errors, retractions, and dead ends; in fact, there have been more elemental discoveries" that have proven false than there are current elements on the table. *The Lost Elements: The Shadow Side of Discovery* collects the most notable of these instances, stretching from the nineteenth century to the present. The book tells the story of how scientists have come to understand elements, by discussing the failed theories and false discoveries that shaped the path of scientific progress. Chapters range from early chemists' stubborn refusal to disregard alchemy as legitimate practice, to the effects of the atomic number on discovery, to the switch in influence from chemists to physicists, as elements began to be artificially created in the twentieth century. Along the way, Fontani, Costa, and Orna introduce us to the key figures in the development of the periodic table as we know it. And we learn, in the end, that this development was shaped by errors

and gaffs as much as by correct assumptions and scientific conclusions." In this captivating classroom supplement, students examine atoms, the building blocks of nature! Topics covered include matter, atomic structure, electrons, Mendeleev, the periodic table, elements, compounds, solutions, mixtures, and more! Information is presented in fascinating passages and reinforced with a variety of activities. A complete answer key is also included. Mark Twain Media Publishing Company specializes in providing captivating, supplemental books and decorative resources to complement middle- and upper-grade classrooms. Designed by leading educators, the product line covers a range of subjects including mathematics, sciences, language arts, social studies, history, government, fine arts, and character. Mark Twain Media also provides innovative classroom solutions for bulletin boards and interactive whiteboards. Since 1977, Mark Twain Media has remained a reliable source for a wide variety of engaging classroom resources.

- New York Times bestseller • The 100 most substantive solutions to reverse global warming, based on meticulous research by leading scientists and policymakers around the world "At this point in time, the Drawdown book is exactly what is needed; a credible, conservative solution-by-solution narrative that we can do it. Reading it is an effective inoculation against the widespread

perception of doom that humanity cannot and will not solve the climate crisis. Reported by-effects include increased determination and a sense of grounded hope.” —Per Espen Stoknes, Author, *What We Think About When We Try Not To Think About Global Warming* “There’s been no real way for ordinary people to get an understanding of what they can do and what impact it can have. There remains no single, comprehensive, reliable compendium of carbon-reduction solutions across sectors. At least until now. . . . The public is hungry for this kind of practical wisdom.” —David Roberts, *Vox* “This is the ideal environmental sciences textbook—only it is too interesting and inspiring to be called a textbook.” —Peter Kareiva, Director of the Institute of the Environment and Sustainability, UCLA In the face of widespread fear and apathy, an international coalition of researchers, professionals, and scientists have come together to offer a set of realistic and bold solutions to climate change. One hundred techniques and practices are described here—some are well known; some you may have never heard of. They range from clean energy to educating girls in lower-income countries to land use practices that pull carbon out of the air. The solutions exist, are economically viable, and communities throughout the world are currently enacting them with skill and determination. If deployed collectively on a global scale over the next thirty years, they represent a credible path forward, not just to

