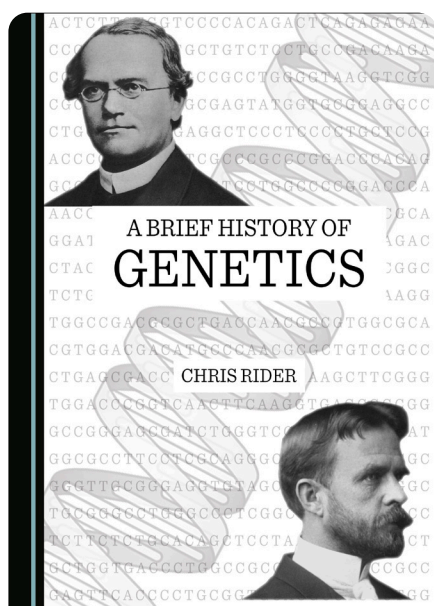


Reviews published in *School Science Review* are the opinions of individual reviewers, and are not an official Association for Science Education (ASE) view or endorsement of the resource. Reviewers are selected to write reviews on the basis of their experience and interests. They are expected to draw attention to perceived weaknesses or limitations of a resource as well as its strengths. The reviews are written from the standpoint of someone seeing the materials for the first time and considering how they themselves would use them, or think colleagues would be likely to use them.

- 38 **A Brief History of Genetics** *Chris Rider*
- 39 **Up, Up and Away: The Flight of Butterflies & Other Insects** *John Brackenbury*
- 39 **Lessons in Chemistry** *Bonnie Garmus*
- 40 **The Atom: A Visual Tour** *Jack Challoner*
- 40 **Your Adventures at CERN: Play the Hero Among Particles and a Particular Dinosaur!**
Letizia Diamante



A Brief History of Genetics

Chris Rider

Newcastle upon Tyne: Cambridge Scholars Publishing, 2022

225 pp. £35.99

ISBN 978 1 527 58951 3

At a time when progress in our understanding of genetics is both rapid and of huge significance in a multitude of ways this book is a worthy addition to the library of material aimed at lay readers interested in updating and extending their knowledge of the subject or students wishing to put what they are learning in class into its historical context. In providing a chronological account of the

development of genetics, starting from examples of animal breeding in history, through Mendel and his experiments, to the structure of DNA, our knowledge of replication, transcription and translation and on to genetic engineering, gene editing (and an introduction to CRISPR) and cancer immunotherapy, the author has told a very readable and accessible story in an engaging manner.

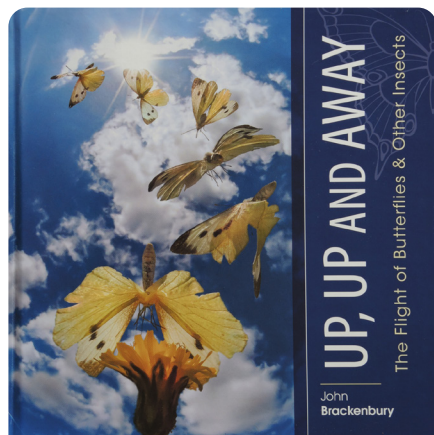
Aided by simple but effective diagrams, the science is explained clearly and concisely and is supported by a comprehensive glossary and carefully chosen accounts of some of the key experiments in the field. A summary at the end of each chapter also assists the reader in keeping abreast of the timeline and the key scientific principles. As well as the famous names, there are many references to the part played by a number of significant lesser-known scientists, many of whom have been recognised with Nobel prizes or have played key roles in supporting developments without a lot of recognition beyond the scientific community.

The chapters on ‘*Genes and diseases*’ and ‘*The uses of genetics*’ (both covering 1980s to 2020,

the date of original publication) are timely and give a real sense of the speed at which the science is progressing. Using a range of examples, the consequences of our new-found understanding are brought to life and the inevitable ethical dilemmas are identified and left for the reader to explore further if interested.

It is difficult to pinpoint the place a book such as this could play in a school environment. It is somewhere between a popular science book and a textbook. A science teacher with a background in physics or chemistry might find it useful to read to update their knowledge, an interested student might use it as a starting point for identifying further reading on aspects of what is presented in the book (there are suggestions for further reading in an appendix), or an A-level biology teacher might find some new names and some new examples to enhance their teaching. The downside is that it is an expensive publication and, unfortunately, I cannot see any reference to it being available as an e-book (at a lower cost!) on the publisher’s website.

Janet Mitchell



Up, Up and Away: The Flight of Butterflies & Other Insects

John Brackenbury
 Bath: Brown Dog Books, 2022
 152 pp. £25.00
 ISBN 978 1 83952 480 6

This is a collection of insect pictures, the likes of which you have probably never seen before. The images are the result of a long-term commitment by photographer John Brackenbury to the development and execution of techniques to record butterflies and other insects, both in flight and during take-off. The results are awe-inspiring, and the composite images especially so.

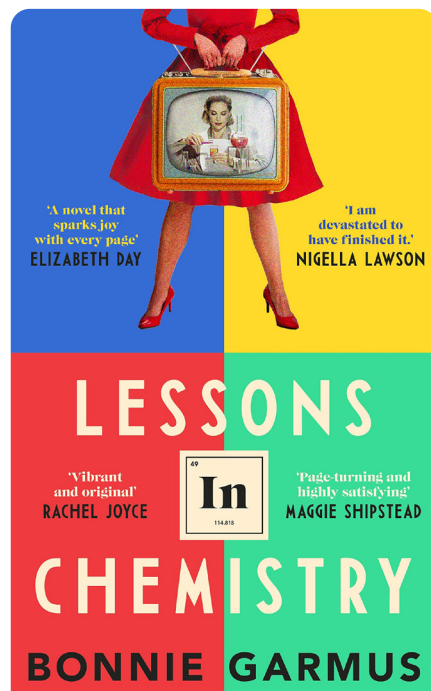
The accompanying captions are short but informative and are complemented by two chapters providing background information covering both flight and photography. Brackenbury's writing style is in turn factual and poetic. Referring to the familiar clap of a pigeon's wings, he suggests that the same might also be heard for a passing butterfly: *'I suspect that if our ears were sensitive enough we would hear a round of soft 'applause' each time a butterfly fluttered past.'*

The two chapters are easy reads but the pictures that sandwich the text are the book's strength. Gallery I is a collection of earlier images in the usual clinical style, with airborne insects pictured against plain backgrounds. Gallery II sets the creatures' motion in the context of their habitats using compositions that Brackenbury describes as *'insect panoramas'*.

The resulting photographs, which have almost endless depth-of-field, are packed with behavioural and environmental information. At the zenith of such pictures sit the composite images showing multiple stages of insect flight for butterflies, ladybirds and even mating dragonflies.

Condensing a sequence into a single picture begs the question, is it possible to view the motion in its original form, recorded as a short, high-speed film? The answer is yes but to find the best clips you will need to use *Facebook* rather than *YouTube*: links to both are provided on Brackenbury's website, john-brackenbury-photography.com. But even without the videos, *Up Up and Away: The Flight of Butterflies & Other Insects* is a stunning book that deserves to be in every school library.

Jon Tarrant



Lessons in Chemistry

Bonnie Garmus
 Doubleday, 2022
 400 pp. £6.50
 ISBN 978 0 8575 2812 4

Lessons in Chemistry is the novel that we, as a population, need but don't deserve. Bonnie Garmus crafts a wonderful, uplifting novel about

Elizabeth Zott, a promising chemist who uses her platform of a cooking show to subtly increase the science capital of the American population in the 60s.

Throughout *Lessons in Chemistry*, we follow the story of Elizabeth Zott, a talented chemist who is unfairly denied her chance to gain her doctorate due to the misogynistic practices within the STEM industry at the time. Despite Zott's trials and tribulations, she is offered her own cooking show entitled 'Supper at Six', which she uses to push her agenda: providing through cooking analogies a scaffolded, uncompromised science education to an entire demographic that was denied entry into the STEM industry.

Because when women understand chemistry, they begin to understand how things work ... when women understand these basic concepts, they can begin to see the false limits that have been created for them.

Though the story is set in the 60s, its themes remain relevant today. The STEM industry remains inaccessible to vast swatches of the population. The glass ceiling, whether it be due to race, gender or background, denies promising academics a chance to shine. This creates a downwards trend in which these overlooked demographics believe they don't belong within STEM and the education they deserve is so often cruelly denied. Except a good STEM education isn't about learning how molecules react or how bacteria reproduce; it is about improving a person's scientific literacy. To improve a person's scientific literacy develops their critical thinking, which in turn allows them to understand and question the world around them and eventually, take action.

The desire to improve the scientific literacy of an entire

overlooked demographic forms Elizabeth Zott's journey through the book, using her platform to educate the masses without compromise. Throughout the novel, Elizabeth is pressured by sponsors to 'dumb down' the science in her show to make it more marketable and palatable to the masses, but she remains steadfast that science should not be made more palatable. Denying someone the full science education experience is to deny them their scientific literacy. The parallels between the sponsors' demands for 'Supper at Six' and the multitude of STEM toys clogging up our toy shelves in supermarkets and toy shops are highlighted by Elizabeth's struggle to not make science marketable. To make science marketable is to remove the detail within science. Science education should be uncompromised. A toned-down science education does not teach someone critical-thinking skills; it teaches them that you don't need to work hard since everything is already laid out for you.

If you are an educator, the themes of 'stretching and challenging' your students so they can question the world around them can improve your teaching pedagogy. For students, it carries the themes of challenging yourself and experiencing the joy of learning.

Lessons in Chemistry is a book that should be part of the curriculum. The importance of a good science education is a lesson that we, as a population that is slowly becoming 'anti-science', need to hear.

Francis Jones

The Atom: A Visual Tour

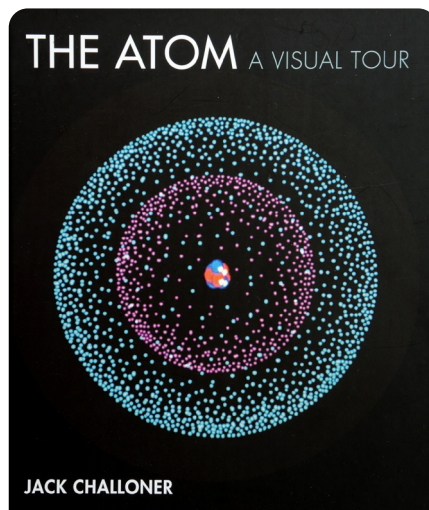
Jack Challoner

Cambridge, MA: MIT Press, 2018

192 pp. £27.99

ISBN 978 0 262 03736 5

This book has been around for a few years now but it still stands as



a tour de force in its coverage and accessibility. The subtitle, *A Visual Tour*, suggests a book where content is subservient to presentation but nothing could be further from the truth. Jack Challoner's book is perfect for serious readers who want to expand their knowledge of all things atomic, from the history of the atom as a single then composite particle, via microscopy and scanner technologies to the fundamental building blocks of the Standard Model. As such, this book is ideal for both students on advanced study courses and teachers in search of background information to bolster their knowledge.

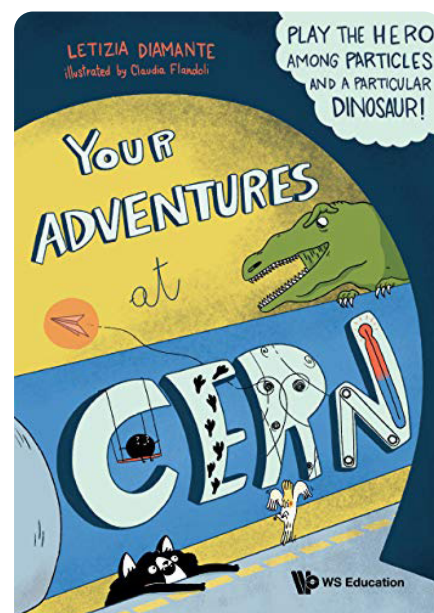
The clarity of Challoner's explanations is outstanding and even the toughest sections are likely to be understood after checking the relevant paragraphs a second time. It also helps that the content has been divided into bite-sized chunks, with many sub-topics occupying their own double-page spread. Importantly, the chunks are cross-linked and Challoner does an excellent job when, for example, transitioning from Aristotle's continuous and infinitely divisible matter to von Guericke's (Magdeburg) spheres. Later in the book, Schrödinger's wave equation is nicely explained and paves the way for the tunnelling that makes alpha decay possible. On the chemistry front, discussion of the periodic table leads neatly to

an exploration of different types of bonding and the geometry of hybrid orbitals.

With such a vast range of content, it is inevitable that there are some summaries and omissions but this does not matter when painting the bigger picture. More importantly, and bucking the trend for many similar books, Challoner has not given his tour a comfortable ending: 'What is the world really made of?' he asks. 'The answer, it seems, is fields ... It may be hard to accept this picture of reality, comprising simply these ethereal fields existing everywhere when ... no one knows what a field might be made of.'

To its credit, as well as being highly informative, *The Atom: A Visual Tour* is also commendably thought provoking.

Jon Tarrant



Your Adventures at CERN: Play the Hero Among Particles and a Particular Dinosaur!

Letizia Diamante

London: World Scientific Publishing (UK), 2021

180 pp. £12.90

ISBN 978 9 81123558 0

Although aimed at younger readers, I would recommend this handsomely illustrated book to anyone of any age who has even a passing interest in science. Its

engaging format is what sets it apart. Like a video game in book form, the various puzzles make it even more interactive. Depending on the decisions you make, you are sent back and forth to different pages so you have no idea how much of the book you have read or how much is left. This might make it a hit with reluctant readers.

First of all, you have to decide whether you want to visit CERN as researcher, student or tourist. Like re-playing a video game, the book invites itself to be re-read because different decisions will send you on alternative trajectories through

the book. I found myself gleefully wondering if I might get stuck in a loop from which I couldn't escape; spoiler alert, you won't.

You are accompanied by Shrody the cat and Cheepy the cockatiel, which were cleverly chosen as devices to explain science beyond particle physics. The adventure format may sugar the pill for those more interested in reading fiction than learning about science. Young family members describe it as '*fun and exciting*' but it is sure to entertain no matter what your age and it is a refreshing and imaginative way to learn

new science or acquaint you with knowledge you might have forgotten.

Its target audience is perhaps somewhere between years 4 and 9 (ages 8–14). It will provide the youngest readers with stretch and challenge as they will occasionally encounter unfamiliar vocabulary; though the words can largely be understood from the context, it would do readers no harm to look up their meaning. School librarians, in both primary and secondary, should ensure their school has a copy.

Mike Follows

Reviewers

Mike Follows teaches physics at King Edward's School, Birmingham.

Francis Jones is an experienced chemistry teacher and the founder of STEM@Home Ltd, which aims

to make science practicals fully accessible. He holds a masters degree in STEM education and is studying for his PhD in science education at King's College London.

Janet Mitchell is a recently retired chemistry teacher living in Surrey.

Jon Tarrant is a writer and photographer who has been coaxed out of early retirement to return to teaching A-level physics.