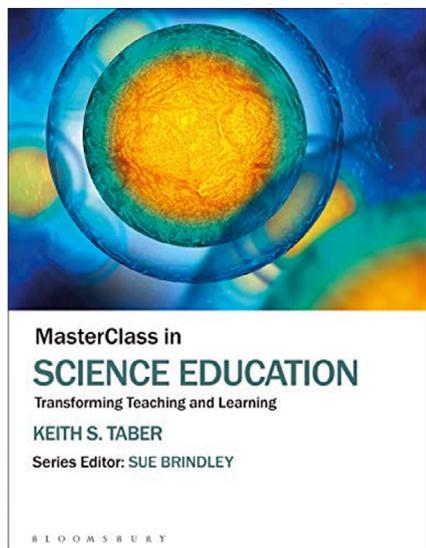


Reviews

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.

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Masterclass in Science Education: Transforming Teaching and Learning

Keith S. Taber

London: Bloomsbury Press, 2018

237 pp. £27.99

ISBN 978 1 4742 8941 2

If you are new to science teaching then this book provides some useful insights into some of the issues you might face. While time is of

the essence as an NQT, there are certainly some parts of this book that you could keep going back to for teaching ideas. Not every teacher has the time or inclination to delve into how children learn science, but even the briefest understanding of this subject can provide huge benefits to how teaching is approached.

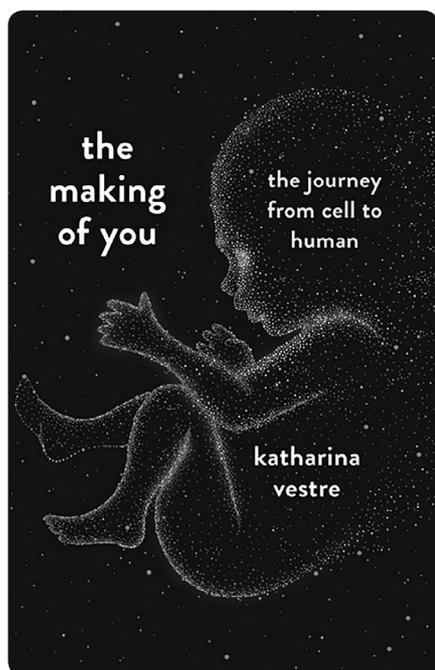
Masterclass in Science Education begins by critiquing the science curriculum. 'Why teach everyone science?' is a pertinent question as we are increasingly asked to explain the impact of the curriculum we are delivering in schools. As an NQT, this section would help you to understand the importance of science within schools and to realise the important role of science educators. Chapter 3 looks at the language of science, something that is taking an increasingly prominent place in science lessons, and oracy across the curriculum. A

particularly useful section in the first part of the book looks at a range of tools with which to present scientific ideas and knowledge. This would be the go-to section for when pupils have struggled with a concept when first taught and you want to approach it differently, or if you are struggling to think of how best to deliver something.

The final part of the book looks at issues teachers of science face, such as 'A challenge in biology: natural selection'. While this is not an exhaustive list of all the scenarios that we find ourselves facing, it certainly covers a handful of interesting ones. These provide thought-provoking material and are well worth a read.

This would be a good addition to the NQT bookshelf, as it provides support for teachers who want to develop their professional skills.

Kate Cree



The Making of You: The Journey from Cell to Human

Katharina Vestre

London: Profile Books, 2019

141 pp. £10.99

ISBN 978 1 78816183 1

eISBN 978 1 78283513 4

The Making of You is a fascinating delve into pregnancy, from the fertilisation of the egg right up until the first breath. It is a short book, written in simple but precise language. Almost every page contains some surprising and interesting fact. These include the historical, for example that Leeuwenhoek investigated his own sperm, and, of course, the biological, for example that a sperm does not blindly swim up the fallopian tubes but targets the egg by detecting the heat and chemicals it emits.

The book contains a plethora of scientific information and carefully explains difficult concepts, such as heredity or how sex is determined genetically and morphologically. Divided up by month of pregnancy, the incredible journey from unfertilised egg to baby is described, with line drawings at the start of each chapter to show the stage of development and size of the embryo or fetus. The simple

language belies the complexity of the material and allows the reader to grasp the amazing process of development and differentiation. The true value of this book to students, however, lies in the way it brings so many key aspects of biology together, showing the whole story and linking diverse topics such as microscopes, the nervous system, cell differentiation and genetics. This is something often missed by students, who think of biology as simply a series of topics to be learnt.

Suitable for school students and adults alike, I believe this book would be particularly useful to A-level students, as it consolidates many of the topics taught, including cell communication, Hox genes, genetic research and the nervous system and brain. It would also engage and inspire GCSE students or even younger students with an interest in biology. The brevity of the book and its simple language make it accessible to all and I believe it will encourage a love of biology in those who read it. Available as a hardback or ebook, it would also make a fascinating gift for any pregnant friends or colleagues!

Sarah Wood

The Dinosaurs Rediscovered: How a Scientific Revolution is Rewriting History

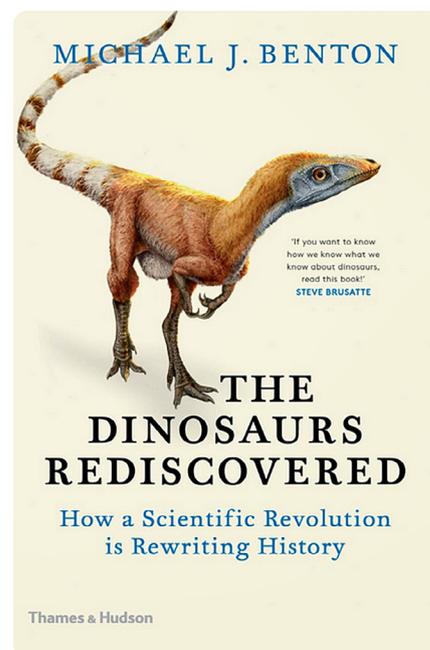
Michael J. Benton

London: Thames and Hudson, 2019

336 pp. £24.95

ISBN 978 0 500 05200 6

Advertised as a 'how we know what we know' rather than a 'what we know' about dinosaurs, this is an account of how palaeontology has progressed over the past few decades from speculation to 'informed fact'. For example, from analogous features shared by their living relatives, it has been possible to reason that the occurrence of certain pigment-containing structures in fossil bird feathers, only



visible under the most powerful microscopes, indicates particular colour forms in their owners: a neat explanation of how we can now be confident that some dinosaurs had ginger feathers and others black or brown ones! Equally, by building computer models of dinosaur skulls and incorporating stress testing of their known components, it has become possible to predict just how hard a *T. rex* could really bite. Such methods, the author maintains, have turned palaeontology from its old image of Victorian natural history collecting into a rigorous, hypothesis-based, testable science.

The origin of the dinosaurs themselves, whether by outcompeting other groups of reptiles to achieve dominance or by taking advantage of new opportunities offered by sudden environmental catastrophes, is discussed in some detail, with the author firmly of the opinion that opportunism was the model for success. Unfortunately, much of what follows this promising beginning is, essentially, the standard stuff of dinosaur books, with many personal anecdotes to bring in the human face of an otherwise rather familiar story. There are some interesting and speculative asides, continuing the

theme of recent ‘discoveries’, but many of the ‘new’ and ‘revolutionary’ methods discussed are really just recent applications of existing methods more traditionally used elsewhere (comparative techniques in biology, CT scanning, electron-microscopy, mass spectrometry, etc.), together with increasing reliance on ever-more complex statistics and ever-evolving computer software. In this regard, the book’s subtitle (*How a Scientific Revolution is Rewriting History*) does seem a little overstated.

While undoubtedly a useful contribution to the corpus of popular books on dinosaur biology, this is sometimes heavy going, both in text and illustrations. There is a strong autobiographical emphasis as the author presents and justifies his life’s work, and many of the diagrams are complex and rather difficult to follow. There are, however, other charming illustrations of some of the key players in the dinosaur story and, taken overall, the narrative is consistently interesting. For this reason this can be recommended for biologists as well as geologists with an interest in evolution.

Ian Lancaster

Is Medicine Still Good for Us? A Primer for the 21st Century

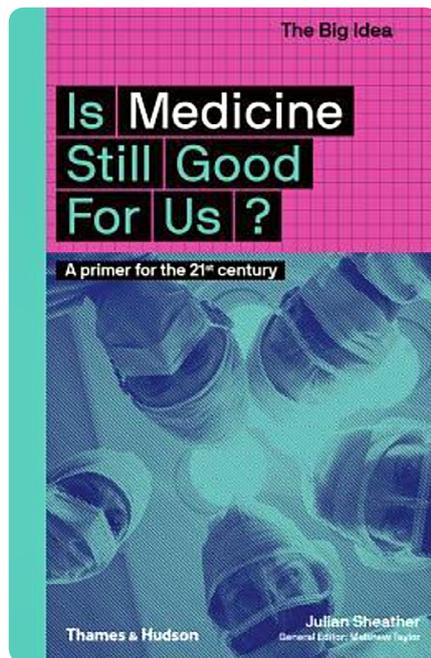
Julian Sheather

London: Thames and Hudson, 2019

144 pp. £12.95

ISBN 978 0 500 29458 1

Combining a speedy review of the history of medicine with a look at the challenges of providing medical care in the 21st century, this concise, thought-provoking overview is well worth a read. Drawing on relevant up-to-date examples, the author successfully provides the background to the current state of global medical care, the evolution of expectations of what medical services can provide and the unsustainability of the current structures in our modern, technologically driven



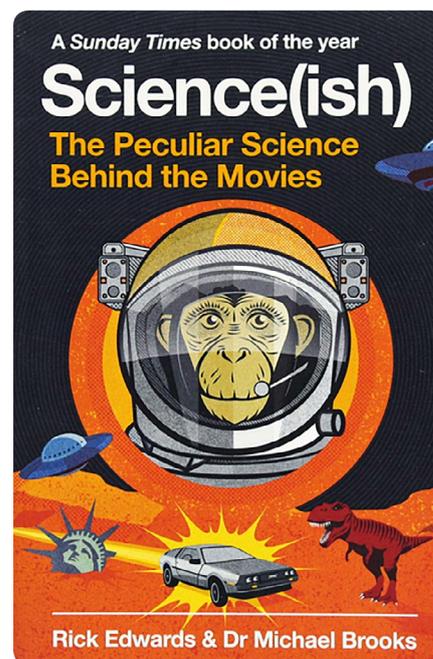
world. Bringing in elements of economics and asking pertinent ethical questions about the future of medicine, it is something of a sobering story, especially for those of us who take the NHS for granted.

This is part of a series entitled ‘The Big Idea’ and is presented in what the publishers call ‘quick-recognition text hierarchy’. This aims to provide different ways of engaging with the book, ranging from simply reading the key ideas (presented in large fonts) in half an hour to reading the whole text (more detail provided in increasingly smaller text) from cover to cover in two to three hours. It took me a while to get used to the appearance of each page (it did not sit comfortably with my eye), but once I got used to it and realised that it was actually presented linearly throughout, I thoroughly enjoyed it.

As scientists, nurturing students to both engage in the impact of science on today’s world and to pursue a career in science, this is a definitely a book to read. Whether it provides examples to bring into wider ‘how science works’ discussions or offers ideas for a wider general studies programme, it will be a worthwhile endeavour. It is also a very good text to

recommend to students who are considering a career in medicine. For those who are wedded to the idea, it will provide some stark realities of the profession they are aspiring to join, while for those who are not so sure, it might just crystallise their thoughts and encourage them to think again!

Janet Mitchell



Science(ish): The Peculiar Science Behind the Movies

Rick Edwards and Michael Brooks

London: Atlantic Books, 2017

272 pp. £7.05

ISBN 978 1 78649221 0

This is a popular science book. I was drawn to it because of my interest in how science is portrayed in movies and I recognised that one of the co-authors is the excellent Michael Brooks. My discovery that it is based on a podcast of the same name was a bonus. Concise and entertaining, the book devotes a chapter to each of 10 different science fiction films as a vehicle to explore and explain some of the associated science. (The films are an eclectic mix of the sci-fi genre: *The Martian*, *Jurassic Park*, *Interstellar*, *Planet of the Apes*, *Back to the Future*, *28 Days Later*, *The Matrix*, *Gattaca*, *Ex Machina* and *Alien*.) It might help if you have seen the films being

discussed, although each chapter includes a synopsis. It is written in an engaging style, covers huge swathes of scientific territory and is more than worth the cover price.

However, in terms of holding my interest, I found the book patchy; maybe this is inevitable. Although a physicist by training, I particularly enjoyed the material on consciousness and artificial intelligence (discussed in the *Ex Machina* chapter) and eugenics (in *Gattaca*). This is perhaps because I was learning something new; readers with other backgrounds will have different preferences. Although I tended to gloss over the physics, the explanation of space–time was first class. With *Google* to hand, perhaps the absence of a bibliography is not a serious oversight.

Each chapter starts with a humorous dialogue between the two writers but this will not be to everyone's taste and I found myself skipping these. Some may find the prose a little too informal at times (e.g. on page 15 men are described as 'dicks') and the attack on the late Michael Crichton a little unseemly; others will find this writing style engaging. These reservations notwithstanding, I would recommend this book to all teachers of science and as enrichment for interested students from secondary age upwards.

Mike Follows

Auroras: Fire in the Sky

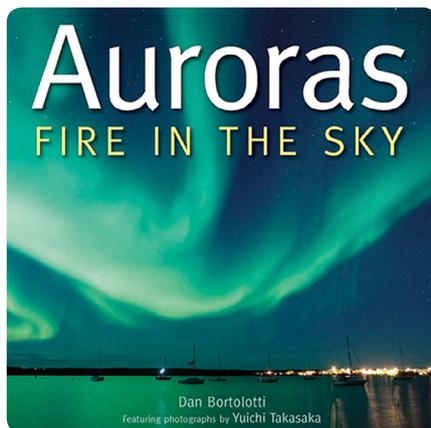
Dan Bortolotti with photographs by Yuichi Takasaka

Ontario: Firefly Books, 2018

143 pp. £14.95

ISBN 978 0 2281 0064 5

This book was first published in hardback in 2011. This soft-cover edition has the hallmark of a coffee-table book. However, it is much more than this. The 107 photographs, by Yuichi Takasaka, are outstanding. The photographs are accompanied by informative



commentaries and text by the author who lives in Aurora, Ontario, Canada. The commentaries and text address questions such as: 'Why are auroras usually seen only at high latitudes?', 'How do scientists study them?', 'What causes the different colours?' and 'Why are massive auroras often followed by blackouts and computer system crashes?' The folklore is not forgotten either.

This may appear to be a book for specialists but the book should appeal to a wide age range of those interested in the night sky. It may be worth putting a copy in the upper primary and secondary school libraries. This is a book for the enthusiast.

J. Keri Davies

Quantum Space: Loop Quantum Gravity and the Search for the Structure of Space, Time, and the Universe

Jim Baggott

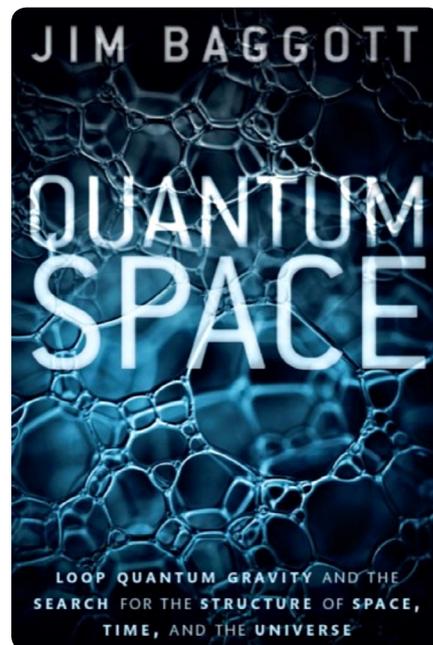
Oxford: Oxford University Press, 2018

421 pp. £20.00

ISBN 978 0 19 880911 1

Quantum gravity is not on any A-level physics specification, to my knowledge. However, the physics it tries to marry, quantum mechanics and general relativity, does get to sit at the table, so to speak, to degrees varying according to which A-level exam board is being followed.

Quantum gravity *could* be the theory allowing the behaviour of the universe at quantum scales against a backdrop of space and time to be



explained, while *also* enabling us to dispense with the separate theory of relativity where gravity is just the effect of masses moving in curved space–time – no backdrop required.

Such a theory might not quite amount to a 'theory of everything', but to get even close is a kind of theoretical physics holy grail. In the red corner is the crowd favourite, string theory; in the blue corner is the underdog, loop quantum gravity, or LQG.

Given that this book describes theoretical physics that is, in the main, not on the A-level physics specification, and mostly follows the work of LQG workers Carlo Rovelli and Lee Smolin rather than work on the much sexier string theory, it would be fair to say a book on LQG is setting out its stall in a remote corner of an already niche market.

Lowered expectations of the utility of the book for one's day-to-day teaching aside, it is worth noting that some of our students, especially those with a keen mathematical talent, may choose to work on such theoretical challenges at university. They may even already be asking you questions that show they already ski off the A-level physics specification piste. Eventually, the technology

could catch up, enabling empirical verification of the theories, as with LIGO and gravitational waves or the LHC and the Higgs boson (but don't hold your breath on detecting the graviton, as to shield the required hyper-massive detector from neutrino background noise it would need a shield light years thick!). It is a reminder that science is a human endeavour, and useful contributions can be added from all over the world, and from left field as well as the centre.

Honourable mention must be made of the often-intriguing titles chosen for some of the chapters: *'I used every available key ring in Verona'* (which refers to a 3-D model made by Rovelli to show how continuous space could be woven from a network of loops of gravitational force) and *'Our second or third guess solved the equations exactly'* (the latter title truly a false dawn as equations for the quantum states of the geometry of space–time turned out to have an infinite number of exact solutions).

Jim Baggott has deliberately kept this book pretty much a mathematics-free zone. Some prior physics knowledge would be very handy for readers, and I would have appreciated a few more diagrams. But if you have enjoyed/got through popular science books about such areas as strings and superstrings, time, and the God particle, here is a fine addition to the oeuvre.

Ian Francis

Biographic: Tesla

Brian Clegg

Lewes: Ammonite Press, 2018

96 pp. £9.99

ISBN 978 1 78145 353 7

Biographic: Einstein

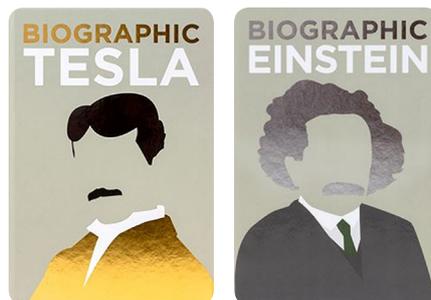
Brian Clegg

Lewes: Ammonite Press, 2018

96 pp. £9.99

ISBN 978 1 78145 333 9

We are certainly not short of biographies of these two giants



of physics, but the infographic approach adopted in these books offers a fresh slant to the genre. So there are word clouds, pie charts, timelines and family trees. We can imagine listening to the groovy tunes of 'Einstein and the Relativities' (featuring, among others, Brian Cox on synthesiser and Richard Feynman on bongos), as well as learning that the Tesla (motors) Gigafactory in Nevada is being built north/south, so that GPS automation can navigate within to best effect.

A new biography also gives us the chance to bring things up to date, for example by including the discovery of gravitational waves by LIGO, which simultaneously proved Einstein both right and wrong: he predicted their existence, but stated that they would also be impossible to ever detect. And we can learn a little about the car company named after the Croatian engineer/inventor who, although he would be displeased with the car's use of DC batteries, would be most gratified to find them using AC electric motors.

Each book splits into four main sections, *Life*, *World*, *Work* and *Legacy*, the scientist as person being the central figure, ahead of the science. *'Five things you didn't know about...'* gives teachers an extra opportunity to weave in those little anecdotes and trivia to (at least slightly) enliven and humanise possibly dry electromagnetic theory or the photoelectric effect.

I have to admit a sneaking regard for the gold and silver of the book covers, adding a little bling to our bookshelves. My guess is that a younger demographic

would like the shininess even more. However, the books have a few aspects that may not appeal to teachers: my pet bugbears are non-metric units being given prime billing, and a representation of the electromagnetic spectrum with powers of 10 helpfully listed for wavelengths but with the accompanying wiggly waveform shown being shortened by less than a factor of 10. There is also a certain pandering to the 'mad scientist' stereotype: Einstein's refusal to wear socks for example, and Tesla's odd behaviours (such as not enjoying food and drink unless he had calculated its cubical contents), which intensified following his brother's death. But given the subject material, I think it forgivable, and certainly death rays and conspiracy theories are far more interesting than dull conformity.

I would recommend copies being bought by your school library. There is no need for students to read a chapter at a time, and the presentation is accessible to a wide range of readers – to dip in and out wherever and whenever they like. Look out for the books with a shiny spine.

Ian Francis

The Astounding Science Puzzle Book

Matt Brown

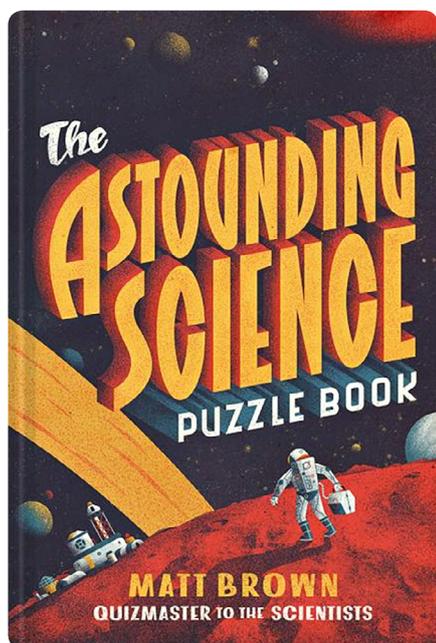
London: Batsford, 2018

192 pp. £9.99

ISBN 978 1 84994 501 1

'Name the only moon or planet in the solar system to have no consonants in its name?' If you know the answer to this, or just enjoy the challenge of figuring it out, then this book might go on your wish list. It would definitely be useful if you are stuck for a present for a colleague, or simply need a quick quiz to liven things up in a GCSE or A-level class.

The book contains 101 different puzzles, ranging from quizzes to crosswords, anagrams to logic



puzzles, and there is something for most people in here. However, do not buy this unless you have a 'good' scientific knowledge: these puzzles are designed to test and you will often end up with an 'Aaah' moment of discovery. It is a nice little bit of fun!

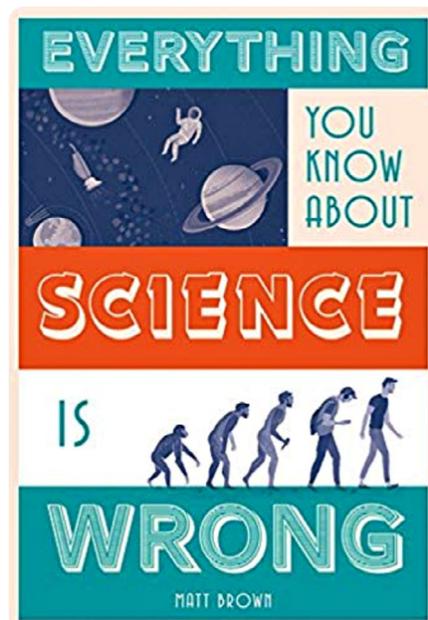
I have tried a few of these quizzes with my top set GCSE classes and they do enjoy them, but did they learn much from them? Maybe not. That said, if you set questions for quizzes then this could be a valuable resource book. There are a lot of very interesting questions and answers, with brief explanations behind the answers, but overall this is nothing more than a general interest book.

Should you buy this for your classroom? Probably not, as there are plenty of other fact books out there with a great deal more explanation. Should you buy this

for a friend? Possibly, it will amuse, encourage and probably baffle quite a few others out there. It will be a nice little distraction for the summer holidays but be prepared for it to eat away at your time!

The answer by the way is Io, a major moon of Jupiter.

Kate Cree



Everything You Know About Science is Wrong

Matt Brown

London: Batsford, 2017

175 pp. £9.99

ISBN 978 1 84994 402 1

This is one of five books in the author's 'Everything you know about ...' series and nicely covers the whole of science. The book sets out to debunk common myths about the facts that we have all been quoting since we were first taught them. It is an interesting read, written in a friendly chatty style (I finished it in an hour or so), but it

does not help with teaching in the classroom except to ensure that we are delivering the correct facts. This is a book that could be bought for a friend or relative who has an interest in science and likes to be entertained.

The book is divided into eight sections: what it means to be a scientist, space, physics, chemistry, biology, the Earth, the human body, famous scientists and pseudoscience. Within these, it gives two short pages to a key 'fact' that we all assume to be correct. The author discusses the statement and describes how it should be amended or corrected so that the science is correct. Examples include 'Nothing travels faster than light' and 'Glass is a liquid', which I have heard being taught in various classrooms by newly qualified teachers as well as seasoned experts. The author goes on to explain that of course light can be slowed by dense mediums, and glass is, and always has been, a solid. This is always done in a very conversational tone and takes an often quite light-hearted look at the science reinforcing this.

I enjoyed reading this book, and it does contain facts and quotes that I will use with my classes but it really is only a book I would dip into every now and again just to amuse. In his introduction the author states that 'mythbusting is not only fun, but important'; I would agree that the book is a bit of fun. It certainly won't change your classroom teaching. Buy it for a friend, but expect to get the facts quoted to you frequently.

Kate Cree

Reviewers

Kate Cree is a science teacher in the North West.

J. Keri Davies is an independent consultant in higher education.

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Ian Francis is a physics teacher and examiner.

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Sarah Wood teaches biology in north-west London.

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