

Mastery in primary science

Deborah Wilkinson with Wayne Stallard
London: Learning Matters (SAGE), 2019
152 pp. £21.99
ISBN 978 1 5264 7270 0

Explores how 'rich' learning tasks support the development of mastery-level knowledge and skills in primary science

I was initially somewhat concerned about this book, as the first sentence includes a reference to children having, '**mastered at greater depth** the primary science curriculum'. As most primary science subject leaders will know, there is no expectation to assess children as working at 'greater depth' in primary science in England.

In part 1, the authors outline some good practice in teaching primary science, linking planning and assessment and introducing strategies to promote pupil independence and good questioning. The theory and research behind the concept of mastery are outlined; the authors opine that, '*some children... should have the opportunity to achieve **mastery at a greater depth***'. The authors do make it clear that this is not a requirement according to the current National Curriculum in England. The authors' argument is based on the current UK *Teachers' standards* (DfE, 2011), which, they argue, cannot be fully met if teachers are not considering 'mastery at a greater depth' in science. Although I have reservations about the use of the term 'greater depth', the evidence presented in this chapter is relevant and compelling. I found the brief history of assessment covered in this chapter fascinating: I had not previously been aware of some of the recommendations and changes made during the 1980s and 1990s and

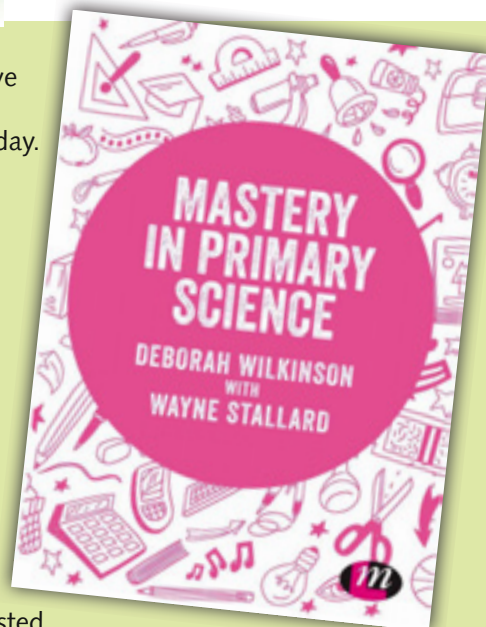
how these may have impacted on the system we have today.

Part 2 includes guidance on good practice in early-years settings and then contains activities that could be used for every topic throughout primary school. For each topic, the conceptual knowledge learning objectives are outlined, activities are suggested, vocabulary and misconceptions are identified and then an assessment task is described. Assessment tasks include an image and often a link for more detail. The tasks are described as being used to evidence 'secure mastery' of concepts. Bloom's Taxonomy is referenced and there is then a suggestion of what evidence of mastery at greater depth might look like. The suggested activities are excellent and the reference to Bloom's Taxonomy allows teachers to provide opportunities to challenge more-able learners.

The book does not identify how teachers might assess mastery of 'working scientifically' skills, but does reference the fantastic TAPS resources (pstt.org.uk). Other than my reservations at the use of the term 'greater depth', this is an excellent book to support teachers in assessing conceptual understanding.

Helen Spring

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TTS STEM cards

STEM activity cards KS1/2

STEM activity cards KS2

STEM challenge cards KS2

Caroline Alliston

Nottingham: TTS, 2019

Each pack 10 cards, £12.99

Inviting packs of STEM activities and challenges for key stages 1 and 2

My STEM club pupils couldn't wait to get into these!

These sets of STEM activity and challenge cards each contain 10 A4 laminated project cards, helpfully colour coded by key stage. Each card has a comprehensive list of equipment needed to complete



the activity or challenge, including helpful illustrations, and the back of each card has a clear explanation of the underlying scientific and engineering knowledge and understanding. The cards are of such good quality that I felt comfortable leaving them out on the table during investigations (even the messy ones!) so that

pupils could refer back if they needed to.

The packs contain a great variety of activities, some already familiar to dedicated STEM club attendees, but some new and novel ideas, with a range of challenge from density towers to fuse-bead clocks and cork gymnasts. I was very pleasantly

surprised by how well the activities worked and I was delighted to find that most of the resources I needed could be easily found around school, or purchased at a low cost.

The accompanying teacher notes provide a helpful reminder of resources to collect prior to the activities, making it easy to request



items from home in advance. Although the majority of projects require tools often readily available in school, any additional tools come with the TTS part number for easy ordering to make the process even simpler. Teachers will also appreciate the notes on health and safety on each card, encouraging consideration of hazards and risks, and additional information such as suggested number of additional adults and estimated time for the project.

The pack comes tried and tested by my pupils and feedback was overwhelmingly positive, although in our case the egg parachute and the ooglies were clear favourites from the key stage 1 activities. Miraculously no eggs were cracked during our investigation!

For a teacher who runs a weekly STEM club and sometimes struggles to come up with ideas for activities, these cards are a godsend. Another winner by Caroline Alliston!

Elaine Stockdale

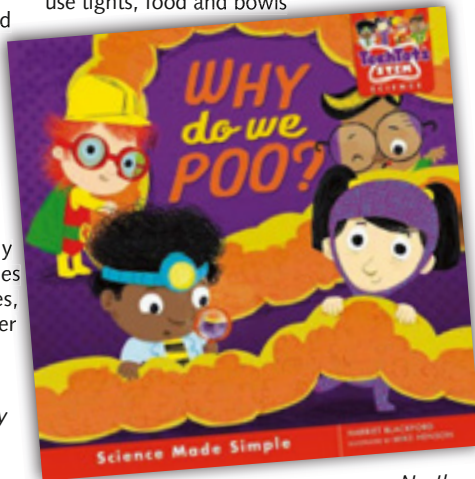
Science Lead, Tongwynlais Primary School

Tech Tots STEM science: Why do we poo?

Harriet Blackford, illustrations by Mike Henson
24 pp. £9.99
Boxer Books, 2019
ISBN 978 1 912757 03 9

Fun and engaging book to explore the process of digesting food for ages 4-8

Why do we poo? is a fantastic engaging and colourful book that explores the step-by-step process of digesting food. It looks at how the 'Tech Tots' characters start to explore why they poo while they are sitting on the beach eating their lunch. To do this, the Tech Tots create an investigation in which they use tights, food and bowls



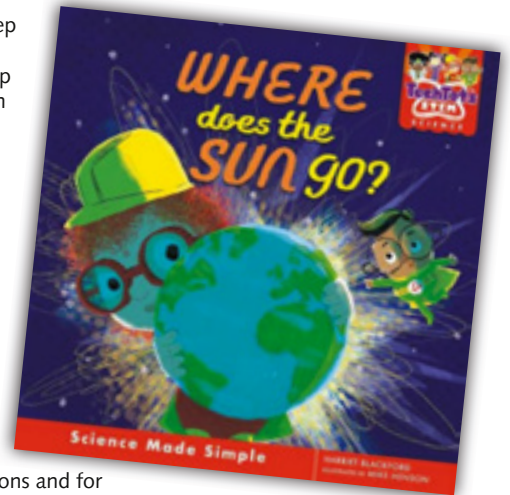
to explore the process step by step. Within the story they begin by mashing up food and placing it within the tights to illustrate the role of intestines and how the body absorbs nutrients.

One of the greatest positives of this story is the consistent use of scientific terms, used in a way that would not disengage children from the story. Using these terms with younger children would provide great opportunities for discussions and for encouraging them to start using the correct terms at a young age.

As a newly qualified teacher reviewing this book, I could see a wide range of opportunities for using the story within a class, from in-depth class discussions, recreating the investigation or using the story as a hook to exploring digestion in more depth. The illustrations are colourful and engaging and support the story well. The story is well judged for the target age phase, with the humour an effective way of hooking children into the story. This is certainly a book that I will be adding to my classroom collection!

Lisa Fox

Primary school teacher and current MA in Education student at Northumbria University



when it spins?' and 'How do we not feel ourselves spinning?'

In order for children to investigate these questions for themselves, the book presents a wonderful idea of how children could carry out a practical investigation. This encourages children's enquiry skills and promotes experiential learning, something which I think is integral for younger children as it engages them more within an activity.

My only negative comment would be that some aspects of the book lack sufficient information; for instance, towards the end of the story, when one of the Tech Tots is still confused about how we are not able to feel the Earth move as it revolves around the Sun. Although an example is given to address this question, it is not covered in much detail and younger children may still not understand this concept. In order to avoid this, I think it would have been a good idea for the author to include another practical example of how children could investigate this further.

This is a fun, simple story that introduces younger children to STEM subjects and brings a fascinating subject to life. With bold, colourful, eye-catching illustrations, I think younger children would thoroughly enjoy this book.

Nicole Sweeney

Primary Education BA (Hons) degree student, Northumbria University

Tech Tots STEM science: Where does the Sun go?

Harriet Blackford, illustrations by Mike Henson
26 pp. £9.99
Boxer Books, 2019
ISBN 978 1 912757 01 5

Brings a fascinating subject to life as it explains how the Earth revolves around the Sun and explores day and night; suitable for ages 3-5

In this story, the 'Tech Tots', Mia, Seb, Isla and Oscar, explore the concept of day and night to address the question of, 'Where does the Sun go?' The book covers different misconceptions that children may have when exploring this topic, when they ask questions such as 'Why don't we fall off the Earth

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