(a) I focused upon a heavy string suspended vertically to raise questions about the tension in a string and why the string needs to be weightless, or massless as Gerry would say, because this is easily put before a class in the manner described in the article. Gerry's robust argument concerning a string being used to pull a particle horizontally may well be worth adding to the mix, but may be less easily appreciated by our students.

(b) Gerry says that he would find the correct statement of Newton's second law unhelpful. I would beg to differ upon this point. I have always found this treatment helpful to students in being able to appreciate the reach of Newton's Laws into the real world and being able to understand why, at A level, we work with particles of constant mass. And of course it provides an application of their calculus in the differentiation of mv as a product. The two examples provided in the article are just that, examples taken from the real world to emphasize the applicability of this wonderful subject. There is no intention that they should be worked through mathematically. The focus is then entirely upon the traditional $F = ma$.

(c) There is indeed much fun to be had in discussing pulleys but I have not included them, pulleys, in the next articles. I hope that Gerry will forgive me this omission!

Yours sincerely,

Tom Roper

Dear Editors

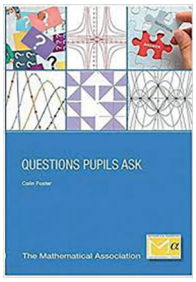
In the November 2018 issue, Paul Stephenson invited readers to extend his list of applications of the difference of two squares. My response concerns Pythagorean Triples. There is a formula for these which is related to what I give below, but if you don't want to use it then:

In a right-angled triangle $x^2 + y^2 = z^2$, so $x^2 = z^2 - y^2 = (z + y)(z - y)$. To get a set of values of x, y, z which are a Pythagorean triple choose a value of x whose square has two other factors of the same parity. For example, $x = 4$, $x^2 = 16 = 8 \times 2$. If $z + y = 8$ and $z - y = 2$ then $z = 5$ and $y = 3$, giving 3, 4, 5; or take $x = 12$, $x^2 = 144 = 18 \times 8$. If $z + y = 18$ and $z - y = 8$ then $z = 13$ and $y = 5$, giving 5, 12, 13.

Yours sincerely,

Wil Ransome

Questions Pupils Ask
Colin Foster
The Mathematical Association,
259 London Road, Leicester LE2 3BE
www.m-a-org.uk
ISBN: 978-0-906588-91-8
£15.95



Questions Pupils Ask is another fine publication from The Mathematical Association that prompts teachers to think about their own classroom experiences. The book is clearly divided into three parts. Part 1: itself entitled Questions Pupils Ask; Part 2: Reflections on Topics, and Part 3: Problems, Puzzles and Tasks.

In Part 1 Colin Foster introduces discussion on such questions as 'Why isn't 1 a prime number' and 'Is i irrational?' The approach taken is many-fold. Foster considers what the student could be thinking when the questions are asked, how the teacher may tackle the questions in order to ensure that the opportunity to develop the student's mathematical knowledge is taken, and what other questions arise from the original question.

Part 2 deviates from the idea of questions that pupils ask directly. The author takes eleven different topics, all of which secondary students meet in their school career, and considers their impact as rich sources of mathematical engagement. With careful consideration, a teacher could take any one of these topics and devise a lesson or a series of lessons that would provide a stimulating learning experience for their classes. An example is the discussion of how students may find the area of triangles and quadrilaterals, the focus turns to how learners may prove the formula of a trapezium and relate this to other formulae that they know. Regardless of the experience of the reader there is plenty of material to prompt thought and discussion of classroom practice.

Part 3 concentrates on problems and puzzles. Though this chapter can be read relatively easily it is much more enjoyable to have pen and paper to hand and to work through the questions asked. The range of secondary school mathematics that is covered in this part of the book is wonderful and covers material such as partitions of numbers, combinations, geometric sequences, coordinate geometry, inequalities, sample sizes, and much more. The ease with which each topic is presented enables the reader to consider the use of the problems in their own teaching or as a prompt to develop further such problems.

As a complete book the material contained in *Questions Pupils Ask* is very relevant to today's teachers and students alike. It could be read as a whole from cover to cover or can be dipped in to at quiet times and when sources of inspiration are required. As with so many of the publications produced by The Mathematical Association this book makes an excellent addition to a mathematics department's bookshelf.

Darren Brumby

Is That a Big Number?
Andrew C. A. Elliott
Oxford University Press
www.oup.com
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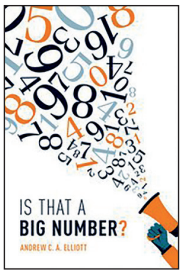
£18.99



As "The Hitchhiker's Guide to the Galaxy" puts it, "Space … is big. Really big. You just won't believe how vastly hugely mind-bogglingly big it is. I mean you may think it's a long way down the road to the chemist, but that's just peanuts to space." Andrew Elliott, in this energetic exploration of counting and measuring, aims to help the reader develop "number sense", to "comprehend numbers in an intuitive way". Brimming over with facts, the chapters in the first half of the book explore not only space but also a multitude of other arenas. Each section probes a different aspect of number: length in sport, buildings, rivers; time in the context of geology, human prehistory, ancient history; area and volume through landmass as well as "sipping and shipping"; velocity, from the top speed of a horse to the Earth's rotation around the Sun.

To enable readers to develop their sense of number, Elliott provides five tools.

- Landmark numbers provide "memorable numbers … as yardsticks"
- Visualization uses pictures to provide contexts for comparison
- Divide and conquer breaks big numbers down into manageable components
- Rates and ratios "will reduce big-numbers to … numbers within your comfort zone"
- Log scales are introduced to handle numbers of widely different scales.

These techniques are applied throughout the book to illustrate to the reader their