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May 2003

Regulars

Pluschat



This issue's *Pluschat* topics

- Optional maths – should students be able to give up maths at age 14?
 - Outer space – In what will now be a regular feature, mathematician and cosmologist John D. Barrow shares some maths that's amused and intrigued him.
 - Readers' corner – More Strange activities for last issue's Ship of Fools!
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Optional maths?



Is this all a student needs?

Just how important do you think maths is? And is it important for everyone?

Last month, the leader of the NASUWT (one of the teachers' unions) – himself a maths teacher – said that students should be allowed to drop GCSE maths entirely if they wanted to. Terry Bladen claimed that making maths non-compulsory after age 14 would "help schools to some extent to overcome the problem of recruiting specialist maths teachers", and "allow more time in the curriculum for other subjects".

It is easy to sympathise with this suggestion. After all, many 14 year olds have long ago stopped understanding maths, and no longer have any idea what is going on in their lessons. If you haven't mastered fractions and percentages, what is the point of sitting in bafflement through Euclidean geometry and quadratic equations? Wouldn't your time be better spent on understanding the basics?

Perhaps this is what Mr. Bladen meant when he said that "pupils should be numerate, with numeracy taught throughout all the key stages, but numeracy can be divorced from mathematics. How often do the majority of people need or use mathematical concepts once they have left school?" But are things really so simple? As this issue's [career interview](#) with a primary maths teacher shows, even very young children must engage with genuine mathematics – not only exploring shape, space and number, but also questioning results, creating logical arguments and exploring consequences. This is not a mere matter of "numeracy". If we say that numeracy is all that people need in their everyday lives, it is a very short step to arguing that, since calculators can do everything numerate that a human can do, we never need learn any maths at all.

Plus's straw poll of friends and colleagues – most of them mathematicians – revealed an unexpected level of sympathy with the suggestion that students should be allowed to study only "numeracy" after age 14 if this is what they want. But perhaps these mathematicians do not realise that when other people talk about numeracy, they almost certainly don't include the reasoning skills that can be acquired by studying maths, and that any mathematician would think central to a decent education. This devaluing of what mathematics can offer the world will also cause great damage to the public awareness of the importance of maths. As one mathematician said: "What is numeracy if it isn't maths? I am all for not making people learn things they won't use, and instead helping them to be numerate, but it is still maths they are learning and if people don't call it that then they might not realise that is what they are using every day."

But all of these objections are theoretical. There is a far more important practical reason for rejecting this proposal. Who is most likely to end up dropping maths at 14 if that becomes an option, thereby restricting their choices of future study and career, and decreasing the amount they can expect to earn in the future?

Here's a prediction. Not many of them will be middle-class with pushy parents.

Outer space – A sense of balance



Surely a mathematician can help

Whatever you do in life there will be times when you feel you are walking a tightrope between success and failure, trying to balance one thing against another, or avoid one activity gobbling up every free moment of your time. But what about the people who really are walking a tightrope? The other day I was watching some old newsreel film of a now-familiar sight: a crazy tightrope walker making a death-defying walk high above a ravine and a rushing river. One slip and you are just another confirmation of Newton's law of freefall under gravity.

We have all tried to balance on steps or planks of wood at times, and we know from experience that there are some things that help to keep you balanced and upright: don't lean away from the centre, stand up straight, keep your centre of gravity low. All the things they teach you in circus school. But those tightrope walkers always seem to carry very long poles in their hands, which sometimes even flop down at the ends because of their weight.

Why do you think tightrope walkers do that?

I asked a lot of people. Everyone had a quick answer but none of them gave the right one. Surely a mathematician can help. What do *you* think?

Readers' corner



The puzzle in issue 24 of *Plus* turned out to be very popular, with plenty of readers sending us solutions – many of which were even right! Roland Vyncke, from Belgium, went one step further, and sent us a couple of auxiliary questions as well:

1. Is it possible that, if the rock is heavy enough and the lake not so deep, the Strange couple run aground in the middle of the lake after throwing the rock overboard?
2. What happens if the rock is attached to a cable (an anchor!) before being thrown overboard and afterwards it doesn't reach the bottom of the lake (it keeps hanging halfway down because the cable is too short)?

If you want to send us your answers to these questions, or say something about any topic that might be of interest to *Plus* readers, e-mail plus@maths.cam.ac.uk. Let us know if you are happy for your email and our response to be published in *Plus*. (We may edit emails before publication.)



Plus is part of the family of activities in the Millennium Mathematics Project, which also includes the NRICH and MOTIVATE sites.