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Making mathematics music to their ears

ALEXANDRA FREAN, EDUCATION EDITOR

- **Professor calls for inspiring teaching**
- **Teenagers 'often get bored'**

Schools are putting children off maths by making them do too many sums and failing to teach the relevance to everyday life, says a leading academic.

Marcus du Sautoy, Professor of Mathematics at the University of Oxford, said that while the introduction of the numeracy strategy had enthused a generation of younger children about maths, too often this momentum was lost between the ages of 11 to 14.

"Pupils often get very bored with the first stage of secondary school maths. There is too much emphasis on numbers and sums. People think maths should be all about arithmetic, but that is wrong.

"We don't excite children with maths at this age. There is almost a fear that we shouldn't expose them to too much 'big maths' because they wouldn't be able to take it," he said.

Professor du Sautoy, who often plays a trumpet during lectures to illustrate the similarities between harmonics and the sine waves used to predict prime numbers, suggested that maths teaching should be similar to music teaching.

He said: "You have to teach all the scales and arpeggios, but first you have to play the finished piece of music to the pupil so they know what they are aiming for. To inspire and excite you have to show the big picture of what they are aiming for first even if they don't yet understand how to get there."

He also suggested that teenagers struggling with maths may benefit from learning a musical instrument. "There is evidence that if you play an instrument during the early teenage years it stimulates the mathematical side of your brain. Both music and maths are about searching for and recognising patterns," he said.

Professor du Sautoy also believes that teenagers could be enthused by stories of mathematical discovery.

These include the tale of Evarist Galois, a French revolutionary who died in a duel before his 21st

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birthday, but not before coming up with the theories of equations that are the origin of modern algebra.

Other maths stories, particularly those concerning prime numbers that are divisible only by themselves and one, are to be found in nature.

Take the cicada. Some forms of this insect hide in the ground for 17 years before emerging into the forest, where they breed, lay eggs and die after six weeks. Scientists believe that the cicada has a predator that also emerges periodically.

"If the cicada came up every nine years and the predator came every six years, the cicada would be killed off after 18 years. If the cicada came up every seven years, it would take 42 years before it was killed. By emerging after 17 years, a prime number, it keeps out of step with the predator for longer. That's the beauty of prime numbers," Professor du Sautoy said.

He also advocates mixed-age group teaching for maths, believing that the subject has to be taught as a pyramid from bottom to top.

"You have fully to understand one layer before you can move up to the next. If somebody doesn't get Year 9 maths, there is no point in moving to Year 10 because they won't be able to understand it."

Professor du Sautoy was speaking before delivering the Royal Institution's annual Christmas lectures, which will be broadcast on Five next week with the aim of popularising mathematics.

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