

# DR MATHS

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**Dear Dr Maths,**  
**I am studying for my A2 maths and have to learn so much that I can not believe that there could be more maths! Are there any maths problems that have not yet been solved?**

**Debra, via e-mail**

As with most subjects, the more you learn, the more you realise there is to discover.

It's like when you learn to play a sport, you think if only I could put top spin on the ball it would improve my game, but having mastered that skill you move on to the next.

Maths is just the same. It's like building blocks; the more techniques and methods you learn, the easier it is to solve problems.

Knowing two ways to solve a certain type of problem is much better than one, since if one route fails you can always use the other.

One of my heroes is Professor Richard Feynman.

He is well known for having had many different, and sometimes non-standard, ways of solving problems.

There is a humorous book called *Surely You're Joking, Mr Feynman: Adventures of a Curious Character*, which is an edited collection of stories of his life.

The Hailstone Sequence is a good unsolved maths problem which

mathematicians believe always gives the answer one, but no one has been able to prove this!

The rule to generate The Hailstone Sequence is to take any whole number greater than 0. If it is even, halve it, otherwise if it is odd, triple it and add one.

For example starting with 10, halve it to get five. Five is odd therefore  $3 \times 5 + 1$  gives 16. This is even, so half it and you get another even number, eight.

Then following the rules gives four, two and 1. Therefore starting with ten and applying the Hailstone Sequence Rule you end up with one.

Starting with thirteen gives this sequence; 13, 40, 20, 10, 5, 16, 8, 4, 2, 1.

Why not test some of your own whole numbers? If you find one which does not work write in and tell me.

Here is a puzzle for you to try: What is the next number in this sequence...

3, 2, 2, 3, 8, 35, 204, ?

The first correct answer will win a copy of the book *The Number Puzzler* published by Tarquin.

■ **Do you have a maths question or problem? Write to Dr Maths, Evening Chronicle, Groat Market, Newcastle, NE1 1ED or e-mail [DRMaths@hotmail.co.uk](mailto:DRMaths@hotmail.co.uk)**