



Welcome to Issue 34 of the Secondary Magazine. This is it! Exam season is here. Will our treasured Year 11 pupils do themselves justice? Who will be more nervous – you or them? This issue includes articles to take your mind off those examinations and dispel YOUR nerves!

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From the editor

So what are you currently thinking about Functional Skills? In this issue, we have a chance to consolidate our approach in the light of the recent changes and make sure we understand what is now required.

Up2d8 Maths

The fortnightly Up2d8 maths resources explore a range of mathematical themes in a topical context. The BBC's *The Apprentice* follows the search for a new apprentice for Sir Alan Sugar's business empire. This Up2d8 invites students to look at the data from the previous four series alongside data for the current series, and to make and justify a prediction about who they think will win.

The Interview – Andrew Malcolm

Who links vanilla ice cream and bookshops? This issue's interviewee talks about his private passions alongside his vital work for the Met Office.

Focus on...percentages

A percentage is a way of expressing a number as a fraction of 100 (per cent meaning 'per hundred') Read this and other facts about percentages in this article.

A resource for the classroom – classifying sequences

Using a sorting grid, pupils are invited to classify a set of sequences; an activity to stimulate mathematical thinking in your classroom.

5 things to do

There are plenty of stimulating events mentioned here, so wherever you live make a summer journey to receive some mathematical enrichment.

Diary of a subject leader – Real issues in the life of a fictional Subject Leader

What is your department working on at the moment? Our subject leader struggles to find evidence of his department's focus on developing teaching and learning as he conducts a lesson observation.



From the editor

How did you feel when you heard the news that the requirement to pass Functional Maths at Level 2, to gain a C or higher in GCSE Maths had been dropped? I can't be the only one to feel a little disappointed, can I?

I very much believe in the problem-solving approach to teaching and learning which is almost a necessity for students to experience Functional Maths, so I was delighted that Functional Maths gave me another opportunity to talk about this, not only with my department but with my SLT too. We've been working on strategies to integrate problem solving at all levels and ages for the last year or so (as a response to both Functional Maths and the new KS3 curriculum). [Always, Sometimes, Never?](#) questions and Odd One Out activities have become part of our habitual toolkit of lesson strategies. There's been a noticeable improvement in both our students' ability to express their opinion and mathematical ideas, and my department's ability to lead these discussions. Without the 'hurdle', would SLT still be supportive of what they see as my 'new approach'?

Functional Skills haven't gone away – they're still embedded in the new GCSEs which will be taught from 2010 (our current year 8) and are integral to the Diplomas. They're also still going to exist as standalone qualifications worth half a GCSE should we choose to enter students for them.

It's the embedding in the new GCSE that I think is the key point for me and my department to make sure that we continue working on developing our students' problem-solving skills. This focus was further reinforced when a friend forwarded me a [factsheet](#) from QCA which gives details of two new assessment objectives which *place greater emphasis on application and problem solving*. The factsheet goes on to say that the questions will change: *The assessment of application and problem solving means that candidates need to be given the opportunity to decide for themselves how to tackle a question and to choose the mathematics they will use. As a result, some questions will be longer and less structured.*

This is good news, isn't it?! I know hardly anyone involved in mathematics education who thinks that 'teaching to the test', reducing maths to a series of algorithms to be applied without real understanding, is the way that they want to teach. Functional Skills and the new GCSE give us an ideal opportunity to break out of this habit and to continue to develop new, problem-solving behaviour both for ourselves and our students.



Up2d8 maths

The fortnightly Up2d8 Maths resources explore a range of mathematical themes in a topical context. The resource is not intended to be a set of instructions but rather a framework which you can personalise to fit your classroom and your learners.

Do you watch *The Apprentice*? Who do you think Sir Alan will hire this year? As the current series approaches its climax, this Up2d8 resource looks for patterns in the hiring and firing of candidates and asks if you can predict the winner. Students are presented with raw data about each candidate from each of the five series so far and are asked to manipulate, analyse and interpret the data to give a reasoned prediction about the eventual outcome. You might think that a candidate who's hardly ever taken into the boardroom is a sure thing to win – after all, Lee McQueen, last year's winner, was never taken into the boardroom through the whole twelve weeks. However, one of his competitors in the final showdown was Claire Young who'd been in the boardroom five times and had only been on the winning team four times. What are the key factors for success? Which of the remaining candidates will succeed?

This resource is not year group specific and so will need to be read through and possibly adapted before use. The way in which you choose to use the resource will enable your learners to access some of the Key Processes from the Key Stage 3 Programme of Study.

[Click here](#) to download the Up2d8 maths resource - in PowerPoint format.



The Interview

Name: Andrew Malcolm

About you: Andrew works for the Met Office. Following a Maths degree at York University, Andrew did a PhD at Reading University followed by two post-doctoral contracts at Imperial college in the Aeronautics department and at Reading University Maths department. He then joined the Met Office in Bracknell. For the next 13 years he worked on solving the equations behind the weather forecasts on supercomputers, before moving into work on making the computer code work faster on current and future supercomputers. When the Met Office moved to Exeter in 2003, he moved as well.

The most recent use of mathematics in your job was... analysing run times to see which sections of code don't speed up in proportion to the number of computer processors used.

Some mathematics that amazed you is... I still think complex numbers are a joy to behold.

Why mathematics? I was always good at mental arithmetic and always enjoyed finding out the next piece in the mathematical puzzle.

Your favourite/most significant mathematics-related anecdote is... [Ed Lorenz](#) discovering the butterfly effect in 1961. Using a simple system of equations that was supposed to reproduce some gross features of the weather, he decided to look at one section of a particular mathematical solution in more detail. So he plugged in the intermediate conditions as printed out by my computer, to save starting from the beginning. But of course, what had been printed out were rounded-off numbers. When he returned from a coffee break to look at the new model, he found that it differed completely from the original. A shift of a few decimal places had radically changed the weather over the equivalent of a couple of months.

Something that makes you laugh is... Blackadder

Your favourite television programme is... Numb3rs (even in relaxation I can't get away from maths).

Your favourite ice-cream flavour is... vanilla.

Who inspired you? My first teacher at secondary school, Mr McGregor, and my teacher for A levels, Dr Cousins.

If you weren't doing this job you would... be working in or running a book shop.



Focus on...percentages

A percentage is a way of expressing a number as a fraction of 100 (per cent mean 'per hundred') and is often shown using the symbol %, which is thought to have evolved from a symbol abbreviating the Italian *per cento*.

Is it possible to give more than 100%? It's a common cliché on the sports field! Maybe it depends on whose effort we're taking 100% to be?! Read John Dabell's blog [Giving 110%](#).

Two plus two may not always equal four! People deal with percentages every day: the performance of a stock portfolio, a sale at the department store, or the performance of a new hybrid car, are all often expressed as per cent changes. As an everyday occurrence, calculating percentages should be second nature to the average person. "Not so," says Akshay Rao, professor of marketing at the University of Minnesota Carlson School of Management, in [an article](#) on sciencedaily.com.

Maurice Lauré, joint director of the French tax authority, the *direction générale des impôts*, was first to introduce VAT on 10 April 1954. Initially directed at large businesses, it was extended over time to include all business sectors. In France, it is now the most important source of state finance, accounting for approximately 45% of state revenues.

The [Baker Percentage](#) is a way of calculating the amount of ingredients used when baking bread. Instead of taking the total weight of the loaf as 100%, the weight of the flour is taken as the whole and so all amounts are calculated as percentages of this.



A resource for the classroom – sequences

I expect you have looked at the resources in the Standards Unit Box: [Improving Learning in Mathematics](#). I have been interested in looking at the different types of resource which are introduced in 'the box' and categorised by Malcolm Swan in the accompanying book [Improving learning in mathematics: challenges and strategies](#), and using these categories to generate activities for pupils which encourage higher level thinking.

This resource fits into the category of Classifying Mathematical Objects: learners devise their own classifications for mathematical objects, and apply classifications devised by others. They learn to discriminate carefully and recognise the properties of objects. They also develop mathematical language and definitions.

Pupils are given a set of sequences, either written out as numbers or expressed in their general form. Initially, you may wish to ask pupils to sort out the sequences in a way that makes sense to them.



After this, you may ask pupils to sort the sequences onto [the grid included](#).

	increasing	decreasing
increment of 4		
increment of 3		
increment of 2		

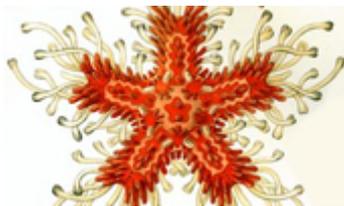
Good questions to ask might be:

- Why does this sequence go here?
- How would you make up a new sequence for this box?

- How did you decide that this n th term belonged here?
- How would you make up a new n th term for this box?
- Do the n th terms in this row/column have anything in common?

Possible extension activities might include:

- generating new sequences to place on the grid
- generating new n th terms to place on the grid
- devising a new sorting grid and the sequences/ n th terms to classify.



5 things to do this fortnight

- Mathematics and its history abound in fiction – there are novels by mathematicians, novels about mathematicians (historical or fictitious) and novels about mathematics. Some writers base work on mathematical structures or use mathematical methods to generate and transform their prose. Some mathematicians use fiction to communicate their mathematical ideas.

On the weekend of the **30 and 31 May** at Rewley House, Oxford, the British Society for the History of Mathematics is running a workshop, [Mathematics and Fiction](#), exploring the various interactions between mathematics and literature. It includes readings and interviews with writers, talks about the uses of mathematics in fiction, and opportunities for discussion and debate.

- [Magic Numbers](#): on **5 June** the Cheltenham Science Festival hosts Carol Vorderman, renowned for her speedy calculations, and mathematical wizard Dr Maths (aka Steve Humble) for an exciting arithmetic challenge with plenty of puzzles and magic tricks. Delve into mathematical history and explore how maths can help you predict the future. Get your pen and paper ready for this number-crunching adventure.
- **Building Motivation and Attainment in Mathematics** is a free event for maths teachers in which delegates will have an exciting opportunity to try out new maths activities to improve mathematical and problem-solving skills, hear about tried and tested ways of raising attainment and enthusiasm in maths, and evaluate ways to boost pupils' mathematical confidence through kinaesthetic learning – new ideas for lessons for KS3 pupils, which can be adapted to suit other year groups. There will be structured sessions and workshops, allowing time for working in small groups, discovering how other teachers use maths enrichment resources and trying out new materials. You will meet other maths teachers to swap ideas and discuss teaching experiences. The event takes place at Roedean School, Brighton, on **8 June**. Each delegate will receive a free activity pack to take back to the classroom, with copies of all the day's materials. You can download [a letter](#) giving more details, and [an application form](#) - which also gives details of other dates and locations.
- On **9 June** at the Natural History Museum in London, Professor Ian Stewart will be presented with the 2008 Christopher Zeeman award. This new medal will be awarded triennially to recognise and reward the contributions of mathematicians involved in promoting mathematics to the public, and to encourage others to work in this area by demonstrating that such activities are valued and are a part of a mathematician's roles and responsibilities. It is jointly awarded by the London Mathematical Society and the Institute of Mathematics and its Applications. Following the presentation, Professor Stewart will give a lecture based around the **Curious Case of the Courant-Robbins Train**. In their classic 1941 work, *What is Mathematics?* Richard Courant and Herbert Robbins describe an apparently complex problem in mechanics. It concerns a train and how its motion, and the influence of gravity, would affect a rod pivoted on the floor. They ask if it is possible to place the rod in such a position that, if it is released when the train starts, it will not fall to the floor during the entire journey. Avoiding the complexities of mechanics, they assert that the answer is 'yes', using a simple application of the concept of continuity. Courant and Robbins' answer is certainly correct if the continuity assumption is justified. But is it? This is not obvious. In particular, does the shape of the floor make any difference to the answer? Find out more and book your place by contacting [Antony Bastiani](#).

- The first week of June is [Volunteers' Week](#), a national celebration of volunteers and volunteering, which takes place from 1-7 June each year. This year, Volunteers' Week is celebrating its 25th anniversary.



Diary of a subject leader

Real issues in the life of a fictional Subject Leader

I observed a member of my department as part of their performance management last week. I struggled to hide my disappointment with the lesson. Don't get me wrong, it wasn't bad. In fact, I would argue that the majority of students had made progress and the teacher concerned managed the classroom well. The problem lay in the level of boredom that both the students and I endured. The teacher had played safe, adopting a dry and didactic approach whereby the students were given little opportunity to explore the ideas and concepts raised. This went against everything that I had been trying to promote since September.

I understand my role in developing the skills and attributes of members of my department for both their benefit and that of the school. I would question any teacher who was to say that they taught in the same way now as they did five years previously. It is an evolving profession with plenty of scope for creativity and experimentation, both of which are essential in stimulating students to learn. Is it not through risk-taking that progress is made?

Of course, part of the process is for teachers to reflect upon their current practice both individually and collectively. Our department meetings have recently become a forum for educational debate, led and planned by my staff on a rotation basis. The discussion allows ideas and opinions to be exchanged in order to share good practice and assess new strategies and initiatives. The materials are readily available through a variety of professional bodies, including the National Strategies and the NCETM. Our next focus is on 'Fostering and managing collaborative work' taken from the published Bowland materials. I believe it's time well spent, providing a structure for positive dialogue on the art of 'teaching'; time that is rarely available yet often desired.

Throughout this year, the underlying message that I have tried to get across to my staff is to experiment in the classroom. In order for us to develop and improve our teaching, we must sometimes go out of our comfort zone and try new ideas. Nevertheless, the observation did allow me to identify areas for development over the forthcoming months and to evaluate the teacher's CPD requirements. I will be interested to see if it does make a difference.