

Further Mathematics numbers continue to rise

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IMPORTANT DATE

Conference for Area Coordinators

- Spring 2011
 Conference, 9th and 10th February 2011, York.

This year A level Mathematics and Further Mathematics numbers have again shown very healthy increases. A level Further Mathematics was the fastest growing A level subject, with numbers increasing by 11.5% from 10473 to 11682. A level Mathematics numbers rose by 6.2% to 77001.

The proportion of state-funded schools and colleges in England teaching A level Mathematics that also have students taking A level Further Mathematics has risen from less than 40% five years ago to over 60% now.

It's interesting to see how Further Mathematics has fared in England, where it is supported by the Further Mathematics Support Programme, compared with Wales and Northern Ireland, where the FMSP does not operate. The graph shows how the number of students who took A level Further Mathematics has increased as a percentage of the number of students who took A level Mathematics in recent years.

A pilot programme of Further Mathematics support is starting in Wales this academic year, managed by the Wales Institute of Mathematical and Computational Sciences (WIMCS), with help from the FMSP.

The continued strong increases in the uptake of Further Mathematics show the strength of demand from students. The FMSP's role in promoting the benefits of studying AS/A level Mathematics and Further Mathematics, and working with schools and colleges to ensure all students can access Further Mathematics tuition, has been a crucial factor.

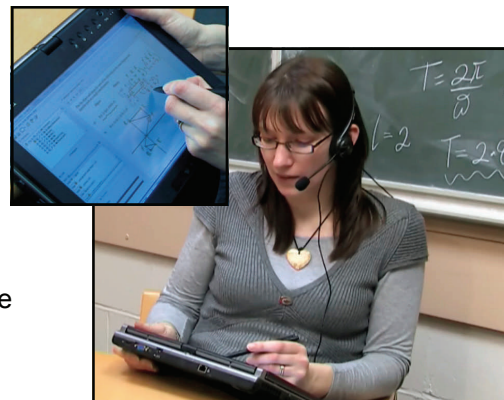
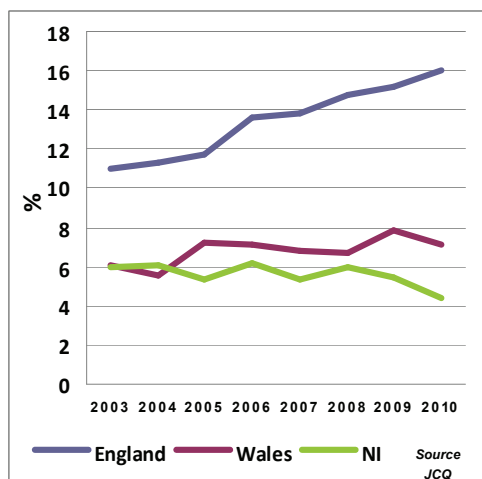
Increasing numbers of universities are now recommending or requiring students to take Further Mathematics to access degree courses with a significant mathematical content – see www.furthermaths.org.uk/universities.php.

AS Further Mathematics studied in year 13 is now recognised as an excellent option for many students who wish to go on to study engineering or sciences at university, even if mathematics is not their favourite subject. As well as helping students to cope with the mathematical demands of their degree courses, it also strengthens their university applications and can help them to win places.

This newsletter shows how the FMSP is actively engaged in supporting students and teachers across the country. Live Online Professional Development (LOPD) is an area where the FMSP has established its expertise. This provision enables teachers to improve their mathematical knowledge and pedagogical skills through a live online course, without the need to incur travel or supply cover costs.

The rich array of events organised across the country, managed by the FMSP Area Coordinators, emphasise how schools/colleges, universities and industry can work together to give young people a real insight into mathematics, its applications and the opportunities that it can bring.

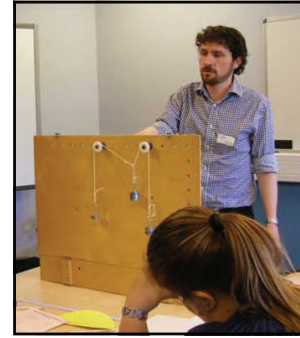
Charlie Stripp, Programme Leader



FMSP CPD

The FMSP CPD strand had a very successful year. Our brilliant Area Coordinators between them organised an amazing 42 Further Mathematics CPD events that were attended by around 500 teachers. They were also involved in mathematics A level CPD, regional and national conferences and a host of network meetings. Congratulations to them all for their hard work.

This academic year the 'Teaching Further Mathematics' course has started its fifth year with 34 teachers. LOPD courses are about to start up and the ACs are already fixing dates throughout the academic year for CPD events. The two photographs are from a 'Practical Approaches to Teaching Mechanics' day in York.



We have been working with the NCETM to develop our support for teachers of mathematics within the level 3 Engineering Diploma. Research on the type of support that would be most valuable to these teachers indicates that there is a need for mathematical problems in an engineering context. Both MEI and the NCETM have been working to produce such resources and three 'Diploma Mathematics Networks' are being established to encourage teachers to work together to trial and reflect on these and other resources. For more information about the networks and resources please see:

www.furthermaths.org.uk/diploma.php and www.ncetm.org.uk/resources/26900

For further information and updates on FMSP CPD provision please see www.furthermaths.org.uk/teacher_area/cpd.php or check the Regional pages on the FMSP website.

Sue de Pomerai, CPD Leader

The LOPD programme continues to grow with over 100 teachers taking part in online courses last year.

We are now taking applications for courses running from November 2010, which include **FP1, AS and A2 Core Maths, Using ICT to enhance teaching & learning in A level Mathematics** and a course for teachers of the **level 3 Engineering Diploma**.

For teachers who have never attended an online CPD session, we are offering free taster sessions so you can come along and see what it's like.

Teachers can book online at: www.furthermaths.org.uk/teacher_area/rpd.php

Sue de Pomerai, CPD Leader

Sadly, we've said goodbye to Dan Williams, who has been working with us during the last year through the Year in Industry (Yini - www.yini.org.uk) scheme. Dan is heading off to the University of Manchester to study Chemistry and Law. Dan has been an enormous help to us and we wish him every success for the future. Fortunately we have recruited an excellent new Yini student, Aditi Shah, to take over from him. After her placement Aditi intends to take a degree in Business Administration at the University of Bath.

Janice Richards, Communications and Marketing Leader



Live Online Professional Development

Year in Industry students

STMC

Throughout this term the FMSP has been taking entries for the fourth annual Senior Team Mathematics Challenge, which it organises in partnership with the United Kingdom Mathematics Trust. Last year over 900 schools/colleges competed in the competition and early indications this year are that the eventual number of schools and college competing will easily exceed this. For more details of the regional finals go to:

www.furthermaths.org.uk/stmchallenge.php

All previous STMC questions and solution are available there. These are a great source of enrichment problems, based on GCSE level mathematics, but requiring creative mathematical problem-solving skills.

Richard Lissaman, Student Support Leader

FM support for Mature and Gap year students and blended tuition

This year the FMSP is offering courses to support mature and gap year students to study both AS and A2 Further Mathematics. This extends the programme of support for AS Further Mathematics offered last year. The AS course provides weekly live online sessions which total to give over 30 hours of live online support throughout the year. The A2 course offers monthly live online one-to-one tutorials. Both courses provide a programme of study based on the Integral online resources (www.integralmaths.org). The cost of a course is £200. For more details see: www.furthermaths.org.uk/online.php

Some of the AS FM sessions in this provision have been scheduled fortnightly by module, so that they can be supplemented by extra tutorial support on the alternate weeks. Live online sessions are primarily concerned with mathematical content which can be explored more deeply during extra tutorial support. This blend of tuition was piloted last year with excellent results and is available to FMSP students again this year for a larger range of modules. For more details contact: richardlissaman@furthermaths.org.uk

Richard Lissaman, Student Support Leader



Mathematics at Work Competition

In 2009-10, the FMSP ran a second Mathematics at Work competition for Year in Industry students. The students were invited to submit exemplars that illustrated how they used mathematics during their placement. The exemplars needed to convey how school mathematics was used in solving real problems in the workplace. We received an impressively large number of entries.

Some of the best entries can be viewed by navigating to the 'Real-world mathematics' page from the 'Student area' of the FMSP website:

www.furthermaths.org.uk/student_area

The photo shows one of the winners, Cameron Blackwell, receiving his prize from Stephen Lee from the FMSP. Charity Watkins, YinI Regional Director, and Cameron's managers, from Balfour Beatty Mott MacDonald, also attended.

Richard Browne, Diploma Support Leader

News and events from the FMSP Regions

As well as providing Further Mathematics tuition to hundreds of students each year the FMSP Area Coordinators in their regions engage in many other activities to foster interest and provide training in mathematics. Details of just a small number of these can be seen over the next four pages.

EAST OF ENGLAND

Continuing Professional Development

At the end of the summer term a selection of one day CPD courses were attended by teachers from across the region. These courses proved very popular. The training days focused on 'introducing a module' and the main aim was to allow teachers to gain confidence with key topics in the most common modules that would typically be covered in an AS Further Mathematics qualification (FP1, D1 and M1). The days focused on subject knowledge but also featured opportunities to share some useful teaching and learning tips and ideas for use in the classroom. As part of the course evaluation teachers were asked, 'What were the most useful aspects of the day?' Here is a selection of teachers' favourite aspects from the courses:

"Classroom ideas & renewing my enthusiasm for D1."

"I am from a school that has never taught D1. Just going through so many parts of the course was excellent."

"Excellent activities to reinforce ideas, lots of ideas to help teaching."

"Seeing visual representations of the topics."

"New approaches to teaching topics, sharing resources and networking with other teachers."

"Brushing up on topics and new angles on various topics."

"There were so many amazing things, that it is difficult to pick just a few, but certainly geometrical interpretation of equations of constant acceleration was magic. Now it is so easy to remember them when the shape image is in my mind. Not to mention the scale and brush experiment, pulleys with springs, 'forces come in pairs', matching activity and I could continue for quite a while. Inspired and inspiring..."

"Ideas of using experiments to teach a concept, resources and examples, working in pairs and working out questions."

"Common misconceptions, recommended websites, the practical examples, the handouts and networking."

Each of the courses in D1, FP1 & M1 will be offered again. However, we are always open to requests from teachers to develop new courses. We are happy to run courses in schools and colleges across the East of England region.

Sharon Tripconey, Area Coordinator - East of England

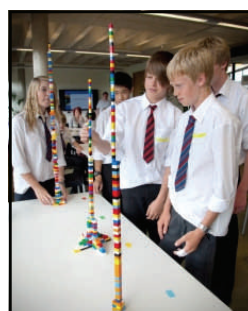
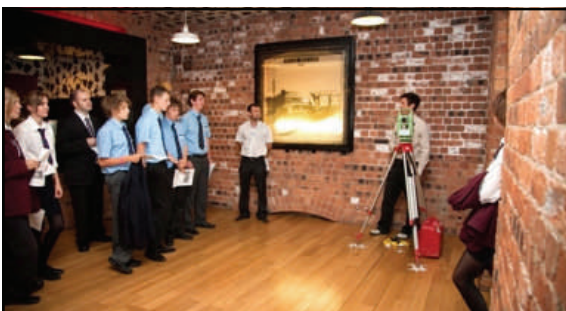


EAST MIDLANDS

Maths at Work Conferences

During last term, Maths at Work Conferences were held in Derby, Nottingham, Northampton, Lincoln and Loughborough. It is especially pleasing that more teachers are now involved in liaising with personnel from industry and commerce to organise the events.

Rod Bond, Ria Symonds, Area Coordinators - East Midlands



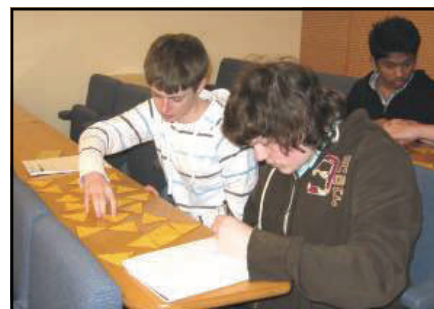
SOUTH EAST

Snow and Ash Clouds

A Level students have been particularly affected by natural phenomena this year; first the snow hampering last minute revision in January, (when the FMSP provided online revision sessions as an innovative solution) then the ash cloud causing disruption in April. While schools struggled to cover for absent teachers, two presenters for the Statistics 2 revision day in Oxford were stranded in South Africa and Morocco! Fortunately other colleagues stepped in to avoid disappointing around 90 students preparing for their exam.

Before the ash cloud arrived, students also attended revision days for Further Pure modules. In the photograph students can be seen tackling a tricky Complex Numbers jigsaw.

Alexandra Hewitt, Area Coordinator - South East



SOUTH WEST

Take Maths Further

Wednesday 23rd June this year saw the fourth annual 'Take Maths Further' conference for Year 10 students, held at Bournemouth University. A capacity crowd of just under 300 people enjoyed a keynote speech by Ben Sparks based on Edwin A Abbott's book Flatland.

This was followed by a series of more interactive talks on topics ranging from the deceptively simple - 'A bit, a byte, a nybble or a crumb' from the FMSP's Sharon Tripconey - to the inter-galactically huge - Kurt Baker's 'How Maths changed our view of the solar system'.

The fourth 'Take Maths Further' conference drew schools from a wider range than ever before and the support offered by Poole Grammar's Year 12 Further Maths group 'dream team' of Joe Bailey, James Crickmore, Chris Taylor and Alex Todd was very much appreciated. Their enthusiasm for their subject and energetic engagement with the activities of the day served as an excellent example to the young mathematicians of the future. Also on hand to share his experience of University Maths was ex-PGS student Chris Hayward, who has just completed his degree course at Bath and will shortly be starting a PGCE course.

The challenging conference quiz provided an opportunity for students to engage with higher level maths than they would normally have access to and students gained prizes of graphic calculators or boxes of chocolates for the most elegant attempts at the questions.

Thanks to a grant from the Clothworkers' Institute we were able to offer this event free to students.

Next year's 'Take Maths Further' will be at Bournemouth University on Wednesday 29th June 2011 and booking will open after Easter.

Jo Sibley, Area Coordinator - South West



The 'Mugungus Crew' from Budmouth Technology College carried off one of the more share-able prizes...



NORTH WEST

Mersey Mathamagic 2010

In June 2010 the FMSP in the North West, in partnership with University of Liverpool and the University of Chester, and with the generous sponsorship of the Clothworkers' Foundation, held the first ever 'Mersey Mathamagic', an event designed to entertain and inspire Year 10 mathematicians with the aim of encouraging more students to consider taking Mathematics and Further Mathematics in the sixth form.



Deciding to let the usefulness and entertainment value of mathematics speak for itself, the organising committee had arranged for the 85 participating students and accompanying staff to encounter a huge maths fairground on arrival. Stalls were manned by the very eager trainees on the University of Chester Maths Enhancement Course whose incredible imagination ensured an amazing variety of activities for students to attempt. Also in attendance were the reliably stimulating Liverpool FunMaths Roadshow, and a "Mathematics Busker". It all added up to a hugely entertaining start.



Before lunch, students attempted one of three themed practical tasks, where the applications of mathematics to the real world were obvious for all to see. Refitting a computer lab using decision mathematics, ensuring a maximum return on investments subject to the vagaries of the market, and designing the optimum sweets package (and trying to get "Hired!" and not "Fired!" in the process) were the tasks our brave young workers had to tackle – and superbly well they did, too.

After lunch "Mr Rollercoaster", aka Professor John Roberts, delivered an eye-opening presentation on the mathematics of theme park design; for some participants, this was their first direct contact with someone who uses GCSE and A Level Mathematics and Physics as part of their everyday job. Finally, the tried and tested "Dragon Mathematics" competition provided a suitably energetic and noisy end to the day.

Congratulations to all involved – we hope this will be the first in a long line of annual events.

Abi Bown and Martin Bamber, Area Coordinators - North West

YORKSHIRE AND THE HUMBER

Practical Mechanics and FP1/D2 CPD

In June, in conjunction with The National STEM Centre, a Practical Mechanics Session was held at York. Teachers were shown (and took part in) experiments to aid the understanding of some of the topics from the Mechanics 1 module.



When asked 'What were the most useful aspects of the day' replies were:

"Giving lots of practical ways to teach mechanics and to not be scared to try things out."

"Short practical activities, use of Geogebra...longer practicals and the opportunity to have a go ourselves"

Also using The National STEM Centre venue, a FP1 training event was held on 4th March and a D2 training event on 9th July. Seventeen teachers attended the FP1 day and fifteen attended the D2 day. All exam specifications were catered for. Some participants' comments were:



"Very useful insight into FP1 topics."

"Excellent resources. Most enjoyable day."

"Although I already teach FP1 and FP2 it is good to get fresh ideas."

Some comments regarding the most useful aspects of the day:

"Time and space to think about Maths; indications on the expectations in the exam; being able to take the resources; talking Maths with other teachers"

Jane West and Jean Smith, Area Coordinators - Yorkshire and the Humber

EAST OF ENGLAND

Maths at University Day

On 1st July, the University of East Anglia (UEA) hosted the fourth 'Maths at University' day. The day gave students a 'taste' of what it is like to study Mathematics, or a mathematics-based subject, at university (not necessarily just UEA). The aim of the day was to help students make informed decisions about what to study and where to study after completing their sixth form education.

The day started with two fascinating lectures focused on pure mathematics and applied mathematics respectively. These were delivered in a lecture theatre by Dr Sinead Lyle and Simon Kirby. Following the lectures, students were given a choice of problems to solve in small groups. These groups were set up so students had the opportunity to work with other students that they hadn't previously met – just like a typical first day of a degree course!

After lunch, students had a chance to explore the campus at UEA before attending a plenary activity where they formed the audience for a mathematical 'Question Time'. The panel consisted of a Maths lecturer, the Maths Admission Officer, the PGCE Maths Coordinator, a graduate who was just about to begin studying for a Maths PhD and a post graduate who had just completed their course. Questions ranged from "What is your favourite mathematical book?" to "Do I need Further Maths to get on a degree course?" Feedback from students included:

"The Panel answered questions that I hadn't even thought of!"

"Pretty cool how maths applies to all these different things."

"The lectures were all very interesting and gave valuable insight into the types of things studied."

"Group work was challenging but fun!"

Year 10 Team Challenge

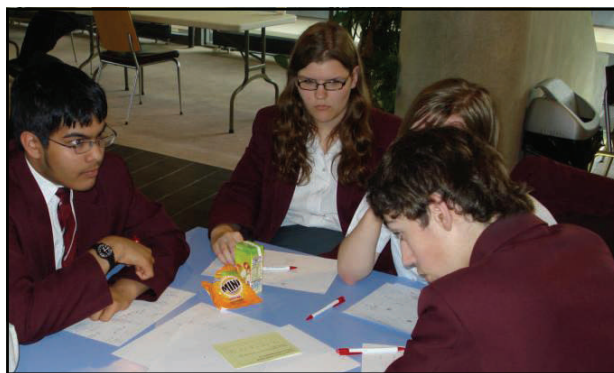
At the beginning of the summer term the Centre for Mathematical Sciences, University of Cambridge hosted the final for the Year 10 Mathematics Team Challenge. The top two scoring teams from each of nine heats (hosted at schools across the East of England in the spring term) competed against each other to become the overall competition winners for 2010. Congratulations to:

1st place: Merchant Taylor's School, Nr Watford.

2nd place: Northgate High School, Ipswich.

3rd place: The King's School, Peterborough.

Sharon Tripconey and Chris Saker, Area Coordinators - East of England



Recreational Mathematics

In the second FMSP newsletter we included a nice problem on 'difference of two square roots'.

Question:

$$(\sqrt{2}-1)^2 = \sqrt{9}-\sqrt{8} \quad (\sqrt{2}-1)^3 = \sqrt{50}-\sqrt{49}$$

Is every positive integer power of $\sqrt{2}-1$ the difference between the square roots of consecutive integers?

Solution:

Yes! (A reasoned solution can be seen at: www.furthermaths.org.uk/challenge.php)

This issue's problem:

Tom's shirt has 8 buttons in a vertical line with a spacing of one unit between each adjacent pair. He'd normally button them up in the obvious way, starting at the top and fastening them one at a time until he reached the bottom and so, from start to finish, his hands move a distance of 7 units.

Clearly 7 units is the minimum distance his hands could move, but what is the maximum? Using the order shown, the distance travelled is 31 units.

Is this the maximum?

And what is the maximum for an n -buttoned shirt?

6

2

4

8

1

3

7

5

Free access to thousands of mathematics resources



Schools and colleges can register with the FMSP to access the services provided by the Further Mathematics Support Programme.

These include a free single-user teacher account to extensive online Further Mathematics resources (including materials for the Applied A Level modules), and resources to support the principal and additional and specialist learning

units within the Level 3 Engineering Diploma. These are within MEI's Integral Mathematics Resources site, which, over summer, has been updated to improve the look and navigation within the site.

Once registered, schools and colleges may take advantage of the local FMSP tutoring facilities. They will also receive invitations to participate in study days, revision days and student enrichment activities, as highlighted in this newsletter. Registration is available from the FMSP homepage: www.furthermaths.org.uk

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