

Spring 2014

North West
Regional

NEWSLETTER

The National Picture

The Department for Education is to provide Mathematics in Education and Industry with substantially enhanced funding for a further three years to continue and extend the work of the Further Mathematics Support Programme, working with the National Centre for Excellence in Teaching Mathematics and the Institute of Education.

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Maths Problem

The FMSP will expand its work to improve access to Further Mathematics tuition, and to increase the numbers of students in England studying advanced mathematics post-16. The FMSP will continue to have a strong emphasis on teachers' professional development, to help meet the increasing demand from students to study Mathematics beyond GCSE level.

UKMT/FMSP Senior Team Mathematics Challenge Final

On February 4th at the Camden Centre, London, 59 teams competed in the 2013/14 STMC Final. The teams were all winners from the 55 regional heats involving 1146 schools and colleges.

The overall champions were the team from Hampton School. Alton College were in second place with Rainham Mark Grammar School taking third. The poster competition, on the theme of *Ruled Surfaces*, was won by The Grammar School at Leeds. The competition was again sponsored by Rolls-Royce plc. Dr Peter Neumann presented the prizes and congratulated all the participants on their achievements.

FMSP Wales

FMSP Wales has secured continued funding for the project from the Welsh Government for 2014-15 and 2015-16. For further information see the FMSP news announcement at:

www.furthermaths.org.uk

Extended professional development courses

The FMSP provides a range of professional development courses, such as for STEP/AEA and for Key Stage 4. It also has an extensive programme of online professional development.

For more details on the FMSP CPD provision, please see:

www.furthermaths.org.uk/teacher_area/cpd.php

There are also extended courses that are taking applications:

Teaching Further Mathematics

enables participants to study the content of Further Mathematics from a teaching and learning perspective. The course starts in July and applications are now being taken. For more information and an application form please see:

www.furthermaths.org.uk/teacher_area/tfm.php

Teaching Advanced Mathematics

is designed to give teachers the skills and confidence to teach A level Mathematics effectively, focusing on subject knowledge and pedagogy. The Masters-accredited course fees are £600 but *schools and colleges of participants are entitled to receive £1200 in March 2015*, in recognition of the support they provide to enable one of their teachers to take the course. For more information please see:

www.mei.org.uk/tam

Regional Events and Updates

North West calendar at a glance

CPD Events

Our CPD programme, both locally and nationally, continues to expand. Courses are offered for AS and A2 Core Mathematics, Further Pure 1, A2 Further Pure and Applied Units and ICT. See the full programme below and at www.furthermaths.org.uk/northwest.

This year for some events we are combining a CPD event and a KS5 Teacher's Meeting to create a format which we hope will appeal to even more teachers. See below for more details.

A2 Mechanics

Lancaster 19th March

A2 Further Pure

Liverpool 9th June

D2

Lancaster 11th June

AS Core

Liverpool 11th June

A2 Further Pure

Manchester 16th June

A2 Core

Liverpool 18th June

Year 12 Modelling and EPQ

Manchester 23rd June

Liverpool 30th June

Geogebra for KS4

Manchester 1st July



Getting to grips with the crossnumber

Enrichment Events

Year 10 Competition

Lancaster 5th March

Liverpool 12th March

Chester 13th March

Manchester 20th March

Year 10 Competition Final

Manchester 1st May (tbc)

Year 12 Problem Solving

(also free teacher CPD)

Manchester 6th March

Liverpool 17th March

Year 13 STEP Revision

(also Free Teacher CPD)

Liverpool 12th May

Lancaster 14th May

Manchester 15th May

KS5 Teacher Meetings

These meetings are held in the afternoon and are intended to help ALL KS5 teachers by focusing on methodology and resources rather than content. Consequently, some familiarity with content is assumed.

Practical A2 Mechanics

Lancaster 19th March

Rob Eastaway

Manchester 24th March

Autograph for KS5

Liverpool 2nd April

Autograph (Stats)

Liverpool 21st May

Enrichment for Students

STEP / AEA Support + Problem Solving for Y12

After the increase in interest and provision for students and teachers with regard to support for STEP and AEA, this year we have introduced a range of events to assist sixth-form students with more advanced problem-solving techniques. The full programme will include sessions on University application, interview technique as well as advice and group sessions on solving more advanced problems and specific help with the Oxford MAT and STEP / AEA papers. There is also a modelling day in the Summer for year 12 students which might be of particular interest to those considering doing an extended project. For further details please see below or email Abi, James or Martin.

KS4 Enrichment Days Spring / Summer 2014

After the success of last year's comprehensive range of KS4 and KS5 enrichments events, we are planning to hold a similar range again this year. The format will change slightly, with a "Fairground" being introduced at all events, and a mixed-school competition to conclude each day. There are events in Manchester, Liverpool, Lancaster, Chester and Cumbria to encourage as many schools as possible to take part. Again, see below for full details.

Year 10 Competition

Lancaster 5th March
Liverpool 12th March
Chester 13th March
Manchester 20th March

Taking Maths Further

Dalton-in-Furness 24th April

Year 10 Competition Final

Manchester 1st May (tbc)

Mathamagic (able Y10 students)

Manchester 7th July
Lancaster 9th July
Carlisle 10th July
Liverpool 14th July
Chester 16th July

KS5 Enrichment Days Spring / Summer 2014

Year 12 Problem Solving (also free teacher CPD)

Manchester 6th March
Liverpool 17th March

AS Core Revision

Liverpool 31st March

A2 Core Revision

Liverpool 28th April

C1 & C2 Revision

Lancaster 6th May

C3 & C4 Revision

Lancaster 7th May

Year 13 STEP Revision (also Free Teacher CPD)

Liverpool 12th May
Lancaster 14th May
Manchester 15th May

Year 12 Modelling and EPQ

Manchester 23rd June
Liverpool 30th June

MathsWorks

Liverpool 2nd July



Senior Team Maths Challenge - Lancaster,
22 November 2013

Enrichment

Year 12 and Year 13 Problem – Solving Events

We have been considering the issue of how to improve the problem-solving skills of the more able AS and A-Level students for some time now. Feedback has indicated a lack of confidence amongst some teachers in supporting the most able students. In addition, we were very keen to develop a programme of support that would encourage teachers to be able to engage in solving complex problems alongside their students. We have previously offered help to students preparing to sit STEP and AEA exams, and last year we ran courses just for teachers to explain the thinking behind STEP and AEA exams and to investigate ways in which teachers could help their students. As a consequence, one of our key initiatives this year has been to put together all these elements into a coherent package.

After experimenting with various models, we decided to offer termly day-long events for Year 12 and Year 13 students - 6 individual events in total, repeated in Manchester, Liverpool and Lancaster for the Year 12 events; in Manchester and Liverpool for the Year 13 events. By the end of the academic year, therefore, we will have organized a total of 15 events across the North West, with a target attendance of 5 – 10 teachers and 25 – 30 students per event. Feedback from these events has shown that they have been a great success, with students and teachers particularly valuing the variety of approaches used to present problems and perhaps more importantly, to allow students and teachers to reflect upon the generic approaches they used when engaging in complex problem-solving. Some details of these ideas are given below:

- Mini-competitions, using the Dragon Maths format: students tackle short problems in groups and are given the next question on completion of the previous – no help is given. Longer, bonus questions requiring more insight are also available.



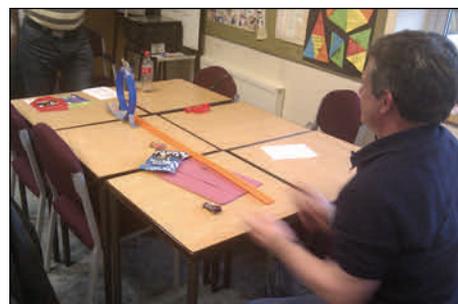
- Stand-Up Maths: students work in groups of 3 tackling more open, multi-stage problems standing up at a whiteboard (portable sheets of whiteboard material stuck to walls are often used). The very act of standing up together around a board seems to make a considerable difference to students' (and teachers') engagement with the problems.



- Master Classes: a theme such as proof, number, etc, is used and students are given a small number of examples to discuss, before detailed solutions are discussed. The real point of this approach is for students to consider their options, and possible strategies, prior to solution, in the hope that this will encourage a more general strategic approach.

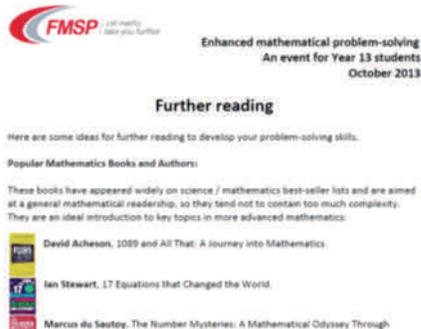


- Teachers' sessions: at some stage in each of our events, teachers have the chance to meet to consider their approach to encouraging the development of problem-solving skills. A focus for a teachers' sessions might be technical details, such as the purpose and format of STEP and AEA exams, or a more open session on the best ways to foster a genuine change in students' approaches to problem-solving.



Year 12 and Year 13 Problem – Solving Events continued

- Research: we have selectively chosen key areas for further research and wider reading in mathematics, with ideas for how students and teachers can begin to engage in the process of active research in mathematics.



- Applications: as well as introducing students and teachers to some abstract themes in mathematics that they might not encounter as part of the 'normal' mathematics curriculum, we have used a number of real-world applications to allow students to explore for themselves the importance of mathematics in industry and the work-place.

The London Eye

- The London Eye is **135m tall**, making this impressive landmark one of the tallest structures in London.
- Each rotation of the London Eye takes **30 minutes**.
- The wheel carries 32 passenger capsules holding 25 people each.

The challenge in this activity is to produce a graph showing how the height of a person above ground changes as they complete one revolution in the London Eye

Points to consider:

- Shape of the graph?
- Maximum / minimum values?

At the end of the academic year, we intend to conduct a thorough review of all the work that we have undertaken as part of this project with a view to developing and extending the programme next year.

Update from Cumbria and Lancashire

This year in Cumbria and Lancashire we've continued to organise events for both staff and students. Problem-solving has been our main theme.

We've been running termly problem-solving events for Year 13 students and their teachers - these are particularly useful for students entering, or thinking of entering, STEP or AEA, but anyone interested in problem-solving should find them useful. Following events in Lancaster on 1 October 2013 and 3 February 2014, our third event of the year, "Preparing students for STEP and AEA", will be on Wednesday 14 May 2014 in the Postgraduate Statistics Centre at Lancaster University. All are welcome.

On Tuesday 28 January 2014, Judith Mallam of the FMSP ran a very enjoyable enrichment event for Year 10 students at St Benedict's School in Whitehaven, including several puzzles and our famous Dragon Quiz. This was followed by a CPD event on problem-solving within Key Stage 4 Mathematics, attended by 20 students from schools across West Cumbria. Feedback was excellent. We'll be organising another Year 10 enrichment event at Dowdales School in Dalton-in-Furness on Thursday 24 April, and we hope to put on many others over the next year.

The FMSP Year 10 Mathematics Competition continues to grow in popularity. Our recent heat on 5 March 2014, facilitated by James Groves and Bob Summers, saw 14 teams travel to a decidedly warm hall at Lancaster University to do battle. Following an epic tussle, AKS Lytham saw off Clitheroe Royal Grammar School by just half a point to become heat winners. The best four teams from the heat now go forward to a regional final in Manchester on 1 May. Next year, we hope to organise more heats, at venues across Cumbria and Lancashire, so if you'd like to be a local host, do get in touch.



Students at the Lancaster heat of the Year 10 Mathematics Competition

Dedicated School Support

Teaching and Revision

The North West FMSP continues to support the teaching of Further Mathematics in schools and colleges in a number of ways. We are particularly keen to help schools that are willing to offer further mathematics in-house but have limited time and resources available. The FMSP's "Live Interactive Lectures" (LIL) now exist in many different units and for a number of examining bodies to support in-house teaching of FM.

For more details see the further maths website
www.furthermaths.org.uk

We will of course continue to offer direct tuition, both face-to-face and online, as previously, as well as a full programme of face-to-face and online revision days.

Maths Problems

Consider the graphs of the two equations:

$$xy = 12$$

$$y = 2x - 10$$

Which graph comes closer to the origin, *and* what is its distance from the origin?

Answer: $y = 2x - 10$ has shortest distance $\sqrt{20}$ from O; $xy = 12$ has shortest distance $\sqrt{24}$ from O. therefore $y = 2x - 10$ comes closer to the origin.



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North West Events pages:

For teachers: www.furthermaths.org.uk/?section=regions&page=NW_CPD

For students: www.furthermaths.org.uk/?section=regions&page=NW_enrichment