Post-16 Group Newsletter May 2011

The Mathematical Association and The National Association for Numeracy and Mathematics in Colleges working together to support post-16 mathematics education

What is the Post-16 Group doing?	A working group is preparing a professional development day on *Teaching the new GCSE mathematics: Will you be ready for the new specifications in September 2011?* which will be held in Birmingham on 15 June. Also, new working groups are being established. **[more]**
Engaging Level 3 Learners	The first professional development event developed by the Post-16 Group was held in March; one of the participants gives her impressions of the event. **[more]**
NANAMIC Annual Conference	The NANAMIC Annual Conference, CPD Workshops and AGM will take place in Peterborough on 6 July. **[more]**
National STEM Centre	Do you know about the National STEM Centre and the important collections of resources which it hosts? **[more]**
Researching Mathematics Learning	One source of up-to-date research into mathematics education is the British Society for Research into Learning Mathematics (BSRLM) **[more]**
Big Ideas in Mathematics	Find out about a European project to help teachers work with the big ideas in mathematics. **[more]**
Skilled to Go	The Skilled to Go website has recently been updated. One FE trainer shares his experiences of the resources **[more]**
Alex's Adventures in Numberland	Read a review of Alex Bellos's book *Alex's Adventures in Numberland*. **[more]**
Recognising Mathematics Teachers	Read about Chartered Mathematics Teacher status. **[more]**
Your contributions are welcome	If you would like to comment on this newsletter or contribute to a future issue, or become involved in the work of the Post-16 Group then please **email** us.

[top]

For more information about the Post-16 Group:
visit our **website** or **email** us.

More information about **MA** and **NANAMIC** can be found on their websites.

The Mathematical Association
Supporting Mathematics in Education

National Association for Numeracy and Mathematics in Colleges
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What is the Post-16 Group doing?

The Post-16 Group's first two working groups have been working on *Engaging Level 3 Learners* and *Teaching the new GCSEs* in preparation for professional development days. The event on *Engaging Level 3 Learners* was held in Loughborough on 7 March (a report on the day can be found on the next page). Details of the *Teaching the new GCSEs* event are given below.

Teaching the new GCSE mathematics

Will you be ready for the new specifications in September 2011?

Professor Sue Pope (Liverpool Hope University)

Wednesday 15 June 10:00 – 16:00

Birmingham Metropolitan College, Matthew Bolton Campus

Content

- How to use existing resources in the new landscape
- Adapting teaching and learning to the new emphasis
- Preparing for students' past experiences pre-16 at this time of transition
- Rich ideas related to resources and resources to take away

Approach

- Engaging workshop and presentation
- Participants actively involved
- Resource rich
- Confidence building

Target Audience

- Teachers who teach GCSE mathematics
- Managers who supervise GCSE mathematics courses
- Will also be useful for teachers and trainers of vocational subjects who teach mathematics and numeracy within their specialist subject

Cost

- MA and NANAMIC members: £95
- Non-members: £115
  (inclusive of £20 for membership of NANAMIC for this year which can be billed separately)

Further details from the NANAMIC Administrator, Lesley Way, on 07757 816402 or at **committee@nanamic.org.uk**

The Post-16 Group is also considering establishing new working groups on *Dialogue with Higher Education*, *Dyscalculia* and *Doing more with less*. If you would like to be involved then please **email** us.

[top]

Post-16 Group Newsletter May 2011

The Mathematical Association and The National Association for Numeracy and Mathematics in Colleges working together to support post-16 mathematics education

Engaging Level 3 Learners

Jane Annets presented *Engaging Level 3 Learners* at Loughborough College on Monday, 7 March. This was the first post-16 professional development day organised by NANAMIC and the MA and it was also supported by LSIS. One of the participants writes below about her impressions of the day.

The aims of the day were:

- To reflect on our current practice of teaching mathematics and identify small changes which will have a big impact on learning.
- To share and adapt resources, ideas and activities that engage learners and help them to develop a deeper understanding of mathematical concepts and the connection between them.
- To develop strategies to deal with the challenges of using activity approaches to learning.

When I joined in there was a discussion about managing learning. It is always useful for any level of group to hear other teachers talk about different strategies for managing the learning in a group.

One good idea to get everyone actively involved in a group is to give out job cards so each member of the group is given a different role, such as writer, reader or runner. Another idea several teachers have found successful is to put a sealed envelope on each table at the beginning of the lesson; this might be to be opened straightaway and contain the day's task or roles, or it might be not to be opened until the end of the lesson and contain something such as a key result or the solution to a puzzle; the element of theatre and learners' natural curiosity can provide that little extra bit of engagement and motivation.

After an enjoyable lunch, cooked and served by students at the college, we shared ideas about adapting resources. I showed everyone the fraction/decimal/percentage cards from the Standards Unit pack. Everyone matched them up and discussed how they could be used with their learners.

GeoGebra was mentioned as being a good and free resource, I have used it since the training and found it to be an excellent way to show the graph of an equation. The main advantage to me is that, once downloaded, it can be used without an internet connection.

We talked about the principles for effective teaching and the eight points that contribute to the perfect lesson. Then we looked at a previously prepared lesson plan and found the points that were missing and finally we had a go a planning a perfect lesson.

Jane had a way of making everyone feel valued. I left the training feeling motivated and with many new ideas to try out. Although the training was designed for Level 3 / A Level learners the techniques were suitable for all learners.

[top]

Post-16 Group Newsletter May 2011

The Mathematical Association and The National Association for Numeracy and Mathematics in Colleges working together to support post-16 mathematics education

NANAMIC Annual Conference, CPD Workshops and AGM

Connections, Applications and Inspiration

meeting the needs of all mathematics learners and meeting your CPD needs too!

Wednesday 6th July 2011, 10:00 – 16:00

Great Northern Hotel, Peterborough

Keynote Address

- *Proof, Pizza and the Electric Guitar* David Acheson (President of the MA and author of *1089 and All That*)

Target Audience

- Teachers who teach mainly mathematics and numeracy
- Teachers and trainers of vocational subjects who also teach mathematics and numeracy within their specialist subject
- Learning support practitioners and other individuals who would like to add to their repertoire of teaching techniques and resources

Workshops and presentations will include

- Active learning
- Dyslexia and Maths
- Engaging Level 3 learners
- Functional Maths
- New materials for teaching Functional Maths – Frank Eade from MMU
- Certificate in Use of Mathematics and its component level 1 and level 2 FSMQs – Christine Andrews, Senior Examiner, AQA
- Information on these and other options is available from **NANAMIC**.

Cost

- NANAMIC Members: £125
- Non-members: £145

Further details from the NANAMIC Administrator, Lesley Way, on 07757 816402 or at **committee@nanamic.org.uk**

[top]

Professional Development Events

MEI Conference

Thursday 30 June to Saturday 2 July 2011 at Keele University

On the Saturday NANAMIC will be leading several workshops for teachers in the post-16 sector. More details are available from **MEI** and **NANAMIC**.

More details, including booking forms and how to have courses presented at other venues, are available from the Administrator by email **committee@nanamic.org.uk** or by phone 07757 816402.

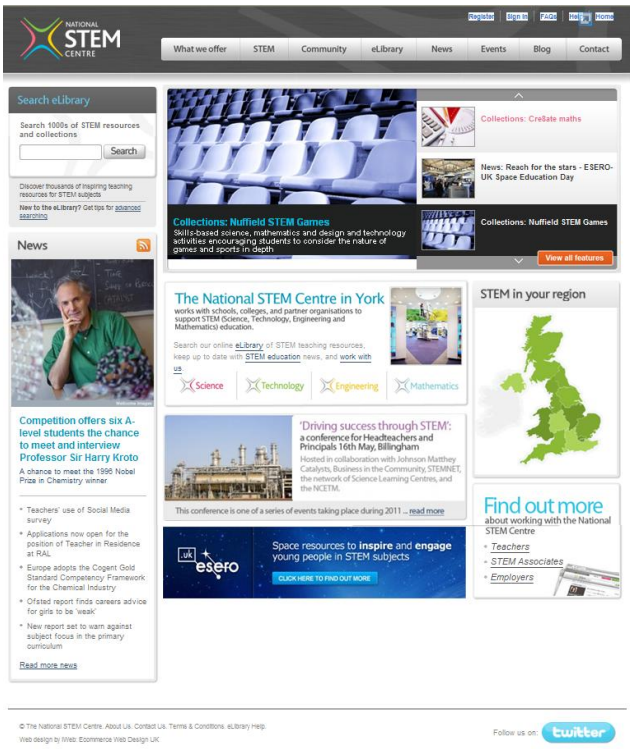
Post-16 Group Newsletter May 2011

The Mathematical Association and The National Association for Numeracy and Mathematics in Colleges working together to support post-16 mathematics education

National STEM Centre

The National STEM Centre is a purpose built centre at the University of York with a growing archive of mathematics resources covering ages 5 -19. The centre offers excellent accommodation for those wishing to linger longer with the rich heritage of resources from the past few decades all gathered into one place. Funding from the Gatsby Charitable Foundation is enabling a growing number of these resources to be available on-line on their website **www.nationalstemcentre.org.uk** . When visiting the website make sure you register to make the most of the site. A visit to their website or physical site in York is highly recommended and as a STEM centre it is also useful for science, technology and engineering. The European Space Education Resource Office (esero) is also sited there.

The website hosts several collections of materials for teaching mathematics including resources from: CIMT, Cre8te maths, GAIM, MEI, Mechanics in Action, NRICH, Royal Academy of Engineering, Shell Centre, SMILE and The Standards Unit.



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Researching Mathematics Learning

The **British Society for Research into Learning Mathematics** is an organisation that is dedicated to research into mathematics learning. It holds termly day conferences at which researchers present their findings which cover topics in mathematics education from early years to undergraduate study; the **informal proceedings** of those termly conferences are freely available on the internet. This year's spring term conference included papers on:

> Is the Capabilities Framework empowering adult learners and helping them improve their mathematical wellbeing?
>
> Family mathematics: how does supporting parents help in the development of children's mathematical skills?
>
> How do teachers choose between the applied options of A-Level mathematics?

The primary audience for the papers is the academic research community, but there is much that can be gleaned from the papers and presentations to inform one's practice.

[top]

Post-16 Group Newsletter May 2011

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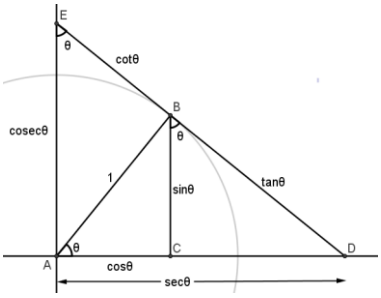
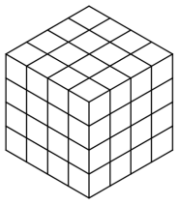
As θ increases from 0° to 90°, what happens to each of the six marked lengths?



What insights might this give students into the graphs of the trig functions?

Imagine surrounding a cube of side length *x* by another layer of cubes.



First cover each face…then fill the gaps along each edge…then the gaps at the corners.

How does this help you to explain the identity $(x+2)^3 \equiv x^3+6x^2+12x+8$?

Can you explain any other identities in a similar way?

Big Ideas in Mathematics

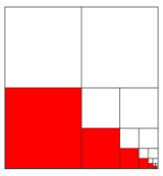
In your opinion, what are the big ideas in mathematics teaching and learning?

A European project (**www.abcmaths.net**) involving partners from England, Germany and Austria focuses on this question and its implications for professional development courses.

For the purposes of the project, the partners came up with a list of Big Ideas under two headings: Subject Matter Knowledge and Pedagogic Content Knowledge. The Big Ideas included proof and argumentation, multiple representations and perspective change, specialisation and generalisation, questioning, using misconceptions, awareness of multiple strategies and extending the domain.

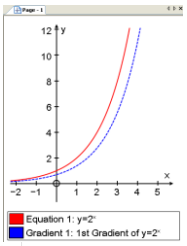
The examples on this page, which the partners use with teachers on their courses, illustrate multiple representations. Examples illustrating other Big Ideas will appear in future newsletters.

How does this diagram illustrate the sum of the series $\frac{1}{4}+\frac{1}{16}+\frac{1}{64}+\frac{1}{256}+\frac{1}{1024}+\ldots$?



Can you think of any other diagrams which show the value of other infinite series?

What insights do these different representations provide?



x	y=2^x	Δy/Δx	(Δy/Δx) ÷ y
1	2		
1.01	2.0139111	1.391110011	0.690750456
1.02	2.02791896	1.400785947	0.690750456
1.03	2.042024251	1.410529183	0.690750456
1.04	2.056227653	1.42034019	0.690750456
1.05	2.070529848	1.430219437	0.690750456
1.06	2.084931522	1.4401674	0.690750456
1.07	2.099433367	1.450184556	0.690750456
1.08	2.114036081	1.460271388	0.690750456
1.09	2.128740365	1.470428378	0.690750456
1.1	2.143546925	1.480656017	0.690750456
1.11	2.158456473	1.490954794	0.690750456

What would you notice if the separation in the values of *x* was 0.001 rather than 0.01?

[top]

Post-16 Group Newsletter May 2011

The Mathematical Association and The National Association for Numeracy and Mathematics in Colleges working together to support post-16 mathematics education

Skilled to Go

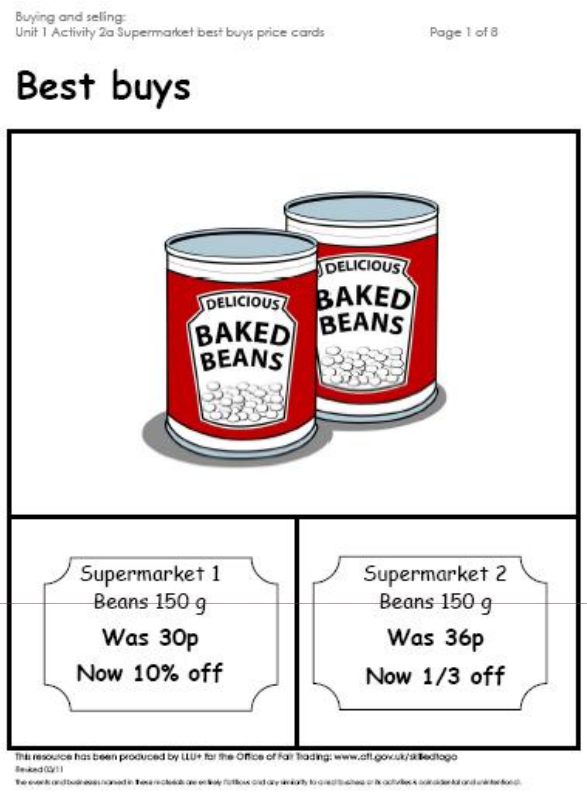
It was two years ago, at the NANAMIC Annual Conference that I was introduced to the brilliant, free resources called *Skilled to Go.* They are produced by the Office of Fair Trading for use in schools and further education colleges with learners from entry level to level 2.

In the workshop, the presenter introduced us to some of the activities and we were all hooked. They were colourful, interactive, engaging and up-to-date. Also, they were legally accurate because of who produces them.

We were then introduced to the whole package which has since been developed to include full teacher notes and the activities referenced to the Adult Core Curriculum. They even produce different resources for Scotland, Wales and Northern Ireland where consumer law is different.

As a manager and teacher trainer I was happy to recommend them to my staff and to my students. They fed back to me how useful they found them. More recently, my daughter was completing some of her teaching practice in a young offenders' institute. She had to teach money management to learners who were challenging and difficult to motivate. She asked me for ideas.

I was happy to recommend *Skilled to Go* to her. With a few adaptations, she was able to use many of the resources and to engage the learners. And that is one of the beauties of them; they can be easily changed. Some of the topics covered are relevant to young adults while others are more concerned with running a home. But all are up-to-date and relevant. The Office even offer email notification of when they update them. The last major overhaul was in March 2011.


Buying and selling:
Unit 1 Activity 2a Supermarket best buys price cards Page 1 of 8

Best buys

This resource has been produced by LLU+ for the Office of Fair Trading: www.oft.gov.uk/skilledtogo

The topics covered are Buying and Selling, Technology, Utilities, Scams and Buying and Selling a Car. It deals with choosing the best buys/deals, knowing your rights as a consumer, being empowered to complain and how to avoid the pitfalls.

To obtain the resources and to register for updates, go to

http://www.oft.gov.uk/skilledtogo.

You can even book free staff training in the use of the resources.

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Post-16 Group Newsletter May 2011

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Alex's Adventures in Numberland

Dispatches from the Wonderful World of Mathematics

Alex Bellos, Bloomsbury Publishing, London, 2010, ISBN 9780747597162

If you are looking for a world tour of mathematics, presented in an enthusiastic, engaging and easily accessible style, then this book is for you. In researching the topics the author has ventured to India to find how the country invented zero and to Reno to experience probability in action. He has learned about ethnomathematics, how maths was shaped by religion and has gained an appreciation of the 50p piece.

We meet the Munduruku from the Brazilian Amazon whose language has no tenses, no plurals and no words for numbers beyond five. Consideration is given to a variety of cultures and languages and how western languages seem to be working against any mathematical ease of understanding.

The x-factor (algebra), geometry, sudoku, slide rules and statistics are all explored with intriguing insights into the people associated with them and the book is illustrated throughout with many photographs and images.

Alex Bellos has a degree in Mathematics and Philosophy. He has spent his working life as a journalist and author and now lives in London. He writes in a unique style – easy for both non-mathematicians and mathematicians alike. This book was first recommended to me by a colleague who is a literacy tutor.

[top]

Recognising Mathematics Teachers

Mathematics teachers in all sectors can apply to be recognised as Chartered Mathematics Teachers if they are members of the

- **Association of Teachers of Mathematics**,
- **Institute of Mathematics and its Applications**,
- **Mathematical Association** or
- **National Association for Numeracy and Mathematics in Colleges**

and can demonstrate they satisfy the required standards in

- Pedagogy,
- Mathematics,
- Experience and
- Continuing Professional Development.

The CMathTeach designation, which incorporates a balance of teaching skills and mathematical knowledge, identifies its holders as being leading members of their profession and having an equivalent standing to chartered professional in other fields.

The CMathTeach designation was introduced within the last two years and already several teachers in the post-16 sector, who work in a variety of settings, have been awarded the designation. To find out more about CMathTeach, what is required, and how to apply, please contact one of the organisations listed above.

[top]