

**The Newsletter  
of the  
National Association for  
Numeracy and Mathematics  
in Colleges**

*An association for all in the Lifelong  
Learning Sector*

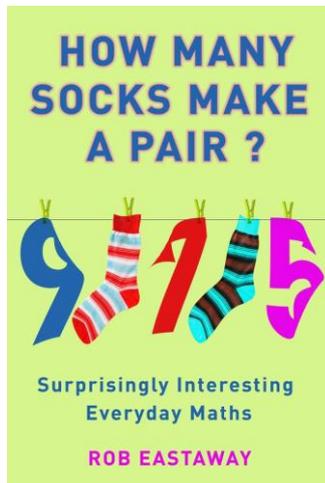
**Spring 2009**

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NANAMIC would like to thank all contributors to this edition of the newsletter. If you would like to contribute to the next newsletter, please contact the Administrator by emailing [ways2teach@ntlworld.com](mailto:ways2teach@ntlworld.com)

## Book Review



How Many Socks Make a Pair  
Surprisingly Interesting Everyday Maths  
Rob Eastaway (2008)

I was hooked by the surprises in the first chapter and all relating to such everyday items as a mirror, a newspaper, a birthday and a football pitch. As you read on, finger counting, packs of cards, paper folding and twisting are all explored with intriguing results. It turns out that even the simple question 'heads or tails' can be more biased than you might have thought. There are number curiosities, palindromes and patterns and would you believe there is a connection between chocolate and football?

If you want to introduce the element of surprise into your teaching then this is the book for you. Rob Eastaway has brought together a delightful collection of, to quote the author, "*the counter-intuitive bits of maths that I love best, particularly the examples that seem to clash with our own experience of the world.*" A very good read.

Viv Brown

**The next Summer Conference will be held on  
Wednesday 24<sup>th</sup> June 2009  
at  
The Stables, High Melton, Doncaster**

Details and booking forms can be found on the website [www.nanamic.org.uk](http://www.nanamic.org.uk) or from the Administrator by emailing [ways2teach@ntlworld.com](mailto:ways2teach@ntlworld.com)

To whet your appetite for attending this year's conference, below are reports on some of the workshops at Conference 2008.

## Summer Conference 25<sup>th</sup> June 2008

Last year's conference was held at Birmingham City University and whilst providing a location convenient for delegates in the Midlands, north-west and south-west, was also attended by delegates from as far afield as Kingston-upon-Thames and Orpington, Kent. The keynote address was given by Richard Lissaman from MEI and once again we had a variety of workshops catering for teachers at all levels of maths and numeracy. The feedback we received was very good and below are some of the comments we received.

*Rachael Read, excellent and very practical.*

*Frank Eade- Inspiring session. Brilliant*

*Bob Francis - stimulating material for work with students, brilliant, extremely useful  
I was happy this year with the choice of workshops and the level of teaching materials that were addressed.*

Many delegates said how good it is to get the opportunity to discuss issues with colleagues and to find it is "*interesting that many teachers' feelings are similar.*"

### Workshop reports

Thank you to all those who contributed reports and some of them are included here. We will publish all of them on the website.

#### Bob Francis's workshop on using spreadsheets as an aid in teaching numerical methods

Having struggled to hold the interest of my students with this topic a few weeks earlier and feeling short of inspiration, I found this workshop very refreshing. Bob's enthusiastic attitude was infectious and he had evidently done so much preparation to produce an interactive teaching and learning aid. The concepts became clear visually (how I had struggled to draw cobweb and staircase diagrams clearly on the whiteboard! ) encouraging the students to experiment with different starting values to find convergence. Bob gave us all a CD with other useful programs as well. Having seen how he set it all up I have been inspired to try the same techniques with other topics and look forward to trying them out with my students this coming year.

Sandra Hills  
Orpington College

## Functional Skills Workshop led by Fiona Allan



Delegates were asked to work in groups of 4 and asked to look at Functional Skills Mathematics specimen papers from the various exam boards. The following points were addressed.

- What do you like about the specimen papers?
- What do you dislike?
- What will learners like about the paper?
- What will learners dislike about the paper?

The session promoted a lot of discussion and was particularly useful for teachers currently involved in the pilot for Functional Skills and those teachers about to get involved. The whole idea of functional skills was not favourably received amongst those present where they were linked to candidates passing the GCSE maths. Some exam boards' specimen papers were disliked with some questions not contextualised so a lot of the papers at present do not lend themselves to vocational areas and at least one had an error or was misleading, hence opening students up to failure.

The general feeling - a lot of discussion and action is required by teachers who hope their voices will be heard. Fiona agreed to circulate feedback information from the session via email.

Sonia Lawrence  
Sutton Coldfield College

## Report on Bob Francis Fabulous Fibonacci workshop

A delightful, well illustrated, excursion into the part played by Fibonacci sequences in nature. We investigated how fast rabbits can breed and the family tree of a honeybee together with the spirals on a cauliflower, coneflower and sunflower. We used our own spreadsheets to investigate how the ratio of successive terms of a Fibonacci sequence tend to the Golden Ratio and viewed how this ratio is present in art. The finale, following an illustration of the Fibonacci sequence in music, was a Fibonacci Waltz by Ted Froberg. A very engaging session with a very useful Powerpoint presentation to take away at the end. Bob referred to the excellent website of Ron Knott (<http://www.mcs.surrey.ac.uk/Personal/R.Knott/Fibonacci/>) which formed a starting point for the development of some of Bob's material for this session.

David Martin

*Rachael Read from King Edward VI Grammar School in Chelmsford ran three workshops for us so was kept very busy all day. Thanks Rachael.*

### **Problem Solving – Rachael Read**

Rachel is an Advanced Skills teacher who uses problem solving approaches extensively in her teaching. She has written numerous activities which combine both problem solving approaches and the making of connections between mathematical topics. In this session she shared some of the resources she has written with us.

A typical resource would be the one on Pythagoras. The textbook approach can be ineffective and very boring – Rachael’s approach isn’t!

We were first given a set of 18 cards containing statements and questions. We had to work out from the cards where to start. The first task was to solve an equation and then ask Rachel for a worksheet of diagrams – a neat way of assessing how far through the task we were. The worksheet contained a variety of shapes. Our task, using the information on the cards, was to name the shapes and find the lengths of their sides. This involved us in scanning each card to work out where to start, and using the properties of the shapes and Pythagoras Theorem to calculate the lengths. We worked in pairs or threes, with Rachael monitoring our progress and only intervening when absolutely necessary.

Once the card activity was completed Rachael’s usual practice is to issue three or four questions based on the activity for homework. This is either pupil or teacher marked, and provides a more formal record of pupil progress. Where pupils mark their own work, or peer mark, answer sheets may contain deliberate errors, forcing pupils to really engage, to discuss the task in hand and to decide for themselves whether the solution under dispute is correct or incorrect.

I left this session wanting to use this teaching approach tomorrow. Providing the material is correctly pitched to challenge but not overwhelm the learner, (as it was) this is an interesting and stimulating way to learn.

Joan Ashley

### **Engaging Algebra – Rachael Read**

Rachael’s infectious enthusiasm for mathematics was conveyed throughout the session. She shared with us a number of resources that learners find stimulating in that they are

- varied,
- competitive,
- collaborative,
- contain problem solving or puzzles, and are
- not bookwork!

Teachers want activities that

- are varied
- are easy to use
- fit into the curriculum
- satisfy observers e.g. differentiation etc.

Some of the activities are of the collaborative card matching type that Malcolm Swan and others have proven to be successful. My A level students have enjoyed ordering the proof of the formula for solving quadratic equations. Working in a boys' grammar school, she finds competitive activities provide motivation and maybe those of us working in FE with learners who see themselves as GCSE "failures" should consider sensitively organised competition as a way of building confidence with our students. She provides differentiation by making activities open ended and allowing students to choose the level of difficulty. She generously allowed us to take copies of materials away on our memory sticks and I am sure provided us with ideas for creating even more activities for ourselves.

Alison Brittle

### **"Active Maths" – Rachael Read**

The objective of the session was to get students or the audience out of their seats and working in groups or together.

There were lots of practical ideas for involving movement and sound in teaching. I particularly liked Angle Kung Fu which had various hand and arm movements and sounds to relate to the terminology such as acute angle, obtuse angle etc. I tried this back at base and got lots of "wow, what an idea, but ...yes the younger students will love it"

There were some wonderful ideas to do with travel graphs, which involved students walking around the room, and other students using a travel graph to illustrate the movement which was given on a card. I liked this idea as I could see my adult evening class relating to this as well as my group of sixteen year olds!

The activities ranged across the ability spectrum, and one that we were asked to do in pairs was a card template based on graphical transformations, but not on the same kind of template used by the jigsaw software. This was quite challenging as it expected us to think in flexible ways, but also to discuss the theory and apply it!

Overall this was a very enjoyable session, one in which no-one was left sitting still and listening for too long!! The movement and sound really encouraged everyone to participate in each activity. Well done to Rachael the presenter!

Maggie Thomas

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## **[During the day members of the NANAMIC committee ran workshops covering a variety of topics.](#)**

### **Starters - Viv Brown**

Viv's session concentrated on starters to promote discussion and learners working together. These were drawn from a variety of sources, including photographs from [www.problempictures.co.uk](http://www.problempictures.co.uk)

Loop or follow-me cards at different levels from <http://www.primaryresources.co.uk/maths/mathsA2.htm>

and

[http://www.standards.dfes.gov.uk/intervention/assets/documents/loop\\_cards.pdf](http://www.standards.dfes.gov.uk/intervention/assets/documents/loop_cards.pdf)

Using poster activities with examples drawn from the QIA (Standards Unit) 'Improving Learning in Mathematics' which can be downloaded from the QIA Excellence Gateway at

<http://teachingandlearning.qia.org.uk/teachingandlearning/#>

or hard copies of 'The Box' are still available from [www.ncetm.org.uk](http://www.ncetm.org.uk)

Examples of ‘Odd One Out’ and ‘Spot the Difference’ were also explored. These can be found on the NCETM web portal in the Subject Learning Coaches’ Community at <http://www.ncetm.org.uk/Default.aspx?page=14&module=com&mode=102&comcid=1305&comf=19289&comu=0#fileviewer> Please note that to access these free resources you will need to register with the NCETM and join the Subject Learning Coaches’ Community. It takes a few clicks to get there, but is worth the effort as there are lots of other useful ideas, activities and discussions available at [www.ncetm.org.uk](http://www.ncetm.org.uk)  
Viv Brown June 2008



### **Learning Grids- Joan Ashley**

Joan’s session introduced a type of resource called learning grids. Rather than working through exercises for practice, learners are asked to work together to match numbers to a set of statements on a grid. Limiting the set of numbers available increases the level of challenge. By talking through the task together learners can develop their understanding and teach each other. The idea can be used for any topic or group of topics.

You can find two examples at <http://www.ncetm.org.uk/Default.aspx?page=14&module=com&mode=102&comcid=2647&comf=17793&comu=0#fileviewer>. (Please note that you will have to log in to the NCETM website and join the Thinking through Mathematics community.) Have a look at the other resources in this community too.

The consensus from those present was that this is a type of activity which they will take back and use in the classroom.

### **Tarsia Software(Jigsaws etc) - Sally Barton**

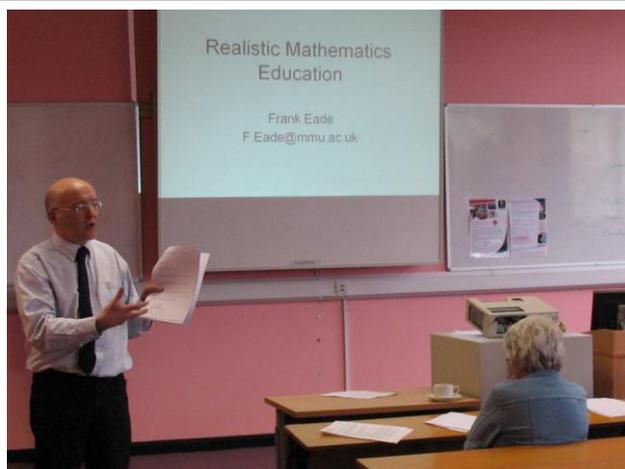
Delegates looked at how to get the most out of this software

- a) how to use the Expression Library feature
- b) how to use the same material for different levels
- c) tips and tricks to make your life easier and your jigsaws more effective

d) how to share the jigsaws you have created

Opportunity was given to look at different styles of questions and answers and structuring that you can use in the jigsaws to explore the different kinds of activity – revision hexagons, follow me cards, exploration/ discovery hexagons, domino pattern matching – you can use to support your teaching and the student’s learning.

Delegates were invited to email beforehand, or bring along, problems they had with the software to try to answer them on the day.



### **Realistic Mathematics Education - Frank Eade**

Frank Eade and his colleagues at Manchester Metropolitan University are developing secondary mathematics materials based on the experience of mathematics educators in the Netherlands who have found that using realistic contexts both to introduce a topic and to develop mathematical concepts has been highly successful in raising standards of achievement there.

The approach is to start with informal knowledge and everyday pictures before rushing to formal or empty symbols. Carefully chosen, high quality pictures of piles of fruit, crates of bottles, candles and stacks of supermarket trolleys all promote debate about mathematics at levels from entry to GCSE.

An initial problem such as “Which is bigger  $\frac{2}{3}$  or  $\frac{3}{4}$ ?” encourages both discussion and use of visual representation to solve it. Working with carefully selected and high quality pictures of patterns of tiles helps learners to think deeply about area and distinguish it from perimeter. This emphasis on dealing with misconceptions and use of concrete ideas is likely to be of particular use with students re-sitting GCSE maths who have found previous more abstract approaches unsuccessful.

Further information can be obtained from [F.Eade@mmu.ac.uk](mailto:F.Eade@mmu.ac.uk)

Alison Brittle

## Dyslexia and Maths

In February NANAMIC ran a Dyslexia and Maths training day at Forth Valley College, Stirling. This took place on the 2<sup>nd</sup> February, the day the snow arrived. This was our first venture into Scotland and we hope we will be able to run more training days in the future, preferably in better weather. Our thanks go to all those who managed to make it to Stirling and I am glad to say everyone made it home safely. We would particularly like to thank Julie Kay for her excellent presentation and are glad to say she made it back to Somerset without incident. Below is a report on the day from one of the delegates.

### Maths & Dyslexia Julie Kay

In spite of the inclement weather, many people managed to make it to Stirling for the informative session on Maths and Dyslexia by Julie Kay. The audience consisted of an eclectic mix of experience, age and all had different reasons for attending and we were all catered for. We explored how factors affect maths learning for the dyslexic learner, especially mathematical vocabulary. As educators we shouldn't take for granted that dyslexic learners can make links when it comes to generalising and these links may need to be pointed out! Many dyslexic learners have particular problems with short term memory so oral arithmetic problems can be very daunting for them. They also are susceptible to transposing numbers and text, being disorganised in presentations, have poor writing skills which collectively can create so many problems and frustrations for the learner and only adds to their already low confidence and concentration.

As part of the diagnostic we learned to identify the 'Inchworm', who works mechanically following written methods without understanding, compared to the 'Grasshopper', who breaks down the problem, probably working from a trial answer, performing the whole calculation mentally and avoiding any written evidence making it difficult to correct any mistakes. These two cognitive styles need to be combined to improve mathematical learning. It was interesting to see the results of a survey carried out between the Netherlands, Ireland and England and how changing teaching activities and self checking methods in England brought the learners to the mid-line alongside their non-dyslexic, mainstream peers. Julie introduced us to different strategies and ideas for short programmes to help improve weaknesses identified in a sample of learners, as well as some useful resources. We were all intrigued with the beads and I, like most people, came away with a superb idea for a simple resource which I can easily make! The weather unfortunately forced the sessions to be shortened but nevertheless it was enjoyable and informative as well as challenging. Attending courses allows us to improve our approach to learners encountering difficulties, it helps us reflect on our own teaching methods, reinforcing as well as introducing new ones, and above all helps us to share ideas and good practice.

Sue Evans, Lakes College

## **NANAMIC – the early days** by Jack Abramsky and Huw Kyffin

NANAMIC's founding conference was held on June 30th 1993 at East Warwickshire College in Rugby. It was attended by 212 delegates, representing 117 colleges. This, however, followed a great deal of activity in the previous years. Several important reports in the 80s set the scene for the establishment of NANAMIC, starting with the Cockcroft<sup>1</sup> report, a wide ranging and influential report which had a major influence on school mathematics but which also gave a great deal of attention to the way mathematics is used in the workplace. A series of three reports on mathematics in FE colleges prepared by HMI<sup>2</sup> pointed out some problems of quality in the provision of mathematics in FE. One of them, the Mathematics in NAFE report concluded with the damning-with-faint-praise statement that "on the whole mathematics in FE was successful within the limited aims it set itself", but tended to be routine and uninspiring.

These reports identified the fragmentation, and even the apparent invisibility, in many instances, of mathematics across colleges as major issues. Frequently, Principals of colleges were unaware of the full range of mathematics teaching within their own colleges. At the same time, large Local Authorities like the Inner London Education Authority recognised that there was a need to develop a coherent cross-college approach to mathematics teaching. A paper published by the Institute of Mathematics and its Applications<sup>3</sup> examined in detail how staff teaching mathematics are deployed across a typical college. Out of a total of 29 staff who taught some mathematics only 5 taught it for more than 15 hours a week, with 13 staff teaching it for 5 or fewer hours a week. The research also showed that mathematics was taught across all the faculties of the college.

Following a very successful HMI conference on mathematics in FE, a group of HMIs led by Ernie Haidon, together with Huw Kyffin, FE Inspector for Kent and Dr Jack Abramsky, Head of Mathematics at Kingston College of Further Education developed proposals for the establishment of an organisation which aimed to address the issue of the development of mathematics within colleges. This gained the support of a number of college Principals, including the Douglas Cotton, then Principal of East Warwickshire College in Rugby, who graciously offered his college as the venue for the inaugural NANAMIC conference in 1993.

The association was established with the following Purpose and Aims:

**Purpose** – To assist colleges in developing quality in all aspects of numeracy and mathematics in further education by focusing on strategic, organisational and policy issues.

### **Aims**

- to monitor and provide information on curriculum developments and act as a focus for the exchange of good practice
- to advise on the role of numeracy and mathematics in aiding progression in education, training and employment

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<sup>1</sup> W.H. Cockcroft Mathematics Counts HMSO London 1982

<sup>2</sup> Mathematics in FE HMI Report London 1982

Non Advanced FE in Practice, 6 Computers and Mathematics, HMI Report London 1987

Mathematics in FE HMI report London 1988

<sup>3</sup> Mathematics in Further Education, Huw Kyffin, The Institute of Mathematics and its Applications Bulletin December 1989 Vol 25

- to represent the sector nationally and respond to national academic and vocational; initiatives
- to monitor and provide information on learning resources
- to liaise with other national numeracy and mathematics organisations and associations
- to work to improve the accreditation of achievements across all education sectors
- to liaise with the Association for Colleges (AfC) on matters related to numeracy and mathematics
- to form working groups as necessary to review particular issues and produce position papers
- to organise conferences and/or staff development activities.

The first NANAMIC Committee was immediately established with Huw Kyffin as Chair, Dr Jack Abramsky, Head of Mathematics at Kingston College of Further Education, as Secretary and Dr Keith Stapleford, Principal of Peterborough College as Treasurer. The other members of the committee were Liz Thunhurst, Head of School at Guildford College, as Minutes Secretary and Conference Organizer, David Ellerby, Vice-Principal of Harlow College, Ann Illis, Principal of Hammersmith and West London College, Alex Cryer, Head of Mathematics and Computing at St Austell College, as Editor of the Newsletter, Helen Poulter of SE Essex 6<sup>th</sup> Form College, and Viv Brown of Gateshead College. The late Professor Trevor Easingwood represented the IMA as a co-opted member and HMI David Dana represented the HMI.

In view of the mission of NANAMIC and the existing professional bodies that serve the mathematics community such as the Institute of Mathematics and its Applications and the Mathematics Association, it was decided that membership of NANAMIC should be offered to institutions in the FE sector rather than to individuals. In its first year, NANAMIC had 160 colleges across England and Wales registered as member organizations.. The cost of membership from inauguration until July 1995 was £50 per college.

The pattern of an annual summer conference and AGM at Rugby was established, and continued through the 90s. The first of many one day specialist conferences was held in the autumn of 1993 in Hammersmith and West London College on Application of Number in GNVQs, which were a relatively new development at that time and causing much anxiety. At this conference delegates completed a questionnaire on Application of Number and how it was being delivered. The results showed a concern that not enough staff development was being undertaken to support the introduction of Application of Number.

The first residential conference was held in the spring of 1994 in Milton Keynes and proved to be a huge success, not only in the quality of the formal inputs but also in the extent and lateness of the conversations about mathematics that ensued throughout the conference.

Further residential conferences followed in Cambridge and in Exeter in 1994 and 1995. Highlights of some of the talks include Christopher Zeeman's talk on the centrality of mathematics for intellectual integrity, a truly inspiring talk. John Mason of the Open University talked about his experience of working with adults and establishing confidence in mathematics, when they had often had negative experiences of it at school. David Carter of Leeds University gave an exciting talk with amazing images on Fractals. NANAMIC also established a tradition of having an entertainment. We were privileged to experience profusely illustrated lectures on mathematics and magic by Michael Wardle of the University of Warwick, and on the mathematics of juggling by Dr Colin Wright. The

latter ended with Dr Wright juggling 5 balls as he cycled on a unicycle whilst explaining the group theoretic principles behind different methods of juggling, and how the mathematics led to the discovery of a hitherto unknown juggling routine! In one conference, the Chair and Secretary devised a quiz on the History of Mathematics, with the winning team receiving a copy of a book by Ian Stewart. Professor Stewart himself gave a fascinating talk on the mathematics of the motion of four legged animals. Other well known contributors at these conferences included Professor Margaret Brown talking about National Curriculum developments at key stages 3 and 4, Professor Rosamund Sutherland on spreadsheet approaches to mathematical modelling, Dr Tony Gardiner on stretching the more able students, Dr Kenneth Ruthven on the use of graphics calculators and there were many more.

In 1994, NANAMIC produced A Help Pack for the GNVQ Core Skill of Application of Number which proved to be a useful resource for colleges. Then, in 1995, in order to help promote mathematics within colleges, NANAMIC offered three £100 prizes to students (of NANAMIC member colleges only) who showed exceptional promise in A level mathematics. The panel of judges (NANAMIC officers and an independent, respected mathematician) were looking for “evidence of outstanding academic achievement, or performance beyond all expectations and/or against the odds, or any other criteria that a college cares to document”. There was only one winner – Krishnan Satkunam who passed 10 mathematics modules all at grade A and collected the equivalent of 4.5 GCEs all at grade A.

Through its links with HMI and other agencies, NANAMIC also sought to influence policy development and responded appropriately to policy developments in FE through the 90s. By the time of the second annual conference NANAMIC had representatives on the National Council for Vocational Qualifications (NCVQ) advisory group for mathematics and numeracy, and on the Joint Mathematical Council (JMC) of the United Kingdom. In the following year, further links were established with the Schools Curriculum and Assessment Authority (SCAA, now QCA, the Qualifications and Curriculum Authority) and the Further Education Funding Council (FEFC).

NANAMIC is today an important player in the world of mathematics and numeracy education. It has worked to improve the quality of the teaching and resourcing of mathematics and numeracy in colleges of further education, in sixth form colleges and in tertiary colleges. It has striven to get managers to understand the problems of the delivery and coherence of mathematics in colleges. It has worked to improve the professional development for all teachers of mathematics, including the many part-timers that work in the system. It has also contributed to work to develop qualifications and assessment instruments that are fit for purpose. All these functions will continue in the years to come. The newly emerging issues will be Functional Skills, mathematics in Diploma courses, the recently announced pilot in a ‘double’ GCSE for mathematics and changes to AS and A level Mathematics and Further Mathematics.

*NANAMIC would like to thank Jack and Huw for their contribution to this newsletter, giving a comprehensive history of the Association. In the next issue we will look at the recent activities of NANAMIC and how we see its future development*

NANAMIC can offer the following training to groups anywhere in the country. This can be for individual organisations or groups of organisations.

Costs will depend on numbers attending. For further details and to discuss options please contact the Administrator

Piloting the NCETM  
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**National Centre**  
for Excellence in the  
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## **Improving Learning in Mathematics** **approaches that encourage active learning including group** **work, discussion and open questions**

### **Programme**

09:45 Welcome & Registration

10:00 Discussing beliefs about learning & teaching—the aims and background to the project approaches and resources

10:45 Activities and approaches from the Improving Learning in Mathematics resource

12:30 Lunch

13:15 Further activities from the resource

15:15 Plenary and Evaluations

15:30 Close

### **Who is this event for?**

- All teachers of maths whether newly qualified or experienced
- Staff who assist in teaching maths without a maths background e.g. teaching assistants
- Individuals who would like to add to their repertoire of teaching techniques and resources

### **What will it cover?**

- Exploring beliefs about teaching and learning
- The research underpinning 'Improving Learning in Mathematics' (ILIM)
- Approaches, activities and learner responses to ILIM
- Responding to learners differing abilities and learning styles

For further information please contact:

Lesley Way  
NANAMIC Administrator and Conference  
Organiser

Email: [Ways2teach@ntlworld.com](mailto:Ways2teach@ntlworld.com)

[www.nanamic.org.uk](http://www.nanamic.org.uk)