MATHSHUBS
BUCKS, BERKS AND OXON

BBO MATHS HUB NEWSLETTER

Term: Autumn | Issue 1 | Date: 28 September 2022

NEWS FROM THE BBO MATHS HUB TEAM

Dear all,

Welcome to our first newsletter of 2022-23. We hope you have all had a great start to the new academic year. It has been an extremely busy few weeks here at the Maths Hub as we plan and schedule all of the free professional development opportunities and activity available to you in 2022-23. We are entering the ninth year of the Maths Hub programme with NCETM, funded by the DfE, and we are delighted to be going from strength to strength with the numbers of schools and teachers who we work in partnership with to develop subject and specialist knowledge in the teaching and learning of maths.

Some particular things to note - subject knowledge specific professional development is offered through the currciulum hubs. We have programmes scheduled for Early Careers Teachers in both Primary and Secondary phases so please look out for those. Details of some of the primary groups already available for booking follow in this newsletter. Primary Early Careers Teachers who worked in our specialist knowledge groups last year are invited to continue on a second year so please check that you/your teachers have signed up for this.

On Monday 26th September we welcomed around 100 Primary Maths Leads and Headteachers to our launch for our revised Sustaining Teaching for Mastery programme. If you are a school who has ever worked with us in any phase of Teaching for Mastery then you are still eligible to join, so please **get in touch** or **complete this form** to join. Being part of this programme will mean joining a supportive network of local Maths Leads and will open up opportunities for the rest of your staff to join collaborative online twilight sessions throughout the year. If you would like to know more about this or any of our programmes, please **register your interest** here and we will be in contact.

Please remember to sign post colleagues in your departments or in other schools who are not in touch with us to join our mailing list. We want to ensure that all schools and teachers in the BBO Maths Hub area have access to the free and high quality professional development available.

We hope you enjoy reading the articles in this edition of our newsletter. If you have any questions or queries about what we offer then please contact us.

We look forward to working with as many of you as possible over this academic year.

Jennie Forde and Jo Walker

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Working with NCETM
NATIONAL CENTRE FOR EXCELLENCE IN THE TEACHING OF MATHEMATICS

If you are having trouble opening the links in this newsletter in the online viewer please click on the book icon on the bottom right to disable page turn transitions

Learning to talk...and learning through talk – the development of Oracy skills in mathematics lessons

PRIMARY

Brenda Robertson Work Group Lead, BBO Maths Hub

Since the pandemic, several reports have made reference to the impact it had in many ways on the development of children's talk. Very young children in their formative years had fewer opportunities for socialising, talking and listening, and many pupils were not necessarily exposed to the development of mathematical language, explanations and conversations that are carefully facilitated across a series of mathematics lessons. They missed opportunities to discuss mathematical problems and possible solutions with their peers and teachers, which we know is supportive of the development of reasoning skills.

The Oracy Research and Innovations Work Groups set out to examine and explore how Oracy skills can be strategically and systematically developed so that they support pupils in deepening their understanding of mathematical concepts and skills, and also help them to further develop and refine their reasoning skills.

Teachers who took part in the Oracy work group last year spent time initially analysing the quality of the mathematical conversations in their classrooms and schools, and then, over the course of a few months, trialled and shared different approaches and strategies to develop this further. They quickly became encouraged to see that small changes to practice often made monumental changes to the way pupils felt confident to articulate their mathematical thinking, understanding and ideas. Moreover, pupils felt more empowered and many of them commented on how much they were enjoying mathematics with what they perceived as more opportunity to talk about it. All work group participants had clear evidence (qualitative and quantitative) by the end of the work groups that there had been a positive impact on pupils confidence, mathematical reasoning and overall progress in their learning.

The power of mathematical talk has also been the focus of research by Robin Alexander. He wrote "Dialogic Teaching – Rethinking Classroom Talk" initially in 2004, and more recently "A Dialogic Teaching Companion" (2020). He stated "Dialogic teaching is good for students. It harnesses the power of talk to engage their interest, stimulate thinking, advance understanding, expand ideas and build and evaluate arguments empowering them for life-long learning and democratic engagement. Being collaborative and supportive, it confers social and emotional benefits too".

In the final report of the "Speak for Change" Inquiry (2021), Emma Hardy (Chair of the Oracy all-party parliamentary group) said ""I saw first-hand how young children's ability and confidence in spoken language provides the bedrock for their learning...Throughout this Inquiry we were reminded of the educational benefits of effective and purposeful talk at every stage of schooling and how a greater focus on oral language improves outcomes for the most disadvantaged students"

Look out for future opportunities to participate in Oracy work groups in 2022 – 23.

Getting Back into AFL Routines

SECONDARY

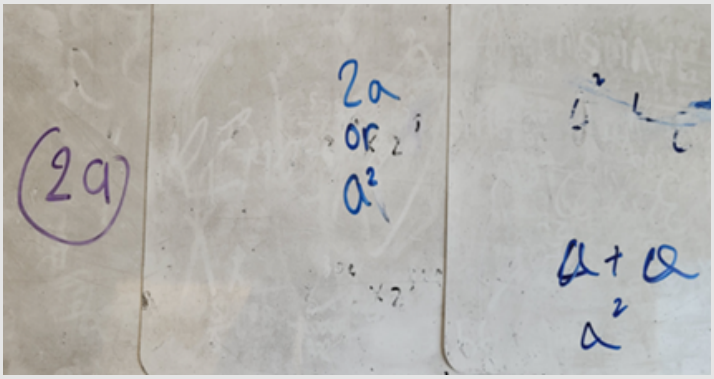
Usman Nasir Secondary Mastery Specialist, Cheney School

One element of my teaching I keep referring back to is the ability to see how every student is doing at any precise moment. I have seen how student understanding develops through utilising various techniques such as think-pair-share, hands-down questioning, peer assessment, and feedback. However, I cannot always unequivocally say whether every student has understood the concept until the end of every unit, suggesting my practice has been focused on the assessment of learning rather than assessment for learning.

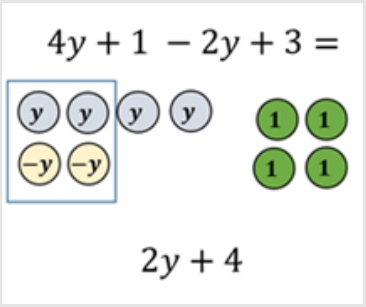
With the start of the new academic year, I have been trying different ways to assess all students throughout the learning process and finding a method that works for me. I have summarised the methods I have tried out below.

Mini whiteboards

Mini whiteboards are the most common piece of equipment in a maths classroom, but I feel that I have not effectively used them until now. Over the summer, I read a blog on the need for checking each row compared to seeing all answers in one go and, therefore, giving a better understanding of the misconceptions of each student. I have been trialing this out and found that by carefully examining each row, I am paying much more attention to what each student wrote rather than a quick oversight on the final answer.



Before teaching how to collect like terms, I wanted to check whether there was a common misconception when adding the same two terms. By tackling this misconception head-on, I ensured students knew why it was rather than . As this was a common misconception within the class, I knew I had to go back to using manipulatives for collecting like terms to ensure students would not gain the same misconception again.



Not having manipulatives to hand, I used virtual manipulatives to show how to collect like terms and then got them to model back on mini whiteboards. I analysed each row carefully, checking that each student showed the process by drawing out the counters. During individual practice, I got the students to continue to draw the counters until they were confident.

Mini whiteboards are a vital tool for every maths teacher, especially when you want to see individual workings and what misconceptions there are. The only downside is when pens run out of ink!

Getting Back into AFL Routines (cont.)

SECONDARY

Usman Nasir Secondary Mastery Specialist, Cheney School

Multiple choice cards

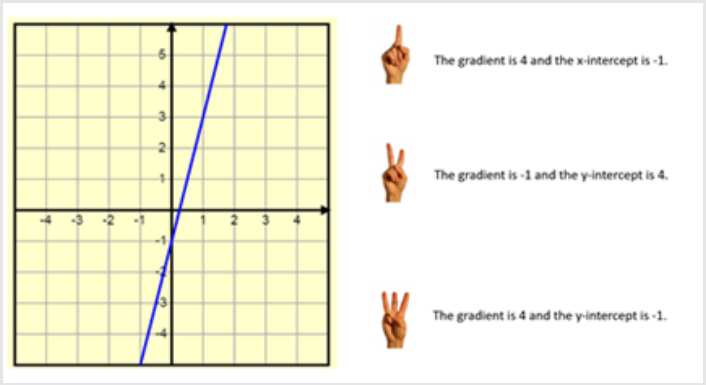
One website that most maths teachers use is Diagnostic Questions. The questions are of high quality and built upon misconceptions. To support with answering the multiple choice questions, I printed cards with each option written on them and got students to stick these in the back of their books.

In my year 10 class, I used these cards at the beginning of a unit to assess whether students could divide with decimals when it was the dividend and divisor. This reaffirmed my assumption that the students would struggle with the latter. As teachers, we have a lot of content to get through in a short time, so using this knowledge, I went back to my unit plan so lessons would be more meaningful by focusing on this.

I have found this to be better than individual cards, as they won't be lost within the book and is more challenging for students to compare answers.

Finger voting

Having seen other teachers use finger voting, I have realised how quick and easy it is. It requires nothing printed or any technology, so it is a great way to check understanding. Like the other techniques, giving students time to think about the answer before voting is vital.



Having used finger voting as a plenary, I was able to quickly assess whether students were able to identify the gradient and y-intercept. This allowed me to see that 90% of students could answer the questions correctly, and I was confident to move on to the next part of learning. For the 10% of students who were still unsure, I was able to set an intervention on Dr Frost as part of their homework.

This technique has been a great way to check understanding when you do not have any equipment to hand. Unlike exit tickets, it's excellent for questions when you are not looking to check for specific methods.

Technology

I came across Mathswhiteboard.com while looking for different ways to implement technology in my classroom. This allows you to check understanding as you can generate new questions and increase difficulty, quickly discovering where the misconceptions might be.

Getting Back into AFL Routines (cont.)

SECONDARY

Usman Nasir Secondary Mastery Specialist, Cheney School

Going through the difficulty levels, I could see that the students in my class understood multiplying & dividing by powers of 10 and converting to standard form when numbers were positive. However, as soon as it got to the three-star questions, I noticed that less than 50% of the class were getting the answers correct, suggesting that I needed to reteach the process of writing in standard form when the numbers were less than 1. Using IDYDWD, I modelled how to answer these questions, allowing students to recall the method.

If you haven't come across this website already, it has excellent tools you can use for everyday teaching. However, the only downside of the MWB function is the need for students to have their own devices, which may not always be possible.

Summary

I hope these examples have given you ideas to try out in your classrooms. No matter which method you choose to use or what part of the lesson you use it in, I feel that it is vital to create routines and consistency with them. This will ensure all students know what to expect and allow a smooth transition between activities.

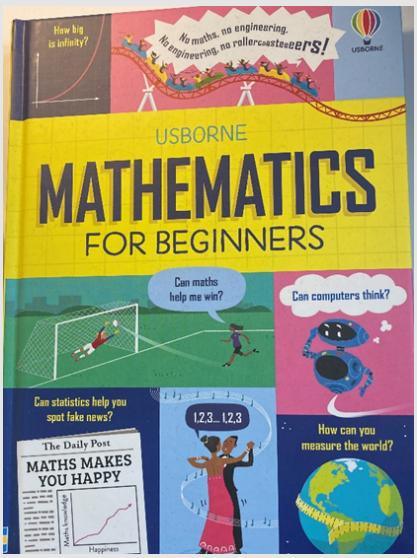
Book Review

SECONDARY

Dr Audrey Curnock Work Group Lead, BBO Maths Hub

Mathematics for Beginners by Tom Mumbray and Sarah Hall, published by Usborne

ISBN 978-1-4749-9854-3



If you are keen reader as I am, you will probably often rave about a book. This is one of those books that I am currently raving about. You will no doubt have read books about Mathematics and its history and you may wonder why you should read this one. What makes this one special that your school should have a copy and use it? Many other Mathematical books are written for older students or adults, so what makes this special is that it is aimed for year groups 5,6 7 and 8 primarily. So the style, the presentation and content have all been drafted to suit these ages – not only to suit them but to enthrall them. To open a door into the world of mathematics, a subject we probably see as beautiful, but younger people may see as difficult. How we perceive Mathematics is such an important part of how we interact with it and how we feel about it and how we progress in it.

How could a book for KS2 and KS3 hope to enthral students? It makes Maths come alive.

It is an exciting book because the presentation of the Mathematical content is beautifully crafted, and takes on the form of a type of comic book strip (think Marvel), which is ideally suited to young people. It is colourful and lively and developed to engage the younger reader. What is especially insightful is that there are three characters Nina, El and Marcus who journey with you in this book and they ask questions, helping our understanding and it is almost as if the reader is able to ask questions. themselves This helps develop fascination, critical thinking and insight.

This excellent book takes us on a journey through Mathematics and its history. It begins with how early civilizations needed maths for counting and numeracy in the sense of bartering, nd commerce. This journey continues with how numbers developed, starting in Babylon, then moves on to Ancient Egypt, then onto Greece and India. Chapters include one on Number (which travels from infinity to special sequences to primes.) There is a chapter on Geometry which looks at pi, measuring the earth, symmetry and even fractals. It does not shy away from advanced ideas – but describes them in an approachable way, e.g. a Mobius strip. It talks about the distance between 2 points in a plane and how we measure distance between 2 points on the surface of the earth. Wow! It has a chapter on Graphs and Charts and mentions Graph Theory (the Konigsberg problem). It looks at what is Proof – and even mentions Andrew Wiles' work and the Millennium Conjectures (in a simplified, gentle form). It has chapters on more modern maths – Probability and Statistics, Computing, and Mathematical Models. It also takes a look at jobs that use Maths. I highly recommend it to you. I was privileged enough to be asked to read this and comment on it, as it was drafted and prior to publication (but I do not receive royalties!).

Please note : these views are those of Dr Curnock, the BBO Maths Hub does not endorse any particular books nor receive anything from this review.

Introduction to Post-16 for 2022/23

Post-16

Fung (Yvonne) Poon Level 3 Lead, BBO Maths Hub

I hope you have all had a great summer, I believe most of us may feel ages ago. I would like to take this opportunity to introduce myself. I am, Yvonne Poon, Head of Maths and SLE at Baylis Court Girl School in Slough. We have been teaching KS3 Mathematics mastery for several years. Mathematics mastery has had a positive impact on our students, who have gained confidence with their mathematics, can tackle more complex problems, and can explain their work in more detail. We strongly believe we can apply the same mastery pedagogy in our KS4 and KS5 lessons as well as in KS3. I am glad that I have been given an opportunity to lead and share our good practice in a wider community i.e. YOU in 2022 – 2023.

Please welcome our 2022/23 Post-16 Team who will run the following work groups.

New to Teaching Core Maths with Megan Mcfarland

If you, or someone in your school, is new to teaching Core Maths, consider signing up for the fully funded New to Teaching Core Maths Work Group. This course will introduce the key ideas in Core Maths and supports teachers in developing specialist knowledge on six key themes including contextualised problem solving; applying Fermi estimation and modelling; developing critical analysis; making sense of finance; exploring statistics; using the pre-release materials.

Developing A-level Pedagogy with Chris Podger

If you teach A-level maths, sign up for the fully funded developing A-level pedagogy Work Group, exploring the overarching themes of the A-level qualification: problem solving and mathematical thinking.

Developing Core Maths Pedagogy with Beth Willamson,

If you are an experienced teacher of Core Maths, perhaps you would like to participate in the fully funded Developing Core Maths Pedagogy Work Group looking to develop effective teaching approaches and consider ways to increase student numbers. A focus on teaching mathematical concepts and process effectively through contextualised problem solving. Also, an opportunity to explore the pre-release materials for preparation for the exams.

Our Level 3 Work Groups received good feedback from the Work Groups of Core Maths and A-level Maths last year. Ideas from the Work Groups have been trialled and have been implemented in departments. Participants found it helpful to develop pedagogy which we hope will be of us to you this year too. Please do not hesitate to click on the links above to ind out mor informationm be sure to register with us as soon as bookings have opened (watch this space). We are arranging Open Morning/Afternoon observations in mid November for those who are new teaching or interested in taking up Core Maths in the future. We will send you the details as soon as we confirm the time and venue.

Primary Work Groups and Opportunities for 2022/23

PRIMARY

The Maths Hub Programme has PD opportunities for all teachers at all stages in their careers and across all phases. We are busy planning all of our programmes and dates this for year but are pleased to announce that bookings have already opened for many of our SKTM programmes in 2022/23. Follow the 'More Info' links for further details on the opportunities or click 'Book Now' to register for your place. Alternatively, contact info@bbomathshub.org.uk to discuss the best programme for you and your department.

All of our Work Groups are free.

Specialist Knowledge for Teaching of Mathematics – Primary Teaching Assistants

Who can take part?

These programmes are designed for primary teaching assistants who would like to develop their specialist knowledge for teaching maths. This may be particularly relevant for new TAs or TAs that have not received maths-specific training.

What is involved?

This project is designed to improve the subject knowledge and pedagogical knowledge for all practitioners teaching and supporting the learning of primary maths.

It utilises primary teaching assistant-specific materials and focuses on the following mathematical areas: What is effective in the learning and teaching of mathematics?; Number sense (part 1); Number sense (part 2); Additive reasoning; Multiplicative reasoning; Fractions. The modules are each designed to last three to four hours, but may last longer if delivered online. This programme will take place across the equivalent of four days.

What will you learn?

- Your pupils will demonstrate a positive attitude towards maths, being willing to have a go, persevere, and share their mathematical ideas
- You will review your practice as a result of the sessions and make specific adaptations to support the pupils you are working with
- You will understand the key elements that form number sense, forms of addition and subtraction, forms of multiplication and division, and forms of fractions, including precise language, structures and representations

Please use the buttons below for more information on this programme or to book your place at your chosen venue

MORE INFO | BOOK BERKS | BOOK BUCKS | BOOK OXON

Specialist Knowledge for Teaching of Mathematics – Primary Teachers

Who can take part?

These programmes are designed for primary teachers who would like to develop their specialist knowledge for teaching maths. This may be particularly relevant for teachers that have moved phases or have not received maths-specific training.

What is involved?

This project is designed to improve the subject knowledge and pedagogical knowledge for all practitioners teaching and supporting the learning of primary maths.

There are two pathways: Number and Spatial Reasoning. Each pathway consists of several core units and looks at specific topics as well as policy and practice. Exploration of modules in these pathways will take place during the course of the academic year, over the equivalent of four days. Participants in the programme may wish to follow one pathway this year, and the other pathway next year.

What will you learn?

- Your pupils will demonstrate a positive attitude towards maths, being willing to have a go, persevere, and share their mathematical ideas
- Your pupils will be able to explain their maths and their mathematical thinking using appropriate language
- You will review your practice as a result of the sessions and make practice-specific adaptations to impact on pupil outcomes
- You will enhance your maths subject knowledge with an emphasis on the key structures in each mathematical area covered

Please use the buttons below for more information on this programme or to book your place at your chosen venue

MORE INFO | BOOK OXON | BOOK BERKS | BOOK BUCKS | BOOK SLOUGH

Primary Work Groups and Opportunities for 2022/23

PRIMARY

The Maths Hub Programme has PD opportunities for all teachers at all stages in their careers and across all phases. We are busy planning all of our programmes and dates this for year but are pleased to announce that bookings have already opened for many of our SKTM programmes in 2022/23. Follow the 'More Info' links for further details on the opportunities or click 'Book Now' to register for your place. Alternatively, contact info@bbomathshub.org.uk to discuss the best programme for you and your department.

All of our Work Groups are free.

Specialist Knowledge for Teaching of Mathematics – Primary Early Career Teachers

Who can take part?

Phase 1 Communities in this project are for those identified as Early Career Teachers – teachers in their first or second year of teaching.

This Work Group will enable participants to develop subject knowledge for the Teaching of Mastery – with a particular focus on number sense and place value. Key experiences will include:

- Observing children's mathematical learning
- Developing understanding of small-steps in linked learning, which can be adapted and used in school with pupils
- Maintaining a reflective journal

Teachers involved will be afforded opportunities to network, including with others teaching children in the same phase. In addition to engaging teachers, the Work Group intends to give mentors (where applicable) the opportunity to connect with the programme. This will come through an introductory briefing at the beginning of the Work Group, so planned work can be outlined, plus the invitation to join a later workshop alongside their linked teacher(s).'

What will you learn?

- Your pupils will be seen to elaborate when responding to questions, showing that their answer stems from a secure understanding
- You will identify essential concepts, knowledge, skills within the topic area and provide opportunity for all pupils to learn and master these critical components
- You will develop an understanding of approaches to assess pupils' prior learning, so that learning sequences are planned to take this into account

This Work Group will be held at Aureus Primary School in Didcot, Oxfordshire and led by Nathan Crook. Groups in Bucks and Berks to follow soon.

MORE INFO BOOK NOW

Specialist Knowledge for Teaching of Mathematics – Early Years Teachers

Who can take part?

These programmes are designed for individuals who would like to develop their specialist knowledge for teaching maths to three- to five-year-olds. This may be particularly relevant for teachers that have moved phases or have not received maths-specific training.

What is involved?

This programme is designed to improve the subject knowledge and pedagogical knowledge for all practitioners teaching and supporting the learning of early maths.

There are two types of SKTM Early Years pathways: Pathway One: Number Patterns and Structures and Pathway Two: Pattern, Shape, Space and Measures. Each pathway is the equivalent of a four-day programme and has three core elements, three associated pedagogy sessions, and a task to support the transition from theory to practice. There is also a final core unit that aims to review quality provision.

What will you learn?

- Your pupils will demonstrate a positive attitude towards maths, being willing to have a go, persevere, and share their mathematical ideas
- You will review the mathematical learning opportunities and pedagogical approaches across your wider provision
- You will evaluate and enhance the opportunities to promote mathematical learning in all areas of provision

This Work Group consists of four sessions and will be held in person at Longford Park Primary School. Your Work Group Lead will be Joe Burbank. Groups in Bucks and Berks to follow soon.

MORE INFO BOOK NOW

Secondary Work Groups

SECONDARY

The Maths Hub Programme has PD opportunities for all teachers at all stages in their careers and across all phases. We are busy planning all of our programmes and dates this for year but are pleased to announce that bookings have already opened for some of our projects for 2022/23. Follow the 'More Info' links for further details on the opportunities or click 'Book Now' to register for your place. Alternatively, contact info@bbomathshub.org.uk to discuss the best programme for you and your department.

All of our Work Groups are free.

Secondary Subject Leaders' Network

We are delighted to announce the launch of a new network for heads of mathematics in secondary schools across the BBO region. Following a consultation process, three key themes have been selected to be the focus of each meeting. Within each theme we will address your role as a leader and manager in terms of responsibility for student outcomes and also as a leader of other colleagues. Participants will have time during each day to plan actions to implement and review before the next session.

The themes are as follows:

Face to Face Day 1 : **Assessment and Monitoring**

This day will focus on assessment of students and monitoring of teachers in your teams.

Face to Face Day 2 : **Building Autonomy**

This day will focus on strategies for developing more independence in students and the right level of autonomy in teachers.

Face to Face Day 3 : **Beyond the Maths Department**

This day will focus on aspects of the subject leader role that extend beyond the maths classrooms.

Each meeting will be followed by an online session where everyone will meet to share progress with actions planned on the previous face to face meeting.

Although the network will come together in the online meetings and share a discussion forum, for convenience we have split the face to face meetings into 2 groups, one in **Oxfordshire** and one in **Buckinghamshire**. The meetings for the first group will take place at John Mason School in Abingdon, OX14 1JB. The second group will meet at Wycombe High School in High Wycombe, HP11 1TB.

For full details of the Work Group and session dates, please use the buttons below:

Benefits

- You will promote and develop a shared vision, culture and set of principles for teaching and learning in maths
- You will ensure coherence in the curriculum and provide support for teaching for mastery across the department
- You and your department will establish collaborative ways of working to support ongoing developments
- You will develop in your ability to lead change

The **Work Groups** are fully funded by the Maths Hubs Programme, so are **free** to participating schools.

BOOK OXON

BOOK BUCKS

Secondary Work Groups

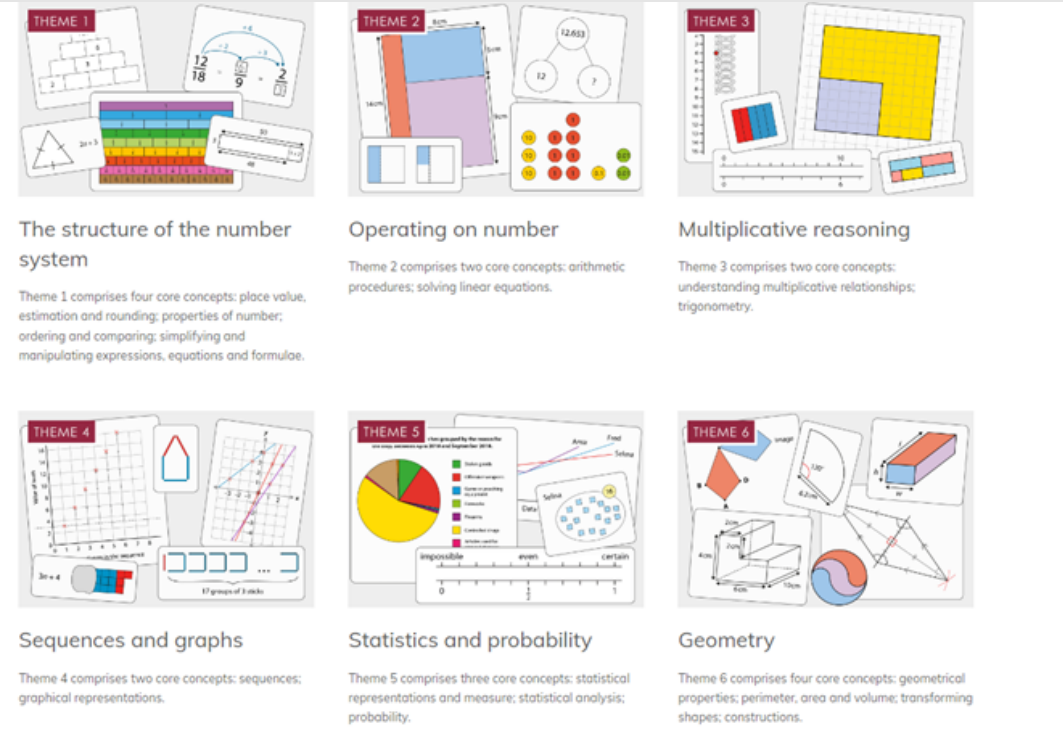
SECONDARY

Specialist Knowledge for Teaching Mathematics – ECTs and Non Specialists

Are you an ECT looking to improve your subject knowledge in maths? Are you teaching maths outside your own specialism or is someone in your maths department a non-maths specialist? Our SKTM programmes for secondary teachers offer 2 fully funded programmes of high quality CPD that can help.

Here at the Maths Hub we support all phases of teachers at varying stages in their career including ECT's and Non-Specialist secondary teachers through our Specialist Knowledge for Teaching Mathematics (SKTM) programmes. We have prepared a **booklet** to show how we can support teachers with their own general teaching pedagogy and knowledge.

The ECT projects offer high-quality subject knowledge and pedagogy maths support for ECTs, recognising the requirements of the ECF. The communities formed as part of the project provide an opportunity for participants' conversation to remain focused on the teaching of maths, with teachers at a similar stage of their career.



The Non-Specialist project offers highly-regarded professional development offering secondary non-specialist maths teachers valuable CPD focusing on subject knowledge and pedagogy.

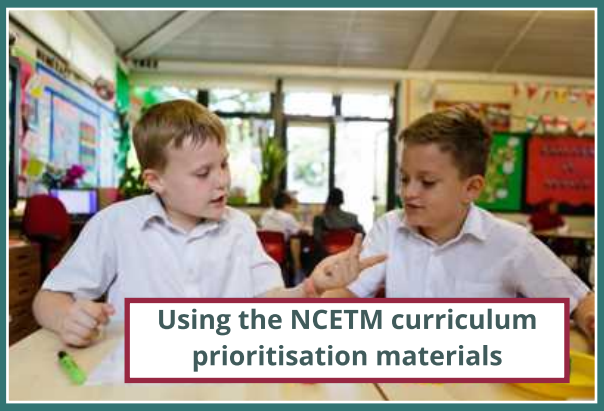
Please note that everything that we offer is free to attend and that we are funded by the DfE so the pedagogies covered are in line with their expectations of teachers.

If you are interested in any of the programmes please complete this questionnaire:

https://forms.gle/aegbYSwyvbDoLHcW8

MORE INFO REGISTER INTEREST

NCETM NEWS AND FEATURES - PRIMARY



NCETM NEWS AND FEATURES - SECONDARY & POST-16

Working with NCETM NATIONAL CENTRE FOR EXCELLENCE IN THE TEACHING OF MATHEMATICS

OTHER EVENTS AND OPPORTUNITIES

NETWORK MEETINGS (IN ASSOCIATION WITH THE AMSP)

Year 13 Problem Solving Workshops

These classes are suitable for any A level Mathematics student with an enquiring mind who wish to develop their problem-solving ability. They are particularly suitable for those students who are required to sit an admissions test as part of a university offer. These 2-hour workshops are held in-person at the Maths Institute, Oxford University and are in high demand. The expectation is that students will attend every session.

Please apply as soon as possible as places are limited.

Click to book your place.

Dynamic visualisation of data

Thursday 13th October - 09:15 - 15:15.

This course is suitable for all teachers of Mathematics who wish to develop their students' understanding and ability to analyse and interpret data from KS3 to KS5. This is a one-day face-to-face session to show how data can be visualised in the classroom using the Desmos Graphing Calculator and how changes to the data affect these visualisations. This can help to develop students' understanding and appreciation of summary statistics, their ability to make comparisons between different data sets and their ability to efficiently analyse data.

Click to book your place.

Working with NCETM NATIONAL CENTRE FOR EXCELLENCE IN THE TEACHING OF MATHEMATICS

Advanced Mathematics Support Programme