

Developing Mathematical Thinking for GCSE and beyond

For teachers of Mathematics in years 7-11

NCP1917



Overview

Recent changes in the mathematics curriculum attempt to push mathematical education toward fostering a deeper understanding of *mathematical thinking*. For several years, the Maths Hubs have organised NCETM sponsored workgroups on **Mathematical Thinking for GCSE**, and as a result, there are now a number of teachers across the region who have been involved in developing activities to encourage mathematical thinking in their pupils in order to best prepare pupils for the demands of the GCSE. In this workgroup you will be looking at what mathematical thinking is, how it can be taught and how traditional questions can be adapted to engage pupils in thinking mathematically

This **Developing Mathematical Thinking** workgroup is suitable for all mathematics teachers; teachers **new** to the group and teachers who have **participated in previous Mathematics Thinking workgroups** (as the latter will have the opportunity to further develop the ideas from previous sessions).

Being involved in this Workgroup means being part of a team of other maths teachers, to work together to develop your understanding of mathematics and your professional practice. It also involves a commitment to work with colleagues in your department on the ideas explored in the workgroup sessions.

Who is this for?

All secondary maths departments and teachers wishing to begin or continue a programme of professional development to address the reasoning and problem-solving challenges of the mathematics GCSE. The approaches attempt to address not only the longer development of these skills across all teaching, but also the needs of current KS4 students as they approach GCSE.

In order to maximise the wider impact of the professional development across the department, it is suggested, where possible, that each school sends two members of department, at least one of whom is experienced and has some leadership responsibility within the department.

What is involved?

- Four one-day workshops spread over three terms.
- Gap tasks between the workshops will include Lesson Study, allowing wider departmental participation in the professional development.
- As part of the professional development, there will be an evaluation process focussing on the impact of the Work Group.

Funding

The Work Group is offered free to all state-funded secondary schools in England.

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What will I gain from participating fully in this work group?

You will be reflecting more deeply on what constitutes thinking mathematically, specifically in years 7 to 11 with an eye to the demands of the new GCSE syllabus, and looking at how this can be helpful as pupils develop mathematical ideas. You will look at frameworks for thinking about what constitutes mathematical thinking, and how such frameworks might help you in planning schemes of work and classroom activity.

With colleagues in your department and with other participants you will develop resources and teacher guidance notes for looking at how to support your learners to develop their critical mathematical thinking skills. You will also be able to consider and support some of the additional demands that this places upon both teachers and learners.

Who is leading the Work Group?

The workgroup will be led by Peter Gates of the Centre for Research in Mathematics Education, School of Education, University of Nottingham.

However, the first session will be led by **Prof John Mason of the Open University**. John is internationally renowned for his work on mathematical thinking, something he has been working on for some 50 years. John will work exclusively with the group to establish ways of working, strategies for thinking and supporting pupils.

Expectations of participants and their schools

- Schools will need to commit to the release of the **same** nominated teacher(s) for all face-to-face workshops and to support them in the gap tasks.
- Meeting time should be provided for the nominated teacher(s) to share with their wider department the new, useful learning and ideas arising from attending the work group
- The department will also support the participating teachers to summarise the impact of their workgroup participation as part of the professional development and Work Group evaluation.

When and where are the face-to-face sessions?

Four day-long face-to-face workshop sessions at George Spencer Academy, NG9 7JA on the following dates:

- Day 1: Friday 8 November 2019
- Day 2: Friday 13 December 2019
- Day 3: Friday 7 February 2020
- Day 4: Friday 27 March 2020

If you're interested, what next?

To request a place on this work group, please [complete this booking form](#).