Extending mathematical understanding and pedagogy (2024-2025) (Terms 1 and 2)

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This year, you will be extending your mathematical thinking by going deeper into your subject knowledge. This is a chance for you to bring together all of the on-campus teaching and classroom practice to the sessions, as you will use these to determine your assignment foci.

Your assignment requires you to identify critical issues in mathematics teaching and learning. These issues will be ones that have significance to you (i.e. you have seen these to be issues when out on placement). Crucially important is that you engage critically with the materials you read - recognising that one journal article or one book is one opinion. Just as there is no one resource that is perfect in maths, there is no one article/book that will fulfil all of your needs. For example, if I were looking at mastery as a critical issue, I might believe that it involves workbooks for the class, particularly if that's what the scheme of work provides. Now, I know that I could easily find written materials to back this up but is it really the best way to teach for mastery or is it just what we're seeing more and more of in schools? My assignment would, therefore, need to explain why worksheets are great for keeping children busy in lessons but not necessarily great for learning (with evidence to back this up from academic sources). Doing this would evidence my criticality.

34 items

Core texts and documents (11 items)

Mathematics explained for primary teachers, by Derek Haylock, 2024
Book | **Essential** | Please bring your copy of this book to sessions as we will be using it each time. Please don't worry about which edition you have.

Small numbers, big ideas : essential concepts for teaching early maths, by Jonathan Austen, 2024
Book | **Recommended**

Issues in mathematics teaching, by Peter Gates, 2001
Book | **Recommended**

Progression documents (5 items)

National curriculum in England: primary curriculum, by Department for Education, 2015
Webpage | Essential

Early years foundation stage (EYFS) statutory framework The standards that school and childcare providers must meet for the learning, development and care of children from birth to 5., by Department for Education, 2024
Document | Essential

Teaching mathematics in primary schools: Guidance for teaching mathematics at key stages 1 and 2 to help pupils progress through the national curriculum., by Department for Education, 2021
Webpage | Recommended

Exemplification of ready-to-progress criteria, by NCETM
Webpage | Recommended

Learning Trajectories
Website | Recommended

Errors and misconceptions (3 items)

Resourceaholic: Topics in Depth Project
Webpage | Recommended

Tackling misconceptions in primary mathematics: preventing, identifying and addressing children's errors, by Kieran Mackle, 2017
Book | Recommended

Mathematical misconceptions: a guide for primary teachers, by Anne Cockburn; G. H. Littler, 2008
Book | Recommended

Session 2: Counting (3 items)
Subject knowledge

Teaching and Learning Early Number - in Chapter 2: Children's beliefs about counting, by Ian Thompson, 2008
Book | Optional

Chapter 6 - Counting: what it is and why it matters - in Teaching and Learning Early Number, by Maclellan Effie, 2008
Chapter | Optional

The counting model - in The child's understanding of number, ©1986
Chapter | Optional

Session 3: Place value (4 items)

Putting place value in its place - in Mathematics Teaching, by Ian Thompson, 2003
Article | Recommended

Place value: the English disease? - in Enhancing primary mathematics teaching, 2003
Chapter | Recommended

An investigation of the relationship between young children's understanding of the concept of place value and their competence at mental addition, by Ian Thompson; Rod Bramald
Document | Recommended

The acquisition of numeracy, by Jenny Young-Loveridge
Document

Session 4: Addition and subtraction (5 items)

Mental Maths: just about what we do in our heads?
Document | Essential

Calculation guidance for primary schools, by National Centre for Excellence in the Teaching of Mathematics, 2015
Document | Recommended

Aspects of Children's Mathematics Anxiety - in Educational Studies in Mathematics, by Karen Newstead, Jun 1998
Article | Recommended

Primary mathematics for trainee teachers, edited by Marcus Witt, 2014
Book | Recommended | Chapter 4 provides a good overview of addition, inlcuding the most effective representations.

The effect of instruction on children's solutions of addition and subtraction word problems - in Educational Studies in Mathematics : An International Journal, by T. P. Carpenter, 198302
Article | Recommended

Session 5: Assignment support (1 items)

The contribution of educational research to teachers’ professional learning: philosophical understandings - in Oxford Review of Education, by Christopher Winch; Alis Oancea; Janet Orchard, 2015
Article | Recommended | Trainees often see teacher training as having two discrete elements: campus and placement. This article discusses the imperative for critical reflection amongst teachers. It has not been shared with you for the purpose of citing within your assignment - it would be inappropriate to do so. What it does do, however, is highlight the importance of educational research as the third and necessary element linked to teachers' professional knowledge. It's well worth a read.

Session 6: Multiplication (5 items)

Good practice in primary mathematics: evidence from successful schools, by OFSTED, 2011
Webpage | Recommended | While this document was withdrawn in 2018, its findings helped shape the 2014 National Curriculum for mathematics. Ofsted argues that less efficient approaches and algorithms involve too many steps (p.3), but this session considers the implications of teaching procedurally, which can be at the expense of children's deeper understanding.

Fluency Without Fear: Research Evidence on the Best Ways to Learn Math Facts, by Jo Boaler, 2015
Document | Essential

Multiplicative Reasoning: Teaching Primary Pupils in Ways That Focus on Functional Relations - in Curriculum Journal, by Mike Askew, 2018
Article | Recommended

Multiplication and Division (Chapter 5) - in Primary mathematics for trainee teachers, by Ahir Balbir, 2014
Chapter | Recommended

Number Facts, by NCETM
Webpage | Recommended | Look at the video clip for rapid recall in KS2 for multiplication facts - it gives a great activity but also models helping pupils to explain how they derived facts.

Session 7: Division (3 items)

Division: what do we mean by 'efficient methods'? - in Mathematics Teaching, by Dave Benson, 2014
Article | Essential | This is the primary article referenced in session 7. Please do take on board the very helpful advice that this article shares.

Multiplication and Division (Chapter 5) - in Primary mathematics for trainee teachers, by Ahir Balbir, 2014
Chapter | Recommended

Young Children's Intuitive Models of Multiplication and Division. - in Journal for Research in Mathematics Education, by Joanne T. Mulligan; Michael C Mitchelmore, 1997
Article | Recommended

Session 8: Fractions, decimals and percentages (2 items)

Fractions: Spine 3 of the Primary Mastery Professional Development Materials, by NCETM
Webpage | Recommended | In our session, our focus is very much on number lines and bar models. These representations are well used by the NCETM and make lovely connections to prior learning. Of particular use are the teacher guides, as they unpick the concepts really well.

Primary teachers' preferred fraction models and manipulatives for solving fraction tasks and for teaching - in Journal of Mathematics Teacher Education, by Karina J. Wilkie; Anne Roche, 2022

Article