

PGCE primary mathematics (3-7 and 5-11) (Terms 1, 2 and 3)

View Online



NB: Content will be added as the seminars progress across the year.

This PGCE module is designed to develop your conceptual understanding of maths, which will support their growing subject knowledge. Imperative to this is making connections across different strands of maths, understanding the ways in which children learn and typically develop, and the pedagogical approaches that can facilitate children's deeper understanding, irrespective of age. Focusing on some of the big ideas in maths, linked to the module on Professional Studies, trainees will see the way in which approaches can be seamlessly integrated across the maths curriculum. This reading list covers the reading specific to each session, but has additional sections linked to topics that will be applicable when teaching.

Askew, M. (2016a) 'Talk', in Transforming primary mathematics: understanding classroom tasks, tools, and talk. Updated and revised edition. London: Routledge, Taylor & Francis Group, pp. 147–155. Available at:
<https://www-taylorfrancis-com.oxfordbrookes.idm.oclc.org/chapters/mono/10.4324/9781315667256-14/talk-mike-askew?context=ubx>.

Askew, M. (2016b) 'Variation theory', in Transforming primary mathematics: understanding classroom tasks, tools, and talk. Updated and revised edition. London: Routledge, Taylor & Francis Group, pp. 75–88. Available at:
<https://www-taylorfrancis-com.oxfordbrookes.idm.oclc.org/chapters/mono/10.4324/9781315667256-8/variation-theory-mike-askew?context=ubx&refId=74d431d9-eed2-452d-a4cd-650dee1f825b>.

Askew, M. (no date) 'Private talk, public conversation'. Available at:
<http://mikeaskew.net/page3/page5/files/Privatetalkpublicconverse.pdf>.

Barclay, N. (2021) 'Valid and valuable: lower attaining pupils' contributions to mixed attainment mathematics in primary schools', *Research in Mathematics Education*, 23(2), pp. 208–225. Available at: <https://doi.org/10.1080/14794802.2021.1897035>.

Bishop, W. (2014) 'Why do Americans stink at math? Some of the answer', *Nonpartisan Education Review*, 10(1). Available at:
<https://nonpartisaneducation.org/Review/Reviews/v10n1.htm>.

- Boaler, J. (2015) 'Fluency Without Fear: Research Evidence on the Best Ways to Learn Math Facts'. Available at:
<https://www.youcubed.org/wp-content/uploads/2017/09/Fluency-Without-Fear-1.28.15.pdf>.
- Boaler, J. and Dweck, C.S. (2015a) *Mathematical Mindsets: Unleashing Students' Potential Through Creative Math, Inspiring Messages and Innovative Teaching*. Chichester: John Wiley & Sons, Incorporated.
- Boaler, J. and Dweck, C.S. (2015b) 'Rich mathematical tasks', in *Mathematical Mindsets: Unleashing Students' Potential Through Creative Math, Inspiring Messages and Innovative Teaching*. Chichester: John Wiley & Sons, Incorporated, pp. 57–91. Available at:
<https://ebookcentral.proquest.com/lib/brookes/reader.action?docID=4444210&pg=75>.
- Boaler, J. and Dweck, C.S. (2015c) 'The power of mistakes and struggle', in *Mathematical Mindsets: Unleashing Students' Potential Through Creative Math, Inspiring Messages and Innovative Teaching*. Chichester: John Wiley & Sons, Incorporated, pp. 11–20. Available at:
<https://ebookcentral.proquest.com/lib/brookes/reader.action?docID=4444210&pg=29>.
- Briggs, M. and Davis, S. (2015) *Creative teaching: mathematics in the primary classroom*. Second edition. London: Routledge/Taylor & Francis Group.
- Carr, M. et al. (2011) 'Combined fluency and cognitive strategies instruction improves mathematics achievement in early elementary school', *Contemporary Educational Psychology*, 36(4), pp. 323–333. Available at:
<https://doi.org/10.1016/j.cedpsych.2011.04.002>.
- Clements, D. and Sarama, J. (2018) 'Myths of Early Math', *Education Sciences*, 8(2). Available at: <https://doi.org/10.3390/educsci8020071>.
- Clements, D.H. (1999) 'Subitizing: What Is It? Why Teach It?', *Teaching children mathematics*, 5(7), pp. 400–405. Available at:
<https://contentstore.cla.co.uk/secure/link?id=c8e55348-16b9-ee11-ad36-0050f2f06092>.
- Clements, D.H. (2019) 'Evaluating the Efficacy of a Learning Trajectory for Early Shape Composition', *American Educational Research Journal*, 56(6). Available at:
<https://doi.org/10.3102/0002831219842788>.
- Clements, D.H. and Sarama, J. (2013) 'Rethinking early mathematics: What is research-based curriculum for young children?', in L.D. English and J.T. Mulligan (eds) *Reconceptualizing early mathematics learning*. Dordrecht: Springer, pp. 121–147. Available at:
https://www.academia.edu/6921404/Clements_D_H_and_Sarama_J_2013_Rethinking_early_mathematics_What_is_research_based_curriculum_for_young_children.
- Cockburn, A. and Littler, G.H. (2008) *Mathematical misconceptions: a guide for primary teachers*. London: SAGE.
- Cotton, T. (2021) 'Chapter 9 Geometry: properties of shapes, position and direction', in *Understanding and teaching: primary mathematics*. Fourth edition. Abingdon: Routledge,

pp. 193–222.

Cox, S. (2020) Three practical approaches to help pupils learn from mathematical mistakes , EEF Blog. Available at:
<https://educationendowmentfoundation.org.uk/news/three-practical-approaches-to-help-pupils-learn-from-mathematical-mistakes>.

Cuoco, A., Goldenberg, P. and Mark, J. (1996) 'Habits of Mind: An Organizing Principle for Mathematics Curricula.', *Journal of Mathematical Behavior*, 15(4), pp. 375–402.

Department for Education (2015) National curriculum in England: primary curriculum. Available at:
<https://www.gov.uk/government/publications/national-curriculum-in-england-primary-curriculum>.

Department for Education (2023a) 'Development Matters: Non-statutory curriculum guidance for the early years foundation stage'. Available at:
<https://www.gov.uk/government/publications/development-matters--2>.

Department for Education (2023b) 'Statutory framework for the early years foundation stage: Setting the standards for learning, development and care for children from birth to five'. London: Department for Education. Available at:
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1170108/EYFS_framework_from_September_2023.pdf.

Dignath-van Ewijk, C. and van der Werf, G. (2012) 'What Teachers Think about Self-Regulated Learning: Investigating Teacher Beliefs and Teacher Behavior of Enhancing Students' Self-Regulation', *Education Research International*, 2012.

Dowker, A. (1992) 'Computational Estimation Strategies of Professional Mathematicians', *Journal for Research in Mathematics Education*, 23(1), pp. 45–55.

Drews, D. and Hansen, A. (2007) Using resources to support mathematical thinking: primary and early years. Exeter: Learning Matters. Available at:
<https://oxfordbrookes.idm.oclc.org/login?url=http://www.vlebooks.com/vleweb/product/openreader?id=OxfBrookes&isbn=9781844457960&uid=^u>.

Early Childhood Maths Group (no date) Spatial Reasoning. Available at:
<https://earlymaths.org/spatial-reasoning/>.

Early Years Coalition (2021) Birth to 5 Matters: non-statutory guidance for the Early Years Foundation Stage. Available at: <https://birthto5matters.org.uk/>.

Eather, J. (no date) A Maths Dictionary for Kids: plus maths charts. Available at:
<http://www.amathsdictionaryforkids.com/>.

Education Endowment Foundation (2017) Improving Mathematics in Key Stages 2 and 3: Eight recommendations to improve outcomes in maths for 7–14 year olds. Available at:
<https://educationendowmentfoundation.org.uk/education-evidence/guidance-reports/maths-ks-2-3>.

Education Endowment Foundation (2020a) Improving Mathematics in the Early Years and

Key Stage 1: Five recommendations to support practitioners in developing the maths skills of 3–7 year-olds. Available at:
<https://educationendowmentfoundation.org.uk/education-evidence/guidance-reports/early-maths>.

Education Endowment Foundation (2020b) 'Improving Mathematics in the Early Years and Key Stage 1: summary of recommendations'. Available at:
https://d2tic4wvo1iusb.cloudfront.net/production/eef-guidance-reports/early-maths/EEF_Maths_EY_KS1_Summary_of_Recommendations.pdf?v=1701663272.

Evans, J. (no date a) 'Talking about maths', *Education 3-13*, 30(1), pp. 66–71. Available at:
<https://doi.org/10.1080/03004270285200131>.

Evans, J. (no date b) 'Talking about maths', *Education 3-13*, 30(1), pp. 66–71. Available at:
<https://doi.org/10.1080/03004270285200131>.

Faulkner, V. and Ainslie, J. (2017) 'Subitising through the years', *Australian Primary Mathematics Classroom*, 22(1), pp. 28–36.

Foster, C. (2023) Teaching specific tactics for problem solving, Foster77 Mathematics Education: Colin Foster's mathematics education blog. Available at:
<https://blog.foster77.co.uk/2023/03/teaching-specific-strategies-for.html>.

Francis, B. et al. (2017) 'Attainment Grouping as self-fulfilling prophesy? A mixed methods exploration of self confidence and set level among Year 7 students', *International Journal of Educational Research*, 86, pp. 96–108. Available at:
<https://doi.org/10.1016/j.ijer.2017.09.001>.

Fyfe, E.R., Rittle-Johnson, B. and DeCaro, M.S. (2012) 'The effects of feedback during exploratory mathematics problem solving: Prior knowledge matters', *Journal of Educational Psychology*, 104(4), pp. 1094–1108. Available at:
<https://oxfordbrookes.idm.oclc.org/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=pdh&AN=2012-11775-001&site=ehost-live>.

Gelman, R. and Gallistel, C.R. (no date) 'The counting model', in *The child's understanding of number*. Cambridge, Mass: Harvard University Press, pp. 73–82. Available at:
<https://ebookcentral.proquest.com/lib/brookes/reader.action?docID=3300437&ppg=90>.

Gilligan, K.A. (2017) 'The contribution of spatial ability to mathematics achievement in middle childhood', *Journal of Experimental Child Psychology*, 163, pp. 107–125. Available at: <https://doi.org/10.1016/j.jecp.2017.04.016>.

Gray, E. (2008) 'Compressing the counting process: strength from the flexible interpretation of symbols', in *Teaching and Learning Early Number*. Maidenhead: McGraw-Hill International (UK) Ltd, pp. 82–94. Available at:
<https://ebookcentral.proquest.com/lib/brookes/reader.action?docID=409780&ppg=101>.

Hansen, A. (2008) 'Counting and understanding number', in *Primary mathematics: extending knowledge in practice*. Exeter: Learning Matters, pp. 27–44. Available at:
<https://ebookcentral.proquest.com/lib/brookes/reader.action?docID=686449&ppg=27>

Haylock, D. and Manning, R. (2019) *Mathematics explained for primary teachers (5-11)*. 6th edition. London: SAGE.

Johnston-Wilder, S. and Mason, J. (no date) *Developing thinking in geometry*. London: Open University in association with Paul Chapman Pub.

Lai, M.Y. and Murray, S. (2012) 'Teaching with Procedural Variation: A Chinese Way of Promoting Deep Understanding of Mathematics', *International Journal for Mathematics Teaching and Learning* [Preprint]. Available at: <http://www.cimt.org.uk/journal/lai.pdf>.

Learning and Teaching with Learning Trajectories (no date). Available at: <https://www.learningtrajectories.org/>.

Lee, N.H. and Tan, B.L.J. (no date) 'The role of virtual manipulatives on the CPA approach', *The Electronic Journal of Mathematics and Technology*, 8(2), pp. 102–121. Available at: <https://repository.nie.edu.sg/bitstream/10497/18917/1/TEJMT-8-2-102.pdf>.

Lemov, D. (2021) *Teach like a champion 3.0: 63 techniques that put students on the path to college*. Third edition. Hoboken, NJ: Jossey-Bass, a Wiley imprint.

Loewenberg Ball, D. (1992) 'Magical hopes: manipulatives and the reform of math education', *American Educator: The Professional Journal of the American Federation of Teachers*, 16(1), pp. 14–18. Available at: <https://www.aft.org/ae/summer1992/ball>.

Mansergh, J. (2009) 'Using a counting stick to teach the 17x table'. Association of Teachers of Mathematics. Available at: <https://www.youtube.com/watch?v=yXdHGBfoqfw>.

Mason, J. (2010) 'Effective questioning and responding in the mathematics classroom'. Available at: <http://mcs.open.ac.uk/jhm3/Selected%20Publications/Effective%20Questioning%20&%20Responding.pdf>.

MathsBot.com (no date) Tools for maths teachers. Available at: <https://mathsbot.com/>.

Montague-Smith, A. et al. (2018a) *Mathematics in early years education*. Fourth edition. Abingdon, Oxon: Routledge.

Montague-Smith, A. et al. (2018b) 'Sorting, matching and handling data', in *Mathematics in early years education*. Fourth edition. Abingdon, Oxon: Routledge, pp. 223–247. Available at: https://oxfordbrookes.idm.oclc.org/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=nlebk&AN=1602227&site=ehost-live&ebv=EB&ppid=pp_223.

Moyer, P.S. (2001) 'Are We Having Fun Yet? How Teachers Use Manipulatives to Teach Mathematics', *Educational Studies in Mathematics: An International Journal*, 47(2), pp. 175–197. Available at: <https://doi.org/10.1023/A:1014596316942>.

Mulligan, J.T. and Mitchelmore, M.C. (1997) 'Young Children's Intuitive Models of Multiplication and Division.', *Journal for Research in Mathematics Education*, 28(3).

National Centre for Excellence in the Teaching of Mathematics (2014) 'Mathematics glossary for teachers in Key Stages 1 to 3'. Available at:
<https://www.ncetm.org.uk/media/hpihrj3s/national-curriculum-glossary.pdf>.

National Centre for Excellence in the Teaching of Mathematics (2019) What is unitising, and why is it important? Available at:
<https://www.ncetm.org.uk/features/what-is-unitising-and-why-is-it-important/>.

National Centre for Excellence in the Teaching of Mathematics (no date a) 'Geometry: properties of shapes with reasoning'. NCETM. Available at:
https://www.ncetm.org.uk/media/ettef0hw/8_progression_map_geometry_properties_of_shapes_reasoningv2.pdf.

National Centre for Excellence in the Teaching of Mathematics (no date b) Progression Maps for Key Stages 1 and 2. Available at:
<https://www.ncetm.org.uk/classroom-resources/progression-maps-for-key-stages-1-and-2/>.

National Centre for Excellence in the Teaching of Mathematics (NCETM) (no date) Statistics . Available at: <https://www.ncetm.org.uk/classroom-resources/cp-year-6-unit-8-statistics/>.
National Council of Teachers of Mathematics (2014) Procedural Fluency in Mathematics. Available at:
<https://www.nctm.org/Standards-and-Positions/Position-Statements/Procedural-Fluency-in-Mathematics/>.

National Council of Teachers of Mathematics (no date a) Principles to Actions: ensuring mathematical success for all. Available at: <https://www.nctm.org/PtA/>.

National Council of Teachers of Mathematics (no date b) Strategies for Formative Assessment. Available at:
<https://www.nctm.org/Research-and-Advocacy/Research-Brief-and-Clips/Strategies-for-Formative-Assessment/>.

NCETM (2015) Primary Assessment Materials. Available at:
<https://www.ncetm.org.uk/classroom-resources/assessment-materials-primary/>.

NCETM (no date a) 'Measurement'. Available at:
<https://www.ncetm.org.uk/media/14iciudq/7-progression-map-measurement.pdf>.

NCETM (no date b) Measures: Comparing different aspects such as length, weight and volume, as a preliminary to using units to compare later. Available at:
<https://www.ncetm.org.uk/classroom-resources/ey-measures/>.

NRICH (no date) Statistics. Cambridge: University of Cambridge Faculty of Mathematics. Available at: <https://nrich.maths.org/12638>.

NRICH Primary Team (2021) 'Reasoning: the Journey from Novice to Expert'. Available at: <https://nrich.maths.org/11336>.

Nunes, T. (2009) 'Development of maths capabilities and confidence in primary school'. Department for Children, Schools and Families. Available at:
<https://dera.ioe.ac.uk/id/eprint/11154/>.

Ofsted (2023) Subject report series: maths. Available at:
<https://www.gov.uk/government/publications/subject-report-series-maths>.

Oughton, R. (2022) 'Developing "deep mathematical thinking" in geometry with 3- and 4-year-olds: a collaborative study between early years teachers and university-based mathematicians', *Mathematical Thinking and Learning* [Preprint]. Available at:
<https://doi.org/10.1080/10986065.2022.2119497>.

Resourceaholic (no date) Topics in Depth Project. Available at:
<https://www.resourceaholic.com/p/topics-in-depth.html>.

Sharifah Osman et al. (no date a) 'Enhancing students' mathematical problem-solving skills through bar model visualisation technique', *International Electronic Journal of Mathematics Education*, 13(3), pp. 273–279. Available at:
<https://www.iejme.com/download/enhancing-students-mathematical-problem-solving-skills-through-bar-model-visualisation-technique-3919.pdf>.

Sharifah Osman et al. (no date b) 'Enhancing students' mathematical problem-solving skills through bar model visualisation technique', *International Electronic Journal of Mathematics Education*, 13(3), pp. 273–279. Available at:
<https://www.iejme.com/download/enhancing-students-mathematical-problem-solving-skills-through-bar-model-visualisation-technique-3919.pdf>.

Siraj-Blatchford, I. (2009) 'Quality teaching in the early years', in *Early childhood education: society and culture*. 2nd ed. Los Angeles: SAGE, pp. 147–157. Available at:
<https://oxfordbrookes.on.worldcat.org/oclc/794488030>.

Skemp, R.R. (1976) 'Relational Understanding and Instrumental Understanding', *Mathematics Teaching*, 77, pp. 20–26. Available at:
<http://www.davidtall.com/skemp/pdfs/instrumental-relational.pdf>.

Swan, M. (no date) 'Dealing with misconceptions in mathematics', in *Issues in mathematics teaching*. London: RoutledgeFalmer, pp. 147–165. Available at:
<https://contentstore.cla.co.uk/secure/link?id=fbac7b29-ba57-ee11-830d-0050f2f06092>.

Tabor, P.D. et al. (2021) *Numeracy for all learners: teaching mathematics to students with special needs*. Thousand Oaks, California: Corwin.

Thomson, J. and Moore, V. (2023) 'Maths vocabulary (NCETM Maths Podcast, Episode 71)'. NCETM. Available at: <https://www.ncetm.org.uk/podcasts/maths-vocabulary/>.

Wilkerson, T. (2022) *Using Formative Assessment Effectively*. NCTM. Available at:
<https://www.nctm.org/News-and-Calendar/Messages-from-the-President/Archive/Trena-Wilkerson/Using-Formative-Assessment-Effectively/>.