**Primary Early Years 3-7 Postgraduate Curriculum Map Mathematics**

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| **University Curriculum** | | | | | |
| **Session Sequence** | **Session Content Subject Specific Components/s** | **Learn That**  **(CCF reference in numerics e.g. 1.1)** | **Learn How**  **(CCF reference bullets alphabetically e.g. 1c)** | **Links to Research and Reading** | **Formative Assessment mode** |
| **Session 1 Mastery and Mathematical Play** | Understanding the need for developing strong subject knowledge in mathematics.  Developing an awareness of the range of research that has been undertaken in early years mathematics.  Knowing how mathematical concepts are promoted through and evident in early years mathematical play.  Develop mathematical curriculum knowledge and identify and explore how they progress across the age phases in the EYFS using non-statutory guidance.  Exploring trainee attitudes and confidence in mathematics. Developing their understanding of the programmes of study for Key Stage 1 mathematics.  How children learn in mathematics and the implications for teaching.  Exploring mathematical anxiety and the potential implications this can have on working and long-term memory.  Develop their understanding of the mastery approach currently used within mathematics teaching. | **1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1, 3.2, 3.7, 3.10, 4.1, 4.2, 4.3, 4.4, 4.7,**  **5.1, 8.1,** | **1c, 3a, 3d, 8a, 8d, 8f** | Cotton, T. (2020) *Understanding and teaching primary mathematics.* Oxon: Routledge.  Department for Education (2021) *Statutory framework for the early years foundation stage*.  Available at: https://www.gov.uk/government/publications/early-years-foundation-stage-framework--2 (Accessed: 22 November 2021).  Department for Education (2021) *Development Matters*. Available at: <https://www.gov.uk/government/publications/development-matters--2>  Early Education (2021) *Birth to 5 Matters: Non-statutory guidance for the Early Years Foundation Stage*. Available at: <https://birthto5matters.org.uk/wp-content/uploads/2021/04/Birthto5Matters-download.pdf>  Haylock, D. and Manning (2019) Mathematics Explained for Primary Teachers. Los Angeles: SAGE.  Montague-Smith, A, Cotton, T, Hanson, A. and Price, A. (2018) Mathematics in Early Years Education. Oxon: Routledge.  NCETM Progression Maps for EYFS.  Available at:  <https://www.ncetm.org.uk/in-the-classroom/early-years/>  OFSTED. 2021. *Research Review Series: Mathematics.* Available at: https://www.gov.uk/government/publications/research-review-series-mathematics  Pound, L. (2022) *Teaching Mathematics Creatively.* Oxon: Routledge (shape elements indicated in the index) | Questioning in play activities focusing on subject knowledge.  For example, shape names, perimeter, circumference, algebra.  Trainee reflection.  Numeracy Challenge Score  Key component tracker. |
| **Session 2 Counting and Place Value**  **Early Calculation** | Knowing the importance of developing a positive attitude to mathematics.  Knowing the counting principles and how they can be developed through adult led tasks.  Knowing what subitizing is and developing their knowledge of how to plan to promote understanding of subitizing in adult led tasks.  Be familiar with the NCETM progression grids for counting.  Identify how adult-led learning and provision can be adapted and inclusive focusing on examples for SEND and EAL.  Understanding the relationship between the four operations.  Know the broad range of methods of calculation (mental, calculator, written methods).  Know the structures related to addition.  Know the structures related to subtraction.  Know that place value encompasses many aspects of knowledge that link together to give children good number sense  Knowing the components and conventions around place value and associated common errors and misconceptions.  Be familiar with the NCETM Ready to Progress materials for place value.  Know how to use place value in calculation and how it underpins calculating at Key Stage 2. | **1.1, 1.2, 1.3, 1.4, 1.6, 2.1, 2.2, 3.2, 3.4, 3.5, 3.7, 4.4, 4.7, 5.2, 7.4, 8.4** | **1b, 2d, 4a, 4b, 4c, 4j, 5a, 5b, 5h** |  |  |
| **Session 3**  **Calculation: The four operations**  **Fluency** | Know the difference between declarative, procedural and conditional knowledge.  Understand that whilst spacing of practice is important, recall of bonds and counting patterns should be practiced daily  Understand that whilst spacing of practice is important, recall of bonds and counting patterns should be practiced daily  Introduce trainees to ideas on practising recall and mathematical reasoning and how they can be adapted for the classroom.  Know the mathematical laws that apply to addition and subtraction.  Know appropriate ways to model addition and subtraction that builds on their understanding of the CPA approach.  Deconstruct a video of a year 1 lesson on subtraction and extend their knowledge of planning through creating appropriate activities to support the focus of the independent learning within the lesson.  Know that multiplication involves repeated addition and division involves repeated subtraction.  Understand grouping and sharing as forms of division.  Know appropriate models to support multiplication and division with a particular emphasis on arrays.  The commutative property in relation to multiplication and division.  Understand that a fraction is an equal amount.  Know that children develop knowledge of fractions within number, measures and shape.  Know the vocabulary associated with fractions | **3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 4.2, 4.3, 4.7, 5.2, 5.3, 5.4, 5.5, 6.5** | **3a, 3b, 3c**  **3m, 3n**  **4a** |  |  |
| **Session 4**  **Mathematics shape and space/ Geometry**  **Measures** | Be aware of the place of shape and space within the EYFS and that there is no ELG to assess shape and space.  Know the names and properties of common 2d and 3d shape (triangles, squares, rectangles and circles)  Exploring the approaches to developing knowledge of shape in the EYFS.  Unpicking a problem solving activity in terms of subject knowledge, adaptive teaching and progression in learning  Knowing the progression in geometry from EYFS, into Key Stage and its future progression in Key Stage 2.  The ability to recognise 2d and 3d shapes by name and identify some key properties.  Know the difference between a standard and a non standard unit of measure.  Know the common difficulties associated with measuring length.  Raise their awareness of estimation skills and methods within the context of capacity | **2.6, 3.2, 3.3, 3.4, 4.2, 4.6, 4.7, 4.8, 4.9, 4.10, 5.2, 5.7, 6.4, 6.5, 6.6** | **3d, 3e, 3g, 3a, 5e, 5h, 6e** |  |  |

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| **School Based Curriculum – Nursery** | | | | |
| **Observing :** Observe how expert colleagues use and deconstruct approaches, in mathematics, in at least one adult lesson.  **Planning :** Observe how expert colleagues break tasks down into constituent components, in mathematics, for at least one adult lesson. Observe how expert colleagues plan for mathematical play experiences within the continuous provision environment.  **Teaching :** Rehearse and refine particular approaches in mathematics for a group/whole class. Deliver group/whole class teaching in mathematics and support children in continuous provision as they engage in mathematical experiences.  **Assessment :** Check prior knowledge and understanding during adult led lessons and continuous provision play.  **Subject Knowledge :** Discuss and analyse subject specific components with expert colleagues | | | | |
| **Subject Specific Components/s (know, understand, can do)** | **Learn That**  **(CCF reference in numerics e.g. 1.1)** | **Learn How**  **(CCF reference bullets alphabetically e.g. 1c)** | **Links to Research and Reading** | **Formative Assessment** |
| To know how to create a supportive and inclusive environment for mathematics with a predictable system of reward and sanction in the classroom.    To know how to take pupils’ prior learning into account when planning for mathematics learning and to avoid overloading working memory.  To understand that a predictable and secure environment benefits all pupils but is particularly valuable for pupils with a wide range of needs in mathematics.    To understand how to assess in accordance with the school assessment policy and make formative assessments of children’s mathematics skills during adult led tasks and within continuous provision.    To praise the efforts of pupils and the progress that they have made in mathematics learning in order to promote a positive attitude to mathematics.    To demonstrate sufficient awareness of subject-specific knowledge when planning and delivering adult led tasks and enhancing the environment for mathematics. | 1.2, 1.4    2.1, 2.4    3.1, 3.5, 3.9    4.1, 4.6    5.2, 5.7    6.1, 6.3  7.1, 7.2, 7.3    8.1, 8.6, 8.7 | 1.c, 1.d, 1g    2.a, 2.e    3.a, 3.c, 3.d, 3.f, 3.m, 3.r, 3.u    4.a, 4.b, 4.h, 4.i, 4.m, 4.n    5.a, 5.b, 5.o  6.e, 6.g, 6.k, 6.m, 6.o    7.a, 7.b, 7.c, 7.f, 7.h, 7.j, 7.l,    8.b, 8.e, 8.f, 8h, 8.k, 8.n, 8.q, 8.r | Cotton, T. (2020) *Understanding and teaching primary mathematics.* Oxon: Routledge.  Department for Education (2021) *Statutory framework for the early years foundation stage*.  Available at: https://www.gov.uk/government/publications/early-years-foundation-stage-framework--2 (Accessed: 22 November 2021).  Department for Education (2021) *Development Matters*. Available at: <https://www.gov.uk/government/publications/development-matters--2>  Early Education (2021) *Birth to 5 Matters: Non-statutory guidance for the Early Years Foundation Stage*. Available at: <https://birthto5matters.org.uk/wp-content/uploads/2021/04/Birthto5Matters-download.pdf>  Haylock, D. and Manning (2019) Mathematics Explained for Primary Teachers. Los Angeles: SAGE.  Montague-Smith, A, Cotton, T, Hanson, A. and Price, A. (2018) Mathematics in Early Years Education. Oxon: Routledge.  NCETM Progression Maps for EYFS.  Available at:  <https://www.ncetm.org.uk/in-the-classroom/early-years/>  OFSTED. 2021. *Research Review Series: Mathematics.* Available at: https://www.gov.uk/government/publications/research-review-series-mathematics  Pound, L. (2022) *Teaching Mathematics Creatively.* Oxon: Routledge (shape elements indicated in the index) | Weekly Mentor Meetings    Weekly Development Summary    Lesson Observations    Mentor & Link Tutor Meetings  Additional support for trainee at risk (Cause for Concern) procedures as appropriate |

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| **School Based Curriculum – Key Stage 1** | | | | |
| **Observing :** Observe how expert colleagues use and deconstruct approaches, in mathematics, in at least one lesson throughout school.  **Planning :** Observe how expert colleagues break tasks down into constituent components over a sequence of mathematics lessons. Plan, as appropriate, for a sequence of lessons in mathematics.  **Teaching :** Rehearse and refine particular approaches in mathematics.  **Assessment :** Draw conclusions about what pupils have learnt by looking at patterns of performance over a number of assessments with support and scaffolding from expert colleagues  **Subject Knowledge :** Discuss and analyse subject specific components with expert colleagues | | | | |
| **Subject Specific Components/s (know, understand, can do)** | **Learn That**  **(CCF reference in numerics e.g. 1.1)** | **Learn How**  **(CCF reference bullets alphabetically e.g. 1c)** | **Links to Research and Reading** | **Formative Assessment** |
| To know how to collaborate with colleagues to create learning that is inspirational and challenging that helps pupils to be extrinsically motivated in their mathematics lessons.    To know how to plan and deliver a well-sequenced mathematics curriculum that is representative of the school's values and ethos.    To understand how to encourage resilience and perseverance in pupils’ mathematical learning and normalise the making of mistakes.  To understand how to model new content effectively, using a blend of discussion, questioning and examples to develop understanding in mathematics lessons.    To be an effective role model, including how to model a positive attitude towards mathematics.    To adjust planning in mathematics lessons, according to formative assessment information of children’s learning. Apply this to mathematical schemes where appropriate. | 1.1, 1.5    2.3, 2.5, 2.6, 2.9    3.2, 3.3, 3.4, 3.8, 3.10    4.2, 4.3, 4.4, 4.8, 4.9, 4.11    5.1, 5.3, 5.6    6.2, 6.4, 6.7    7.5, 7.7    8.3, 8.4 | 1a, 1e, 1h    2c, 2d, 2f, 2k    3b, 3.g, 3.j, 3.l, 3.o, 3.p, 3.q, 3.s, 3.t    4.c, 4.d, 4.g, 4.j, 4.l, 4.o    5.c, 5.d, 5.g, 5.h, 5.i, 5.l, 5.m, 5.n    6.a, 6.c, 6.f, 6.i, 6.j, 6.l, 6.n, 6.p, 6.q    7.d, 7.e, 7.i, 7.m    8.a, 8.d, 8.g, 8.i, 8.j, 8.l, 8.o, 8.s | Cotton, T. (2020) *Understanding and teaching primary mathematics.* Oxon: Routledge.  Department for Education (2021) *Statutory framework for the early years foundation stage*.  Available at: https://www.gov.uk/government/publications/early-years-foundation-stage-framework--2 (Accessed: 22 November 2021).  Department for Education (2021) *Development Matters*. Available at: <https://www.gov.uk/government/publications/development-matters--2>  Early Education (2021) *Birth to 5 Matters: Non-statutory guidance for the Early Years Foundation Stage*. Available at: <https://birthto5matters.org.uk/wp-content/uploads/2021/04/Birthto5Matters-download.pdf>  Haylock, D. and Manning (2019) Mathematics Explained for Primary Teachers. Los Angeles: SAGE.  Montague-Smith, A, Cotton, T, Hanson, A. and Price, A. (2018) Mathematics in Early Years Education. Oxon: Routledge.  NCETM Progression Maps for EYFS.  Available at:  <https://www.ncetm.org.uk/in-the-classroom/early-years/>  OFSTED. 2021. *Research Review Series: Mathematics.* Available at: https://www.gov.uk/government/publications/research-review-series-mathematics  Pound, L. (2022) *Teaching Mathematics Creatively.* Oxon: Routledge (shape elements indicated in the index) | Weekly Mentor Meetings    Weekly Development Summary    Lesson Observations    Mentor & Link Tutor Meetings    Additional support for trainee at risk (Cause for Concern) procedures as appropriate |

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| **School Based Curriculum – Reception** | | | | |
| **Observing :** Observe how expert colleagues use and deconstruct approaches, in mathematics, in at least one lesson throughout school.  **Planning :** Plan a sequence of lessons in mathematics and enhancements to continuous provision.  **Teaching :** Rehearse and refine particular approaches to teaching mathematics in both adult led lessons and whilst engaging in continuous provision.  **Assessment :** Discuss with expert colleagues summative assessment, reporting and how data is used in mathematics.  **Subject Knowledge :** Discuss and analyse subject specific components with expert colleagues | | | | |
| **Subject Specific Components/s (know, understand, can do)** | **Learn That**  **(CCF reference in numerics e.g. 1.1)** | **Learn How**  **(CCF reference bullets alphabetically e.g. 1c)** | **Links to Research and Reading** | **Formative Assessment** |
| **Reception**    To know how to independently plan lessons and enhancements to the environment for mathematics that have high expectations of all learners.    To know how to react quickly to emerging misconceptions and take effective remedial action when planning for mathematics learning.    To understand how to expertly manage behaviour, motivate children, and thus have a positive long-term impact on pupils' attitude and aspirations in mathematical experiences.    To understand how schools use data to set targets for mathematics and monitor progress and communicate data for accountability to stakeholders.    To help all pupils to understand that they can succeed in their mathematics learning, even when faced with challenge.    To learn how to provide different representations of a concept to support mathematics understanding, e.g., visuals and written words. | 1.3, 1.6    2.2, 2.7, 2.8    3.6, 3.7    4.5, 4.7, 4.10    5.4, 5.5    6.5, 6.6    7.4, 7.6    8.2, 8.5 | 1.b, 1.f    2.b, 2.g, 2.h, 2.i, 2.j, 2.k    3e, 3.h, 3.i, 3.k, 3.n    4.e, 4.f, 4.k, 4.p    5.e, 5.f, 5.j, 5.k  6.b, 6.d, 6.h    7.g, 7.k, 7.n, 7.o, 7.p    8.c, 8.m, 8. p | Cotton, T. (2020) *Understanding and teaching primary mathematics.* Oxon: Routledge.  Department for Education (2021) *Statutory framework for the early years foundation stage*.  Available at: https://www.gov.uk/government/publications/early-years-foundation-stage-framework--2 (Accessed: 22 November 2021).  Department for Education (2021) *Development Matters*. Available at: <https://www.gov.uk/government/publications/development-matters--2>  Early Education (2021) *Birth to 5 Matters: Non-statutory guidance for the Early Years Foundation Stage*. Available at: <https://birthto5matters.org.uk/wp-content/uploads/2021/04/Birthto5Matters-download.pdf>  Haylock, D. and Manning (2019) Mathematics Explained for Primary Teachers. Los Angeles: SAGE.  Montague-Smith, A, Cotton, T, Hanson, A. and Price, A. (2018) Mathematics in Early Years Education. Oxon: Routledge.  NCETM Progression Maps for EYFS.  Available at:  <https://www.ncetm.org.uk/in-the-classroom/early-years/>  OFSTED. 2021. *Research Review Series: Mathematics.* Available at: https://www.gov.uk/government/publications/research-review-series-mathematics  Pound, L. (2022) *Teaching Mathematics Creatively.* Oxon: Routledge (shape elements indicated in the index) | Weekly Development Summary  Lesson Observations  Link Tutor |