**Primary Initial Teacher Education: Curriculum Plan**

**STRAND: Postgraduate Programmes Core Mathematics**

**(Links to Fluency/ Reasoning/ Problem Solving/ Mastery)**

***NB – this curriculum plan identifies when trainees will ‘meet’ content for the first time – the intention is that at each phase, university and school-based colleagues will support trainees in recalling, refining, applying and discussing content from the previous phases.***

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| **Curriculum Intent:** *Through our Initial Teacher Education Curriculum, it is our intention that all Edge Hill Primary teacher trainees will:* * *understand that mathematics is the route to developing both accurate and fluent numeracy skills and the importance of this in relation to everyday life skills and financial literacy*
* *understand that this approach is supported by robust evidence*
* *understand the purpose of the three mathematics curriculum aims and how these can be addressed for all areas of the mathematics curriculum.*
* *develop their confidence and promote an enthusiasm and passion for mathematics and believe that all children can be successful mathematicians, regardless of social background or other circumstances and that this is their moral purpose as educators.*
 |
| **Phase** | **Learn that…** | **Learn how to…** |
| **Phase 1****(University-led)** | **Trainees will know:**  | **Trainees will be able to:**  |
| * The three aims of the mathematics curriculum. **LT3.1**
 | * Plan, teach and assess a sequence of lessons developing both conceptual and procedural understanding of number, including counting, place value and both mental and written calculation. This will be consolidated whilst on professional practice. **LH2.3, LH2.7, LH2.9, LT3.5, LH3.3, LH3.7, LH3.8, LT6.1, LT6.3, LT6.4, LH6.1, LH6.3**
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| * One of the key aims of the mathematics curriculum is for pupils to become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately. **LT3.1, LT4.8**
* This will specifically link to understanding of declarative and procedural knowledge. **LT3.3, LT3.5, LH3.11**
 | * Plan, teach and assess times tables using effective strategies without just using drill and practice and use these strategies to enable pupils to make connections between this knowledge and the inverse operation of division. This may be consolidated whilst on professional practice. **LT2.1, LT2.5, LT2.7, LT2.8, LH2.9, LH3.3, LH3.11, LT4.2, LT6.1, LT6.3, LT6.4, LH6.1, LH6.3**
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| * One of the key aims of the mathematics curriculum is for pupils to reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language. **LT3.1**
 | * Promote the use of mathematics specific vocabulary across all areas of mathematics. This will be consolidated whilst on professional practice.
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| * One of the key aims of the mathematics curriculum is for pupils to solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

This will specifically link to understanding of conditional knowledge. **LT3.1** | * Plan to utilise appropriate concrete and visual resources to support number sense and a conceptual understanding of calculation strategies considering the CPA approach. This may be consolidated whilst on professional practice.**LH2.3, LH2.9, LH3.12, LT4.3, LH4.8, LH5.9**
 |
| * The 5 counting principles.
 | * Promote a mathematical mindset for pupils irrespective of background or ability. This may be consolidated whilst on professional practice. **LT1.1, LT1.2, LT2.1**
 |
| * The declarative and procedural subject knowledge required to plan, teach and assess the following areas effectively and confidently: counting, place value, common mental calculation strategies, common informal written calculation strategies, the formal written calculation strategies as defined in the **appendix of the National Curriculum document.LT2.2, LH2.3, LH2.7, LT3.3, LT3.5, LT4.2, LT6.1, LT6.3, LT6.4**
 | * Plan, teach and assess a sequence of lessons following a mastery approach. This should be consolidated whilst on professional practice.**LT2.7, LH2.3, LH2.9, LH3.3, LH3.4, LH3.7, LH4.1, LH5.6, LT6.1, LT6.3, LT6.4, LH6.1, LH6.3**
 |
| * How to convert between fractions, decimals and percentages. Have a secure understanding of ratio and proportion and use this to teach these concepts in creative ways.- procedural knowledge **LT3.5, LT4.2**
 | * Identify common “symptoms” of maths anxiety and propose strategies to support children with their learning with reference to the latest research and support networks (Maths Anxiety Trust). This may be consolidated whilst on Professional Practice.
 |
| * The difference between an error and a misconception. **LH1.3, LT2.6**
 | * Plan for pupils to have opportunities to learn and develop reasoning skills by including a variety of teaching and learning approaches.- conditional knowledge. This will be consolidated whilst on professional practice.**LT2.7, LH2.8, LT3.5, LH3.3, LH4.1**
 |
| * Strategies for addressing common misconceptions across all areas of the mathematics curriculum.**LH1.3, LT2.6, LH2.6, LT3.4**.
 | * Assess reasoning skills through questioning, observation and scaffolded conversations. This will be consolidated whilst on professional practice.**LH2.8, LT3.5, LT4.6, LH4.14, LH4.15, LH5.12, LT6.1, LT6.3, LT6.4, LH6.1, LH6.3, LH6.6**
 |
| * The names and properties of common 2d and 3d shapes and the associated vocabulary – declarative knowledge and developing associated schema. **LH1.2, LT3.5, LT3.7**
 | * Implement a problem-solving culture into every mathematics lesson where pupils are engaged by the challenge and demonstrate resilience.- conditional knowledge. This should be consolidated whilst on professional practice. **LT1.1, LT1.2, LT3.2, LT7.4**
 |
| * The advantages of talk and language in mathematics lessons. **LT4.7**
 | * Identify their developmental needs as mathematical educators and independently address these. This will be consolidated whilst on professional practice.
 |
| * That teachers can influence pupils’ resilience and beliefs about their ability to succeed, by ensuring all pupils have the opportunity to experience meaningful success in mathematics avoiding Maths Anxiety (key research here) **LT1.1, LT1.2**
 | * Plan and assess mathematics lessons involving number, calculation and geometry. This my be consolidated whilst on professional practice. **LH2.3, LH2.7, LH2.9, LT3.5, LH3.3, LH3.7, LH3.8, LT6.1, LT6.3, LT6.4, LH6.1, LH6.3**
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| * The cognitive factors leading to mathematical difficulties. **LT2.4**.
 | * Promote resilience and perseverance when problem solving, whist considering the role of long term memory, working memory and CLT- conditional knowledge. This should be consolidated whilst on professional practice. **LT1.1, LT1.2, LT7.4**
 |
| * Polya’s 4 step process for problem solving.
 |
| **Trainees will understand:**  |
| * The three aims of the mathematics curriculum and how they relate to each other.**LT3.1**
 |
| * The term fluency in relation to mathematical progression and the declarative and procedural knowledge associated with number and calculation. **LT3.1, LT3.3, LT3.5, LH3.11**
 |
| * The progression sequence through calculation and place value. **LT2.2, LT2.6, LH2.3, LH2.7, LT3.7**
 |
| * Fluency is not just rapid number recall it is developing a sense of number.**LT2.5, LH3.11**
 |
| * There are specific areas of mathematics that do require mental recall – number bonds, times tables and how this links to working memory and long term memory.**LT2.3, LT2.4, LT2.5, LH3.11**
 |
| * There is specific technical vocabulary used within counting, place value, calculation and statistics**. LH1.2**
 |
| * That mental strategies inform the informal and formal written strategies to calculation – procedural knowledge **LT2.6, LH2.7, LT3.5, LT3.7, LH3.8, LT4.2**
 |
| * What constitutes mathematical reasoning
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| * Develop an understanding of mathematical mindset in relation to the work by Carol Dweck and more recently, Jo Boaler. **LT2.1**
 |
| * The Concrete, Pictorial, Abstract (CPA) approach, in relation to Bruner’s principles of enactive, iconic, symbolic and the value of dual coding. **LH3.12, LT4.3**
 |
| * The conditional knowledge required by pupils to reason mathematically and problem solve in relation to number and calculation**. LT2.1, LH2.7, LT4.2**
 |
| * The progression sequence through Fractions, Decimals and Percentages (FDP) **LH2.3**
 |
| * There is specific technical vocabulary used within fractions, decimals and percentages, and geometry, **LH1.2**
 |
| * The concept of procedural and conceptual variation.
 |
| * How subitising can support the development of counting skills. **LT2.2, LT3.5**
 |
| * There are a number of types of problem solving, not just word problems.
 |
| * There are a number of skills required to become an efficient problem solver. **LH2.3, LT3.5**
 |
| * There are different stages to the problem-solving process.
 |
| * The conditional knowledge required by pupils to reason mathematically and problem solve across all areas of the mathematics curriculum.**LT2.7, LT3.7, LT4.2**
 |
| * How their own mathematical schema have developed over time, particularly in relation to calculation strategies. **LT2.9, LT3.7**
 |
| * The term “maths anxiety” in relation to cognitive load theory and the possible impact on learning and progress. **LT1.1, LT1.2**
 |
|  | **Composite knowledge / understanding / skills***By the end of this phase trainees will* ***know:**** A range of strategies to support pupil understanding of how to calculate successfully, using mental, informal and formal written methods, including the relevant declarative and procedural knowledge associated with number and calculation. **LT2.2, LT2.7, LT2.8, LT2.9, LH2.3, LH2.7, LH2.9, LT3.3, LT3.5, LT3.7, LH3.8, LT4.2, LH4.3**
* Common misconceptions within number, place value, calculation and geometry. **LH1.3**
* The relevant declarative and procedural knowledge associated with extended number and geometry. **LH1.3, LT3.4, LT3.5, LT4.2, LH4.3, LH6.4**

*By the end of this phase trainees will* ***understand:**** That a secure knowledge of place value underpins the ability to calculate both mentally and use formal written methods and the role of long term and working memory in this process. **LT2.2, LT2.6, LT2.7, LT2.8, LT2.9, LH2.3, LH2.7, LT3.2, LT3.7, LH3.7, LH3.8, LT4.2**
* How to address common misconceptions related to number, place value and calculation and strategies to address these, including support with cognitive overload. **LH1.3, LT2.6, LH2.6, LT3.4, LH6.4, LH6.5, LH6.7**

*By the end of this phase trainees will* ***be able to:**** Model effective practice in the teaching of number and calculation. **LH2.9, LH3.3, LH3.7, LT6.1, LT6.3, LT6.4**
 | **Assessment pertaining to phase 1*** Assessment will take the form of NNC at the start of the phase.
* Assessment in each session through peer discussions, tutor questioning, peer modelling. Common misconceptions are built into each session. The importance of working memory and long term memory are discussed in relation to students own experiences as well as in relation to the pupils they will teach.

Assessed in the end of phase interim ASK through paired modelling task and tutor – led discussion. |
| **Research, literature and resources supporting the curriculum design of Phase 1.** | * **Mathematics explained for primary teachers (6th Edition), Derek Haylock & Ralph Manning, 2019**
* **Research Review: Mathematics, Ofsted, 2021**
* **Ready to Progress materials, DfE and NCETM, 2020**
* **NCETM Progression maps, NCETM, 2021**
* **NCETM videos**
* **NCETM Mastery materials**
* **CPA approach as proposed by Jerome Bruner 1966**
* **National Curriculum, 2014**
* **Nrich website**
* **The effects of maths anxiety in primary students, Theodosia Prodromou & Nick Frederickson, 2018**
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| **Phase 2****(School-led – Professional Practice 1)***\*Trainees will observe, discuss, apply and secure the knowledge, understanding and skills developed at Phase 1 and will add the following…* | **Trainees will know:**  | **Trainees will be able to:** |
| * The key elements required to plan, teach and assess a sequence of lessons developing both conceptual and procedural understanding of number, including counting, place value and both mental and written calculation. **LH2.3, LH2.7, LH2.9, LT3.5, LH3.3, LH3.7, LH3.8, LT6.1, LT6.3, LT6.4, LH6.1, LH6.3**
 | * plan, teach and assess a sequence of lessons developing both conceptual and procedural understanding of number, including counting, place value and both mental and written calculation.This may be consolidated whilst on professional practice **LH2.3, LH2.7, LH2.9, LT3.5, LH3.3, LH3.7, LH3.8, LT6.1, LT6.3, LT6.4, LH6.1, LH6.3**
 |
| * Mathematics specific vocabulary in relation to calculation, number facts, counting and place value. **LH1.2**
 | * plan to utilise appropriate concrete and visual resources to support number sense and a conceptual understanding of calculation strategies considering the CPA approach. This may be consolidated whilst on professional practice.**LH2.3, LH2.9, LH3.12, LT4.3, LH4.8, LH5.9**
 |
| * How to use appropriate concrete and visual resources to support number sense and a conceptual understanding of calculation strategies considering the CPA approach. **LH3.12, LT4.3**
 | * promote the use of mathematics specific vocabulary in relation to calculation, number facts, counting and place value.
 |
| * How to promote a mathematical mindset for pupils irrespective of background or ability. **LT2.1**
 | * Plan for pupils to have opportunities to learn and develop reasoning skills by including a variety of teaching and learning approaches.- conditional knowledge. This will be consolidated whilst on professional practice.**LT2.7, LH2.8, LT3.5, LH3.3, LH4.1**
 |
| * The conditional knowledge required by pupils to reason mathematically and problem solve in relation to number and calculation**. LT2.1, LH2.7, LT4.2**
 | * Assess reasoning skills through a use of formative assessment strategies adapted to the needs of each pupil. This will be consolidated whilst on professional practice.**LH2.8, LT3.5, LT4.6, LH4.14, LH4.15, LH5.12, LT6.1, LT6.3, LT6.4, LH6.1, LH6.3, LH6.6**
 |
| * How to assess reasoning skills through questioning, observation and scaffolded conversations. **LH2.8, LT3.5, LT4.6, LH4.14, LH4.15, LH5.12, LT6.1, LT6.3, LT6.4, LH6.1, LH6.3, LH6.6**
 |
| * The 5 big ideas to promote the teaching of Mastery (NCETM). **LT3.3**
 | * Plan and assess using a mastery approach, supported by the NCETM materials. This may be consolidated whilst on professional practice.**LT2.8, LH2.3, LH2.8, LH2.9, LT3.3, LH3.3, LH3.4, LH3.7, LH4.1, LT6.1, LT6.3, LT6.4, LH6.1, LH6.3, LH8.3**
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| * Mastery is misunderstood and not all teachers are clear about it what it actually means.**LT3.3**
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| * Mastery was popularised after its success in East Asia, but it was explicitly based on theories from around the world.
* **LT3.3**
 |
| **Trainees will understand:**  |
| * Collaborative learning and mathematical dialogue are effective approaches to developing reasoning skills and present effective assessment opportunities.**LT3.5, LT6.1, LT6.3, LT6.4**
 |
| * The purpose and presentation of the Multiplication Tables Check (MTC) – declarative knowledge **LT3.3, LT3.5, LH3.11**
 |
| * There are different forms of questioning that can elicit different response. **LT4.6, LH4.14, LH4.15, LH5.12**
 |
| * There is specific vocabulary associated with reasoning that will develop as children progress through the curriculum. **LH1.2**
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|  | **Composite knowledge / understanding / skills***By the end of this phase trainees will* ***know:**** The key components of a successful mathematics lesson.

*By the end of this phase trainees will* ***understand:*** * The value of questioning as an assessment tool and the value of talk and collaborative work to reduce cognitive load and develop working memory. **LT1.1, LT1.2, LH1.2, LT3.2, LT4.7, LT7.4,**
* How to build in opportunities to revisit learning ie links to place value and written calculation and consider the implications for long term memory. **LT2.4, LT2.8, LH2.11, LH3.10**

*By the end of this phase trainees will be* ***able to:*** * Confidently plan, teach and assess a high-quality number (counting, place value, calculation) lesson, that takes into account common misconceptions and formative assessment strategies. **LH1.3, LH2.8, LH2.9, LT3.4, LH3.3, LH4.1, LH6.4**

Confidently model and scaffold learning to support cognitive load. **LT2.4, LT2.8, LH2.11, LH3.10** | **Assessment pertaining to phase 2**Assessed throughout Professional Practice 1. Lesson observations, weekly development meetings and weekly focus tasks. |
| **Research, literature and resources supporting the curriculum design of Phase 2.** | * **Mathematics explained for primary teachers (6th Edition), Derek Haylock & Ralph Manning, 2019**
* **Research Review: Mathematics, Ofsted, 2021**
* **Ready to Progress materials, DfE and NCETM, 2020**
* **NCETM Progression maps, NCETM, 2021**
* **NCETM videos**
* **NCETM Mastery materials**
* **CPA approach as proposed by Jerome Bruner 1966**
* **National Curriculum, 2014**
* **Nrich website**
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| **Phase 3****(University-led)***\*Trainees will review the knowledge, understanding and skills developed at Phases 1 and 2, and will add the following…* | **Trainees will know:**  | **Trainees will be able to:** |
| * How to apply their previous knowledge to link different areas and skills of mathematics - conditional knowledge **LT2.2, LT3.5, LT4.2**
 | * Plan, teach and assess a sequence of lessons following a mastery approach, developing both conceptual and procedural understanding of all areas of the mathematics curriculum. This may be consolidated whilst on professional practice.**LT2.8, LH2.3, LH2.8, LH2.9, LT3.3, LH3.3, LH3.4, LH3.7, LH4.1, LT6.1, LT6.3, LT6.4, LH6.1, LH6.3, LH8.3**
 |
| * Conversion procedures for common measurements.- procedural knowledge **LT2.2, LT3.5**
 |
| * The declarative and procedural subject knowledge required to plan, teach and assess the following areas effectively and confidently: measure, statistics and algebra. **LH1.2, LH2.3, LT3.5, LT4.2**
 |
| **Trainees will understand:**  |
| * The progression sequence for measure, statistics and algebra. **LH2.3**
 |
| * There is specific technical vocabulary used within statistics, measure and algebra. **LH1.2**
 |
| * The terms transitivity and conservation and how to use these concepts to assess children’s basic understanding of measure.
 |
|  | **Composite knowledge / understanding / skills***By the end of this phase trainees will* ***know:**** A range of strategies to support pupil understanding across all areas of the primary mathematics curriculum, including the relevant declarative and procedural knowledge. **LT2.2, LT2.7, LT2.8, LT2.9, LH2.3, LH2.7, LH2.9, LT3.3, LT3.5, LT3.7, LH3.8, LT4.2, LH4.3**
* Common misconceptions within measure, statistics, algebra. **LH1.3**
* The relevant declarative and procedural knowledge associated with extended number and geometry. **LH1.3, LT3.4, LT3.5, LT4.2, LH4.3, LH6.4**

*By the end of this phase trainees will* ***understand:**** How to address common misconceptions across all areas of the primary mathematics curriculum and strategies to address these, including support with cognitive overload. **LH1.3, LT2.6, LH2.6, LT3.4, LH6.4, LH6.5, LH6.7**
* The meaning of the term mathematics mastery**.LT3.3**
* How to adapt their mathematics teaching to meet the needs of all pupils. **LT1.3, LT5.1, LT5.2, LT5.3, LT5.7, LH5.2**

*By the end of this phase trainees will be* ***able to:*** * Verbalise their approaches to teaching mathematics effectively across all curriculum areas, including consideration for equality and diversity. **LT1.3, LT5.1, LT5.2, LT5.3, LT5.7, LH5.2**
 | **Assessment pertaining to phase 3**Assessed in final taught session through peer discussions, tutor questioning, peer modelling. Common misconceptions are built into each session. The importance of working memory and long term memory are discussed in relation to students own experiences as well as in relation to the pupils they will teach.Algebra and statistics will be synchronous online sessions during PP1. Whilst engagement with the session cannot be as closely monitored, questions in ASK will pick up on the trainees’ knowledge and understanding.Assessed in the final session end of module ASK, through group and tutor discussions, with evidence provided in EP if appropriate. |
| **Research, literature and resources supporting the curriculum design of Phase 3.** | * **Children’s errors in mathematics, Alice Hansen, 2020**
* **Mathematics explained for primary teachers (6th Edition), Derek Haylock & Ralph Manning, 2019**
* **Research Review: Mathematics, Ofsted, 2021**
* **Ready to Progress materials, DfE and NCETM, 2020**
* **NCETM Progression maps, NCETM, 2021**
* **NCETM videos**
* **NCETM Mastery materials**
* **CPA approach as proposed by Jerome Bruner 1966**
* **National Curriculum, 2014**
* **Nrich website**
* **The effects of maths anxiety in primary students, Theodosia Prodromou & Nick Frederickson, 2018**
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| **Phase 4** **(School-led – Professional Practice 2)***\*Trainees will observe, discuss, apply and secure the knowledge, understanding and skills developed at Phases 1, 2 and 3, and will add the following…* | **Trainees will know:**  | **Trainees will be able to:** |
| * How to plan, teach and assess a sequence of lessons developing both conceptual and procedural understanding across all maths curriculum areas appropriate to the key stage they are placed in. **LH2.3, LH2.7, LH2.9, LT3.5, LH3.3, LH3.7, LH3.8, LT6.1, LT6.3, LT6.4, LH6.1, LH6.3**
 | * Plan and assess a sequence of lessons appropriate to the key stage they are placed in, using a mastery approach, supported by the NCETM materials or similar. This should be consolidated whilst on professional practice.**LT2.7, LH2.3, LH2.9, LH3.3, LH3.4, LH3.7, LH4.1, LH5.6, LT6.1, LT6.3, LT6.4, LH6.1, LH6.3**
 |
| * Plan, teach and assess a sequence of lessons following a mastery approach appropriate to the key stage they are placed in. **LT2.7, LH2.3, LH2.9, LH3.3, LH3.4, LH3.7, LH4.1, LH5.6, LT6.1, LT6.3, LT6.4, LH6.1, LH6.3**
 | * Promote resilience and perseverance when problem solving, whist considering the role of long term memory, working memory and CLT- conditional knowledge. This should be consolidated whilst on professional practice. **LT2.3, LT2.4, LT2.5, LT2.7, LT7.4**
 |
| * How to promote the use of mathematics specific vocabulary across all areas of mathematics appropriate to the key stage they are placed in .
 | * Plan a sequence of lessons that take into account spaced learning and consider appropriate points to revisit knowledge and check understanding. **LT2.4, LT2.8, LH2.11, LH3.10**
 |
| * How to plan for pupils to have opportunities to learn and develop reasoning across the mathematics curriculum appropriate to the key stage they are placed in, by including a variety of teaching and learning approaches.- conditional knowledge **LT2.7, LH2.8, LT3.5, LH3.3, LH4.1**
 |
| * How to plan and assess using a mastery approach, supported by the NCETM materials or similar, appropriate to the key stage they are placed in. **LT2.8, LH2.3, LH2.8, LH2.9, LT3.3, LH3.3, LH3.4, LH3.7, LH4.1, LT6.1, LT6.3, LT6.4, LH6.1, LH6.3, LH8.3**
 |
| **Trainees will understand:** |
| * Mastery is an approach to teaching mathematics ensuring all children achieve to their full potential.
 |
| * Spaced learning can benefit cognitive load, working memory and long term memory. **LT2.4, LT2.8, LH2.11, LH3.10**
 |
|  | **Composite knowledge / understanding / skills***By the end of this phase trainees will* ***know:**** How to plan, teach assess, lessons across all areas of the mathematics curriculum, taking into account prior learning and the needs of all pupils. **LT3.5, LH3.3, LH4.1, LT6.1, LT6.3, LT6.4**

*By the end of this phase trainees will* ***understand:*** * The declarative and procedural knowledge pertinent to each child developing an ability to relate mathematics to real life and to problem solve. **LT2.2, LH2.3, LH2.7, LT3.3, LT3.5, LT4.2, LT6.1, LT6.3, LT6.4**

*By the end of this phase trainees will be* ***able to:*** * Confidently and effectively plan, teach and assess children’s mathematics skills and understanding through a series of lessons using a mastery approach. demonstrating the elements of good practice indicated in the EHU ‘Lesson Observation Prompts’, and adjusting plans in response to assessment. **LT3.5, LH3.3, LH4.1, LT6.1, LT6.3, LT6.4**
 | **Assessment pertaining to phase 4**Assessed throughout Professional Practice 2. Lesson observations, weekly development meetings and weekly focus tasks. |
| **Research, literature and resources supporting the curriculum design of Phase 4.** | * **Children’s errors in mathematics, Alice Hansen, 2020**
* **Mathematics explained for primary teachers (6th Edition), Derek Haylock & Ralph Manning, 2019**
* **Research Review: Mathematics, Ofsted, 2021**
* **Ready to Progress materials, DfE and NCETM, 2020**
* **NCETM Progression maps, NCETM, 2021**
* **NCETM videos**
* **NCETM Mastery materials**
* **CPA approach as proposed by Jerome Bruner 1966**
* **National Curriculum, 2014**
* **Nrich website**
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| **Phase 5****(University-led)***\*Trainees will review the knowledge, understanding and skills developed at Phases 1, 2, 3 and 4, and will add the following…* | **Trainees will know:**  | **Trainees will be able to:** |
| * How to adapt their mathematics teaching to meet the needs of all pupils. **LT2.3, LT2.4, LT2.5, LT2.7, LT7.4**
 | * Continue to keep in touch with developments in mathematics through engagement with Maths Hubs and Maths Associations.
 |
| * A range of strategies to challenge children at all levels and abilities. **LT2.3, LT2.4, LT2.5, LT2.7, LT7.4**
 |
| * How to promote an enthusiasm for mathematics and engage children in their learning.
 |
| **Trainees will understand:** |
| * How the Ofsted Inspection Framework influences planning and teaching in Mathematics
 |
| * The link between social justice and elements of the mathematics curriculum, ie understanding of money
 |
|  | **Composite knowledge / understanding / skills***By the end of this phase trainees will* ***know:**** The features of effective teaching and learning in mathematics.

*By the end of this phase trainees will* ***understand:*** * Issues that can impact on mathematics learning and understanding, ie maths anxiety, dyscalculia.

*By the end of this phase trainees will be* ***able to:*** * Plan and teach an effective sequence of learning in mathematics, which is informed by assessment of prior learning, uses specific mathematics pedagogies to facilitate progression in subject knowledge, integrates formative assessment and is appropriate to the needs of the learners. **LT3.5, LH3.3, LH4.1, LT6.1, LT6.3, LT6.4**
 | **Assessment pertaining to phase 5** |
| **Research, literature and resources supporting the curriculum design of Phase 5.** | * **Mathematics explained for primary teachers (6th Edition), Derek Haylock & Ralph Manning, 2019**
* **Research Review: Mathematics, Ofsted, 2021**
* **Ready to Progress materials, DfE and NCETM, 2020**
* **NCETM Progression maps, NCETM, 2021**
* **NCETM videos**
* **NCETM Mastery materials**
* **CPA approach as proposed by Jerome Bruner 1966**
* **National Curriculum, 2014**
* **Nrich website**
 |