Early Years Initial Teacher Education Curriculum Plan – Mathematics Undergraduate Programme

Curriculum Intent
Through our Initial Teacher Education Curriculum, it is our intention that all Edge Hill Primary Early Years trainees will address the seven key feature of effective practice : • Believe that children can be successful mathematicians, regardless of social background or other circumstances and that this is their moral purpose as educators • Understand that children explore many mathematical concepts in their play some of which will not be actively taught until a later age phase • That young children are naturally curious and will experience many opportunities for problem solving during their play • Develop their confidence and promote an enthusiasm and passion for mathematics through supporting both adult-led and child-initiated play • Understand that mathematics is the route to developing both accurate and fluent numeracy skills and the importance of this in everyday life skills • Understand the purpose of the three mathematics curriculum aims and how these can be addressed for all areas of the mathematics curriculum (planning, teaching, assessment) • Understand that pedagogical decisions are supported by robust evidence • Promote the development of mastery throughout the mathematics curriculum

Phase	Learn that….	Learn how to….
Phase 1	**Trainees will know:** • All children are unique and bring different mathematical skills to their school experience • It is important to develop a positive attitude to mathematics and to engage purposively in children's mathematical play	**Trainees will be able to:** • Observe children's mathematical play and extract the knowledge, understanding and misconceptions demonstrated • Intervene sensitively in play to extend learning and mathematical vocabulary

	• It is important that the environment is enabled to promote mathematical exploration, discussion and problem solving • It is important for children to have a strong grounding in number • Children need to develop number sense and move from counting strategies through reasoning strategies to retrieval and application • Children's mathematical play can encounter a range of more complex concepts including area, perimeter, congruency, similarity and translations • Shape and space play an important role in young children's surroundings and play • Effective problem solving requires the building up of a 'problem solving toolbelt' • The characteristics of effective learning are visible in children's mathematical play and promote mathematical reasoning **Trainees will understand**	• Plan for mathematical enhancements to areas of provision including structuring and modelling resources for a range of differing needs • Plan adult led experiences that develop and secure children's understanding of the counting principles. • Observe for misconceptions in counting and how these might be addressed through adult support • Plan enhancements to areas of provision that allow children to practice the counting principles • Plan a range of activities that enable children to develop number sense to 10 • Promote higher level concepts in continuous provision planning so that young children have practical experience of these. For example, using a set of cutters to promote congruency and similarity when playing in the malleable area of provision • Plan appropriate play opportunities around shape and space promoting mathematical language • Use Polya and Dewey's problem solving cycles to plan for and scaffold children's mathematical problem solving during play • Plan,teach, scaffold and assess children's mathematical reasoning during both adult led and child initiated play **Composite knowledge/ understanding/skills** At the end of this phase students will **know**:

	• The 3 aims and how they relate to each other and early years pedagogy • The term fluency in relation to early mathematical progression • The progression sequence through counting and early calculation • How subitising can support the development of counting skills • Fluency is not just rapid recall it is developing a sense of number • There are specific areas of mathematics that do require mental recall (number bonds) • There is specific technical vocabulary used within counting, early calculation and shape • What constitutes mathematical reasoning • Mastery is an approach to teaching mathematics ensuring all children are achieving • How mathematical play and adult led activities can be adapted for children with differing needs • The advantages of promoting mathematical talk in both adult led and child initiated play	• A range of strategies to support children's mathematical play At the end of this phase students will **understand:** • The importance of counting and early calculation as the foundations of number At the end of this phase students will **be able to**: • Plan, teach and assess high quality mathematical opportunities for both adult led and child initiated play
Phase 2	**Trainees will know:** • The subject knowledge required to plan, teach and assess the Key Stage 1 programme of study for mathematics. This will include varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge accurately and rapidly • The concrete, pictorial, abstract approach in relation to Bruner's principles of enactive, iconic and symbolic • Children may transition from EYFS to Key Stage 1 with varying needs mathematically • The difference between an error and a misconception	**Trainees will be able to:** • Plan, teach and assess a sequence of lessons following a mastery approach • Plan teach and assess a guided group session • Plan for pupils to have opportunities to learn and develop reasoning skills by including a variety of teaching and learning approaches • Assess reasoning skills through questioning, observation and scaffolded conversations • Implement a problem solving culture into every mathematics lesson where pupils are engaged by the challenges and demonstrate resilience

	• Strategies for addressing common errors and misconceptions across all areas of the Key Stage 1 mathematics curriculum • The structures of addition, subtraction, multiplication and division • The properties of common 2d and 3d shapes and the associated vocabulary • Van Hiele's levels of geometric thinking • The difference between non standard and standard measures • The 5 big ideas to promote the teaching of mastery (NCETM) **Trainees will understand** • The progression sequence though EYFS and Key Stage 1 for: counting, place value, calculation, geometry, measures and statistics • There is specific technical vocabulary used within number, geometry, measures and statistics • The difference between tiling and iteration and the implications for measuring accurately • The terms transitivity and conservation and how to use these concepts to assess children's basic understanding of measures • The concept of procedural and conceptual variation • Collaborative learning and mathematical dialogue are effective approaches to developing reasoning skills and present effective assessment opportunities • There are different forms of questioning that can elicit different responses • There is specific vocabulary associated with reasoning that will develop as children progress • There are a number of types of problem solving not just word problems	• Adapt the teaching of mathematics to meet the needs of children with SEND and those that have EAL **Composite knowledge/ understanding/skills** At the end of this phase students will **know**: • Common errors and misconceptions across all areas of the Key Stage 1 mathematics curriculum At the end of this phase students will **understand:** • How to model mathematical concepts with the aim of addressing common errors and misconceptions At the end of this phase students will **be able to**: • Plan, teach and assess a series of lessons that build children's understanding of mathematical concepts in a secure manner

	• There are a number of skills required to become an efficient problem solver • There are different stages to the problem solving process which is cyclical in nature	
Phase 3	Trainees will know: • Mastery is misunderstood and not all teachers are clear about what it actually means • Mastery was popularised after its success in East Asia but it was explicitly based on theories around the world • How to apply their previous knowledge to link different areas and skills of mathematics • The difference between a working wall and a passive display • The cognitive factors leading to mathematical difficulties Trainees will understand: • The value of the graphical representations children produce and how these demonstrate development from early years through to primary • The advantages of creating a mathematics working wall • The importance of supporting parents and how to engage them effectively	Trainees will be able to: • Plan, teach and assess creative and engaging mathematics lessons • Engage parents in their child's mathematical development • Plan for pupils to have opportunity to learn and develop reasoning skills by including a variety of teaching and learning a